

W.D.B. WARBROEK

# THE GRASSROOTS ENERGY TRANSITION

THE SUCCES AND GOVERNANCE OF  
LOCAL LOW-CARBON ENERGY INITIATIVES



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*THE SUCCESS AND GOVERNANCE OF LOCAL  
LOW-CARBON ENERGY INITIATIVES*


DISSERTATION

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on the authority of the rector magnificus,  
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by

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## Acknowledgements

*This PhD research truly has been a journey in many respects.*

In my search for suitable theoretical frameworks to understand citizen initiatives in the energy transition, I encountered many strands of literature and inspiring authors. There were times that I thought that I finally found the suitable concept or proposition that could effectively grasp the reality of these local low-carbon energy initiatives. The next day, reading back my notes, I was not quite so sure about my ideas that I wrote down the day before. This iterative process characterized my research endeavour, and I believe, characterizes the very essence of conducting sound research. For me, research very much shows resemblance with weightlifting, a sport that I have been practicing before I started my academic career. In weightlifting, this iterative process is found in the continued back and forth between working the weights that your body is used to, and trying to beat your personal record by putting on a little more weight on the barbell. Perhaps this is why my theoretical frameworks that I have developed are quite extensive.

Just as weightlifting, writing a PhD thesis can be quite unforgiving. Lifting weights for years can be undone by a regular flu or a period in which there is simply not enough time to visit the gym. Of course, it is a matter of weeks before one is back at his old level. But still, getting back at that old level and also exceeding it requires quite some motivation and discipline. The same goes for writing a dissertation. Without discipline, motivation, and a continuous effort to finalize the job that you started, a PhD thesis will never get to see a public defence. Finishing and defending a PhD thesis and lifting weights are two endeavours that does not come easy. Perhaps this is why I somehow enjoy(ed) both of them so much.

Lifting weights and writing a PhD thesis are both very much solitary undertakings. Every barbell that I deadlifted, squatted or bench-pressed, I did so myself. Still, at times that I wanted to beat my personal record (i.e. put a little more weight on the barbell), I asked my gym buddy to assist me while doing the routine. Sometimes, my gym buddy will help just enough so that my momentum during the squat, deadlift or bench-press is maintained. The same principle goes for writing a PhD thesis. I myself searched for useful theoretical frameworks, combined them into a new ones, conceptualized concepts, and analysed my data. But at crucial times, my supervisors provided support. It is therefore here that I would like to express my gratitude to my supervisors Hans Bressers, Thomas Hoppe and Frans Coenen. Here, I would also like to thank my colleagues at CSTM for all the interesting discussions, lunch walks, and coffee moments that we had.

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# Chapter 1

## Introduction



## 1.1 Background

A daunting challenge stands before humanity: climate change. Throughout recent history, world leaders, politicians and policymakers have tried to find common ground for the means and pathways for combating global warming. Supranational efforts to tackle this vexing challenge have started more than three decades ago. Already in 1987, the Brundtland Commission gave meaning to the term sustainable development: “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland *et al.*, 1987, p. 24). As such, the process of sustainable development is unequivocally connected to tackling climate change. In 1992, countries that participated in the Rio Summit agreed on two important issues: the adoption of the United Nations Framework Convention on Climate Change and the implementation of Agenda 21. At this point, it was acknowledged that greenhouse gas emissions need to be stabilized in order to prevent dangerous anthropogenic interference with the climate system. With the adoption of ‘Local Agenda 21’, or ‘LA21’, it was recognized that local governments have a crucial role in furthering sustainable development. A couple of decades later during the twenty-first session of the Conference of the Parties (COP21), it was acknowledged in the Paris Agreement that non-state actors are key players in the transition towards low-carbon economies and societies. As such, the challenge to keep global warming within two degrees necessitates action from various actors on different levels, scales and domains.

An important means for climate change mitigation is the generation of low-carbon energy as an alternative to fossil fuels and to reduce CO<sub>2</sub> emissions. Despite these supranational action in the fight against climate change, in 2018 global energy-related CO<sub>2</sub> emissions increased by 1,7% to 33,1 gigatons (International Energy Agency, 2019).

Against this backdrop, initiatives comprising of groups of citizens that want to take matters into their own hands by generating low-carbon energy in their local environment have been booming throughout Western-Europe in recent years (Kooij *et al.*, 2018; Oteman, Wiering, & Helderma, 2014; G. Seyfang, Park, & Smith, 2013; Yildiz *et al.*, 2015). In Germany in the second half of the 2000s, the number of citizen energy production cooperatives increased rapidly: from 4 solar energy cooperatives in 2007 to over 200 by 2010 (Oteman *et al.*, 2014), with at least more than 600 newly formed citizen energy cooperatives in total in 2013 (Yildiz *et al.*, 2015). It is estimated that in Denmark in 2017, 20% of the installed wind energy capacity is owned by citizen cooperatives, farmers and local landowners (Kooij *et al.*, 2018). In 2010, collective citizen initiatives accounted for around 40-50% of total installed wind energy capacity in Austria (Schreuer, 2016). According to REScoop.eu, Europe is now home to over 1500 energy cooperatives, which amount to over one million members (REScoop.EU, 2019a). Although these citizen initiatives have received less scholarly attention in the US (US Community Energy, 2018), Klein and Coffey (2016) compiled several databases related to LLCEIs in the US into one central database and identified more than 5,000 completed community energy projects. The Netherlands is no exception, where energy cooperatives have also been proliferating from 70 LLCEIs in 2012 to 484 LLCEIs in 2018 (Schwencke, 2018). International success stories are for instance Klimakommune Saerbeck (Germany) where



the Bioenergy Park which is partially owned by local citizens and produces 29 MW, which is 275% more renewable energy than Saerbeck actually needs (Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015) or the Danish island of Samsø, which transformed large parts of its energy system with active citizen participation and managed to raise the low-carbon energy share from 13% to 75-80% within 10 years (Sperling, 2017, p. 888). In this dissertation, these initiatives are referred to as Local Low-Carbon Energy Initiatives (LLCEIs), which involve the bottom-up initiating and ownership of a project or series of projects involving the generation, stimulation and/or facilitation of low-carbon energy and/or energy efficiency by citizens/actors from civil society on a local scale. It is argued that the energy transition is manifesting itself in a disruptive way at the community level, vouching for the importance of the involvement of local level actors in reshaping the energy system (Dütschke & Wesche, 2018).

On 14 June 2018 the European Parliament and the Council finally reached a political agreement on rules for how Europe will roll out renewable energy over the next decade. The EU now has a binding objective of increasing renewables by 32% by 2030, with the possibility to review the target in 2023 in order to revise it upward. This presents an unprecedented development as the revised EU Renewables Directive provides explicit and well-defined roles for citizens and communities. Amongst others, it contains definitions of ‘renewable energy communities’ and ‘self-consumption’. Next to setting strong definitions the Directive provides rights and a basis for EU Member States to develop national legislation and regulatory frameworks to acknowledge, govern and support renewable energy communities and self-consumers (i.e. ‘pro-sumers’). This includes taking into account renewable energy communities in national renewable energy support schemes, improved collaboration between the latter and local authorities, and supporting and strengthening the role of renewable energy communities in helping (socio-economic) vulnerable customers and alleviation of poverty (REScoop.EU, 2019b). Thus, at least for LLCEIs in Europe, there seems to be a role for them in the energy transition.

### *1.1.1 The Role of LLCEIs in the Energy Transition*

Often referred to in the literature as ‘community renewable energy’ (Rogers, Simmons, Convery, & Weatherall, 2008; Walker & Devine-Wright, 2008; Walker, Devine-Wright, Hunter, High, & Evans, 2010) or ‘grassroots innovations’ (Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014; Smith, Hargreaves, Hielscher, Martiskainen, & Seyfang, 2015), LLCEIs do not solely amount to the Megawatts worth of low-carbon energy they generate or the reduction in energy demand and CO<sub>2</sub> emissions they effectuate. Indeed, the true value of LLCEIs as “small scale and bottom-up interventions, lies in more than just the sum of their parts” (Mulugetta, Jackson, & van der Horst, 2010, p. 7541). By their very nature, LLCEIs pursue what is often referred to as ‘social innovation’ (Maruyama, Nishikido, & Iida, 2007; Seyfang & Smith, 2007). Social innovation entails the satisfaction of previously unmet human needs; fosters changes in social relations, positions and rules between the involved stakeholders, especially with concern to governance; and increases the socio-political capability and access to resources (Moulaert, Martinelli, Swyngedouw, & González, 2005, p. 1976). Within the

context of the transition towards low-carbon economies and societies, LLCEIs as processes of social innovation invoke changes in actor configurations and resource access within the energy system. Instead of a centralized, private oriented and integrated energy system, LLCEIs envision a more localized, community-oriented energy system with more autonomy and a greater role for civic participation and influence (Arentsen & Bellekom, 2014; Foxon, 2013; Hall, Foxon, & Bolton, 2014). Foxon (2013) sees this as a ‘Thousand Flowers’ transition pathway towards a low-carbon electricity system that is dominated by a civil society logic.

Small-scale distributed generation and greater community ownership of generation characterize this pathway. Distributed generation – or small-scale electricity generation – holds the promise of a lower need for investments in expensive transportation and distribution infrastructures (Hoff, Wenger, & Farmer, 1996; Pepermans, Driesen, Haeseldonckx, Belmans, & D’haeseleer, 2005; van der Vleuten & Raven, 2006; Koepfel, 2003), while greater community participation and ownership is suggested to enhance the acceptance of low-carbon energy projects (Agterbosch, Meertens, & Vermeulen, 2009; Cowell, Bristow, & Munday, 2011; Gross, 2007; Musall & Kuik, 2011; Ruggiero, Onkila, & Kuittinen, 2014; Toke, Breukers, & Wolsink, 2008; Warren & McFadyen, 2010; Wolsink, 2007). Furthermore, benefits associated with LLCEIs include environmental (e.g., carbon reduction, energy saving); economic (lower energy bill, local economic regeneration, job creation); and social drivers (community cohesion, social and civic gratification) (Arentsen & Bellekom, 2014; Bomberg & McEwen, 2012; Boon & Dieperink, 2014; Dóci & Vasileiadou, 2015; Hoffman & High-Pippert, 2010; J.C. Rogers *et al.*, 2008; G. Seyfang *et al.*, 2013; van der Schoor & Scholtens, 2015). Additionally, studies have suggested LLCEIs to be effective contexts for behavioral change (Heiskanen, Johnson, Robinson, Vadovics, & Saastamoinen, 2010; Jennifer C. Rogers, Simmons, Convery, & Weatherall, 2012). As such, it becomes evident that in developing efforts directed at sustainable development and climate change mitigation, no single intervention can deliver the level of systemic change required to address climate change and energy security (Mulugetta *et al.*, 2010, p. 7541).

Importantly, Meadowcroft (2007, p. 302) argued that the governance for sustainable development implies a process of ‘societal self-steering’ in which society takes action to bring about change and is involved in the critical reflection on existing practices. LLCEIs embody this societal self-steering and challenge the status quo in numerous ways. The grassroots, activist nature of LLCEIs conflicts with existing practices, leading to vexing conundrums that require solving.

### *1.1.2 Clash with the Status Quo*

The objectives and modus operandi of LLCEIs clash with existing energy regimes and policy domains. Traditional actors – often called ‘incumbents’ – typically dominate the existing playing field, which favors corporate ownership and centralized, large-scale energy generation, supply and distribution over decentralized pathways and impedes the development of LLCEIs (Arentsen & Bellekom, 2014; Bauwens, Gotchev, &

Holstenkamp, 2016; Bergman & Eyre, 2011; Foxon, 2013; Kellett, 2007; Kooij *et al.*, 2018; Magnani & Osti, 2016; Nolden, 2013; Oteman *et al.*, 2014). This leads to ‘carbon lock-in’ (Unruh, 2000) in the domestic energy system in which incumbent actors only seek to optimize current systems through incremental change. At the same time, they develop defense and cooptation mechanisms to protect the system (and hence, their own interests) against potential market intruders (Geels 2002, Fuchs & Hinderer, Forrest & Wiek 2015 (Forrest & Wiek, 2015; Fuchs & Hinderer, 2014; Geels, 2002). As a consequence, they create persistent market and policy failures that block system/market entry by newcomers such as LLCEIs (Bergman *et al.*, 2009). This institutional lock-in inhibits system innovation that allows for the diffusion of low-carbon energy and distributed generation (Hamilton, Mayne, Parag, & Bergman, 2014; Mulugetta *et al.*, 2010; Nadaï *et al.*, 2015; Adrian Smith, Stirling, & Berkhout, 2005; Wolsink, 2012).

This discrepancy between the status quo and LLCEI practices typically gives rise to a number of problems. These involve inter alia difficulties associated with obtaining a connection to the grid (Blanchet, 2014; Fuchs & Hinderer, 2014; Ruggiero *et al.*, 2014); competing with large energy companies that dominate the market and have lobby strength (Kooij *et al.*, 2018; Nolden, 2013; Oteman, Kooij, & Wiering, 2017; Oteman *et al.*, 2014; Strachan, Cowell, Ellis, Sherry-Brennan, & Toke, 2015); archaic energy regulations and legislation (Magnani & Osti, 2016); and getting projects financed (Hall, Foxon, & Bolton, 2016; Koirala, Koliou, Friege, Hakvoort, & Herder, 2016; Nolden, 2013; Strachan *et al.*, 2015). Furthermore, studies have also observed that the existing institutional and policy frameworks and settings may impede on LLCEI development as well. The issues that arise here inter alia involve: unsuitable spatial planning regimes (Nolden, 2013; Strachan *et al.*, 2015); instable and uncertain policy frameworks (Ruggiero *et al.*, 2014); funding schemes that are difficult to access for community energy groups or do not match their aspirations or plans (Creamer, 2015; Dinnie & Holstead, 2017; Hall *et al.*, 2016; Nolden, 2013; Ruggiero *et al.*, 2014); problematic interactions with government bodies (Wüste & Schmuck, 2012); limited political support (Oteman *et al.*, 2017, 2014; Wüste & Schmuck, 2012); and limited access to policy makers and key decision-making forums (Bomberg & McEwen, 2012; Oteman *et al.*, 2017; Strachan *et al.*, 2015).

As a result, the apparent proliferation of LLCEIs is not to be taken for granted. The existing governance landscape greatly influences the further development of LLCEIs. Considering the abovementioned frictions, it is therefore no coincidence that scholars have been interested in the implications of social innovation for governance arrangements (Adams & Hess, 2010; Adams & Hess, 2008; Moolaert, Martinelli, Gonzalez, & Swyngedouw, 2007; Swyngedouw, 2005; Voorberg, Bekkers, & Tummers, 2015). Thus, shedding light into the interactive effects between LLCEIs and governance arrangements is crucial for understanding their further development.

### *1.1.3 The Increasing Role of Civil Society*

The abovementioned barriers predominantly relate to the socio-political acceptance by key stakeholders and policy makers of institutional changes and policies needed for

distributed generation (Warbroek & Hoppe, 2017). Socio-political acceptance is generated inter alia by the prevalence of strong institutional capacity and political commitment (Sovacool & Lakshmi Ratan, 2012). Crucially, LLCEIs as social innovations are likely to transform existing practices and discourses when they resonate with shifts in existing governance cultures or exogenous pressures promoting similar ideas and practices (González & Healey, 2005, p. 2067; Healey, 2006; Strachan *et al.*, 2015). This being said, governments increasingly engage in practices that emphasize the role of localities and civil society in processes of decision- and policymaking, as well as public service delivery (Bradley, 2014; Clarke & Cochrane, 2013; Hajer, 2011; Mitlin, 2008; Voorberg *et al.*, 2015; Walker, Hunter, Devine-Wright, Evans, & Fay, 2007; Wallace, 2010; Yetano, Royo, & Acerete, 2010; Rutland & Aylett, 2008).

Such shifts in governance culture can be observed in recent trends within the UK. UK central government pushes for devolution and localism, which involve the transfer of responsibilities and power to lower tiers of government and local communities (Strachan *et al.*, 2015). Similar sentiments can be observed in the Netherlands, with white papers setting out the principles of the ‘do-democracy’ (*doe-democratie*, author’s translation) (Ministry of the Interior and Kingdom Relations, 2013), or emerging notions such as the ‘participative society’ (*participatiesamenleving*, author’s translation) (House of Representatives, 2014), or the ‘energetic society’ (Hajer, 2011).

Against the underlying backdrop of citizen democratic disenchantment and political disengagement paired with tendencies of self-organization and bottom-up action on part of civil society throughout Western liberal democracies (Hasanov & Zuidema, 2018; Nederhand, Bekkers, & Voorberg, 2016; Mackenzie, 2018; Eder *et al.*, 2014; Koch, 2016), scholars have investigated emerging patterns of governance that reserve a greater role for civil society in processes of governing and public service delivery (Reddel, 2004; Swyngedouw, 2000; Mitchell, 2002; Hindess, 1997). Within this context, LLCEIs may be at the right time and place to generate socio-political acceptance in order to transform the status quo.

#### *1.1.4 Implications for Governance Arrangements*

The proliferation of LLCEIs inevitably has implications for the governance of the energy system. In essence, the transition of domains such as decentralized energy systems, emission reductions, and decarbonization necessitate a new governance system (Adil & Ko, 2016; Baldwin, Rountree, & Jock, 2018; Bolton & Foxon, 2015; Yaqoot, Diwan, & Kandpal, 2016), specifically, one that conveys polycentric characteristics (e.g. Jordan *et al.*, 2015). Ostrom (2010, p. 552) characterized polycentric governance as multiple governing units at different scales that function independently from each other and set rules and norms within a specific domain. Polycentric governance allows better for contextualization, experimentation and innovation to help arrive at solutions at multiple scales needed to govern a decentralized energy infrastructure (Goldthau, 2014). LLCEIs exemplify decentralized, local experiments that – if scaled up – have the potency to

destabilize such lock-in mechanisms and facilitate the energy transition (Seyfang & Smith, 2007; Beermann & Tews, 2017).

One of the core assumptions of this dissertation is that innovation in governance arrangements is key for the success of LLCEIs. Accordingly, LLCEIs potentially evoke the establishment of new place-based and scale-related ‘situative’ governance arrangements (Devine-Wright & Wiersma, 2013; Frantzeskaki, Avelino, & Loorbach, 2013; Fuchs & Hinderer, 2014; Head, 2007; Wade, Hamilton, Eyre, & Parag, 2013). Reason for this is that socially innovative practices such as LLCEIs are rooted in place-based needs and contexts (Baker & Mehmood, 2013, p. 327) and therefore predominantly interact with local actors (e.g. local government, companies, regional grid operators). National level actors such as national government, commonly shape the conditions of the playing field on a more general level (Bomberg & McEwen, 2012; Creamer, 2015; Fuchs & Hinderer, 2014; Nolden, 2013; Oteman *et al.*, 2014). The ability of LLCEIs to thrive is therefore crucially influenced by the role of local power constellations, unique spatial and scalar characteristics, the primacy of genuine ‘bottom-up’ engagement, and the existing set of technological options available (Devine-Wright & Wiersma, 2013, p. 1115; Fuchs & Hinderer, 2014; Head, 2007; Moss, Becker, & Naumann, 2014).

Various authors suggest that in particular subnational governments play a key role in addressing the frictions that emerge locally and in preventing that LLCEIs remain at the niche level – operating at the margins of the energy system (Foxon, 2013; Hoppe *et al.*, 2015; Magnani & Osti, 2016; Markantoni, 2016; Peters, Fudge, & Sinclair, 2010; J.C. Rogers *et al.*, 2008; Wade *et al.*, 2013). Thus, the future perspective of LLCEIs and their role in the energy system depend on the extent to which self-organizing processes of social innovation by LLCEIs are facilitated and guided by governments rather than through the exercise of governance (i.e., on roles played by non-state actors in governance mechanisms; e.g., self-governance by citizen-led organizations) alone (Burch, Shaw, Dale, & Robinson, 2014; Evans, Joas, Sundback, & Theobald, 2006; González & Healey, 2005; Hajer, 2011; Hawkins & Wang, 2012; Swyngedouw, 2005; Van Der Schoor, Van Lente, Scholtens, & Peine, 2016). State institutions and traditional forms of political authority persist and are still central in governance (Bell, Hindmoor, & Mols, 2010; Goetz, 2008; Hill & Lynn, 2005; Meadowcroft, 2007; Pierre & Peters, 2010). Specific capacities for governments to engage in are for instance innovations in governing, such as policy innovations and institutional adaptations. Bell *et al.* (2010) argue that within this context, governments are experimenting with new ways of governing that require the involvement of non-state actors (i.e. role played by government in governing governance). In this regard, governments are extensively involved in the self-organization of governance networks and selecting a balance between direct imperative coordination and indirect orchestration; this is known as a process of ‘meta-governance’ (Jessop, 1997, 2002; Somerville, 2005; Sørensen & Torfing, 2016; Sørensen & Torfing, 2009). In this sense, meta-governance refers to the strategic activities of government in relation to governance (Somerville, 2005). As such, governments are key players in shaping the spaces in which LLCEIs emerge and develop.

### *1.1.5 Capacities, Resources and Embedding*

The success and further development of LLCEIs does not solely revolve around supportive governance arrangements. The capacities and resources vested in LLCEIs, as well as their relationship with the local community they are situated in are key aspects for LLCEI success as well. Various studies have highlighted the importance of practical capacities such as time, financing, skills and expertise for the development of LLCEIs (Allen, Sheate, & Diaz-chavez, 2012; Park, 2012). The presence of these practical capacities – or lack thereof – greatly influences the extent to which LLCEIs develop and become successful. For example, authors have observed a lack of funding application capacities in community energy groups or difficulties in accessing grant funding in general (Creamer, 2015; Dinnie & Holstead, 2017; Johnson & Hall, 2014; Ruggiero *et al.*, 2014; Wüste & Schmuck, 2012). Such deficiencies greatly impact the development of LLCEIs since access to grant funding is key for LLCEIs to realize their ambitions (Bomberg & McEwen, 2012; Feola & Nunes, 2014; Hicks & Ison, 2011; Hinshelwood, 2001; Middlemiss & Parrish, 2010; Parag, Hamilton, White, & Hogan, 2013; Park, 2012; Rogers *et al.*, 2008; Seyfang *et al.*, 2013; Shaw & Mazzucchelli, 2010; St. Denis & Parker, 2009; Walker, 2008).

Taking note of the above, the usage of capacities that lie within a local community can cover some of these insufficiencies as well as provide for a heightened degree of embeddedness – both crucial for LLCEI success. Embeddedness is here understood as linkages with the socio-institutional structure of the locality, involving social norms, practices and relations, identity and culture. The degree of embeddedness of an LLCEI in its local community influences its legitimacy, which organizational ecologists and institutional theorists consider a crucial condition for resource accessibility and organizational survival (Aldrich & Fiol, 1994; Baum & Oliver, 1991, 1992; Meyer & Rowan, 1977; Zimmerman & Zeitz, 2002; DiMaggio & Powell, 1983). Furthermore, various scholars recognize the intricate relationship between an LLCEI and its local community as an influential factor for development and success. On the one hand, scholars point out that the local community influences the shape and mobilization process of LLCEIs (Bomberg & McEwen, 2012; Forrest & Wiek, 2014; Haggett, Creamer, Harnmeijer, Parsons, & Bomberg, 2013; Islar & Busch, 2016; Süßer, Döring, & Ratter, 2017; Wirth, 2014). On the other hand, LLCEIs also actively mobilize the capacities (such as cultural, organizational and personal capacities) present in communities to harvest support and acceptance (Islar & Busch, 2016; Middlemiss & Parrish, 2010; Oteman *et al.*, 2017; van der Schoor *et al.*, 2016; von Bock und Polach, Kunze, Maaß, & Grundmann, 2015). Examples are the involvement of the local village council when initiating an LLCEI, using the village name for branding the LLCEI, or providing opportunities for villagers to become involved in the LLCEI. These studies suggest that LLCEIs can put to use existing, endogenous capacities found within their community to countervail the lack of resources or capacities while simultaneously embedding the LLCEI in its community to further their development.

## **1.2 Problem statement**

In their endeavors, LLCEIs seem to bridge the divide between state, market and society because of the hybridity of their operations. LLCEIs encompass civic initiatives that are involved with private goods (i.e. low-carbon energy applications) in the pursuit of targets that have public value (e.g. climate mitigation, CO<sub>2</sub> reduction). Assessing the factors and mechanisms that contribute to success is therefore complex as the researcher needs to be attentive to the various theoretical concepts, notions and frameworks that each present a slice of the pie to understanding LLCEIs themselves and the elements of the institutional and social environment in which they operate. The various ways in which LLCEIs emerge (e.g. how they are organized, what their ambitions are, the scale of their project) presents another challenge in making inferences about the phenomenon as such. Studies looking into LLCEIs often address but a few pieces of the puzzle of the success of LLCEIs. The processes involved in bringing about the energy transition in general, and the role of LLCEIs therein specifically, have been predominantly studied through lenses such as Strategic Niche Management (SNM) and the Multi-Level Perspective (MLP) (Dóci, Vasileiadou, & Petersen, 2015; Seyfang & Haxeltine, 2012; Seyfang *et al.*, 2014, 2013; Seyfang & Smith, 2007; Smith *et al.*, 2015). This school of thought originated from the study of the diffusion of technological innovations, and many authors have applied the framework to studying LLCEIs. However, SNM and MLP fail to effectively take LLCEIs as the unit of analysis and lack a profound perspective on the governance and politics involved in the energy transition. This dissertation fills this gap by providing comprehensive theoretical frameworks that are able to shed light on the entirety of factors that contribute to LLCEI success. Additionally, although the European Parliament and the Council agreed upon the importance of Member States having effective support schemes for LLCEIs in place, little research has been done that uncovers the specificities of such support structures. This dissertation addresses this knowledge gap as well.

## **1.3 Research Objectives**

Taking note of the above discussion, the success and development of LLCEIs greatly depends on a mixture of factors stemming from various domains, actors, levels and scales. These factors can roughly be divided in four loci that deserve analytical attention: (i) the LLCEI itself: their bottom-up and voluntary nature often implies a lack of capacities and resources to realize their ambitions (e.g. Park, 2012; Seyfang *et al.*, 2013); (ii) the relationship between the LLCEI and its community: LLCEIs aim to generate low-carbon energy in their locality and therefore require embedding in their local communities (e.g. Park, 2012; Rogers *et al.*, 2012); (iii) the presence of institutional hurdles and barriers stemming from the fossil fuel-based energy regime that favor the status quo hamper the development and success of LLCEIs (e.g. Oteman *et al.*, 2014; Strachan *et al.*, 2015); (iv) and the extent to which actors in the governance landscape provide support to LLCEIs (e.g. Bird & Barnes, 2014; Hoppe *et al.*, 2015; Mey, Diesendorf, & MacGill, 2016; Seyfang *et al.*, 2014). Particular configurations of these groups of factors stemming from case-specific circumstances produce a great deal of variety in the degree of success of LLCEIs. LLCEIs have been studied in various

national settings with authors drawing different conclusions regarding the factors stimulating the success and development of LLCEIs (Creamer, 2015; Dinnie & Holstead, 2017; Feola & Nunes, 2014; Hoppe *et al.*, 2015; Magnani & Osti, 2016; Oteman *et al.*, 2014; Sperling, 2017; Strachan *et al.*, 2015).

This being said, the first objective of this doctoral study is to take inventory of the plethora of factors that are likely to contribute to the success and development of LLCEIs. While the scientific body of literature has increased along with the growth in number of LLCEIs, only a few attempts have been made to amalgamate the factors that influence the development and success of LLCEIs in a comprehensive theoretical framework. Thus, the second objective of this doctoral thesis is to arrive at such a theoretical framework. The third objective is to obtain empirical insights into LLCEIs and the support structures in the Dutch-Frisian setting. As such, particularities characterizing the national and regional governance landscape apply to all Frisian LLCEIs and are expected to be constant variables. The province of Fryslân is home to a relatively large number of LLCEIs. Within Fryslân there are over 50 LLCEIs (Schwencke, 2018). The Netherlands is home to 353 local cooperatives (483 when project cooperatives and wind cooperatives are taken into account), of which Fryslân has the highest number of LLCEIs per capita in the Netherlands. The province also belongs to the top three of provinces that have the largest installed capacity of community-owned solar PV (12,1 MWP in Fryslân, compared to the provinces of Noord-Brabant with 12,2 MWP and Noord-Holland with 13,2 MWP) (Schwencke, 2018). The province of Fryslân therefore provides for a rich context to study the variation in LLCEI success, effectively enabling the researcher to distillate factors of influence that pertain to LLCEIs themselves, the relations with their respective local communities, as well as the relationship with local and regional government. Lastly, by delving into the dynamics involved in the subnational governance arrangements, the fourth objective of this study is to determine the conditions that are important for supportive governance arrangements for LLCEIs.

#### **1.4 Research Questions and Structure of the Thesis**

Based on these research objectives, this doctoral thesis answers two main research questions:

- 1 *What are the factors that contribute to explaining the variation in success of Local Low-Carbon Energy Initiatives (LLCEIs) in the Dutch region of Fryslân?*
- 2 *How do governance actors support or obstruct the success and further development of LLCEIs?*

Each of the sub-questions that help to answer the main research questions are discussed further below.

Firstly, in order to understand what factors influence the success of LLCEIs, it is important to consult the existing body of academic knowledge. And so:



*1A What are the variables that influence the success of LLCEIs in the academic literature?*

After having obtained a theoretical understanding of LLCEI success, the resulting theoretical framework needs to be empirically assessed. Thus:

*1B To what extent do the factors of sub-question 1A contribute to explaining variation the success of low-carbon energy initiatives in the Dutch region of Fryslân?*

To answer sub-question 1B, the framework developed for sub-question 1A is applied to study fourteen Frisian LLCEIs.

As was illustrated by the discussion above (Subsection 1.1.4), the governance landscape plays an influential role in shaping the space for LLCEIs to succeed and develop. Therefore, this doctoral study pays specific attention to unraveling the practices and processes related to governance arrangements which foster the success and development of LLCEIs. The following sub-question is the first out of three to address this:

*2A To what extent does the further development of LLCEIs depend on the completeness and coherence of the strategies and roles employed by intermediaries?*

This doctoral thesis expands its focus to investigate supportive strategies, roles and activities that not necessarily originate from public government bodies. Scholars have argued that so-called ‘intermediaries’ form a part of the solution in engaging the complex interplay of resource deficiencies and unsupportive institutional settings in order to accelerate the development of LLCEIs (e.g. Bird & Barnes, 2014; Hargreaves, Hielscher, Seyfang, & Smith, 2013; Seyfang *et al.*, 2014). The purpose of this sub-question is to determine whether the support structure for LLCEIs in Fryslân takes consideration of the multifaceted nature and operations of LLCEIs.

As mentioned above in Subsection 1.1.4, one of the core assumptions of this doctoral study is the role of innovation in governance for the effective support of LLCEIs. This being said, a lot can be learned from studying the way in which governments respond to LLCEIs and thus whether governments engage in innovative activities such as policy innovation. Best practices can be observed, while inertia, caveats or struggles can be illuminated as well. And so, this dissertation provides an answer to the following sub-question:

*2B In what ways do local and regional governments innovate in governing to respond to the emergence of LLCEIs?*

The purpose of this sub-question is to determine the way governance arrangements pertaining to LLCEIs take shape, which capacities are mobilized in the process, and the role of subnational governments therein.

Policy change and innovation, however, is suggested to be preceded by processes of agenda-setting and shifts in government attention (Baumgartner *et al.*, 2011; Kingdon, 1984). Therefore, an important condition for LLCEI support is the extent to which governments have attention for the phenomenon. Notions such as territory, locality, collective action, communities, participatory democracy, and decentralization began to emerge in discourses in the energy policy domain (Catney *et al.*, 2014; Moss *et al.*, 2014; Nadaï *et al.*, 2015; Walker *et al.*, 2007). This gives a reason to further look into the extent to which Dutch local governments, key actors in stimulating LLCEIs, have picked up the theme of community energy in their climate change governing processes and policies. The following sub-question deals with this:

*2C In which ways and to which degree of specificity in terms of goals and means, are LLCEIs mentioned in policy documents of local governments in The Netherlands? By using a web-scraping*

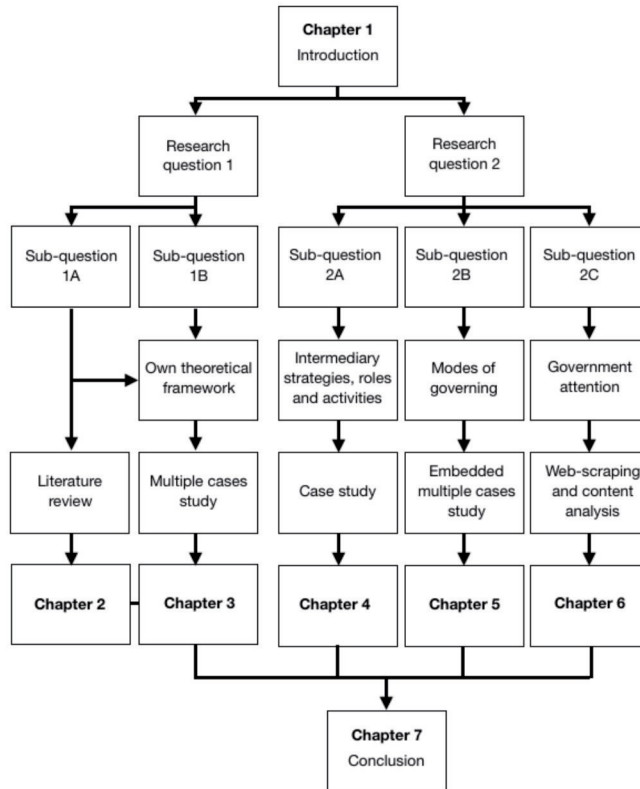
The purpose of this sub-question is to reveal the extent to which LLCEIs as a novel policy phenomenon have generated socio-political acceptance amongst Dutch local governments, with government attention as a proxy indicator for socio-political acceptance.

Following from this, the findings presented in Chapters 3, 4, 5 and 6 form the input for Chapter 7. In Chapter 7, conclusions are drawn and the theoretical contributions of this thesis are reflected upon. Figure 1.1 provides an overview of the research questions and how they relate to the chapters of this doctoral study.

As can be seen in Figure 1.1, the answer to sub-question 1A forms an important input for answering sub-question 1B, namely, the theoretical framework. As such, sub-question 1A only indirectly (visualized by the horizontal connection between the boxes ‘Chapter 2’ and ‘Chapter 3’) contributes to Chapter 7, where conclusions are drawn, as sub-question 1B empirically assesses the validity of the theoretical framework.

Important to emphasize here is that the research questions make a crucial distinction between two dependent variables: LLCEI success and the further development of LLCEIs. Success is primarily related to studying LLCEIs as grassroots organizations within their institutional context. Thus, the focus of Chapters 2 and 3 is on the internal governance of LLCEIs, their relation with their local community, as well as the relation with actors in their institutional context. These chapters primarily look at the factors that influence the success of individual LLCEIs. Nevertheless, gaining insights in the mechanisms and factors for success also provides input for formulating recommendations for what is needed for the further development of LLCEIs. The further development of LLCEIs hinges on their socio-political and societal acceptance as well as the extent to which they foster social innovation.

The chapters devoted to answering Research question 2 (Chapter 4, 5 and 6) mainly focus on what is needed for the further development of LLCEIs. The chapters deal *inter alia* with the barriers that need to be overcome and what actions (non-)government



**Figure 1.1**

Research questions and their relation with the chapters of this dissertation.

actors may take in order to stimulate the phenomenon as a whole. Thus, these chapters look at what is needed for the further development of the LLCEI movement as a whole. Still, the lessons that may be derived from answering research question 2 along with its sub-questions can form important input for recommending best practices in terms of policymaking and interactions between LLCEIs and (non-) government actors (thus providing valuable insights for individual LLCEI success).

## **1.5 Outline of the Dissertation**

The structure of this dissertation follows the sequence that was explained above and shown in Figure 1.1

This **Chapter 1** introduced the background of the topic of study. The introductory chapter gave an overview of the implications of the recent upsurge of LLCEIs and the relevance of studying the phenomenon. Next to this, Chapter 1 outlined the research objectives, research questions and structure of the thesis.

The main purpose of **Chapter 2** is to answer sub-question 1A. In this chapter an extensive (multi-disciplinary) literature study is conducted. In the process of doing so,

a specific definition of LLCEIs, grounded in social geography, is presented. Three analytical points of focus guide the literature review; the LLCEI itself, the interaction between the LLCEI and the local community, and LLCEIs and governance. The range of factors that are suggested to be important for LLCEIs success are synthesized in a comprehensive theoretical framework that is used as input for Chapter 3.

In **Chapter 3**, the theoretical framework presented in Chapter 2 is empirically tested by means of a multiple cases research design. The chapter presents a rich in-depth qualitative analysis and statistical cross-case analysis of fourteen Frisian LLCEIs. The chapter discusses the Frisian LLCEI movement at length and elaborates upon the research and analysis methods that were used.

In **Chapter 4**, the Frisian intermediary support structure is analyzed in terms of its completeness and coherence. In doing so, Chapter 4 provides an answer to sub-question 2A. The chapter starts with taking inventory of the various elements that characterize the requirements for LLCEIs to further develop. As a next step, the various roles, activities and strategies of intermediaries are discussed and juxtaposed with the requirements for LLCEI development. The core assumption of this study is that the degree of coherence and completeness of the support provided by intermediaries influences the extent to which the support stimulates the further development of LLCEIs. The purpose of this chapter is to determine whether the support structure for LLCEIs in Fryslân takes consideration of the multifaceted nature and operations of LLCEIs. This chapter is based on an article that was published in Sustainability, in the Special Issue “Social Innovations in the Energy Transition” in July, 2018.

**Chapter 5** presents an in-depth comparative case study of the Dutch regions of Overijssel and Fryslân in order to investigate the ways in which subnational governments innovate in governing in their response to the emergence of LLCEIs. As such, Chapter 5 gives an answer to sub-question 2B. Various conceptual and analytical notions are coalesced in order to arrive at a set of hypotheses that describe the modes of governing that emerge and how these are characterized by particular types of policy innovation and institutional adaptation. The purpose of this chapter is to determine the way governance arrangements pertaining to LLCEIs take shape, which capacities are mobilized in the process, and the role of subnational governments therein. This chapter is based on an article that was published in Sustainability, in the Special Issue “Innovation in the European Energy Sector and Regulatory Responses to It” in January, 2017.

**Chapter 6** comprises an explorative study of the extent and ways in which LLCEIs have come to the attention of the 380 Dutch local governments. In so doing, the chapter addresses sub-question 2C. By applying methods of web scraping and text mining, this chapter uses the publicly accessible information management systems of Dutch municipal councils to test a set of theoretical assumptions concerning the ways in which local governments may support LLCEIs. This multi-disciplinary study is the

result of a collaboration with The Ministry of the Interior and Kingdom Relations and a consultancy firm. The purpose of this chapter is to reveal the extent to which LLCEIs as a novel policy phenomenon have generated socio-political acceptance amongst Dutch local governments, with government attention as a proxy indicator for socio-political acceptance.

**Chapter 7** presents the conclusions of this doctoral thesis and reflects on its findings. The studies discussed in the individual chapters serve as building blocks for answering the two central research questions of this dissertation in a comprehensive manner. The key conceptual and theoretical arguments postulated throughout this thesis are reflected upon by positioning this dissertation in current academic debates. Furthermore, policy and societal implications of this research are discussed as well.

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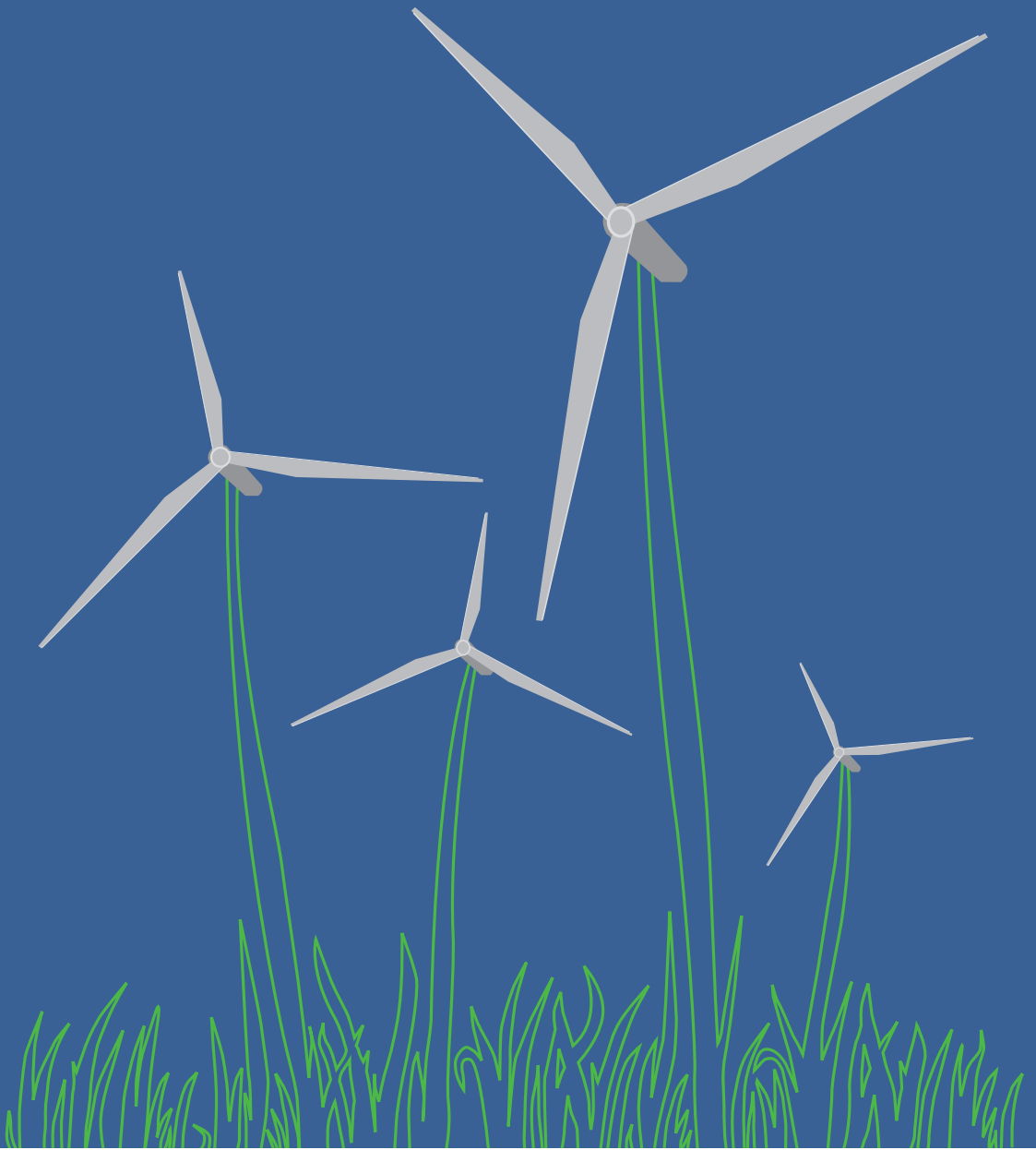
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# Chapter 2

Literature review and theory



This chapter provides an answer to the sub-research question 1A:

*What are the variables that influence the succes of LLCEIs in the academic literature?*

This chapter starts off with a definition of LLCEIs and discusses the analytical points of reference that are crucial to understanding LLCEI success (Section 2.1). Next, Sections 2.2, 2.3 and 2.4 provide an extensive discussion of the existing body of knowledge which is used to formulate various propositions that concern the factors and mechanisms that influence LLCEI success. The propositions are accumulated in a comprehensive theoretical framework that is presented in Section 2.5. Important to note here is that there is a distinction between the hypotheses that are empirically tested in Chapter 3 and key assumptions that underlie the theoretical framework. The latter are not empirically tested, nor are they numbered, but they shed light into the reasoning behind the theoretical framework. This theoretical framework is used to analyze 14 Frisian LLCEIs (Chapter 3).

## **2.1 Analyzing Local Low-carbon Energy Initiatives**

### *2.1.1 Defining Local Low-Carbon Energy Initiatives*

This dissertation refers to Local Low-Carbon Energy Initiatives (LLCEIs) as the bottom-up initiating and ownership of a project or series of projects involving the generation, stimulation and/or facilitation of low-carbon energy and/or energy efficiency by citizens/actors from civil society on a local scale. In this regard, LLCEIs are interpreted as ‘self-organization’ initiatives in the context of low-carbon energy transitions (Boonstra & Boelens, 2011; Edelenbos, van Meerkerk, & Kopenjan, 2016; Nederhand, Bekkers, & Voorberg, 2016; van Meerkerk, Boonstra, & Edelenbos, 2013). The LLCEIs that are subject of this dissertation engage with low-carbon energy technologies either at individual household-level (e.g., lighting bulbs, weather-strips, advice on energy saving measures on appliances, water-use, heating us, roof-based solar PV panels, insulation measures) or at the meso-level (collectively owned low-carbon energy installations (Walker & Cass, 2007).

Importantly, the projects, activities and operations enacted by LLCEIs are inevitably locally bound. For instance, in the case of a collective solar PV panel project: the installation requires a specific physical site within the locality. The scale of the locality may however vary for LLCEIs. LLCEIs can have the ambition to meet the energy demand of a small village, an urban district in a medium-sized city, or perhaps an entire island. Cox’ notion of ‘spaces of dependence’ is able to capture this scalar variation of the localities. Spaces of dependence involve “those more-or-less localized social relations upon which we depend for the realization of essential interests and for which there are no substitutes elsewhere; they define place-specific conditions for the material wellbeing of people and their sense of significance” (Cox, 1998b, p. 2). LLCEIs are locally dependent as to their “primary interest is in defending or enhancing the flow of value through a specific locality: the territory that defines for them a geographically



circumscribed context of exchange relations critical to their reproduction” (Cox & Mair, 1988, p. 310).

In other words, the LLCEI strives to realize its projects, operations and activities through its spaces of dependence. For instance, while certain LLCEIs primarily seek to foster local community ownership of their low-carbon energy installation (making the local community a critical part of the LLCEI’s space of dependence), other LLCEIs (via particular financial constructions) may invite actors or citizens outside of the local community to invest in the project (and as such expand their space of dependence). The literature devoted to LLCEIs commonly refers to the phenomenon as ‘community renewable energy’, which tends to ‘conflate the project (that is the ‘community’ low-carbon energy project) with the community it is embedded in’ (Becker & Kunze, 2014, p. 181). The sole concept ‘community’ leaves indistinct the scalar and spatial configurations and politics involved and implies that community low-carbon energy as such involves to a significant degree a collective and inclusive endeavor (Walker, 2011). This dissertation’s conceptualization of LLCEIs and their inevitable interaction with their spaces of dependence effectively makes the distinction between the LLCEI and its locality through which it seeks to realize its ambitions. As such, it is argued that the interaction between an LLCEI and its local community (i.e. locality) is a crucial venue from which success factors can be derived (see Section 2.3 for further discussion). In contrast to Becker and Kunze’s (2014) suggestion to abandon the ‘local’ in conceptualizing LLCEIs to include non-local and participatory public projects, I reiterate the local character of LLCEIs in order to account for (non-) politically motivated LLCEIs that resemble ‘simple’ niches (Seyfang & Smith, 2007) that do not seek to transcend the local scale.

### *2.1.2 Analytical points of focus*

Having defined LLCEIs, it becomes apparent that crucial distinctions need to be made between an LLCEI and its local community (as a ‘spaces of dependence’). This distinction is an important step towards disentangling the factors and mechanisms underlying the success of LLCEIs. Additionally, attention to the actors LLCEIs engage with to realize their objectives is key in this effort as well. This being said, LLCEI success can be discerned by account of three analytical foci: the LLCEI itself; the dynamics and interactions between the LLCEI and its ‘spaces of dependence’; and the dynamics and interactions between the LLCEI and its ‘spaces of engagement’. Before the literature review is presented, the three analytical points of reference are briefly discussed as they give structure to the literature review.

In terms of the first analytical point of focus, organizational structure, design, characteristics and (member) capacities of an LLCEI are expected to influence its success. And so, these factors are derived from studies looking into the survival and effectiveness of non-profit, voluntary-based organizations and start-up ventures. These factors predominantly pertain to matters internal to the LLCEI. The core assumption that relates to this is:

*The presence of the conditions discussed in Section 2.2 promotes the success of an LLCEI.*

Secondly, by striving to generate low-carbon energy and engage in energy efficiency measures, LLCEIs produce value and capital through their local communities and are therefore to a significant degree influenced by them. This dissertation captures this symbiotic relationship with the concept ‘spaces of dependence’. As mentioned above, spaces of dependence involve “those more-or-less localized social relations upon which we depend for the realization of essential interests and for which there are no substitutes elsewhere; they define place-specific conditions for the material wellbeing of people and their sense of significance” (Cox, 1998b, p. 2). The spaces of dependence (or the local community) influence LLCEI success in various ways. For example, if the operations of a LLCEI differ from the institutional expectations stemming from the local community (such as: ‘how it is done around here’, (Wirth, 2014, p. 239), it will have an impact on the LLCEI’s success. In this regard, organizational and institutional theorists have emphasized that the degree of ‘embeddedness’ of organizations in their localities and organizational fields influences organizational survival. Embeddedness refers to the interconnections between an organization and its institutional environment. There are several mechanisms and strategies that LLCEIs can bring to use to mediate or maintain the relationship with its local community. The key assumption that pertains to this is:

*LLCEIs that effectively accommodate the institutional influences stemming from its spaces of dependence are more likely to be successful.*

Section 2.3 discusses the interactions between the LLCEI and its locality.

When LLCEIs experience a problematic relation with their spaces of dependence, they need to engage with other centers of social power in order to address this issue – the third point for analysis. Such a problematic relation can involve, for instance; a lack of financial capital for an LLCEI to realize a collective solar panel PV project; or the case in which a project initiated by an LLCEI requires specific spatial planning permits. In these cases, LLCEIs need to mobilize different actors (e.g. local and regional government, intermediaries, energy companies, grid operators, other LLCEIs) to accomplish their operations through the spaces of dependence. Cox refers to this as the process in which the actor involved constructs networks of associations, or ‘spaces of engagement’ to defend its local interests. Within these spaces, politics unfold that assist in securing a space of dependence (Cox, 1998, p.2). While Cox argues that spaces of engagement are constructed when threats to local interests occur, this doctoral thesis states that LLCEIs construct such spaces in order to attain their ambitions (see also Nielsen & Simonsen, 2003, p. 923). The underlying assumption here is:

*The extent to which LLCEIs construct spaces of engagement to alleviate issues they experience in their locality influences the degree of success.*

Section 2.4 elaborates upon the processes involved in constructing the spaces of engagement.

The added value of using Cox's notions of spaces of dependence and engagement as a conceptual framework to analyse the interactions between LLCEIs, their localities, and relevant stakeholders lies in its attention to the politics involved in the scalar variance inherent to LLCEIs (Devine-Wright & Wiersma, 2013; Walker & Devine-Wright, 2008). Instead of treating LLCEIs as a homogenous phenomenon in which influences stemming from the locality and beyond all have a similar impact on the success of LLCEIs, the notions of spaces of dependence and engagement are able to grasp how certain social relations, place-specific conditions and networks matter more or less to the success of certain LLCEIs.

## **2.2 The LLCEI**

The hybrid nature and relatively immature field of research of LLCEIs demands an analytical approach that is open to conceptualizations and theoretical frameworks from relevant academic disciplines and literatures. LLCEIs' hybrid nature and the relative immature field of research on LLCEIs does not necessarily mean that one has to reinvent the wheel for arrive at a comprehensive theoretical framework. In the effort to develop such a framework for understanding the factors that help to explain the variation of success of LLCEIs, various relevant disciplines and literatures may come to mind next to the existing literature on LLCEIs. Studies looking into the mechanisms for business start-ups success; literature on social enterprises, social movements, non-profits and community-based organizations are examples of bodies of knowledge that provide relevant insights in further the understanding of LLCEI success. The literature review presented in this section firstly discusses the factors relevant for the LLCEI itself. Next, the mechanisms at play in the interactions between the LLCEI and its space of dependence are elaborated upon. Lastly, attention is paid to how LLCEIs construct their spaces of engagement to secure the conditions in their spaces of dependence.

### *Project champions*

LLCEIs are typically run by volunteers who want to make their locality more sustainable by taking action themselves (e.g. Hufen & Koppenjan, 2015; van der Schoor *et al.*, 2016; Ornetzeder & Rohrer, 2013). More specifically, so-called project champions are commonly important driving forces of LLCEIs. Various studies have argued and provided evidence of the important role of such committed individuals in driving the success of LLCEIs (Alexander, Hope, & Degg, 2007; Bomberg & McEwen, 2012; Chmutina, Wiersma, Goodier, & Devine-Wright, 2014; Feola & Nunes, 2014; Forrest & Wiek, 2014; Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015; Martiskainen, 2016; Noll, Dawes, & Rai, 2014; Oteman, Wiering, & Helderman, 2014; Ruggiero, Onkila, & Kuittinen, 2014; Seyfang & Smith, 2007; Sperling, 2017; van der Schoor & Scholtens, 2015; von Bock und Polach, Kunze, Maaß, & Grundmann, 2015; Walker, 2008; Yalçın-Riollet, Garabuau-Moussaoui, & Szuba, 2014). Project champions

are defined as those key committed individuals involved in the LLCEI who have a “prominent role in starting, endorsing or carrying out a project” (Ruggiero *et al.*, 2014, p. 59). These project initiators, are often people who are either well known in their communities and/or very active members of the community (Martiskainen, 2016, p. 7). In this way, project champions have an important role in fostering trust in the project (Sperling, 2017) as well as acceptance and support (Süsser, Döring, & Ratter, 2017). In comparison, if we look at local firebrands in other contexts, Evans *et al.*, (2013) have shown that numerous cases can be found where for instance mayors have acted as external drivers for the promotion of LA21. According to the findings of Chmutina *et al.*, project champions display the following characteristics: they have “vision, credibility and respect, access to resources, experience, and they actively engage in the project” (2014, p. 126). Various studies have further qualified that project champions need not to solely refer to an individual, but may as well materialize as a core group of committed individuals that are imperative for project success (Alexander *et al.*, 2007; Chmutina *et al.*, 2014; Forrest & Wiek, 2014; Newman, Waldron, Dale, & Carriere, 2008; Seyfang, Park, & Smith, 2013).

Therefore, in this dissertation it is proposed that:

*1. The extent to which LLCEIs are managed by a core group of committed individuals contributes to their success.*

### *Human capital*

Literature looking into the role of human capital in entrepreneurial and new venture success provides for various propositions that further specify the mechanisms and capacities through which project champions, or other involved volunteers manage to establish LLCEIs that survive. In this regard, Becker (2009) distinguished general and specific human capital, a distinction broadly picked up by authors investigating the role of agency in new venture survival (Bosma, van Praag, Thurik, & de Wit, 2004; Bruderl, Preisendorfer, & Ziegler, 1992; Colombo, Delmastro, & Grilli, 2004; Cooper, Gimeno-Gascon, & Woo, 1994). In line with Bruderl *et al.* (1992), traditional measures of general human capital are years of schooling and years of work experience. For measuring specific human capital, industry and entrepreneur specific human capital are distinguished, respectively being measured by prior experience in the relevant industry and prior self-employment or leadership experience (Bruderl *et al.*, 1992, p. 229). Studies also have indicated that the educational level of the founder of a firm is a key determinant of firm survival (Bates, 1990, p. 551; Cooper *et al.*, 1994). Other studies such as Unger *et al.* (2011) have found that outcomes of human capital investment, i.e. knowledge and skills, specify the human capital – entrepreneurial success relationship to a higher degree than human capital investments (education and experience). Additionally, this relationship was also stronger for human capital that had a high degree of task-relatedness (human capital that relates to the current tasks of the organization), compared to human capital with low task-relatedness. This is in line with findings that suggest the importance of using specific competencies for LLCEI success (Bomberg & McEwen, 2012; Forrest & Wiek, 2014; Hargreaves, Hielscher, Seyfang, & Smith, 2013; Herbes, Brummer, Rognli, Blazejewski, & Gericke, 2017; Hinshelwood,

2001; Middlemiss & Parrish, 2010; Ornetzeder & Rohracher, 2013; Rogers, Simmons, Convery, & Weatherall, 2008; Seyfang *et al.*, 2013; Wüste & Schmuck, 2012). As such, it is expected that:

*2. The extent to which LLCEIs have human capital (understood as knowledge and experience in relevant industry, self-employment or leadership experience) contributes to their success.*

#### *Size*

In line with this, specific human capital has a greater positive impact on initial firm size than the generic component (Colombo *et al.*, 2004). The relevance of firm start-up size becomes apparent by the manifold of studies that confirm that firm start-up size (number of employees at time of founding, asset size, equipment value, financial capital, and/or team size) enhances the likelihood of venture survival (Audretsch, Houweling, & Thurik, 2000; Audretsch & Mahmood, 1995; Bruderl *et al.*, 1992, p. 230; Frese *et al.*, n.d.; Korunka, Kessler, Frank, & Lueger, 2010; Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno, 2015; Mata, Portugal, & Guimarães, 1995). Evidently, LLCEIs show similarities with firm start-ups, but in one crucial way differ with regard to the former; LLCEIs are voluntary organizations. As such, it is highly unlikely that LLCEIs start with significant assets, financial capital or any employees. Studies looking into the success factors of LLCEI specifically highlighted the importance of founding and the size of the steering group (Feola *et al.*, 2013; Robbins & Rowe, 2002). Indeed, the importance of a sizeable group of volunteers becomes apparent as non-profit organizations such as sport clubs – and LLCEIs as well – struggle to retain volunteers and sustain their participation (Alexander *et al.*, 2007; Steven M. Hoffman & High-Pippert, 2010; Wollebaek, 2009). Thus, this dissertation hypothesizes that:

*3. The size of LLCEIs (measured by the number of volunteers) is positively related to their success.*

#### *Board diversity*

Wollebaek (2009) showed that the survival of local voluntary associations is positively correlated with board diversity (operationalized by diversity in age and profession) (see also Vermeulen, Minkoff, & Meer, 2016). Since some studies have indicated that the LLCEI movement seems to be relatively homogenous with regards to age and gender (Brunner, 2018; Huijben & Verbong, 2013; van der Schoor & Scholtens, 2015; Van Veelen, 2018), this study understands board diversity as variation in age and gender. Thus, it is expected that:

*4. The degree of board diversity (in terms of age and gender) contributes to the success of LLCEIs*

#### *Time*

Next to factors related to human capital, various studies have highlighted the availability of time of volunteers as an important factor that adds to the realization of

LLCEI projects (Allen, Sheate, & Diaz-Chavez, 2012; Feola *et al.*, 2013; Forrest & Wiek, 2014; Herbes *et al.*, 2017; Hinshelwood, 2001; Ornetzeder & Rohrer, 2013; Rogers *et al.*, 2008; Seyfang *et al.*, 2013). Significant investment in time is needed to realize a LLCEI project (Park, 2012). Therefore, I hypothesize that:

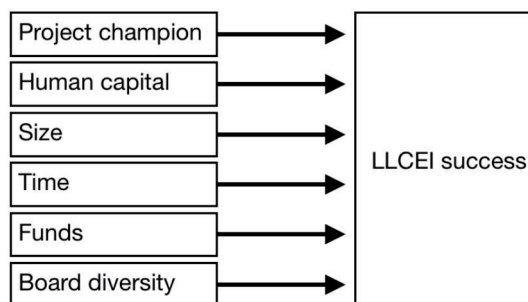
*5. The degree to which LLCEIs are led by individuals that are flexible in spending time and have time available to spend on the initiative (i.e. because of their status of employment, retirement) contributes to their success.*

#### *Funds*

In the ability to successfully apply for funds, as well as the availability of funds are important factors for LLCEI success (Park 2012; Seyfang & Smith 2007; Middlemiss & Parrish 2010; Hinshelwood 2001; Seyfang *et al.* 2013; Walker 2008; Wüste & Schmuck 2012; Rogers *et al.* 2008; Feola & Nunes, 2014; Forrest & Wiek, 2015; Ruggiero *et al.*, 2014; Ornetzeder & Rohrer, 2013; Hicks & Ison, 2011; Adams & Berry, 2008; Feola *et al.*, 2013). In terms of getting funding for the LLCEI's project, government is not the sole provider of grant funding. Ruggiero *et al.* (2014) found that the LLCEIs they studied managed to get their projects financed with use of start-up capital provided by the local community. This signals the importance for LLCEIs to actively search for funds at various venues. Indeed, in the literature on new venture survival, "financial capital input levels, irrespective of owner education, are strong determinants of small business survival prospects" (Bates, 1995, p. 551; Bruderl *et al.*, 1992; Cooper *et al.*, 1994; Shane & Delmar, 2004). Therefore:

*6. The degree to which LLCEIs are able to raise funds contributes to their success.*

Figure 2.1 provides an overview of the factors that are expected to contribute to LLCEI success, which have been discussed at length throughout this section.



**Figure 2.1**

Overview of internal factors that influence LLCEI success.

In sum, this doctoral thesis proposes that the success of LLCEIs is influenced by a positive configuration of the following factors: the presence of a project champion; human capital involved in LLCEI; the LLCEI's size; the flexibility to use time; the ability to raise funds; and the degree of board diversity. Figure 2.1 gives an overview of these factors.

## 2.3 The LLCEI and the local community

As was explained in subsection 2.1.2, the interaction of LLCEIs with their institutional environment can be usefully categorized into two spaces: (i) the interaction with the local community itself (spaces of dependence), and (ii) the interaction with stakeholder networks, such as local and/or regional government, grid operating companies, and intermediaries constituting a ‘space of engagement’. The following subsections discuss the dynamics and mechanisms at work in interactions between LLCEIs and their spaces of dependence. Section 2.3 will deal with the interaction between LLCEIs and their spaces of engagement.

### 2.3.1 Places, spaces and scales

In order to understand LLCEI success better, research should pay attention to the interactions between the LLCEI and the local community. In this study, the local community is grasped by the concept of ‘spaces of dependence’ (local community, locality and spaces of dependence are used interchangeably throughout this doctoral thesis and refer to the same phenomenon). This study assumes that these spaces of dependence influence the LLCEI to a great extent. Kevin Cox’s ‘spaces of dependence’ and ‘spaces of engagement’ framework helps to understand the interactions between the LLCEI, its locality and the social networks constructed to realize its place-dependent interests (see Section 2.4 for spaces of engagement). In a fundamental way, the interaction between the LLCEI and its locality is characterized by what Cox refers to as a relation of ‘local dependence’. Local dependence signifies a relation of dependence to a locality which arises from the relative spatial immobility of certain social relations or material foundations” (Cox & Mair, 1988). Cox conceptualizes such localities as ‘structures of local social relations’, or ‘spaces of dependence’. The opportunities and constraints arising from those local social structures – via the lack of substitutability of those structures – provide the place-specific conditions that define an actor’s material well-being and sense of significance (Cox, 1998b, p. 2, 1998a, pp. 28–29). Knowledge, various forms of capital (e.g. social, human, financial), culture, norms and values are understood to be spatially fixed and shape an actor’s operations. Place dependence also has a material basis, where physical space, spatial planning and grid infrastructure set boundaries for the possibilities of LLCEI projects (see for instance Oteman *et al.*, 2014; Schreuer, 2016)

Accordingly, the local community can be interpreted as an institutional force itself, where certain values, norms and practices shape the LLCEI and its activities (Marquis, Glynn, & Davis, 2007; Wirth, 2014; Scott, 2008). Several studies highlight the importance of these influences. For instance, Süsser *et al.*, (2017) showed that the social processes and structures underlying socio-geographic places shape and inform innovative and entrepreneurial activities directed at community renewable energy. Similarly, Devine-Wright and Wiersma (2013) find that the social, cultural and political processes that configure the spatial settings in which decentralized energy initiatives are situated, are unique and highly context dependent. Furthermore, Walker and

Devine-Wright argue that community renewable energy is signified by two dimensions; process and outcome. The first is concerned with “who a project is developed and run by, who is involved and has influence” (2008, p. 498); where community renewable energy has ‘the local community’ as answer to those questions. The outcome dimension denotes how the outcomes of a low-carbon energy initiative are spatially and socially distributed; where community renewable energy creates economic and social value for its locality. It becomes apparent that LLCEIs emphasize the realization of low-carbon energy measures in and through their localities, often referred to as (local) communities. This means that the local character of community renewable energy is an important defining aspect that embodies a variety of underlying processes that deserve analytical attention.

Importantly, however, the local scale is not the only space through which LLCEIs realize their ambitions, as circumscribed by Cox’ spaces of dependence – spaces of engagement dialectic. In this regard, Cox (1998) sees “jumping scales” as essentially contingent on the interaction and dynamics of the spaces of dependence and engagement. For example, politics may occur at the regional scale because of certain interests at the local scale and vice versa. Actors engaged in the space of engagement (incorporated via networks of associations) can be at the local, regional, and national level, and are incorporated on the basis of how they are relevant to realizing the interests at hand. Thus, according to Cox, scales are not understood in spatial terms, rather, networks characterize the spatiality of scale (see also Taylor Aiken, 2017). In the context of LLCEIs, they may want to install low-carbon energy technology in a village, a group of villages, region or even an island. That being said, a comprehensive understanding and analysis of the factors that contribute to LLCEI success should take into consideration the role of place-based and scalar processes and settings.

Therefore, LLCEIs need to take into account those relations and institutional influences when realizing their interests through their localities. Hence, one of the central assumptions that underlies the theoretical framework is: LLCEIs are more likely to be successful when they accommodate those influences and relations stemming from their spaces of dependence.

### *2.3.2 The interaction between an LLCEI and its spaces of dependence*

In order to accommodate those local dependencies effectively, LLCEIs can employ various strategies and actions. In the section below, this study will elaborate upon these strategies and mechanisms that grasp the intricate interaction between an LLCEI and its locality. Firstly, by drawing on social capital that is present in the locality in various degrees – such as ties with e.g. inhabitants, close friends of the LLCEI’s board members, potential customers, members and participants – LLCEIs can access valuable resources that are crucial for their success (see Ghose & Pettygrove, 2014; von Bock und Polach *et al.*, 2015). Secondly, it is argued that the extent to which and in which ways an LLCEI aligns its activities and operations with its local community is crucial for its success. In doing so, LLCEIs may implement a particular repertoire of



strategies and mechanisms. In discussing the various ways how this alignment and underlying processes work, this study draws on different strands of institutional theory, such as neo-institutional perspectives (e.g. Wirth, 2014; Marquis & Battilana, 2009; Marquis *et al.*, 2007) and institutional organizational theory (e.g. Meyer & Rowan, 1977, Baum & Oliver, 1991;1992). Specifically, I argue how strategies directed at normative and socio-cognitive features of the communities, enhancing legitimacy, fostering ownership and participation, and acquiring visibility will align the LLCEI with its locality. In essence, the abovementioned concepts embrace the dialectic relationship between an LLCEI and its locality, and is able to grasp its various configurations.

### 2.3.3 *Social capital*

Various scholars have highlighted social capital as an important resource where LLCEIs depend on to successfully realize community low-carbon energy projects (Forrest & Wiek, 2014; Hicks & Ison, 2011; Kalkbrenner & Roosen, 2016; Sperling, 2017; von Bock und Polach *et al.*, 2015; Walker, Devine-Wright, Hunter, High, & Evans, 2010; Yildiz *et al.*, 2015). Other research domains that have a great deal of overlap with studies on community renewable energy show similar results. In the body of knowledge on new venture survival, social capital in terms of useful business ties within the social networks of the new venture is observed to be imperative as well (Brüderl & Preisendörfer, 1998; Korunka *et al.*, 2010; Uzzi, 1996). Moreover, social capital is found to be an important ingredient for local community business, economic development (Flora, 1998; Kilkenny *et al.*, 1999; Peredo, Chrisman, & Chrisman, 2006), and sustainable community development (Newman *et al.*, 2008; Simpson, 2005).

Definitions of social capital most commonly centre on networks of social relationships that are governed by social norms, trust and reciprocity, and which can be put to use (Nahapiet & Ghoshal, 1998; Onyx & Bullen, 2000; Woolcock, 1998; Putnam, 1993).. Importantly, social capital not only involves the number of social ties, but also the resources that can be mobilized by drawing on those social relationships. Nahapiet and Ghoshal (1998) therefore define social capital as: “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit” (p. 243) (compare Bourdieu 1985, p. 286). As such, social capital is conceived as a combination of access to networks and resources (Foley *et al.*, 2001, p. 277-278). This conceptualization importantly accounts for variations in contextual settings, “more ties are better, but one tie might be sufficient to gain access to a crucial resource” (Foley *et al.*, 2001, p. 276).

The resources that can be accessed through social ties and as well as other advantageous features are assumed to vary regarding the strength of the ties. Granovetter (1973) distinguished weak and strong ties, which were later on complemented by the notion of vertical ties (Dale & Newman, 2008; Ebi & Semenza, 2008; Newman & Dale, 2005; Rydin & Holman, 2004; Pretty & Ward, 2001). The

strength of ties is determined by the frequency of contact, emotional intensity, the degree of intimacy, and reciprocal commitments that characterize the tie (Granovetter, 1973, p. 1361). Strong ties, or bonding social capital, involve strong social networks between homogenous groups, which results from repeated personal contacts. Trust, reciprocity, social norms and values arise from these social networks. Weak ties, or bridging social capital (e.g. Putnam, 2000), refers to social networks between heterogeneous groups, which springs from outward oriented distant ties. This type of social capital connects or cuts across different groups or communities (Narayan, 1999). Studies have argued for the importance of a mix of bonding and bridging ties specifically for grassroots organizations within communities (Ghose & Pettygrove, 2014; Hicks & Ison, 2011; Martiskainen, 2016; Newman & Dale, 2005; von Bock und Polach *et al.*, 2015). The benefits flowing from bonding and bridging ties are discussed below.

Weak ties provide actors with new information and ideas by ‘building’ bridges between two previously separated actors, or networks (Granovetter, 1973; Burt, 1992). Bridging social capital has the potential to provide for opportunities, information and resources that do not come from mere bonding social capital (Ebi & Semanza, 2008; Granovetter, 1973; Burt, 1992). For instance, West and Noel (2009, p. 18) found that networking activities designed to infuse ventures frequently with novel knowledge and information significantly predicted firm performance. In the understanding of this doctoral study; bridging capital refers to the horizontal ties that LLCEIs have with other LLCEIs as well as ties with local firms or organizations. This shows overlap with how Pretty and Ward (2001) conceptualize local-local connections as “horizontal connections between groups within communities or between communities...” (p. 212). Indeed, contact with other LLCEIs provides LLCEIs with access to information (Parag, Hamilton, White, & Hogan, 2013) and enables them to take on larger projects by means of collaborating with other LLCEIs (Oteman, Kooij, & Wiering, 2017). Likewise, studies show that collaboration and contact between LLCEIs is important for their success (Feola *et al.*, 2013; Oteman *et al.*, 2017; Ruggiero *et al.*, 2014).

Strong ties, on the other hand, are able to provide for joint-problem solving opportunities, trust, and the transfer of tacit, fine-grained and complex knowledge (Uzzi, 1996; Hansen, 1999). Furthermore, strong ties have also been argued to be important for start-up ventures (Brüderl & Preisendörfer, 1998). Outcomes of innovation processes as well appear to be particularly dependent on strong, interpersonal, high-trust relationships (Moran, 2005). Studies have shown the importance of trust in forming coherent and cooperative communities and for project success in community renewable energy (Hinshelwood & McCallum, 2001; Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014; Walker *et al.*, 2010). Indeed, when comparing bonding social capital with Cox’ definition of spaces of dependence, “those more-or-less localized social relations upon which we depend for the realization of essential interests and for which there are no substitutes elsewhere...” (1998, p.2), the crucial role of strong social ties within the local community for LLCEI success becomes apparent. For this study, bonding social capital thus refers to the local social relations (within the

spaces of dependence) that LLCEIs draw on which provides them with resources that assists in achieving their goals. More specifically, it refers the degree to which LLCEIs use social ties with members of the local community to access resources such as financial or human capital. These are informal relations between individuals; e.g. the chair of an LLCEI reaching out to its neighbor for financial participation in the LLCEI's project or a volunteer in the LLCEI contacting relatives for customer recruitment. Therefore I hypothesize that:

*7. The degree to which LLCEIs are able to draw on a mix of bonding and bridging capital contributes to their success.*

This study elaborates on the linkages between LLCEIs and other centres of social power, referred to as bracing or linking social capital, more elaborately in Section 2.4 since this type of capital overlaps with Cox' spaces of engagement.

### *2.3.4 Institutions*

As social capital can be considered a key resource for LLCEIs, there are also more structural features of local communities that shape their operations and influence their success. These structural features and their impact on organizations can be traced to institutional theory, which appears to be effective in substantiating the intricate relationship between LLCEIs and their local communities. Scott defines institutions as follows, "institutions are social structures that have attained a high degree of resilience [and are] composed of cultural-cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life" (Scott, 2008, p. 48). Institutions thus enable and constrain the actions of actors and can carry sanctions for non-compliance such as a loss of legitimacy. Institutions crucially differ from social capital. Institutions apply universally to a group of people, in the case of this thesis to the local communities in which LLCEIs operate. Social capital, on the other hand, can be used as a resource, is not available to all, is directed at the goals of particular actors, and must be built at a cost (Nooteboom, 2007, p. 32). Nooteboom (2007) argues that social capital is partly based on institutions and may also contribute to their development. Furthermore, where institutional influences are weaker, social capital becomes more important. This way, the doctoral study accounts for the contextual variation of LLCEIs: for some LLCEIs, institutions may have stronger impact on their actions than in other cases. Additionally, in this study the concept of social capital focuses on the micro-level; on local social relations between the LLCEI and actors and members of its spaces of dependence and how these relations provide access to resources. The institutional analysis focuses on the ways in which LLCEIs can align their actions with their local communities, the latter being considered an institutional order in its own respect. The assumption that pertains to this idea and that underlies the theoretical framework is therefore:

*The degree to which LLCEIs align their actions with the institutional features of their local communities contributes to their success.*

### 2.3.4.1 *The influence of institutions*

Institutional environments shape organizational structures and processes (Hirsch, 1975; Meyer & Rowan, 1977; Rowan, 1982). Various studies have highlighted that a variety of institutional influences strongly affect an organization's course of action (Baum & Oliver, 1991, 1992; Becker, Kunze, & Vancea, 2017; Bomberg & McEwen, 2012; Marquis *et al.*, 2007; Meyer & Rowan, 1977; Vermeulen *et al.*, 2016; Wirth, 2014; Wollebaek, 2009). Institutions thus define the choice set of actions and decisions that are appropriate, and hence constrain social, economic and political interaction (March & Olsen, 1998; North, 1991; Oliver, 1991). Similar to how Scott (2008) defines institutions, Wirth (2014) conceptualizes 'community' as an individual institutional order, through which cultural-cognitive ('how things are done around here'), normative ('what is right to do around here') and regulative (derived from rules, standards, regulations) forces shape the course of action of community renewable energy initiatives (Clark, Southern, & Beer, 2007; Kalkbrenner & Roosen, 2016; von Bock und Polach *et al.*, 2015). By drawing on work of Marquis and colleagues (Marquis & Battilana, 2009; Marquis *et al.*, 2007), Wirth (2014) appreciates the distinctive role of geography in understanding the influence of local communities on organizations. Marquis *et al.* (2007, p. 927) argue that; 'local understandings, norms, and rules can serve as touchstones for legitimizing' organizational action, and therefore analyses should focus on the influence of local communities.

Accommodating these influences is crucial for LLCEI success as community acceptance and support is essential for low-carbon energy uptake in community (Forrest & Wiek, 2015; Shaw & Mazzucchelli, 2010; von Bock und Polach *et al.*, 2015). Furthermore, the alignment of the LLCEIs' operations with the dominant institutional logic of the local community enhances the legitimacy of LLCEIs. In essence, legitimacy is a matter of social acceptance (Bergek *et al.*, 2008; Deephouse & Carter, 2005; Chen & Roberts, 2010) that results from compliance with expectations, norms, rules and beliefs. In a study on the social acceptance by a community wind farm pilot, members of the community regarded the legitimacy of the outcome of a wind farm pilot and the acceptance of the outcome as synonyms (Gross, 2007). Zimmerman and Zeitz define legitimacy as "a relationship between the practices and utterances of the organization and those that are contained within, approved of, and enforced by the social system in which the organization exists" (2002, p. 416). In other words, legitimacy refers to the extent to which the activities and outcomes of LLCEIs align with values, cognitions, norms and expectations of its spaces of dependence. Thus, LLCEIs can derive legitimacy from accommodating the institutional influences stemming from its spaces of dependence. Importantly, legitimacy is considered a key resource for new ventures to acquire new resources and for their survival – and thus a factor that critically influences venture growth (Zeitz & Zimmerman, 2002, see also Aldrich & Fiol, 1994; Hannan & Freeman, 1989; Meyer & Rowan, 1977; Scott 1994; 2008; Delmar & Shane, 2004). In this regard, Tolbert *et al.* (2011, p. 1336) concluded that (prevailing) institutional pressures influence a new venture's decisions concerning its appropriate structures, practices, and behaviors and therefore add to its legitimacy.

Legitimacy is especially important for new ventures as they typically lack a performance record and the kind of access to capital and resources that established organizations often have.

In sum, the logic of the argument for the institutional alignment of an LLCEI with its local community is as follows: institutions influence the actions of organizations; organizations that align their actions with those institutions enhance their legitimacy (or acceptance); legitimacy is an important resource particularly for new ventures since it provides them with access to new resources, the latter being associated with venture survival and growth. Thus, in order to understand how LLCEIs align their actions with their local communities, the mechanisms underlying the influences of cultural-cognitive and normative features of local communities, as well as the strategies and actions that LLCEIs can employ as to those institutional features are further discussed below. Since the context of this study is the Dutch province of Fryslân, I assume that the regulative influences predominantly stem from local and regional government, which belong to the spaces of engagement of LLCEIs (further discussed in Section 2.4).

#### 2.3.4.2 Cultural cognitive influences

Cultural-cognitive pressures influence organizations through locally shared frames of reference and identity that provide taken for granted assumptions, methods, ideas, practices and the like, which are widely accepted within the community in which they operate (Marquis & Battilana, 2009). Factors related to geography, history and tradition give variation in frames of reference across localities (Marquis & Battilana, 2009). Organizations that accommodate these widely-held beliefs and assumptions acquire legitimacy and access to resources (Zimmerman & Zeitz, 2002). Wirth (2014) found that cultural-cognitive forces (i.e. community spirit and cooperative tradition of South Tyrolean communities) influenced the scale, site and organization of the studied biogas cooperatives. Indeed, various studies have observed the influence of such institutional forces on community energy mobilization and initiative development (Bomberg & McEwen, 2012; Frantzeskaki, Avelino, & Loorbach, 2013; Haf & Parkhill, 2017; Holland, 2004; Kalkbrenner & Roosen, 2016; Koirala, Koliou, Friege, Hakvoort, & Herder, 2016; Korjonen-Kuusipuro, Hujala, Pätäri, Bergman, & Olkkonen, 2017; Reddy, Uitto, Frans, & Matin, 2006; Robbins & Rowe, 2002; Sperling, 2017; Süsser *et al.*, 2017).

By aiming to generate low-carbon energy in a decentralized fashion with enhanced community ownership and participation, LLCEIs challenge specific, taken for granted, assumptions and practices that are endorsed by the status quo. As such, LLCEIs are likely to benefit from aligning their actions specifically with traditions and practices (other than those related to energy) flowing from the local community in which they are situated.

Indeed, studies on bottom-up rural development – referred to as endogenous development – signal the importance of a shared identity (an identity that emphasizes

the shared characteristics of a population) and cultural symbols (regional language, folklore, and so on) for mobilizing developmental benefits and revitalizing the local economy for localities (Lee, Árnason, Nightingale, & Shucksmith, 2005; Ray, 1997, 1998, 1999a, 1999b). Furthermore, Magnani *et al.* (2016) observed that community renewable energy can contribute to rural development by re-territorializing energy and energy issues, a process they refer to as “localized (new) meanings and material outcomes strongly influenced by local environmental and formal/informal institutions” (p. 40). Additionally, recruitment strategies for, and incentives to sustain participation in community energy initiatives are found to be more successful when they are sparked by a connection to and an appreciation of place (Hoffman & High-Pippert, 2010, p. 7572). In their study, Haf and Parkhill (2017) demonstrated that Scottish and Welsh community renewable energy initiatives particularly sought to re-ignite and sustain cultural traditions (language use, traditional practices, repatriation of historical knowledge or reclaiming the relationship between people and land) (p. 110). Taking account of the above, it is therefore expected that:

*8. The degree to which LLCEIs align their operations with values and frames of reference related to the local community’s geography, identity, history, traditions, and culture contributes to their success.*

In practice, this means for instance that LLCEIs communicate in the regional language, align their projects with cultural community events (cf. von Bock und Polach *et al.*, 2015), or choose for a specific site for the installation that does not clash with the community’s cultural connection to that place (see for instance, Veelen & Haggett, 2017; Manzo & Perkins, 2006; Devine-Wright, 2009; Alkon, 2004).

#### *2.3.4.3 Normative influences and embeddedness*

The mechanisms of normative pressures are understood as “local relational systems that shape different standards of appropriateness across communities” (Marquis & Battilana, 2009, p. 290). In this regard, organizations’ objectives or goals and the appropriate ways to pursue these vary by community and are influenced by the conformity to other actors’ expectations (Marquis & Battilana, 2009; Marquis *et al.*, 2007; see also Von Bock und Polach *et al.*, 2015). Marquis and Battilana’s (2009; Marquis *et al.*, 2007) main argument is that community-level social and normative institutional forces affect the behavior and practices of firms. This study argues that this works through the following mechanisms; institutional embeddedness, LLCEI visibility, LLCEIs ability to meet community interests and needs, and the extent to which LLCEIs foster genuine participation. Each mechanism will be discussed below.

Marquis and Battilana (2009) argue that the influence of community-level social and normative features works mainly through two mechanisms; connectivity of firms with local organizations and the presence of community institutions (Marquis *et al.*, 2007). These two taken together refer to local relational systems which are expected

to have socio-normative effects on firm behavior. According to Marquis *et al.* (2007), the two mechanisms facilitate the spread of information and put firms directly in touch with social needs. Translated to the context of LLCEIs, I argue that LLCEIs will benefit from dense connections with local community institutions and organizations as it will facilitate legitimacy and provides for an enhanced degree of engagement with the local community (see also Zimmerman & Zeitz, 2002). Indeed, Allen *et al.* (2012, p. 277) suggest that community low-carbon energy projects should be located in public locales such as schools to maximize community engagement and foster a snowball effect. Forrest and Wiek (2014) found that the parish council of the community legitimated the ideas of the community project which helped the latter to get off the ground.

The logic of this proposition is also derived from studies looking into the impact of institutional embeddedness on new firm survival. Institutional embeddedness is operationalized as relational density, which refers to “the number of formal relations between the members of a population and key institutions in the environment” (Baum & Oliver, 1992, p. 540). In this case, institutions are understood here as “key government or community constituents in an organization’s task environment that possesses either communitywide and uncontested acceptance (e.g., public schools, churches), or legislative and administrative authority in the organization’s domain (e.g., government agencies, regulatory commissions)” (Baum & Oliver, 1991, p. 187). Vermeulen *et al.* (2016) conclude that connections with other non-profit organizations in the locality and the ability to include different local constituencies on boards of directors (measured by board size), enhance organizational embeddedness, which positively influenced the survival rate of community-based organizations. In the case of LLCEIs, institutional linkages – a direct and regularized relationship between an organization and an institution” (Baum & Oliver, 1991, p. 187) – may involve inter alia relationships with the local village council, or other community organizations (Forrest & Wiek, 2014, 2015). In other words:

*9. The degree to which LLCEIs connect with key actors in the local community (e.g., local village council, village church, local schools) contributes to their success.*

Institutional embeddedness differs from the concept of social capital. Institutional linkages specifically refer to the connections between LLCEIs and organizations and institutions within the LLCEI’s task environment. Bonding social capital emphasizes the social relations between core members of the LLCEI and members of the community (e.g. close friends, family, neighbors). As such, bonding social capital focuses on relations between individuals and the resources accessed through these relations. Bridging social capital captures those social relations between LLCEIs located in different communities: here, although LLCEIs are organizations they are not considered key community constituents that enjoy communitywide and uncontested acceptance. An institutional linkage is for instance an LLCEI using the local village council as a channel to present their project and recruit participants, in so doing demonstrating that the local village council supports and legitimizes their

project. An example of bonding social capital is the chair of an LLCEI reaching out to close friends and relatives to ask for financial participation in the LLCEI's project.

### 2.3.5 Community involvement

Marquis and colleagues (Marquis *et al.*, 2007; Marquis & Battilana, 2009) emphasize that community-level social and normative features convey an evaluative component, i.e. "what is right to do around here" (Marquis *et al.*, 2007, p. 934). Certainly, studies have shown that motivations for establishing community energy projects (that can be considered successful LLCEIs) strongly connect with community interests and needs, instead of global climate change issues (Forrest & Wiek, 2015; Hasanov & Zuidema, 2018; Hicks & Ison, 2011; Islar & Busch, 2016; Li, Birmele, Schaich, & Konold, 2013; Sperling, 2017; Süsser *et al.*, 2017). This is underscored by findings that show that a lack of public engagement and interest is perceived as a threat by community renewable energy initiatives, and community support to be crucial for success (Seyfang *et al.*, 2013; Seyfang *et al.*, 2014). One way to make sure that community interests and needs are represented in the LLCEI is for it to enable the participation and involvement of the locality.

The degree of local participation in the LLCEI as such is crucial for its acceptance. Researchers have observed the positive influence of enhanced participation in the planning process of low-carbon energy installations. In specific, high levels of participatory planning are often associated with enhanced social and public acceptance of low-carbon energy projects (Breukers & Wolsink, 2007; Devine-wright, Mcalpine, & Batley-White, 2001; Gross, 2007; Jobert, Laborgne, & Mimler, 2007; Khan, 2003; McLaren Loring, 2007; Sovacool & Lakshmi Ratan, 2012; Strachan, Lal, & von Malmborg, 2006; Wolsink, 2007; Zoellner, Schweizer-Ries, & Wemheuer, 2008). Furthermore, literature on community-based organizations also emphasize the role of participation in enterprise survival (e.g. Peredo *et al.*, 2006). On the topic of LLCEIs, participation possibilities for locals in LLCEI projects has been observed to foster support and acceptance as well (Boon & Dieperink, 2014; Forrest & Wiek, 2014).

Enabling appropriate community and member participation in low-carbon energy project decision-making processes and outcomes may foster legitimacy and acceptance since it demonstrates values such as fairness and transparency (Agerbosch, Meertens, & Vermeulen, 2009; Gross, 2007; Marschalek, 2008; Wüste & Schmuck, 2012; Zoellner *et al.*, 2008). In this regard, authors have conceptualized the structures and attributes of civic participation in LLCEIs and how various configurations of participation may have diverse effects and outcomes (Chilvers & Longhurst, 2016; S. Hoffman *et al.*, 2013; S. M. Hoffman & High-Pippert, 2005; Steven M. Hoffman & High-Pippert, 2010; Johnson & Hall, 2014; Walker & Devine-Wright, 2008). Central to their argument is that the nature of community energy (and thereby the energy system) is value laden, which needs to be reflected in community



energy research. This also becomes apparent in the diversity of motives that incentivize people to participate in an LLCEI (Arentsen & Bellekom, 2014; Bauwens, 2016; Fleiß, Hatzl, Seebauer, & Posch, 2017; Hoffman & High-Pippert, 2010; Islar & Busch, 2016; Kalkbrenner & Roosen, 2016; Li & Yu, 2013; Oteman *et al.*, 2014; Radtke, 2014; Rogers *et al.*, 2008; Seyfang *et al.*, 2013; Wüste & Schmuck, 2012). To allow for participation, LLCEIs can involve the community in multiple ways, such as by providing the community with information about the LLCEI and its activities; by consulting the community and establishing genuine dialogue, and by involving the community in decision-making processes or ownership of the low carbon energy installation (see Devine-wright *et al.*, 2001). The proposition that follows from this is:

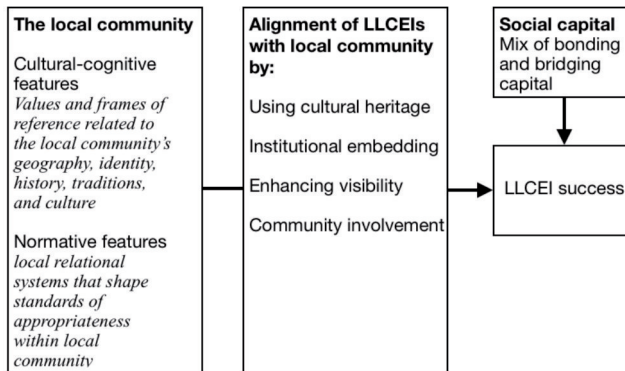
*10. The degree to which LLCEIs enable the local community to become involved (information, consultation, participation) contributes to their success.*

### 2.3.6 Visibility

Another means to acquire legitimacy is to demonstrate success and enhance visibility of the LLCEI. Zimmerman and Zeitz (2002) propose that visibly addressing norms and values (such as operating profitably, or specifically in case of LLCEIs; demonstrating success such as realized projects) endorsed by the societal environment relevant to the new venture have positive effects on their legitimacy. For instance, visible low-carbon energy technologies promote awareness and have positive effects on attitudes vis-à-vis low-carbon energy technology (Boon & Dieperink, 2014; Heiskanen, Jalas, Rinkinen, & Tainio, 2015; Rogers, Simmons, Convery, & Weatherall, 2012). Furthermore, demonstrating success and results can enhance community participation (Gui & MacGill, 2017; Saunders, Gross, & Wade, 2012). Moreover, de Vries *et al.* (2015) observed that members of LLCEIs are often reluctant to pay membership fees if the LLCEI's results are not visible. Additionally, being physically present allows community action groups to extend their networks into the wider community (Fien & Skoien, 2002, p. 279). This means not only physical in the sense of doing missionary work in the streets of a village, but also, for instance, a town sign showing the energy ambitions of a village (von Block und Polach *et al.*, 2015). Visibility can also be interpreted as sharing success stories in the media and social media (Feola *et al.*, 2013; Feola & Nunes, 2014; Forrest & Wiek, 2014, 2015; Hoppe *et al.*, 2015; Seyfang *et al.*, 2013; van der Schoor & Scholtens, 2015). These studies show that visible actions or projects of LLCEIs can add to the legitimacy of an LLCEI and can instill the LLCEI with various benefits. It is therefore expected that:

*11. The degree to which LLCEIs are visible within and beyond their communities contributes to their success.*

Figure 2.2 visualizes the mechanisms and factors stemming from the interaction between an LLCEI and its local community.



**Figure 2.2**

Overview of how interactions between an LLCEI and its local community influences LLCEI success.

In sum, LLCEIs are influenced by their local communities and LLCEIs can employ various means to align their operations with the local community in which they are situated. The degree to which the LLCEI aligns with the institutional fabric of the local community influences the legitimacy and acceptance of the LLCEI, which are considered crucial conditions for LLCEI success. As such, the success of LLCEIs greatly depends on the interaction between an LLCEI and its spaces of dependence, or ‘the local community’. In essence, this relation involves the extent to which the LLCEI effectively aligns itself with the community. Alignment consists of activities in which the LLCEI accommodates normative and cultural cognitive features stemming from the community. In terms of cultural-cognitive actions, LLCEIs can strive to align their projects with community practices, traditions, symbols and the like. In terms of normative features of communities, LLCEIs may connect with key institutions, arrange for genuine participation, enhance the visibility of the LLCEI, and ascertain that their operations meet the needs of the local community. Furthermore, another important mechanism for LLCEI success is the extent to which LLCEIs draw on a mix of bonding and bridging social capital. Both of these types of social capital can provide the LLCEI access to crucial resources such as novel information (in case of bridging capital) or financial capital (in case of bonding social capital). The distinction between social capital and institutional features of the local community is made because the former is referring to the usage of social relations for goal achievement of LLCEIs. The latter refers to more structural elements of local relational systems (or spaces of dependence) which are assumed to be rather resilient – LLCEIs that align with those institutional features are more likely to be successful as they garner legitimacy, a key resource for the survival and growth of new ventures.

Some of the concepts used in this section seem to show a degree of overlap. Specifically, the terms spaces of dependence, locality, and local community have been used interchangeably. Furthermore, social capital and institutions seem to be the result

of one another to a certain degree. Additionally, institutional embeddedness is closely related to social capital and garners legitimacy, while legitimacy and social acceptance seem to refer to the same idea. Therefore, Table 2.1 provides an overview of which concepts can be considered synonyms, as well as the concepts that do have a specific relation that requires some careful demarcation.

Table 2.1 provides an overview of the core concepts used throughout Section 2.3 and how they relate to one another. It also provides the definitions used for these concepts in the remainder of this doctoral thesis.

**Table 2.1**  
Overview of concepts used in Section 2.3.

<b>Concept</b>	<b>Definition used in this thesis</b>
<i>Spaces of dependence</i>	Spaces of dependence are “those more-or-less localized social relations upon which we depend for the realization of essential interests and for which there are no substitutes elsewhere; they define place-specific conditions for the material wellbeing of people and their sense of significance” (Cox, 1998b, p. 2).
<i>Locality</i>	Locality is the territory that defines for actors a geographically circumscribed context of exchange relations critical to their reproduction” (Cox & Mair, 1988, p. 310). Thus, locality and spaces of dependence refer to the same idea.
<i>Local community</i>	Cox (1998) distinguishes locality and community as the former is primarily involved with territorializing local economic development, while the latter is guided by cultural-cognitive and normative features. The core argument of Marquis and colleagues (Marquis & Battilana, 2009; Marquis <i>et al.</i> , 2007) is that such institutional features influence organizations. Hence: organizations are locally embedded. Essentially, locality, local community, and spaces of dependence refer to the same geographically confined area comprising of embedded local social relations sharing elements of local culture, identity, norms and values.
<i>Social capital</i>	Social capital refers to informal social ties that actors use to access resources. Distinction is made between bonding and bridging capital. Bonding social capital refers to social ties used by LLCEIs within local community to access resources. These social ties are thus part of the local community (overlap with the concept local community/locality/spaces of dependence), but social capital emphasizes the resources that can be mobilized through these ties. In this study, bridging social capital (i.e. horizontal social ties between heterogeneous groups) is understood as ties with other LLCEIs that may provide new information, ideas, or opportunities for collaboration.

**Table 2.1**  
Continued from page 46

<i>Concept</i>	<b>Definition used in this thesis</b>
<i>Institutions</i>	Institutions are “social structures that have attained a high degree of resilience [and are] composed of cultural-cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life” (Scott, 2008, p. 48). Institutions apply universally to a group of people, in the case of this thesis to the local communities in which LLCEIs operate. Social capital, on the other hand, can be used as a resource, is not available to all, is directed at the goals of particular actors, and must be built at a cost (Nooteboom, 2007, p. 32). Nooteboom (2007) argues that social capital is partly based on institutions and may also contribute to their development. Regarding the former: shared norms of reciprocity and trust, social identity and values are features of social capital and can also be derived from institutions. In terms of how social capital may contribute to the development of institutions; social relationships can become cemented and develop as institutions.
<i>Institutional embeddedness</i>	Institutional embeddedness involves the ties with local community organizations that possess communitywide or uncontested acceptance (see Baum & Oliver, 1991). A high degree of institutional embeddedness garners legitimacy and provides access to resources. Institutional embeddedness differs from social capital as understood in this dissertation in the sense that it refers to formal linkages with local community organizations, instead of informal linkages that LLCEIs draw on to access resources.
<i>Legitimacy</i>	Legitimacy refers to the degree of conformance between the values and norms of a socially constructed system and the practices of an actor within that system. Legitimacy is considered a key resource for new ventures to acquire new resources. Legitimacy is associated with new firm survival and growth.
<i>Social acceptance</i>	Social acceptance is similar to legitimacy, as Chen and Roberts (2010, p. 656) explain: “if legitimacy is said to stem from some socially constructed system of values, norms, beliefs, and definitions (Suchman, 1995), then conformity to this system grants social acceptance. In other words, in order to be perceived as legitimate organizations, the pattern of organizational structures and actions is assumed to follow the prescription of these socially constructed norms and principles.”

## **2.4 LLCEIs and governance**

### *2.4.1 Spaces of engagement and linking social capital: ties with government and intermediaries*

Enhancing or maintaining place dependent interests and ascertaining that value flows through the locality are not solely dependent on the ability of the LLCEI to accommodate the interests and institutional forces prevalent in the locality as described in the section above. When actors such as LLCEIs experience a problematic relation to

a space of dependence, they can engage with other centers of social power and construct through networks of associations a space of engagement: the space in which the politics of securing a space of dependence unfolds (Cox, 1998, p. 2). Therefore, the extent to which LLCEIs construct links with other actors outside of their local community to deal with issues stemming from their spaces of dependence is an important measure for LLCEI success as well. The networks of associations consist of outward oriented ties and in the understanding of this study may provide the LLCEI with vertical ties, or linking social capital. Linking social capital refers to norms of respect and trusting relationships between actors of different scales, orders of power, institutions and political structures (Firth, Maye, & Pearson, 2011; Rydin & Holman, 2004; Szreter & Woolcock, 2004; Poortinga, 2012).

As such, in the understanding of this doctoral thesis, spaces of engagement and linking social capital essentially refer to the same idea. Cox' notion of spaces of engagement was formulated to conceptualize how politics of scale unfold, and how actors embedded in localities strive to safeguard local interests by associating with other centres of social power. Linking social capital helps actors to mobilize political resources and power outside of their own social network. To locate linking social capital, this study focuses on ties with government actors and so-called intermediaries. Indeed, ties between an LLCEI and (local and/or regional) government actors (Aylett, 2013; Parag *et al.*, 2013; Seyfang *et al.*, 2013; van der Schoor & Scholtens, 2015; Yalçın-Riollet *et al.*, 2014), as well as ties with intermediaries (Bird & Barnes, 2014; Ruggiero *et al.*, 2014) appear to be essential for LLCEI success. Intermediaries are actors that create “new possibilities and dynamism within a system” (Howells, 2006, p. 726) and create “spaces and opportunities” (Stewart & Hyysalo, 2008, p. 296–297) for others. Within these spaces and dynamics, intermediaries “mediate, they work in-between, make connections, and enable a relationship between different persons or things” (Hodson *et al.*, 2013, p. 1408).

In similar vein of how bonding and bridging social capital involve a combination between (horizontal) social networks and access to resources, linking social capital refers to a combination of vertical relationships and access to resources. Therefore the following propositions are put forward:

*12. The degree to which LLCEIs are connected with government actors contributes to their success.*

*13. The degree to which LLCEIs are connected with intermediaries contributes to their success.*

The logic behind these propositions is that linking social capital can infuse LLCEIs with crucial resources such as financial capital (e.g. in shape of subsidies or loans), expert knowledge, or political backing.

### 2.4.2 Supportive governance arrangements

This conceptualization of how social networks that cut across centres of social power can be employed by LLCEIs to achieve their goals has considerable overlap with governance theory. In his influential work, Rhodes defined governance as ‘self-organizing, interorganizational networks’ (Rhodes, 1996, p. 652). This leans on the ‘governance without government’ school of thought, which argues that government is increasingly losing its legitimacy and capacity to govern (Pierre & Peters, 2005). This society-centred perspective on governance – emphasizing co-ordination, self-governance processes and social networks – provides, similar to Cox’ spaces of engagement, a perspective that highlights how LLCEIs can influence their own success by engaging with other actors to mobilize resources. Still, by solely focusing on the agentic capacities of LLCEIs to construct such networks of relationships (i.e. by engaging with government actors and intermediaries by means of self-governance), one may lose sight of the actors, institutions and policy frameworks that shape the governance arrangements in which these interactions ensue.

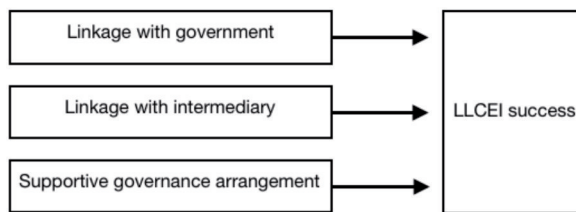
In this regard, scholars agree that the abovementioned society-centred perspective of governance can be considered one of (at least) two categories of governance commonly perceived by political scientists and public administration scholars. The other perspective is state-centric and is concerned with the “extent to which the state has political and institutional capacity to steer, and how the role of the state relates to the interests of other influential actors” (i.e. Pierre, 2000, p. 3). In other words, this perspective argues that government and affiliated organizations are central in moulding the governance arrangements of policy domains. Certainly, evidence suggests that national government plays an important role in shaping the general supportive policy framework for LLCEIs (Bomberg & McEwen, 2012; Oteman *et al.*, 2014; Wade, Hamilton, Eyre, & Parag, 2013). There is a specific role for subnational governments, as they seem to be critical in providing institutional support to LLCEIs when there is a lack of institutional fit at the national level (Oteman *et al.*, 2017). Numerous studies show that the support provided by local (Hoppe *et al.*, 2015; Markantoni, 2016; Peters, Fudge, & Sinclair, 2010; Ruggiero *et al.*, 2014; Shaw & Mazzucchelli, 2010; Wade *et al.*, 2013) and regional government (Schoor & Scholtens, 2015; Oteman *et al.*, 2017) adds to the development and success of LLCEIs. On the basis of these studies, I hypothesize that:

*14. The extent to which the subnational governance arrangements are supportive of LLCEIs is expected to positively affect their success.*

Governance arrangements can be similar for different LLCEIs. National-level policy instruments pertain to all LLCEIs in a specific country, same as how LLCEIs within a specific region are subject to the spatial planning regime that is in place in that specific area. In this sense, the proposition refers to those local-level governance arrangements that can vary for individual LLCEIs. Certainly, various studies have shown that governance arrangements for decentralized energy and climate change action manifest at the local level (e.g. Bulkeley & Kern, 2006; Fuchs & Hinderer, 2014). The relevance of

looking into local governance arrangements for LLCEIs is confirmed by various studies as well (Mey, Diesendorf, & MacGill, 2016; Peters *et al.*, 2010; Wade *et al.*, 2013). As such, the extent to which the governance arrangement can be considered supportive can be derived from various loci. Aspects pertaining to the governance arrangement that can be considered unsupportive may involve inter alia unsuitable spatial planning regimes (Nolden, 2013; Strachan, Cowell, Ellis, Sherry-Brennan, & Toke, 2015); instable and uncertain policy frameworks (Ruggiero *et al.*, 2014); funding schemes that are difficult to access for community energy groups or do not match their aspirations or plans (Creamer, 2015; Dinnie & Holstead, 2017; Hall, Foxon, & Bolton, 2016; Nolden, 2013; Ruggiero *et al.*, 2014) limited political support (Oteman *et al.*, 2017, 2014; Wüste & Schmuck, 2012); or limited access to policy makers and key decision-making forums (Bomberg & McEwen, 2012; Oteman *et al.*, 2017; Strachan *et al.*, 2015). Furthermore, proxy indicators for the degree of supportiveness of the governance arrangement are the capacities present at local government for climate change action. For instance, local catalysts (Hoppe & Coenen, 2011; Hoppe *et al.*, 2015; Hoppe, van der Vegt, & Stegmaier, 2016), the presence of a full-time expert, as well as the municipal budget for sustainability.

Figure 2.3 provides an overview of how governance settings influence LLCEI success.

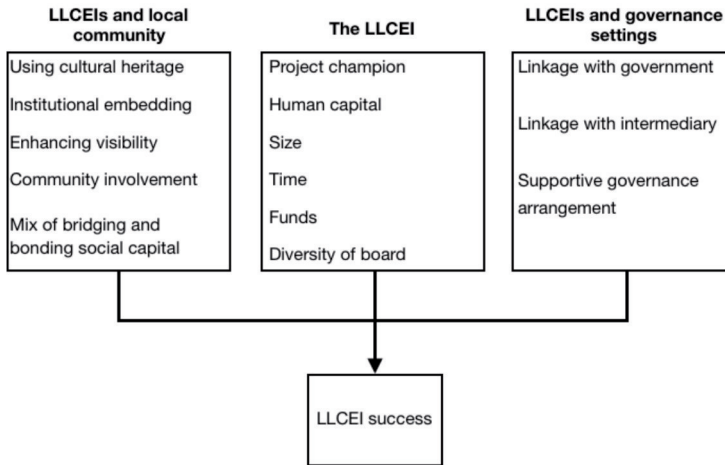


**Figure 2.3**

Overview of factors stemming from governance settings that influence LLCEI success

## 2.5 Theoretical framework

The amalgamation of the various factors and mechanisms outlined in Sections 2.2, 2.3, and 2.4 is visualised in Figure 2.4.



**Figure 2.4**

Theoretical framework of factors and mechanisms influencing LLCEI success

The framework presented in Figure 2.4 shows the collection of factors and mechanisms that are expected to influence the success of LLCEIs. The framework describes three analytical foci from which LLCEI success can be discerned: the LLCEI itself; the dynamics and interactions between the LLCEI and the local community (i.e. spaces of dependence); and the dynamics and interactions between the LLCEI and the governance arrangements (i.e. spaces of engagement). These three dimensions influence the success of an LLCEI. It is important to stress that not the overall stock but rather the positive configuration of the factors and mechanisms helps to understand why some LLCEIs are more successful than others. For instance, the lack of human capital in an LLCEI can be offset by linkages with intermediaries that provide access to expert knowledge. The mechanisms and propositions underlying each of the three analytical dimensions are summarized below.

The center square, named ‘The LLCEI’, shows that multiple factors that pertain to the internal organization of the LLCEI can influence its success. The box on the left, named “LLCEIs and local community” underscores the importance of fruitful interactions between the LLCEI and its local community, earlier in the thesis also referred to as the LLCEI’s spaces of dependence. LLCEIs that manage to align with the institutional features of their local communities are expected to be more successful as the means to do so (e.g. by using cultural heritage, linking up with key community organizations, enabling meaningful participation,) are argued to garner legitimacy. Furthermore, drawing on social capital within the local community as well as linking up with other LLCEIs are anticipated to add to LLCEI success because these social ties provide access to resources.



The square on the right, “LLCEIs and governance settings” addresses two key conditions. The first involved the extent to which LLCEIs make an effort to mobilize different actors (e.g. local and regional government; intermediaries; energy companies; grid operators) in order to realize their goals. The extent to which LLCEIs link up with government actors and intermediaries is hypothesized to influence their success. Secondly, it is argued that existing policy frameworks and the formal institutional landscape (e.g. decision-making processes, established practices, dominant discourses) influence the success of LLCEIs as well.

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# Chapter 3

**The success of LLCEIs**

**Abstract:** Evidence of academic studies analysing social, organisational and governance factors that influence success of community energy initiatives is scarce. This chapter analyses the success of ‘local low-carbon energy initiatives’ (LLCEIs) using these potential success factors. In order to do this I established conceptual claims pertaining to three groups of factors: (i) those related to the LLCEI organization; (ii) those related to the interaction between a LLCEI and the local community; and (iii) those related to the presence of supportive governance settings and linkages with government and intermediaries. To analyse the influence of these factors on LLCEIs success I used a cross-case research design with fourteen LLCEIs in the Dutch Province of Fryslân. Results show that there is a difference in sets of factors positively correlating to different measures of LLCEI success. Factors related to the LLCEI organization correlate to realising collective energy projects and to a lesser extent to individual projects. Items related to interaction of the LLCEI with the local community foremost correlate to customer base and to a lesser extent to individual projects realised. Finally, items related to the governance setting correlate mostly with individual projects realised.

In this chapter, the theoretical framework presented in Chapter 2 will be used to analyze fourteen LLCEIs in the Dutch province of Fryslân. While Chapter 2 provided a literature study of the factors and mechanisms that are likely to influence the success of LLCEIs, this chapter assesses the extent to which the propositions underlying the theoretical framework holds up in the analysis of fourteen individual cases. Thus, this chapter provides an answer to sub-question 1B:

*To what extent do the factors of sub-question 1A (Chapter 2) contribute to explaining variation the success of low-carbon energy initiatives in the Dutch region of Fryslân?*

The chapter starts off with an account of the context of study; the province of Fryslân. Subsequently, the research design is discussed, including the case selection strategy and criteria; and the data-collection and methods of analysis. The following three sections discuss the ordinal scores analysis in the order of the groups of factors related to LLCEI success: factors internal to the LLCEI (Section 3.3), the interaction between the LLCEI and the local community (Section 3.4), and factors related to the governance arrangements (Section 3.5). Section 3.6 presents the cross-case analysis. Section 3.7 juxtaposes the findings of the analysis with current academic contributions. In Section 3.8, conclusions are drawn and the line of argumentation for the emphases and theoretical foci applied in Chapters 4, 5, and 6 is developed.

### **3.1 The province of Fryslân and its LLCEIs**

#### *3.1.1 The province of Fryslân*

The Dutch province of Fryslân is chosen as the context of this doctoral thesis. The Province of Fryslân is located in the northern part of The Netherlands. Each province in the Netherlands has its own provincial government, comprising of the Provincial Executive and Provincial Council. Dutch provinces have some decentralized administrative authorities of their own (e.g., spatial, environmental, and water policies). As such, many of the provinces in The Netherlands have their own energy transition programs (typically offering subsidies and other supportive policies). When compared to other Dutch provinces, Fryslân can be considered as active, as it entails a relatively large portion of policies to support regional socio-economic development (also related to the issue of regional demographic and socio-economic decline and livability), including policies to support and facilitate LLCEIs, often indirectly via the involvement of several intermediary organizations. As a rural province, Fryslân experiences issues related to regional shrinkage, which evidently has an impact on local socio-economic conditions. Enhancing the livability of Fryslân and tackling the issues inherent to shrinkage are at the top of the political agenda. The province sees LLCEIs as one way to spur regional development and augment livability.

Fryslân is characterized by a rural landscape, dairy farms, and has its own official language and cultural identity. It is home to over 400 rural townships and small villages (many with a population of less than 1500). The LLCEIs in Fryslân typically evolve in

these small villages and townships. This is, however, not only for reasons of sustainability. Throughout history, self-organization and collective action of Frisian communities have been defining elements of the Frisian identity (Kenniscentrum Immaterieel Erfgoed Nederland, 2018). For instance, in the late 19th century, Fryslân was home to 66 cooperative dairy plants of a total of 112 in the Netherlands (Willemsens, 1995). The relatively large number of Frisian LLCEIs is also a case in point. Within the province, there are over well over 50 LLCEIs, of the 353 in total (483 when project cooperatives and wind cooperatives are taken into account) in the Netherlands. Furthermore, Fryslân is amongst the provinces with the highest number of LLCEIs per capita in the Netherlands. With 650.000 inhabitants and well over 50 LLCEIs, the density of LLCEIs is bigger than in Noord-Brabant with 2.5 million inhabitants and 51 LLCEIs (excluding wind cooperatives and project cooperatives). The province also belongs to the top three of provinces that have the largest installed capacity of community-owned solar PV (12,1 MWP in Fryslân, compared to the provinces of Noord-Brabant with 12,2 MWP and Noord-Holland with 13,2 MWP) (Schwencke, 2018). Whereas the majority of the Frisian LLCEIs were established no more than 4–5 years ago, some of them have been into existence since the 1990s. Moreover, the LLCEIs in Fryslân show a large variety in size, scope, and type of organization. For instance, the region houses an initiative that has close to 1000 customers, whereas the majority of the LLCEIs have a customer base in the 20–100 range.

It becomes apparent that Fryslân is a rather extreme case; both in terms of the number of LLCEIs and their installed capacity of low-carbon energy. Still, there seems to be a great deal of variety across Frisian LLCEIs. This makes the Frisian context a suitable one for testing the theoretical framework that was developed.

### *3.1.2. Frisian LLCEIs; an overview of the movement*

Although the upsurge of Dutch LLCEIs took off around 2012, the province of Fryslân is not new to the idea of citizen-initiated low-carbon energy projects. As such, one can distinguish two waves of Frisian LLCEIs. Their origin and characteristics are described below. This background is important for arriving at the cases that will be selected for this study.

#### *The first wave: wind energy foundations and associations*

The Province of Fryslân has known an upsurge of LLCEIs in shape of wind energy foundations/associations in the late 1980s and early 1990s. These LLCEIs sprung from anti-nuclear and pro-environmental sentiments (Oteman, Wiering, & Helderma, 2014) and typically used to exploit one or more collectively-owned wind turbines. This surfacing of LLCEIs in Fryslân in particular and in the Netherlands in general, however, did not evolve in the same way as it did in countries such as Denmark or Germany, where LLCEIs shaped the organization and structure of the energy system in favor of extended civil involvement and ownership. Still, the ‘first wave’ of Frisian LLCEIs showed what low-carbon energy can do for harnessing socio-cultural values and local economic regeneration in a shrinkage region (see Appendix A). The wind energy initiatives commonly used the income generated from their wind turbines for community revitalization purposes.

However, these LLCEIs dating from the early 1990s are excluded from our study since the context and drivers in and from which these initiatives emerged are fundamentally different from the ‘new style’ LLCEIs. The ‘old’ wind energy foundations associations were driven by anti-nuclear and pro-environmental sentiments and benefitted from inter alia profitable subsidy schemes and feed-in tariffs, easy access to investment capital, relatively no opposition regarding wind turbines, and no stringent permit procedures for constructing a 30-meter-tall solitaire wind turbine. The current new wave of LLCEIs differs to a great extent from the wind energy initiatives dating from the 1990s. For instance, the process of getting a permit for a wind turbine has become lengthy and increasingly complex. This is one of the reasons why the ‘new style’ LLCEIs typically pursue the realization of solar PV projects. Moreover, opposition concerning wind turbines has increased up to the point that the Provincial Council in Fryslân decided against solitaire on-shore wind turbines. Additionally, current subsidy schemes and feed-in tariffs are characterized by uncertainty and barely allow for a feasible business case, much unlike the period of development of previous wind energy foundations and associations. Likewise, LLCEIs experience difficulties in getting their projects financed.

#### *The second wave: low-carbon energy cooperatives*

In 2017, the Province of Fryslân was home to 46 ‘new style’ LLCEIs. From the 46 LLCEIs, 45 are organized as cooperatives. One LLCEI is a foundation (“Leefbaar met Energie Feanwâlden). Of the 45 cooperatives, 44 are “energy cooperatives”, one is a “village cooperative” (“KRIGEL”). The Frisian LLCEI movement is headed by a provincial umbrella cooperative ‘Ús Koöperaasje’. Each individual LLCEI can become a member of Ús Koöperaasje when it has at least 20 members. Chapter 4 discusses the activities of intermediaries such as Ús Koöperaasje. From the 46 LLCEIs, 6 are not a member of the provincial umbrella cooperative. While some relatively new LLCEIs may not be at the stage in which they are eligible for membership of Ús Koöperaasje, there are LLCEIs which intentionally opted out of the provincial cooperative’s membership. The Frisian LLCEIs demonstrate significant variation in terms of their spaces of dependence, clients, relative number of clients, and the projects that are in development or that were realized. To get a better grip on this variation and to inform the case selection process, Tables 3.1, 3.2, 3.3, and 3.4 were made and are shown in this chapter’s main text. These tables add to a profound characterization of the Frisian LLCEI movement. A complete overview of the Frisian LLCEIs and key characteristics is found in Appendix B.

#### *Spaces of dependence*

As can be seen in Table 3.1, the LLCEIs differ with regard to their spaces of dependence. The different categories are derived from the localities through which LLCEIs strive to achieve their ambitions. Commonly, the locality can be derived from the name of the LLCEI. In other instances, the spaces of dependence could be derived from the websites of LLCEIs. Table 3.1 shows the six types of spaces of dependence and the corresponding number of LLCEIs. The large majority of Frisian LLCEIs are situated in rural settings (42 LLCEIs). Only four LLCEIs operate in more urban settings (“Achter de Hoven”, “Westeinde”, “Bolsward”, and “Ijlst”).



**Table 3.1**

Categories of spaces of dependence in which Frisian LLCEIs are situated.

<b>Spaces of dependence</b>	<b>Number of LLCEIs</b>
<i>Village</i>	20
<i>Multiple villages</i>	13
<i>Municipality-wide</i>	5
<i>Island</i>	4
<i>City district</i>	2
<i>City</i>	2
<b>Total</b>	<b>46</b>

### *Clientele and membership*

Because of the way the Frisian LLCEI movement is institutionally organized, it is important to make a distinction between ‘clients’ and ‘members’. Commonly, LLCEIs choose to formally organize themselves as cooperatives. This legal form allows members of the cooperative to influence decision-making processes by taking votes. Members are people that pay an annual membership to the LLCEI in concern, but are not necessarily clients. Clients are households that get their energy supplied from an LLCEI. For most LLCEIs, clients are members of the LLCEI as well. There are two underlying arguments as to why clients can be regarded a better indicator of LLCEI success than membership. Firstly, being a client demands for a more intensive level of commitment than solely being a member (i.e. deciding to buy energy from an LLCEI versus supporting the LLCEI with a relatively small annual fee (typically ranging from €10 to €50 a year)). The second reason lies in the fact that LLCEIs themselves do not supply energy to clients, but their own regional energy supplier ‘Energie VanOns’ does. LLCEIs can therefore be rather considered as contractual intermediaries. This contractual relation is based on an annual fee of €75,- that an LLCEI receives from ‘Energie VanOns’ for each client that it managed to connect to the energy supplier. This fee is derived from the money that the regional energy supplier saves from not having to invest in a marketing campaign since each individual LLCEI is an advocate and promotor of the energy supplier. In practice this means that an LLCEI with 50 clients receives €3500,- on a yearly basis. The LLCEI may decide for itself how these payments are spent (e.g. developing low-carbon energy projects). This study presents five categories to group together cases that show similar numbers of clients. The categories were constructed on the basis of the available data. The categorization and the absolute number of clients are shown in Table 3.2.

**Table 3.2**

Categorization of number of clients of LLCEIs in the province of Fryslân

<b>Category</b>	<b>Number of clients</b>	<b>Number of LLCEIs</b>
<i>High</i>	60 >	5
<i>Medium-high</i>	50-59	4
<i>Medium</i>	40-49	4
<i>Low-medium</i>	21-39	9
<i>Low</i>	< 20	17
<b>Total*</b>		<b>39</b>

The categorization of the relative number of clients (number of clients compared to the number of households in the locality) and the number of LLCEIs in each category are presented in Table 3.3. The categories are constructed on the basis of available data on the number of clients of Frisian LLCEIs.

**Table 3.3**  
Categorization of number of clients relative to number of households  
in LLCEI's area of operation

Category	Percentage of households that are clients	Number of LLCEIs
<i>High</i>	30% >	4
<i>Medium-high</i>	20% - 29%	0
<i>Medium</i>	10% - 19%	4
<i>Low-medium</i>	5% - 9%	6
<i>Low</i>	< 5%	25
<b>Total*</b>		<b>39</b>

\*Six LLCEIs are not a member of Ús Koöperaasje, and therefore do not have a client base as an LLCEI needs to be a member of Ús Koöperaasje in order to recruit customers. One LLCEI joined Ús Koöperaasje after this data was collected.

#### *Low-carbon energy generation*

Frisian LLCEIs, with exceptions, commonly seek to generate low-carbon energy by using solar PV installations. However, the size and scale of these installations differ to a great extent. Here, size refers to the installed capacity of the low-carbon energy installation. Scale refers to level of the low-carbon energy technology; either at individual household-level (e.g., lighting bulbs, weather-strips, advice on energy-saving measures on appliances, water-use, heating use, roof-based solar PV panels, insulation measures) or meso-level (collectively owned low-carbon energy installations) (Walker & Cass, 2007).

In this regard, five categories were constructed on the basis of available data on the projects of Frisian LLCEIs. The categorization and number of projects are presented in Table 3.4. This categorization may be interpreted as rather arbitrary, especially since the emphasis is on solar PV panels, instead of the number of kilowatt-peaks. However, the number of solar PV panels involved in finished or planned projects proved to be easier to find on the LLCEIs' websites than the capacity of the installation (or the type of solar PV panels used for that matter). And so, this categorization will assist in grouping the cases together and making them comparable. Important to note here is that Table 3.4 applies to both collective and individual, household-level solar PV panels separately. For example, an LLCEI can score 'high' on a collective project, but 'low' on an individual household level.

**Table 3.4**

Categorization of number of collective and individual household level solar PV panels

Category	Number of solar PV panels	Individual	Collective
<i>High</i>	500>	4	5, 4 pending
<i>Medium-high</i>	300-499	2	1
<i>Medium</i>	200-299	1	10, 6 pending
<i>Low-medium</i>	100-199	1	1
<i>Low</i>	<99	1	1
<b>Total</b>		<b>9 projects</b>	<b>18 finished projects, 10 are still in development.</b>

\*Six LLCEIs are not a member of Ús Koöperaasje, and therefore do not have a client base as an LLCEI needs to be a member of Ús Koöperaasje in order to recruit customers. One LLCEI joined Ús Koöperaasje after this data was collected.

## **3.2 Research design and methodology**

### *3.2.1 Research design*

In order to answer the research question, a multiple case studies research design was used to investigate fourteen LLCEIs. A multiple case studies design strengthens the theoretical claims of this study by allowing for both within-case analysis and cross-case analysis. The case study method appreciates an “in-depth investigation of a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident” (Yin, 2009, p. 18; Yin, 1994 xi). As became apparent from the literature discussed, the local context is deemed of utmost importance for the development of the LLCEI. The case study method effectively takes into account the symbiotic relationship between a case and its context. Furthermore, the case study inquiry is appropriate for dealing with a multiplicity of variables and influences that are at work in this highly complex social phenomenon since it “copes with the situation in which there will be many more variables of interest than data points (see Yin, 1994, p. 3; Yin, 2009 p. 18). The case study method therefore relies on multiple sources of evidence, with data with data converging in a triangulating fashion which in turn benefits from the prior development of theoretical propositions to guide data collection and analysis.

### *3.2.2 Cases*

The cases of this study are LLCEIs, which are referred to as the bottom-up initiating and managing of a project or series of projects involving the generation, stimulation and/or facilitation of low-carbon energy and/or energy efficiency by citizens/actors from civil society on a local scale. In analyzing the success of LLCEIs, the study

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1 The core group of volunteers within the LLCEI are distinguished from passive participants who are a member of the LLCEI but are not involved in the operation or management of the initiative.

focuses on the organization (core group of volunteers<sup>1</sup> (often the board), and capacities such as fundraising abilities, flexibility to use time) as well as its projects and activities (directed at the local community and spaces of engagement). Furthermore, case-specific contextual circumstances directly influencing the LLCEI are included as well, in particular the local community and local governance arrangements. Regarding the former, the analysis pays attention to particular settings or aspects that can shape the relation between the LLCEI and its spaces of dependence. Regarding the governance arrangement, local government capacities (e.g. policies, spatial planning policies, presence of civil servant responsible for sustainability), as well as actors and or conditions stemming from policy / institutional frameworks that can influence the LLCEI are accounted for as well in each case. For example, an LLCEI that strives to realize a collective low-carbon energy installation on a strip of land owned by the regional Waterboard benefits from collaborating with this public authority.

### 3.2.3 Operationalization of theoretical constructs

Next to a clear definition of this study's cases, it is paramount to provide clear-cut operationalizations of the theoretical constructs that have been discussed at length in Chapter 2. Table 3.5 presents the operationalization of the theoretical constructs that are expected to influence the success of LLCEIs as well as the operationalization of success.

**Table 3.5**  
Operationalization of theoretical constructs and indicators of success.

Concept	Indicator	Measurement
<i>The LLCEI</i>		
<i>Project champion</i>	Individual or core group of committed individuals that have a prominent role in carrying out a project.	The larger the group of core committed individuals, the higher the ordinal value assigned.
<i>Human capital</i>	Knowledge, skills and experience with high degree of task-relatedness (such as in the relevant industry, self-employment or leadership experience).	The more individuals with specific knowledge and skills, the higher the ordinal value assigned.
<i>Start-up size</i>	The size of the group of volunteers that the LLCEI can draw on.	The larger the size of the group of volunteers, the higher the ordinal value assigned.
<i>Time</i>	The degree to which the core group of volunteers are able to spend their time flexibly (e.g. because of self-employment, retirement, unemployment/in-between jobs).	The more individuals that can spend their time flexibly, the higher the ordinal value assigned. Retired individuals are more flexible than self-employed or unemployed individuals.

**Table 3.5**  
Continued from page 71

<b>Concept</b>	<b>Indicator</b>	<b>Measurement</b>
<b>Funds</b>	The extent to which the LLCEI is able to raise funds and to which it has a stable flow of income.	The more funds the LLCEI is able to generate and the larger a stable flow of income is, the higher the ordinal value assigned.
<b>Board composition</b>	The degree of variation in age and gender of the board.	The more variation in gender and age of the board, the higher the ordinal value assigned.
<b>LLCEIs and the local community</b>		
<b>Using cultural heritage</b>	Usage of regional language in communication and marketing, alignment of LLCEI with traditions and identity of locality.	The more cultural markers the LLCEI uses and the more the activities of the LLCEI align with the cultural heritage of the locality, the higher the ordinal value assigned.
<b>Institutional embedding</b>	Ties with community organizations (i.e. village council, associations, schools, churches).	The more ties with community organizations, the higher the ordinal value assigned.
<b>Enhancing visibility</b>	Participating in community events, organizing energy markets/cafés, personal contact with residents, up to date website, activity on social media, attention in local/regional media, physical signs in the locality.	The physical measures for visibility (e.g. signs, personal contact, participation in community events) receive a higher ordinal value than (social) media coverage. Overall, the more individual activities the LLCEI engages in, the higher the ordinal value assigned.
<b>Community involvement</b>	Extent to which LLCEIs inform (e.g. organizing meetings, distributing flyers), consult (e.g. sending a survey to assess what sustainability measures community members are interested in taking, or asking the residents how income generated by the LLCEI should be spent) and involve (in ownership and financial participation) the local community.	Involvement receives a better score than consultation, the latter receives a better score than informing the community. The more activities for community involvement LLCEIs engage in the higher the ordinal value assigned.
<b>Bonding social capital</b>	Usage of relations within the local community to access resources such as new customers, financial capital).	The more resources (human capital, financial capital, customers, participants) the LLCEI accesses by means of strong ties, the higher the ordinal value assigned.

**Table 3.5**  
Continued from page 72

<b>Concept</b>	<b>Indicator</b>	<b>Measurement</b>
<b><i>Bridging social capital</i></b>	Ties with other LLCEIs, local firms, organizations, and parts of the locality	The more resources (e.g. knowledge, human capital, customers) the LLCEI accesses by means of weak ties, the higher the ordinal value assigned.
<b><i>LLCEIs and governance settings</i></b>		
<b><i>Linkage with government</i></b>	The degree to which the LLCEI has had contact with local government actors and the extent to which resources were accessed through this linkage.	The more resources accessed through the linkage with government, the higher the ordinal value assigned.
<b><i>Linkage with intermediary</i></b>	Ties with intermediaries and extent to which this linkage has provided access to resources	The more the LLCEI benefitted from the linkage with an intermediary, the higher the ordinal value assigned.
<b><i>Supportive governance arrangement</i></b>	Capacity at local government: local catalyst, budget for sustainability, presence of a full-time expert, ambition.	Supportive policy: subsidies, spatial planning, financial and fiscal measures. Other (semi-)governmental or private actors that provide support to the LLCEI's project(s).
<b><i>Success: customers</i></b>	Number of customers of the regional energy supplier.	The larger the number of customers, the higher the ordinal value assigned.
<b><i>Success: relative customers</i></b>	Number of customers relative to the total number of households in the locality	The larger the number of customers relative to the number of households in the locality, the higher the ordinal value assigned.
<b><i>Success: individual household projects</i></b>	Number of households with energy efficiency measures or total number of solar PV panels realized for individual households.	The larger the number of households with energy efficiency measures or number of solar PV panels for individual household, the higher the ordinal value assigned.
<b><i>Success: collective projects</i></b>	Number of solar PV panels realized by means of (a) collective (that is multiple financial participants stemming from the locality) project(s).	The larger the number of solar PV panels realized by means of (a) collective project(s), the higher the ordinal value assigned.

### 3.2.4 Case selection and dealing with many variables and a small *N*

Since this study seeks to analyze the influence of 14 independent variables on 14 cases, it is susceptible to the “many variables, small *N*” problem (Lijphart, 1971, p. 686; Goggin, 1986). One way to circumvent this issue is by the maximum variation logic. Fourteen cases have been selected on the basis of their variance in their degree of success, as well as their spaces of dependence. An important advantage of the maximum variation case-selection technique is that the shared patterns that cut across cases are significant as they emerged out of heterogeneity (Patton, 2002, p. 235).

This study uses four indicators to measure LLCEI success which also assist in the case selection process. The indicators are: (i) the number of customers; (ii) the number of customers relative to the number of households in the locality; (iii) realized low-carbon energy and energy efficiency projects for individual households; and (iv) collective low-carbon energy projects that have been realized. The logic behind these indicators is as follows; (i) LLCEIs receive an annual fee from the regional energy supplier for each customer, which provides the LLCEI with financial capacity to undertake new projects; (ii) a high degree of customers in the locality signals the embeddedness of the LLCEI which is particularly relevant in order to account for the variance in the spaces of dependence of LLCEIs; and (iii and iv) LLCEIs that realized installation(s) with greater capacity (size; amount of solar PV panels or measures taken) and on an individual household as well as collective level (scale) are more successful than LLCEIs that have installations with lower capacity and solely individual level household measures.

Furthermore, another case selection criterium (but not an indicator of success) is the LLCEIs’ spaces of dependence. Therefore, LLCEIs that have similar spaces of dependence in terms of scale can also be grouped together which assists in comparing comparable cases. The underlying reason for using these indicators to select the cases for study is to prevent the screening procedure from becoming a “mini” case study of every potential case (Yin, 2009, p. 91).

### 3.2.5 Selected cases

The cases that were selected for this study are presented in Table 3.6. Figure 3.1 shows a map of the province of Fryslân in which the selected cases are indicated.

**Table 3.6**

Overview of selected cases, their spaces of dependence and how they are referred to in text.

LLCEI	Spaces of dependence	LLCEI in text referred to as
<i>Amelander Energie Coöperatie</i>	Island	Ameland
<i>Trynergie</i>	Multiple villages	Trynergie
<i>Energie Coöperatie Gaasterland</i>	Multiple villages	Gaasterland
<i>Westeinde</i>	Urban district	Westeinde

**Table 3.6**  
Continued from page 74

LLCEI	Spaces of dependence	LLCEI in text referred to as
<i>Doniawerstal-Energie</i>	Multiple villages	Doniawerstal
<i>Energzy Koöperaasje Om (de) Noorderpolder (EKON)</i>	Multiple villages	Noorderpolder
<i>Grieneko</i>	Multiple small villages	Grieneko
<i>Energie Kûbaard</i>	Small village	Kûbaard
<i>Energzy Koöperaasje Easterwierrum</i>	Small village	Easterwierrum
<i>Coöperatie “Duurzaam Heeg”</i>	Village	Heeg
<i>Wijnjewoude Energie Neutraal</i>	Village	Wijnjewoude
<i>Energie Coöperatie Achter de Hoven</i>	Urban district	Achter de Hoven
<i>Lokale Energie Coöperatie Opsterland</i>	Municipality	Opsterland
<i>Energie Coöperatie “De Eendracht”</i>	Municipality	Eendracht



**Figure 3.1.**

Map of the Province of Fryslân with geographic locations of the selected cases, made with use of Google Maps (Google, n.d.)

### 3.2.6 Data collection

The data collection strategy for each case involves a one-time data collection effort (Yin, 1994, p. 35). Sources of evidence for data collection are semi-structured in-depth interviews, documentation (websites, policy documents, white papers, statutes, minutes of meetings), direct observation (e.g. workshops, attending meetings, field visits), and physical artifacts (e.g. low-carbon energy installations, community centers).



For each case, the ‘project champions’ or initiators of the LLCEIs were selected as interviewees. Via a snowballing approach, other individuals that played key roles in projects of LLCEIs were interviewed as well. Websites of LLCEIs commonly give an overview of the board members, of which the chair is typically the person of interest. During the interview, the interviewee was asked with which actors the LLCEI interacts. The researcher subsequently contacted the person or organization for an interview.

Initiators of LLCEIs were firstly approached either by telephone or e-mail to arrange an interview. When possible, the researcher introduced himself on various occasions to familiarize the initiators and stakeholders with his project and objectives. Experts in the researcher’s network were important ‘gatekeepers’ that helped the researcher to access the LLCEIs that were selected for the study.

In order to gain access to stakeholders that are specific for the case in concern, the researcher addressed them either directly (e-mail/telephone) or asked the LLCEI for an introduction. Interviewees from local government or provincial government were contacted by telephone or e-mail to arrange an interview. In total 44 interviews were conducted in the period from January 2016 to November 2018. Interviewees involved chairs of LLCEIs, sustainability and climate change civil servants on both local and provincial level, and advisors active in the community energy field. An overview of the interviewees, their affiliation, function, and for which case they were interviewed is presented in Appendix C (Table C1). Instances in which the researcher acted as a participant in order to collect data are also presented in Appendix C (Table C2). These events were commonly considered opportunities for the researcher to collect additional data.

### *3.2.7 Data treatment*

The interviews were recorded and stored on a password-protected device only accessible to the researcher. The recordings were then manually transcribed. The researcher developed a case description for each case containing the empirical evidence from multiple data sources (e.g. the transcripts, notes based on attended meetings, and additional information retrieved on the websites of the LLCEIs). In the process of making the case descriptions, specific excerpts that could be conceptually related to the theoretical constructs were extracted from the various data sources collected.

Subsequently, for each of the independent variables from the theoretical framework, values were assigned by using a five-point scale. This ordinal scale ranges from ‘--’ for a poor manifestation of the independent variable to ‘++’ for a strong manifestation of the case on the independent variable. Qualitative descriptions are given to support the assignment of the five values (- -; -; +/-; +; ++) to the indicators of the independent variable in each of the fourteen cases. As such, for each individual case, a particular configuration of the independent variable indicators can be derived. The

values assigned for each of the variables and indicators, and for each case were determined on the basis of interpretation of the case descriptions. The scores were subsequently inserted in a data-matrix containing the assigned values for each of the independent and dependent variables (and four indicators in the case of the latter), for each individual case. During the assignment of values in the data matrix the researcher went through an iterative and scrupulous process of assigning the values of the variables for each case, and filling the matrix by doing so. The scoring per case was then discussed extensively with co-researchers. Moreover, interviewees were contacted again in case of missing values, uncertainty about assignment of certain values, and to confirm certain assignment choices. This allowed to carefully determine the ordinal values per variable and indicators across the set of 14 cases. This meant that when an LLCEI scored ‘++’ on human capital, it needed to be unequivocally clear why another LLCEI scored ‘+/-’ on human capital when comparing the two. It took the researcher six weeks to fine-tune the scoring of the values and to balance the data-matrix.

### *3.2.8 Data analysis*

The case descriptions and completing the data-matrix were important steps towards both within-case analysis and cross-case analysis. Here, within-case analysis involves “detailed case study write-ups” that provide a narrative of the development of the LLCEI, and implicates that the researcher “becomes intimately familiar with each case as a standalone entity” (Eisenhardt, 1989, p. 540). The within-case analysis was conducted by providing detailed accounts and the reasoning underlying each attributed value.

Following the results of each within-case analysis, is the cross-case analysis. The within-case analysis gives in-depth insights into how the various factors contributed to the success of each case. The subsequent cross-case analysis enhances the analytical generalization of the theoretical framework as the hypotheses underlying the theoretical framework gain in strength when they are tested against multiple cases. As this study involves fourteen cases, which are compared on fourteen different independent variables and one dependent variable (having four different indicators, though), performing the cross-case analysis solely in an interpretative way is not deemed sufficient (Gerring, 2007). The complexity involved in comparing fourteen cases consisting of ‘rich data’ prevents the researcher from making any rigid comparison and deriving results (e.g. vis-à-vis theoretical claims or hypotheses) concerning the differences and similarities across the cases.

As this research is interested in testing the formulated hypotheses to explain for variation in success of LLCEIs, it makes sense to use statistical analysis to complement interpretations of qualitative or ordinal characteristics of the cases studied. In doing so, the cross-case analysis is performed by identifying bivariate correlations between selected independent variables and indicators of the dependent variable. As a correlation measure Spearman’s Rho was used for two reasons. First,

the independent variables are of an ordinal variable type. To allow for statistical analysis the scale ranging from “- -“ to “+ +” was then transformed to numeric categories ranging from 1 (“- -“) to 5 (“+ +”). Secondly, the descriptive statistics (See Table 3.7) show that a number of variables are skewed, and for that reason do not show a normal distribution. As such, it is not allowed to use the rank correlation measure mostly used in analyzing statistical bi-variate correlation (i.e. Pearson’s R). As an alternative, I decided to use a non-parametric measure that fits the data better; i.e. Spearman’s Rho.

The correlation analysis, and thus the cross-case analysis is, however, not solely based on the strength and significance of the statistical correlations. The correlations are illustrated with rich, qualitative interpretation and case illustrations, that way providing in-depth insights into the relation between the independent and dependent variables. As such, the cross-case analysis is a triangulation of qualitative and quantitative research methods.

Table 3.7 shows the descriptive statistics of the independent and dependent variables. There are a few observations that can be made. First is that the LLCEIs involved in this study are commonly run by or can draw on competent individuals (minimum = 3 or ‘+/-‘ and a mean of 4.50 for human capital). The same goes for institutional embedding (minimum = 3 or ‘+/-‘, mean = 4.64). Reason for this is that a large group of LLCEIs started as working groups of their respective village councils or district councils and LLCEIs also use these councils commonly as a communication channel to present their ideas and recruit customers or participants. For the majority of the LLCEIs in this study, the target group is their local community, which is reflected in the statistical mean for this variable as well as the minimum score (minimum = 3 or ‘+/-‘, mean = 4.64). For the remaining eleven independent variables, the LLCEIs show notable variation. Still, despite this variation, the LLCEIs have received relatively high scores on nine out of the fourteen independent variables. Indeed, Table 10 also visualizes this observation with the multiplicity of dark green cells. The variables which display relatively low means are diversity of the board (mean = 2.57), and supportive governance arrangement (mean = 2.86).

For the dependent variables, LLCEIs do not perform well in terms of the relative number of customers on the total number of households in the locality and the realized projects for individual households (the means are respectively 2.57 and 2.79). For the relative number of customers, this can be explained by the locality in which the LLCEI is active. LLCEIs that choose a large locality have to recruit a large number of customers to perform well on this indicator of success. LLCEIs that do score well on this indicator of success are situated in relatively small localities (Ameland is the exception). In terms of individual household-level projects, there are LLCEIs that have decided to solely pursue collective projects and customer recruitment thus negatively impacting their score on this indicator of success.

**Table 3.7**  
Descriptive statistics (N = 14).

	Minimum	Maximum	Mean	Std. Deviation	Skewness*
<i>Project champion</i>	1	5	3.93	1.207	-1.070
<i>Human capital</i>	3	5	4.50	.760	-1.229
<i>Size</i>	1	5	4.00	1.301	-1.223
<i>Time</i>	1	5	3.64	1.447	-.510
<i>Funds</i>	2	5	4.36	1.008	-1.383
<i>Board</i>	1	5	2.57	1.342	.045
<i>Cultural heritage</i>	1	5	3.43	1.697	-.463
<i>Institutional embedding</i>	3	5	4.64	.745	-1.874
<i>Visibility</i>	2	5	4.57	.938	-2.200
<i>Community involvement</i>	3	5	4.64	.633	-1.687
<i>Bonding capital</i>	2	5	4.07	1.141	-.884
<i>Bridging capital</i>	2	5	4.29	1.069	-1.106
<i>Linkage government</i>	1	5	3.64	1.216	-.388
<i>Linkage intermediary</i>	2	5	4.43	.938	-1.720
<i>Supportive governance arrangement</i>	1	5	2.86	1.351	.080
<i>Success: customers</i>	1	5	3.29	1.684	-.525
<i>Success: customers relative</i>	1	5	2.57	1.910	.413
<i>Success: individual</i>	1	5	2.79	1.762	.083
<i>Success: collective</i>	1	5	3.79	1.122	-1.039

\*Std. error for all items .597

### **3.3 The LLCEI**

#### *3.3.1 Project champion*

Each LLCEI has a committed individual or a group of committed individuals that played a significant role in pursuing the goals of the LLCEI. The main difference between the LLCEIs arises from the number of individuals that comprise the core group and the extent to which the project champion is still committed. As such, LLCEIs with a larger group of committed individuals score better than LLCEIs with only one individual driving the initiative. As such, the LLCEIs Trynergie, Westeinde, Doniawerstal, Wijnjewoude score well due to the size of the core group, ranging from three to six individuals. Furthermore, Grieneke and Ameland also score well on this variable, despite having only two and one committed individuals respectively. Their score arises from the fact that the project champion in Ameland is regarded by the Frisian LLCEI movement as one of its founding fathers. Furthermore, he has a paid position in the LLCEI and still supports other LLCEIs in numerous ways. For

Grieneke, both individuals laid the groundwork for a blueprint for all Frisian LLCEIs that want to realize a collective solar PV project using the national tax-reduction scheme. They also started a pilot for making 50 households energy neutral by using an Energy Service Company financing model. Both of these activities implied intensive collaboration with Frisian intermediaries and significant time investments for the benefit of the Frisian LLCEI movement. Noorderpolder, Gaasterland and Heeg are driven by two committed individuals, in which one is the primary driving force, with significant support of the other individual. In case of Noorderpolder, for example, the project champion spent substantial time on arranging the administrative requirements for the solar PV project. Being one of the first in its kind, Noorderpolder had to do a lot of pioneering where the perseverance and involvement of the project champions played a crucial role. LLCEIs that have a lower score in this category are primarily driven by a single individual which has voiced his or her concerns for the continuity of the LLCEI if they were to pull back (Easterwierrum, Kûbaard, and Opsterland). Still, the role of such an individual ought not to be underestimated. In Easterwierrum, the project champion single handedly recruited 50 customers for the LLCEI, significantly influencing its success. In case of Opsterland, the LLCEI is still carried by a committed individual, but there have been moments that he (and the board) decided to quit his activities because of multiple setbacks the LLCEI endured. Without this individual, the LLCEI is likely to stop its activities. In case of Achter de Hoven, the LLCEI had a project champion during the start-up phase, but this person pulled back from the LLCEI after a while, leaving it in a managerial vacuum and leading to the discontinuing of the LLCEI. This issue has been overcome by Eendracht, where during a general assembly meeting an individual volunteered to take seat in the board as the successor to the previous project champion who could not invest anymore time in the LLCEI due to personal circumstances.

### *3.3.2 Human capital*

The overall majority of LLCEIs are run by, or can draw on, useful human capital. Human capital that is typically present involves individuals with entrepreneurial experience, legal and financial experts, people that have worked in the energy industry or have an engineering background, as well as individuals that have worked in the public sector. LLCEIs that score well on this factor are those that can draw on a mix of relevant experience and skills. In this sense, Trynergie is inter alia able to draw on the expertise and experience of a retired agricultural entrepreneur, a provincial civil servant, a council member, an employee at a large energy supplier, and an individual with his own marketing and communication firm. This mix of human capital importantly contributed to the success of Trynergie, such as the successful application of the national feed-in tariff, as well insights in the possibilities at (local and regional) government. This is similar for Westeinde, in which inter alia former civil servants are involved, a financial expert, and a technician that is knowledgeable on low-carbon energy applications. The project champion of Ameland worked for a major natural gas and oil extraction company for 25 years. Among the volunteers participating in the LLCEI was a legal expert, who was useful in sorting out whether the subsidy that the LLCEI applied for

was a case of state support, a decisive moment for a subsidy that significantly influenced the feasibility of the solar PV farm. Other individuals had extensive knowledge of bookkeeping and financing. The individuals involved in Doniawerstal also bring a productive mix of other skills and expertise to the table, where the participants have knowledge on subsidies, business development, certificate trading, and crucially an individual that is involved in one of the Frisian intermediaries that support LLCEIs.

Kûbaard also scores well on this condition as the two individuals that are the main proponents of the LLCEI were involved in the initiation and management of the community-owned wind turbines dating back from the 90s. Similarly, in case of Noorderpolder the involved individuals had experience with community projects as well as low-carbon energy applications and projects. In case of Heeg, the LLCEI is driven by an entrepreneur in solar PV boats, and importantly involves a former director of an energy company that is employed at a Frisian intermediary that supports the LLCEI movement. Another individual that is involved in Heeg has expertise on community development. Grienko and Wijnjewoude both have individuals involved that have experience with low-carbon energy applications in their own house. Wijnjewoude also has experts on communication, financing, and organizational management. Grienko is able to draw on the expertise and experience of entrepreneurs, the chair of the LLCEI was involved in the international biotech sector.

In Achter de Hoven, individuals were involved that had experience in community development as well as experience in the technical and commercial sector. However, right after the LLCEI was formally established, two of the main initiators pulled back also diminishing the human capital present in the LLCEI. Gaasterland put in considerable effort to gain knowledge on the community energy sector, but the individuals that were involved had entrepreneurial and leadership experience, and were knowledgeable on the technologies of low-carbon energy; they constructed the fuse-box for the solar PV project themselves. Opsterland is run by an individual who has worked the majority of his career in the public sector and an individual that is knowledgeable on solar PV panels was involved as well.

While there are individuals involved in Easterwierrum that have some experience with low-carbon energy applications, accountancy and entrepreneurial skills, the LLCEI finds it challenging to start a collective solar PV project and had difficulties with starting their own website. Next to Easterwierrum, Eendracht also has a neutral score. The reason for this is that the background, knowledge and experience of the individuals involved fitted the nature of the LLCEI to a lesser degree. Eendracht was led in the early days by a healthcare professional with experience in management. Although the individual was enthusiastic, she experienced difficulties in initiating collective projects due to a lack of substantive knowledge about the field. Later on, the LLCEI still had issues in finding volunteers that have experience and are knowledgeable about (low-carbon energy) project management. The project champion, however, has experience with low-carbon energy project development and public relations. Under his lead, the LLCEI is close to realizing its first collective solar PV project.

### 3.3.3 Size

As became apparent from the analysis, size is not limited to the board or core group of the LLCEI, but also pertains to the people that the LLCEI manages to involve in workgroups or which the LLCEI can reach out to when in need of support. These workgroups typically assist in completing specific tasks or supporting the realization of concrete projects. LLCEIs that receive the best score have a relatively large core group or board (larger than four) that are involved in the day-to-day activities as well as have access to such ‘external’ support. Wijnjewoude is one of the LLCEIs that has the highest score. The LLCEI has a core group of six individuals, and can draw on the support of at least five individuals that help inter alia with maintaining the website or provide advice on PR matters. Furthermore, Wijnjewoude appointed a project leader for their plans to realizing an energy park in the village and arranged for an energy coach for the village who visits homeowners to conduct a free-of-charge energy scan of their house and provides advice on what energy measures the homeowners could take in order to make their house more energy efficient. In case of Ameland, the LLCEI was started by seven individuals. As time went by, volunteers dropped out, but Ameland never experienced any shortage on volunteers as the LLCEI managed to install multiple work packages (e.g. one for communication, another for the solar PV farm), and recruited seventeen ambassadors to promote their cause in the locality. Gaasterland and Trynergie both recruited four ambassadors. Gaasterland, however, primarily runs on three active board members, while one of the strong suits of Trynergie, as stated by an interviewee, is (next to their core group of four individuals) their ability to draw on the support of numerous individuals when needed. Westeinde has an active board of five and managed to involve various individuals in a workgroup as well as an energy director who provided advice for low-carbon energy applications and energy efficiency measures for individual households. Doniawerstal has a large board of six individuals and managed to organize a workgroup (with four persons involved) that is responsible for realizing their second and third collective solar PV project. Although Noorderpolder had a small board of three members, the LLCEI was able to organize a workgroup where five individuals had an important role in realizing the solar PV roof. Heeg has a core group of four individuals, but is able to draw on the expertise and help of various individuals which contributed to the realization of their collective solar PV project as well (such as youngsters that delivered flyers door-to-door, or the support of an expert that is active in the community energy sector).

While Ameland, Trynergie, Westeinde, Noorderpolder, Wijnjewoude, Heeg, Grienko, Easterwierrum, Kûbaard, Doniawerstal, and Eendracht all made use of volunteers that do not have a formal seat in the board, not all of these LLCEIs receive the highest score. Grienko, for instance, frequently gets advice from four local entrepreneurs. However, Grienko’s board only consists of three members and the LLCEI experienced difficulties in getting additional board members. This issue is not specific to Grienko. Opsterland, Kûbaard, Achter de Hoven, Eendracht also have difficulties in finding active board members. Although Opsterland frequently managed to invite a potential future members of the board to experience one day of volunteering for the LLCEI, this

has not resulted in an expansion of the board. While Opsterland does have a board of three members, the project champion is the sole driving force of the LLCEI. This also applies to Achter de Hoven, which published numerous vacancies on their website for positions in the board and requests for project-based volunteering without any positive responses. Right after two individuals that initiated the LLCEI pulled back from Achter de Hoven, the project champion that was left mainly carried the LLCEI by himself. As such, LLCEIs that do not score well in this category have issues in organizing a sizeable core group with active members or recruiting volunteers for project-based work. In this way, although Eendracht managed to organize a work package for the collective solar PV project that it aims to realize, not all (four) members of the board are actively participating in the LLCEI.

### *3.3.4 Flexibility and availability of time*

In terms of the factor time, the LLCEIs differ with regard to the extent to which the individuals active in the LLCEI are able to devote time to the initiative. This being said, the LLCEIs that score well on this condition are commonly driven by multiple individuals that are retired (Trynergie, Westeinde, Noorderpolder, Wijnjewoude, Grieneke). Interviewees in the case of Westeinde particularly mentioned that they benefitted greatly from being retired as they were able deal with issues that needed to be addressed during office hours, which significantly helped keeping the flow of the solar PV farm project going. The two project champions of Grieneke invested a significant amount of time in the LLCEI, which could not have been the case if the two individuals were still employed. The individuals that are most active in Trynergie and Noorderpolder were also retired. Other individuals involved were still employed or entrepreneurs. Wijnjewoude is also driven by a project champion that is retired. Additionally, the LLCEI has a project leader for the energy park the LLCEI aims to realize who is in-between jobs. Furthermore, other individuals involved in Wijnjewoude are also retired or entrepreneurs.

In the case of Ameland, the project champion has a paid position in the LLCEI. In other cases, the project champion is retired, but has to work with board members that are still employed. These LLCEIs therefore have a slightly lower score (Gaasterland, Opsterland). Heeg and Kûbaard have a neutral score as these LLCEIs are run by entrepreneurs, which can typically allocate their time more flexibly but still have commitments to their firms. Despite that two individuals in Doniawerstal are retired, these individuals have other commitments that prevent them from spending time on the LLCEI. Furthermore, the other individuals involved in Doniawerstal are still employed. Eendracht and Easterwierrum have a low score since the project champions and majority of the board are still employed or entrepreneurs. Also, in Easterwierrum specifically, the project champion is employed (as well as the majority of the core group) and is also involved in various additional community activities that require attention as well. Kûbaard also scores low as a lack of time was considered by the LLCEI to be a barrier to pursuing a collective project. Insufficient time still plays a role and prevents the LLCEI from pursuing additional activities. For Achter de Hoven the



project champion was unemployed, but because of personal reasons he had to pull back from the initiative and was unable to further spend time on the LLCEI.

### 3.3.5 Funds

The extent to which LLCEIs are able to generate additional funds from their localities distinguishes them from one another. With no exceptions, all LLCEIs received so-called start-up subsidies. These are typically in the range of €1000 to €2500. Ameland and Trynergie are the exception with respectively €30,000 and €10,000 worth of start-up subsidies. The start-up subsidies are provided by local government and the province, apart from Eendracht and Achter de Hoven, which received a start-up subsidy of €1000 from their village council and district panel. The majority of LLCEIs successfully applied for project-subsidies as well: Wijnjewoude managed to raise a €22.000 project subsidy, €5000 for their website donated by a bank, and close to €5000 worth of prize money; Kûbaard got a €5273 project-subsidy for its solar PV project; Noorderpolder received €6280 for their solar PV roof; Doniawerstal €10,000 for their solar PV projects; Westeinde received close to €40,000 for the project ‘energy neutral district’ and for their solar PV farm; Gaasterland received €4500 for their collective solar PV project; Trynergie received €35,000 for seven collective solar PV projects, Heeg got €13,000 for the solar PV project and a monitoring project; Grieneko received €3400 for their solar PV projects; and Eendracht also received a project subsidy for its solar PV project.

While the size of these subsidies differs to a large degree, they are determined by the scale of the project. For the majority of the subsidies, the LLCEIs are expected to provide private investment capital as well. The ability of the LLCEI to do so therefore provides for a profound understanding of their performance in this category. Multiple LLCEIs succeeded in raising funds through their localities, although in various ways. Achter de Hoven crowd-funded €44,000 for a solar PV roof for the district school. Still, as the LLCEI is situated in a socio-economically disadvantaged neighborhood, Achter de Hoven noticed the difficulties in raising funds in the locality. Noorderpolder recruited in its village three investors that each chipped in the solar PV project for €40,000. Without these investors, Noorderpolder would not have met the requirements of the provincial investment fund. Thus, these investors importantly added to the success of the LLCEI. Grieneko recruited two investors in the locality that provided the investment capital for their first collective solar PV project. Gaasterland, Doniawerstal and Heeg also managed to recruit financial participants to invest in their collective solar PV projects. The difference between the LLCEIs Grieneko and Noorderpolder and the three aforementioned LLCEIs is that the former raised significant funds amongst a small group of individuals, while Gaasterland, Doniawerstal and Heeg recruited a larger number of households and firms to invest in their solar PV projects. The investments of these individual households or local businesses coincide with the number of solar PV panels that matches their electricity bill. For their second solar PV project, Grieneko also recruited financial participants in this way. Furthermore, the ability to generate funds from the locality is also shaped by the

customer base of LLCEIs. This is because LLCEIs receive an annual fee for each customer that it recruits for the regional energy supplier. In this sense, a large customer base (in addition to being an indicator for success) is an indicator for the financial capacity of the LLCEI in the sense that it provides a steady flow of income. In this regard, Ameland had significant financial capacity due to its large customer base, which allowed the LLCEI to invest in the solar PV farm. Because of their customer base, Trynergie, Doniawerstal, Gaasterland, Grieneko, Easterwierrum, Kûbaard, Heeg and Eendracht also have a degree of income certainty. However, Doniawerstal donates the majority of its funds to the local village councils, therefore having little financial capacity. This is not the case for Achter de Hoven, Westeinde, Opsterland, and Wijnjewoude which all have a small customer base. Furthermore, Opsterland and Wijnjewoude have difficulties with getting sufficient investment capital for their projects. Opsterland used significant private money to kickstart the LLCEI, but has difficulties in raising private investment capital, as is required by the provincial investment fund and other banks. Although Wijnjewoude received various subsidies and grants, the LLCEI experienced difficulties in getting sufficient investment capital to buy the site for their envisioned energy park.

Easterwierrum had no plans for collective low-carbon energy projects, and thus has neither applied for any project subsidies nor has it attempted to raise investment capital in the village. Similar to Doniawerstal, Easterwierrum not necessarily uses its income that is generated by its customer base for low-carbon energy projects. Furthermore, a few LLCEIs have managed to gain income on the basis of a fee that it received for being an intermediary between a solar PV installation firm and individual households (Trynergie and Grieneko). However, the income generated is not significant to realize new projects. For Kûbaard, the community wind turbine foundation granted the solar PV project of the LLCEI €5000 as well as a loan with a more beneficial interest rate than the provincial investment fund. Additionally, the LLCEI succeeded in getting 24 households to financially participate in the solar PV project. For those LLCEIs that realized collective solar PV projects with use of the national tax-reduction scheme, the business case did not allow for any significant profits that could be used for future projects (Heeg, Grieneko, Gaasterland, Doniawerstal). Noorderpolder and Ameland do get a return on investment due to their projects being subsidized by the national feed-in tariff. On this account, Ameland, Opsterland, Trynergie, and Westeinde successfully applied for this feed-in tariff.

### *3.3.6 Board*

The variation in the composition of the board is derived from both gender and age. Gaasterland, Westeinde, Noorderpolder, Grieneko, Heeg, and Opsterland have all-male boards. Heeg can be regarded an exception as the theme of sustainability was picked up rather broad, in which more women are involved in pursuing other aspects of sustainability (such as local food production and planting trees). In terms of age, the board members involved in the abovementioned LLCEIs are all 40+. The boards of Westeinde, Grieneko and Noorderpolder are primarily seated by men of the ages 60 and

up. Trynergie, Wijnjewoude, Doniawerstal, Kûbaard, Easterwierrum, Achter de Hoven, Ameland and Eendracht do have female board members. For Kûbaard, Achter de Hoven and Trynergie this is one female board member on a total of three. Ameland has one female board member on a board of five; Doniawerstal one female board member on six board members; Easterwierrum has three female board members on a total of seven; Wijnjewoude has three women involved in their core group of eleven people. Eendracht has two female board members on a total of five. However, after the start-up phase of Achter de Hoven, the project champion acted as both as treasurer and secretary. Wijnjewoude and Eendracht are the only LLCEIs that have a positive score as these LLCEIs managed to involve both female and young participants. Eendracht has the youngest board member, not only for the cases involved in this study, but for all LLCEIs in Fryslân, as well as the provinces of Groningen and Drenthe. The boards of Trynergie, Doniawerstal, Kûbaard, Easterwierrum, Achter de Hoven and Ameland comprise of individuals ranging in the ages of 40-60+. Various interviewees mentioned that they have trouble finding committed board members, as well as young board members. Another aspect that emerged when asking the interviewees about the composition of the board was that the majority of the LLCEIs have members in the board that have been active in the village before, in for instance the local village council, or other associations or clubs.

### **3.4 The LLCEI and the local community**

#### *3.4.1 Using cultural heritage*

A few LLCEIs have managed to align their activities with the localities in which they are situated. Grieko, Eastierwierrum, Kûbaard are all small villages in which the degree of organization and social cohesion is high. For example, one of the four villages of Grieko's area of operation is home to eleven different associations in a community of only 75 households. For Kûbaard, this is seven different associations and commissions on also 75 households. Easterwierrum has 22 different associations and commissions on 135 households. Organizing an LLCEI in these villages therefore aligns with the traditions and practices of these villages. These villages are also used to fend for themselves as through history municipal mergers increased the (both physical and experienced) distance between these villages and the municipality. As a result, the village councils have been more a layer of government in these villages than in other parts of Fryslân. For Kûbaard specifically, the village is already familiar with the benefits that low-carbon energy may bring for the community because of the community-owned wind turbines that have been in place since the 90s.

For Ameland, the LLCEI framed its ambitions in such a way as to appeal to the sense of independency, a key feature of Ameland's territorial identity. The LLCEI emphasized energy independency, used a personal approach to recruit clients and participants for their cause, and attracted local firms to help in realizing their activities (such as having the flyers for the solar PV farm printed by the local printing firm). This suited the locality's tight-knitted social structure. Furthermore, despite installing solar PV panels on the ground on an island where nature and the landscape are considered

invaluable assets (the key pillar of Ameland's economy is tourism), the LLCEI (and municipality) located the solar PV farm right next to an airstrip, and integrated the installation in such a way as to obstruct a direct view on the solar PV farm in order to disengage potential opposition that it might give rise to. This greatly influenced the success of Ameland, in the sense that opposition was dealt with effectively, bolstering the realization process of the solar PV farm. As such, Ameland, Easterwierrum, Kûbaard and Grieneke score the highest in this category.

Another case that scores well in this category is Trynergie. This LLCEI explicitly uses the regional language for marketing the activities of the LLCEI. Furthermore, only after a number of villages in the vicinity voiced their desire to become involved with the LLCEI and after a profound investigation of the possibilities and benefits (and recognizing that the LLCEI suffered from a lack of capacity due to the small scale of the village Oentjserk from which the LLCEI originated), the LLCEI expanded its area of operation from one village to the region of Trynwâlden, comprising seven villages. However, the region also knows a long shared history. The LLCEI uses the names of the region and villages in a way as to link sustainability with the villages. An example is 'Oenkerk', which the initiative changed to 'Groenkerk', ('Groen' is Dutch for green). The multiple rounds of collective purchasing of solar PV panels that Trynergie organized carried the name 'Sun of Tryntsje', the latter being the legend from which the seven villages are said to originate. Furthermore, the LLCEI also collaborates with the various cultural associations within the region to recruit customers. In doing so, it recruited the association of churches in the region as a customer.

Next to Trynergie, Gaasterland, Doniawerstal, Noorderpolder, Opsterland and Eendracht also chose a regional scale as area of operation. For these LLCEIs the choice emerged from the same reasoning as Trynergie; the regional scale was needed to enhance the capacity of the LLCEI. However, while the region covered by Trynergie (whilst not necessarily being tight-knitted or socially cohesive) shows a degree of shared cultural heritage (that should not, however, be overestimated) which the LLCEI strives to tap into, the choice of locality of the abovementioned LLCEIs did not directly arise from cultural considerations. The name 'Doniawerstal' is based on the municipality that ceased to exist in 1984. However, the region itself does not specifically have a shared history or identity; the villages that participate in the LLCEI did so because they agreed to become involved. Similar to how Trynergie and Doniawerstal started in a small village, so did Eendracht. The LLCEI decided to expand its area of operation to the entire municipality. Despite the willingness of the various village councils to become involved, some were not invited to the meetings where the possibilities were discussed, and in a later phase, the village councils were not open to collaboration. Gaasterland is a region that is known for its characteristic landscape. Gaasterland chose to align the scale of its operations with the sustainability workgroup that was already active in the region. This workgroup sought to stimulate sustainability in the broadest sense from the bottom-up, in which the link with culture and nature were two important elements. In line with this, the LLCEI introduced its ambitions doing an annual cultural event in the region.

While culture is not specifically an issue that the LLCEI aims its activities to, the projects that were successfully realized by the sustainability workgroup, as well as the involvement of the villages in the process signals a shared sense of locality. Noorderpolder started in two small villages that have collaborated for a long time and share a village council. The villages have 75 households and 7 different associations. The community is used to initiating community projects, so the LLCEI fitted this tradition. However, the LLCEI chose a larger region for its area of operation in order to expand its capacity for selling shares in their solar PV roof. This larger region does not overlap with the boundaries of the locality of the two villages. The villages that are in the area of operation ventilated that they were planning to start an LLCEI themselves and decided against publishing Noorderpolder's project in the local village newspaper.

Opsterland also chose the municipal scale for the sake of capacity. In its operations and activities, the LLCEI does not particularly align its activities with traditions, identities or cultural markers of the villages and mainly has a professional point of departure. The activities of Heeg suit the entrepreneurial and open-minded mindset of the village. The village of Heeg, known for its tourism and water sports has a high degree of organization. An indication of this is the 100 firms on a total of around 140-150 local firms that are a member of the village's entrepreneurial association. The village is used to initiating community projects. An example is the village's solution for the problematic public transport connection between the village and one of the largest cities in the municipality. The villagers introduced a pick-up point where passersby can pick up individuals and drop them off in the city. Another example is a petition that was signed by numerous villagers to withhold a transmission tower from being located near the village. The LLCEI uses the regional language in naming their activities, and integrated sustainability in their process of developing a community vision. Wijnjewoude is not able to draw on a strong shared identity, norms or culture, neither is there a particular tradition in the community where projects are easily collectively initiated. Wijnjewoude does not receive the lowest score as the LLCEI does direct its activities to a confined area; the village of Wijnjewoude.

Achter de Hoven and Westeinde are located in urban districts in a medium-sized city, where the role of culture and identity is less prominent. However, the process of revitalization in which the district Achter de Hoven was involved in provided for an impetus. In this process, the municipality and the district sought to empower and develop the district that was pestered by manifold problems related to inter alia drugs, slumlords and prostitution. Following a petition from district residents, a part of the district was rebuilt in an energy efficient way. The LLCEI jumped this bandwagon and sought to push this transition further. In so doing, the LLCEI talked the language of the working-class neighborhood and directly appealed to the needs of the residents; sustainability not primarily for the sake of the environment, but for saving money on the energy bill. As such, the LLCEI managed to realize various sustainability activities that suited the district. Westeinde primarily directed its activities to a part of the district that could be grasped as a coherent locality. The LLCEI noticed the difference in

culture when it tried to involve a part of the district located across the provincial highway. As a consequence, the LLCEI experienced difficulties in connecting with that part of the district.

### 3.4.2 *Institutional embedding*

The LLCEIs Noorderpolder, Trynergie, Doniawerstal, Westeinde, Heeg, Wijnjewoude, Grieneko, Easterwierrum, Achter de Hoven and Eendracht, all started as a workgroup of the village or district council and had the task to explore the possibilities for and interest in local low-carbon energy and energy efficiency in the respective localities. In for instance Heeg, Grieneko, Noorderpolder, and Trynergie, sustainability was a theme in the village vision statement. For Heeg specifically, sustainability permeated the village's vision statement. LLCEIs that did not specifically start as a workgroup of the village council still ascertained that their ideas found approval at the village council (Kûbaard, Gaasterland, Ameland). As such, institutional embedding primarily arrives from the linkage between the LLCEI and the district or village council. Kûbaard even sought to establish a formal link with the village council in its statutes, similar to how the foundation of the community wind turbine is linked to the village council. Next to a survey amongst the LLCEI's members, Easterwierrum consulted the village council on how to spend the revenue stemming from the annual customers' fees. Trynergie involved the village councils from the seven villages from the start when the LLCEI explored whether an LLCEI on a regional scale would be in line with the interest of the villages.

Additionally, the villages in the region were already used to working together which helped throughout this process. Doniawerstal took another approach to ascertain institutional embedding by having representatives of each village in the board of the LLCEI, even aiming to have board members of the respective village councils to also take seat in the board of the LLCEI. Similar as Trynergie, Doniawerstal had support of the four village councils to explore the possibilities for low-carbon energy generation and energy saving on a local scale. The majority of LLCEIs also use the village council to present their ideas to the locality, to take inventory of community needs and interests and to recruit new members. However, unlike the villages comprising Trynergie, the villages in Doniawerstal are not used to collaborating and therefore struggled for time to time to align their perspectives. Although Noorderpolder too arose from the village council, the LLCEI had difficulties in landing their ideas at the other village councils in the region.

Other LLCEIs sought collaboration with schools, such as Opsterland, Achter de Hoven and Westeinde. Achter de Hoven solely succeeded in this by realizing a crowd-funded solar PV roof for the district's school. Opsterland and Westeinde explored with the school management the possibilities for energy saving and energy generation, but this has not lead to any concrete output. Opsterland primarily sought their institutional rooting in the collaboration with entrepreneurial associations (Westeinde and Heeg too collaborated with the local entrepreneurs' associations), and experienced difficulties in connecting

with other villages. In a similar way, Eendracht addressed the village councils in its region for a collaboration to recruit additional customers for the LLCEI, which would provide the village council with a share of the annual customer fee. The LLCEI received no response from the various village councils. Trynergie, Heeg and Eendracht reached out to local sports and cultural associations for the same type of collaboration. For Trynergie this led to additional customers. Heeg and Eendracht did not experience the same success. Additionally, Trynergie and Doniawerstal managed to recruit the Protestant parish church and the foundation Alde Fryske Tsjerken (foundation ‘Old Frisian Churches, author’s translation) respectively. Opsterland had a meeting with two local churches to recruit them for financial participation in the solar PV project.

### *3.4.3 Enhancing visibility*

LLCEIs that strive to enhance their visibility do so in various ways. Except for Easterwierrum, all LLCEIs have their own website. The LLCEIs that frequently (on average once a month) update their website are Opsterland and Wijnjewoude. The other LLCEIs are relatively inactive on their websites. The majority of the LLCEIs also have a Facebook account; the exception is Noorderpolder. Again, the extent to which the LLCEIs are active on social media varies. Eendracht, Wijnjewoude, Trynergie, Ameland, Grieneko, Opsterland, Gaasterland, and Westeinde are relatively active. Some LLCEIs started active, but became less active over time (Heeg, Kûbaard, Doniawerstal, Easterwierrum, Achter de Hoven). Various LLCEIs placed advertisements in village magazines (Ameland, Trynergie, Gaasterland, Westeinde, Wijnjewoude, Easterwierrum, Opsterland and Eendracht). Furthermore, some LLCEIs had their own stand at annual village or district fairs (Gaasterland, Westeinde, Trynergie, Wijnjewoude, Noorderpolder and Heeg).

Other LLCEIs have organized information markets (Trynergie, Heeg, Doniawerstal, Noorderpolder, Kûbaard). Although Doniawerstal primarily did this at the start of the LLCEI and does little work to enhance the visibility of the LLCEI next to the information meetings that were held to inform residents about the solar PV projects. Without exceptions, the LLCEIs organized such information meetings about a range of topics related to their cause or to recruit participants and customers. Trynergie and Opsterland have small billboards to advertise for their projects and cause. Heeg installed a monitor screen at a show window to inform passersby how many energy has been generated by the solar PV project. Grieneko also did this and installed the monitor screen in the local bar. Multiple LLCEIs distributed flyers to households in their localities (Ameland, Eendracht, Opsterland, Heeg, Trynergie, Gaasterland, Westeinde, Wijnjewoude, Grieneko, Easterwierrum, Achter de Hoven, Kûbaard). Kûbaard sends all villagers a newsletter by email a few times a year to inform the villagers about the LLCEI.

A few LLCEIs distinguish themselves with a more personal approach to make themselves visible to the locality. Kûbaard, Grieneko, Easterwierrum, and Ameland frequently paid personal visits to recruit participants for their projects as well as customers for the regional energy supplier. Gaasterland also frequently visited future

participants in the solar PV project and ascertained its visibility throughout the region by frequently giving presentations in the villages. Westeinde and Achter de Hoven both offered low-tech sustainability measures to residents (such as installing weather-strips on window and door frames, or in Achter de Hoven checking tire pressure) to residents. The main goal of these activities was to get in touch with new members and to recruit them for other projects. Wijnjewoude won two prizes, of which one has been awarded by the partnership of the ten largest rural municipalities of the Netherlands. Both came with a financial reward. Noorderpolder did not put in considerable effort to advertise and communicate about their project beyond the confines of the two villages. Although Eendracht is active in communicating about the LLCEI and its projects, the LLCEI has been inactive (and therefore invisible) for some time after it was reinvigorated by the current project champion.

#### *3.4.4 Community involvement*

Because of the legal form that the LLCEIs choose, namely a cooperative, they are legally bound to organize at least one annual general assembly meeting in which the members of the cooperative can influence decision-making by voting. As there is no variation among them in this respect, the indicator of participation is better derived from the degree to which the locality participated in the siting and investment of the installation, as well as the degree to which residents or members are consulted about the focus of the LLCEI's activities.

Ameland organized multiple meetings to invite residents to invest in the low-carbon energy installation. Financial participation was open to both members and non-members of the LLCEI. Furthermore, local nature organizations were involved in order to reach consensus on the integration of the solar PV farm in the landscape. One of the means of doing so was to assess the biodiversity of the location of the solar PV farm and the LLCEI involved a local beekeeper to put up a few beehives on the site. Furthermore, local companies were involved in printing the flyer and constructing the natural barrier that would function to obstruct the view on the solar PV farm. The LLCEI enabled members and residents to participate symbolically by investing in one solar PV panel, which amounts to €250. Others invested in 4-5 solar PV panels. There were also a few investors that have a larger share in the solar PV farm. The solar PV farm has three equal partners; the LLCEI, the municipality, and an energy supplier. All decisions regarding the solar PV farm are required to be unanimous, thus safeguarding the influence of the LLCEI.

At the start, the various villages that would comprise Trynergie ventilated that they liked to become involved with the LLCEI. This legitimized the expansion of the scale of the LLCEI's locality (from one village to seven villages) and importantly gave the LLCEI additional capacity (in terms of clientele, but also human capital). The LLCEI collaborates with local installation firms and local sports clubs and associations to revitalize local economy and livability. Trynergie did however experience difficulties in finding sufficient participants for their collective solar PV projects and realized one



solar PV roof without participation of the locality. The LLCEI did ask the locality what it wanted the LLCEI to look further into; solar or wind energy. With help of a number of students, the LLCEI sent around a survey to inquire the local citizens about their interest in sustainability.

Other LLCEIs also consulted their localities concerning where they would be interested in low-carbon energy and energy efficiency projects. During the start-up phase, Gaasterland took inventory (via information meetings) of what the locality was interested in in terms of energy efficiency and energy generation. Gaasterland also conducted a screening of the capacity for sustainability (in terms of potential customers) in the region. The LLCEI takes into consideration local issues. This becomes apparent in the survey that the LLCEI published on their website, which enquires locals about their interest in an electric shared car as the region is difficult to access by public transportation. At the start of the LLCEI, Grienko sent around a survey to ask the residents in what they were interested in in terms of sustainability, so that the LLCEI knew what projects to pursue. Of the 75 surveys distributed in one of the villages, 68 were retrieved, of which 61 surveys indicated that the household was interested in sustainability measures. In the other villages involved in Grienko, almost two thirds of the surveys were handed in at the LLCEI. When Grienko as well as Kûbaard introduced the idea of an energy cooperative, a large share of the village attended the meeting and almost unanimously agreed with the start of the initiative. Grienko ascertains a personal approach, the LLCEI goes door-to-door to recruit participants for their collective projects.

Easterwierrum also sent around a survey asking its members on how to spend the total annual fee the LLCEI received from the regional energy supplier. Amongst the 34 members that filled in the survey, 15 chose for an ice track. The two options included in the survey that related to sustainability, a solar bench and a charging point in the village, received respectively six and one votes. Furthermore, Easterwierrum also applied a personal approach; one of the initiators paid visits to potential customers and helped them with calculating whether they are better off with switching to the regional energy supplier. At the start of the Achter de Hoven, a number of students investigated how the residents felt about sustainability and whether they were willing to take measures related to energy efficiency and generation. The overall results of the study were positive, which was reason for the LLCEI to become established. Despite being located in urban districts, Achter de Hoven and Westeinde both used a personal approach in the sense that they paid visits to residents to install weather-strips on doorframes and to enquire about potential other energy efficiency measures these residents were willing to take. Achter de Hoven directed its activities at saving costs, promoted low investment energy efficiency measures, as well as job creation in the district that was particularly struck by the economic recession. Additionally, the LLCEI lobbied for a sustainability loan for households with little financial capacity.

Opsterland also asked attendants of its introductory meetings where to focus its activities on, but predominantly collaborated with firms. Opsterland unilaterally

decided that it wanted to focus its activities on making the municipality energy neutral, to subsequently ask individual villages about their interest in becoming involved. While Opsterland engaged with numerous organizations and firms in the municipality, the LLCEI had more difficulties in involving the local communities. Doniawerstal, on the other hand, gave various presentations in individual villages to assess whether the villages were interested in joining their cause. Only the villages that showed commitment and that were willing to put effort in the LLCEI were included in the LLCEI. As such, the villages involved in Doniawerstal joined because of their interest, not because the LLCEI arbitrarily chose a region. Doniawerstal transferred the annual fees directly to the village councils. The village councils may decide how to allocate these funds. Doniawerstal worked with a local contractor for installing solar PV panels for collective project. While this benefited the acceptance of the project, it gave issues in the realization of the solar PV project as the fuse box was not in line with regulations, preventing the LLCEI from getting the tax reduction which was crucial for the profitability of the business case. After Eendracht became separated of the sustainability initiative from which it originated and in the process expanded its scale, community involvement was lacking. For a long time, the LLCEI did not increase its member base and did not pursue any low-carbon energy projects. When the new chair took seat, the connection with the community was rekindled as the LLCEI managed to recruit enough participants for its first solar PV project.

Similar to Ameland, Wijnjewoude actively consulted the locality about their plans for an energy park. The LLCEI invited residents to deliberate on the siting of the energy park, and sought to reach a consensus that would be acceptable for everyone. Additionally, after taking note of the request of the LLCEI's members to learn more about specific low-carbon energy applications and technologies, the LLCEI started organizing information meetings with particular topics. Wijnjewoude also provided an unemployed villager with a course on energy coaching, to give energy advice to households. Westeinde discussed the plans for the solar PV farm with residents living in the vicinity and reached consensus on the siting and integration of the solar PV farm in the landscape. Additionally, Westeinde also consulted the locality via meetings in the district panel about topics that the LLCEI should pursue and keeps the district informed on the progress of the solar PV farm via the local district magazine. In the cases of Wijnjewoude and Heeg, residents were invited to two workshops to deliberate about the scenarios for making the village energy neutral. The sustainability workgroups (including the LLCEI) that are active in Heeg all originated from a visioning process in which the locality was involved extensively. The activities were not limited to energy, but also recycling waste, mobility, and local food production in order to foster a broad involvement and acceptance in the village.

Gaasterland managed to get enough financial participants for their solar PV project. The investments are relatively well distributed (participants of 5-6 PV panels, and 10-20 PV panels) and households have the primacy for investing in the solar PV project. The LLCEI only allowed households that also are a customer of the regional energy supplier to invest in the project. Grieneke, Kûbaard, Heeg and Doniawerstal also

recruited enough participants for the solar PV project. For Grieneke, Doniawerstal and Kûbaard, the solar PV panels were mainly bought by individual households. Heeg also recruited six firms to invest in the solar PV project, next to the 14 households that invested in the project. Because there were relatively large households and firms involved, the certificates for the solar PV project were relatively quickly sold. However, the LLCEI struggled to recruit sufficient participants for the second solar PV project.

Opsterland, Wijnjewoude and Noorderpolder struggled to get enough participants for their solar PV projects. For Noorderpolder, this was not a problem that prevented the realization of the project since the solar PV roof made use of the national feed-in tariff, was funded by the regional investment fund and three private investors. Noorderpolder specifically chose the national feed-in tariff for realizing the solar PV project, as the LLCEI noticed that it would not likely have enough participants in the region for a solar PV project that would be subsidized by the national tax reduction scheme. Still, Noorderpolder managed to get around 40 participants for their solar PV roof, which account for 439 solar PV panels on a total of 1200. The lack of community participation made the LLCEI decide to realize the next project of 639 solar PV panels without participation of the locality. The insufficient participation in the solar PV project does however prevent the projects from Wijnjewoude and Opsterland from being realized, thus negatively influencing their success. Still, unlike Doniawerstal, Gaasterland, Ameland, or Noorderpolder, Wijnjewoude and Opsterland offer financial participation starting from €99 per solar PV panel, instead of €300-350. This enables investors with a smaller financial capacity to invest in the project as well. Westeinde makes use of the same national feed-in tariff as Noorderpolder. Westeinde is therefore not necessarily dependent on local participation in the solar farm, but is still awaiting the construction of the solar PV farm, before the LLCEI starts recruiting participants. The participation of locals is, similar to Noorderpolder, not preventing the solar PV farm from being realized. By means of crowdfunding, Achter de Hoven enabled locals as well as organizations to donate or to invest in the solar PV panels that were installed on the roof of the local school. The majority of the financial capital came in shape of investments, not donations.

### *3.4.5 Bonding social capital*

The factor of bonding social capital is mainly derived from the extent to which LLCEIs draw on social relations to access resources. For LLCEIs specifically, this means for instance drawing on the knowledge and expertise base present in the locality, profiting from the social cohesion that is present in the locality, or getting local participants, investors, customers, or in case of roof-based solar PV, roof owners on board.

The trustworthiness of the initiators importantly affected the degree of success of various LLCEIs. In the case of Kûbaard the project champion mentioned that his role in the community wind turbine led to the locals almost ‘blindly’ trusting him and thus

straightaway switching to the regional energy supplier, irrespective of whether it would mean that the energy bill would increase. This meant that the LLCEI achieved a high degree of clients relative to the number of households in the locality and realized a collective solar PV project in which 24 households participate. Easterwierrum also experienced this, as the project champion mentioned that she is well-known in the community (inter alia because of her active involvement in the community). In some cases switching energy suppliers in favor of the regional energy supplier would mean a more expensive energy bill. Still a few residents switched because they trusted the project champion and that it would mean that the village would benefit from it.

For Doniawerstal, the advantages of social capital became apparent in the way one of the project champions recruited the financial participants for the collective solar PV project. The individual, who has lived in the village of 130 households for over 38 years and owns a successful firm in mechanics in the same village, personally approached people he knew to ask them to invest in the solar PV project. One of the key individuals responsible for one of the other villages also mentioned that there were instances in which residents joined the LLCEI due to the trustworthiness of the project champion, who has been active in numerous local commissions and associations. Doniawerstal was, however, less able to make use of social capital in the other two villages, where the LLCEI still sought to realize collective solar PV projects. For Noorderpolder, the initiators were well known in the villages because of their previous work in the community and were able to quickly draft four villagers (two of them from the two villages from which the LLCEI originated) to invest in the collective solar PV project. The owner of a large potato shed offered his roof which the LLCEI used for the solar PV project. Despite more lucrative offers from project developers, the roof owner kept his promise to the LLCEI. Notwithstanding the ability of Noorderpolder to make use of their social capital within the two villages, the LLCEI experienced difficulties in connecting with the other villages in their locality in terms of selling certificates.

Next to the trustworthiness of the core individuals involved in the LLCEI, the tight-knitted nature of these localities also importantly contributed to the success of a number of LLCEIs. Grieneko, Easterwierrum, Kûbaard, and Doniawerstal (one of the four villages) all have small, tight-knitted localities as their areas of operation. In these localities, people commonly know each other personally. The introductory meetings of Grieneko, Kûbaard and Easterwierrum were attended by a large proportion of the residents in the involved localities, which signals the degree of civic engagement in these villages as well. This involvement crucially added to the extent to which the LLCEI were able to garner support and participation of the community. This is for instance indicated by the village house in one of the villages of Grieneko that is also a customer of the regional energy supplier. Another indicator is the high ratio of the number of customers of the regional energy supplier relative to the total number of households in Grieneko, Kûbaard and Easterwierrum. This kind of social cohesion is also present in the case of Ameland, despite being considerably larger (both in terms of geographical scale and number of households in the locality) than the abovementioned LLCEIs. Because Ameland is an island, the LLCEI is able to draw on a specific kind of social cohesion that

is derived from the identity of the islanders. The villages on the island easily collaborate and the sense of independency unites the island. The idea of the LLCEI travelled fast via word-of-mouth and the local village magazines. The ambassadors that the LLCEI recruited made use of their personal networks which sped up the process of customer recruitment. Furthermore, the initiators contacted individuals from their personal network which proved to be crucial for the success of the LLCEI. An example is the legal expert that assisted with investigating whether the LLCEI infringed the matter of state support.

Other ways in which the use of bonding social capital was important for the success of LLCEIs became apparent in the social networks that were accessed to enhance the volunteering base of the LLCEI as well as to arrange roofs for the collective solar PV projects. Trynergie specifically enlarged its scope in terms of its scale in order to draw on additional human capital that is present in the villages in the region. Because of its enlargement, the LLCEI benefited from additional volunteers that brought along with them relevant knowledge and expertise. Most of these individuals were already in the personal network of the core group. In the village from which the LLCEI started, on a total of 850 households, Trynergie managed to realize over 650 solar PV panels on individual households. The next aim of the LLCEI was to realize seven different collective solar PV roofs. The roofs were already arranged and the owners have been approached via the personal networks of the initiators. With use of ambassadors, the LLCEI strived to access the social capital present in these villages. Still, whereas in instances Trynergie profited from personal contacts to recruit customers and participants, the LLCEI mainly relied on marketing and information meetings to sell solar PV panels and certificates.

Gaasterland has benefited from personal contacts in arranging the roof for their collective project, as well as for recruiting customers. In this sense, the same trustworthiness of the initiators played a role in occasions where some customers joined the regional energy supplier because they knew the initiators. Still, the role of bonding social capital was limited as the LLCEI is active in a larger region and they put in significant effort in making the LLCEI known to the villages in the region. Similar as Trynergie, Gaasterland strived to access social capital present in the region by using ambassadors. Importantly, one of the ambassadors was a board member of the village council where in the village the first solar PV project was realized.

The village in which Heeg is situated relatively easily picks up collective community projects; such as a parking lot that the village changed to a community meeting place, a transmission tower that is relocated because the community organized a petition and a lobby group, or the local pick-up point to bring villagers to one of the larger villages in the region. These projects are all initiated and managed by people from the village, who know who to approach for what. For instance, the assessment of whether the roof was suitable for the solar PV project was conducted by a villager. Although of a similar size, the social structure of Wijnjewoude was very different from Heeg as the LLCEI notices that it needed to put in significant effort to recruit participants for their projects. The LLCEI was not able to draw on the same ability to swiftly pick up collective

community projects such as Heeg did. Wijnjewoude was to a certain extent able to draw on personal relations to bolster the activities of the LLCEI, but sought to strengthen and expand the social cohesion in the village. The Christian and public school in the village represent a cleavage that divides the village. Still, the LLCEI managed to recruit 190 members.

LLCEIs that also benefitted to a lesser degree from social capital are Achter de Hoven and Westeinde. Residents in the districts where Westeinde and Achter de Hoven are located are not as networked in the same way as the localities where the other LLCEIs are situated. Achter de Hoven specifically experienced issues when trying to expand the board and finding volunteers for their activities. Westeinde and Achter de Hoven have in common that they mostly directed their attention to accessing resources available at government and other organizations. Thus, the degree of community organization in these localities where the LLCEIs operated is present to a far lesser degree. Both project champions of Westeinde and Achter de Hoven mentioned that residents mostly keep to themselves. However, the initiators of Westeinde all lived in the district for a long time, so their social network within the district was extensive. The initiators mentioned that the district does not have a significant turnover of homeowners as many residents have lived in the district for a long time and their children also live in the same district. The 160 members of the LLCEI is an indicator of this. The LLCEI further frequently used the knowledge available in the district for its projects directed at individual households as well as for the energy cafés the LLCEI organized.

Eendracht started in a village in which the sustainability transition was picked up broadly (the village was one of the first in the Netherlands to initiate a grassroots sustainability transition), by involving inter alia local schoolchildren and youngsters in realizing a village garden and DIY solar boilers. For instance, a local construction company made available a warehouse for the initiative to construct the DIY solar boilers. The organizational and social capacity came from the village, where individuals knew who to approach for what. After the LLCEI broadened its scope to the municipality, Eendracht however lost those benefits of bonding social capital and does not work with ambassadors. Opsterland has difficulties in finding board members and active participants that can bolster the LLCEI. The LLCEI struggles to find participants for the collective solar PV project, despite it being in the village that the LLCEI originated in, and in which the project champion has been involved in the village council for years.

#### *3.4.6 Bridging social capital*

Bridging social capital is derived from the linkages that LLCEIs have with other LLCEIs, as well as the extent to which the LLCEIs are able to connect with other organizations or parts of the locality that contribute to their operations.

In this case, Opsterland extensively made use of its connections with firms and other organizations in arranging multiple roofs for its project and establishing collaborations. The connections with other villages, however, were more difficult to establish.

Opsterland had contact with another LLCEI to collaborate on the application for the national feed-in tariff, which helped the LLCEI further in this process. Despite that Noorderpolder – which originated in two villages that have been collaborating for a long time (the villages have a shared community center) – managed to recruit financial investors from other villages in the region, they did not succeed in selling the certificates for the solar PV project in the other villages. Furthermore, since it was a frontrunner, the LLCEI incidentally had contact with other LLCEIs. The same goes for Ameland and Eendracht; these LLCEIs started at the brink of the second wave of Frisian LLCEIs. As such, they mostly benefited from contact with other frontrunner LLCEIs in the Netherlands, and even from abroad.

Ameland and Eendracht predominantly learned from other LLCEIs about the start-up process, which steps to take and about issues related to the formal organization. As such, for these LLCEIs, contact with other LLCEIs during the start-up phase was important during the first stages. Ameland made extensive use of ambassadors to recruit customers. These played an important role in the success of the LLCEI in terms of its customer base. Later on, Ameland became the frontrunner in Fryslân and shared its knowledge and experience with many LLCEIs, such as Eendracht, Achter de Hoven and Gaasterland. In this sense, Noorderpolder, Achter de Hoven and Eendracht did not take a similar role as Ameland did. Eendracht, akin to Opsterland and Noorderpolder, to a lesser degree managed to get the villages in the region on board. Still the LLCEI succeeded in getting the chair of the village council involved in the workgroup for the first collective solar PV project, and also has a few board members that come from different villages in the region. Eendracht also established contact with a foundation driven by local firms that facilitates sustainability projects in the municipality. However, the project champion voiced his concern about the fragmentation and lack of coordination of sustainability initiatives in the region, indicating a lack of connectedness with these initiatives.

Westeinde also had contact with another LLCEI during the start-up phase to inform about the organizational process of initiating an LLCEI, and also had contact with an LLCEI about the institutional features of managing the solar PV farm that the LLCEI is planning to realize. Other bridging capital materialized inter alia as networked connections with a consultancy company, a project developer, and various firms that specialize in low-carbon energy applications.

Grieneke, Easterwierrum and Kûbaard collaborate regularly. They frequently had meetings in which they aligned their activities, shared their experiences, and exchanged useful tips. They organized a LED-light bulb campaign together, in which members of the LLCEIs could get a discount. They further collaborated on conducting a petition for the municipality to use locally generated energy. While the collaboration between these LLCEIs may not have directly influenced their success, it did extend their capacities in terms of information and knowledge, and also proved to be a vehicle to collectively voice their concerns to the local government. Grieneke and Kûbaard also frequently visited national events to expand their social networks. During one of these events, Kûbaard recruited a new board member.

Doniawerstal collaborated extensively with one LLCEI in a project, but did not have frequent contact with other LLCEIs. In this project, where 100 households had smart meters installed, the LLCEI collaborated with a consultancy firm and a cooperative where students with an interest in sustainability can gain experience in practice by assisting in sustainability-related projects. Apart from this collaboration, Doniawerstal struggled with its position to represent four villages. The villages did not always align when operational or more strategic decisions needed to be made; such as whether the LLCEI should spend money on promotional material and marketing, or more generally how revenue is allocated.

Wijnjewoude reached out to a neighboring village to deliberate about the siting of the energy park. The LLCEI put in significant effort to enhance the social cohesion by approaching new residents, and by reaching out to specific target groups. However, as mentioned above, there was not sufficient bridging capital to overcome some of the dividedness in the village that arises from the Christian and public school. The LLCEI struggled to bridge this gap. The LLCEI did not engage with other LLCEIs frequently, but sought to establish collaboration with the housing corporation, has collaborated with a consultancy firm, the distribution system operator, and local firms. According to one of the interviewee, the energy park that the LLCEI aimed to realize was very different (in terms of what low-carbon energy applications are pursued) from what other LLCEIs do, which is why there was little incentive to reach out to other LLCEIs.

One of the individuals involved in Heeg was a key individual in the Frisian LLCEI movement as he was involved in establishing the regional umbrella cooperative Ús Koöperaasje and the regional energy supplier Energie Van Ons. As such, he was in contact with many other LLCEIs which he provided support to but also could learn from. Furthermore, Heeg frequently approached firms within the village for collaboration concerning their roof, for organizing a local information market on sustainability, or for calculating the roof capacity.

Gaasterland had contact with other LLCEIs predominantly in the start-up phase to learn about the particularities of grassroots organizing in the domain of low-carbon energy. As such, during the start-up phase, the LLCEI spent considerable time networking to boost their knowledge level. The workgroup from which the LLCEI originated also provided for social network connections in the region. The LLCEI invests considerable effort in keeping in touch with other villages in the region. Gaasterland regularly gives presentations or is present on community events to recruit customers and participants for their projects. The ambassadors that the LLCEI recruited assist in this process.

Trynergie has collaborated with other LLCEIs in the start-up phase, and frequently collaborated with other LLCEIs on matters such as the application for the national feed-in tariff, as well as laying the institutional groundwork for the seven collective solar PV roofs the LLCEI aimed to realize. Furthermore, the LLCEI collaborated with various local installation firms for the collective purchase rounds for solar PV panels. The LLCEI was well connected with the villages in the region as Trynergie strived to



realize one collective solar PV roof in each village. Similar to Gaasterland, the ambassadors assisted in this process. Furthermore, the roof on which a solar PV project was planned was arranged via the network of one of the initiators of the LLCEI.

### **3.5 LLCEIs and governance**

#### *3.5.1 Linkage with government*

The extent to which interactions between the LLCEI and government have contributed to the success of the LLCEIs varied to a great extent. The interaction between (local) government and LLCEI ranged from an equal partnership to skepticism regarding the commercial nature of LLCEIs.

In terms of the former, Ameland had a partnership with the municipality of Ameland, and an energy supplier, in which the three parties all have an equal share in the solar PV farm. This collaboration crucially influenced the success of Ameland. The government arranged the location for the solar PV farm, applied for exploitation and investment subsidies, assisted in making the site available by buying out the tenants leasing the site, and offered a surety for the investment required for the solar PV farm. Next to the extensive collaboration with the local government, the provincial government provided the LLCEI with a start-up subsidy. Westeinde also collaborated closely with the local and provincial government. Both layers of government assisted in the application for the required permits. The provincial government assisted in applying for the national feed-in tariff and it kept the parcel available for the LLCEI to arrange the necessary preparatory work (i.e. applying for permits, subsidies, investment capital). The municipality of Leeuwarden assisted the LLCEI in allocating a subsidy for a trajectory for the district to transition towards an energy neutral district. Furthermore, the local government put in effort to speed up the process of getting the alteration of the existing zoning plan accepted by the municipal council. What helped in both Ameland and Westeinde is that the local governments knew the initiators of the LLCEIs personally, which added to their trustworthiness. This similar trustworthiness was also present in the case of Trynergie. One of the initiators was a local council member and the other a provincial civil servant. The LLCEI ascertained to keep issues related to the LLCEI and matters related to their professional life separated. Their experience in the public sector, however, helped greatly in grasping opportunities for collaboration with the local government. The LLCEI was regularly in contact with the local government. The alderman was one of the ambassadors of the LLCEI and the local government and LLCEI jointly organized an energy market.

In case of Wijnjewoude, the municipality of Opsterland approached the village with the request if it was willing to become a pilot for making the village energy neutral in 10 years. This process was facilitated by a consultancy firm which was subsidized by the local government. Upon learning that a subsidy was available for household-level energy efficiency measures, the LLCEI in ad hoc fashion swiftly implemented the policy by using the entire subsidy for 34 house owners. The local government stayed involved in

the process and attended several workshops and meetings. The local government also assisted the LLCEI when the latter started talks with the Waterboard about taking over the wastewater treatment plant that was put out of commission. The lot on which the treatment plant was located presents an opportunity for large-scale energy generation and storage. One of the ways in which the municipality supported the LLCEI was by giving a temporary spatial permit for the solar PV farm that the LLCEI aimed to realize.

Gaasterland and the municipality of De Fryske Marren regularly gave joint presentations to interested residents. Both parties benefited from this as the LLCEI was able to potentially recruit new customers and participants, while the municipality benefited as the LLCEI also put effort in getting attendants for the presentation. At one point the local government facilitated the LLCEI by sending out an invitation letter that mentioned the LLCEI's activities and invited residents to attend an information meeting about the LLCEI. The invitation letter was sent to a large number of households in the region. The municipality also paid for renting the accommodation for that meeting where in the end 150 inhabitants visited the meeting. The LLCEI regularly interacted with the municipality in meetings where other LLCEIs were invited as well. Doniawerstal had a similar arrangement with the local government, but there have been occasions where miscommunication resulted in two meetings being organized at the same time by the LLCEI and local government. The municipality also played a role in incentivizing the village where Doniawerstal originated from to start an LLCEI. However, because of the absence of the civil servant responsible for sustainability (due to personal circumstances), the LLCEI had to rekindle the relation with the local government.

For Heeg, the interaction with the municipality of Súdwest-Fryslân mattered less for the success of the LLCEI as the solar PV project is roof-based. While the interviewee mentioned that the local government was easy to approach and willing to help out, the request of blueprints for the building that the LLCEI was planning to put solar PV panels on took considerable time for the municipality to process, and the latter in first instance provided the wrong blueprints. For Eendracht, the project champion had difficulties in getting in contact with the right civil servant. While the municipality of Oostellingwerf mentions the LLCEI by name in its sustainability strategy document, the interaction between the two parties was not straightforward. An indication of this is the large-scale solar PV farm that was realized by the local government and a project developer. While the local government and the LLCEI started discussing and exploring the possibility for the LLCEI to become involved in the project, the construction of the solar PV farm commenced without the participation of the LLCEI.

Achter de Hoven was dubbed by the municipality of Leeuwarden as a pilot district to explore the potential for enhanced citizen involvement in issues related to urban development. While this indicated the local government's openness to grassroots initiatives, the LLCEI experienced that the willingness and positivity was in sharp contrast with the municipality's internal commitment to provide substantive support. For instance, the LLCEI had to wait a year for Leeuwarden to invest in a thermal camera that the LLCEI could use. The same goes for the sustainability loan that the LLCEI needed in

order to cover the upfront investment capital for individual households that were willing to take energy efficiency measures. The LLCEI wanted a sustainability loan as a pilot for the district, but the municipality insisted on a municipal-wide sustainability loan, which took more time to implement. Additionally, the municipality asked the LLCEI to develop an educational program on sustainability for elementary schools. While the municipality funded the development process, there were no funds to implement the newly developed educational program. An interviewee from local government mentioned that the LLCEI asked for structural financial support, which the local government could not provide. In the case of Achter de Hoven, both parties had different expectations concerning their responsibilities, which more than once led to frictions.

A similar observation can be made in the case of Opsterland, where the LLCEI and local government – the municipality of Opsterland – also had different expectations concerning who was responsible for what. At the start of Opsterland, the LLCEI wanted to realize a ground-based solar PV farm on municipal property. There were reservations at the municipality to use a parcel (that was destined in the zoning plan for house building) for the sole purpose of energy generation. However, the municipality was still open to it if the LLCEI made preparations and provided the municipality with a business plan. However, the LLCEI wanted it to be a joint effort. This process took around 1,5 years and was a dead end. The municipality wanted a market price for the parcel and was not willing to make an exception for the LLCEI. Furthermore, because of the project champion's long (political) career at the local government, this at times impeded on the interactions between the LLCEI and the local government. This happened to such an extent that the LLCEI had to put forward another individual in place of the project champion to interact with the local government. Other instances where there was friction between the LLCEI and local government, is when the LLCEI filed a formal subsidy request for the lease of an office in which it wanted to start a partnership with a sustainable technology centre. This centre would teach courses on the installation of low-carbon energy applications to mechanics. The local government did not respond to the request (for reasons unknown to the LLCEI), so the LLCEI terminated the lease contract.

Noorderpolder also had a conflicted interaction with the municipality of Menameradiel which was resolved later on. The LLCEI experienced difficulties in starting interacting with the local government, as the LLCEI felt that the municipality was unperceptive and showed a lack of interest vis-à-vis the LLCEI. The LLCEI also felt that it took the municipality long to grant a subsidy that was already earmarked for the LLCEI. After the meeting in which the frustrations were discussed, the subsidy was provided quickly. A municipal merger in 2018 made the LLCEI part of a new municipality named Waadhoeke.

Grieneke, Easterwierrum, Kûbaard also experienced a conflicted interaction with the municipality of Littenseradiel, as the latter firstly conceived the LLCEIs as commercial parties. The municipality had to find its way in how to interact with the LLCEIs. Later on the relationship was improved, as the LLCEIs delivered a petition to the local

government for it to use locally generated low-carbon energy. The petition was picked up positively by the local government. From then on, the LLCEIs and the local government made an effort to keep each other updated on their activities, and the municipality invited the LLCEIs to have their six-weekly meeting at city hall. In 2018, municipal reorganizations changed the administrative situation for the LLCEIs involved. This entailed that Kûbaard and Easterwierrum from then on became part of the municipality of Súdwest-Fryslân. Grieneko was from that moment onwards situated in the Leeuwarden municipality.

### *3.5.2 Linkage with intermediary*

For Noorderpolder, Grieneko, Easterwierrum, Kûbaard, Eendracht and Opsterland, a troubled interaction with local government was countervailed with the support that arose from intermediaries. Noorderpolder collaborated extensively with the provincial investment fund and the Energy Workshop to develop a business-model and business case in order to apply for the national feed-in tariff. The intermediaries both assisted in the application process for the national feed-in tariff as well. Grieneko, Kûbaard and Eendracht profited from the administrative assistance and fiscal expertise of an individual that has been active at the Energy Workshop as a freelancer. The LLCEIs paid for the services of the entrepreneur. Eendracht particularly mentioned that the fiscal expert's assistance was a weight of the project champion's shoulders in terms of VAT declarations and tax returns. Despite this positive impact of the intermediary, the LLCEI did not frequently visit meetings organized by the intermediaries. Kûbaard and Easterwierrum attended several meetings organized by the Energy Workshop and both LLCEIs invited the fiscal expert to give a presentation on the tax-reduction scheme that the LLCEI could use for a collective solar PV project. Unlike Easterwierrum, Kûbaard followed up on this presentation and realized a solar PV project. The blueprint for setting up a collective solar PV project with use of the tax reduction-scheme (created by the intermediary) was important for Kûbaard, as the interviewee mentioned that he did not want to spent 400-500 hours to investigate the feasibility of such a project.

When Opsterland lost its motivation to persevere against the backdrop of two negative decisions on its application for the national feed-in tariff. The Energy Workshop played an important role by rekindling the enthusiasm of the project champion and provided significant support in assisting the LLCEI with its third and successful application for the national feed-in tariff. Furthermore, the LLCEI frequently interacts with the intermediaries on more strategic issues pertaining to the institutional organization of LLCEIs in the province. Grieneko also collaborated extensively with the energy workshop. The LLCEI was involved in setting up a template for the tax-reduction scheme. The template was useful as the tax-reduction scheme is a complex fiscal policy instrument with which many LLCEIs struggle with. Another project in which Grieneko collaborated with the Energy Workshop was a pilot for energy neutral housing. Grieneko and the Energy Workshop jointly explored the possibility of establishing an Energy Service Company (ESCO) to help homeowners in making their houses energy neutral. The investment capital needed for this financial construction,

however, could not be provided. As a consequence, Grienko had to tell over 50 homeowners which it recruited for the pilot that the project was not feasible.

Experts of the Energy Workshop also helped Trynergie, Doniawerstal, Heeg and Gaasterland with their collective solar PV projects. Heeg profited from the help of fiscal experts to develop the business plan to help realize the collective solar PV project. Gaasterland attended various meetings organized by the Energy Workshop, which helped the LLCEI to become familiar with the community energy sector. During the start-up phase, the LLCEI made use of the standardized statutes that were provided by Ús Koöperaasje. Furthermore, Gaasterland also received support of the same fiscal expert for realizing their collective solar PV project and followed a course on customer recruitment, provided by the regional energy supplier. During the start-up phase (in the time when the LLCEI was still a workgroup of the district panel), Westeinde received support from Doarpswurk in terms of organizational processes and learned more about the community energy sector with help of Ús Koöperaasje. The provincial investment fund helped Westeinde with their business case. Doniawerstal also profited from the support provided by the fiscal expert, which helped the realization of the solar PV project. Doarpswurk and Ús Koöperaasje assisted during the start-up phase of Doniawerstal: Doarpswurk with the visioning and social-organizational processes, and Ús Koöperaasje provided the LLCEI with standardized statutes. Trynergie also benefitted from the support of the Energy Workshop. The intermediary assisted with the application for the national feed-in tariff and helped with developing the business case for the collective solar PV projects. Furthermore, via the intermediary, the LLCEI got in touch with other LLCEIs which helped Trynergie inter alia in developing the institutional organization for the seven collective solar PV projects it aimed to realize. Here, the support of the fiscal expert was also crucial. The LLCEI accessed relevant knowledge, expertise and information via the Energy Workshop.

When Ameland started its activities in 2009, the Energy Workshop and Ús Koöperaasje were not yet established. As such, during the start-up phase as well as the entire process of realizing the solar PV farm, the LLCEI could not draw on support provided by the intermediaries that have supported the other LLCEIs. However, Ameland frequently interacted with the individuals that were the founding fathers of these intermediaries. Ameland mainly took advantage of the intermediaries as they helped expanding the LLCEI's social network. Additionally, Ameland drew on the support of the fiscal expert that is hired by the Energy Workshop when it initiated another collective solar PV project that made use of the tax-reduction scheme. Achter de Hoven was in a similar position as Ameland in the sense that the LLCEI was established before the intermediaries became active in Fryslân. While Achter de Hoven did link up with Ús Koöperaasje by becoming a member (all LLCEIs in this study did this in order to be qualified as official resellers of the regional energy supplier), the LLCEI mentioned that the initiative was already a few steps ahead of the other LLCEIs. Achter de Hoven therefore could not profit from getting relevant information, knowledge or support via the intermediaries. Unfortunately, while the Energy Workshop and other intermediaries further developed their tool box to support

LLCEIs after the start-up phase, this came too late for Achter de Hoven. The LLCEI became dormant before it could profit from this.

Wijnjewoude was also dissatisfied with the support the intermediaries provide. The energy park the LLCEI aimed to realize involves particular low-carbon energy technologies and specific applications of them. In brief, the LLCEI aimed to realize a green-gas hub, energy storage, mono-digesters, and a solar PV farm. Apart from solar PV, the intermediaries have not developed templates, concepts or standardized business cases for the technologies (as well as their applications) involved in the envisioned energy park. As such, Wijnjewoude did not draw on the support of the intermediaries for the realization of their energy park. The LLCEI did profit from the support provided by the intermediaries during the start-up phase, specifically in terms of standardized statutes and assistance with a deliberative process on envisioning energy scenarios for the village. Furthermore, the LLCEI also made use of a template and the fiscal expertise provided by the Energy Workshop for the realization of a collective solar PV roof.

### *3.5.3 Supportive governance settings*

Wijnjewoude and Opsterland are located in the same municipality. The municipality of Opsterland had one (part-time) civil servant that was responsible for the policy domains of environment and water, in which sustainability was headed under the former. At the time of the study, the local government had an annual budget of €7,500 for the environment policy domain, but the interviewee mentioned that sustainability projects were frequently financed with funds stemming from other departments. Whereas at the time of the interviews (early 2017), the municipality did not aim to be a frontrunner, in early 2018 the coalition agreement stated that the municipality has the ambition to be energy neutral in 2035.

In case of Wijnjewoude the governance context significantly impeded the success of the LLCEI. With regard to obtaining the lot on which the former wastewater treatment plant was located, the negotiations with the Waterboard have been ongoing for two years (since 2016). The reason the LLCEI wanted to get this lot was to have a non-obtrusive space for an energy park. The key issue is the legal accountability for the risk that the wastewater treatment plant has caused soil pollution underneath the sludge basins. Without demolition, which was estimated to cost the waterboard around €400.000, this risk had to be covered in the purchase contract. The LLCEI was not willing to be held accountable for the risk, and the Waterboard was not willing to sell the lot without accountability for potential environmental pollution on part of the purchaser. Additionally, the Waterboard was reluctant to let go of the former wastewater treatment plan for a symbolic price, as it feared to be accused of state aid. This process impeded the realization of the energy park that Wijnjewoude envisioned. Furthermore, one project within the energy park was a solar PV farm. In order to meet the requirements for the national feed-in tariff, the LLCEI needed a spatial permit. The temporary spatial permit provided by the municipality for the solar PV farm, however, was not sufficient. The permit lasted for 10 years, while the national feed-in tariff is provided for 15 years. In

addition to this, the provincial government objected the municipality's spatial permit as the location is too far removed from the village itself, which was not in line with the province's spatial planning policy on ground-based solar PV. Another barrier was that the LLCEI was not the owner of the lot, which is another obstacle that prevented the LLCEI from successfully applying for the national feed-in tariff.

One of the first projects that Opsterland aimed to realize was a ground-based solar PV farm on a municipal parcel. Although the civil servant was willing to explore the possibility for ground-based solar PV, internally there was a lot of discussion in different departments whether it would be a good idea for the municipality to use the area for the sole purpose of energy generation, instead of multiple land use or house building. The municipality and Opsterland could not reach an agreement, which impeded on the success of the LLCEI. Furthermore, in order to realize multiple solar PV projects on business-owners' roofs in an industrial area, a co-financing arrangement is required by the provincial investment fund. The LLCEI had difficulties in raising the funds needed for the co-financing. Furthermore, the interest rate of the provincial investment fund impedes on the feasibility of their business case. Other instances that more than once impeded on the realization of projects was where the LLCEI was paid in advance for the strength calculation of the roof construction where the LLCEI aimed to install solar PV panels to subsequently learn that the roof was not suitable for solar PV panels. More than other LLCEIs, Opsterland experienced the adverse effects of the competition with professional project developers. Opsterland predominantly collaborated with SME's in order to install solar PV projects on the roofs of these businesses. In more than one occasion, the LLCEI proved to be too expensive making the SME deciding in favor of an external project developer. A national-scale initiative started by a large energy supplier to replace asbestos roofs with solar PV panels had as a consequence that one party where the LLCEI had an agreement with for 1,000 solar PV panels decided to pull back from the agreement in favor of the energy supplier.

While Ameland can be regarded as the first LLCEI among the new style LLCEIs, the governance arrangement was not necessarily unsupportive of the LLCEI. It was rather the exact opposite. First of all, an important aspect that stimulated the success of the LLCEI was the attitude and capacity of the municipality of Ameland vis-à-vis sustainability. The idea of a solar PV farm originated from the mayor. The alderman supported the idea and three civil servants further investigated the feasibility of a solar PV farm. Of the three civil servants, there were two from the sustainability department (both full time sustainability civil servants) and one from the spatial planning department. Importantly, one of the sustainability civil servants was a coordinating civil servant, which entails that he ensured that progress is made in terms of policy implementation and has more leeway in taking initiative to pursue opportunities that contribute to the municipality's ambition. The committed civil servants investigated the most suitable location and applied for the national feed-in tariff and kept in mind three criteria: it had to be municipal property; a lot with as little nature legislation applicable to it as possible; and at least 10 acres to account for the electricity demand of all households on the island. The municipality succeeded in selecting a strip of land that met these requirements.

Regarding the municipality's ambition, it ratified a covenant with various societal and private sector stakeholders to make the island energy neutral and to consider the locality as a testing ground for innovative low-carbon energy applications and technologies. Furthermore, the municipality conceived of sustainability as an alternative to the touristic monoculture of the local economy. The municipal council also played an important role by agreeing to have the local government as a guarantor for the amount of €3,5 million for the solar PV farm. This was necessary to meet the requirements for the subsidy application at the Wadden Fund. The Wadden Fund granted the solar PV farm €2,6 million. In the end, the local government, the LLCEI and the energy company each invested €314.000 in the solar PV farm. The province granted the project little over €330.000. Furthermore, the municipal council also agreed with altering the zoning plan to allow for the solar PV farm to be constructed and the local government offered a buyout to the farmers that were leasing the parcels for their manure accounts. Another crucial element of the governance arrangement for Ameland was the equal partnership of the LLCEI, municipality, and energy firm. All had an equal share in the solar PV farm and an equal say in the decision-making processes involved. Furthermore, the partnership also entailed that each party brought to the table their own resources, expertise and capacities. The municipality arranged the spatial procedures, permits and kept the municipal council updated and involved throughout the process. The energy supplier organized the tendering process for the construction of the solar PV farm and provided for a project manager. The LLCEI functioned as a representative for the constituency as it facilitated broad public support and financial participation by the islanders. This collaboration amongst equals was a characteristic element of the governance arrangement that was important for the success of the case.

Noorderpolder too emerged when the intermediary support structure in Fryslân was beginning to take form. There had not been any other LLCEIs that realized collective projects. The first aim of Noorderpolder was to make use of one of the existing wind turbines in the locality. After a discussion on wind energy heated up in the province, and after the LLCEI concluded that the wind turbines were already subsidized and could not go for another round, the LLCEI decided to pursue solar PV. When Noorderpolder started exploring the idea of a collective solar PV project, the tax-reduction scheme could not provide the LLCEI with a feasible business case. Only after the tax-reduction scheme was adjusted in 2016, LLCEIs could realize collective solar PV projects with a profit margin to cover the organizational and operational costs and give financial participants a return on their investment. This adjustment however came too late for Noorderpolder. Against this backdrop, the LLCEI received extensive support from Doarpswurk and the Frisian investment fund. The intermediaries helped with the application for the national feed-in tariff as there were various requirements that needed to be met. One of these was the right of superficies with the mortgager of the owner of the potato barn, which was a lengthy and troublesome process. Furthermore, the intermediaries assisted the LLCEI in developing a business model that would enable the LLCEI to sell certificates to local residents. Individuals that invested in the solar PV roof, however, still had to pay for electricity transportation costs despite the energy installation being in the vicinity. At the



time the solar PV roof was almost constructed, the LLCEI still could not settle with the regional energy supplier on a power purchase agreement, which is why it had to set up a contract with a different energy supplier. The option for residents that would give the best return on their investment meant that they had to become a customer at this energy supplier, which was another hurdle for Noorderpolder.

Westeinde enjoyed a supportive governance setting which influenced the degree of success of the LLCEI. The location of the solar PV farm fitted an infrastructural project led by the provincial of Fryslân where multiple large-scale solar PV farms were to be constructed. The lot where the LLCEI aimed to realize the solar PV farm was owned by the province. The province kept the lot available throughout the process in which the LLCEI – with extensive help of the province – applied for the national feed-in tariff and had to arrange for all the complementary requirements as it involved a ground-based solar PV project. One of these was the environmental permit, which the province helped to develop and paid for the costs involved (€50,000) in advance. The municipality of Leeuwarden made sure to keep the flow of the process going. The municipal council put the decision on the environmental permit swiftly on the agenda for the council to take a vote on the decision. The municipality in which Westeinde was located is ambitious in the domain of sustainability and wanted to be a frontrunner. Leeuwarden had multiple full-time civil servants that are responsible for sustainability and climate change. One of them was a coordinating civil servant which was a well-known policy entrepreneur in the province. He was involved in setting up the umbrella cooperative for the Frisian LLCEIs. The municipality had an annual budget of €80.000 to spend on sustainability.

Achter de Hoven, although located in the same municipality, had different experiences. The district was considered a pilot by the municipality in which residents would take charge over their own livelihood in the district by taking responsibility for amongst others; community gardens, establishing a healthcare cooperative for the district, and their own energy supply. As the district comprises predominantly of low-income households, the ability of the LLCEI to encourage households to take energy efficiency measures predominantly hinged upon the lack of upfront investment capital. The sustainability loan that the district requested at the municipality for the district alone took long to process, in which the municipality decided to develop the instrument for the entire municipality (in order to get the support of the municipal council), instead of a pilot for the district. The LLCEI also requested a thermal camera to scan houses in the district. The LLCEI had to wait a year on both the sustainability loan and the thermal camera, which impeded on the flow of the initiative. Achter de Hoven pursued a project where the district would get monitors at the entrance points of the district which would inform passersby about how much electricity is generated by the solar PV panels in the district. The grid operator, which was key in the sense of its financial contribution pulled back from the project, which prevented the project from being realized.

In case of Eendracht, the governance arrangement also had not been particularly supportive. The municipality of Oostellingwerf had the ambition to be energy neutral

in 2030 and had an annual budget of €100.000. Oostellingwerf also strived to realize this ambition, by for instance realizing a solar PV farm of 26 acres. While the government, the project developer and LLCEI started investigated the possibility of the latter to become involved, the project continued without participation of the LLCEI. In essence, the same partnership could have been arranged as was the case in Ameland. In terms of human capacity, the municipality had one full-time civil servant that is responsible for the environmental department, and one civil servant working three days a week on the subject of waste. While the municipalities of Ameland and Leeuwarden (cases Westeinde and Achter de Hoven) had a civil servant that can be considered a policy entrepreneur, this civil servant did not share the same characteristics (i.e. of actively facilitating LLCEIs by opportunistically making use of resources and networks). Despite this, the municipality did mention the LLCEI in its sustainability agenda policy document. Apart from the municipality, the governance arrangement has not directly restricted or contributed to the success of Eendracht.

The local government in which Trynergie is located, Tytsjerksteradiel, was ambitious when it comes to sustainability. The municipality wanted to be a frontrunner and had a committed alderman and civil servant that both encourage the sustainability agenda. The sustainability theme was well integrated in the municipal organization as the alderman has a coordinating function regarding the sustainability policy domain. This entails that the other aldermen have to take into account sustainability in their respective domains and that the alderman is the first point of contact when it came to sustainability. The alderman and civil servant formed a tight partnership. Although the municipality of Tytsjerksteradiel had an annual budget of €25,000 for the sustainability policy domain, the sustainability policy framework harnessed a degree of flexibility for the municipality to jump on opportunities that may arise. One of these is adjusting the property tax for ground-based solar PV projects to a symbolic price of €250. Although this did not directly benefit Trynergie, it did indicate that the municipality is willing to facilitate LLCEIs. Another indication of this was that the alderman is an ambassador for Trynergie. Furthermore, the local government gave a substantial start-up subsidy and funded a baseline study that amongst others looked into the willingness of local residents to invest in low-carbon energy measures. The local government also provided the LLCEI with a start-up subsidy (€6300) that was larger than in the cases of other LLCEIs. Even more so as the municipality was working towards a cultural change in which the wishes of citizens are taken as a point of departure instead of the municipality determining the societal interest. Other actors in the governance arrangement of Trynergie have not directly decremented or added to the success of the LLCEI. On a national level, indications that the tax levied on electricity would be lowered by national government in 2019 (negatively effectuating the business case of the collective solar PV roofs) did however impede on the progress and success of the LLCEI.

For Grieneke, Easterwierrum, and Kúbaard, the governance settings have been similar to a certain extent as they are all located in the same municipality. In first instance, the municipality of Littenseradiel was skeptical vis-à-vis LLCEIs as it perceived them to be commercial entities. The local government's stance regarding the LLCEIs changed

positively after a while. The effect was that the municipality and LLCEIs were coordinating their activities and met up regularly. The municipality in which the LLCEIs were located, was however up for a reorganization in 2018. And so as of 2018, the LLCEIs needed to establish new contacts with their respective municipalities. Despite these irregularities, for Easterwierrum the governance setting has not been of direct (neither positive nor negative) influence as the LLCEI did not pursue individual or collective low-carbon energy projects. The other two LLCEIs did realize collective projects. As both Grieneke and Kûbaard used local farmers' roofs for the collective solar PV projects, the LLCEIs did not require any spatial permits of zoning plan adjustments and the LLCEIs did not experience noteworthy issues with getting a connection to the grid, or sorting out the right of superficies with the mortgagers of the roof-owners. Similar to Easterwierrum, the governance setting for Kûbaard also has not been of direct influence on the success of the LLCEI, as it was able to realize the solar PV project predominantly with the help of intermediaries and the workgroup that was established for the purpose of the solar PV roof. In contrast, Grieneke did experience setbacks that stemmed from the governance arrangement. The LLCEI recruited 50 homeowners for a pilot to retrofit their houses to energy neutral houses. The LLCEI and intermediaries explored the possibility for establishing an energy service company (ESCO) to circumvent the upfront investment capital associated with the measures that the homeowners would have to take to make their houses energy neutral. The Provincial Council agreed that the LLCEI and intermediary could explore the possibility of a provincial guarantee fund to enable such an ESCO. However, this provincial guarantee fund did not materialize and the LLCEI had to disappoint the 50 homeowners that signed up for the project.

The municipality in which Heeg is located, Súdwest-Fryslân, was particularly supportive of LLCEIs. Due to the geographical scale of the municipality (municipality is one of the largest in the Netherlands in terms of its geographical size), the local government was used to working with communities and village councils. As such, more than in other municipalities, the village council can be regarded as a layer of government. The municipality of Súdwest-Fryslân had the ambition to have reduced carbon emissions with 49% in 2030 and have all houses energy neutral in 2030. In 2022, the local government wanted to have a share of 25% low-carbon energy on its total energy demand. The municipality invested significant funds in a platform to support homeowners in taking energy efficiency measures. There was one committed, full-time civil servant for sustainability. He had a certain degree of freedom within the municipal organization to initiate and pursue further projects that he considered to be important for realizing the municipality's ambitions. One of these projects has been a white paper concerning an a priori granting of the spatial permit if a ground-based solar PV project is organized in accordance with three conditions: local involvement, legitimacy (in terms of a democratic process, a legal status, and in terms of the distribution of benefits), and financial feasibility. The local government investigated the impact of this white paper with use of three pilots, amongst them an LLCEI that was not part of this study. The municipality had annually a €56,000 budget for sustainability, which could be used rather flexibly, according to the civil servant.

Whilst the local government in general was supportive for LLCEIs, this has not been of direct influence to the case of Heeg. As a matter of fact, the LLCEI had to wait for some time on the blueprints of a building that the LLCEI wanted to construct solar PV panels on. In first instance, the local government provided the LLCEI with the wrong blueprints. Another setback that impeded on the progress of the collective solar PV roof was a faulty calculation of the connection to the grid on the side of the grid operator. The costs that were involved for connecting the solar PV project to the grid turned out to be twice as high as the quotation provided by the grid operator. This mishap occurred during the summer, in which the individual that was responsible for resolving this issue was on holiday leave. This led to a delay of 3 to 4 months. As the LLCEI realized its first collective solar PV project on a roof, the LLCEI did not have to deal with spatial planning policies and permits procedures.

Gaasterland is both located in Súdwest-Fryslân and the municipality of de Fryske Marren. De Fryske Marren had the ambitious goal of being independent of fossil fuels in 2030. The municipality had two civil servants; one for the environmental policy domain, and one for sustainability. While there was to a certain degree support for sustainability amongst the aldermen, internally the municipality was fragmented and sustainability was not yet well integrated in the organization. De Fryske Marren installed a similar platform as Súdwest-Fryslân to facilitate homeowners in taking energy efficiency measures. The alderman had a significant role in realizing the platform. Gaasterland took benefit of this platform by jointly giving presentations with the municipality during meetings where the platform and its features are presented to homeowners. This helped the LLCEI in getting additional customers. The LLCEI experienced no issues with the grid operator. This was not the case for Doniawerstal, which is also located in De Fryske Marren. As the LLCEI was the first to realize a collective solar PV roof with use of the tax-reduction scheme, it encountered some difficulties. One of these was the requirements for the fuse box that needed to be installed for the collective solar PV roof. A local firm that specializes in solar PV panels installations installed the PV panels for the LLCEI's project and constructed the fuse box. However, the fuse box was not placed at the height that is required according to industry standards. The grid operator therefore in first instance did not give a formal agreement for the fuse box, which also prevented the LLCEI from making use of the tax-reduction scheme. Ultimately, the issue was resolved, but it gave significant delay. Another issue was that in order for the LLCEI to keep the flow of the project going, the initiators paid for amongst others the connection to the grid and the notary costs. The LLCEI applied for a subsidy only after these costs were made. The province stated that these costs were, however, not eligible for a subsidy as they were already made by the initiator.

In Table 3.8 the results of the ordinal scores analysis are presented (ranging from ‘--’ to ‘+++’).

**Table 3.8.**  
Results of the ordinal analysis

	Ameland	Trynergie	Gaasterland	Westeinde	Doniawerstal	Noorderpolder	Wijnjewoude	HeegGrieneke	Easterwierrum	Kûbaard	Achter de Hoven	Opsterland	Eendracht	Eendracht
<i>Project champion</i>	++	++	+	++	++	+	++	+	++	+/-	+/-	--	+/-	+/-
<i>Human capital</i>	++	++	+	++	++	++	++	++	++	+/-	++	+	+	+/-
<i>Size</i>	++	++	+	++	++	++	++	++	+	+	+/-	--	-	+/-
<i>Time</i>	++	++	+	++	+/-	++	++	+/-	++	-	-	--	+	-
<i>Funds</i>	++	++	++	++	++	++	+	++	++	+/-	++	+/-	-	+
<i>Board</i>	+/-	+/-	--	--	+/-	--	+	+/-	--	+	+/-	+/-	--	++
<i>Cultural heritage</i>	++	++	+/-	-	--	+	-	++	++	++	++	+	--	--
<i>Institutional embedding</i>	++	++	++	++	++	+	++	++	++	++	++	++	+/-	+/-
<i>Enhancing visibility</i>	++	++	++	++	+/-	-	++	++	++	++	++	++	++	+
<i>Community involvement</i>	++	++	++	++	++	+/-	++	+	++	++	++	++	+	+
<i>Bonding capital</i>	++	++	+	+	+	++	+/-	++	++	++	++	-	-	+/-
<i>Bridging capital</i>	++	++	++	++	+/-	+	+/-	++	++	++	++	-	++	+/-
<i>Linkage government</i>	++	++	++	++	+	+/-	++	+/-	+/-	+/-	+/-	+/-	--	+/-
<i>Linkage intermediary</i>	+	++	++	++	++	++	+/-	++	++	+	++	-	++	+
<i>Supportive governance arrangement</i>	++	+	+	++	-	-	--	+/-	--	+/-	+/-	+/-	--	+/-
<i>Success: customers</i>	++	++	++	--	++	-	--	+	+	+	+	--	--	+
<i>Success: customers relative</i>	++	--	+	--	--	--	--	+	++	++	++	--	--	--
<i>Success: individual</i>	++	++	+	++	-	--	+	--	+	--	--	+	--	--
<i>Success: collective</i>	++	+/-	+	++	+	++	+/-	+	++	--	+	+/-	+/-	+

### 3.6 Cross-case analysis

To compare the cases in a systematic manner, this study used Spearman's Rho as a nonparametric measure to demonstrate the bivariate correlations between the independent and dependent variables. With only a few exceptions a 95% confidence level interval is used. The results of the analysis are presented in Table 3.9 and Table 3.10. Significant results are presented using asterisks and are highlighted in yellow. In this subsection, the correlations are illustrated with rich, qualitative interpretations and case illustrations, which provide in-depth insights into the relation between the independent and dependent variables.

**Table 3.9**

Results of cross-case analysis (Spearman's Rho, N=14) demonstrating bivariate correlations between the theoretical predictors and indicators of success.

		Success: customers	Success: customers relative	Success: individual	Success: collective
<b>Project champion</b>	<i>Rho</i>	.326	-.026	.660**	.443
	<i>Sig. (1-tailed)</i>	.127	.465	.005	.056
<b>Human capital</b>	<i>Rho</i>	.116	.041	0.372	.519*
	<i>Sig. (1-tailed)</i>	.346	.445	.095	.029
<b>Size</b>	<i>Rho</i>	.284	-.096	.380	.364
	<i>Sig. (1-tailed)</i>	.162	.373	.090	.101
<b>Time</b>	<i>Rho</i>	.033	-.093	.566*	.467*
	<i>Sig. (1-tailed)</i>	.456	.376	.017	.046
<b>Funds</b>	<i>Rho</i>	.557*	.260	.337	.721**
	<i>Sig. (1-tailed)</i>	.019	.185	.119	.002
<b>Board</b>	<i>Rho</i>	.114	.013	-.190	-.504*
	<i>Sig. (1-tailed)</i>	.349	.482	.258	.033
<b>Cultural heritage</b>	<i>Rho</i>	.327	.728**	.123	.071
	<i>Sig. (1-tailed)</i>	.127	.002	.337	.404
<b>Institutional embedding</b>	<i>Rho</i>	.313	.434	.545*	-.024
	<i>Sig. (1-tailed)</i>	.138	.060	.022	.467
<b>Visibility</b>	<i>Rho</i>	-.115	.433	.385	-.298
	<i>Sig. (1-tailed)</i>	.347	.061	.087	.151
<b>Community involvement</b>	<i>Rho</i>	.274	.321	.657**	-.134
	<i>Sig. (1-tailed)</i>	.171	.132	.005	.325

**Table 3.9**  
Continued from page 113

		<b>Success: customers</b>	<b>Success: customers relative</b>	<b>Success: individual</b>	<b>Success: collective</b>
<b>Bonding capital</b>	<i>Rho</i>	.514*	.649**	-.005	.358
	<i>Sig. (1-tailed)</i>	.030	.006	.493	.105
<b>Bridging capital</b>	<i>Rho</i>	.291	.608*	.106	.173
	<i>Sig. (1-tailed)</i>	.156	.010	.359	.277
<b>Linkage government</b>	<i>Rho</i>	.378	-.076	.803**	.179
	<i>Sig. (1-tailed)</i>	.091	.398	.000	.270
<b>Linkage intermediary</b>	<i>Rho</i>	.264	.052	-.104	.399
	<i>Sig. (1-tailed)</i>	.180	.430	.362	.079
<b>Supportive governance arrangement</b>	<i>Rho</i>	.395	.176	.492*	.197
	<i>Sig. (1-tailed)</i>	.081	.274	.037	.250

\*. Correlation is significant at the 0.05 level (1-tailed)

\*\* . Correlation is significant at the 0.01 level (1-tailed)

N=14

**Table 3.10**  
Inter-item correlations (Spearman's rho, N = 14).

		<b>Project champion</b>	<b>Human capital</b>	<b>Size</b>	<b>Time</b>	<b>Funds</b>
<b>Project champion</b>	<i>Rho</i>	1.000	.732**	.818**	.816**	.624**
	<i>Sig. (1-tailed)</i>		.001	.000	.000	.009
<b>Human capital</b>	<i>Rho</i>	.732**	1.000	.709**	.625**	.736**
	<i>Sig. (1-tailed)</i>	.001		.002	.008	.001
<b>Size</b>	<i>Rho</i>	.818**	.709**	1.000	.669**	.620**
	<i>Sig. (1-tailed)</i>	.000	.002		.004	.009
<b>Time</b>	<i>Rho</i>	.816**	.625**	.669**	1.000	.459*
	<i>Sig. (1-tailed)</i>	.000	.008	.004		.049
<b>Funds</b>	<i>Rho</i>	.624**	.736**	.620**	.459*	1.000
	<i>Sig. (1-tailed)</i>	.009	.001	.009	.049	
<b>Board</b>	<i>Rho</i>	-.191	-.274	-.029	-.456	-.372
	<i>Sig. (1-tailed)</i>	.256	.171	.461	.050	.095
<b>Cultural heritage</b>	<i>Rho</i>	.062	.296	.140	.076	.357
	<i>Sig. (1-tailed)</i>	.416	.152	.317	.398	.105
<b>Institutional embedding</b>	<i>Rho</i>	.409	.405	.331	.063	.403
	<i>Sig. (1-tailed)</i>	.073	.076	.124	.416	.077
<b>Visibility</b>	<i>Rho</i>	.000	-.011	-.187	.058	-.139
	<i>Sig. (1-tailed)</i>	.500	.485	.261	.422	.317
<b>Community involvement</b>	<i>Rho</i>	.349	.158	.055	.048	.157
	<i>Sig. (1-tailed)</i>	.111	.295	.426	.435	.296
<b>Bonding capital</b>	<i>Rho</i>	.312	.473*	.459*	.275	.645**
	<i>Sig. (1-tailed)</i>	.139	.044	.049	.170	.006
<b>Bridging capital</b>	<i>Rho</i>	.180	.157	.111	.303	.343
	<i>Sig. (1-tailed)</i>	.269	.296	.353	.147	.115
<b>Linkage government</b>	<i>Rho</i>	.716**	.393	.639**	.525*	.479*
	<i>Sig. (1-tailed)</i>	.002	.082	.007	.027	.042
<b>Linkage intermediary</b>	<i>Rho</i>	.276	.415	.235	.305	.614**
	<i>Sig. (1-tailed)</i>	.170	.070	.209	.144	.010
<b>Supportive governance arrangement</b>	<i>Rho</i>	.096	-.013	.205	.014	.368
	<i>Sig. (1-tailed)</i>	.372	.482	.241	.481	.098



**Table 3.10**  
Continued from page 115

		Board	Cultural heritage	Institutional embedding	Visibility	Community involvement
<b>Project champion</b>	<i>Rho</i>	-.191	.062	.409	.000	.349
	<i>Sig. (1-tailed)</i>	.256	.416	.073	.500	.111
<b>Human capital</b>	<i>Rho</i>	-.274	.296	.405	-.011	.158
	<i>Sig. (1-tailed)</i>	.171	.152	.076	.485	.295
<b>Size</b>	<i>Rho</i>	-.029	.140	.331	-.187	.055
	<i>Sig. (1-tailed)</i>	.461	.317	.124	.261	.426
<b>Time</b>	<i>Rho</i>	-.456	.076	.063	.058	.048
	<i>Sig. (1-tailed)</i>	.050	.398	.416	.422	.435
<b>Funds</b>	<i>Rho</i>	-.372	.357	.403	-.139	.157
	<i>Sig. (1-tailed)</i>	.095	.105	.077	.317	.296
<b>Board</b>	<i>Rho</i>	1.000	.033	.079	-.065	.111
	<i>Sig. (1-tailed)</i>		.455	.395	.412	.353
<b>Cultural heritage</b>	<i>Rho</i>	.033	1.000	.530*	.458*	.264
	<i>Sig. (1-tailed)</i>	.455		.026	.050	.180
<b>Institutional embedding</b>	<i>Rho</i>	.079	.530*	1.000	.525*	.823**
	<i>Sig. (1-tailed)</i>	.395	.026		.027	.000
<b>Visibility</b>	<i>Rho</i>	-.065	.458*	.525*	1.000	.501*
	<i>Sig. (1-tailed)</i>	.412	.050	.027		.034
<b>Community involvement</b>	<i>Rho</i>	.111	.264	.823**	.501*	1.000
	<i>Sig. (1-tailed)</i>	.353	.180	.000	.034	
<b>Bonding capital</b>	<i>Rho</i>	-.066	.823**	.356	.043	.075
	<i>Sig. (1-tailed)</i>	.412	.000	.106	.442	.400
<b>Bridging capital</b>	<i>Rho</i>	-.407	.529*	.216	.563*	.117
	<i>Sig. (1-tailed)</i>	.074	.026	.230	.018	.345
<b>Linkage government</b>	<i>Rho</i>	.041	.018	.554*	.164	.583*
	<i>Sig. (1-tailed)</i>	.444	.476	.020	.287	.014
<b>Linkage intermediary</b>	<i>Rho</i>	-.682**	.049	-.054	-.118	-.202
	<i>Sig. (1-tailed)</i>	.004	.434	.427	.344	.245
<b>Supportive governance arrangement</b>	<i>Rho</i>	.023	.287	.351	.265	.313
	<i>Sig. (1-tailed)</i>	.469	.160	.109	.180	.138

**Table 3.10**  
Continued from page 116

		Bonding capital	Bridging capital	Linkage government	Linkage intermediary	Supportive governance arrangement
<b>Project champion</b>	<i>Rho</i>	.312	.180	.716**	.276	.096
	<i>Sig. (1-tailed)</i>	.139	.269	.002	.170	.372
<b>Human capital</b>	<i>Rho</i>	.473*	.157	.393	.415	-.013
	<i>Sig. (1-tailed)</i>	.044	.296	.082	.070	.482
<b>Size</b>	<i>Rho</i>	.459*	.111	.639**	.235	.205
	<i>Sig. (1-tailed)</i>	.049	.353	.007	.209	.241
<b>Time</b>	<i>Rho</i>	.275	.303	.525*	.305	.014
	<i>Sig. (1-tailed)</i>	.170	.147	.027	.144	.481
<b>Funds</b>	<i>Rho</i>	.645**	.343	.479*	.614**	.368
	<i>Sig. (1-tailed)</i>	.006	.115	.042	.010	.098
<b>Board</b>	<i>Rho</i>	-.066	-.407	.041	-.682**	.023
	<i>Sig. (1-tailed)</i>	.412	.074	.444	.004	.469
<b>Cultural heritage</b>	<i>Rho</i>	.823**	.529*	.018	.049	.287
	<i>Sig. (1-tailed)</i>	.000	.026	.476	.434	.160
<b>Institutional embedding</b>	<i>Rho</i>	.356	.216	.554*	-.054	.351
	<i>Sig. (1-tailed)</i>	.106	.230	.020	.427	.109
<b>Visibility</b>	<i>Rho</i>	.043	.563*	.164	-.118	.265
	<i>Sig. (1-tailed)</i>	.442	.018	.287	.344	.180
<b>Community involvement</b>	<i>Rho</i>	.075	.117	.583*	-.202	.313
	<i>Sig. (1-tailed)</i>	.400	.345	.014	.245	.138
<b>Bonding capital</b>	<i>Rho</i>	1.000	.571*	.093	.377	.244
	<i>Sig. (1-tailed)</i>		.016	.376	.092	.200
<b>Bridging capital</b>	<i>Rho</i>	.571*	1.000	.059	.553*	.353
	<i>Sig. (1-tailed)</i>	.016		.420	.020	.108
<b>Linkage government</b>	<i>Rho</i>	.093	.059	1.000	-.059	.554*
	<i>Sig. (1-tailed)</i>	.376	.420		.420	.020
<b>Linkage intermediary</b>	<i>Rho</i>	.377	.553*	-.059	1.000	-.013
	<i>Sig. (1-tailed)</i>	.092	.020	.420		.482
<b>Supportive governance arrangement</b>	<i>Rho</i>	.244	.353	.554*	-.013	1.000
	<i>Sig. (1-tailed)</i>	.200	.108	.020	.482	

### 3.6.1 The LLCEI

#### *Project champion*

The variable project champion significantly and positively correlates ( $\rho = .660$ ;  $p = .005$ ) with success measures in terms of realized projects for individual households. Indeed, in case of Ameland, the project champion personally visited numerous households to help them in taking the decision to install low-carbon energy and energy efficiency applications. At Trynergie, a core group of committed individuals organized various collective purchase rounds of solar PV panels which effectuated over 1,300 solar PV panels. For Eendracht where a project champion was not present in the LLCEI in a sustainable way, the LLCEI also did not perform well on the individual success indicator. In terms of expected relations, the correlation between project champion and success in terms of collective projects is not significant ( $\rho = .443$ ;  $p = .056$ ) when measured against the “rule of thumb” limit of 5%. However, as such it still presents a relatively strong relationship. In various cases, project champions have played an important role in ascertaining that collective projects are implemented. Examples are Grieneke, Ameland, Westeinde. Especially when setbacks were experienced (such as happened in more than one occasion in these cases), project champions managed to keep the flow of the project going. These project champions typically invested considerable time and energy to deal with procedures, applications, and permits that need to be in order for a collective project to be realized. This is also observed in the correlation between the items project champion and time ( $\rho = .816$ ;  $p = .000$ ). The variable project champion is also significantly correlated with an LLCEI’s ability to raise funds ( $\rho = .624$ ;  $p = .009$ ), presence of human capital ( $\rho = .731$ ;  $p = .001$ ), and the LLCEI’s linkage with government ( $\rho = .716$ ;  $p = .002$ ). In various LLCEIs, project champions were responsible for raising funds, interacting with the local government, and were also knowledgeable individuals with relevant experience. The significant correlation between size and project champion ( $\rho = .818$ ;  $p = .000$ ) arises from the fact that a large core group of committed individuals (i.e. the variable ‘project champion’) also implies a large size of the LLCEI.

#### *Time*

Taking the above mentioned into account, the importance of the variable ‘flexibility and availability of time’ also becomes apparent as it displays significant and positive correlations with both individual success ( $\rho = .566$ ;  $p = .017$ ) and collective success ( $\rho = .467$ ;  $p = .0467$ ). Realizing such projects often implies that interactions with firms, government or other stakeholders take place during office hours. LLCEIs that have volunteers who are able to spend time flexibly on these issues have therefore an important asset for project success (i.e. the Westeinde, Trynergie, Ameland, Gaasterland, Grieneke, and Noorderpolder cases). Indeed, the analysis shows that flexible time and linkage with government are significantly and positively correlated ( $\rho = .525$ ;  $p = .027$ ).

#### *Human capital*

Human capital significantly and positively correlates with collective success ( $\rho = .519$ ;  $p = .029$ ). Individuals involved in LLCEIs, such as Ameland, Westeinde, Heeg,

Noorderpolder, Kûbaard and Grieneko, have amongst others relevant experience with setting up enterprises, legal expertise, experience in the public sector, and experience in setting up community projects. These qualities have been important in various occasions in the realization of collective projects. For instance, Eendracht noticed that because of a lack of expertise in the field of low carbon energy, for a long time it did not succeed in initiating and realizing a collective project. Human capital also significantly and positively correlates with funds ( $\rho = .736$ ;  $p = .001$ ). Indeed, for LLCEIs such as Ameland, Trynergie, Kûbaard, Wijnjewoude, Westeinde, and Heeg, knowledgeable individuals played an important role in raising funds for the LLCEI.

### *Size*

Although size does not significantly correlate with any of the indicators of success, indirect impact on these and other indicators can be derived from its correlation with other items. The reason for this is two outliers that confound the correlation. Noorderpolder and Wijnjewoude both drew on a reasonable number of volunteers (valued with ‘++’), but did not perform well on multiple indicators of success. Nonetheless, Noorderpolder did score well on collective success, but both LLCEIs did not manage to recruit a fair amount of customers, which has a negative effect on their overall degree of success. Additionally, Wijnjewoude was in the process of realizing a large-scale energy park, which is a difficult and time-intensive project in itself, as well as a collective solar PV project. For both LLCEIs, the size of the group of volunteers did play an important role in achieving the degree of success that they did, as well as the progress that was made. With respect to the small N, and including the context of these two outliers, it can be argued that size does have a positive effect on LLCEI success. Size significantly and positively correlates with project champion ( $\rho = .818$ ;  $p = .000$ ), funds ( $\rho = .620$ ;  $p = .009$ ), time ( $\rho = .669$ ;  $p = .004$ ), and human capital ( $\rho = .709$ ;  $p = .002$ ). Initiatives such as Trynergie and Ameland drew on multiple knowledgeable individuals (i.e. human capital) that were not part of the core group but played an important role in the realization of their projects. Furthermore, size and time reinforce each other. While Easterwierrum managed to include various volunteers in their initiative, the people involved were bound by other commitments (such as employment, or a young family) which influenced their ability to invest time in the LLCEI.

Size was also found to correlate with the LLCEI’s linkage with government ( $\rho = .639$ ;  $p = .007$ ). Government interviewees mentioned that one of the criteria they take into consideration when making their decision on supporting an LLCEI is the number of people involved. Is it carried by just one individual or is the LLCEI initiated by a larger group of committed individuals? Government interviewees mentioned that they were more willing to support LLCEIs when their ideas and projects are carried by multiple individuals and the locality they are situated in. Since LLCEIs commonly receive grants or subsidies from government actors, it explains the correlation between size and funds; an LLCEI that has a sizeable group of volunteers involved is more likely to receive funds (from government actors) since it shows a degree of public support, a value that was considered important by government interviewees. The correlation between size and bonding capital is discussed below.

### *Funds*

The correlation of funds and success measured in number of customers ( $\rho = .557$ ;  $p = .019$ ) is a straightforward one: LLCEIs that have a large customer base have more financial capacity (because of the annual fee that LLCEIs receive for each customer from the energy supplier) than LLCEIs that have few customers. Furthermore, the ability to raise funds is also significantly and positively correlated with collective success ( $\rho = .721$ ;  $p = .002$ ). Collective projects often rely on external funding, whether it is by local residents, subsidies, grants, bank loans, feed-in tariffs or tax-reductions. LLCEIs that struggle to raise funds, such as Opsterland, also have problems with realizing collective projects. The ability to raise funds was also found to significantly and positively correlate with the linkage with government ( $\rho = .470$ ;  $p = .042$ ) as the overall majority of LLCEIs received start-up subsidies from local government. Raising funds, such as writing an application for the national feed-in tariff, or convincing local residents to financially participate in a collective low-carbon energy project requires a significant investment of time. Some of these activities can only be conducted during office hours (contacting the municipality or the Tax and Customs administration, in Dutch the latter is known as the 'Belastingdienst', which is an institution of the national government) which explains the significant and positive correlation between time and funds ( $\rho = .459$ ;  $p = .049$ ). Furthermore, the various workshops, sessions, and face-to-face support for the national feed-in tariff and the tax-reduction scheme organized by the Energy Workshop seem to explain the significant and positive correlation between funds and the linkage with intermediaries ( $\rho = .614$ ;  $p = .010$ ).

### *Board*

In contrast to what was expected, the diversity (in terms of age and gender) of the board is significantly, but negatively correlated with collective success ( $\rho = -.504$ ;  $p = .033$ ). One explanation for this is that the board composition of the majority of the LLCEIs involved in this research is fairly homogenous. Board members are often males who are in their 50s or 60s. The LLCEIs that have a more diverse board – Wijnjewoude, Easterwierrum and Eendracht – have not been particularly successful in terms of collective projects.

## *3.6.2 The LLCEI and the local community*

### *Cultural heritage*

The factor cultural heritage is significantly and positively correlated to success measured by the number of households that are a customer relative to the total number of households in the locality ( $\rho = .728$ ;  $p = .002$ ). The strength of this relationship predominantly arises from the LLCEIs Ameland, Kûbaard, Easterwierrum and Grieneke as these LLCEIs score well in terms of relative number of households that are a customer of the LLCEI and the extent to which they used cultural heritage. For the latter three, community initiatives are common practice and the LLCEIs suited this community tradition. Ameland is a unique case as the sentiment of independency that arises from being an island resident fitted the ambitions of the LLCEI to make the island independent of fossil fuels.

### *Institutional embedding*

Institutional embedding is significantly related to success measured by individual household-level energy applications ( $\rho = .545$ ;  $p = .022$ ). Apart from Opsterland (that also performed rather poorly on individual household-level measures) and Eendracht, the LLCEIs in this study all have positive scores on institutional embedding. In order to gain legitimacy, visibility and to recruit participants, LLCEIs typically use the local village councils or district councils as a communication medium. Institutional embedding also has a positive, although just not significant at the .05 level, correlation with success indicated as the number of customers relative to the number of households in the locality ( $\rho = .434$ ;  $p = .060$ ). LLCEIs that perform well on this measure of success have strong connections with the local village councils. The significant and positive inter-item correlations between institutional embedding and visibility ( $\rho = .525$ ;  $p = .027$ ), and institutional embedding and community involvement ( $\rho = .823$ ;  $p = .000$ ) confirm this. Furthermore, another explanation for the correlation between institutional embedding and individual success is that the majority of the LLCEIs that realized low-carbon energy projects for individual households started as working groups of the village council. This means that the LLCEIs were already institutionally embedded from the very start. Furthermore, institutional embedding and linkage with government also significantly and positively correlate ( $\rho = .554$ ;  $p = .020$ ). Various government interviewees mentioned that the linkage of an LLCEI with institutions in its task environment (such as the village council or the local association for entrepreneurs) is an important indicator for civil servants to judge the extent to which the LLCEI is supported by the locality.

### *Visibility*

Visibility shows positive, but only significant at the .10 level, correlations with success measured by the number of customers relative to the total number of households in the locality ( $\rho = .433$ ;  $p = .061$ ), and realized household-level low-carbon energy and energy efficiency projects ( $\rho = .385$ ;  $p = .087$ ). Indeed, LLCEIs such as Gaasterland, Ameland, Grieneke, Easterwierrum, and Kûbaard often personally approached residents to recruit them as customers. Grieneke, Ameland and Achter de Hoven used a distinctive personal approach to recruit participants for projects for individual households. Trynergie put in much effort to communicate about the LLCEI and its collective purchase rounds for solar PV panels. It even wrote a marketing and communication plan. Visibility also significantly and positively correlates to community involvement ( $\rho = .501$ ;  $p = .034$ ) and institutional embedding ( $\rho = .525$ ;  $p = .027$ ). One of the central ways in which LLCEIs seek to make their ideas known to the locality is by organizing meetings in the local village center thus linking up with local institutions. Furthermore, one could argue that one of the conditions to community involvement is visibility. The community needs to know about the LLCEI before it can be involved in a substantial way.

### *Community involvement*

The underlying explanation of why community involvement and individual household-level success correlate ( $\rho = .657$ ;  $p = .005$ ) is similar to why the ability to raise funds correlated with a large customer base. For the latter, a large customer base inevitably

entails that the LLCEI has a strong financial capacity. In a similar vein, LLCEIs that are successful with regard to energy applications installed by individual households are by definition able to involve the community. For the measure of collective success, as can be observed in the case of Noorderpolder, community involvement in terms of financial participation is not necessarily required. Noorderpolder made use of the national feed-in tariff, which does not presuppose local participation. The analysis also shows a significant and positive correlation between community involvement and visibility ( $\rho = .501$ ;  $p = .034$ ). This makes sense as LLCEIs that manage to involve the community (by means of financial participation or in decision-making) engage in various activities to make the LLCEI known in the locality. Community involvement and linkage to government also significantly and positively correlate ( $\rho = .583$ ;  $p = .014$ ). Various government interviewees mentioned that their support for an LLCEI was dependent on the extent to which the LLCEI is supported by the local community.

### *Bonding capital*

Bonding capital significantly and positively correlates with the relative number of households that are customer ( $\rho = .649$ ;  $p = .006$ ). For these LLCEIs (Ameland, Grieneke, Easterwierrum and Kûbaard), the tight-knitted structure of the communities as well as the trustworthiness of the initiators importantly added to the large customer base relative to the total number of households in the locality. Bonding capital also correlates significantly and positively with success measured by the number of customers ( $\rho = .514$ ;  $p = .030$ ). This correlation can be explained by the fact that becoming a customer of the LLCEI requires a certain degree of commitment and trust in the initiators and the LLCEI itself. The customer needs to take action in order to switch energy suppliers. Furthermore, LLCEIs such as Ameland, Gaasterland, Grieneke, Kûbaard, Easterwierrum often personally approached residents to convince them to become customer of the regional energy supplier. Bonding social capital also significantly and positively correlates with funds ( $\rho = .645$ ;  $p = .006$ ), size ( $\rho = .459$ ;  $p = .049$ ), and human capital ( $\rho = .473$ ;  $p = .044$ ). Various LLCEIs (i.e. Trynergie, Gaasterland, Ameland, Grieneke, Kûbaard; Heeg, and Noorderpolder) recruited people in their personal networks as financial participants or as volunteers for the LLCEI itself. The significant and positive correlation between bonding capital and cultural heritage ( $\rho = .823$ ;  $p = .000$ ) can be explained by the traditions and established practices that govern community relations and are used by LLCEIs such as Trynergie, Grieneke, Easterwierrum, Kûbaard and Ameland to link the LLCEI to the community.

### *Bridging capital*

Bridging capital also significantly and positively correlates with the relative number of households that are customer of the regional energy supplier ( $\rho = .608$ ;  $p = .010$ ). The LLCEIs that score well on success measured by the relative number of customers (Grieneke, Easterwierrum, Kûbaard) meet up frequently with other LLCEIs that are in the same municipality. Interviewees mentioned that they, amongst other things, discussed strategies of how to effectively recruit customers during these meetings. The majority of LLCEIs have upwards of a neutral score with regard to bridging capital. Important to mention here is that meetings, events, and sessions organized by

intermediaries are commonly venues where LLCEIs meet and share experiences. Indeed, the analysis shows that there is a significant and positive correlation between bridging capital and linkage with intermediaries ( $\rho = .553$ ;  $p = .020$ ).

### 3.6.3 LLCEIs and governance settings

#### *Linkage with intermediaries*

In contrast to the hypothesis regarding the role of intermediaries, the statistical analysis has not indicated any significant correlations between this predictor and the four indicators of success. One explanation for this can be that, excluding the Achter de Hoven case, all LLCEIs have more than ‘+/-’ on this item. This means that irrespective of their linkage with intermediaries, LLCEIs have been successful or relatively unsuccessful. Nevertheless, various interviewees mentioned the important role of these intermediaries particularly in the successful realization of collective projects. Indeed, the correlation between the two is positive albeit just not significant ( $\rho = .399$ ;  $p = .079$ ).

#### *Linkage with government and supportive governance arrangements*

LLCEIs’ linkage with government ( $\rho = .803$ ;  $p = .000$ ) and the presence of a supportive governance arrangement ( $\rho = .492$ ,  $p = .037$ ) both significantly and positively correlate with success indicated by individual household-level energy (efficiency) measures. Individual household-level measures can be performed without any permits and low-carbon energy production by individual households is supported by the ‘Salderingsregeling’ (‘net metering’ in Dutch; author’s translation), which makes these measures financially attractive and feasible. In other words, the governance arrangement is supportive for individual household-level measures. For collective projects, this is typically a different story. LLCEIs, such as Noorderpolder that did realize collective projects have done so in the absence of a supportive governance arrangement. Other LLCEIs such as Wijnjewoude and Opsterland struggle to realize collective projects due to unsupportive settings in the governance context.

In terms of the LLCEIs’ linkage with local government, in the multiple cases that are successful with regard to individual household-level measures (Ameland, Wijnjewoude, Trynergie and Gaasterland), the government often provided support by means of subsidies or endorsing the activities of the LLCEIs, for instance, by symbolically putting up a solar PV panel.

### 3.6.4 In sum: factors related to success

The cross-case analysis shows an array of factors that have an influence on the different indicators of success. For this reason, this subsection provides a recapitulation of what has been discussed above.

The analysis showed that bonding social capital is significantly related to success measured by the number of customers. As such, communities that are tight-knitted in combination with the ability of LLCEIs to draw on personal contacts and social networks importantly influenced the performance on this measure.



Bonding social capital, bridging social capital and cultural heritage are significantly related to success measured by the number of households that are a customer of the LLCEI relative to the total number of households in the locality. Bonding capital works according to a similar mechanism as in case of the absolute number of customers. The personal networks of the initiators along with a tight-knitted community help in recruiting customers. Additionally, the trustworthiness of the initiators was specifically mentioned in cases that scored well on this indicator of success. Furthermore, cultural heritage played a role for the LLCEIs to attract a relatively high number of customers. Grieneko, Kûbaard and Easterwierrum were able to draw on the high degree of social organization in their respective communities. These communities are used to starting initiatives from the bottom-up. Furthermore, Kûbaard already had a long history with community energy, because of the village wind turbines dating back to the 1990s. The LLCEI Ameland, which is situated on an island, was able to draw on the cultural sentiment of independency that united the islanders. This being said, independency of fossil fuels fitted this cultural identity.

With regard to bridging capital, this factor implicates that the LLCEIs that are successful in recruiting customers are not solely inward oriented. Indeed, Grieneko, Kûbaard, and Easterwierrum frequently had meetings and discuss projects, strategies and activities. Ameland, as one of the first LLCEIs of the second wave assisted many LLCEIs during the start-up phase and shares their experiences with the LLCEI-community.

The following factors significantly correlated with success measured by household-level projects that have been realized by the LLCEI: presence of project champions; flexibility to spend time; institutional embedding; linkage with government and the presence of a supportive governance arrangement.

Low-carbon energy and energy efficiency measures for individual households are commonly supported by inter alia subsidies and tax reductions. For instance, in the case of Wijnjewoude, 34 homeowners profited from a €140,000 subsidy that was available to individual household-level measures. These measures did not require any spatial permits or zoning plan adjustments, which contributed to a supportive governance context. This also explains the significant and positive correlation with government. In case of collective projects, LLCEIs often need to discuss issues such as spatial permits, zoning plan adjustments or lease contracts with (local or regional) government actors. Here, different interests are at stake and this can lead to frustrations (i.e. in the Opsterland and Wijnjewoude cases). In case of individual household-level measures, this is not the case as the interests of local government and the LLCEI typically align. Local governments look for ways to make existing houses in the municipality energy efficient – the LLCEI presents a means to that end.

LLCEIs that engage in individual household-level measures often started as working groups of the local village council, which is an indication of the extent of institutional embedding. Moreover the local community center is often used as a communication medium to recruit participants and present the ideas of the LLCEI to the local

community. The role of project champions and time also becomes apparent in realizing household-level measures. For individual households, low-carbon energy and energy efficiency measures imply significant private investments. Because of this, the LLCEI has to put in effort to convince the locality of the benefits that the LLCEI can provide. Furthermore, collective purchase rounds of solar PV panels require a degree of organization and time investment. These projects therefore need a group of volunteers that are able to devote time as well as an individual or a group of individuals that ascertain that the flow of the project is sustained.

The presence of human capital, the flexibility to use time, and the ability to raise funds were all found to significantly and positively correlate with success as indicated by collective projects realized by LLCEIs. Indeed, the realization of collective projects requires expert knowledge and skills in inter alia project and process management, low carbon energy installations, bookkeeping, permits, taxes, regulations and subsidies. Furthermore, project champions commonly invest significant time in order to come to the realization of the project. Although the variable project champion was not significant at the .05 level, the relation between collective success and project champion is positive and relatively strong ( $\rho = .443$ ,  $p = .056$ ). Therefore, it would be arbitrary not to mention this among the set of factors predicting LLCEI success. Furthermore, as these projects implicate considerable upfront investment capital, the ability to raise funds importantly matters to their ability to become successful.

### **3.7 Discussion**

The analysis shows that the majority of the factors that were derived from the academic body of knowledge played a role – be it indirectly or directly; and with strong and significant correlations or sometimes with correlations just outside the 95% confidence interval – in explaining the variation in success of LLCEIs. By grouping the factors in three categories, the theoretical framework effectively dealt with the complexities involved in running a successful LLCEI. The strength of this study is to be found in its attention to the array of factors that matter to the success of LLCEIs. The extent and in which ways these factors added to the success of LLCEIs, and how the findings of this research relate to existing academic literature is further reflected upon below.

#### *3.7.1 The LLCEI*

##### *Project champions*

In line with previous research, project champions appear to play a crucial role in the success of LLCEIs (Chmutina, Wiersma, Goodier, & Devine-Wright, 2014; Feola & Nunes, 2014; Martiskainen, 2016; Ruggiero, Onkila, & Kuittinen, 2014). What this study adds to the body of knowledge is that project champions also have a role in ensuring the continuation of the LLCEI. The analysis shows that LLCEIs that are not run by project champions are susceptible to discontinuation (e.g. Achter de Hoven) and that new project champions may replace inactive project champions which in turn can reinvigorate the LLCEI to the extent that it realized a collective project (Eendracht).

More specifically, project champions also have an important role in maintaining the flow of the project and making sure progress is made. Project champions are often responsible for starting partnerships and collaborations with firms, governments or other parties. They are often the face of the LLCEI. Whereas this may have positive implications in terms of the trustworthiness of the LLCEI (e.g. Ameland, Kùbaard, Easterwierrum, Westeinde, Gaasterland, Doniawerstal, Heeg, Noorderpolder), it may also work in the opposite way as was the case in the vexed interaction between Opsterland and the local government. Furthermore, LLCEIs that are successful are also managed by a core group of committed individuals, instead of a single person (Alexander, Hope, & Degg, 2007; Chmutina *et al.*, 2014; Forrest & Wiek, 2014; Newman, Waldron, Dale, & Carriere, 2008; Seyfang, Park, & Smith, 2013).

### *Human capital*

This study also provides evidence for the importance of human capital specifically for the realization of collective community energy projects (Bomberg & McEwen, 2012; Forrest & Wiek, 2014; Hargreaves, Hielscher, Seyfang, & Smith, 2013; Hinshelwood, 2001; Middlemiss & Parrish, 2010; Ornetzeder & Rohracher, 2013; Rogers, Simmons, Convery, & Weatherall, 2008; Seyfang *et al.*, 2013; Wùste & Schmuck, 2012). The role of human capital becomes apparent in the cases where there was insufficient human capital. These LLCEIs did not initiate or complete collective projects as they missed the relevant expertise, skills and knowledge. While these LLCEIs did accomplish community projects in the early stages of the LLCEI (Easterwierrum made sustainable bookcases for the village and Eendracht initiated a project on DIY solar heaters), they missed the skills and knowledge that specifically pertained to the development of collective low-carbon energy projects. LLCEIs that did have sufficient human capital had amongst others knowledge and skills concerning entrepreneurship, low-carbon energy applications, community development, and project development and management. Knowledge and skills pertaining to subsidy applications and practices of local and regional government also helped LLCEIs in realizing collective projects. For customer recruitment, these specialized skills were not important as these aforementioned LLCEIs performed well in that sense.

### *Size*

As the statistical analysis showed, size is not directly correlated to the success of LLCEIs. Still, the weak correlation with success could be explained by two outliers. What could be concluded from the qualitative analysis, however, is that LLCEIs that have more people involved are able to draw on those individuals when needed. In so doing, these individuals typically do not have a formal seat in the board and are not involved in the day-to-day activities of the LLCEI. Rather, these individuals provide assistance or advice to LLCEIs and therefore take some load off the core group's shoulders. As such, LLCEIs with a larger size seem better off in dealing with setbacks and periods of inactivity. Achter de Hoven is a case in point, where a small core group was downsized to the point where only one individual was left responsible for the continuation of the LLCEI. As a result, the LLCEI has remained inactive as of 2014. Finding ways to keep volunteers committed and involved remains a challenge for

LLCEIs (Alexander *et al.*, 2007; Robbins & Rowe, 2002). In terms of the importance of size for collective projects, Kûbaard only initiated its collective solar PV project after three individuals volunteered for a working group that would be responsible for the development of the project. As such, size seems to be one part of the solution for the continuation of LLCEIs. Similarly, Trynergie drew on various individuals that helped the LLCEI *inter alia* with its marketing and communication campaign and subsidy applications. Unlike the findings of Feola and Nunes (2014), who emphasized the importance of founding and steering group size, this study indicates that a sizable group of so-called secondary volunteers that is not necessarily involved in managing the LLCEI also adds to the LLCEI's success. This finding is in line with Wicker and Breuer (2013), who found that local sports associations that make use of secondary volunteers, which are volunteers that sporadically help out in the association, are linked to smaller organizational problems (as opposed to organizations that solely rely on a core group of committed volunteers which were found to be related to bigger organizational problems). Additionally, LLCEIs starting with a relatively large group of initiators is not a recipe for guaranteed success (i.e. Eendracht, Easterwierrum). It is more the LLCEIs that are able to retain a fair amount of (secondary) volunteers – such as Trynergie, Ameland, Westeinde, Grieneke, Kûbaard, Noorderpolder – which distinguish themselves as successful cases.

#### *Board diversity*

What this study also confirms is that the volunteers involved in LLCEIs represent a relatively homogenous group of people, namely highly-educated, white, grey-haired men (Brummer, 2018; Huijben & Verbong, 2013; van der Schoor & Scholtens, 2015; Van Veelen, 2018). In terms of gender equality, inclusiveness and representativeness this can be regarded as a weakness of the LLCEI movement. In contrast to what was hypothesized, (collective) success and board diversity (understood as diversity in terms of age and gender) are negatively correlated. On the basis of the results of the qualitative analysis, it can be argued that this homogenous group of people commonly have a relevant skillset and knowledge base that play an important role in the realization of collective projects. The lack of gender equality in the LLCEI movement can be considered a symptom of more structural female underrepresentation in the energy sector (Clancy & Roehr, 2003; Clancy, 2009).

#### *Time*

In line with other studies, this research showed that LLCEIs with volunteers that are flexible in spending time on the LLCEI (i.e. retired, self-employed or unemployed individuals) are more likely to be successful in realizing low-carbon energy projects (Allen, Sheate, & Diaz-chavez, 2012; Feola *et al.*, 2013; Forrest & Wiek, 2014; Herbes, Brummer, Rognli, Blazejewski, & Gericke, 2017; Hinshelwood, 2001; Ornetzeder & Rohrachner, 2013; Rogers *et al.*, 2008; Seyfang *et al.*, 2013).

#### *Funds*

This study also showed that the ability of LLCEIs to attract start-up capital does not play an important role in their success as all LLCEIs managed to receive start-up

capital (compare Hinshelwood, 2001). In the Dutch context, start-up capital for LLCEIs (ranging from €1500 to €5000) is commonly conceived as financial capital that covers the costs inter alia for formally establishing an LLCEI; for printing promotional materials, and designing a logo (compare Ruggiero *et al.*, 2014). Rather the ability of LLCEIs to raise funds such as a feed-in tariff, tax-reduction scheme, financial participation by local residents, or loans from banks or private investment funds does influence their success. For instance, Noorderpolder was able to raise a third of the total project costs (€ 120,000) amongst four individuals in the locality in order to get the rest of the project funded by the provincial investment fund. The provincial investment fund required the LLCEI to provide a 33% of the total project costs. In another case, a bank required Opsterland to raise 15-20% of the total project costs (which is over €1 million) of a large solar PV project in order for the LLCEI to receive a loan that covers the rest of the project costs. Opsterland, however, has not succeeded in raising these funds, which directly influenced its ability to realize the project. The LLCEI contacted the bank since the interest rate of the provincial investment fund significantly impeded on the feasibility of Opsterland's business case. For LLCEIs in the Dutch context, this means that raising funds in the locality implies significant investments by the locality. This is in line with Ruggiero *et al.* (2014), who concluded that the ability of local communities to provide investment capital influenced the decision of financial institutions to fund the community project. For the financial institutions in the Dutch-Frisian context, this is even a rigid requirement.

The ability of LLCEIs to raise funds is also circumscribed by their ability to successfully apply for the national feed-in tariff or tax-reduction scheme. Trynergie, Westeinde, Opsterland, wrote various applications for the national feed-in tariff applications before they succeeded in getting a positive decision. This greatly impeded on the progress of their project and it took the initiators significant time to complete the applications. The complexity involved in subsidy applications is also observed in other contexts (Adams & Berry, 2008; Creamer, 2015; Forrest & Wiek, 2015; Hinshelwood, 2001; Rogers *et al.*, 2008; Wüste & Schmuck, 2012). In particular cases, government or intermediaries assisted LLCEIs with the application procedures. The ability to raise funding in the context of LLCEIs presupposes a professional approach in which considerable knowledge and expertise of subsidy and grant applications and fundraising in general is required (Hinshelwood, 2001). Indeed, not all LLCEIs have volunteers that are knowledgeable on this.

Furthermore, in order for LLCEIs to make use of the tax-reduction scheme, LLCEIs need to attract financial participants that are located in the direct vicinity (i.e. within a specific range of zip codes) of the low-carbon energy installation. Kûbaard, Grieneko, Doniawerstal, Heeg and Eendracht have been able to recruit sufficient participants for the solar PV-installations that have been realized. Wijnjewoude and Opsterland however, did not and were still in the process of recruiting participants. As such, for Dutch LLCEIs making use of the tax-reduction scheme, raising funds is a synonym for recruiting participants. In turn, recruiting participants is a task that requires considerable effort and investment of time.

### 3.7.2 *The LLCEI and the local community*

#### *Institutional embedding*

In terms of institutional embedding, this mostly occurred through linkages between the LLCEI and the local village council. While this garners a degree of legitimacy, the role of the village council in the social fabric of a village may vary. In tight-knitted villages (i.e. Kûbaard, villages comprising Grieneke, Easterwierrum) the village councils are regarded as an important part of the social structure of the community. Being supported by the village council or using the latter as a forum to present ideas and to recruit participants can add legitimacy to LLCEIs in these settings. In localities that are not that tight-knitted and where village council meetings (or district council meetings) are not well-attended, only a small part of the community will be reached by such institutional embedding. As such, the role of institutional embedding in the success of LLCEIs depends on the system of local social relations of the locality.

Institutional embedding does matter during the start-up phase of the LLCEI, where it seeks to establish a connection with its spaces of dependence. This is indicated by the correlation between institutional embedding and individual household-level projects as LLCEIs have a tendency to start with purchase rounds for solar PV panels for individual households (Trynergie, Westeinde, Gaasterland, Grieneke, Achter de Hoven, Wijnjewoude) before continuing to pursue collective projects. During this start-up phase, the linkage with a village council is an important means to gauge whether the envisioned space of dependence of an LLCEI overlaps with its ‘true’ spaces of dependence. LLCEIs that failed to circumscribe its true spaces of dependence in a sufficient way struggled to become rooted in the locality. This was the case with LLCEIs that strived to represent an entire municipality (envisioned spaces of dependence) but did not establish fruitful connections with the respective village councils. Trynergie, which started in a small village, expanded its area of operation to seven villages that comprise a region that is known as Trynwâlden. As such, Trynergie captured its ‘true’ spaces of dependence since the village councils supported their ideas and the LLCEI managed to recruit participants and customers from the various villages. As such, the findings of this study suggest that institutional embedding is intimately linked with the configuration of the spatial settings of LLCEIs (see Devine-Wright & Wiersma, 2013; Süsser, Döring, & Ratter, 2017).

#### *Cultural heritage*

In terms of cultural heritage, LLCEIs do take into consideration landscape values, and seek for support in the community by refraining from low-carbon energy applications that are likely to garner opposition, such as large-scale wind energy. Furthermore, in terms of the role of identity, the name of the LLCEI commonly represents a village or region. For some LLCEIs, this refers to a former municipality, a district, a village, or a group of villages. LLCEIs strive to appeal to the sense of place of inhabitants and to promote the idea of local ownership and local values. This was specifically observed in for instance the cases of Ameland and Trynergie. Ameland appealed to the sentiment of independency of the islanders (compare Sperling, 2017), Trynergie established

partnerships with local installation firms and cultural associations. Cultural heritage also played a role in the sense of how communities were already used to organize. This is in line with the findings of Wirth (2014). LLCEIs situated in local communities that already had a tradition of grassroots organizing (i.e. Easterwierrum, Grieneko, Kûbaard, Noorderpolder) swiftly recruited a notable number of participants and were well rooted in the locality. But the role of cultural heritage for the success of LLCEIs ought not to be overestimated. This for instance became apparent in the issue of language use by the LLCEIs. The Frisian language was used by some LLCEIs to communicate their ideas to the community. However, seeing the use of the regional language and sustaining cultural traditions as an end itself, as Haf and Parkhill (2017) observed in Scottish and Welsh community renewable energy initiatives, was not the case in the Frisian context. For instance, when LLCEIs start meetings or give presentations, they commonly ask the attendants whether to converse in Frisian or Dutch. This being said, the study suggests that local traditions and history predominantly mattered in tight-knitted communities.

### *Community involvement*

For community involvement, multiple LLCEIs consulted the local community about their interests and needs regarding low-carbon energy and energy efficiency. This way, LLCEIs could direct their attention to issues that actually mattered to the community. In a relatively small locality (75 households), Grieneko therefore, by firstly consulting the community by means of a survey, managed to install a total of 250 solar PV panels on individual households. Similarly, residents in the locality of Kûbaard ventilated that they would like to become involved in a collective solar PV project. The LLCEI initiated the collective solar PV project only after the residents showed their interest in such a project. As a result, 24 of the 75 households in the village participated in the project. Thus LLCEIs that have community interests as a driver for their initiative appear to be more successful (Forrest & Wiek, 2015; Hasanov & Zuidema, 2018; Hicks & Ison, 2011; Islar & Busch, 2016; Li, Birmele, Schaich, & Konold, 2013; Sperling, 2017; Süsser *et al.*, 2017). Furthermore, LLCEIs took a role in informing the community about the possibilities pertaining to low-carbon energy and energy efficiency applications by organizing information sessions and energy cafés (see Martiskainen, Heiskanen, & Speciale, 2018). LLCEIs ask attendants what topics they would like to discuss in follow-up meetings. As such, some of these meetings organized by LLCEIs are needs-driven, whilst others are organized to recruit customers and participants.

Whether an LLCEI made use of the national feed-in tariff or the tax reduction-scheme influenced the extent to which the involvement of the community influenced the success of the low-carbon energy project. Local participation is not necessarily required for the national feed-in tariff. In some cases, LLCEIs could not recruit enough financial participants for the project (or decided against opening up the project for financial participation), resulting in a large part of the project being financed by third parties. For the tax-reduction scheme, this is not the case. LLCEIs that make use of this measure need enough financial participants in order for the project to be a success. The

way the majority of the LLCEIs recruited participants ensued via similar mechanisms; flyers, information meetings, follow-up face-to-face meetings. LLCEIs that were in the process of realizing large low-carbon energy installations have involved the locality to deliberate upon the site of the installation and its integration in the landscape. As such, LLCEIs made an effort to enhance the acceptance of these projects that have considerable impact on the landscape (Breukers & Wolsink, 2007; Sovacool & Lakshmi Ratan, 2012).

### *Visibility*

In terms of visibility, LLCEIs promoted their norms and values in terms of being close to residents in the locality (i.e. closer than the large energy suppliers) and demonstrating their trustworthiness by personally approaching residents (see Zimmerman & Zeitz, 2002). For LLCEIs that were particularly successful in recruiting a large part of their constituency as customers or a significant number of customers in general (Grieko, Easterwierrum, Ameland, Gaasterland, Trynergie), this personal approach was crucial. Its importance also became apparent in overcoming situations that could have been devastating for the trustworthiness of the LLCEI in concern. In case of Grieko, the LLCEI recruited residents to participate in a project for energy neutral housing. Having recruited 50 individual households (on a total of 310), the LLCEI had to tell the participants that the project turned out to be unfeasible. The LLCEI personally visited each participant to explain the situation and recruit them for a new project; the collective solar PV roof. Grieko realized two collective solar PV roofs and was in the process of realizing a third. Although focusing on a larger locality, Gaasterland still recruited their customers and participants for the collective solar PV project primarily via face-to-face encounters and meetings. LLCEIs primarily use local newspapers (such as village or district magazines) to invite the locality to information meetings or to inform the about the progress of the projects that they are working on. Visibility in terms of success stories in the media was of importance to a lesser degree. LLCEIs communicate their achievements primarily in local or regional newspapers and social media. The impact of this is uncertain. Noorderpolder for instance hoped that media coverage of their success story in the regional newspaper would lead to additional participants, which unfortunately was not the case. As such, this study suggests that visibility predominantly revolves around the (physical) visibility of the LLCEI in its locality.

### *Bonding capital*

In line with other studies, this research shows that bonding social capital importantly added to the success of LLCEIs (Forrest & Wiek, 2014; Hicks & Ison, 2011; Kalkbrenner & Roosen, 2016; Sperling, 2017; von Bock und Polach, Kunze, Maaß, & Grundmann, 2015; Walker, Devine-Wright, Hunter, High, & Evans, 2010; Yildiz *et al.*, 2015). By means of bonding social capital, LLCEIs recruited volunteers, customers, participants, investors and roof-owners. Bonding social capital worked predominantly via three mechanisms; the trustworthiness of the initiators, the personal relations that provided access to resources, and the tight-knitted social structure of the community. In the cases of Easterwierrum, Kûbaard, Gaasterland, Doniawerstal and Ameland the



trustworthiness of the initiators was an important factor that contributed to the success of these cases (Hinshelwood & McCallum, 2001; Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014; Walker *et al.*, 2010). Initiators of LLCEIs often have a service record in terms of community involvement. Whether they have been the chair of the local village council or the local sports club, the initiators of LLCEIs are often the ‘usual suspects’ in their localities with respect to community engagement. For the LLCEIs in this study, this added to the trustworthiness of the initiators and the LLCEI itself.

Furthermore, in various cases, personal contacts with residents in the locality gave LLCEIs access to resources such as investment capital; human capital in shape of expertise, knowledge and volunteers; available roof space; customers and participants. This proved to be crucial for the success of various LLCEIs. For Noorderpolder, for instance, the required investment capital was raised within the locality and the roof owner kept the roof reserved for the LLCEI despite more lucrative offers of professional project developers. Trynergie frequently relied on input from their social network, which provided the LLCEI with access to human capital and roof owners.

Another way in which social capital added to the success of LLCEIs was the degree of social cohesion and civic engagement present in the local community. This materialized *inter alia* by a large number of attendants at LLCEI meetings (see Forrest & Wiek, 2014; Sperling, 2017). Such social cohesion added to the extent to which the LLCEI was able to garner support and participation of the community (see Süsser *et al.*, 2016). As a result of the tight-knitted nature of these localities, the LLCEIs managed to recruit a significant number of customers relative to the number of households in the locality (Ameland, Kûbaard, Grieneke, Easterwierrum).

### *Bridging capital*

When the second wave of Frisian LLCEIs started to emerge, the first frontrunner LLCEIs benefited from connecting with other LLCEIs (sometimes outside of Fryslân) during the start-up phase. By means of bridging capital, the frontrunner LLCEIs amongst other things learned how to establish an LLCEI and what organizational form to take. When the Frisian LLCEI movement started to gain track, an intermediary support structure was established. This support structure presented an infrastructure for LLCEIs that emerged after the frontrunner LLCEIs to connect with one another and share experiences. The majority of LLCEIs do not collaborate. The LLCEIs in this study incidentally reached out to other LLCEIs for advice or help. A group of LLCEIs who frequently meet up and share experiences completed a petition that was directed at the local government. The petition requested that the local government should use green energy generated in the locality. Whilst these LLCEIs institutionalized their collaboration to a certain extent (by meeting up regularly, later on with local government attending the meetings as well), this did not directly add to the projects that the LLCEIs realized. As such, bridging capital can infuse LLCEIs with useful information (Parag, Hamilton, White, & Hogan, 2013), but there have been no instances in which LLCEIs collaborated to take on larger

projects (Oteman, Kooij, & Wiering, 2017), nor can it be concluded that bridging capital is crucial for LLCEI success (Feola *et al.*, 2013; Oteman *et al.*, 2017; Ruggiero *et al.*, 2014).

Another way in which bridging capital materialized in the context of LLCEIs was with the use of ambassadors. By using ambassadors, LLCEIs with relatively large localities as spaces of dependence strive to reach potential customers and participants. For Ameland, Gaasterland and Trynergie these ambassadors played an important role in embedding the LLCEI throughout the locality. By making use of ambassadors, LLCEIs can draw on bonding social capital that becomes accessible through the ambassador. As such, ambassadors function as boundary spanners between bonding and bridging capital. Thus it can be argued that a mix of bonding and bridging capital matters more to LLCEIs that operate in larger localities. Intermediaries also played an important role in enabling interactions between LLCEIs, and thus facilitating the use of bridging capital. During all kinds of meetings, sessions and communities of practice, the intermediaries aggregated the lessons learned of LLCEIs and made this information readily available.

### *3.7.3 LLCEI and governance settings*

#### *Linkage with intermediaries*

Taking the abovementioned into account, intermediaries played an important role in various cases. The reason why the importance of LLCEIs' linkage with intermediaries was not reflected in the statistical analysis is because the overall majority of LLCEIs (irrespective of their degree of success) frequently interacted with the intermediaries. For the successful cases, the intermediaries often were of considerable significance and provided expert knowledge and specialized support (Bird & Barnes, 2014; Ruggiero *et al.*, 2014). LLCEIs that emerged at the very start of the second wave of Frisian LLCEIs missed out on this institutionalized support structure and had to invent the wheel themselves. For LLCEIs that emerged with the intermediary support structure in place, specific yet standardized knowledge was readily available and the intermediaries already developed templates and toolkits for complex matters such as national feed-in tariff or tax-reduction scheme applications (see also Hargreaves *et al.*, 2013).

#### *Linkage with government*

The importance of the linkage with (local) government actors often depends on the type of project that is pursued by the LLCEI. The success of LLCEIs that pursue collective, ground-based low-carbon energy projects is more dependent on a positive linkage with government actors than LLCEIs that pursue individual household-level low-carbon energy applications or LLCEIs that solely seek to expand their customer base. As soon as a low-carbon energy installation requires an adjustment of the zoning plan, a connection to the grid, or a spatial permit, government actors become important allies. The case of Opsterland shows that a conflicted relation with local government can be a barrier to realizing ground-based solar PV.

In case of Easterwierrum, the relation with local government that was in first instance absent did not prevent the LLCEI from recruiting customers. Similarly, the influence of the local government in the case of Wijnjewoude was enhanced when the LLCEI started developing plans for an energy park in the village. When Grienko helped households in the locality to install solar PV panels, the LLCEI did not rely on the support of local government. The ways in which government actors supported LLCEIs varies. Local governments performed symbolic roles by endorsing projects of LLCEIs, but also provided for more substantive support such as assisting with spatial permit procedures, engaging in a partnership with an LLCEI, and alleviating administrative barriers. Importantly, some LLCEIs also had political backing by the municipal council, which was crucial in the cases of Ameland and Westeinde. Additionally, with two exceptions, the LLCEIs all received start-up capital from local government.

The trustworthiness of the initiators also influenced the interaction between the LLCEI and government actors, as initiators are often ‘usual suspects’ that were already known by civil servants and public officials (Taylor, 2003). However, interactions between LLCEIs and local government have been awkward at times too. In some cases, the local government was skeptical to support LLCEIs as they viewed LLCEIs as commercial entities. In other cases, local government voiced its support for LLCEIs in policy documents, but in reality, the interaction between the two was pestered by miscommunication, and misalignment of expectations. Whilst in one case a local government saw a large solar PV farm as an opportunity to involve an LLCEI, in another case the local government chose to collaborate with an external project developer. Important to note is that in some cases conflicted interactions between LLCEIs and local government have been addressed and solved.

#### *Supportive governance arrangements*

In general, the local and regional governance arrangements have not been very supportive of LLCEIs. Some successful cases (Ameland, Westeinde) were situated in a particularly supportive governance arrangement. For Westeinde this was predominantly derived from the fact that the LLCEI’s solar PV project fitted the existing provincial plans for multiple solar PV farms in that specific place. For Ameland, the equal partnership with local government and an energy supplier ascertained that hurdles that were encountered during the process were overcome. The project also received a significant grant from the Waddenfund and the province of Fryslân also pitched in.

For individual household-level projects, the governance arrangement is fairly supportive. On the one hand this can be derived from sustainability loans and subsidies provided by local governments. Furthermore, as individual household level measures commonly do not require spatial permits, projects can be realized without interference of government actors. The national net metering regulation also stimulates the adoption of solar PV panels, although there is uncertainty regarding the time period that the regulation will remain in effect. As such, LLCEIs that focus on individual household-level projects experience a supportive governance arrangement that adds to their success.

This is a different story for LLCEIs that pursue collective projects. In general, the governance arrangements have not been very supportive for various LLCEIs which directly impacted their success. This arises inter alia from issues related to lease contracts of government owned parcels, zoning plans, financial requirements, and national regulations. Various LLCEIs struggled to meet the requirements in order for financial institutions to provide investment capital. Furthermore, various LLCEIs applied numerous times for the national feed-in tariff without success. As LLCEIs are voluntary organizations, they experience difficulties in competing with market parties and professional project developers that are active in the energy sector. LLCEIs often struggle to develop a feasible and profitable business case, which directly impacts their success. This focus of the governance arrangement on a ‘revenue-generating business model’ has been observed in other institutional contexts as well (Creamer, 2015; Seyfang *et al.*, 2013, p. 988). One way the province sought to alleviate this issue is by providing LLCEIs with grants to cover the costs that are made before a project is at the stage in which it can be realized. This approach has been observed in Scotland as well (Hicks & Ison, 2011).

What could also be learned from the cases that although local government can be important players for LLCEIs, their capacity to govern influences the degree to which they can be supportive and so the extent to which the governance arrangement is supportive. In various cases, LLCEIs found themselves in a governmental vacuum due to upcoming municipal mergers. In other instances, the local government has not been very receptive vis-à-vis LLCEIs and climate change and sustainability were not yet well integrated in the municipal organization.

### **3.8 Conclusion**

This chapter set out with the following research question, “*What are the factors that contribute to explaining the variation in success of Local Low-Carbon Energy Initiatives (LLCEIs) in the Dutch region of Fryslân?*”

As a first step to answering the research question, a comprehensive theoretical framework was developed in Chapter 2. The core proposition of the theoretical framework was that the success of LLCEIs can be derived from three groups of factors; those related to the LLCEI itself; factors related to the interaction between an LLCEI and the local community; and lastly the presence of supportive governance settings and linkages with local government and intermediaries. The fourteen propositions underlying the theoretical framework were tested on the basis of a multiple cases research design among fourteen Frisian LLCEIs. On the basis of the results of the analysis, it can be concluded that the success of LLCEIs is influenced by the configuration of factors belonging to the three pillars in the framework. In other words, an LLCEI that performs well internally still requires to a certain degree the support of governance settings and a fruitful connection with the community. An LLCEI that is well embedded in the community to a certain degree is also dependent on the support from the governance arrangement and needs to have sufficient capacity to act. Lastly, an LLCEI that finds itself in a supportive

governance arrangement still needs to link up with the community and possess a certain degree of organizational capacity in order to be successful.

Eleven of the fourteen variables were significantly and positively correlated (except for board diversity, which was negatively correlated) to one or more of the indicators of success. The three variables that were not significantly related to the indicators of success – size, visibility, and linkage with intermediaries – showed positive and only barely non-significant correlations. This entails that the factors that were derived from the scientific literature all appear to explain a part of the picture of LLCEI success. As the operations of these Frisian LLCEIs range from customer recruitment to realizing large-scale solar PV installations, it is difficult to come to generalizable lessons learned. This specific insight is an important contribution to the existing body of knowledge. Recent academic literature seems to consider community energy as a uniform phenomenon in which grassroots initiatives to a degree pursue similar projects. The Frisian context showed that as well as in their approach and in their ambitions, LLCEIs differ greatly.

This inevitably means that there is no cookie-cutter approach to roll out successful LLCEIs. LLCEI success is context dependent and as the study showed is also greatly dependent on socio-spatial settings and configurations. The pool of resources that a local community can tap into (e.g. social capital, human capital, project champions, cultural heritage, and so on) in order to establish an LLCEI that has notable capacity to act is hard to manipulate. One cannot simply implement a project champion in a local community, nor is it impossible to infuse, from the top-down, a locality with bonding social capital. Of course, recommendations can be that LLCEIs should choose an area of operation that overlaps with its true spaces of dependence, or the local social relations upon which we depend and for which there are no substitutes elsewhere. An area of attention that can, however, be manipulated to a certain degree is the local governance structure. In this regard, how local government, governance arrangements and intermediaries may add to the success of LLCEIs is dealt with in the remainder of this dissertation.

Several limitations of this study need to be considered. The first pertains to the number of cases in relation to the number of independent and dependent variables. This leads to a large number of possible explanations for LLCEI success. Furthermore, although the researcher has determined the scores for the various factors through an iterative process, where he went back and forth between the collected data and the data-matrix, contacted interviewees in case of missing values, and discussed the values with his supervisors, the scoring of the values does reduce the reliability of this study. Furthermore, although this study has scrutinized a relatively large number of cases in-depth, the LLCEIs were studied in a single institutional and administrative context which limits the theoretical generalization of this study's findings.

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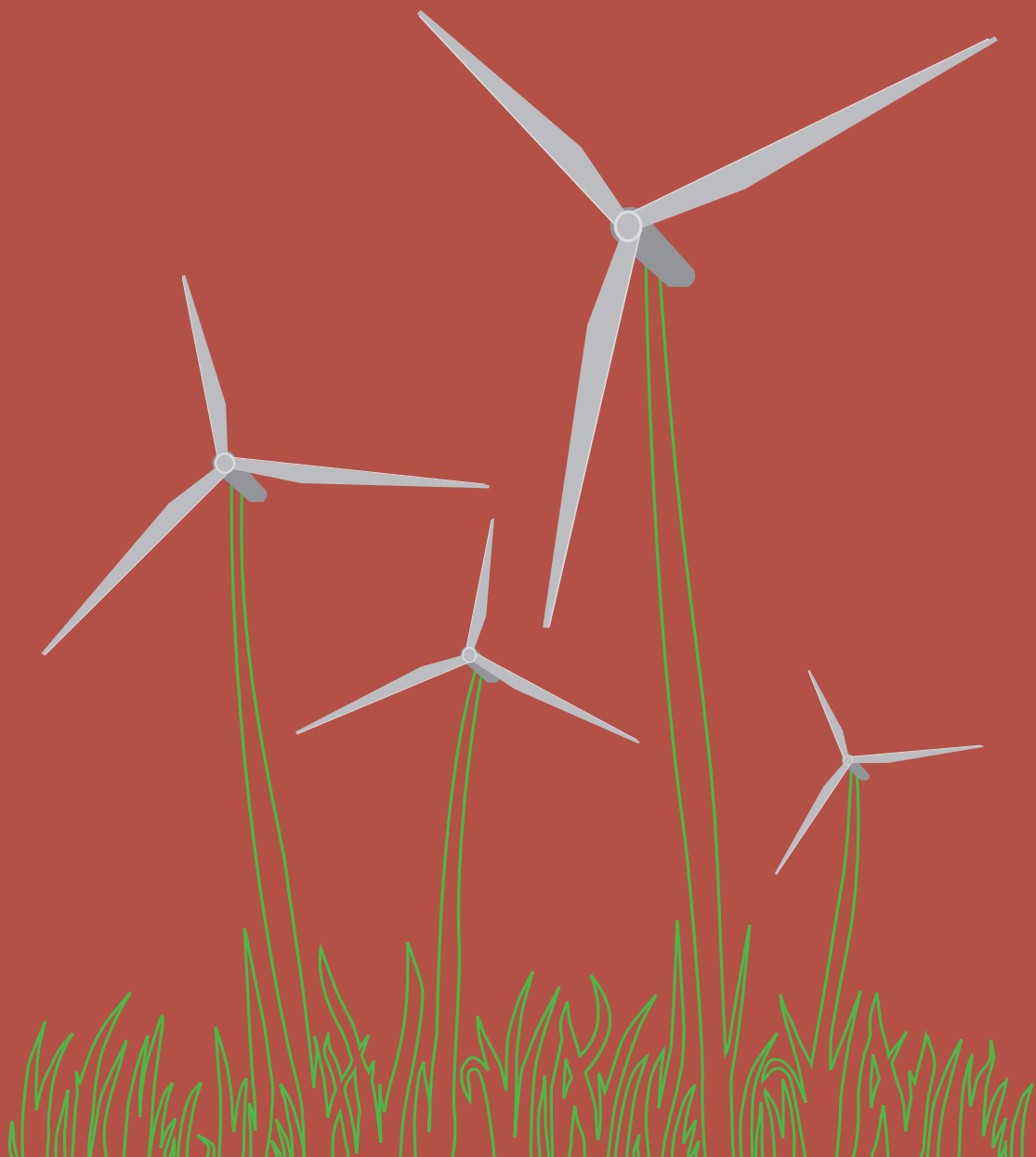
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# Chapter 4

**The role of intermediaries in supporting LLCEIs**

**Abstract:** Recent scholarly attention shows that grassroots civil society low-carbon energy initiatives increasingly become part of the subnational climate change governance landscape. Despite their potency in view of consumer-owned distributed generation and enhanced citizen influence in the organization of the energy infrastructure, local low-carbon energy initiatives (LLCEIs) struggle to become viable alternatives to the centralized, private oriented energy system. To further LLCEI development, support needs to build their capacities; alleviate institutional hurdles and barriers stemming from the fossil fuel-based energy regime; and open up the system for the uptake, acceptance or breakthrough of LLCEIs. Evidence suggests that so-called “intermediaries” form a part of the solution in addressing these issues. Despite previous attempts at analyzing intermediary roles and activities vis-à-vis the development of community energy, the reality of the various roles and strategies intermediaries can employ and the support LLCEIs require to further develop have not yet been synthesized in a comprehensive analytical framework. This article aims to fill this gap by developing such a framework. We reflect on the analytical framework by evaluating the intermediary support structure in a specific case: the Province of Fryslân. From the analysis, we conclude that the Frisian case provided modest support to the claim that intermediary support is effective in addressing the needs of LLCEIs as the strategies and roles observed represent a complete and coherent support structure.

## 4.1 introduction

The daunting task to keep global warming within two degrees necessitates action on different levels, scales and domains. In recent years, initiatives comprising of groups of citizens that want to take matters into their own hands and strive to generate low-carbon energy in their local environment have been booming throughout Western Europe (Kooij *et al.*, 2018; Oteman, Wiering, & Helderma, 2014; Seyfang, Park, & Smith, 2013; Yildiz *et al.*, 2015). In Germany, in the second half of the 2000s, the number of citizen energy production cooperatives increased rapidly: from 4 solar energy cooperatives in 2007 to over 200 by 2010 (Oteman *et al.*, 2014), with at least 600 newly formed citizen energy cooperatives in total in 2013 (Yildiz *et al.*, 2015). It is estimated that in Denmark in 2017, 20% of the installed wind energy capacity is owned by citizen cooperatives, farmers and local landowners (Kooij *et al.*, 2018). In 2010, collective citizen initiatives accounted for around 40–50% of total installed wind energy capacity in Austria (Schreuer, 2016). The Netherlands is no exception. Dutch energy cooperatives have been proliferating from around 70 to almost 400 in total in 2017 (Schwencke, 2017). According to REScoop.eu, Europe is now home to over 1500 energy cooperatives, which amount to over one million members (REScoop.EU, 2018). Although what we term “local low-carbon energy initiatives” (LLCEIs) have received less scholarly attention in the US, Klein and Coffey (Klein & Coffey, 2016; Community Energy US, 2018) compiled several databases related to LLCEIs in the US into one central database and identified more than 5000 completed community energy projects. We refer to LLCEIs as the grassroots initiating and managing of a project or series of projects involving the generation, stimulation, and/or facilitation of low-carbon energy and/or energy efficiency by citizens/actors from civil society on a local scale. Success stories of the phenomenon of LLCEIs are for instance Klimakommune Saerbeck (Germany). In Saerbeck, local citizens were extensively involved in the realization and ownership of the Bioenergy Park that produces 29 MW worth of low-carbon energy – 275% more energy than Saerbeck actually needs (Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015). Another example is the Danish island of Samsø, which transformed large parts of its energy system with active citizen participation and managed to raise the low-carbon energy share from 13% to 75–80% within 10 years (Sperling, 2017, p. 888).

Not only do LLCEIs augment efforts to diversify the energy supply and decentralize energy generation, they also touch upon a wider range of issues. Enhanced citizen involvement in the energy transition by means of such bottom-up initiatives has inter alia the potential to facilitate socio-economic regeneration, foster social acceptance of low-carbon energy technologies, and promote behavioral change (Berka & Creamer, 2018; Rogers, Simmons, Convery, & Weatherall, 2012). Scholars have therefore considered LLCEIs as instances of social innovation in the sense that much of the innovation centers around changes in social relations and practices with use of low-carbon energy technologies (Maruyama, Nishikido, & Iida, 2007; Seyfang & Haxeltine, 2012; Seyfang & Smith, 2007).

Despite the recent upsurge of LLCEIs, their further development greatly depends on a mixture of factors stemming from various domains, actors, levels and scales. The bottom-up and innovative nature of LLCEIs clashes with the centralized, monopolized, fossil fuel-based energy infrastructure dominated by multinationals that are only accountable to their shareholders. As such, LLCEIs challenge existing and prevalent practices, social relations, and regulations geared to the archaic energy regime—also referred to as “carbon lock-in” (Unruh, 2000). LLCEIs struggle to become a viable alternative to the status quo and are in need of capacity building. The issues that underlie the further development of LLCEIs can roughly be divided in three categories: (i) the bottom-up nature of the LLCEIs often implies a lack of resources and capacities and they require embedding in their communities (e.g. Park, 2012; Rogers *et al.*, 2012); (ii) institutional hurdles and barriers stemming from the fossil fuel-based energy regime favor the status quo but hamper LLCEIs (e.g. Oteman *et al.*, 2014); and (iii) LLCEIs experience difficulties in opening up the regime for their uptake, acceptance or breakthrough (e.g. Bird & Barnes, 2014; Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014). However, LLCEIs are in need of support to further develop. The core proposition of this paper is therefore as follows: the success of support for LLCEIs is determined by the extent to which it addresses these issues altogether. The various aspects that amount to the requirements of support for LLCEI development can be perceived as interdependent components of an ecosystem: the completeness and coherence of the support provided to LLCEIs positively influences their development.

Scholars have argued that so-called intermediaries form a part of the solution in engaging the complex interplay of resource deficiencies and unsupportive institutional settings in order to accelerate the development of LLCEIs (e.g. Hargreaves, Hielscher, Seyfang, & Smith, 2013; Seyfang *et al.*, 2014). Intermediaries cut across the energy provider, user and regulator triad, and are defined by their “in-betweenness” (Moss, 2009, p. 1481; Kivimaa, 2014). Studies show a great variety in the roles that intermediaries can have and the various activities they can employ vis-à-vis LLCEIs (Bomberg & McEwen, 2012; Forrest & Wiek, 2014; Hargreaves *et al.*, 2013; Hicks & Ison, 2011; Parag, Hamilton, White, & Hogan, 2013; Ruggiero, Onkila, & Kuittinen, 2014; Seyfang *et al.*, 2014). Studies from different countries show that intermediaries are key players in inter alia fostering knowledge transfer, information flows, and capacity building; and are central in brokering partnerships between LLCEIs and actors from outside the community energy sector such as regime incumbents and central actors of the energy system (Hargreaves *et al.*, 2013; Parag *et al.*, 2013; Ruggiero *et al.*, 2014). Transition studies scholars have argued that intermediaries perform a key role in strategic niche development (Geels & Raven, 2006). Despite previous attempts at analyzing intermediary roles and activities vis-à-vis the development of community energy (Bird & Barnes, 2014; Hargreaves *et al.*, 2013; Seyfang *et al.*, 2014; A. Smith, Hargreaves, Hielscher, Martiskainen, & Seyfang, 2015), the reality of the various roles and strategies intermediaries can employ and the support LLCEIs require to further develop (i.e., capacity building and embedding LLCEIs in their communities, alleviating institutional barriers, and opening up the regime) have not yet been synthesized in a comprehensive analytical framework. This article aims to fill this gap

by developing such a framework. In doing so, we reflect on the analytical framework we developed on the basis of an extensive literature review by evaluating the intermediary support structure in an empirical case: the Province of Fryslân, the Netherlands. The central research question of this paper is:

*To what extent does the further development of LLCEIs depend on the completeness and coherence of the strategies and roles employed by intermediaries?*

The central research question can be broken down into three sub-questions:

- (i) What do LLCEIs require to further develop?
- (ii) What strategies activities and roles by intermediaries help to address the requirements of LLCEIs to further develop?
- (iii) How is the completeness and coherence of intermediary support reflected in an empirical case, the Province of Fryslân?

The first two sub-questions are answered by means of an extensive literature review. The product of the first sub-question is a classification of the aspects and issues that relate to the further development of LLCEIs. The product of the second sub-question is an analytical framework that can be used to assess the completeness and coherence of supportive activities provided by intermediaries. The third sub-question involves reflecting on our analytical framework by evaluating the intermediary support structure in an empirical case.

This paper is structured as follows. Section 4.2 provides an answer to what LLCEIs require to further develop, gives a conceptualization of intermediaries and classifies the various strategies, roles and activities that can be employed by intermediaries (answering sub-question 2). Section 4.3 addresses the research approach and methods used in this paper. Section 4.4 gives an answer to the third sub-question by reflecting on our analytical framework by means of evaluating an empirical case. In Section 4.5, the results of the analysis are discussed. We draw conclusions in the final section.

## **4.2 Conceptual Background and Theoretical Framework**

This theoretical section provides an overview of the specific strategies, roles and accompanying activities intermediaries may employ to support LLCEIs. However, it is important to firstly substantiate what LLCEIs require to further develop and thus where intermediary's strategies, roles and activities should be directed to in order to be successful.

### *4.2.1. Further Developing LLCEIs*

The further development of LLCEIs crucially depends on three areas of attention: (i) building capacities and embedding LLCEIs; (ii) alleviating barriers and lock-ins; and (iii) opening the existing regime for the uptake, acceptance or breakthrough of LLCEIs. Each of these areas are further discussed below.

#### 4.2.1.1. Capacity Building and Embedding LLCEIs

Various studies have highlighted the importance of practical capacities such as time, financing, skills and expertise for the development of LLCEIs (Allen, Sheate, & Diaz-chavez, 2012; Park, 2012). In terms of skills, authors have noticed the importance of management and communication skills (e.g., bringing people together, using existing networks and creating new ones, and dealing with external bodies), as well as skills in accountancy and writing funding applications (Bomberg & McEwen, 2012; Forrest & Wiek, 2014; Hinshelwood, 2001; Martiskainen, 2016; Middlemiss & Parrish, 2010; Seyfang *et al.*, 2013). In addition, several studies point to the important role of local or tacit knowledge in the realization of community energy projects (Allen *et al.*, 2012; Martiskainen, 2016; Ornetzeder & Rohracher, 2013; Seyfang *et al.*, 2013; St. Denis & Parker, 2009), as well as the prominent role of technical knowledge regarding low-carbon energy solutions (Hicks & Ison, 2011; Rogers, Simmons, Convery, & Weatherall, 2008; Ruggiero *et al.*, 2014; Shaw & Mazzucchelli, 2010; St. Denis & Parker, 2009; Walker, 2008). Moreover, scholars have underscored the importance of social networks to provide access to resources for LLCEIs and build their capacity (Aylett, 2013; Bomberg & McEwen, 2012; Forrest & Wiek, 2014; Ghose & Pettygrove, 2014; Hamilton, Mayne, Parag, & Bergman, 2014; Hicks & Ison, 2011; Martiskainen, 2016; Ornetzeder & Rohracher, 2013; van der Schoor & Scholtens, 2015; von Bock und Polach, Kunze, Maaß, & Grundmann, 2015; Walker, Devine-Wright, Hunter, High, & Evans, 2010). The presence of these practical capacities, or lack thereof, greatly influences the extent to which LLCEIs develop and become successful. For example, authors have observed a lack of funding application capacities in community energy groups or difficulties in accessing grant funding in general (Creamer, 2015; Dinnie & Holstead, 2017; Johnson & Hall, 2014; Ruggiero *et al.*, 2014; Wüste & Schmuck, 2012). Such deficiencies greatly impact the development of LLCEIs since access to grant funding is key for LLCEIs to realize their ambitions (Bomberg & McEwen, 2012; Feola & Nunes, 2014; Hicks & Ison, 2011; Middlemiss & Parrish, 2010; Parag *et al.*, 2013; Park, 2012; Rogers *et al.*, 2008; Seyfang *et al.*, 2013; Shaw & Mazzucchelli, 2010; St. Denis & Parker, 2009; G. Walker, 2008). Scholars have also observed that LLCEIs struggle to sustain motivation and enthusiasm and carry on with their activities during “bad weather” or when they experience struggles in their respective communities (Feola & Nunes, 2014; Hargreaves *et al.*, 2013; Seyfang *et al.*, 2014).

Taking note of the above, the usage of capacities that lie within a local community can cover some of these insufficiencies as well as provide for a heightened degree of embeddedness – both crucial for LLCEI success. Embeddedness is here understood as linkages with the socio-institutional structure of the locality, involving social norms, practices and relations, identity and culture. The degree of embeddedness of an LLCEI in its local community influences its legitimacy, which organizational ecologists and institutional theorists consider a crucial condition for resource accessibility and organizational survival (Aldrich & Fiol, 1994; Baum & Oliver, 1991, 1992; Meyer & Rowan, 1977; Zimmerman & Zeitz, 2002; DiMaggio & Powell, 1983). Furthermore, various scholars recognize the intricate relationship between an LLCEI and its local

community as an influential factor for development and success. On the one hand, scholars point out that the local community influences the shape and mobilization process of LLCEIs (Bomberg & McEwen, 2012; Forrest & Wiek, 2014; Haggett, Creamer, Harnmeijer, Parsons, & Bomberg, 2013; Islar & Busch, 2016; Süsser, Döring, & Ratter, 2017; Wirth, 2014). On the other hand, LLCEIs also actively mobilize the capacities (such as cultural, organizational and personal capacities) to harvest support and acceptance (Islar & Busch, 2016; Middlemiss & Parrish, 2010; Oteman, Kooij, & Wiering, 2017; Schoor, Lente, Scholtens, & Peine, 2016; von Bock und Polach *et al.*, 2015). Examples are the involvement of the local village council when initiating an LLCEI, using the village name for branding the LLCEI, or providing opportunities for villagers to become involved in the LLCEI. These studies suggest that LLCEIs can put to use existing, endogenous capacities found within their community to countervail the lack of resources or capacities while simultaneously embedding the LLCEI in its community to further their development.

#### 4.2.1.2. *Alleviating Barriers*

Insofar building the capacities of LLCEIs (or helping them to draw on their own) makes them successful organizations, system-level changes are needed for LLCEIs to become a viable alternative to the status quo. This proves to be a difficult endeavor as LLCEIs directly challenge prevalent practices that are inherent to the fossil-fuel based regime. The existing energy infrastructure is highly centralized, dominated by private interests, and is coordinated in an integrated fashion (Arentsen & Bellekom, 2014; Goldthau, 2014; Kooij *et al.*, 2018; Wolsink, 2012). These characteristics do not sit well with a bottom-up movement that favors a local and community-based approach with a heightened degree of autonomy. This discrepancy typically gives rise to a number of conundrums. These involve inter alia difficulties associated with obtaining a connection to the grid (Blanchet, 2014; Fuchs & Hinderer, 2014; Ruggiero *et al.*, 2014); competing with large energy companies that dominate the market and have lobby strength (Kooij *et al.*, 2018; Nolden, 2013; Oteman *et al.*, 2017, 2014; Strachan, Cowell, Ellis, Sherry-Brennan, & Toke, 2015); archaic energy regulations and legislation (Magnani & Osti, 2016); and getting projects financed (S. Hall, Foxon, & Bolton, 2016; Koirala, Koliou, Friege, Hakvoort, & Herder, 2016; Nolden, 2013; Strachan *et al.*, 2015).

Furthermore, studies have also observed that the existing institutional and policy frameworks and settings may impede on LLCEI development as well. The issues that arise here inter alia involve: unsuitable spatial planning regimes (Nolden, 2013; Strachan *et al.*, 2015); instable and uncertain policy frameworks (Ruggiero *et al.*, 2014); funding schemes that are difficult to access for community energy groups or do not match their aspirations or plans (Creamer, 2015; Dinnie & Holstead, 2017; S. Hall *et al.*, 2016; Nolden, 2013; Ruggiero *et al.*, 2014); problematic interactions with government bodies (Wüste & Schmuck, 2012); limited political support (Oteman *et al.*, 2017, 2014; Wüste & Schmuck, 2012); and limited access to policy makers and key decision-making forums (Bomberg & McEwen, 2012; Oteman *et al.*, 2017; Strachan *et al.*, 2015).



### 4.2.1.3. *Opening Up the Regime for the Uptake and Acceptance of LLCEIs*

These barriers need to be addressed and the existing institutional landscape has to become open to LLCEIs in order for them to proliferate and diffuse. For a large part, the diffusion of LLCEIs hinges on the social acceptance by key actors and markets of the institutional changes and policies that foster distributed generation by communities (Wolsink, 2012). Such acceptance is encouraged *inter alia* by the prevalence of strong institutional capacity, political commitment, favorable legal and regulatory frameworks, competitiveness of the new technology, mechanisms for information and feedback, and access to financing (Sovacool & Lakshmi Ratan, 2012). The acceptance and uptake of LLCEIs in the regime can for instance foster “energy democracy” (Burke & Stephens, 2018; Forman, 2017; Van Veelen, 2018) – an enhanced sense of democratic and community control of energy generation, distribution, and the energy system itself – and “energy justice” (Forman, 2017) – safeguarding principles of procedural, distributive and recognition justice in the energy system. These concepts of enhanced citizen involvement and influence coalesce in a so-called “Thousand Flowers” transition pathway, which takes small-scale, distributed generation, local ownership and decision-making as a starting point for governing the low-carbon energy transition (Foxon, 2013). Within such a pathway, the social embedding of LLCEIs and the low-carbon energy applications they employ in their respective communities is an important process that generates further uptake and acceptance (Wolsink, 2012). However, without support and careful coordination for such status quo challenging concepts and configurations, LLCEIs are not likely to outgrow their niche (Arentsen & Bellekom, 2014; Hatzl, Seebauer, Fleiß, & Posch, 2016; Seyfang *et al.*, 2014).

Thus, support strategies of intermediaries need to adhere to the issues that vex LLCEIs. Intermediaries need to assist in building LLCEIs’ practical and endogenous capacities as well as embedding, help with alleviating barriers to subsequently open the energy and governance systems for new practices and concepts. It is the conceptualization of intermediaries, their strategies, roles and activities that we attend to in the following subsections.

### 4.2.2. *Conceptualizing Intermediaries*

Studies of intermediaries show a great variety of actors that may perform intermediary activities, such as NGOs, governmental agencies, Energy Service Companies (ESCOs), consultancies, academic institutions, councils, business network platforms, and individuals (Backhaus, 2010; Bird & Barnes, 2014; Bush *et al.*, 2017; Kivimaa, 2014; Kivimaa & Martiskainen, 2018; Martiskainen & Kivimaa, 2018). That being said, governments can also perform intermediary activities in the form of an enabling mode of governing (Bulkeley & Kern, 2006), as has been observed in previous studies on government support for LLCEIs (Hoppe *et al.*, 2015; Warbroek & Hoppe, 2017). Intermediaries are therefore best conceptualized in terms of their activities and the processes they undertake, instead of who or what kind of actors carry out these actions (Kivimaa & Martiskainen, 2018). To begin with, the literature uses various adjectives

to categorize the functions of intermediaries involving inter alia: transition intermediaries (Kivimaa *et al.*, 2017), innovation intermediaries (Howells, 2006; Stewart & Hyysalo, 2008), energy intermediaries (Backhaus, 2010; Hodson, Marvin, & Bulkeley, 2013), user intermediaries (Barnes, 2017; Boon, Moors, Kuhlmann, & Smits, 2011), and niche intermediaries (Hargreaves *et al.*, 2013; Seyfang *et al.*, 2014). Underlying the various types of intermediaries and the actors involved is the “relational” and “in-between” character of their work (Moss, 2009). Intermediaries are actors that create “new possibilities and dynamism within a system” (Howells, 2006, p. 726) and create “spaces and opportunities” (Stewart & Hyysalo, 2008, pp. 296–297) for others. Within these spaces and dynamics, intermediaries “mediate, they work in-between, make connections, and enable a relationship between different persons or things” (Hodson *et al.*, 2013, p. 1408).

However, what guides the various roles and activities substantiated by intermediaries in their support for LLCEIs? Evidently, the issues discussed in Section 4.2.1 are the primary objects of intermediary support, but there are various ways in how intermediaries can do this. In other words, in what ways do different strategies shape intermediaries’ roles and activities in the support for LLCEIs? We attend to this matter in the following section.

#### 4.2.3. *Strategies Intermediaries Use*

The numerous roles and activities of intermediaries – that are discussed in the following subsections – are guided by strategies. We argue that the support for LLCEIs would involve a combination of multiple strategies to successfully address the issues that hamper LLCEIs and further their development. One of the most dominant perspectives that substantiates such a strategy is that of Strategic Niche Management (SNM). SNM originates from studies looking into socio-technical transitions. In the realm of the low-carbon energy transition, proponents argue for the need of social and technological innovations to cope with climate change (Geels, Hekkert, & Jacobsson, 2008). Radical innovations that potentially destabilize the existing socio-technical regime (i.e., low-carbon energy technologies challenging the fossil fuel-based regime) require nurturing in protected spaces before they can further diffuse (Kemp, Schot, & Hoogma, 1998). These protective spaces, known as niches, are shielded from pressures of the incumbent regime (Smith & Raven, 2012). Strategic Niche Management sheds light onto the processes and strategies of how niches can be created and developed to spur a system-wide transition (Kemp *et al.*, 1998; Schot & Geels, 2008). Three processes are of particular importance in the development of niches; managing expectations which relate to how niches are presented to the public and whether they live up to the promises they make about performance and effectiveness; building social networks to embrace a wide variety of stakeholders that can mobilize resources; and learning processes that contribute to knowledge and expertise on how to improve innovations as well as second-order learning in which actors critically reflect on the assumptions of regime systems (Kemp *et al.*, 1998). Theory suggests that successful niches can influence the regime by enabling

replication of projects within the niche, bringing about changes through multiple small initiatives; by enabling constituent projects to grow in scale and attract more participants; and by facilitating the translation of niche ideas into mainstream settings (Seyfang & Haxeltine, 2012). In the process of developing niches and making them more robust, intermediaries appear to be of particular significance (Geels & Deuten, 2006; Hargreaves *et al.*, 2013; Ruggiero, Martiskainen, & Onkila, 2018; Ruggiero *et al.*, 2014; Seyfang *et al.*, 2014). Therefore, SNM mainly addresses issues related to alleviating barriers and opening up regimes for the acceptance and breakthrough of LLCEIs.

SNM differs from a Business Incubator approach to the provision of support in the sense that the latter strives to accelerate the creation of successful entrepreneurial businesses individually (Bruneel, Ratinho, Clarysse, & Groen, 2012), without emphasizing the development of a specific niche. Rather, the business incubator forms a protective space itself by providing to business start-ups the following: shared office spaces and equipment; administrative services (e.g., reception and clerical services); business support involving (one-to-one) coaching and training activities (i.e., business planning, marketing, accounting, managerial support, and access to finance); and access to services via external networks (Bergek & Norrman, 2008; Bøllingtoft & Ulhøi, 2005; Bruneel *et al.*, 2012; Hansen, Chesbrough, Nohria, & Sull, 2000; Lai & Lin, 2015; Pauwels, Clarysse, Wright, & Van Hove, 2016; Smilor, 1987). This way, business incubators make sure that new ventures can attend to their core business, instead of having to deal with complementary issues such as accounting. Business incubators assist new ventures in getting past the first critical years (Bøllingtoft & Ulhøi, 2005) and thereby strive to enhance the survival rate of new ventures and accelerate their growth with the aim to engender self-sustaining, flourishing businesses. Policy makers commonly think of incubators as a tool to promote economic development and technological innovation (Bergek & Norrman, 2008). In terms of LLCEI support, the business incubator approach is primarily concerned with building capacities of start-up LLCEIs and alleviating barriers associated with the start-up phase.

Two other perspectives that have hitherto not been connected to the community energy and intermediary literature provide useful suggestions for intermediary strategies as well. The findings of various studies that show that existent or potential internal capacities and (symbolic) resources are pivotal in community-based bottom-up developments (Bomberg & McEwen, 2012; Forrest & Wiek, 2014; Middlemiss & Parrish, 2010; Walker & McCarthy, 2010) – can be directed back to the ideas of endogenous development and Asset-Based Community Development.

Originally introduced as an innovative approach to rural development, the key principle of Endogenous Development is that development will be more successful and sustainable if it: (i) starts from a base of local resources; and (ii) involves popular participation in the design and implementation of development action (Ray, 1999, p. 524; see also Shucksmith, 2000). As such, endogenous development builds upon,

stimulates and supports social innovation (Neumeier, 2012, p. 59). The endogenous development approach ties people and their innovations, entrepreneurship and capital to the locality. The logic of the endogenous approach involves that a territory formulates its own development repertoire, understood as the resources or often used practices that an actor can choose from and draw upon in a given situation (Ray, 1999b, p. 525). This concept embodies the principles of endogeneity: “the idea of local ownership of resources and the sense of choice (local, collective agency) in how to employ those resources (physical and intangible) in the pursuit of local objectives” (Ray, 1999b, p. 525). Within this, the cultural-territorial identity is a central resource for communities to draw upon. Ray (1999a) argues that culture – understood as a set of place-specific forms (e.g., language and dialect, local knowledge, folklore, music, and landscape) – can be used to animate and define development (Ray, 1999a, p. 263). In this sense Bomberg and McEwen (2012) showed that community culture, values and identity can sustain community mobilization. Similarly, Forrest and Wiek (2014) noted that a significant solidarity from a common village identity and sense of pride was also a critical success factor. Ray (1998) suggests that territorial initiatives can use these cultural and identity symbols to revalorize place and to localize economic control. When applying the rationale of endogenous development to LLCEI support, the approach seeks to further the development of LLCEIs by safeguarding ownership, participation and embeddedness.

In a similar vein, the Asset-Based Community Development (ABCD) approach was developed in response to socio-economic problems in US cities in the 1990s. The core axiom of the ABCD approach is to retain a focus on the assets and capacities of the community, instead of its needs, deficiencies and problems in community revitalization efforts (Kretzmann & McKnight, 1996). Consequently, ABCD leaves control with the initiators themselves and instills confidence in communities (Mathie & Cunningham, 2003). Furthermore, ABCD presupposes that the development process is relationship-driven, making use of the social capital present in the community (Kretzmann & McKnight, 1996; Mathie & Cunningham, 2003). Indeed, Hicks and Ison (2011) observed the importance of bridging, bonding and linking capital in successful LLCEIs (see also van der Schoor & Scholtens, 2015). As a strategy, ABCD supports LLCEIs by animating existing capacities and assets of the local communities wherein they are situated.

Table 4.1 gives an overview of the strategies mentioned above. We do not perceive these strategies as mutually exclusive. Within a particular intermediary role or activity one may discern multiple strategies. The various strategies that we have outlined help to illuminate the key assumptions that guide the intermediaries’ roles and activities and assist in assessing the comprehensiveness of the intermediary support structure. We argue that intermediary support structures that draw on all of the strategies listed in Table 4.1 are more likely to be successful in supporting LLCEIs and furthering their development. In the following section, we elaborate upon the various roles and activities of intermediaries.

**Table 4.1**  
Overview of intermediary strategies.

<b>Strategy</b>	<b>Theoretical Rationale</b>	<b>Assumptions Regarding Needs LLCEIs Have</b>	<b>Type of Support to LLCEIs</b>
<i>Strategic Niche Management</i>	Build and nurture a protective space for individual experiments and technological innovations to enhance their potential to engender a transition by means of replication, growth in scale, or translation. The niche is further developed by managing expectations, creating social networks, and fostering learning processes.	Niches and the experiments therein are regarded as improvements to the existing regime. If niches are not able to open up and influence the regime, they cease to exist. Support is directed at further developing of the niche.	Alleviating barriers, opening up systems for new practices
<i>Business Incubator</i>	New ventures are provided with resources and capacities to accelerate their growth and enhance their survival.	Support is needed in the start-up phase of the LLCEI, after which it is expected to survive on its own. Help is supported toward development of business models.	Alleviating barriers, building practical capacities
<i>Endogenous Development</i>	Using local resources, stakeholders and markers stemming from the territorial-identity to revitalize the locality. People at the local level know best how to tackle local problems. Stimulate social innovation.	LLCEI support is contextualized and ensues by means of popular participation and ownership in its design and implementation.	Building endogenous capacities and embedding LLCEI in its social context
<i>Asset-Based Community Development (ABCD)</i>	Development is based on the capacities and assets that are present, instead of a focus on needs and deficiencies.	LLCEIs need to be supported by focusing on existing assets.	Building and using existing assets and capacities

#### 4.2.4 Roles and Activities of Intermediaries

Similar to the variety of actors who may function as intermediaries and the various strategies that may be employed, the roles and activities of intermediaries also vary to a great extent. Below, we discuss the various roles of intermediaries in accordance with the support LLCEIs require for their development.

#### 4.2.4.1. *Building Capacities and Embedding LLCEIs*

In distinguishing intermediary roles within innovation processes, Stewart and Hyysalo (2008) argue that intermediaries may assume a facilitating role to build capacities for other actors. This role involves collecting and distributing financial, technical and institutional resources, and providing skills and knowledge. Howells (2006) noted that intermediaries assist in finding funding, and processing, generating and combining knowledge. Within this role, one might expect activities such as conducting feasibility studies (Ruggiero *et al.*, 2014) or the provision of technical and legal advice, as well as guidance on funding sources and applications (Bird & Barnes, 2014; Bomberg & McEwen, 2012; Dinnie & Holstead, 2017; Hinshelwood, 2001; Kivimaa, 2014; Ruggiero *et al.*, 2014). The facilitating role is further characterized by endogenous development, asset-based capacity building and embedding measures by means of: updating the personal, organizational, and entrepreneurial capacities of participants in order to ensure project survival (e.g., giving training workshops, activating and updating project champions, developing complementary business initiatives to make LLCEI financially sustainable); linking and developing relationships with key individuals in the locality to tap into their skills and capacities; reviving the community spirit; and ensuring ownership of the installation by the local community (Guerreiro & Botetzagias, 2018). Furthermore, this role also involves facilitating and organizing networking channels between LLCEIs (Hicks & Ison, 2011; Wade, Hamilton, Eyre, & Parag, 2013). Researchers further found that intermediaries facilitate access to information, as well as information flows and interactions between LLCEIs to share experiences (Bird & Barnes, 2014; Parag *et al.*, 2013). In addition, face-to-face mentoring and training workshops appear to be of particular help to LLCEIs (see also Hicks & Ison, 2011; Seyfang *et al.*, 2014).

Geels and Deuten (2006) state that intermediaries engage in knowledge aggregation and distribution, involving the transformation and de-contextualization of local knowledge into robust, abstracted and standardized knowledge that can be shared between local practices. In practice, intermediaries aggregate experiences and lessons learned in formats such as case-studies, toolkits and handbooks (Hargreaves *et al.*, 2013) or common templates for subsidy application (Bird & Barnes, 2014). In their study on local climate initiatives and enabling experimentation, Matschoss and Heiskanen (2017, p. 89) observed that intermediaries aggregate lessons and experience by pooling knowledge and experiences from diverse participants (through co-creation, events, meetings, awards); by drawing in new non-local knowledge from experts and research; and by collecting knowledge and exemplars from other countries or experiments.

#### 4.2.4.2. *Alleviating Barriers within the Status Quo*

Brokering activities point to the network manager role of intermediaries in innovation processes (see also Howells, 2006; Kivimaa, 2014). This involves bringing relevant actors into the innovation network; maintaining their commitment and interest; and safeguarding a degree of openness of the innovation network to other interests.

Additionally, brokering activities encompass conducting negotiations on behalf of individuals and institutions that appropriate the innovation. Hargreaves *et al.* (2013) too conceptualized a brokering role for intermediaries in the community energy sector. Within the brokering and managing partnerships role, intermediaries introduce community initiatives to potential partners, broker collaborations between community energy groups and large companies, and specify the terms and conditions of partnerships to safeguard community energy groups' interests. In a similar vein, Matschoss and Heiskanen (2017) argue that intermediaries can challenge established practices by introducing new actor configurations.

Additionally, intermediaries engage in lobbying activities to influence policy. These activities are commonly undertaken in light of getting new sources of investment and developing new business propositions for community energy groups. On the topic of rural and urban revitalization in the US in the 1980s, intermediaries supported community development corporations by helping to link up the interests of these local initiatives with local funders to shape a common vision, and by assuming a brokering, advocacy and fundraising role (Anglin & Montezemolo, 2004). Guerreiro and Botetzagias (2018) found that an intermediary in their case lobbied for funds for LLCEIs. Intermediaries also have a representative function to outsiders (see also Hasanov & Zuidema, 2018) as they engage with policy makers to show what issues arise on the ground when LLCEIs deal with policies (Bird & Barnes, 2014), and form a communication channel between LLCEIs and government (Parag *et al.*, 2013). Furthermore, Bird and Barnes (2014, p. 213) observed that intermediaries link community energy groups with policies. In a similar way, Wade *et al.* (2013) described that intermediaries may function as a strategic interface between centralized formal structures (government, energy companies) and the decentralized nature of LLCEIs.

#### *4.2.4.3. Opening Up the System for the Uptake, Acceptance or Breakthrough of LLCEIs*

Configuring activities involve the shaping of the innovation by configuring content of the innovation such as setting rules for uses; prioritizing, aligning and shaping particular uses, goals and form of projects as well as the goals, expectations and needs of other stakeholders (Howells, 2006; Klerkx & Leeuwis, 2009; Stewart & Hyysalo, 2008). In a similar vein, Guerreiro and Botetzagias (2018) observed that intermediaries can ensure a social fit of the technology in concern. The work of intermediaries in developing new financing and business models is also relevant here (Guerreiro & Botetzagias, 2018; Huijben & Verbong, 2013; Kivimaa & Martiskainen, 2018), as well as scaling up local initiatives to a level where funding agencies are interested in providing financing (Wade *et al.*, 2013). In other words, configuring LLCEIs along with the low-carbon energy applications involved generates acceptance which is crucial for their wider diffusion and development.

To further generate acceptance of LLCEIs and broaden the impact of LLCEIs beyond their local context, intermediaries may engage in framing and coordinating. Whereas

framing and coordinating rather brings to mind activities such as influencing decision-making arenas in favor of LLCEIs, Geels and Deuten (2006) argue that the provision of guidance, advice and templates substantiates this role. Furthermore, Hargreaves *et al.* (2013) argue that in this role, intermediaries provide face-to-face mentoring and training workshops to build capabilities and confidence. To prevent conflating this role with the abovementioned facilitating kind, we deviate from these authors. In our understanding, intermediaries coordinate between actors in decision-making arenas to prevent lock-in and ensure progress in terms of diffusing innovative processes and activities. As an example, Bird and Barnes (2014, p. 213) observed that the intermediaries in their study assisted in developing a shared vision that transcended the day-to-day practicalities and activities of LLCEIs and provided a systemic picture of the community energy sector. Furthermore, intermediaries may frame debates and discourses in various ways to achieve favorable outcomes in decision-making processes (Hisschemöller & Sioziou, 2013). For instance, Rohrachner (2009) found that intermediaries attempt to reframe energy markets by establishing green electricity labels. These labels aim to provide guidance and transparency in green electricity offers and articulate demand for such products (Rohrachner, 2009, p. 2015).

Geels and Deuten (2006) identified another role for intermediaries, which is the creation of an institutional infrastructure. The creation of a shared institutional infrastructure facilitates the standardization and stabilization of the innovation to link up with the demands and expectations of mainstream users (Geels & Deuten, 2006), and aims to identify the shared rules or development trajectory for the community energy sector (Hargreaves *et al.*, 2013). However, the authors of both studies predominantly interpret the institutional infrastructure as a forum to store, exchange and circulate knowledge. In the understanding of Hall and Taylor (1996, p. 938) institutions refer to “the formal or informal procedures, routines, norms and conventions embedded in the organizational structure of the polity or political economy”. Here, the institutions involved pertain specifically to the community energy sector, where notions such as small-scale, distributed generation, local ownership, community benefits and decentralized decision-making prevail and define actor interactions. Communities aspiring to establish an LLCEI can link up with this infrastructure to accelerate their development. Such an infrastructure that actively supports and legitimizes LLCEIs’ activities and goals afford LLCEIs a wider reach, enhanced capacities and generates acceptance.

An overview of the roles and activities of intermediaries is provided in Table 4.2. The intermediary roles and accompanying activities listed in Table 4.2 along with the strategies summarized in Table 4.1 form the basis for evaluating the intermediary support structure in the case that we have selected. Similar to the proposition pertaining to the various strategies, we argue that the completeness of the various roles and associated activities listed in Table 4.2 has a positive influence on the development of LLCEIs.



**Table 4.2**

Overview of intermediary roles and activities.

<b>Relevant Support Required by LLCEIs</b>	<b>Associated Roles from Literature</b>	<b>Activities</b>
<i>Building capacities and embedding into community</i>	Facilitating	Distributing financial, technical, institutional, knowledge resources, providing advice, building capacity, and skills.
	Aggregation of knowledge	Developing toolkits, handbooks, and templates, and distributing these.
<i>Alleviating barriers within the status quo</i>	Brokering	Advocacy, negotiation with other parties, representative function, lobbying, engaging with policy makers, introducing new actor configurations, and embedding in current policy frameworks. Identifying and challenging institutionalized practices.
	Creating institutional infrastructure	Setting up a supportive environment in which local initiatives are embedded and integrated, and which governs interactions and activities.
<i>Opening up the system for the uptake, acceptance or breakthrough of LLCEIs</i>	Configuring	Embedding technology in the local community. Prioritizing or shaping certain uses of the technology, developing new (business) models, and engaging in pilots.
	Framing and coordinating	Articulating demand, framing discourses and debates, and coordinating between actors in decision-making processes.

#### 4.2.5 Interaction Effects of Intermediary Strategies, Roles and Activities

In practice, however, the completeness of the strategies, roles and activities of intermediaries – and their underlying agendas – outlined in the subsections above might amount to a coherent intermediary support structure, but could also lead to conflictive and unproductive interactions between intermediaries. The latter may negatively influence the effect intermediaries have on the development of LLCEIs. Ambiguity may for instance arise when intermediaries emphasize their boundary role as a resource to advocate for unconventional practices that clash with the status quo, but thereby lose access to networks of influence (i.e., government) which is an important resource for both themselves and their target groups (Hisschemöller & Sioziou, 2013, p. 15). The result may be that intermediaries choose to support innovations that do not challenge prevalent practices to safeguard resource access. We therefore complement our core assumption regarding the completeness of the intermediary support structure. We argue that, next to the completeness, the coherence of the intermediary support also positively effects the development of LLCEIs.

### **4.3 Research Design and Methodology**

To study the roles and strategies of intermediaries to support LLCEIs and hence answer the main research question of this paper, a case-study research design was used. We did this to understand the research phenomenon of interest to this study in its real life complex environment and learn from practices (Yin, 2011). The geographical domain of our case study is Fryslân, a province in the northern part of The Netherlands. In the following subsections, case selection, data collection and analysis of the study are presented.

#### *4.3.1 Case Selection*

The Dutch Province of Fryslân was selected as the empirical context of this study. Compared to other Dutch provinces, Fryslân forms a rather extreme case. Firstly, it is home to a relatively large number of LLCEIs. Within Fryslân there are over 50 LLCEIs, of approximately 400 total in the Netherlands, and Fryslân has the highest number of LLCEIs per capita in the Netherlands (Schwencke, 2017). Furthermore, Fryslân is home to the largest installed capacity of community-owned solar PV (9953 kWp in Fryslân, compared to the runner-up province of Noord-Holland with 5674 kWp) (Schwencke, 2017). As such, Fryslân has an extreme score in terms of how LLCEIs and the low-carbon energy applications they employ proliferate. The Frisian case is therefore suitable to develop new hypotheses – in this paper the suggestion of novel approach to analyzing intermediary support (Gerring, 2007). Moreover, extreme outcomes allow better for development of new theory than typical outcomes do. Hence, we theorize that the confluence of (multiple) intermediaries who supported Frisian LLCEIs effectively achieved the number of LLCEIs established and the realized installed capacity of solar PV.

As a province, Fryslân represents not only a geographical entity but also an administrative entity, having some decentralized administrative authorities of its own (e.g., spatial, environmental, and water policies). Many of the provinces in The Netherlands also implement energy transition programs (typically offering subsidies and other supportive policies). When compared to other Dutch provinces, Fryslân can be considered as active, as it directs a relatively large portion of policies to support regional socio-economic development (also related to the issue of regional demographic and socio-economic decline and livability), including policies to support and facilitate LLCEIs, often indirectly via the involvement of several intermediary organizations. As a rural province, Fryslân experiences issues related to regional shrinkage, which evidently has an impact on local socio-economic conditions. Enhancing the livability of Fryslân and tackling the issues inherent to shrinkage are at the top of the political agenda. The province sees LLCEIs as one way to spur regional development and augment livability. Moreover, Fryslân has a long cultural tradition of (endogenous) local community empowerment and entrepreneurship (which favors the establishment and presence of LLCEIs). Finally, the province also entails a comprehensive set of actors that can serve as intermediaries. Whereas some of them are government-affiliated, others are NGOs or private firms.

For the reasons mentioned, the Frisian context represents a case that suits the theoretical conditions that we excerpt. Although Fryslân represents a rather unique case, it is fair to conceive other regional entities (also outside The Netherlands) having comparable conditions favoring intermediary support to LLCEIs (i.e., having a culture of local empowerment and supporting entrepreneurship, likely to cope with issues like demographic and socio-economic decline, having a regional authority in place target these issues with regional support policy, and having a wide set of organizations in place that can and will act as intermediaries). Theoretically, strong intermediary support to LLCEIs may also occur in other regions meeting these conditions.

Within the Frisian case, the foremost (six) intermediary organizations in support of LLCEIs were selected: the Province of Fryslân, Doarpswurk, the Frisian Environmental Agency, Ús Koöperaasje, Energie VanOns, and the Energy Workshop. More detailed information on these intermediaries is presented in Section 4.4.

#### *4.3.2. Data Collection and Analysis*

Empirical data were collected by means of seventeen in-depth interviews with advisors and strategic officers employed at intermediary organizations, local and regional government officials, as well as initiators of LLCEIs. Interviews were recorded and transcribed. Furthermore, meetings of intermediaries and LLCEIs were attended as well. Next to interview data, text documents were collected, involving inter alia internal strategic documents, policy documents, subsidy applications, concept notes, and the websites of the intermediaries. These documents were provided by interviewees or collected by means of searching the websites with relevant search terms.

Data analysis concerned text interpretation and coding of interview transcripts and text documents. Interpretation of data involved reflection on key concepts used on the roles and strategies of intermediaries in support of LLCEIs (see Section 4.2, in particular Table 4.2 on these concepts). This led us to construct and present case descriptions on the roles of intermediaries and the strategies they employed. This includes historical information on their organization and role, and practices in support of LLCEIs they engaged in. In some cases, we used quotations from interviews to illustrate particular phenomena we encountered that are of special conceptual interest. Finally, for all observed intermediaries, information is analyzed and presented reflecting on the associated intermediary activities, roles and strategies. This information is clustered in Table 4.4 to allow for cross-intermediary comparison.

## **4.4 Results**

### *4.4.1. Description of the Frisian Case*

The Province of Fryslân is located in the northern part of The Netherlands. Each province in the Netherlands has its own provincial government, comprising the Provincial Executive and Provincial Council. The province is characterized by a rural

landscape, dairy farms, and has its own official language and cultural identity. It is home to over 400 rural townships and small villages (many with a population of less than 1500). The LLCEIs in Fryslân typically evolve in these small villages and townships. This is, however, not only for reasons of sustainability. The Province of Fryslân suffers from demographic decline. Large parts of the province have been designated as “shrinkage regions”. To cope with the issues of demographic and economic decline, much of the provincial government’s political attention is directed to tackling these issues while enhancing (rural) livability and seeing LLCEIs as one of the means to do so. Furthermore, throughout history, self-organization and collective action of Frisian communities have been defining elements of the Frisian identity (Kenniscentrum Immaterieel Erfgoed Nederland, 2018). For instance, in the late 19th century, Fryslân was home to 66 cooperative dairy plants of a total of 112 in the Netherlands (Willemsens, 1995). The 53 LLCEIs considering a total of 650,000 inhabitants is also a case in point. Dutch provinces “Noord-Holland”, “Noord-Brabant”, and “Gelderland” have, respectively, 58, 53, and 54 LLCEIs (Schwencke, 2017). However, these are significantly larger provinces in the sense of population with, respectively, 2.7 million, 2.5 million, and 2 million inhabitants. Whereas the majority of the Frisian LLCEIs were established no more than 4–5 years ago, some of them have existed since the 1990s. Moreover, the LLCEIs in Fryslân show a large variety in size, scope, and type of organization. For instance, the region houses an initiative that has close to 1000 customers, whereas the majority of the LLCEIs have a customer base in the 20–100 range.

#### *4.4.2. Observed Intermediary Strategies, Roles and Activities*

Various actors can be discerned in the intermediary support structure for LLCEIs in Fryslân. Firstly, we describe the intermediary support issued by the provincial government. Next, we provide descriptions of four actors that have intermediary roles and engage in intermediary activities: “Doarpswurk”, “Friese Milieu Federatie”, “Ús Koöperaasje”, and “Energie VanOns”. The latter two organizations form an institutional infrastructure that is included in the descriptions of the actors. Lastly, Doarpswurk, Friese Milieu Federatie and Ús Koöperaasje collaborate in a platform, named the “Energy Workshop”. The majority of the supportive activities of these organizations having intermediary roles are therefore compiled and analyzed in the subsequent description of the “Energy Workshop” platform itself. The individual actors’ characteristics and their interrelations are summarized in Table 4.3.

##### *Province of Fryslân*

One of the primary policy instruments of the Frisian provincial government designed to build the capacity of bottom-up initiatives is the “Iepen Mienskipfûns” (“Open Community Fund”; authors’ translation). The Open Community Fund is a grant funding scheme that facilitates bottom-up initiatives that contribute to the livability of their locality. An initiative is judged by a panel of representatives of citizens living in the region and is based on the following criteria: public support, continuity, collaboration, empowerment, and ecology. This way, initiatives stemming from the local community (i.e., ideas should display public support) that address local issues

(the ecology criterion lists themes such as the energy transition, strengthening cultural-historical and landscape structures, or stimulating cultural tourism and a sense of identity) and stimulate the use of local resources and capacities (e.g., collaborating with local stakeholders or empowering socio-economically vulnerable groups) are supported by the province (Province of Fryslân, 2016, Province of Fryslân, 2018). This signals both strategies of endogenous development and asset-based community development. The majority of the provincial money used for this fund stems from its rural policy budget (Province of Fryslân, 2015, p. 59), which was €15.8 million for the period 2016–2019 (Province of Fryslân, 2018).

### *Doarpswurk*

“Doarpswurk” (“Village work”; authors’ translation) was established in 2008 to support Frisian rural villages in transition processes regarding the overall livability of the Frisian countryside. Low-carbon energy supply is seen as one of the means to stimulate the livability and social cohesion in rural villages while promoting social innovation at the same time. Doarpswurk has an expansive social network in the province and knows how to make use of the social structures of the villages and townships, signaling asset-based community development:

*“So the villages are organized. The social capital that we draw on is organized in the villages (...) you can nicely comprehend those organized villages, we can do our tricks with them and then something nice will come out of it.”*

Such “tricks” involve inter alia a visioning process, giving support to the organizational processes of grassroots initiatives, and embedding the ideas of initiators in the local community. Doarpswurk places responsibility and ownership at the village itself (Doarpswurk, 2018) and supports villages and citizen initiatives that contribute to a sense of community and social cohesion in the villages by means of offering pro-active, innovative and accessible support (Doarpswurk, 2018). Doarpswurk guides initiatives in the process of organizational development, but does not aim to take over control of the process itself. This way, the ideas and developments remain in the hands of the local initiators, and therefore are more likely to fit in well with the community itself. These activities correspond with a capacity-building role of an intermediary and signal an endogenous development approach, emphasizing the importance of popular participation, ownership, and a sense of choice in the implementation process.

### *Frisian Environmental Federation*

The “Frieze Milieu Federatie” (FMF; “Frisian Environmental Federation”, authors’ translation) is an umbrella organization consisting of 38 nature and environment organizations. FMF is dedicated to maintaining the Frisian nature and environment and has experience with organizing innovative projects and managing processes, and communication and information campaigns that have to do with various domains of sustainability. More specifically, FMF addresses the issues of climate change, biodiversity, landscape preservation and development. It collaborates with a comprehensive set of different kinds of stakeholders in society (e.g., citizen initiatives,

governments, and business firms). As such, FMF has a broad and diverse network of partners with whom it collaborates. The majority of supportive activities by FMF ensue in the “Energy Workshop”, which are further discussed below.

### *Ús Koöperaasje*

“Ús Koöperaasje” (“Our Cooperative”; authors’ translation) was established in 2013 to represent the interests of Frisian LLCEIs. As such, Ús Koöperaasje is an umbrella cooperative where individual LLCEIs can become a member of. The original idea of an overarching cooperative came from the energy coordinator of the Municipality of Leeuwarden that, based on several visits to LLCEIs, concluded that these initiatives typically face similar problems. The Municipality of Leeuwarden facilitated the establishment of Ús Koöperaasje by allowing its energy coordinator (a civil servant) to work on the project one day a week and granting a subsidy in the start-up phase of the cooperative. Ús Koöperaasje’s main goal is to stimulate the development of Frisian LLCEIs to make sure that Fryslân residents retake control of their (low-carbon) energy affairs. As one means to do so, Ús Koöperaasje makes promotional material available such as banners, t-shirts and flyers to its members which can be used during events organized by Frisian LLCEIs. Furthermore, Ús Koöperaasje provides templates for websites that can be used by start-up LLCEIs that do not have their own website yet. These activities indicate an incubator strategy, providing means of marketing and communication to assist start-up LLCEIs that lack the individual capacities to arrange this themselves. In addition, Ús Koöperaasje has considerable expert knowledge on legal, fiscal and technological issues that pertain to the reality of LLCEIs. For instance, LLCEIs are provided with standardized statutes for establishing a cooperative organization. As such, Us Koöperaasje also displays a facilitating and knowledge aggregation role. Furthermore, Ús Koöperaasje holds two general assemblies each year, in which LLCEIs set the agenda for discussion and express what kind of support they require, such as an organization that lobbies for and represents their cause:

*“If you talk about what kind of roles Us Koöperaasje has, sometimes it is in the sphere of lobbying. Recently a letter was sent to the national government to ask whether a part of the feed-in tariff could be reserved for local initiatives”*

(...)

*“What’s also important is to advertise what we are doing (...) we often tell what we are doing throughout the country (...) so the representative and the ambassador functions, those are of course important tasks.”*

The representation and lobbying activities of Ús Koöperaasje demonstrate its role as an intermediary that challenges and strive to alleviate barriers that impede on the development of LLCEIs. Ús Koöperaasje makes an effort to organize a disparate movement consisting of LLCEIs that have varying ambitions, signaling a strategy of niche development. By bringing together LLCEIs under one flag and by engaging various stakeholders, Ús Koöperaasje actively builds social networks, which is considered a key process for niche development.

Another important function of Ús Koöperaasje is its shareholder role in the grassroots

energy supplier named “Energie VanOns” (“Our own Energy”; authors’ translation) that was specifically established for the LLCEI movement:

*“We are a cooperative of cooperatives that links people to our own energy supplier.”*

This role can be interpreted as one of coordination, since the main aim of Ús Koöperaasje here is to help establish as many LLCEIs as possible in order for the latter to become resellers of the energy supplied by Energie VanOns. As such, Ús Koöperaasje articulates the demand for regionally generated and distributed low-carbon energy. For LLCEIs individually, Ús Koöperaasje represents their interests vis-à-vis the regional energy supplier.

### *Energie VanOns*

As mentioned above, Ús Koöperaasje is a shareholder of the energy supplier Energie VanOns. The other two shareholders are two umbrella cooperatives that were established for the neighboring provinces of Drenthe and Groningen, respectively, the “Drentse Kei” and the “Gronninger Energie Koepel”. Energy supplier Energie VanOns was established in 2014 by the three umbrella cooperatives with help of a €300,000 loan, provided by the provinces of Fryslân and Drenthe. The Groningen province issued a subsidy of €100,000.

Energie VanOns and the umbrella cooperatives form an institutional infrastructure that works as follows. LLCEIs are members of the three umbrella cooperatives, who are in turn owners of Energie VanOns. Individual LLCEIs function as resellers for energy supplied by Energie VanOns. The rights and duties (such as billing and payment) for both parties are embedded in a reseller contract. As such, customers (e.g., households, business firms, and local churches) of the LLCEI use energy that is supplied by Energie VanOns.

The LLCEI receives a yearly remuneration of €75 for each customer. For instance, a particularly successful Frisian LLCEI, the “Amelander Energie Coöperatie” (“Ameland Energy Cooperative”; authors’ translation), has close to 1000 customers that generate €75,000 every year because of this scheme. This forms a great means of financial income for the LLCEI in concern. In doing so, the institutional infrastructure supports the capacity building of LLCEIs and opens up the system by articulating demand for locally generated low-carbon energy. As such, it embeds LLCEIs in a model that is able to compete with existing practices in energy markets by providing consumers with a viable alternative to status quo energy supply contracts. Furthermore, the institutional infrastructure comes with a new actor configuration, with LLCEIs and energy suppliers mutually reinforcing one another and challenging established centralized energy systems. One can derive a combination of strategic niche management, ABCD and endogenous capacity building in the sense that the infrastructure seeks to mainstream LLCEIs and does so by encouraging LLCEIs to focus on building a client base in their locality and generating a much-needed source of income in this way. This combination of strategies also becomes apparent in the primary objective of Energie VanOns, which is to buy and sell the low-carbon energy that is generated by LLCEIs. This way, it ascertains that energy is generated and used in the local environment and benefits the local economy:

*“It is the intention to bring this ‘flywheel’ in motion so that this process reinforces itself. (...) With this flywheel comes the self-sufficiency of people (...) helping with making your environment more sustainable, and therefore also the Frisian component, and the strengthening of the Frisian economy, those elements come together.”*

In addition, the institutional infrastructure brings focus into, and coordinates the range of LLCEIs that have been emerging in the province:

*“We have created a structure with Ús Koöperaasje and Energie VanOns to foster a flow of capital, to unite people, and to give them something to hold onto (...) a focus in what they want to do.”*

**Table 4.3**

Actors, their characteristics and interrelations in the Province of Fryslân.

<b>Actor</b>	<b>Characteristics</b>	<b>Relation</b>
<i>Province of Fryslân</i>	Decentralized government that is responsible for spatial planning, environmental management, and infrastructure. Monitors local governments.	Subsidizes Doarpswurk and FMF as these are go-to partners for implementing livability and sustainability policies. The provincial government provided a financial loan to Ús Koöperaasje.
<i>Doarpswurk</i>	Semi-governmental organization. Independent foundation that has its own strategy, vision and mission. Maintains livability and social resilience of Frisian rural countryside.	Subsidy and policy implementation relation with the provincial government. It collaborates with FMF and Ús Koöperaasje in the Energy Workshop.
<i>Friese Milieu Federatie (FMF)</i>	Umbrella organization that has its own strategy, vision and mission. It concerns a network organization that sets up campaigns and projects for maintaining the environment, nature and combating climate change, and brings together actors in decision-making processes.	Subsidy and policy implementation relation with the provincial government. Collaborates with Doarpswurk and Ús Koöperaasje in the Energy Workshop.
<i>Ús Koöperaasje</i>	Grassroots umbrella cooperative that represents the interests of LLCEIs.	Received a financial loan from the provincial government. Collaborates with Doarpswurk and FMF in the Energy Workshop.
<i>Energie VanOns</i>	Regional energy supplier, that was established to serve the interests of the LLCEI movement.	Ús Koöperaasje is a shareholder of Energie VanOns. LLCEIs are re-sellers of the energy supplied by Energie VanOns.



#### 4.4.3. The Energy Workshop

Having noticed the increase of Frisian LLCEIs (3 LLCEIs in 2012, 27 in 2014, and 50 in 2017) and thereby the demand for support, Doarpswurk, FMF and Ús Koöperaasje jointly developed a program entitled the “Energiewerkplaats” (“Energy Workshop”, authors’ translation) in 2013 to support LLCEI grassroots development in a more integrated fashion. The “Energy Workshop” provides support for each of the different stages LLCEIs go through and groups these LLCEIs together – akin to an incubator strategy. Firstly, communities that have “green” aspirations for their locality (and thus are not considered LLCEIs yet) are supported by means of inspiration sessions:

*“The only thing we do for communities that are interested in doing something with sustainability in their village is giving them inspiration. We show them examples, show them what is possible, and prove to them that the ideas that they have can indeed be realized”.*

Subsequently, when communities decide to come in action, the Energy Workshop assists them in developing a vision and plan that guides them into achieving an “energy neutral” goal locally. Together with the community, the Energy Workshop maps the energy consumption of the designated geographical domain (i.e., as an energy audit); what is required before subsequently coming up with technological solutions to make it energy neutral; and what the community deems the most suitable solutions (e.g., solar, wind, geothermal, or energy saving measures such as insulation). Thus, the Energy Workshop is also characterized by a strategy of endogenous development since it actively involves the community in the designing and drafting of low-carbon energy solutions. Furthermore, start-up initiatives were advised that they need to contact the local government early in the process if their plans to achieve energy neutrality would require legal permits or zoning alterations, but also for explaining how local governments work, and that it typically takes time for governments to respond to inquiries. This signals a brokering role. When the Energy Workshop started its activities in 2014, the majority of the support it offered was directed at mobilizing initiatives and providing guidance for communities on how to start and maintain a viable community organization. This incubator strategy helped building LLCEI capacities. Furthermore, the Energy Workshop also facilitated local governments on multiple occasions and informed them how to cope with LLCEIs, and how to evaluate the projects that LLCEIs aspire. In this sense, the Energy Workshop functioned as a translator and broker between LLCEIs and local governments.

Having provided substantial social-organizational support to soon-to-be LLCEIs and existing LLCEIs, the Energy Workshop organized various communities of practice (CoP) for start-up LLCEIs that wanted to follow-up on their plans:

*“We do not have the resources to provide individual support to each start-up initiative. A lot of the questions and concerns that arise in the start-up phase are*

*relatively generic. These issues can be dealt with just fine in small groups of around eight to twelve participants”.*

To serve the CoPs, the Energy Workshop organized several sessions to tackle complex issues and when needed hired external experts to facilitate them in doing so. The CoPs discussed inter alia the application process for the national feed-in tariff (the “Stimulerend Duurzame Energie” (SDE+): Stimulation Sustainable Energy (authors’ translation) and the national tax relieve scheme that was specifically developed for LLCEIs (the Regeling Verlaagd Tarief; “postcoderoos”: commonly referred to as the “zip-code rose scheme”). Throughout these sessions, LLCEIs shared information and experiences with each other:

*“Those two [Ús Koöperaasje and the Energy Workshop] have been of crucial importance for us in the sense that we had easy access to knowledge and got in touch with other LLCEIs where we got to learn a lot from each other. What has been done by one LLCEI can easily be shared with the others.”*

As a result of these CoPs and accompanying sessions, the Energy Workshop developed and issued various standardized application forms, statutes needed for establishing a legal entity, toolboxes and templates. This standardized knowledge was made open source and hence became publicly available to all Frisian LLCEIs. The CoP instrument illustrates a range of capacity-building activities, such as providing access to social networks; organizing opportunities for (shared) learning; and aggregating and distributing knowledge. Moreover, the sessions organized to apply for subsidies signal a brokering activity to embed LLCEIs in the existing policy structure. Once the LLCEIs went through the relatively generic issues, more complicated and case-specific issues may arise that require specialist, expert and tailored support:

*“At a certain moment, they [LLCEIs] reach a point where they need tailor-made support (...), we then discuss matters such as the location of the installation and what that means for the connection to the grid (...) and we calculate business cases”.*

Here, the Energy Workshop supported individual LLCEIs and often hired external experts to assist in tackling complex legal, financial, technical or business-case related issues for individual LLCEIs. For instance, the Energy Workshop assisted in getting investment capital for a 1200 solar PV panel roof plant initiated by an LLCEI. Furthermore, the Energy Workshop came to the assistance of an LLCEI that wanted to terminate its activities because it became demotivated by the multiple rejections of its subsidy applications. To motivate the LLCEI again, the Energy Workshop assisted in writing a new subsidy application and recalculating its business case. In conceptual terms, this capacity building role signals face-to-face mentoring and coaching activities, as well as fundraising and helping to sustain motivation.

Next to the multi-phased, incubator-like support provided to start-up as well as relatively advanced LLCEIs, the Energy Workshop actively developed innovative models and

concepts in an attempt to further the transition to low-carbon energy with enhanced citizen influence and participation. These activities are discussed below.

#### *4.4.3.1 Developing New Financial Schemes and Business Models*

In 2016, the Energy Workshop started a pilot for an LLCEI-owned Energy Service Company (ESCO) to realize energy neutral housing for homeowners in a small rural village. At the start, the Energy Workshop took up the initiative to write a subsidy application to get the pilot funded. The process started with an expert who made an integrated overview of the energy demand for the individual households that participated in the pilot. The aim of the pilot was to develop a financial construction to cover the required investment capital by piling together all the individual measures in an integrated funding application. The corresponding business model would become an LLCEI-owned ESCO that implements the required measures for making the individual houses energy neutral, along with a guaranteed output from the measures for fifteen years. This new business concept was an illustration of a configuring intermediary activity by scaling up individual projects to make them appealing to investors. Engaging in such experiments within a protective space (by dubbing it a pilot) to challenge the existing regime (existing practices in financing energy measures) fosters learning and is therefore indicative of a strategic niche management approach. The pilot started in late 2016 but became gridlocked after a while. The Energy Workshop was not able to reach an agreement regarding the interest rate with the private entity that manages the provincial investment fund – the primary source of funding for innovative low-carbon projects in the region. Consequently, the Energy Workshop reached out to the Provincial Council and raised the idea of a provincial guarantee fund for LLCEIs. As a result, the Council adopted a resolution allowing the Energy Workshop to investigate the potential and parameters of such a fund. However, not much progress was made since:

*“The bottleneck is not that we want it [LLCEI-owned energy installations], and neither that the technology cannot do it. Rather the bottleneck is: how can we do it financially? And this is the reality where we find ourselves in.”*

Thus, within and beyond the boundaries of this pilot, the Energy Workshop lobbied and developed new concepts to arrange upfront investment capital for LLCEI projects. In this regard, the Energy Workshop developed a business model that made it virtually possible for LLCEIs to sell shares stemming from their low-carbon energy installation, also covering upfront investment capital. The model allows a private person to virtually buy several (for example) solar PV panels of the LLCEI-owned solar PV installation as a financial investment. The LLCEI pays the investor back (along with an interest rate) with revenues stemming from the generated energy (subsidized by the national feed-in tariff) that is sold back to the grid. The creation of this model allows the local community to become (financially) involved in the production of low-carbon energy, signaling both a strategy of endogenous development and asset-based community development. However, people from outside of the local community are able to participate as well, broadening the scope of the LLCEI and thereby signaling an approach of strategic niche

management as well. The participation model can furthermore be seen as an expression of a configuring activity, because it enables the energy installation to become socially embedded in the locality by developing a novel financial participation model. Additionally, by enabling financial participation in a LLCEI-owned project subsidized by the national feed-in tariff, the Energy Workshop improved the link between LLCEIs and existing policies, thus effectively functioning as a (policy) broker. Here, one can observe the thin line between alleviating barriers and opening up the regimes for LLCEIs.

#### *4.4.3.2. Mienskipsenergie*

In 2017, the Energy Workshop developed a specific guarantee of origin (GO) for Frisian community low-carbon energy projects. This GO, dubbed “Mienskipsenergie” (“Community Energy”, authors’ translation), was a response to the aspiration of a group of Frisian LLCEIs to set up a quality certificate that would articulate and circumscribe the core aspects and values of community low-carbon energy. Furthermore, Frisian LLCEIs and Ús Koöperaasje wanted to come up with an appropriate response to enhance transparency in the GOs market system that is often seen as pestered by green washing (Hufen, 2016). Mienskipsenergie functions as an additional qualitative layer to the existing GOs, which means that by implementing Mienskipsenergie actual GOs are traded. In other words, Mienskipsenergie is able to articulate the demand for low-carbon energy coming from local sources. By means of Mienskipsenergie, the Energy Workshop seeks to translate niche ideas into mainstream settings by articulating market demand, signaling an SNM approach.

The Energy Workshop started using the term Mienskipsenergie in its communications towards local and provincial governments. As a result, the concept began to show up in official documents used by provincial council members as well as resolutions proposed in municipal councils. While the Energy Workshop effectively set the agenda by framing discussions on energy usage by Frisian subnational governments in favor of LLCEIs, Mienskipsenergie had not yet been defined properly. Ús Koöperaasje asked during a general assembly if it should further develop the concept on behalf of the member LLCEIs. After having received a green light to proceed, a set of principles was formulated that served as a basis for Mienskipsenergie. Projects that are eligible for receiving the Mienskipsenergie label have to meet three requirements: (i) the project is developed by means of a democratic process (in terms of both substantive participation in decision-making as well as broad community involvement); (ii) the project has to be broadly supported by the community in the locality (opposition have to be dealt with appropriately, location, size and conditions have to be agreed upon); and (iii) the energy generated and benefits stemming from it flow back to the community. By formulating these principles, Ús Koöperaasje prioritized particular forms of LLCEIs, and thus actively engaged in configuring. To safeguard impartiality and quality, a separate foundation was established that has the legal mandate to issue Mienskipsenergie GOs.

In 2018, an LLCEI named “Energzy Koöperaasje Garyp” (“Energy Cooperative Garyp”; authors’ translation) that managed to establish a 27,000 solar PV panel farm received a

Mienskipsenergie certificate. The intermediary did not invite the national press for the first public disclosure of the certificate since neither the intermediary nor the LLCEI were directly interested in effectuating a broader impact outside of the region. Energie VanOns—the regional energy supplier of which Ús Koöperaasje is a shareholder – made it possible to validate that the energy they supply indeed stems from the Mienskipsenergie certified installation and that a GO has been used in the process of supplying. This means that next to local inhabitants, local businesses can demonstrate (by means of a logo) that they use Mienskipsenergie. For instance, a local brewery has now succeeded in brewing beer with the use of locally generated energy. As such, it even displays the logo of Mienskipsenergie on the bottles in which the beer is sold. The trademark is able to make the achieved results more visible while emphasizing the community’s cultural-territorial identity in the process, which is suggestive of endogenous development:

*“Within a local product, the locally generated energy is also considered an ingredient”.*

Mienskipsenergie was not solely developed for LLCEIs, though. The Municipality of Súdwest-Fryslân collaborated in 2016 with the Energy Workshop to develop a spatial planning requirement that harnesses similar principles. They involve: projects have to be developed according to a rigid democratic process and have to be broadly supported by the public of the locality. Additional criteria imply that projects have to contribute to achieving the local government’s low carbon policy goals and that the project has to be feasible financially. When a project meets the abovementioned requirements, the municipality will ex ante agree with any required zoning plan modifications, which gives the initiators certainty to prolong their activities. Still, the requirements for getting an environmental permit remain in effect and initiators have to integrate the installation in the landscape as well. Nevertheless, the Energy Workshop alleviated barriers pertaining to spatial planning procedures by developing a new model for energy spatial planning in concert with a local government. An overview of the key results on strategies and roles of intermediaries in supporting the development of LLCEIs is presented in Table 4.4.

**Table 4.4**  
Intermediary strategies, roles and activities of actors in support of  
the development of LLCEIs.

<b>Observed Intermediary Activities</b>	<b>Associated Intermediary Roles from Literature</b>	<b>Associated Intermediary Activities from Literature</b>
<i>Provincial Iepen Mienskips Fûns</i>	Facilitating	Providing financial resources.
<i>Social organizational support by Doarpswurk</i>	Facilitating, framing	Capacity building, building skillset of initiators. Framing low-carbon energy as a means to advance livability and social resilience.

**Table 4.4**  
Continued from page 168

<b>Observed Intermediary Activities</b>	<b>Associated Intermediary Roles from Literature</b>	<b>Associated Intermediary Activities from Literature</b>
<i>Representing and lobbying by Ús Koöperaasje</i>	Brokering, framing and coordinating	Lobbying, engaging with policy makers, representative function, advocacy.
<i>Providing advice, communication and marketing tools by Ús Koöperaasje</i>	Facilitating	Capacity building, providing advice knowledge, and institutional resources.
<i>Providing standardized tools by Ús Koöperaasje</i>	Aggregation of knowledge	Developing and distributing templates.
<i>Decentralized energy infrastructure by Energie VanOns and Ús Koöperaasje</i>	Institutional infrastructure	Integrating LLCEIs in a supportive system, reinforcing the movement by steering their operations.
	Framing and coordinating	Articulating demand.
	Facilitating	Building capacity by providing remuneration fees.
	Brokering	Supporting formation of new actor configurations.
<b><i>Energy Workshop</i></b>		
<i>Phased support for LLCEIs</i>	Facilitating	Capacity building, providing knowledge, augmenting skills, providing guidance, establishing social network, learning, developing vision, coaching, and fundraising.
<i>Communities of Practice</i>	Facilitating and knowledge aggregation, brokering	Providing access to expert knowledge and support, and opportunities for learning and networking. Providing and distributing standardized templates and schemes, embedding LLCEIs in existing policies.
<i>Guiding interaction between local governments and LLCEIs</i>	Brokering	Mediating between LLCEIs and local government.
<i>Pilot energy neutral housing</i>	Configuring, brokering	Scaling up LLCEIs for investment capital, social fit of technology, fundraising for investment capital.

**Table 4.4**  
Continued from page 169

<b>Observed Intermediary Activities</b>	<b>Associated Intermediary Roles from Literature</b>	<b>Associated Intermediary Activities from Literature</b>
<i>Developing a financial participation model</i>	Configuring, brokering	Developing new participation concepts, social fit of technology, embedding LLCEI in existing policy frameworks.
<i>Mienskipsenergie</i>	Configuring	Prioritizing particular forms of LLCEIs, developing new spatial planning arrangement.
	Framing and coordinating	Articulating demand, agenda setting, and framing debates.
	Brokering	Introducing new actor configurations.

## 4.5 Discussion

The observed intermediary practices in the Province of Fryslân demonstrate a variety of roles and strategies. The integration of different conceptualizations of intermediary roles and strategies stemming from various fields of study in a comprehensive analytical framework enhanced the understanding of the variety of activities performed by intermediaries supporting LLCEIs. As the number of Frisian LLCEIs increased, so did the completeness of the intermediary support structure. At the outset, the intermediary support structure for LLCEIs was mostly characterized by isolated, individual actors providing intermediary support in accordance with their own agendas and expertise. For instance, Doarpswurk and the provincial government predominantly facilitated LLCEIs by building their capacities according to the rationales of endogenous development and ABCD. The first step in fostering more integrated support for LLCEIs was the establishment of Ús Koöperaasje, an organization that represented the interests of LLCEIs, engaged in lobbying to alleviate barriers, and built the capacities of LLCEIs by aggregating knowledge and by providing marketing and communication equipment. Here, the support given to LLCEIs was mainly characterized by a business incubator strategy, along with several elements of SNM, in which Ús Koöperaasje sought to build a coherent social network of LLCEIs and coordinate the movement as such.

The creation of the decentralized energy infrastructure comprising the umbrella cooperative Ús Koöperaasje and the regional energy supplier Energie VanOns formed the next step in further intensifying the support for LLCEIs in Fryslân. This infrastructure effectively enabled enhanced community ownership and participation in the regional energy system while simultaneously building the capacities of individual

LLCEIs and upscaling their operations by linking them to their own energy supplier to articulate the demand for LLCEI-generated energy. The three requirements for successful support of LLCEIs and their development (i.e., capacity building, alleviating barriers, and opening up the regime) can arguably be seen as the various roles that materialize in the infrastructure (creating institutional infrastructure, facilitating, framing and coordinating, brokering) and signal SNM, endogenous development and ABCD.

Lastly, the collaboration between the three main intermediary actors – that each brought to the table their specific understanding of what LLCEIs need in terms of support – in the Energy Workshop showed that the support for LLCEIs in Fryslân became highly integrated along the way. The Energy Workshop accommodates the totality of roles and strategies that we argued to be crucial for addressing the issues that further the development of LLCEIs. The support given by the Energy Workshop ranged from inspiring communities that were interested in “green” solutions for their localities to developing new financial and business models to enabling the uptake of LLCEIs by their respective communities and regime incumbents. The various steps that we have discerned here indicate that the different intermediary actors started institutionalizing their collaborative activities, ensuring that the various aspects that pertain to the successful support of LLCEIs were integrated in a comprehensive support structure. As such, the intermediary support structure is characterized by its completeness, as well as its coherence.

Although fostering the transition potential of LLCEIs with activities such as the introduction of specialized guarantees of origin on the market (i.e., *Mienskipsenergie*) and the connection with regime actors (i.e., LLCEIs’ own regional energy supplier, significant financial support by both local and provincial government) (cf. Geels & Schot, 2007) – the axiom of the intermediary support structure in Fryslân rather hinges on greater ownership and control of energy supply and demand by the Frisian local communities to promote regional economic development and maintain livability and social resilience. As has also been argued in other studies, it is therefore hard to build a case for a strategic LLCEI niche as such (Dóci, Vasileiadou, & Petersen, 2015; Hargreaves *et al.*, 2013; Seyfang & Smith, 2007). It signals that the technological innovations are subordinated to the social-economic regional agenda of the provincial government and NGOs within the community energy niche (Dóci *et al.*, 2015).

This is why the conceptualizations of intermediary roles we used for the analysis seem rather incompatible as the majority of these turned out to be associated with processes pertaining to technological innovations. Indeed, LLCEIs focus on changing the role of the citizen and energy consumer in the energy system, emphasizing social innovation. The focus on social innovation is reflected in the intermediary roles in our case as well. For instance, instead of prioritizing particular uses of an innovation (cf. Stewart & Hyysalo, 2008), the configuring role materialized in our case as *inter alia* activities that sought to embed LLCEIs in their communities (i.e., developing a



financial participation model), embed LLCEIs in existing institutional frameworks (upscaling LLCEIs to secure investment capital), and embedding LLCEIs by developing a new energy planning model (Mienskipsenergie implemented by local government). In a similar vein, the three intermediary roles proposed by Geels and Deuten (2006) crystallized differently in the case of intermediaries supporting LLCEIs in Fryslân. Rather than creating an institutional infrastructure for LLCEIs to obtain globalized knowledge, it was observed that intermediaries provided LLCEIs with an institutional infrastructure to integrate them into a supportive system, effectively reinforcing the movement by providing more focus to their operations. In terms of framing and coordination, the intermediaries developed new concepts to articulate market demand for energy generated by LLCEIs, instead of merely focusing on replication of successful cases.

However, despite the apparent “internally” oriented niche (where technologies and innovations function to serve a special need for specific social groups without the intention to induce transition) (Dóci *et al.*, 2015), intermediaries were found to actively challenge the status quo and strive to open up the regime for the uptake of LLCEIs by creating new concepts, models, and practices. For instance, the Energy Workshop in the pilot energy neutral housing attempted to set an example, pushing through one experiment to open up the socio-technical regime for other LLCEIs to follow. Thus, whereas the pilot arose from a local need, the impact may be in the order of a process that stretches and may even transform parts of the regime (cf. Smith & Raven, 2012).

This apparent ambiguity between the aim to serve local socio-economic needs (representing an internally oriented niche) and the observed intermediary activities directed at further opening up the regime for the uptake of LLCEIs (indicating processes of strategic niche management) can be explained by theories of multi-level governance (Betsill & Bulkeley, 2006; Hooghe & Marks, 2003; Hooghe & Marks, 2001; Bressers & Kuks, 2003) or polycentric governance (Jordan *et al.*, 2018; (Jordan *et al.*, 2018; Ostrom, 2010). One of the core tenets of these frameworks is that local initiatives may have a wider impact that transcends their scale as a result of the interconnectedness of the political arenas involved. To safeguard interests at the local level, actors may have to engage with other stakeholders both horizontally and vertically. Thus, intermediaries engage with other actors and perform activities within various arenas to secure the interests of LLCEIs. As such, intermediaries necessarily engage with processes of SNM, even if the overall aim of their support centers on developing an internally oriented niche. Intermediary roles that are associated with engaging other stakeholders, i.e., brokering, configuring, framing and coordinating, creating an institutional infrastructure, therefore predominantly indicate strategies of SNM.

## **4.6 Conclusions**

This study set out with the following research question, “*to what extent does the further development of LLCEIs depend on the completeness and coherence of the strategies and roles employed by intermediaries?*”

As a first step to answering the research question, we determined that the support LLCEIs require to further develop is threefold: the need for capacity building and embedding, the alleviation of barriers, and opening up the regime for the acceptance and uptake of LLCEIs. The literature suggests that intermediaries can have a crucial role in furthering the development of LLCEIs. However, having determined the absence of an analytical framework that effectively synthesizes the support requirements of LLCEIs with the supportive work of intermediaries, we developed a comprehensive analytical framework with the main proposition that the completeness and coherence of the strategies and roles employed by intermediaries encourages the development of LLCEIs by successfully addressing their needs. In our effort to make sense out of the sheer variation in the work of intermediaries supporting LLCEIs, we used four theoretical perspectives, of which some have hitherto not been associated with community energy: endogenous development, business incubator, asset-based community development, and strategic niche management. The combination of these four perspectives helps to understand the underlying rationale and assumptions of the support provided to LLCEIs. The results of the analysis suggest the utility of this novel take on intermediary support for LLCEIs as our framework appears to withstand the test of empirical assessment in the evaluation of the case of Fryslân. The results of the analysis show that the four strategies all permeate the various roles that we have distinguished.

To build the capacities of LLCEIs, intermediaries assume a facilitating role by providing knowledge and guidance, augmenting skills, establishing social networks, fostering learning, assisting with fundraising and coaching of individual LLCEIs. Furthermore, intermediaries aggregate experiences and lessons, and translate these in standardized templates and toolkits. In terms of embedding, we observed various activities related to a configuring role, in which intermediaries developed business models and concepts to embed LLCEIs in their communities. With regard to alleviating barriers, intermediaries assume a brokering role, advocating and lobbying for policy reform, linking LLCEIs with existing policy and institutional frameworks, and functioning as a representative for the LLCEIs. To foster the uptake of LLCEIs by the regime, intermediaries create institutional infrastructures, configure LLCEIs by scaling up LLCEIs for getting investment capital, and employ a framing and coordinating role to articulate market demand, frame discourses and debates and coordinate the innovation processes involved.

The completeness of the strategies and roles effectively addresses the multiple aspects that underlie further development of LLCEIs. Furthermore, we observed that as the number of LLCEIs increased, so did the overall coherence of the support provided by intermediaries. The different intermediary actors started institutionalizing their collaborative activities, ensuring that the various aspects that pertain to the successful support of LLCEIs were integrated in a comprehensive support structure. This support structure has provided more focus to the LLCEIs by enabling membership of an umbrella cooperative that represents the movement and which links them to their regional energy supplier. Moreover, the core values of LLCEIs are captured by creating

a specific guarantee of origin for LLCEIs. At the surface, however, this coherence appears to be contrasted with the ambiguity that we observed between the aim to serve local socio-economic needs (representing an internally oriented niche and strategies of endogenous and asset-based community development) and the activities directed at further opening up the regime for the uptake of LLCEIs (indicating processes of strategic niche management). Nevertheless, we argue that this can be explained by theories of multi-level or polycentric governance since intermediaries engage with other actors and perform activities within and across various arenas to secure the (local) interests of LLCEIs.

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# Chapter 5

**Modes of Governing and Policy of Subnational Governments Supporting LLCEIs**

**Abstract:** Recent scholarly attention shows increasing involvement of local low-carbon energy initiatives (LLCEIs) in governance and policy, in particular in relation to innovations regarding low-carbon energy and energy efficiency. The future perspective of active citizenship in the production of locally generated low-carbon energy is largely dependent on the existing institutional and policy frameworks and settings. Subnational governments, in particular, can have a prominent role in this process by engaging in institutional adaptation and policy innovation. The central research question of this paper is: In what ways do local and regional governments innovate in governing to respond to the emergence of LLCEIs? The research question is answered by comparing two case studies: the Dutch regions of Overijssel and Fryslân. We have conceptualized a meta-governing approach of experimentation, characterizing the innovations in governing that emerge when governments respond to the emergence of LLCEIs. We specifically focus on two capacities that subnational governments can use to enhance their governing capacity vis-à-vis LLCEIs and which substantiate the experimental meta-governance mode: institutional adaptation and policy innovation. We then formulated hypotheses that specify the expected policy innovations and institutional adaptations employed vis-à-vis LLCEIs. Data collection involved in-depth interviews and use of secondary data. The results show that a balancing process of authoritative and enabling modes of governing particularly characterized the type of policy innovations that were developed and the institutional adaptations that took place. Both provinces govern LLCEIs at arm's length and issue significant capacity-building strategies that vary in terms of their conditions. Municipalities, however, incline towards impromptu and opportunistic responses, some of them having lasting effects by patching up existing institutional settings, others having more of an episodic character. The results will further the understanding of subnational low-carbon policy and governance innovation processes vis-à-vis the role of LLCEIs.

This chapter is based on Warbroek, B., & Hoppe, T. (2017). Modes of governing and policy of local and regional governments supporting local low-carbon energy initiatives; exploring the cases of the Dutch regions of Overijssel and Fryslân. *Sustainability*, 9(1), 75.

## 5.1 Introduction

Over the past decades, local low-carbon energy initiatives (LLCEIs) have proliferated across Western-European countries. Countries such as Denmark and Germany have shown how LLCEIs shaped the organization and structure of the energy system in favor of extended civil involvement and ownership. The Danish wind energy cooperatives and community district heating projects proliferated from the 1970s onwards. German wind energy cooperatives emerged in the 1980s and were followed up by solar energy cooperatives and local utility companies partially owned by citizens in the first decade of the new millennium. The Netherlands also witnessed the development of LLCEIs in the shape of wind energy foundations and cooperatives in the late 1980s and early 1990s (25 initiatives in total; Agterbosch, 2006; Schwencke, 2015)). These LLCEIs sprung from anti-nuclear and pro-environmental sentiments (Oteman, Wiering, & Helderma, 2014; Agterbosch, 2006) and typically (used to) exploit one or more collectively owned wind turbines. This surfacing of LLCEIs in the Netherlands, however, did not evolve in the same way as it did in Denmark or Germany. Nonetheless, in recent years, the Netherlands has known a strong upsurge of a ‘new style’ of LLCEIs distinct from the first wave in the Netherlands (Oteman *et al.*, 2014). ‘New style’ LLCEIs deploy a range of mechanisms with the objective of enhancing sustainability in their localities. They typically pursue the local production of low-carbon energy in collective ways, aim to supply low-carbon energy to their members, promote energy savings, and disseminate information and give advice on low-carbon energy technology and energy efficient equipment (Boon & Dieperink, 2014; Oteman *et al.*, 2014). After 2010, there was a steep increase in the number of LLCEIs, from little over 20 energy cooperatives in 2011 to 201 energy cooperatives in 2015 (Schwencke, 2015). Often still in their developmental phase, they strive to formulate feasible business models and achieve a degree of professionalization in order to realize their ambitions.

Alluding to the fundamental role of civil society in governance for sustainable development and climate change mitigation (e.g. Meadowcroft, 2007), LLCEIs struggle to become a viable alternative for the existing socio-technical configurations of current energy systems which favor large-scale, centralized energy production, distribution and supply by traditional, incumbent energy sector actors. Amidst these tensions, it is, in particular, subnational governments that have a key role in shaping the playing field and enabling the development of LLCEIs (Bakker, Denters, Oude Vrielink, & Klok, 2012; Burch, Shaw, Dale, & Robinson, 2014; Chmutina & Goodier, 2014; Hamilton, Mayne, Parag, & Bergman, 2014; Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015; Hufen & Koppenjan, 2015; Kellett, 2007; Rabe, 2007; van der Schoor & Scholtens, 2015; Wade, Hamilton, Eyre, & Parag, 2013). Subnational governments are commonly the first venue LLCEIs resort to for support (e.g., seeking assistance in permit procedures, financial support or capacity building). Furthermore, the prominent role of subnational governments is evident since they are more accessible (Hufen & Koppenjan, 2015), better attuned to local needs than national level actors (Mulugetta, Jackson, & van der Horst, 2010), and able to reconcile national top-down policy drivers and bottom-up drivers of community energy groups (Wade *et al.*, 2013).

In contrast to local governments, the national government is more involved in providing a stable and supportive policy framework for LLCEIs (Bomberg & McEwen, 2012; Hamilton *et al.*, 2014; Hufen & Koppenjan, 2015; Oteman *et al.*, 2014). However, many scholars have suggested that civil involvement in the administrative environment is prone to uncertainties and ambiguities (Adams & Hess, 2001; Brownill & Carpenter, 2009; Head, 2007; Lowndes & Sullivan, 2008; Swyngedouw, 2005; Voorberg, Bekkers, & Tummers, 2015). In consolidation with the challenge to escape ‘carbon lock-in’ (Unruh, 2002), scholars have argued for the importance of innovation in the governing of climate change mitigation (Castán & Bulkeley, 2013; Bulkeley & Castán Broto, 2013; Castán Broto & Bulkeley, 2013; Jordan & Huitema, 2014b, 2014c). It is against this backdrop that we are interested in how local and regional governments exactly respond to the proliferation of LLCEIs. On that premise, this paper seeks to analyze policy and institutional dynamics directed at LLCEIs on a subnational administrative level in order to gain insights into the characteristics of the innovations in governing that emerge. The central research question in this paper therefore is:

*In what ways do local and regional governments in the Dutch regions of Overijssel and Fryslân innovate in governing to respond to the emergence of LLCEIs?*

The cases studied in this article – the Dutch regions of Overijssel and Fryslân, and the regional and local governments they embed – are not representative for all (Dutch) subnational governments engaging with LLCEIs, but serve to test a number of hypotheses concerning how they innovate in governing (cf. Yin, 2009). In doing so, we use the cases to reflect and elaborate on a theoretical framework in order to distillate suggestions for future research. The theoretical framework used in this paper synthesizes notions on institutional adaptations and policy innovations that are expected to occur. They are used to elucidate how they are characterized by a balancing process of enabling and more authoritative modes of governing. In this regard, we draw on Jordan and Huitema’s recently introduced conceptual framework on policy innovation (Jordan & Huitema, 2014b, 2014c, 2014a), notions of institutional adaptation (Genschel, 1997; Lanzara, 1998; Streeck & Thelen, 2005; Thelen, 2004), and Bulkeley and Kerns’ modes of ‘governing through enabling’ and ‘governing by authority’ (Bulkeley & Kern, 2006). We stress that despite increasing scholarly attention to LLCEIs, the concepts and theoretical notions that we use in this paper have not been used in research on LLCEIs, thus reiterating the relevance of this academic endeavor.

The paper is structured as follows. In Section 5.2, we present the theoretical background of the paper and subsequently formulate an analytical framework. In this section, we also conceptualize LLCEIs, discuss their role in low-carbon energy transitions and argue that (subnational) governments are central players within this setting. The research approach and methodology is discussed in Section 5.3. The two case studies are presented in Section 5.4, as well as the results of the (comparative) analysis. In Section 5.5, the results of the analysis are discussed and

in Section 5.6 a conclusion is drawn. We finalize the paper by providing suggestions for future research.

## **5.2 Theoretical Framework and Conceptual Background**

### *5.2.1 Conceptualizing Local Low-Carbon Energy Initiatives*

We refer to Local Low-Carbon Energy Initiatives as the bottom-up initiating and managing of a project or series of projects involving the generation, stimulation and/or facilitation of low-carbon energy and/or energy efficiency by citizens/actors from civil society on a local scale. In this regard, LLCEIs are interpreted as ‘self-organization’ initiatives in the context of low-carbon energy transitions (Boonstra & Boelens, 2011; Edelenbos, van Meerkerk, & Koppenjan, 2016; Nederhand, Bekkers, & Voorberg, 2016; van Meerkerk, Boonstra, & Edelenbos, 2013). ‘Local’ is referred to as low-carbon energy technology being either at individual household-level (e.g., lighting bulbs, weather-strips, advice on energy-saving measures on appliances, water-use, heating us, roof-based solar photovoltaic (PV) panels, insulation measures) or meso-level (collectively owned low-carbon energy installations) (Walker & Cass, 2007). Additionally, local refers to the ‘situatedness’ of the actors that participate in a meaningful way (Devine-wright & Wiersma, 2013). This situatedness is circumscribed by Cox’ spaces of dependence’ which are “those more-or-less localized social relations upon which we depend for the realization of essential interests and for which there are no substitutes elsewhere; they define place-specific conditions for the material wellbeing of people and their sense of significance” (Cox, 1998, p. 2).

LLCEIs are locally dependent in that their “primary interest is in defending or enhancing the flow of value through a specific locality: the territory that defines a geographically circumscribed context of exchange relations critical to their reproduction”. In this paper, we explicitly omit the term ‘community low-carbon energy’ – a term commonly used in the literature to describe LLCEIs – since ‘community’ used in this sense tends to ‘conflate the project (that is the ‘community’ low-carbon energy project) itself with the community it is embedded in’. The sole concept ‘community’ leaves indistinct the scalar and spatial configurations and politics involved and implies that community low-carbon energy as such involves, to a significant degree, a collective and inclusive endeavor (cf. Walker, 2011). In contrast to Becker and Kunze’s (2014) suggestion to abandon the ‘local’ in conceptualizing LLCEIs to include non-local and participatory public projects, we reiterate the local character of LLCEIs in order to account for (non-) politically motivated LLCEIs that resemble ‘simple’ niches (Seyfang & Smith, 2007) that do not seek to transcend the local scale.

### *5.2.2 The Role of LLCEIs in Governing Low-Carbon Energy Transitions*

In light of climate change mitigation and carbon reduction goals, LLCEIs are potential vehicles to implement distributed generation (Arentsen & Bellekom, 2014). Distributed



generation holds the promise of a lower need for investments in expensive transportation and distribution infrastructures (Hoff, Wenger, & Farmer, 1996; Pepermans, Driesen, Haeseldonckx, Belmans, & D'haeseleer, 2005; van der Vleuten & Raven, 2006; Koepfel, 2003). Motives for distributed generation achieved specifically through LLCEIs include environmental (e.g., carbon reduction, energy saving); economic (lower energy bill, local economic regeneration, job creation); and social drivers (community cohesion, social and civic gratification) (Arentsen & Bellekom, 2014; Bomberg & McEwen, 2012; Boon & Dieperink, 2014; Dóci & Vasileiadou, 2015; Hoffman & High-Pippert, 2010; Rogers, Simmons, Convery, & Weatherall, 2008; Seyfang, Park, & Smith, 2013; van der Schoor & Scholtens, 2015). Furthermore, LLCEIs enable the involvement of the local public in the development process and the impact of low-carbon energy installations, which have been suggested to positively affect the acceptance of such projects (Agterbosch, Meertens, & Vermeulen, 2009; Cowell, Bristow, & Munday, 2011; Gross, 2007; Musall & Kuik, 2011; Ruggiero, Onkila, & Kuittinen, 2014; Toke, Breukers, & Wolsink, 2008; Warren & McFadyen, 2010; Wolsink, 2007). In order to conceptualize the role of LLCEIs in the development, ownership and operation of the energy system, we refer to Watson's (2004) 'co-provision'. This means "the provision (including generation, treatment, distribution and consumption) of utility services by a range of new intermediaries (e.g., consumers themselves, other organizations or sub-networks), alongside or intermingled with centrally provided services (e.g., public networks or grid-provision)" (Sauter & Watson, 2007; Watson, 2004, p. 1983). We interpret co-provision as ensuing through the self-organizing processes of LLCEIs. Such processes are the cornerstone of social innovation because LLCEIs develop new strategies and practices that meet social goals and in the long term have the potential to change the organizational arrangements and socio-technical structure of the energy system in favor of extended end-user involvement (Dóci, Vasileiadou, & Petersen, 2015; Geelen, Reinders, & Keyson, 2013; Mitlin, 2008; Schoor, Lente, Scholtens, & Peine, 2016; Seyfang & Smith, 2007; Voorberg *et al.*, 2015). That being said, we use the term co-provision since "local innovations – that is LLCEIs – are likely to remain a niche in the dominant central station electricity system" (Arentsen & Bellekom, 2014, p. 10).

### 5.2.3 *The Role of Government in Harnessing the Potential of LLCEIs*

However, realizing a socially innovative distributed energy system through a so-called 'Thousand Flowers Blooming' pathway (Foxon, 2013; Seyfang *et al.*, 2013), or 'civic energy sector' (Johnson & Hall, 2014), implies a clash with existing energy regimes and policy domains. Traditional actors – often called 'incumbents' – typically dominate the existing playing field, which favors corporate ownership and centralized, large-scale energy generation, supply and distribution over decentralized pathways and impedes the development of LLCEIs (Arentsen & Bellekom, 2014; Bauwens, Gotchev, & Holstenkamp, 2016; Bergman & Eyre, 2011; Foxon, 2013; Kellett, 2007; Magnani & Osti, 2016; Nolden, 2013; Oteman *et al.*, 2014). This leads to 'carbon lock-in' (Unruh, 2000) in the domestic energy system in which incumbent actors only seek to optimize current systems through incremental change. At the same time, they develop defense and cooptation mechanisms to protect the system (and hence, their own

interests) against potential market intruders (Forrest & Wiek, 2015; Fuchs & Hinderer, 2014; Geels, 2002). As a consequence, they create persistent market and policy failures that block system and market entry by newcomers such as LLCEIs (Bergman *et al.*, 2009). This institutional lock-in inhibits system innovation that allows for the diffusion of low-carbon energy and distributed generation (Hamilton *et al.*, 2014; Mulugetta *et al.*, 2010; Nadaï *et al.*, 2015; Smith, Stirling, & Berkhout, 2005; Wolsink, 2012). To LLCEIs this results in problems related to uncertainties regarding policy developments, grid connection, market access and contracting, and financing (Nadaï *et al.*, 2015; Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014; Uyterlinde *et al.*, 2002).

These barriers predominantly relate to socio-political acceptance by key stakeholders and policy makers of institutional changes and policies needed for distributed generation (Wolsink, 2012). Various authors suggested that it is, in particular, subnational governments that have a key role in addressing these issues and preventing that LLCEIs remain at the niche level – operating at the margins of the energy system (Foxon, 2013; Thomas Hoppe *et al.*, 2015; Magnani & Osti, 2016; Markantoni, 2016; Peters, Fudge, & Sinclair, 2010; Rogers *et al.*, 2008; Wade *et al.*, 2013). In other words, the future perspective of LLCEIs and their role in the energy system depend on the extent to which self-organizing processes of social innovation and co-provision are facilitated and guided by governments rather than through the exercise of governance (i.e., by non-governmental actors) alone (Burch *et al.*, 2014; Evans, Joas, Sundback, & Theobald, 2006; González & Healey, 2005; Hajer, 2011; Hawkins & Wang, 2012; Schoor *et al.*, 2016; Swyngedouw, 2005). State institutions and traditional forms of political authority persist and are still central in governance (Bell, Hindmoor, & Mols, 2010; Goetz, 2008; Hill & Lynn, 2005; Meadowcroft, 2007; Pierre & Peters, 2000). Bell *et al.* (2010) hold that within this context, governments are experimenting with new ways of governing that require the involvement of non-state actors. In this regard, governments are extensively involved in the self-organization of governance networks and selecting a balance between direct imperative coordination and indirect orchestration; this is known as a process of ‘meta-governance’ (Jessop, 1997, 2002; Somerville, 2005; Sørensen & Torfing, 2016; Sørensen & Torfing, 2009). In this sense, meta-governance refers to the strategic activities of government in relation to governance (Somerville, 2005). It is important to emphasize that we apply an approach (originating in the public administration discipline) having a government-oriented perspective (i.e., role played by government in governing governance), as opposed to a society-centered perspective (i.e., on roles played by non-state actors in governance mechanisms; e.g., self-governance by citizen-led organizations) to study the innovations that occur in governing arrangements in response to LLCEIs evolving.

Accordingly, we differentiate between two modes of governing that can be employed by governments as a response to LLCEIs: (i) governing through enabling and (ii) governing by authority (Bulkeley & Kern, 2006). These two modes of governing represent the balancing process involved in meta-governance; governing by authority involves directive and regulative activities; governing through enabling entails coordinative and facilitative activities. The two modes of governing will be discussed below.

### 5.2.4 *Enabling and Authoritative Modes of Governing*

Confronting “wicked” problems such as climate change mitigation in an age of austerity and against the backdrop of a reinterpretation of the government–citizen relationship generates complex challenges and institutional ambivalence for local governments that endeavor to create the capacity to govern amidst these developments (Anguelovski & Carmin, 2011; Bulkeley & Kern, 2006; Coaffee & Healey, 2003; Hajer, 2003; Swyngedouw, 2005; Wade *et al.*, 2013). Several authors have developed theories and conceptual models to substantiate governance arrangements that harness bottom-up civic action and facilitate action on climate change mitigation in collaboration with a range of stakeholders (Bulkeley & Kern, 2006; Evans *et al.*, 2006; Hajer, 2011; Hawkins & Wang, 2012). In this sense, Hoppe *et al.* (2014, p. 13) state that, “the future outlook of local governments involves a retrenchment to a ‘supportive role’ vis-à-vis public service delivery in general and climate change mitigation policy in particular”.

Bulkeley and Kern’s (2006) ‘governing through enabling’ mode characterizes such a supportive role as an approach for local governments to engage in climate change mitigation (see also Hamilton *et al.*, 2014; Mayne, Hamilton, & Lucas, 2013; Wade *et al.*, 2013). This particular mode of governing refers to the ability of local government to govern through various forms of partnerships and community engagement by means of employing ‘soft’ promotional, facilitative, coordinative and encouraging governing activities to spur climate change action by other actors. Mey *et al.* (2016, p. 40) further substantiated the different ways local governments can engage with the local public under an enabling mode of governing. However, the authors limit their description of local governments that engage with LLCEIs with one type of role: catalysts and supporters. This type of engagement refers to local governments providing funding, administrative support, and physical space to LLCEIs. This enabling approach overlaps with what Sørensen (2006) refers to as a ‘hands-on support and facilitation’ exercise of meta-governance – or network management (Sørensen & Torfing, 2009).

An enabling mode of governing may provide local governments with a means to surpass the formal boundaries of their authority and allows them to put to use new forms of resources and collaborate with relevant actors (Bulkeley, 2005; Dowling, McGuirk, & Bulkeley, 2013; McGuirk, Dowling, & Bulkeley, 2014). However, several authors have argued for the continued importance of an authoritative and leadership role of governments in effectuating climate change action even in the context of developing innovative forms of governing (Bulkeley & Schroeder, 2008; Bulkeley & Kern, 2006; Evans *et al.*, 2006; Gunningham, 2011; Jordan, Wurzel, & Zito, 2013; Markantoni, 2016). In contrast to the ‘softer’ instruments used through enabling, an authoritative mode of governing ensues by means of regulations, rules, permitting, planning requirements, and compulsory economic instruments (Bulkeley & Schroeder, 2008; Bulkeley & Kern, 2006). In particular, this approach is important to guard against coordination and distribution failures (Baker & Mehmood, 2013;

Johnson & Hall, 2014). This governing by controlling mode overlaps with Sørensen and Torfings (2009) network design (or structuration), in which government decides on the rules of the game, and thus can be termed ‘network governance in the shadow of hierarchy’ (Scharpf, 1994). These rules of the game may involve inter alia the access of actors, decision-making rules, power and rights of the actors, and institutional procedures of the networks e.g., (Bakker *et al.*, 2012; Sørensen & Torfing, 2009; Ostrom, 2009).

### 5.2.5 *The Need for Experimental Meta-Governance*

However, striking a balance between the two modes of governing appears to be insufficient in coping with bottom-up civic action and climate change mitigation. In this regard, a vast body of literature has suggested that innovation in governance is necessary to allow for extended civic/end-user involvement in the administrative environment, in energy systems, and to spur socially innovative and self-organizing initiatives e.g., (Coaffee & Healey, 2003; Edelenbos *et al.*, 2016; Foxon, 2013; Fung & Wright, 2001; González & Healey, 2005; Johnson & Hall, 2014; Jones, 2003; Swyngedouw, 2005; Taylor, 2007). Furthermore, in light of the challenge to escape carbon lock-in (Unruh, 2002), scholars increasingly argue for a governing approach that fosters innovation and experimentation in governing activities for climate change mitigation at different levels and scales (Boyd & Ghosh, 2013; Broto & Bulkeley, 2013; Bulkeley & Castán Broto, 2013; Castán Broto & Bulkeley, 2013; Dowling *et al.*, 2013; Gordon, 2013; Jordan & Huitema, 2014c; McGuirk, Dowling, Brennan, & Bulkeley, 2015; Van der Heijden, 2016). According to Bulkeley and Castán Broto, ‘climate change experiments’ signify “purposive interventions in which there is a more or less explicit attempt to innovate, learn or gain experience” (2013, p. 363) “in order to reconfigure one or more socio-technical system for specific ends and where the purpose is to reduce greenhouse gases or adapt to climate change” (2013, p. 368).

Instead of experiments taking place at the margins of the system, experiments are central in coordinating and engaging in climate change action. This can be read as a form of meta-governance mode that emerges from the governing activities that proactively enable and steer LLCEIs via experimental methods such as policy innovations and institutional adaptations. We therefore argue that this meta-governance approach should be regarded in light of balancing the two modes of governing as described above. As such, the types of policy innovations and institutional adaptations that occur are characterized by this process as well. That being said, this approach can be worthwhile to analyze the ‘certain degree of unease’ (Schoor *et al.*, 2016, p. 101) that exists between LLCEIs and subnational governments especially since the latter have a key role in enabling the development of LLCEIs (Burch *et al.*, 2014; Chmutina & Goodier, 2014; Thomas Hoppe *et al.*, 2015; Kellett, 2007; Mey *et al.*, 2016; Wade *et al.*, 2013). Therefore, in this paper, we focus on two capacities that subnational governments can use to enhance their governing capacity vis-à-vis LLCEIs and which substantiate the experimental meta-governance mode: (i) institutional adaptation and (ii) policy innovation. This will help in analyzing the institutional dynamics and

policies that occur in determining the socio-political acceptance of co-provision through LLCEIs. Such acceptance is crucial in low-carbon energy deployment (Wolsink, 2012; Wüstenhagen, Wolsink, & Bürer, 2007).

### *5.2.6 The Role of Institutional Adaptation*

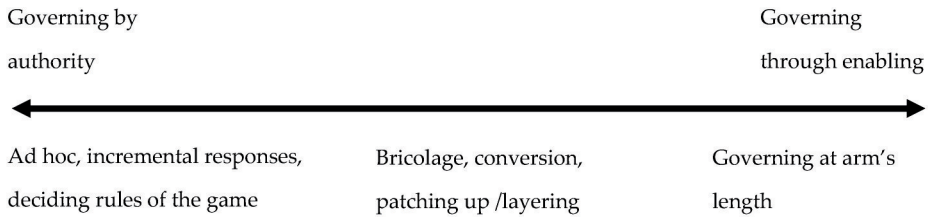
There is a vast body of academic literature that recognizes the importance of the institutional dimension in investigating patterns of change and stability within local governance (Coaffee & Healey, 2003; Geddes, 2006; González & Healey, 2005; Lowndes & Wilson, 2001, 2003). Accordingly, studies have shown that the institutional dimension is very important when addressing (local) governance of low-carbon energy transitions (Andrews-Speed, 2016; Betsill, 2001; Lockwood, Kuzemko, Mitchell, & Hoggett, 2016; Martins & Ferreira, 2011; Moss, Becker, & Naumann, 2014; Schreurs, 2008). The relevance of including the institutional dimension in the analysis is further confirmed by the sheer fact that LLCEIs represent a new type of actor that engenders co-provision and enters the policy domains of energy and climate change mitigation in a way ('bottom-up') that challenges conventional institutional arrangements and questions the early modern liberal-democratic separation between civil-society, market, and state. In other words, LLCEIs promote institutional change. Here, institutions are understood as "the rules of the game in a society, or, more formally, are the humanly devised constraints that shape human interaction" (North, 1990, p. 3). Hence, when analyzing institutions, one focuses on the interaction between the structuring dynamics of institutions and the micro-politics of interactions between political actors (i.e., governments, LLCEIs, intermediary actors). That being said, the analysis seeks to assess how institutions adapt, as a specific model of institutional change (Hargrave & Ven, 2006) through the innovative activities employed by governments vis-à-vis LLCEIs. In this regard, policy instruments or policy innovations employed by governments may act as 'game changers' effectuating a change in the institutional landscape and action arenas at the local level (Lammers & Heldeweg, 2016; McDonnell & Elmore, 1987).

The transformation of institutions tends to be a 'sticky' and 'overwhelmingly incremental' process (North, 1990, p. 89). In her influential book *How Institutions Evolve*, Thelen (2004) argues that students of institutional change ought to focus on endogenous mechanisms and incremental patterns of change, instead of critical junctures in which exogenous shocks bring about path-dependent transformations (i.e., 'punctuated equilibrium'). Taking into consideration the general trend towards state retrenchment and powerful sources of institutional inertia involving vexing uncertainties about institutional alternatives; sunk costs related to existing institutions; and political conflict arising from proponents of the status quo that oppose new institutions (Lanzara, 1998), it is expected that institutional change will be limited to ad hoc or episodic adaptations. We argue that such ad hoc and reactive adaptations should be seen in light of the influence of an authoritative mode of governing and therefore remain at the level of specific episodes of interaction (Coaffee & Healey,

2003). This entails that ‘rules of the game’ are adapted incidentally in a specific project or situation (Lammers & Heldeweg, 2016).

A case study conducted by Lowndes and McCaughie (2013) showed that local governments reinvent their institutional forms by “re-using and recombining available organizational and institutional components” to serve new purposes; a process also known as institutional ‘bricolage’ (Lanzara, 1998, p. 27). Thelen (2004) uses the term ‘conversion’. It can be viewed as a way of innovating and dealing with complexity in order to respond to new challenges. Additionally, ‘patching up’, or ‘layering’ (Streck & Thelen, 2005; Thelen, 2004) involve leaving intact the basic set up of institutional arrangements and remedially supplementing it with new structures and relieving specific bottlenecks and deficiencies (Genschel, 1997, p. 53). Therefore, patching up and institutional bricolage seem to be acceptable mechanisms for institutional adaptation since they are less prone to political conflict, uncertainty and high initial set-up costs (Genschel, 1997; Pierson, 1993). This explains the ‘surprising’ absence of radical new ideas and overt political conflict observed by Lowndes and McCaughie (2013, p. 533) in governments redesigning institutions by means of such adaptive mechanisms. Therefore, institutional bricolage and patching up existing institutions resemble a combination of authoritative (i.e., leaving intact the basic institutional set up, using existing institutions) and enabling (serving new purposes, relieving bottlenecks) modes of governing and are therefore expected to occur.

Lastly, given the time-span involved concerning the emergence of LLCEIs (e.g., in the Netherlands) and thereby the sticky process of institutional change, we expect to observe, at most, that institutional adaptation ensues via governing at arm’s length when ‘governing through enabling’ modes are applied. This entails that governments pro-actively transfer agency, competences and responsibility to other (non-state) actors such as LLCEIs or so-called ‘intermediaries’. Meadowcroft suggests that governments may create new (semi-) autonomous actors who can promote change, or transfer functions from the core of government to such actors operating at arm’s length (2007, p. 311). With respect to governance of low-carbon energy transitions in general and LLCEIs in particular, this refers to the creation of intermediaries, which are actors that function as boundary organizations and spur niche development e.g., (Backhaus, 2010; Bird & Barnes, 2014; Hargreaves, Hielscher, Seyfang, & Smith, 2013; Kivimaa, 2014; Moss, 2009; Parag, Hamilton, White, & Hogan, 2013). Figure 5.1 displays the continuum of governing modes juxtaposed with analytical touchstone variations in institutional adaptation and heralds three hypotheses concerning institutional adaptation vis-à-vis LLCEIs. Firstly, institutional adaptation characterized by governing by authority is expected to take shape by means of ad hoc and incremental responses. Secondly, institutional adaptation characterized by both governing through enabling and governing by authority is expected to take shape by means of bricolage and patching up existing institutions. Lastly, we expect that institutional adaptation characterized by governing through enabling will take shape by means of governing at arm’s length.



**Figure 5.1.**

Continuum of governing modes juxtaposed with variations in institutional adaptation.

### 5.2.7 Policy Innovation

In addition to institutional adaptation, policy instruments prove to be useful indicators to differentiate between new modes of governance and old forms of government (Jordan, Wurzel, & Zito, 2005). Jordan and Huitema's recently introduced conceptual framework on policy innovations functions as a point of departure to help in thinking systematically about what changes in policy may be considered 'innovative' (Jordan & Huitema, 2014b, 2014c, 2014a). In view of this, Jordan and Huitema argue that one should not overlook the capacity of nation-states to close governance gaps by means of engaging in policy innovation. The authors have compiled the conceptual debate on policy innovation and distinguish between three aspects to which innovation can refer: (i) to the novelty of emerging policies; (ii) to the extensive diffusion of such policies; (iii) and to their effects (Jordan & Huitema, 2014c, p. 389).

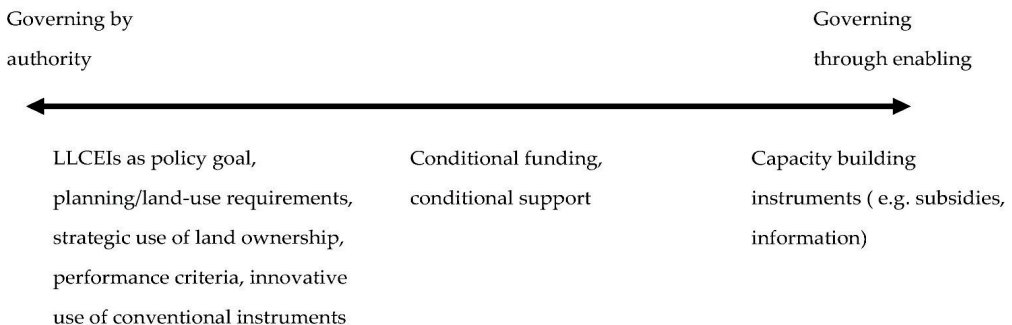
In this paper, when mentioning policy innovation, we mostly address policy invention. Policy invention, in our view, is the extent to which the 'new' policy (or elements therein) adds to or departs from the pre-existing policy mix brought to use in a particular policy domain, by a particular unit of government, in a specific country. Whereas Jordan and Huitema refer to this aspect (next to two other aspects) as a threshold to determine the effects of policy innovation, we contend that this definition of policy invention will assist to alleviate the overlap between the three dimensions of policy innovation. Additionally, our definition deals with the 'acid test' for policy invention that is unlikely to be met, namely: that the policy is new to all adopting agents in the world.

Policy innovations with an authoritative character would involve inter alia planning requirements that embed civil ownership in low-carbon energy developments, strategic land-use planning and using land ownership to support LLCEIs' activities, or formulating performance criteria for LLCEIs (Smedby & Quitzau, 2016). Such authoritative mechanisms are not to be employed by threat of sanction (Bulkeley & Kern, 2006), but should be interpreted in the sense that they structure the network of

LLCEIs and support LLCEIs by making innovative use of conventional instruments. Policy innovations that resemble a combination of enabling and authoritative modes of governing are ones that are characterized by conditions and criteria that have to be met before LLCEIs receive support or funding and are expected to produce tangible, proximate outcomes (e.g. Creamer, 2015; Johnson & Hall, 2014; McDonnell & Elmore, 1987). In this sense, governments retain a degree of control through conditional funding and economic instruments and are likely to employ reporting requirements (Baker & Mehmood, 2013; Head, 2005; Head, 2007).

Bulkeley and Kern’s governing through enabling (2006) and Mey and colleagues’ (2016) local government-LLCEI engagement provide initial insight into the policy inventions expected when governments recur to an enabling mode of governing: provision of financial incentives and subsidies, providing information, shaping policy goals and the delivery of infrastructures and services in partnership with LLCEIs (Bulkeley & Kern, 2006, p. 2249). These activities refer to an overall strategy of capacity building, considered crucial in the development of LLCEIs (Hargreaves *et al.*, 2013; Hoppe *et al.*, 2015; Seyfang *et al.*, 2014). Capacity building accepts more ambiguous and distant outcomes (McDonnell & Elmore, 1987).

Figure 5.2 presents the continuum of governing modes juxtaposed with variations in policy innovations and heralds three hypotheses concerning policy innovation vis-à-vis LLCEIs. Firstly, policy innovations that resemble an authoritative mode of governing are expected to take shape by means of planning and land-use requirements, strategic use of landownership and the introduction of performance criteria. Secondly, policy innovations characterized by a combination of both modes of governing are expected to take shape by means of conditional funding and support. Lastly, policy innovations that are characterized by an enabling mode of governing take shape by means of capacity building measures.



**Figure 5.2**  
Continuum of governing modes juxtaposed with variations in policy innovations.



## 5.3 Research design and Methodology

### 5.3.1 Research Design and Units of Analysis

The research approach concerns an embedded multiple cases study design comparing the Dutch regions of Fryslân and Overijssel (see Figure 5.3 for their geographical locations within the Netherlands). The case studies are used to test the descriptive hypotheses mentioned in Section 5.2. By testing descriptive hypotheses Yin means to use the hypotheses to direct (1) the purpose of the descriptive effort, (2) the full but realistic range of option that may be considered a “complete” description of what is to be studied, and (3) the likely topics that will be the essence of description (Yin, 2009, p. 36). Within the regional case studies, local case studies (of certain municipalities) are embedded (see Figures 5.4 and 5.5). In following Dutch constitutional law, the two regions of Fryslân and Overijssel are referred to as provinces; i.e, the Province of Overijssel and the Province of Fryslân. Both are located in the periphery of the country and consist predominantly of rural areas (which differs considerably from the densely populated ‘Randstad’ which forms the economic center of the Netherlands). Both Fryslân and Overijssel have a provincial government of their own and consist of multiple local governments. In the Netherlands, local governments are understood as municipalities. A municipality in the Netherlands is an administrative entity governed by the Municipal Council and the Mayor and Municipal Executive, which are in turn supported by the administrative apparatus. Municipalities in the Netherlands are the third layer of government (national and provincial government respectively being the first and second layers).



**Figure 5.3**  
Map of the Netherlands.



**Figure 5.4**

Map of embedded cases in Overijssel showing the municipalities and the LLCEIs in question.



**Figure 5.5**

Map of embedded cases in Fryslân showing the municipalities and the LLCEIs in question.

### 5.3.2 Case Selection

Both regions are considered rural and show resemblance in terms of their regional economy and problems that arise from regional demographic shrinkage.

Furthermore, both cases employ a relatively ambitious and progressive low-carbon climate policy (targeting energy efficiency and low-carbon energy), which also applies to having policies that target LLCEIs (Province of Overijssel, 2016a; Province of Fryslân, 2014). To a certain degree, this is related to both provincial governments having had a budgetary impetus following them selling their shares in (former regional) energy suppliers (such as Nuon and Essent), and next having decided to reinvest the accumulated capital to achieve ‘clean energy’ policy goals (which is however not unique among Dutch provincial governments). Furthermore, given that national government LLCEI policies and regulations do not differentiate between the twelve provinces, this puts provinces (and indirectly municipalities) in the Netherlands in principle in similar positions vis-à-vis LLCEIs to decide to develop policies in support of them (non-mandatory). When compared to other Dutch provinces, both Overijssel and Fryslân can be considered ‘early-majority adopters’ or even ‘frontrunners’ when it comes to having policies in place targeting LLCEIs (although peers such as North-Brabant and Gelderland may also classify; no late adopters were selected though). Hence the cases can be considered extreme cases, and important lessons might be retrieved from analyzing them that could potentially be of interest in terms of being best practices and for generating new hypotheses (Gerring, 2007).

### *5.3.3 Data Collection*

Data collection involved 12 semi-structured interviews for the Frisian case, and 20 interviews for the Overijssel case. Interviewees involved LLCEI members, municipal civil servants, provincial civil servants, but also experts from other stakeholders such as distribution system operators. Interview data were bolstered with secondary data (i.e., policy documents, minutes of council meetings, minutes of LLCEI meetings, communications, online articles, site visits, project workshops, and ongoing personal contacts with field experts and LLCEI members) and participant observation (during meetings). Interviews were conducted face-to-face and in addition follow-up questions were raised and addressed by respondents via e-mail. Data were collected in multiple projects, including EU-Horizon 2020 projects, a national research agency project (NWO), regional research projects, PhD projects, four MSc thesis projects, commissioned research by national government, commissioned research by regional government, workshops (by the province, the university), and two Master’s courses in which students worked on projects collecting data and giving advice to LLCEIs (i.e., conducting case study research and presenting business cases to them).

### *5.3.4 Data Analysis*

Data analysis concerned analyzing the collected primary and secondary data, and constructing (embedded) case study narratives of both the Fryslân and Overijssel regions. This process was conducted by the two authors of this paper, who have been following developments on LLCEIs and relevant policies in the two regions for four years, and have actively engaged with key stakeholders and experts ever since.

Once ready, an analytical reflection of the two case study narratives was conducted using the conceptual notions discussed in Section 5.2 (in particular, those mentioned in Figures 5.1 and 5.2). In doing so, we will look into which policy innovations and institutional adaptations arise in practice and how these resonate with the balancing of the two patterns of governing. Additionally, we determine the similarities and differences between the two cases by using the analytical concepts found in Figures 5.1 and 5.2 (Section 5.2). Subsequently, we will address the implications that follow from the analysis in terms of governing sustainability transitions; thus, furthering understanding of the role and impact of LLCEIs in energy transitions, and governmental responses to them.

### *5.3.5 Limitations*

Despite the careful selection of the case studies, the reader should notice that the results of this study cannot easily be generalized to other regions for the two cases can be considered frontrunners or early majority adopters of policies targeting LLCEIs. Nonetheless, emerging patterns and best practices might allow for conceptual elaboration and theoretical generalization.

## **5.4 Results**

This section addresses experiences and practices with government policies directed at LLCEIs. First, however, the roles and functions of provinces and municipalities in the Dutch context are presented. Second, the two case studies are presented. Per case – Fryslân and Overijssel – attention is paid to both the provincial government and municipalities responding to the emergence of LLCEIs.

### *5.4.1 Provincial Governments and Municipalities in the Netherlands*

In the Netherlands, provincial governments are primarily responsible for spatial planning, regional economy, agriculture, infrastructure and transport. Apart from national obligations for siting large-scale wind energy developments, provincial governments' ambitions regarding energy policy and climate change mitigation are voluntary. Municipalities are responsible for housing, land-use plans and regulations, local infrastructure. Furthermore, both provincial governments and municipalities have the statutory obligation to enact specific tasks under the Law on Environmental Management (LEM), specifically having to renew their environmental policy every four years. Both municipalities and provincial governments have varying responsibilities for inter alia air, water and ground quality, environmental permits, environmental quality and impact. Municipalities have the task of municipal waste management. Although both provincial governments and municipalities run environmental policy, this typically concerns traditional command and control, regulatory policy (e.g. Bressers & de Bruijn, 2005; Hoppe & Coenen, 2011). Similar to provincial government, municipalities have significant discretion in determining their goals regarding energy and climate change mitigation (Coenen & Menkveld, 2002).

That being said, provincial governments and municipalities have legal and administrative leeway in determining how and to what extent they respond to LLCEIs by means of innovation in governing.

#### *5.4.2. The Case of Overijssel*

##### *5.4.2.1. The Provincial Government*

As per 2009, the Province of Overijssel has been active in supporting LLCEIs. The strategy deployed by the Province of Overijssel focused on: (i) providing incentives to support LLCEIS; and (ii) support of LLCEIs by communicative means. Incentives are foremost subsidy schemes. First, in 2009 and 2010, the Province initiated a competition – ‘Sustainable Village’ – in which villages that wanted to set up LLCEIs could prepare proposals in order to get funding for their respective plans (for realization in the 2011-2015 period; with project proposal requests ranging between 25,000 and 1,000,000 Euro; Straatman, Hoppe, & Sanders, 2013). The province installed a jury of experts who were tasked to determine which bottom-up initiative would be the winner of the competition and would thus qualify for a provincial subsidy (Sanders, Heldeweg, Straatman, & Wempe, 2014, p. 5). The idea came from a civil servant who was inspired by similar examples in Germany, Denmark and Austria. There were two rounds, in which the first round emphasized the goal of carbon reduction in villages, whereas the second approach took an approach emphasizing the “triple bottom line” (i.e., social cohesion component, less and cleaner energy, and the assumed financial viability of the project). The competition scheme had a significant budget, and allowed for allocation of serious budgets to the participating villages (subsidies issued by Dutch government can only be granted to a legal entity. Thus, the budgets were commonly allocated to local organizational bodies such as village associations or foundations). For instance, the competition winner (the village Hoonhorst) was awarded (not less than) 1.5 M euro to start its local low-carbon energy (the funds were transferred to Hoonhorst’s “Local Interest” – Plaatselijk Belang; authors’ own translation – which is a common organizational body in Dutch villages. These organizations have a board and commonly get small amounts of government budget to use for public purposes for their town. It is not an official administrative level of government). Other winning villages were awarded much less: 50,000 euros. The financial prizes were used in different ways. For example, one LLCEI – Energiek Vasse – used the funding to hire a quartermaster to prepare its organization and business model, whereas another one – Energieneutraal Noord-Deurningen – used the budget to have energy audits conducted and to pay for installment of thermal insulation material in local dwellings. Hence, ways of spending of the budgets was the responsibility of the villages (but of course, within certain limits). A semi-governmental organization, ‘Stimuland’, assisted the respective LLCEIs with organizational affairs and issues concerning project development. All in all, the Sustainable Village scheme contributed to establishment and support in capacity building of 23 LLCEIs according to the Province of Overijssel’s website (Province of Overijssel, 2016b). The Province of Overijssel deemed the scheme successful, and in 2015, a follow-up scheme on supporting villages

to initiate and run local projects on bio-energy issues was launched (hence, a more specific topical approach than its predecessor).

Learning from the experiences, the Province of Overijssel by 2011 embedded support of LLCEIs formally in its policy program on low-carbon energy (entitled ‘New energy’) (Province of Overijssel, 2011). By 2014, the program was revised, adding more attention to support of LLCEIs. Specific attention to LLCEIs in the formal revision of the policy framework arose from a resolution adopted in the provincial council (Province of Overijssel, 2014a). The energy program still needs to be redesigned and adopted, but the provincial council adopted the theme ‘space for local initiatives’ and mentioned support for local initiators and entrepreneurs as one of the main policy lines. Provincial government focused actions on financial support and adaptation of spatial legislation. A specific example is the suggestion to negate the requirement to cluster wind turbines when a local initiative wants to realize a solitaire wind turbine in which more than 50% of the wind turbine is financed by local stakeholders [150]. When preparing the revised energy program, the province decided to involve external stakeholders, much like the neo-corporate structure of the Netherlands which emphasizes bargaining, collaboration and consensus-building with societal stakeholders and interest groups (Bressers, Bruijn, & Lulofs, 2009; Bressers & de Bruijn, 2005), also known as the Dutch governance school (Pierre & Peters, 2000). Although drawing on the province’s recently adopted ‘participation code’ (a code demonstrating that the province underscores and seeks to enhance civic participation in policy- and decision-making) (Province of Overijssel, 2014b), the role of LLCEIs to participate in the revision of the energy program was limited to that of a ‘spectator’ (Province of Overijssel, 2016c). Traditional parties of the energy regime, e.g., the grid-operator active in Overijssel, the Social Economic Council, the association of Nature and Environment in Overijssel, the Association of Dutch Municipalities, looked to represent their interests.

Similar to the Sustainable Village scheme, the Province, Nature and Environment Overijssel and Stimuland annually organize the “Energy Pitch Overijssel” (the first was held in 2013). A commission selects four initiatives out of all applicants and invites them to pitch their plans to a jury of experts. Applications have to meet four selection criteria: societal contribution of the initiative, involvement (in terms of stakeholder involvement, marketing and communication strategies), feasibility, and roadmap (ambition and vision, sub-projects to achieve goal). The selected initiatives receive professional support to further develop their plans. Unlike the Sustainable Village scheme, the Energy Pitch Overijssel does not provide grants or subsidies.

Additionally, there was a lot of policy attention to households adopting energy efficient and low-carbon energy applications. Moreover, the provincial program was part of a larger strategy of Dutch provinces aligning provincial energy policy strategies following the signing of the national energy agreement in September 2013.

Another incentive offered by the Province of Overijssel to support LLCEIs was the so-called ‘Investment Fund’ (Sanders *et al.*, 2014), which is a fund used to provide for upfront investment in local low-carbon energy projects, typically targeting those entrepreneurs who often do not have access to funding (in particular, LLCEIs). The procedure for allocating an investment budget was that entrepreneurs could prepare project plans, pitch their business case for the Province (supported by professional assessors – an independent bank managed the Investment Fund), on which the Province would decide who would benefit from the Funds and who would not. In the end, multiple LLCEIs projects were funded. Notably, solar PV project (e.g., Borne), a wind park (Deventer) and a biogas project (Noord-Deurningen). Whereas, to some, the fund was considered a revelation (e.g., projects funded 1 Mi Euro to carry through), others were disappointed that their project proposal was rejected and local operations came to a halt. However, and perhaps due to its novel character, the Investment Fund was under-utilized because budget allocation guide rules were considered as “too strict”.

Furthermore, the province installed a subsidy mechanism for local low-carbon energy initiatives not limited to citizen-initiated projects with a total budget of €1.25 million (Province of Overijssel, 2016d). The instrument subsidized projects in different developmental phases, of which each phase will be discussed below. In the first phase, activities in the design and concept-phase of a project are subsidized. In the second phase, the actual realization of the project is subsidized. Phase one and two have a combined maximum of €50,000 per project, with the first phase having a ceiling of €20,000 a project. Before projects become eligible for phase two, they require a feasible business case. The third phase involves subsidizing measures to professionalize the project so that it becomes an enterprise with future perspective (the maximum amount of subsidy in this phase is €50,000). An initiative is eligible for a phase three subsidy if it is able to show that its enterprise is based on a feasible business model with future perspective. An initiative may not apply solely for phase 1 or for a subsidy to design a business model, and each phase is concluded with go/no go moments to monitor the progress made.

In addition to incentives directly targeting LLCEIs, the Province also implemented subsidies to cover upfront investments that households and firms make when adopting solar PV panels. Indirectly, this scheme also supported solar farm projects by LLCEIs. The Province incentivized innovative low-carbon energy projects in which (among others) LLCEIs participated (e.g., on smart grids) by providing “in cash’ and ‘in kind’ contributions.

Furthermore, the Province of Overijssel implemented the subsidy scheme ‘Energy Landscapes’ to help initiatives in developing a plan for low-carbon energy generation by means of a workshop, or to subsidize additional measures taken by initiators to integrate the low-carbon energy installation in the environment. One of the criteria of the workshop was that residents, firms, municipality and water board in the area in question were to be involved in the workshop (Province of Fryslân, 2014c). Other policy instruments the Province of Overijssel used had a more communicative

character. For instance, a communication platform (called the “New Energy Overijssel platform”) was set up to facilitate sharing of knowledge on barriers, best practices and lessons between localities. In addition, the Province facilitated the operation of local energy front offices at municipalities (‘energieloketten’).

The Province also supported LLCEIs by gathering information on regulatory barriers local low-carbon energy initiatives experienced, and used them for lobbying at higher government levels (nationally and at the EU level) to provoke mitigation or termination of these regulatory barriers. The Province also tried to spur inter-sectoral policy alignment vis-à-vis local energy projects (e.g., by introducing energy as a policy issue on its urban agenda). Additionally, the Province made efforts to support local low-carbon energy projects by adapting spatial zoning schemes. By doing this, however, it did mean that the Province intervened with spatial policy of municipalities.

As of 2015, the province of Overijssel appointed nine ‘initiative-brokers’ on the basis of the experience they gained by setting up local initiatives themselves. LLCEIs may contact these experts; the experts can in turn provide start-up LLCEIs with knowledge, knowhow, or relevant contacts. The province implemented this policy instrument for LLCEIs to have one central point where they can resort to when in need of support.

#### *5.4.2.2. Municipalities*

Municipalities in Overijssel have provided support to LLCEIs in multiple ways. In some cases, they had an active role in initiating LLCEIs (Deventer, Hof van Twente, Wierden) and provided financial means to allow LLCEIs to build capacities and explore organizational and business development. Part of the larger provincial policy was the establishment of local ‘energy front offices’ (‘energieloketten’) in all of the province’s municipalities.

Experiences by LLCEIs on the satisfaction of services provided by these offices were mixed, though. In some cases, (Tubbergen), the municipal offices were deemed very inadequate and of little use to LLCEIs (Thomas Hoppe, van der Vegt, & Stegmaier, 2016). However, the municipalities of Deventer, Wierden and Hof van Twente delegated the task of managing these energy front offices to their LLCEIs.

Like the Province of Overijssel, municipalities were engaged frequently by LLCEIs when deals had to be made regarding establishment of solar or wind parks. In some cases, such as Deventer, the municipality supported the LLCEI by supporting the permit granting procedure to get access to a site on which wind turbines could be constructed, financed a feasibility study for the cooperative, and granted a € 50,000 start-up subsidy. In this case, a wind park along the highway A2 was realized in 2015. The politically responsible public official had a crucial incentivizing role to push through the realization, of the windmills since a white paper concerning the possibilities of wind turbines in Deventer was already adopted in 2004 but remained unimplemented ever since. Furthermore, the municipality granted the LLCEI another € 50,000 for managing



the energy front office and reserved 25% worth of participation in the wind park. Furthermore, the municipality actively involves Deventer Energie in low-carbon energy projects in the municipality.

Another instance in which a LLCEI evoked a response of the local government is in the Municipality of Raalte. The Municipal Council of Raalte adopted the solar farm (of around 7000 solar PV panels) initiative of the LLCEI 'Escozon' as a pilot and formally assumed a positive attitude vis-à-vis the initiative (Municipality of Raalte, 2014). The attitude was literally described in a proposal by the municipal executive as one that: 'guides the necessary procedures related to spatial planning and offer input for the initiators in elaborating the plans' (Municipality of Raalte, 2013). Similarly, the Municipal Council of Almelo agreed to exempt solar farms from the procedure in which the council has to file a so-called 'declaration of no objection' when projects that are in conflict with existing zoning plans come before the council to apply for an adaptation of the zoning plan. Additionally, the municipalities of Wierden adapted their construction fee regulations for land-based solar PV panel projects in order to assist an LLCEI ('Stichting Duurzame Energie Wierden-Enter' (SDEWE)) that sought to realize a solar farm in the municipality. Instead of having to pay the fees in advance of actual realization of the project, the fees can be paid after the initiators successfully applied for the national feed-in tariff 'Stimuleringsregeling Duurzame Energie' (SDE+) ('Stimulation Measure Sustainable Energy', authors' translation). Furthermore, the construction fees are solely levied on the load-bearing construction, and not on the solar PV panels and transformers significantly reducing the construction fees. The Municipality of Wierden copied this condition from the Municipality of Hof van Twente. The Municipality of Voorst allowed its LLCEI to use the roof of the city hall building for a collective solar PV project of 400 panels. The Municipality of Borne also made available its roof, but it appeared to be not suitable for solar PV panels.

Whereas these cases are examples of relative supportive municipalities, this cannot be said for most of the many municipalities in the rural areas in Overijssel. For instance, LLCEIs in rural Twente report poor responses by municipalities to their plans (cf. to construct biogas infrastructures, solar or wind parks). This appears to be not only related to lack of administrative capacities but also to a lack of political prioritization to low-carbon energy and empowerment of local communities by public officials (Hoppe, Arentsen, & Sanders, 2015).

There are also cases in which the public officials are committed to supporting LLCEIs but 'their' civil servants are not – they even perceive LLCEIs as a potential threat to take over public tasks – and pose a significant barrier towards supporting LLCEIs in local low-carbon energy projects (cf. the Lochem case, albeit just outside the geographical domain of Overijssel, but most probably not a unique case (Hoppe *et al.*, 2015)). For instance, whereas on the one hand the Municipal Council of Raalte decided in favor of the LLCEI's idea of a solar farm, civil servants of the rural municipality mentioned that collaboration with the LLCEI was hampered by the entrepreneurial disposition of the initiative (the LLCEI originally consisted of two entrepreneurs). As

a consequence, the negotiation process about the price of the leasehold for the parcel for the future solar farm that is owned by the municipality ensued strenuously. This is also influenced by the fact that the civil servants solely spoke to the two initiators, and not to a representative part of the village Heeten. The civil servants in question necessitated a sign of public support for the initiators' plans before they would continue collaboration. However, the interaction between LLCEIs and municipalities that predominantly ensues with the initiators of LLCEIs (e.g., Deventer, Raalte, Ommen, Vasse, Noord-Deurningen) has another implication as well.

Governments may be skeptical to engage in collaboration with initiators if the project's continuation is directly dependent upon the involvement of the initiator(s). This became apparent in case of a public official ('alderman') of the municipality Ommen, in which a community center of the hamlet 'Ommerkanaal' was to be made energy-neutral by a group of initiators. The aldermen on the one hand necessitated public support for project approval, but ventilated his concerns regarding the continuation of an initiative in the case that an initiator would drop out.

Furthermore, although the Municipality Hof van Twente co-founded a cooperative together with a LLCEI ('Energie Coöperatie Hof van Twente' (ECHT)) with the goal of making the municipality energy neutral by 2035 (and which is responsible for the operation of the energy front office), the Municipal Council of Hof van Twente decided against the realization of a wind turbine in which the LLCEI participated. One of the arguments of the opposition was that the LLCEI did not adequately involve the residents of the municipality about their initiative. As of writing, the municipality of Hof van Twente contracted an external project developer to realize a solar PV farm (of 37,000 solar PV panels), without involvement of ECHT.

What appears to be missing is inter-municipal collaboration in supporting LLCEIs (despite the fact that there is a 'local climate officers' pool' in the Twente region (Hoppe *et al.*, 2016) (Twente covers a large part of Overijssel in geographical and administrative terms). Therefore, it is not surprising that support by municipalities tends to be situational if not fragmented. Municipalities appear to lack alignment in vision and in coordination of activities towards supporting LLCEIs (Hoppe *et al.*, 2016).

In Overijssel, LLCEIs are more active in rural areas than in urban conglomerations. Notwithstanding potential administrative support by municipalities, LLCEIs are keen to explore ways to continue their project activities and engage with other (semi- and non-governmental) actors. An example is the LLCEI of 'Energiek Vasse', which tried (but rather struggled) to engage with both the provincial government and municipality, but managed to install a solar park on top of the local community center building. The latter was funded by the local citizenry association.

The cities in which LLCEIs are active, and to some degree supported by municipalities, are known to have long histories in actively supporting bottom-up initiatives (e.g., the Deventer municipality in supporting citizens' waste management/litter reduction

projects). In cities in which such a history, culture and mechanism is missing, citizens were found less favorable about the role of municipalities (e.g., Hengelo and Enschede) (Hoppe *et al.*, 2016). Furthermore, the city of Zwolle, capital of Overijssel (but is also a municipality), intensively collaborated with an LLCEI to develop a business model to retrofit a district in the city. The LLCEI received € 100,000 to develop and start up the initiative named *Wijbedrijf Dieze*. The municipality of Zwolle granted a subsidy of € 500,000 to the “district firm” *Dieze*. This neighborhood firm is owned and operated by *Dieze* residents and professionals, and renovates houses in the district of *Dieze* with the goal of providing 500 households with solar PV panels.

### 5.4.3 *The Case of Fryslân*

#### 5.4.3.1 *The Provincial Government*

In 2009, the province of Fryslân issued an agenda-setting vision document that focused on processes of sustainable development. The province holds that the traditional Frisian desire for self-sufficiency and small-scale solutions are qualities to further embark on as one of the ways to arrive at sustainable innovations (Province of Fryslân, 2009a). In doing so, the province seeks to support developments emerging from society. However, in the actual 2009-policy program for low-carbon energy, these approaches were not explicitly mentioned (Province of Fryslân, 2009b). The focus was rather on large-scale projects and firms as partners.

This being the case, the first observable instance of political attention to LLCEIs materialized in a resolution of the Provincial Council in 2011. The Council asked the Provincial executive to clarify what kind of bottom-up projects pursuing the local generation of low-carbon energy were active in Fryslân, and what the role of the province could be vis-à-vis these initiatives. In outlining the role of the province, the executive stated that whereas LLCEIs would not contribute significantly in a quantitative sense to the provincial goals, they are ‘very important for the awareness of and public support for low-carbon energy and energy saving’ (Province of Fryslân, 2012a). The province defined its role by emphasizing its support for “Network Sustainable Villages” (a knowledge platform that engages with sustainability themes for villages initiated by a semi-governmental agency ‘*Doarpswurk*’) and the Frisian Environmental Agency (FMF) that both had specific programs on local initiatives. Furthermore, the province commenced negotiations with the initiators of a provincial energy cooperative.

A year later, another resolution of the Council stressed that LLCEIs require upfront financial support in the short term (Province of Fryslân, 2012b). The resolution was a response to the emergence of LLCEIs in the province and the threat of this movement stalling because of difficulties for the initiatives to get their projects financed. The resolution was adopted, providing a €1 million budget (flowing from the Free Applicable Budget Reserve) that was earmarked for supporting LLCEIs in the shape of upfront investment capital. However, after the province determined that local initiatives struggle to make the step from initial idea to a feasible project, the upfront

investment capital and the to-be erected provincial energy fund with € 90 million worth of investment capital (“Fûns Skjinne Fryske Enerzjy” (FSFE; Fund Clean Frisian Energy; authors’ translation), were deemed inappropriate instruments to address the problem at hand. The FSFE is a revolving fund that invests in innovative low-carbon energy projects. LLCEIs are typically not eligible for this fund since they do not meet the requirements (e.g., having a feasible business-case). Consequently, the province did not opt for direct financial support, but for an approach that would build the capacity and strengthen the organizational competences of the initiatives. In other words: “an approach with a broad spin off”, to effectuate an acceleration in Fryslân (...) since the initiatives can contribute to the targets for low-carbon energy, and strengthen the local economy by developing self-reliance in the process (Province of Fryslân, 2014, p. 2).

The 2014–2020 provincial implementation program on low-carbon energy devoted a separate section to LLCEIs. This marked the first time LLCEIs were explicitly mentioned in a provincial policy program. The term ‘facilitation’, which is mentioned in the document in relation to concrete activities and projects, materializes in the so-called Energy Workshop, the establishment of a provincial cooperative “Ús Koöperaasje”, the Open Community Fund, and ad hoc support provided by the province based on incidental requests. We will discuss each of these aspects below.

As mentioned above, the province’s approach crystallized in different instruments and institutions. The responsibility for the majority of the support for LLCEIs was placed outside of the provincial government’s direct realm and was taken up by a newly established actor and two semi-governmental agencies, which will be discussed below.

The provincial cooperative, Ús Koöperaasje (‘our cooperative’, authors’ translation) was formally established in 2014 with financial (i.e., loan) and political backing of the Frisian province and municipality of Leeuwarden (for instance, the initiators of Ús Koöperaasje were invited to have their meetings in Leeuwarden City Hall). Ús Koöperaasje provided various supportive instruments and expertise that assisted LLCEIs, such as standardized statutes, promotional materials, and financial-technical advised on local low-carbon energy installations and business-models. This ‘umbrella cooperative’ would be the first step in enabling the energy transition on a Frisian level. Individual LLCEIs can become a member of this regional cooperative to enable them to resell locally generated low-carbon energy to their customers and members.

The possibility to actually resell locally generated low-carbon energy was enabled by the partial ownership of the provincial cooperative of a trans-provincial energy supplier “Noordelijk Lokaal Duurzaam” (North Local Sustainable, authors’ translation, NLD). NLD was established with financial and political help of Fryslân and the two other Dutch northern provinces: Groningen and Drenthe (which both have provincial cooperatives, and which are partial owners of NLD as well). The Province of Fryslân issued a loan of €150,000 to NLD (Drenthe issued a loan of €150,000 as well, Groningen gave a subsidy of €100,000). NLD, a profit-for-purpose firm, is the

second step in enabling a Frisian energy transition since it allows for the supply of regionally generated low-carbon energy. Furthermore, this process is strengthened by the principle that for each household that becomes a client of NLD through the LLCEI in its village or neighborhood, NLD gives that LLCEI around €75 for each client, every year. LLCEIs can decide how to reinvest that money in their localities. The umbrella cooperative Ús Koöperaasje provided both a decentralized low-carbon energy infrastructure (in conjunction with NLD) and an infrastructure that allows for a single identity for the LLCEIs (by means of membership). The cooperative explicitly stated that it refrains from any political activities.

The second dimension of the province's response to LLCEIs was to financially support the so-called "Energy Workshop". Originally a work-package of Network Sustainable Villages, the Energy workshop received such attention that Doarpswurk (a foundation that maintains and enhances the livability on the Frisian countryside by processes of social innovation, initiator of the Network Sustainable Villages) sought collaboration with the Frisian Environmental Agency to meet the demand for support of LLCEIs. The actual collaboration between the two semi-governmental institutions started in 2014 with, as basis, a formal subsidy relationship with the province. De facto, Ús Koöperaasje and the Energy Workshop collaborated from 2014 on, but this collaboration will be formalized in the upcoming subsidy program (submitted by Energy Workshop and the provincial cooperative), which proposes a new program for the Energy Workshop for the coming years.

The Energy Workshop follows the various developmental stages of LLCEIs, and ultimately functions as some sort of 'incubator', according to one of the advisors involved in the Energy Workshop. The two semi-governmental institutions combine their knowledge and expertise to give LLCEIs social-organizational support. Doarpswurk was experienced with social processes, and FMF had considerable expertise with communication and marketing. This was complemented by Ús Koöperaasje's knowledge and expertise on low-carbon energy and the institutional infrastructure that has been developed.

The Energy Workshop settled pressing problems of LLCEIs and does so with a hands-on approach. Issues and problems were often addressed by means of organizing workshops, communities of practice, or inspiration sessions. The Energy Workshop dealt with substantive and organizational issues, performed feasibility studies, spurred collaboration with other stakeholders, assisted with drafting of project- and business plans, searched for financial sources, supported in social and organizational processes, and provided guidance in making sense of the array of policies, information and experiences that were present. By staying close to LLCEIs, the Energy Workshop allowed for a high responsiveness and was able to offer tailored support. However, whereas the Energy Workshop was responsive in attempting to solve issues for LLCEIs, it had to cope with provincial policies and regulations as well. Spatial development regulation was, for instance, a factor impeding on the development of LLCEIs, or political preferences with concern to the type of low-carbon energy.

Although the 2014–2015 Energy Workshop focused on broad support and helping out as many LLCEIs as possible, the next Energy Workshop policy (2016 and onwards) directed attention to frontrunners and pioneers in order to truly be impactful. The reason for this change of focus is because after the end of the first subsidy-program, little tangible impact can be measured in terms of low-carbon energy generated on a local scale or in terms of the energy installations constructed.

Besides all of the above mentioned, in 2014, the province of Fryslân has provided a subsidy scheme that involved a €2500 start-up capital enough for 40 LLCEIs. This start-up fund could be used for notary costs for setting up a cooperative, website costs, costs for printing flyers, and so on. Half of the subsidy's budget was allocated to twenty LLCEIs that had applied for the subsidy. The residual €25,000 was transferred to a fund created to support bottom-up civil-society initiatives not limited to LLCEIs; the “Iepen Mienskip Fûns” (IMF) (Open Community Fund; authors translation). The IMF was started in 2015 and boasts a total budget of €2.5 million. Various provincial departments pitched in to provide budget for this subsidy scheme. Theoretically, the annual budget of this fund could be used for the sole support of LLCEIs, whereas the funds themselves flow from different provincial departments. The start-up subsidies do not require strict reporting as to how the subsidy was spent. Similarly, pictures or video footage of projects that utilized subsidies from the IMF-fund suffice as reporting requirement. In turn, these pictures and videos are posted on the province's website.

An example that showcases the province's willingness to incidentally alleviate administrative barriers materialized in the “Energie Coöperatie Westeinde” (ECW). The ECW wanted to construct solar farm of 3.6 acres on a strip of land owned by the provincial government. While the ECW was still searching for a party to invest in their project and waiting for the next SDE+ subsidy round, the province assured that the strip of land remained available and negated (jointly with the municipality of Leeuwarden) €100,000 of fees that were due when a building was constructed on that property (via the so-called ‘Crisis and Recovery procedure’, see explanation below). Furthermore, provincial government commenced the permit application procedure, whereas this was normally the (financial) responsibility for the applicant, which thereby safeguards the solar farm's admission in legal terms. Although this presents an example of ‘hands-on’ support by the province, the level of provincial involvement is mainly restricted to a strategic level and deals with issues related to spatial planning and quality. Furthermore, the province's support for this specific LLCEI ought to be viewed in its very context. The position of the solar farm is in an area that the province designated as a low-carbon energy infrastructural project-zone. The solar farm nicely fitted into this area development plan.

Another instance of ad hoc support was a focus group meeting organized by provincial government. The latter invited five local initiatives (not limited to energy initiatives) in order to understand what it actually means to be a sustainable village, since the province aimed for having 100 of them in 2020. The outcome of the meeting was for

the initiators to have one-to-one conversations with civil servants and provincial executives to discuss the specific barriers that need to be alleviated. Whereas a provincial executive proposed to organize an event at which different bottom-up initiatives could inspire one another, the initiatives present at the meeting stressed that the support they needed was in the shape of alleviating bottlenecks.

Additionally, the province, in collaboration with a municipality, organized a meeting to discuss the potential for adapting budgetary practices to activities of LLCEIs. Still, whereas a great deal of support is given to LLCEIs, when it comes to wind energy development, the Province is solely willing to meet its national obligations. In effect, this means that the Province participates in the development of a large-scale wind farm, in which it does integrate a clause for a required share of civic participation in the project.

#### *5.4.3.2. Municipalities*

Whereas support for LLCEIs on the provincial level is placed at arm's length in a relative planned and thought-out fashion, support policies by municipalities to a certain degree incline towards impromptu practices.

The role municipalities have in supporting LLCEIs varies in each project. However, choosing what role to assume is often not done consciously by municipalities (Oskam, 2012). An example of how different roles materialize can be found in the Leeuwarden district "Achter de Hoven". The municipality of Leeuwarden has financially supported this district to establish an energy cooperative and health care cooperative. However, difficulties arose since the district representatives made a call for structural financial support to maintain their activities. As a consequence, the municipality contemplated whether they could not simply give out their subsidy instruments in different ways. Furthermore, contradicting policies, the importance of a single enthusiastic civil servant for the feasibility of a project, and a lack of creative thinking on the part of the municipality impeded the interactions between the municipality and LLCEIs (Achter de Hoven, 2015).

Related to indistinctness in what roles municipalities play is the opaqueness involved in the criteria used by municipalities to decide whether to support an initiative. Various interviewees (predominantly civil servants) noted that gut feeling plays a significant role in these processes. A key aspect, though, is trust, and indirectly the authenticity of the initiators. Interviewees mentioned that the experience of the civil servant in question plays an important role in this process. These experiences and procedural knowhow were, however, not shared between civil servants. It needs to be stressed that interviewees mentioned that initiators that come to them are often familiar persons (i.e., the 'usual suspects' or former colleagues). Additionally, the initiators of LLCEIs predominantly interacted with municipalities, and various interviewees ventilated their worries regarding project continuation in case initiators would pull back from the initiative. Furthermore, although 'public support' was widely noted as one of the

crucial prerequisites for public officials to support a LLCEI, it was not clear how the degree of public support was measured as this was not explicitly mentioned. However, one important criterion for the decision to support an initiative noted by the interviewees was the requirement of the initiative to align with the agenda and adjacent policy action plan of the municipality.

In pursuit of supporting LLCEIs, the municipality of Leeuwarden acknowledged not to avoid risks. That being said, another district in Leeuwarden (“Camminghaburen”) was granted € 17,500 to realize its ambitions in energy savings and generation, but it failed to follow through. A more successful case involved a handful of initiators from another Leeuwarden district (“Westeinde”), who organized themselves in a cooperative (ECW). This group of volunteers was making significant progress towards realizing a solar farm of 3.6 acres (12,000 solar PV panels) on a strip of land that previously functioned as a provincial highway. Here, the municipality of Leeuwarden granted €15,000 to the LLCEI to develop a roadmap for the district to become energy neutral. The primary mechanism used by the Leeuwarden sustainability department was to give out start-up funds to incentivize LLCEIs. The municipality of Littenseradiel gave out a €2000 start-up subsidy to four LLCEIs (EnergieKûbaard (EK), Griene Enerzjy Koöperaasje Easterein (GEKE), Enerzjy Koöperaasje Easterwierrum (EKE), and Wommelser Enerzjy Koöperaasje (WEK)). The Municipality of Tytsjerksteradiel provided start-up subsidies for the LLCEIs active in its jurisdiction; Enerzjy Koöperaasje Garyp (EKGaryp) and Trynergie. Furthermore, the municipality shows its commitment to the LLCEIs by attending sessions for brainstorming and being present at events organized by the LLCEIs.

Furthermore, various municipalities have adapted spatial regulations and legislation. The Municipality of Tytsjerksteradiel lowered the construction fees for land-based solar PV panels to assist the LLCEI EKGaryp to construct a solar farm on a former waste dump site. Originally, these costs would amount to €150,000, but the municipality lowered the construction fee to €200. Furthermore, the municipality exempted the solar farm from property taxes. The Municipality of Opsterland also lowered its construction fees to spur the development of land-based solar PV panels. Additionally, the Municipal Council of Heerenveen agreed to exempt solar farms from the procedure in which the council has to file a so-called ‘declaration of no objection’ when projects that are in conflict with existing zoning plans come before the council to apply for an adaptation of the zoning plan. Moreover, Heerenveen also developed a spatial planning strategy that indicates areas for land-based solar PV project development and specifically introduced this framework to the LLCEIs active in the municipality.

In Fryslân, three municipalities (Oostellingwerf, Westellingwerf, and Leeuwarden) explored the option of utilizing the national “Crisis and Recovery Law” (CRL), which was a law exercised by central government that enabled governments to bypass regulations if they deemed this desirable in light of an overarching societal need to short-track the construction of solar farms. Via the CRL route, the municipalities could



exempt strips of land from the common spatial planning and quality requirements to enable the construction of future solar farms or other low-carbon projects. Leeuwarden – being the first in the Netherlands in doing this – is in the process of ratifying a spatial development plan that defines the available areas for land-based solar PV panels installations. This exempts the initiating party from having to apply for building permits or having to pay for construction fees.

Furthermore, there are instances in which municipalities and LLCEIs collaborate. In this sense, the Municipality of Ameland financially participates in a solar farm of 23,000 solar PV panels, together with the municipality's LLCEI the 'Amelander Energie Coöperatie', and energy supplier Eneco (each of the three actors owns 33.3% of the LLC that was established for the operation of the solar PV farm). Additionally, the Municipality of Ameland ended the lease contracts with the previous tenants of the parcels of land on which the solar farm was to be constructed to enable the realization of the project.

The municipality of Opsterland indirectly supported the activities of the "Wijnjewoude Energie Neutraal" (WEN) cooperative by issuing subsidies for individual households to implement energy efficiency measures and solar panels. This subsidy was made available for the villages of Wijnjewoude and Terwispel. Whereas Wijnjewoude – with its LLCEI – entirely consumed up the total budget amount of awarded by the subsidy, Terwispel – with no LLCEI of its own – did not. A civil servant mentioned that because of the LLCEI, they did not have to put much effort in informing the local public about the subsidy because WEN took this task over. In implementing the subsidy, the municipality decided to collaborate with WEN in order to refrain from impeding the bottom-up transition process that is manifest in the village. The municipality viewed initiatives such as WEN as a window of opportunity to determine what the public actually wants with regard to local low-carbon energy production, instead of the municipality traditionally studying the possibilities for energy generation and taking this to the citizens to see how they feel about this.

The Municipality of Súdwest-Fryslân actively searched for a set of criteria or new 'rules of the game' (such as participation and public support) for enabling local low-carbon energy production instead of archaic spatial planning legislation. Furthermore, they are exploring the possibilities for LLCEIs to have a role in the policymaking process.


The Frisian municipalities recognize the potential of this bottom-up movement in light of the limited capacity for municipalities to govern climate mitigation on a local scale. A civil servant from the Municipality of Heerenveen mentioned that whereas they are looking for opportunities to join up with LLCEIs, they want to refrain from an extent of intervention that may dislodge the bottom-up process. In doing so, the municipality wonders what the merits of engaging with LLCEIs are.

5.4.4. Results of the Comparative Analysis

In this section, the results of the comparative analysis are presented using concepts presented in Section 5.2. An overview of the key results is presented in Table 5.1 (institutional adaptation) and Table 5.2 (policy innovation).

**Table 5.1**

Results of the Overijssel and Fryslân cases on theoretical criteria for analyzing subnational government responses in relation to institutional adaptations.

<b>Modes of Governing</b>	<b>Institutional Adaptation Criterion</b>	<b>Overijssel</b>	<b>Fryslân</b>
<p>Governing by authority</p>  <p>Governing through enabling</p>	<i>Ad hoc, incremental, episodic responses, deciding rules of the game</i>	<p><b>Local</b></p> <ul style="list-style-type: none"> <li>• LLCEIs made responsible for energy front office</li> <li>• Criteria for LLCEI support context dependent</li> <li>• Civic participation requirement in low-carbon energy installation</li> </ul>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• Assisting in permit application procedure</li> <li>• Civic participation requirement in low-carbon energy installation</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• Criteria for LLCEI support context dependent</li> </ul>
	<i>Bricolage, conversion, patching up/layering</i>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• Alleviating administrative barriers</li> </ul>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• The Energy Workshop</li> <li>• Open Community Fund</li> <li>• Alleviating administrative barriers</li> </ul>
	<i>Governing at arm's length</i>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• Sustainable Village scheme</li> <li>• Involvement of LLCEIs in policy process</li> <li>• Initiative Brokers scheme</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• Co-provision energy front office, cooperative, district company</li> </ul>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• The Energy Workshop</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• Involvement of LLCEIs in policy process</li> <li>• Co-provision low-carbon energy installation</li> </ul>

**Table 5.2**

Results of the Overijssel and Fryslân cases on theoretical criteria for analyzing subnational government responses in relation to policy innovations.

<b>Modes of Governing</b>	<b>Institutional Adaptation Criterion</b>	<b>Overijssel</b>	<b>Fryslân</b>
 <p>Governing by authority</p> <p>Governing through enabling</p>	<i>LLCEIs as policy goal, planning/land-use requirements, strategic use of land ownership, performance criteria, innovative use of conventional instruments</i>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• LLCEIs as policy issue</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• Council decision LLCEI as pilot</li> <li>• Civic participation requirement in low-carbon energy installation</li> <li>• adapting conditions of construction fees</li> </ul>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• LLCEIs as policy line</li> <li>• Civic participation requirement in low-carbon energy installation</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• adapting conditions of construction fees and adapting spatial planning program</li> <li>• Ending lease contract</li> </ul>
	<i>Conditional support, conditional funding</i> <i>Provincial</i>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• Investment Fund</li> <li>• Energy Pitch</li> <li>• Phased subsidy instrument</li> <li>• Energy Landscapes scheme</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• Criteria for public support</li> </ul>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• Fund Clean Frisian Energy</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• Criteria for public support</li> </ul>
	<i>Capacity building instruments (e.g., subsidies, information)</i>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• Sustainable Village scheme</li> <li>• Initiative Brokers scheme</li> <li>• New Energy Overijssel Platform</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• Start-up subsidies</li> </ul>	<p><b>Provincial</b></p> <ul style="list-style-type: none"> <li>• Open Community Fund</li> <li>• The Energy Workshop</li> <li>• Ús Koöperaasje, North Local Sustainable</li> </ul> <p><b>Local</b></p> <ul style="list-style-type: none"> <li>• Start-up subsidies</li> </ul>

5.4.4.1. Institutional Adaptation

In both cases and on both administrative levels, we confirmed our hypothesis that institutional adaptation resembling an enabling mode of governing transpires through

governing at arm's length and various forms of co-provision of energy policies and services. On the provincial level, the majority of the support for LLCEIs was placed at government arm's length in both provinces. This entails that the policy implementation activities regarding the support of LLCEIs were delegated to external, semi-independent, non-public organization (i.e., Doarpswurk, Frisian Environmental Agency, Ús Koöperaasje, Stimuland), platform (the Energy Workshop, Network Sustainable Villages), group of experts (initiative-brokers), or jury (Sustainable Village scheme, Energy Pitch Overijssel). Furthermore, the establishing of Ús Koöperaasje and North Local Sustainable in the Frisian case are examples of how LLCEIs, with help of the province and municipality of Leeuwarden, provide an energy (service) infrastructure for distributed generation through LLCEIs.

However, existing institutional settings influence the way governing at arm's length takes place on the ground. This becomes apparent in the case of the Energy Workshop. Whereas the platform allows for a great deal of expert and specialized support, the actual creation of the partnership between the two semi-governmental organizations and the province is characterized by hierarchy, formal procedures and decision-making processes (Lowndes & Skelcher, 1998). As a result, there is solely a traditional subsidy relationship between the province and the two organizations. As such, organizational interests, budgetary constraints and the hierarchical nature of this relationship put pressure on the ability to collaborate on an equal footing. Hence, while the Energy Workshop allows for a great deal of responsiveness, as soon as issues touch upon the limits of the existing policy framework or regulations, or challenge existing institutional arrangements, the enabling role of the government comes into a gridlock. This becomes apparent, for example, in the case of wind energy development. In both provinces, wind energy is a very politically sensitive subject. Both provinces avoid construction and siting of solitaire wind turbines and prefer large-scale wind parks. LLCEIs therefore have little opportunity to produce wind energy, unless it is in the shape of participation in externally developed projects such as in the case of Deventer or the province of Fryslân – referring to episodic institutional adaptations. Even then, as the case of Hof van Twente shows, the council has significant influence in enabling or hindering such projects of co-provision.

On the municipal level, governing at arm's length is observed as well, specifically in the shape of co-provision. However, the embedded cases show that co-provision commonly ensues in an ad hoc fashion. For instance, the Wijnjewoude LLCEI effectuated a significant proliferation of subsidy requests and de facto co-implemented the subsidy scheme by jointly (with the municipality Opsterland) informing the local public about the subsidy. Additionally, four embedded cases in Overijssel – the Deventer Energie Coöperatie, Energie Coöperatie Hof van Twente, Stichting Duurzame Energie Wierden-Enter and Stichting WijBedrijf Dieze –, and one in Fryslân – Amelander Energie Coöperatie show that municipalities transferred considerable resources and competences to LLCEIs either in the shape of a partnership or the delegation of the management of the energy front desk. However, although each municipality in Overijssel has an energy front office desk, Deventer, Wierden and Hof

van Twente are the only municipalities that (partially) transferred the responsibility for these energy services to LLCEIs. Additionally, whereas the Municipality of Ameland became a partner in the solar farm project, the municipalities of Hof van Twente, Raalte and Leeuwarden did not. Furthermore, Fryslân declined the idea to transfer the responsibility of the provincial energy front office to Ús Koöperaasje. Various local government interviewees mentioned that LLCEIs function as windows of opportunity to promote public support for the local production of low-carbon energy and assist in achieving low-carbon energy policy goals.

The hypothesis that institutional adaptation resembling a combination of enabling and authoritative modes of governing ensues by means of bricolage and patching up is confirmed in both cases. Acts of ‘patching up’ such as the adaptation of spatial planning in Leeuwarden effectively change the ‘rules of the game’ and have a strategic and permanent character. While the adapted spatial planning facilitates land-based solar PV production, it does so with a number of traditional spatial quality criteria. Additionally, the municipalities of Tytsjerksteradiel, Heerenveen, Wierden and Hof van Twente also strategically adapted the construction fees for land-based solar PV panel projects. However, the municipalities did so in varying degrees, skewing either more to an enabling mode of governing (i.e., Tytsjerksterdiel), or leaning more to an authoritative mode of governing (i.e., Hof van Twente, Wierden, Heerenveen).

Furthermore, the Energy Workshop can be considered a product of institutional bricolage. The expertise on social-organizational processes of Doarpswurk was combined with FMF’s knowledge on communication and marketing to support Frisian LLCEIs. In other words, existing institutional resources were combined to serve a new purpose. These practices confirm the interplay of enabling and authoritative modes of governing in innovative responses of subnational governments and their influence on the form of institutional adaptation that occurs.

Both cases show various ad hoc initiatives of institutional adaptation, indicating an authoritative mode of governing. For example, the Province of Fryslân and municipalities of Leeuwarden and Deventer pitched in with the specific LLCEIs in question to assist in settling the permit procedures for constructing their respective low-carbon energy installations. Another example is the Raalte municipal council that dubbed the LLCEI’s solar farm as a pilot. Furthermore, the current subsidy scheme of the Province of Overijssel does not resemble a large size of discretion in terms of subsidy allocation and spending that characterized the Sustainable Village pilot scheme. These instances point to the uncertainty regarding the possibility for such pilots or ad hoc practices to become embedded in existing institutional arrangements. Furthermore, various local government interviewees in both cases mentioned on the one hand their worries regarding the risks of relying on a small number of volunteers, and on the other hand referred to different definitions of ‘public support’ or used different criteria (e.g., gut-feeling, trust) upon deciding to support an LLCEI. This shows the case-by-case basis on which municipalities formulate their response to LLCEIs, as well as the significant influence of the civil servant at hand.

#### 5.4.4.2. Policy Innovation

Both cases show various instances of policy innovations featuring an authoritative mode of governing. Both provincial governments integrated LLCEIs in their low-carbon energy policy programs and policy lines. However, differences can be found with regard to how both regional governments substantiate their support for LLCEIs.

In addition, various municipalities in both cases adapted their spatial planning policies and construction fees (either ad hoc or strategically) to better enable the development of land-based solar installations. The ad hoc adaptations applied to specific LLCEIs, whereas the strategic adaptations did not differentiate between land-based solar installations initiated by LLCEIs or other actors. A number of municipalities in Overijssel made innovative use of the provincial policy for establishing local energy offices (in itself a rather conventional policy instrument to provide information concerning energy production and efficiency) by transferring the responsibilities for these energy offices to LLCEIs.

The results further show instances of conditional support and funding for LLCEIs, signifying the hypothesis that the interplay of authoritative and enabling modes of governing notably shape the policy innovations that occur. Both provinces implemented an investment fund to support innovative low-carbon energy projects. However, the strict requirements of these funds prevent most LLCEIs from a successful application. Furthermore, the Overijssel Energy Landscape scheme, formally a subsidy instrument, is allocated in the shape of a workshop for spatial integration. However, unlike the previous instruments, the scheme does come with a list of requirements as to what projects are eligible for the subsidy and with a predefined format (i.e., a workshop). Typically, initiatives are not at the stage in which they can make use of the subsidy. Moreover, the Overijssel subsidy that provides funds for three different phases comes with strict performance criteria as well. In addition, various provincial instruments in both cases – such as the Energy Pitch, the Sustainable Village scheme and the Open Community Fund require initiators to demonstrate public support for their projects. However, the exact content of such public support is unspecified. Similarly, various local government interviewees in both cases mentioned that upon deciding to support an LLCEI, public support was considered a critical condition (next to trust and gut-feeling).

In both cases, various instances of capacity building were observed. This confirms the hypothesis that policy innovations vis-à-vis LLCEIs under an enabling mode of governing take shape as capacity building measures. Specifically, we observed the use of subsidies in both cases. Both provincial governments gave significant a priori (financial) support to LLCEIs. While subsidies as such are not innovative policy instruments, the way the subsidies are allocated and evaluated are indicative of policy inventions. For instance, the Open Community Funds' budget is pooled from various provincial administrative departments; the citizens involved decide how the subsidy is spent by applying for their own project and there are no strict evaluation criteria as to

how the subsidy is spent. Similarly, the Sustainable Village scheme allowed notable discretion as to how the subsidy was spent as well, whether this involved hiring professionals or financing low-carbon energy measures. In Overijssel, the Sustainable Village scheme incentivized bottom-up action on climate mitigation and directly built capacity for the involved villages and indirectly for the LLCEIs that would follow.

In addition, the province of Fryslân granted significant financial support (in the shape of a loan) to both *Ús Koöperaasje* and North Local Sustainable, establishing new autonomous actors and effectively building capacity for the Frisian LLCEIs. Other instances of capacity building took shape as assistance with organizational development and project management. In this sense, the Initiative-Brokers scheme and the Energy Pitch instrument were set in place in order to help LLCEIs with relevant expertise and contacts to accelerate project development. Furthermore, both provincial governments have implemented instruments to support LLCEIs in a process-oriented way by following the different developmental phases LLCEIs go through. Yet, each of the two provincial governments assumes a different point of departure. The Energy Workshop provides social-organizational support that is appropriate for each phase, either tailor-made and on an individual basis, or via communities of practice. The Energy Workshop is therefore reminiscent of an ‘incubator’ approach (a term that originates from Business Administration research), which entails that LLCEIs are supported in various ways to help them to become a fruitful initiative. The province of Overijssel also implemented the three-phased subsidy scheme that follows the various developmental stages LLCEIs go through, but does so by means of financial support that comes with strict criteria and progress requirements which shows the interplay of enabling and authoritative modes of governing.

On the municipal level of administration, instances of capacity building occur in the shape of governments financing feasibility studies and roadmaps (Deventer, Leeuwarden), allocating start-up capital for specific LLCEIs (Deventer, Leeuwarden, Zwolle, Littenseradiel), or facilitating LLCEIs in other ways, for instance as an intermediary party attracting funds from higher tiers of government to enable the start-up and projects of LLCEIs (Hof van Twente).

Various municipalities in both provinces gave out start-up subsidies for LLCEIs, ranging from relatively small start-up subsidies (€15,000 and €17,500 in Leeuwarden, €2000 in Littenseradiel) to significant lump sums of money (€100,000 in both Deventer and Zwolle; €500,000 in Zwolle). Still, thus far, only a handful of LLCEIs actually set off to construct low-carbon energy installations of their own. For this reason, the policy outcome is rather intangible and should be seen in light of what is achieved in terms of social processes (and thus policy throughput or output). An interviewee in the Fryslân case mentioned that the province does not monitor the share of energy generated by LLCEIs yet, and stated that the share of low-carbon energy produced by LLCEIs will probably be, at this point, negligible. Furthermore, a Leeuwarden interviewee mentioned that the government was increasingly seeking to replace exact and measurable policy evaluations with policy evaluations based on narratives. The

provincial Open Community Fund already uses narrative monitoring to evaluate subsidy spending. Abandoning tangible outcome indicators in favor of narrative-based evaluation embraces the policy ‘silo’ transcending nature of LLCEIs.

## **5.5 Discussion**

### *5.5.1. Innovations in Governing*

The results of our analysis confirm our hypotheses and suggest that the types of innovations in governing that occurred in response to the emergence of LLCEIs can be derived from the balancing process of enabling and authoritative modes of governing. This suggests the relevance of analyzing ‘government by experiment’ or ‘climate change experiments’ (e.g. Bulkeley & Castán Broto, 2013) through a lens of meta-governance. The variety of policy innovations and institutional adaptations signal the interplay and co-existence of the different modes of governing. Furthermore, the application of a government-centered perspective proved to be useful for illuminating the role of subnational governments in the evolution of LLCEIs. In this sense, our case studies suggest theoretical frameworks on strategic niche management ought to be more sensitive towards government influence on grassroots innovations in relation to low-carbon energy transitions (e.g. Seyfang & Haxeltine, 2012; Smith, Hargreaves, Hielscher, Martiskainen, & Seyfang, 2015). In particular, subnational governments seem to have a prominent role in using ‘governing by experiment’ for a “Thousand flowers blooming” approach in which citizen-based grassroots innovations are central (Foxon, 2013; Turnheim *et al.*, 2015). Our results are in line with this view, showing a considerable degree of innovative attention that subnational governments give to LLCEIs. However, this supportive attitude by a small selection of Dutch subnational governments is probably not representative, and results from other studies also revealed unproductive interactions between LLCEIs and local governments (e.g. Becker, Blanchet, & Kunze, 2016; Blanchet, 2014; Strachan, Cowell, Ellis, Sherry-Brennan, & Toke, 2015).

Furthermore, differences between responses of local and regional governments exist, which reveals the importance of agency, contextual conditions and capacities for distributed generation (Fuchs & Hinderer, 2014; Johnson & Hall, 2014). The case studies further show that more than once have policy or institutional entrepreneurs in subnational governments made a significant difference in governing for low-carbon energy transitions by demonstrating leadership and innovative action (Hoppe & Coenen, 2011; Hoppe *et al.*, 2015, 2016; Pitt & Bassett, 2014; Woolthuis, Hooimeijer, Bossink, Mulder, & Brouwer, 2013). That being said, additional research on subnational policy innovation dynamics regarding climate change action is needed – next to nation-state level policy innovation (Jordan & Huitema, 2014c).

The results of the two case studies further indicate that local governments employ authoritative forms of governing to formulate innovative responses to the emergence of LLCEIs. These innovations were primarily directed at changing existing spatial



planning regulations, although varying in terms of their scope (episodic versus more strategic and permanent patching-up). This implies that conventional modes of governing can be employed in innovative ways (cf. Dowling *et al.*, 2013), and stresses the importance of combining enabling modes of governing with authoritative ones (cf. Mey *et al.*, 2016). This reiterates the key role of local governments in low-carbon action in general, and for the support of LLCEIs in particular (e.g. Thomas Hoppe *et al.*, 2015). Moreover, the results reveal that both local and regional governments transferred responsibilities directly to LLCEIs – or indirectly to intermediaries – for public energy service delivery, effectuating co-provision.

Various scholars have recognized and found evidence on the important role of intermediary organizations in building robust LLCEI niches (Backhaus, 2010; Bird & Barnes, 2014; Hargreaves *et al.*, 2013; Kivimaa, 2014; Parag *et al.*, 2013; Seyfang *et al.*, 2014). In our case studies, both of the provincial governments created intermediaries to provide support for LLCEIs. However, they did so in different ways. The Province of Fryslân gave political and financial support to establish three of such intermediaries, greatly assisting in developing the infrastructural and institutional fabric of distributed generation by LLCEIs in Fryslân. Whereas the Province of Fryslân's approach can be considered programmatic and strategic, the approach of the Province of Overijssel was considered rather fragmented and reactive. The difference lies in the Initiative-Brokers scheme functioning in practice as a front office for LLCEIs, whereas the Energy Workshop supports LLCEIs with a well-conceived program. Furthermore, the Energy Workshop consists of two semi-governmental organizations, whereas the Initiative-Brokers scheme involves a group of experienced LLCEI-initiators. In effect, the Energy Workshop functions as an intermediary at arm's length of government, whereas the Initiative-Brokers scheme takes shape as an intermediary through co-provision.

### *5.5.2 Innovating within the Confines of Existing Structures*

Although the innovations in governing that occurred in the cases can be interpreted by the balancing of enabling and authoritative modes of governing, the existing institutional legacy and path dependencies also shape the innovations that emerge vis-à-vis LLCEIs. In this regard, the results reveal that LLCEIs exemplify shifting terrains of relationships between state and citizen, articulate more participatory forms of democracy while questioning the existing representative structures, and challenge existing sources of political legitimacy and processes of policymaking (see Connelly, 2010; Raco & Flint, 2001; Raco, Parker, & Doak, 2006).

In terms of conventional sources and principles of political legitimacy and representative democracy, the presented case studies reveal that local governments predominantly interact with individual initiators and choose to support LLCEIs on the basis of trust, gut feeling, and public support. Whereas the representative democratic principle of 'public support' is considered a key criterion for the support of LLCEIs, its meaning was understood in various ways and appeared to rest on the interpretation of

the civil servant at hand, which varied considerably between civil servants. In combination with other conferrers of legitimacy such as trust, legitimacy appeared to be dependent on specific situations see (Connelly, 2010). That being said, local governments that interact with LLCEIs, predominantly do so with the initiators, often ‘usual suspects’, community ‘stars’ or ‘professional citizens’ that are familiar with the administrative environment and political participation (Boonstra & Boelens, 2011; Taylor, 2007). Tendencies to collaborate with these project champions and simultaneously advancing a focus on ‘the’ community and civil society in official policy documents (in both cases) “betrays a continued focus in government policy on the individual and a one-to-one dialogue between the state and the citizen, which downplays the importance of collective action”(Taylor, 2010, p. 194). Even more so, this points to the co-existing representative and participative structures of democracy; upholding traditional representative values, while predominantly engaging with active citizens. When reflecting on this the results from the analysis of the two case studies presented in this paper reveal that governments are still searching for ways to bridge the gap between state and citizen in general, and perhaps more importantly between the initiator and its locality in particular (this ensues without coordination among or cooperation between, in particular, municipalities).

In a similar vein, the emergence of governing at arm’s length of government, incidental changes in the rules of the game, and various forms of conditional support in subnational governments’ responses to LLCEIs can be considered solutions that avoid explicit struggles with existing institutional arrangements. While these responses allow for a certain degree of flexibility, they are detached from existing institutional settings, or only update existing ones, and therefore have little opportunity to transform the latter. That being said, Healey (2006, p. 304) claims that innovations in governance that succeed in institutionalization and have transformative effects need to transcend “from the level of conscious actor invention and mobilization to that of routinization as accepted practices, and beyond to broadly accepted cultural norms and values”. In view of this, the innovations observed in the Fryslân and Overijssel cases have not (yet) trickled down to this level and power inequalities between officials and citizens have not yet been subjected to (public) debate.

## **5.6 Conclusions**

This paper set out with the research question of “*in what ways do local and regional governments in the Dutch regions of Overijssel and Fryslân innovate in governing to respond to the emergence of LLCEIs?*”

Overall, our study confirmed our hypotheses, revealing that a balancing process of authoritative and enabling modes of governing particularly characterize the type of policy innovations that are developed and the institutional adaptations that take place. In line with what was expected on the basis of contemporary claims in the literature on LLCEIs and institutional change, a number of institutional adaptations were revealed, viz. ‘patching-up’, ‘bricolage’, (episodic) changes in the rules of the game and governing at

arm's length. Furthermore, various policy innovations were observed involving capacity building measures, conditional funding and support, and innovative uses of conventional instruments and innovative changes in spatial planning and requirements. As mentioned earlier, several of these policy innovations effectuated changes in the institutional landscape. The results show that several local governments adapted spatial planning policies and construction fees (either pro-active for all projects, or reactive in response to a call made by an LLCEI), effectuating changes in the rules of the game. Additionally, the results reveal that the majority of the provincial support for LLCEIs is organized at arm's length of government. Regional governments enable LLCEI development by establishing and financially supporting intermediaries that in turn provide specific and expert support to LLCEIs. In Fryslân, this led to a regional institutional infrastructure that enabled co-provision through LLCEIs and opened up the possibility for distributed generation. In Overijssel, co-provision occurred in both the regional and local level, but more in terms of 'co-production' of provincial; policy instruments; i.e., transferring public service delivery implementation activities in favor of LLCEIs (cf. Voorberg *et al.*, 2015). However, exceptions were two instances in which an LLCEI established an energy service company (Zwolle) and the Frisian municipality of Ameland which is co-owner of the limited Liability company operating the solar PV farm.

Additionally, both the provincial and local governments of Fryslân and Overijssel implemented policy innovations in the shape of capacity building. Capacity building took shape in the form of (start-up) subsidies characterized by an absence of reporting and performance requirements. However, this flexibility could only occur under conditions with subsidy schemes with relatively low budgets available. When it comes to large lump-sum investments, this flexibility was typically not observed (i.e., the investment funds of both provinces). Furthermore, at arm's length, intermediaries and platforms provided LLCEIs with socio-organizational support, as well as knowledge and expertise. In both cases, a variety of criteria were used to support decision-making to support LLCEIs. However, these criteria were neither standardized nor shared between municipalities, nor between civil servants (the latter even between civil servants working in the same jurisdiction).

Although LLCEIs are perceived by governments as additions to their own strategies or vehicles that can help them to achieve their climate mitigation targets, LLCEIs still find themselves in an arena that is restricted by political preferences for spatial quality, ambiguous sources of legitimacy and restrictive legislation. This points to a two-sided interpretation of the balancing process of both modes of governing. On the one hand, governments, in innovative ways, employ authoritative and enabling modes of governing in their response to the emergence of LLCEIs. On the other hand, governments integrate authoritative and conventional elements in enabling mechanisms to ensure a degree of influence over the self-organizational processes of LLCEIs. The conditional support and financing as well as the ad hoc responses found in both cases are examples of this. In line with other authors, policy innovations and traditional policy instruments coexist in the responses of subnational governments to the emergence of LLCEIs (Jordan *et al.*, 2005; Jordan, Wurzel, & Zito, 2003).

In these meta-governing arrangements, traditional mechanisms can be used innovatively and innovative enabling practices may come with rather traditional elements. Frictions may arise in this dynamic field as innovative instances of governing challenge conventional modes of governing. Governments appear to be still searching for ways to account for public budget that is spent without immediate results (i.e., capacity building) against the backdrop of complex, intertwined, and ‘policy silo’ transcending societal problems. The combination of experimental and conventional elements is therefore a reasonable response that is indicative of a multiplicity of solution paths that can be advanced. To some extent, this resembles with Transition Management studies, in which the combination of experimental and conventional elements is present as well (Avelino *et al.*, 2014; Frantzeskaki, Avelino, & Loorbach, 2013).

Further research is needed with respect to the effectiveness of different policy instruments and practices that governments implement to support LLCEIs. This applies to the effects of subsidies, in particular since previous research suggested that this type of policy instrument may have ambiguous effects on LLCEIs (Creamer, 2015). Since ad hoc and episodic responses may leave behind ‘seeds’ as positive or negative feedback loops for future policy initiatives or interactions (González & Healey, 2005, p. 2066), research is required to explore the effects of such practices on existing institutional and policy arrangements for LLCEIs. Furthermore, medium to large-N quantitative research is needed among subnational governments in order to determine the factors influencing the extent and shape of innovations in governing vis-à-vis the emergence of LLCEIs.

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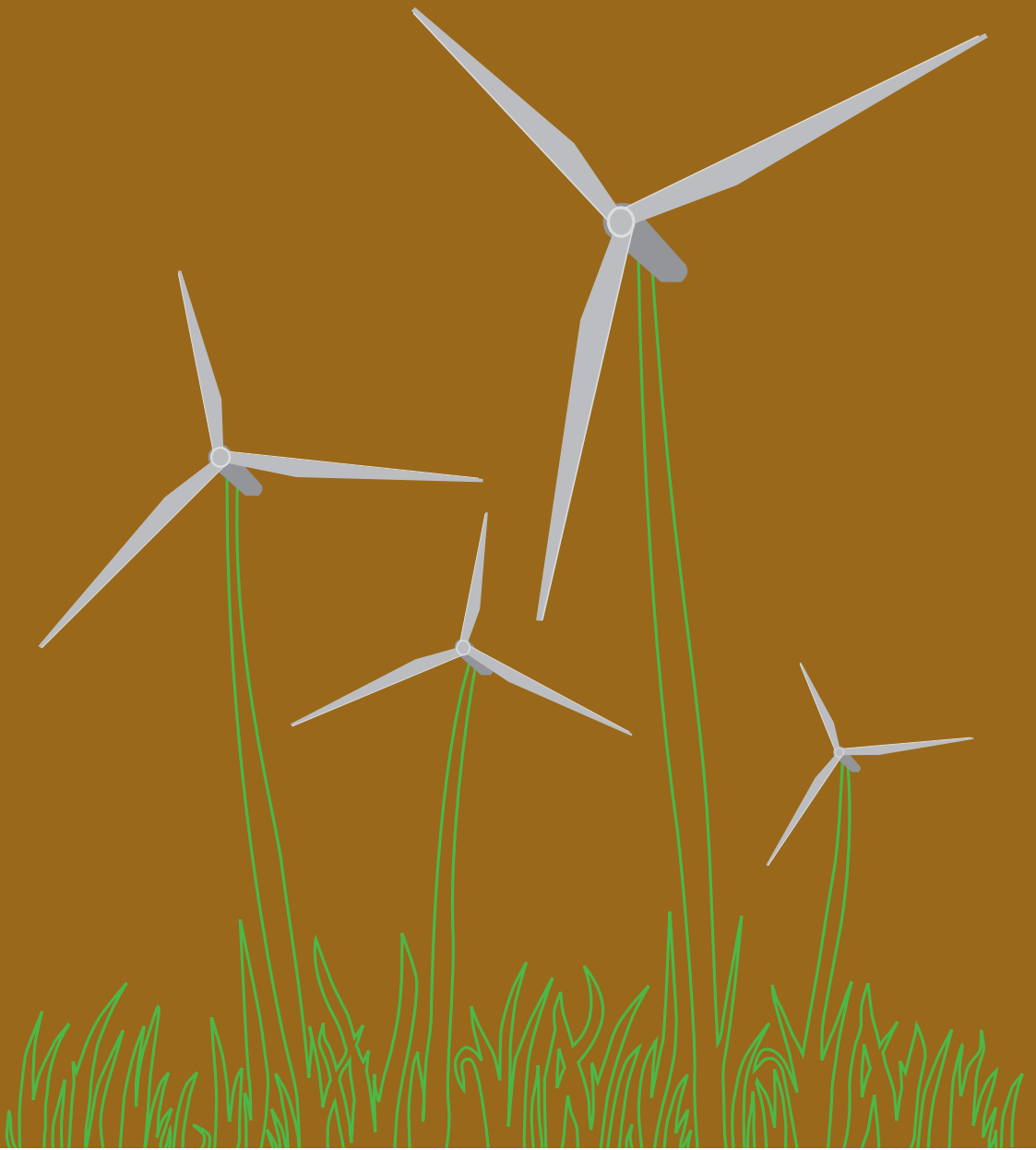
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# Chapter 6

**Local government attention for LLCEIs**



**Abstract:** Recent scholarly attention shows increasing involvement of local low-carbon energy initiatives (LLCEIs) in governance and policy, in particular in relation to innovations regarding low-carbon energy, energy efficiency, and the organization of the energy system. The future perspective of active citizenship in the production of locally generated low-carbon energy is largely dependent on the existing institutional and policy frameworks and settings. Particularly subnational governments can have a prominent role in this process by engaging in institutional adaptation and policy innovation. This chapter draws on Cashore and Howlett's (2007; 2009) typology of policy change to determine the elements and levels of LLCEI attention. The degree of government attention to LLCEIs, however, is an important precursor to policy change and innovation. In this sense, the paper answers the following central research question: In which ways and to which degree of specificity in terms of goals and means, are LLCEIs mentioned in policy documents of local governments in The Netherlands? By using a web scraping and content analysis methodology, this paper sets out to provide an overview of the extent to which and in what ways LLCEIs have been adopted in policy agendas of local governments in the Netherlands (N = 341). Results show that co-occurrences of LLCEI-related words and policy approach-related search terms (e.g. facilitate, collaborate, stimulate, accelerate), were observed the most in comparison to other categories of policy-related search terms. This is an indication that LLCEIs have reached a rather abstract policy level. More specific policy-related search terms, such as specific policy instruments or goals occurred less often. This suggests that, at least in the documents retrieved, local governments incline towards more generic accounts of how they substantiate their attention for LLCEIs. This indeed was also observed in Chapter 5, where local governments were found to reside to impromptu responses to the emergence of LLCEIs. In sum, search terms like 'stimulate', 'facilitate' and 'collaboration' as approaches; 'participate' as means of involvement; 'energy' as policy goal; and 'subsidy' as policy instrument occurred the most in their respective categories.

## 6.1 Introduction

Recent scholarly attention shows increasing involvement of local low-carbon energy initiatives (LLCEIs) in governance and policy, in particular in relation to innovations vis-à-vis mostly renewable energy and energy efficiency as well (Hoppe *et al.*, 2019). Often referred to in the literature as ‘community renewable energy’ (e.g. Walker & Devine-Wright, 2008; Walker *et al.*, 2010; Rogers *et al.*, 2008) or ‘grassroots innovations’ (e.g. Smith *et al.*, 2015; Seyfang *et al.*, 2014), LLCEIs appeal to a different way of organizing and managing the energy system. Instead of a centralized, private oriented and integrated energy system, LLCEIs envision a more localized, community oriented energy system with more autonomy and a greater role for civic participation and influence (Arentsen & Bellekom, 2014; Hall *et al.*, 2014; Foxon, 2013).

In light of climate change mitigation and carbon reduction goals, LLCEIs could function as a means to implement the idea of distributed generation (Arentsen & Bellekom, 2014) and assist to avoid carbon lock-in (van der Ven *et al.*, 2017; Beermann & Tews, 2017, cf. Unruh, 2000; 2002). In essence, the transition of domains such as decentralized energy systems, emission reductions, and decarbonisation necessitate a new governance system (e.g. Adil & Ko, 2016; Yaqoot *et al.*, 2016; Bolton & Foxon, 2015; Baldwin *et al.*, 2018), specifically, one that conveys polycentric characteristics (Jordan *et al.*, 2015; Jordan *et al.*, 2018). Ostrom (2010, p. 552) characterize polycentric governance as multiple governing units at different scales that function independently from each other and set rules and norms within a specific domain. Polycentric governance allows better for contextualization, experimentation and innovation to help arrive at solutions at multiple scales needed to govern a decentralized energy infrastructure (Goldthau, 2014). Unsurprisingly, the realization of a decentralized energy system – in which community energy initiatives exert significant influence – and the inevitable introduction of new governance approaches within this process clashes with the status quo that is dominated by energy sector multinationals and existing policy arrangements that are locked into fossil fuel-based technological systems (Kooij *et al.*, 2018). LLCEIs exemplify decentralized, local experiments that – if scaled up – have the potency to destabilize such lock-in mechanisms and facilitate the energy transition (Beermann & Tews, 2017; Seyfang & Smith, 2007). As such, the bottom-up, self-organizing processes through which LLCEIs emerge are indicative of polycentric governance.

Still, as LLCEIs are commonly managed by volunteers, entering the energy market permeated by professional project developers and multinationals can be challenging. Studies investigating community energy initiatives in this sense recognize the important role especially subnational governments have in providing a level playing field for LLCEIs to enable their proliferation (Mey *et al.*, 2016; Hamilton *et al.*, 2014; Burch *et al.*, 2014; Kellett, 2007; Wade *et al.*, 2013; Hoppe *et al.*, 2015; Van der Schoor & Scholtens, 2015; Berka *et al.*, 2017; Warbroek & Hoppe, 2017). Similarly, scholars have recognized the important role local, bottom-up initiatives of non-state

and subnational actors such as local authorities have in polycentric climate governance (Fuhr *et al.*, 2018; van der Ven *et al.*, 2017). It is therefore the role of subnational governments vis-à-vis the emergence of LLCEIs that is the focus of this chapter.

While recent developments and observations concerning LLCEIs have been gaining traction in the literature and among policy makers, it is not the first time that subnational governments and scholars worked on the intersection of local communities and climate change governance. As an illustrative example, since its introduction, the UNCC's Local Agenda 21 ('LA21') has been a topic of extensive academic and practitioner debate. Evaluations of LA21 typically addressed the issue of how subnational governments deal with enhanced civic participation in governing processes that concern environmental protection (Coenen, 2009a; Coenen & Lafferty, 2001; Coenen *et al.*, 1999; Collier, 1997; Sancassiani, 2005; Selman, 1998). Notwithstanding those experiences, analogies and lessons learned (see for instance Walker *et al.*, 2007), subnational governments still struggle to find effective ways to cope with grassroots civic action in the realm of climate change mitigation (see Chapter 5).

With this in mind, scholars have underlined the imperative function of innovative activities in climate change governance to disrupt the carbon lock-in and to keep global warming within two degrees centigrade (Jordan & Huitema, 2014a, Jordan & Huitema, 2014b; Bulkeley & Castán Broto, 2013; Castán Broto & Bulkeley, 2013). In particular, Jordan and Huitema introduced a conceptual framework of policy innovation to reiterate and further study the role of innovative state action in climate change governance (2014a; 2014b; 2014c)<sup>2,3</sup>. Albeit hitherto the framework has predominantly been applied to scrutinize innovative activities at the nation-state level, it proved to be useful for analysing policy innovation dynamics in response to LLCEIs at subnational levels of government as well, as could be seen in Chapter 5.

Other studies provide similar observations. Findings of Blanchet (2014) show that in the case of Berlin energy policy-making, LLCEIs were a source for policy invention since they pushed the dominant coalition to act towards a local energy transition and – in terms of impact – made the city's energy policy issues known to the public (p. 252). This connects with the observations made by Nadaï *et al.* (2015), who observed that LLCEIs invent ways of doing energy policy differently and bring attention to issues previously unrecognized in relation to low carbon energy developments. Furthermore, Dóci *et al.* (2015) noticed that LLCEIs attract local and provincial government support and that the Dutch policy sub-regime considers LLCEIs important enough to create supportive policies (i.e. financial and professional help) (p. 92). Additionally, notions such as territory, locality, collective action, communities,

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2 This agenda is part of the European Union's COST funded INOGOV network, see <http://www.inogov.org/>

3 See special issue of Environmental Politics (23:5) which focused on innovation in climate policy

participatory democracy, and decentralization have emerged in discourses in the energy policy domain (Nadaï *et al.*, 2015, p. 282; Moss *et al.*, 2014; Catney *et al.*, 2014; Walker *et al.*, 2007). These studies seem to indicate that to a certain degree, governments have picked up the theme of community energy in their climate change governing processes and policies. Indeed, policy change and innovation is suggested to be preceded by processes of agenda-setting and shifts in government attention (Baumgartner *et al.*, 2011; Kingdon, 1984). Still, Kooij *et al.* (2018) observe a strong dominance of an economic discourse on energy and energy policy on the national level in the Netherlands, which leaves little room for the acceptance of conceptions such as LLCEIs and distributed generation. This lack of institutionalization at the national level seems to be compensated for by an institutional fit at the local level (Oteman *et al.*, 2017).

However (as the analysis of Chapter 3 showed) some local governments remained rather sceptical of LLCEIs, and Chapter 5 showed that LLCEIs lack a certain degree of embeddedness in local climate policy as responses to them are often ad hoc. Furthermore, whereas Chapter 5 as well as other studies (e.g. Oteman *et al.*, 2017) have looked into the uptake of LLCEIs in policies and governance arrangements, this has been limited to insights generated from case studies. In order for policy innovations for LLCEIs to occur, LLCEIs first need to enter the agenda of subnational governments. Jones and Baumgartner (2005, p. 232) found that ‘the allocation of attention is a central impetus for a problem-response mismatch in the policymaking process’. Allocation of attention to a policy problem is necessary for policy change to occur. Chapter 5 dealt with the instances where local governments respond to LLCEIs (i.e. ‘the problem’), this chapter looks further into the extent to which LLCEIs draw the attention of local governments. In this sense, this chapter answers the following research question:

*In which ways and to which degree of specificity in terms of goals and means, are LLCEIs mentioned in policy documents of local governments in The Netherlands?*

By using a web scraping data collection, and text mining, and co-occurrence analysis methods, this chapter sets out to provide an overview of the extent to which and in what ways LLCEIs have entered the agenda of 341 local governments in the Netherlands. The central claim here is that the emergence of LLCEIs is reflected in the degree of attention for LLCEIs in subnational government documents. This chapter draws on Cashore and Howlett’s typology (2007, 2009) of policy change to determine the elements and levels of LLCEI attention.

The next section presents relevant theory, and introduces a theoretical framework. Next, Section 3 presents research design and methodology used in this study. In Section 4, the results of the web content mining are presented. In Section 5, the results of the analysis are discussed and conclusions are drawn.

## **6.2 Theoretical and conceptual background**

### *6.2.1 Tracking processes of policy invention*

As much as keeping global warming within the two degrees centigrade rise limit depends on technological innovation. Several scholars have argued for the crucial role of the nation-state in the landscape of climate change governance by means of engaging in policy innovation. The policy innovation framework, introduced by Jordan and Huitema (2014a, 2014b, 2014c), apprehends policy innovation not as a one-dimensional notion, but recognizes that innovation can be understood both as a process and a product of that process. In this sense, the framework differentiates between policy invention, evaluation, and policy diffusion. The invention perspective focuses on the processes and sources of new policy elements. The second perspective, evaluation, seeks to explore the effects and impact of policy innovations. The policy diffusion perspective investigates the processes and mechanisms that explain how policy innovations become adopted and enter into widespread use. Within policy invention processes, stages of policy formulation and agenda-setting appear to be the focal point of inventive activities (Jordan & Huitema, 2014b). As a means to gain preliminary insights into the potential of LLCEIs to invoke policy change and invention, it makes sense to firstly explore the extent to which they actually appear on the agendas of subnational governments.

For subnational governments, the emergence of LLCEIs inevitably means that a new type of actor has entered the policy domains of climate change action and sustainable development. Since the Netherlands has witnessed an upsurge of LLCEIs from 70 LLCEIs in 2012 to 484 LLCEIs in 2018 (Schwencke, 2018), we therefore expect that subnational governments pay attention to LLCEIs in their documentation. In a similar vein with Baumgartner and Jones (1991), who measured US congressional attention *inter alia* by means of counting the number of hearings (see also Jones *et al.*, 1993) and the introduction of bills (Jones & Baumgartner, 2005), we measure government attention for LLCEIs by word frequency (mentioning of LLCEIs) and co-occurrence (mentioning of particular aims or means in combination with LLCEIs) counts in municipal council documents (see Subsection 6.3 for methodology). Council meetings are generally the first venue where new issues (formally) appear on the agenda of Dutch subnational governments for the first time (cf. Baumgartner *et al.*, 2011, p. 953). But how does government attention for LLCEIs, a precursor to policy innovation, materialize? To determine the levels and elements of Dutch subnational government attention to LLCEIs, this study applies a taxonomy of policy components (see Table 6.1). Howlett and Cashore (2009, p. 38) modified Hall's "three order" framework (1993) by discerning six policy elements, rather than three, that can undergo change (see also Cashore & Howlett, 2007). This framework differentiates between policy aims and means, and distinguishes three levels of abstraction that range from theoretical or abstract goals and implementation preferences, to programme specific objectives and policy tools, and specific policy settings and calibrations (See Table 6.1).

**Table 6.1**

Components of public policies involved in policy designs. Adjusted from Cashore and Howlett (2007) and Howlett and Cashore (2009).

		Policy level		
		<i>High level abstraction</i>	<i>Programme level operationalization</i>	<i>Specific on-the-ground measures</i>
Policy element	<i>Policy ends or aims</i>	<i>General abstract policy aims</i> e.g. climate mitigation or adaptation	<i>Operationalizable policy objectives</i> e.g. stimulating the generation of low-carbon energy	<i>Specific policy targets</i> e.g. realization of 100 MW worth of solar PV panels
	<i>Policy means</i>	<i>General policy implementation preferences</i> e.g. preference for market-based instruments, or more coercive measures	<i>Operationalizable policy tools</i> e.g. using subsidies to increase the adoption of low-carbon energy technologies	<i>Specific policy tool calibrations</i> e.g. subsidies are specifically geared to small-scale applications of low-carbon energy

It needs to be stressed that the taxonomy is not used to determine the extent to which policies related to LLCEIs have changed from the status quo of climate change mitigation policies (the taxonomy was originally developed for tracking policy change), but is used to expose the extent and in which degree of specificity of goals and means government attention for LLCEIs materializes in the climate change and sustainable development domains at the subnational level. The comparative case study presented in Chapter 5 explored the ways in which subnational governments respond to the emergence of LLCEIs and showed that multiple approaches were tried out by different local authorities through processes of self-organization. Thus, experimentation and policy innovation takes place at the subnational level, a characteristic of polycentric governance (Jordan *et al.*, 2018). Considering this, it is expected that LLCEIs are frequently in subnational government documents, but this is limited to an abstract level – which pertains to LLCEIs solely being mentioned in government documents, or LLCEIs combined with non-specific approaches describing how local governments support them (e.g. facilitating, stimulating, encouraging), without indicating specific instruments. This trend has been observed among local climate policy of Dutch local governments, the latter having a tendency to adopt ambitious climate targets and visions without sufficient resources and substantial instruments to achieve and implement those aspirations (van Bueren & Steenhuisen, 2013; Schoor *et al.*, 2016).

In the following section, the aims and means that are expected to be observed with regard to LLCEIs are further discussed in light of Cashore and Howlett's (2007; 2009) typology of policy change. Chapter 5, which explored the ways in which subnational

governments innovate in governing in response to the emergence of LLCEIs, provides directions as to what elements of government attention for LLCEIs are expected to be observed.

### *6.2.2 Policy goals and objectives*

This chapter is interested in the extent to which LLCEIs have become adopted in subnational government documents. In terms of general abstract policy aims, we expect that LLCEIs have been adopted in vision documents/agenda setting documents (Schoor *et al.*, 2016, p. 101). This threshold solely involves subnational governments' recognition of LLCEIs in their documents. In the following subsections, we discuss the specific objectives that we expect local governments to mention in relation to LLCEIs. Table 2 provides an overview of the expected objectives.

#### *6.2.2.1. Climate objectives, co-benefits and government objectives*

Needless to say, LLCEIs can be instrumental in realizing government's carbon reduction targets and boost the share of low-carbon energy consumption (e.g. Parag *et al.*, 2013; Warbroek & Hoppe, 2017; Coenen, 2009b). In this sense, policy-makers decide to support LLCEIs in order to stimulate the market for low-carbon energy in context of carbon reduction targets, especially small-scale applications (Walker *et al.*, 2007; Smith *et al.*, 2015). Furthermore, other studies show that governments focus on LLCEIs because of energy demand reduction (Smith *et al.*, 2015; Bulkeley & Fuller, 2012). Another goal for governments to support LLCEIs can be the stimulation of low-carbon energy applications at the local scale (Schoor *et al.*, 2016; Viardot, 2013), also referred to as distributed generation (Barry & Chapman, 2009; Wolsink, 2012).

Moreover, evidence suggests that governments support community renewable energy for an array of other reasons, involving co-benefits such as rural development and regeneration, resilience, fuel poverty, and for enhancing local economic activity (new sources of income and employment) (Munday *et al.*, 2011; Callaghan & Williams, 2014; Slee, 2015; Walker *et al.*, 2007; Walker, 2008; Bulkeley & Fuller, 2012; Smith *et al.*, 2015; Oteman *et al.*, 2014; Forman, 2017). As might be expected, participants and initiators of LLCEIs themselves mention economic gains and benefits, energy saving, environmental benefits, generating low-carbon energy, skills development and job creation (Seyfang *et al.*, 2013; Maruyama *et al.*, 2007; Dóci & Vasileiadou 2015; Rogers *et al.*, 2008; Mayne *et al.*, 2013; Bauwens, 2016; Bulkeley & Fuller, 2012). Generally speaking, community energy supports social, economic, cultural and economic objectives (Forman, 2017). Thus, it is expected that subnational governments mention not only carbon reduction targets in combination with LLCEIs, but also co-benefits such as rural development and local economic development. In other words, LLCEIs are supported as a means to realize government objectives.

### 6.2.2.2. *Participation, ownership and acceptance*

Several studies have shown that community ownership and high levels of participation in planning fosters acceptance of low-carbon energy technologies in general, and of projects in specific (Musall & Kuik, 2011; Warren & McFayden, 2010; McLaren Loring, 2007; Viardot, 2013; Gross, 2007; Jobert *et al.*, 2007; Walker, 2008). Thus, it is expected that governments set objectives in line with enhanced participation of citizens in planning processes and decision making on climate change issues (see Hoppe *et al.*, 2016), as well as objectives that concern models of community ownership. This can be regarded as a normative function of engaging with LLCEIs; to provide for acceptance and better decisions (Coenen, 2009b). In the same line of reasoning, it is expected that governments mention LLCEIs in combination with objectives that relate to acceptance and public support for low-carbon energy (Walker *et al.*, 2007; Viardot, 2013). Various scholars argue that social acceptance is key in furthering the adoption of low-carbon energy technologies (Wüstenhagen *et al.*, 2007; Wolsink, 2012; Zoellner *et al.*, 2008). Specific targets could involve the minimum share of citizen participation in local low-carbon energy installations (Bauwens *et al.*, 2016; Warbroek & Hoppe, 2017). Other goals mentioned in the literature involve that LLCEIs form an opportunity to democratize decision-making in the energy system and on climate change issues (Mulugetta *et al.*, 2010; Schoor *et al.*, 2016; compare Hoppe *et al.*, 2016), and suits the general transition to more public involvement in government (Walker *et al.*, 2007; Smith *et al.*, 2015). Concepts such as active citizenship and civic governance embody such ambitions as well (Hoffman & High-Pippert, 2010; Kooij *et al.*, 2018). Alongside these objectives is the potential of community energy to enact energy justice – which entails the safeguarding of principles of procedural, distributive and recognition justice in the energy system (Forman, 2017; Johnson & Hall, 2014).

### 6.2.3 *Policy means*

To unravel whether subnational governments have mentioned LLCEIs in their documents as merely ‘public policy fads’ (Adams & Hess, 2001) lacking any practical impact that runs the risk of no action at all (Catney *et al.*, 2014), this chapter also investigates the extent in which subnational governments mention any policy means directed at the instrumental and normative support of LLCEIs. Evidence has suggested that although LLCEIs are mentioned in “lofty visions on sustainable energy”, subnational governments in the Dutch province of Fryslân seem to lack the capacity to follow up on those ambitions (Schoor *et al.*, 2016, p. 101).

To begin with, subnational governments may have certain preferences for how they choose to implement policies vis-à-vis LLCEIs (see for instance McGuirk *et al.*, 2014). Taking into consideration Bulkeley and Kern’s (2006) distinction of the various modes of governing of local climate protection, governments may resort to, on the one hand, implementation preferences hinging on an authoritative mode of governing. Within this, governments choose for inter alia measures of coordination, steering, delegation, initiation, control and devolution. On the other hand, in a governance through enabling



approach local governments facilitate, support, use their network to support, invest in, scale up, accelerate, or guide LLCEIs (see also Hoppe *et al.*, 2016; Mey *et al.*, 2016; Hufen & Hoppenjan, 2015; Wade *et al.*, 2013; Aylett, 2013). In the following subsections, the specific policy tools and specific settings that are expected to be observed are discussed. Table 6.2 provides an overview of the expected policy means.

### 6.2.3.1 Financial support

Examples of governments adopting grant funding or loan schemes to support community renewable energy schemes are manifold in the literature (Walker *et al.*, 2007; Hoppe *et al.*, 2015; Hoppe *et al.*, 2016; Oteman *et al.*, 2017; Ruggiero *et al.*, 2014; Creamer, 2015; Walker *et al.*, 2010; Mey *et al.*, 2016; Hufen & Koppenjan, 2015; Warbroek & Hoppe, 2017; Bomberg & McEwen, 2012; Seyfang *et al.*, 2014; Hain *et al.*, 2005; Smith *et al.*, 2015; Bulkeley & Fuller, 2012). In Chapter 5, it was shown that governments adopted subsidy mechanisms with less stringent performance criteria, indicating a particular calibration of subsidy tools. Furthermore, scholars also observed that subnational governments assist LLCEIs by financing feasibility studies (Mey *et al.*, 2016; Hufen & Koppenjan, 2015), or helping with the application for subsidies (Hoppe *et al.*, 2015; Mey *et al.*, 2016).

### 6.2.3.2 Pilots and policy experiments

Given that LLCEIs are a relatively new (policy) phenomenon, the risk averse attitude of government (Howlett, 2014) and the status quo of 'governance and public administration structures that often isolate initiatives within levels of government and/or within program oriented silos, interventions often take the form of pilots' (Adams & Hess, 2008, p. 6) (see also Van Buuren & Loorbach, 2009; Edelenbos *et al.*, 2016). Other authors depict such governance initiatives as being already part of the way in which climate governance ensues, namely government by experiment (Bulkeley & Castán Broto, 2013; Castán Broto & Bulkeley, 2013; McGuirk *et al.*, 2015). Indeed, Chapter 5 showed several instances in which subnational governments adopted pilots in relation to LLCEIs. Thus, it is expected that subnational governments mention pilots or policy experiments in relation to LLCEIs.

### 6.2.3.3 Spatial planning

Spatial planning is a critical factor in the development of low-carbon energy projects. Various studies have described the adverse and conducive effects of particular aspects of spatial planning regimes on low-carbon energy development (e.g. Toke *et al.*, 2008; Breukers & Wolsink, 2007; McLaren Loring, 2007; Wolsink, 2007; Agterbosch *et al.*, 2004; Agterbosch *et al.*, 2009; Toke, 2005; Ellis *et al.*, 2009). In particular, authors have investigated the positive effects of enhanced citizen and community involvement in spatial planning, focusing on participation in the planning process, and the influence of varying ownership structures and community benefits (Khan, 2003; Cowell *et al.*, 2011; Gross, 2007; Warren & McFayden, 2010; Munday *et al.*, 2011; Zoellner *et al.*, 2008;

Simcock, 2016). Depending on the institutional and legislative context, local governments have a degree of authority over spatial planning policies to encourage low-carbon energy development (Bulkeley & Kern, 2006; Toke *et al.*, 2008; Wolsink, 2007). Subnational governments have indeed used these competences by altering land development plans or planning requirements to the advantage of LLCEIs (Bauwens *et al.*, 2016; Süsser *et al.*, 2017; Bristow *et al.*, 2012; Barry & Chapman, 2009). Still, evidence suggests that such supportive spatial planning policies have only been adopted to a limited extent (see Strachan *et al.*, 2015; Markantoni, 2016; Hoppe *et al.*, 2016; Parkhill *et al.*, 2015). Specifically, Chapter 5 showed that subnational governments support LLCEIs via spatial planning procedures by altering construction fees, taxes, planning requirements, and assisting with the application for building permits. Furthermore, studies have shown that local governments have made available municipal roofs or property space in order to support LLCEIs (Mey *et al.*, 2016; Hoppe *et al.*, 2015). Taking note of these observations, it is hypothesized that Dutch local governments have to a certain degree adopted aspects that favour LLCEIs in spatial planning.

#### 6.2.3.4 Intermediaries

Another policy means often recited in the community energy literature is the supportive work of intermediary actors. Their crucial work for the success of LLCEIs was underscored in Chapter 4. These intermediaries come in different shapes and assist LLCEIs by assuming a network manager role and function as boundary workers by intermediating between LLCEIs and other actors. In practice, these intermediaries provide LLCEIs with specific expertise, skills and contacts. Intermediary actors have been found to play a crucial role in sustainability transitions in general (Kivimaa, 2014; Moss, 2009; Backhaus, 2010 Bush *et al.*, 2017; Martiskainen & Kivimaa, 2018; Kivimaa & Martiskainen, 2018;), and for supporting the development of community renewable energy in particular (Ruggiero *et al.*, 2014; Parag *et al.*, 2013; Hargreaves *et al.*, 2013; Seyfang *et al.*, 2014; Forrest & Wiek, 2014; Hicks & Ison, 2011; Bomberg & McEwen, 2012). Various studies have observed that governments funded the activities of intermediaries to support the bottom-up movement of community renewable energy (Smith *et al.*, 2015; Mayne *et al.*, 2013; Schoor *et al.*, 2016; Seyfang *et al.*, 2014; Bird & Barnes, 2014). Local governments will to a certain extent rely on the work of these intermediaries to support LLCEIs that are located in their jurisdiction. Since these intermediaries exemplify at arm's length support of LLCEIs by government – a kind of support that often extends beyond the capabilities of local governments since intermediaries are able to provide specific expertise and skills that are tailored to the needs of LLCEIs – it is hypothesized that local governments mention intermediaries in their documents.

#### 6.2.3.5 Partnerships

Another policy instrument frequently mentioned in the community renewable energy literature is that of partnerships (Wade *et al.*, 2013; Hufen & Koppenjan, 2015; Seyfang *et al.*, 2013; Kellett, 2007; Parag *et al.*, 2013; Mayne *et al.*, 2013). Especially partnerships with government are suggested to be an important success factor (Seyfang

*et al.*, 2013; Yalçın-Riollet *et al.*, 2014; Aylett, 2013). There have been governments that have established organizations such as an Energy Service Company (ESCO) or a project firm in collaboration with LLCEIs (Kellett, 2007; Wade *et al.*, 2013; Warbroek & Hoppe, 2017), or recruited LLCEIs to implement climate policies (Warbroek & Hoppe, 2017). It is expected that subnational governments to a certain degree have engaged with LLCEIs by means of collaboration or formal partnerships.

### 6.2.3.6 Capacity building

Various studies have observed that subnational governments support LLCEIs by capacity building measures. These include the provision of advice, training, information, or governments using their network to support LLCEIs (Hoppe *et al.*, 2016; Mey *et al.*, 2016; Hufen & Koppenjan, 2015; Walker *et al.*, 2010; Warbroek & Hoppe, 2017; Hoppe *et al.*, 2015; Mayne *et al.*, 2013; Parag *et al.*, 2013; Schoor *et al.*, 2016). It is therefore hypothesized that instances of capacity building are found in the documents that are retrieved.

The expected policy means and objectives that are expected to occur in government documents are presented in Table 6.2. As such, in Table 6.2, the examples of the different policy levels and elements outlined in Table 6.1 are replaced with means and objectives in relation to LLCEIs that are expected to occur. Table 6.2 assists in determining the degree of specificity in terms of goals and means in which LLCEIs are mentioned in policy documents of local governments.

**Table 6.2**

Expected policy elements to occur related to LLCEIs. Adjusted from Cashore and Howlett (2007) and Howlett and Cashore (2009)

		Policy level		
		<i>High level abstraction</i>	<i>Programme level operationalization</i>	<i>Specific on-the-ground measures</i>
Policy element	<i>Policy ends or aims</i>	<i>General abstract policy aims</i> LLCEIs mentioned in climate policy documents.	<i>Operationalizable policy objectives</i> LLCEIs mentioned in climate policy documents in combination with one of the following objectives: Carbon reduction; generating acceptance and public support for low-carbon energy; regeneration; economic development, resilience; enhanced citizen involvement in spatial planning; enhanced citizen participation (ownership) in low-carbon energy developments; local energy production; decentralized production; distributed generation; co-production; co-creation.	<i>Specific policy targets*</i> e.g. Specific degree of citizen participation in low-carbon energy development

**Table 6.2**  
Continued from page 246

		Policy level		
		<i>High level abstraction</i>	<i>Programme level operationalization</i>	<i>Specific on-the-ground measures</i>
Policy element	Policy means	<i>General policy implementation preferences</i> <i>Examples include:</i> Coordinating, steering, delegating, initiating, controlling, devolving, facilitating, supporting, connecting, investing, scaling up, accelerating, and guiding.	<i>Operationalizable policy tools</i> <i>Examples include:</i> Alleviating administrative barriers, capacity building (information, advice, guidance, training), financial support (subsidies, grants, funds, loans), spatial planning e.g. requirements, assistance, permits, making available space (or roof), pilots and experiments, intermediaries and partnerships.	<i>Specific policy tool calibrations</i> <i>Examples include:</i> (start-up) subsidies without strict reporting requirements. Lowering taxes or construction fees, tax exemptions for LLCEIs, exempting LLCEIs from construction fees, or adjusting the moment fees have to be paid, municipality paying construction fees upfront, regulation free zones. Giving out loans with low interest rate; giving out loans to projects commonly not eligible for loans at regular banks due to risks involved.

\*On the basis of the experiences with the case studies in Chapter 5, it was difficult to formulate expectations about specific policy targets that concerned LLCEIs. The large number of municipalities under scrutiny and the quantitative methods used in this study prevent the researchers to uncover specific policy targets. For example, the Dutch municipality of Deventer stated that the to-be-installed wind turbines ought to have a 25% degree of citizen participation. The specificity of this policy target prevents it from being generalized as a proposition in a way that makes sense, let alone be transformed as a search term for the web-scrape. Furthermore, specific policy targets related to LLCEIs were hardly found in the literature.

## **6.3 Methodology**

### *6.3.1 Research approach*

To investigate in which ways and to which degree of specificity in terms of goals and means, LLCEIs are mentioned in policy documents of local governments in The Netherlands, this chapter uses a web scraping and content analysis methodology and applies co-occurrence analysis.

In so doing, it is important to first develop a database of Dutch local policy documents. In order to determine the state-of-art of Dutch local government attention for LLCEIs, I therefore used the information management systems that Dutch municipalities use to publish all of their policies, regulations, decisions, resolutions, and other official paperwork on the Internet. As Dutch municipalities are obligated from 2014 onwards to

publish their regulations and permits online, along with the Open Government Act (meaning that council agendas, resolutions, meetings and the like are also published in the same information systems), we chose for an automated data collection method to retrieve those documents. This data collection method is known as ‘web scraping’. Web scraping involves identifying and mining web pages for specific data elements through an automated process of information extraction, organizing and coding the extracted information as a structured data set in order to uncover patterns and relationships (e.g. Youtie *et al.*, 2012; Boeing & Waddell, 2017; Marres *et al.*, 2013). Text mining, in turn, is the process of finding patterns from unstructured text (Nahm & Mooney, 2002).

In order to reveal the levels and elements of government attention for LLCEIs, the (co-) occurrence of LLCEI search terms (the process of arriving at those search terms will be described in the subsections below) was used as a proxy indicator. It is, however, important to keep in mind that not all actions taken by local governments will be published online (cf. Youti *et al.*, 2012). Michael Lipsky’s (1980) seminal work on the discrepancy between government policy in theory and policy practices by street-level bureaucrats portrays exactly this issue. Still, web scraping allowed the researcher to get a baseline overview of the emerging policy domain of LLCEIs without the investment of resources and degree of obtrusiveness typically associated with the application of social research devices such as surveys on a larger scale (or having to deal with a low response rate, for that matter). The subsections below discuss the various steps that were followed and the decisions that were made throughout the process of data-collection and analysis.

### 6.3.2 *Data collection: scraping municipal information management systems*

In order to access and retrieve local government documents from the Web, the (publicly accessible) information management systems used by municipalities in the Netherlands are used. Municipal decisions, orders, policies, agendas, proposals, resolutions, council meetings and other documents related to formal decision-making and governing are published by municipalities on the web via specific information management systems. There are five parties that each provide a different information management system that Dutch municipalities may use (i.e. MSI (iBabs), NotuBiz, GemeenteOplossingen, SIM Groep and Company Webcast). Although the systems are publicly accessible, it was firstly investigated whether an automated process – in this case a ‘web scrape’ – could capture the policy documents published in those different information management systems for subsequent text-mining and analysis. The information management systems of 341 out of all 380 Dutch municipalities: (in 2018) could be accessed by means of algorithms that were created for this purpose.

For two reasons the information management systems of the remaining 39 municipalities could not be disclosed (see Appendix D). The first concerned the usage of an information management system that predominantly publishes audio and video material of council meetings. Secondly, other municipalities in this group used a custom format to publish information, which was difficult to automatically access by means of an algorithm. To arrive at a structured data-set suitable for subsequent

analysis, documents were downloaded and transformed into PDF-files. Duplicates were filtered out during this process. The process of downloading, transforming and saving documents in a database began in October 2017 and was finished in July 2018. The database comprised of 4,873,766 documents.

### *6.3.3 Refining the database to create a dataset; text mining for climate change and sustainability documents*

After having retrieved the online-accessible paperwork of the majority of Dutch municipalities, the database was refined by filtering for documents pertaining to the policy domains of climate change and sustainability. Whereas the majority of the search terms associated with LLCEIs are specific to these domains, some LLCEI-related search terms are rather generic and can therefore apply to other policy domains as well. In text-mining pre-processing operations, so-called ‘domain knowledge’ can therefore be used to enhance concept extraction and validation activities (Feldman & Sanger, 2007, p. 42; Feldman & Hirsch, 1997). Feldman and Sanger (2007) defined domains as ‘areas of interest for which formal ontologies, lexicons or taxonomies of information may be created’ (p.42). Such domain knowledge may be used to formulate certain rules or constraints for the process of text mining.

In this case, I wanted to ensure that only the way that LLCEIs materialize in relevant subnational government documents was investigated. As such, this chapter assumed a simple rule-based system approach to text mining in order to retrieve relevant documents (cf. Cohen & Hunter, 2008). Since (to the researcher’s knowledge) there is no pre-existing lexicon or taxonomy of Dutch local climate and sustainability policy (see for example Van Attenveldt *et al.* 2008a; 2008b) to function as a source of ‘domain knowledge’, nor is there an existing rule-based system to analyse such documents, the researcher developed a system of rules himself to extract suitable documents pertaining to climate and sustainability.

#### *Search terms*

As a first step, in collaboration with a domain expert (based on his knowledge of the field) a set of (manually stemmed) search terms related to climate change and sustainability were formulated. To assess the comprehensiveness and validity of these search terms, the list of search terms was compared with a sample of 10 municipal climate or sustainability policy documents (e.g. local climate and sustainability ambition and vision documents, low-carbon energy programs, implementation documents). In this validation process, several additional search terms could be discerned that were included in the list. Subsequently, the search terms were categorized (see Appendix E). The following categories were formulated: climate, sustainability, units of measurements (e.g. CO<sub>2</sub>, MW, TW, PJ), energy, implementation, bio-energy, geothermal, heat, wind, and solar.

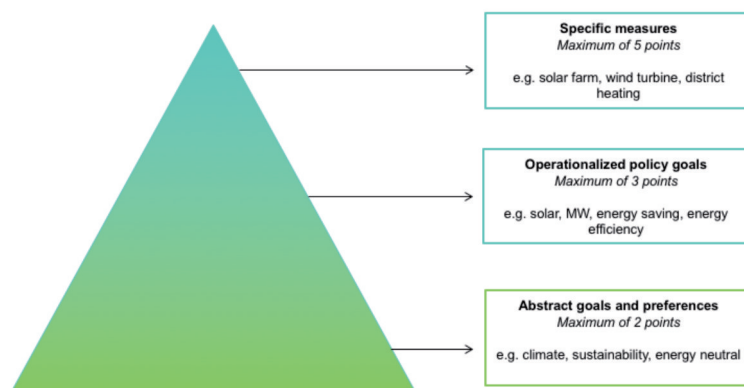
#### *Indexing the search terms*

As a next step, the level of abstractness of the search terms (associated with the themes) was determined on which the indexing for the search terms was based. For example,

different interpretations can be made in terms of the extent of government action on the basis of vision documents that solely discuss the rather abstract aim of climate change mitigation, as compared to documents that discuss specific low-carbon energy sources (e.g. solar, wind, biomass), or even specific low-carbon energy applications or projects (e.g. solar PV panels, wind turbines, solar farms). The underlying assumption here is that the prevalence of concrete and specific search terms such as ‘wind turbine’ or ‘solar farm’ in government documents are indicative of policy substance and government discourse on policy implementation and signal processes towards objective achievement in climate change and sustainability policy domains. General search terms such as ‘sustainable development’ can rather be considered buzzwords that signify public policy fads or acts of symbolic policy making lacking depth, clarity and definition (e.g. Adams & Hess, 2001; Aall *et al.*, 2007; Howlett, 2014; Krause, 2011). In other words, the search terms are taken as proxy indicators for the extent of subnational government action in climate change and sustainability.

As such, the various search terms were indexed according to the same framework that was used in Section 6.2; namely the taxonomy of policy components put forward by Cashore and Howlett (2007; Howlett & Cashore, 2009). The search words that were formulated to capture the domains of climate change and sustainability focus on three different subsets of policy aims or ends; (i) general abstract policy aims (e.g. climate mitigation, energy neutral, circular economy), (ii) operationalizable policy objectives (e.g. wind, low-carbon energy, energy saving), and (iii) specific settings (e.g. wind turbine, solar farm, smart grid) (see Figure 6.2). The more specific the search terms are, the higher their index. To the best knowledge of the researcher, there is no pre-existing index list available for mining Dutch policy documents for climate change and sustainability keywords. Therefore, the indexing was done by the expert involved.

After categorizing the search terms in the aforementioned subsets, the search terms were carefully indexed, consistent with the search terms within the individual subsets, as well as across the subsets. For example, within the subset operationalizable policy objectives, search terms ‘energy efficiency’, ‘energy saving’, and ‘energy generation’ (being still rather general approaches to mitigating climate change) have an index of 1,5, whereas the search terms ‘solar’, ‘wind’, and ‘biomass’ (being specific sources of low-carbon energy) within the same subset have an index of 2,5. (see Appendix E). Each retrieved document could score a total of 10 points. The abstract level accounts for 2 points, the programme level for a maximum of 3 points, and search terms in the level of specific measures can score a maximum of 5 points. In order to prevent search terms such as ‘climate change’ (belonging to the abstract level subset) to disproportionality boost the score of the document, each subset is capped with the abovementioned total number of points, and each individual search term is attributed a specific index. For example, the search term ‘climate change’ is attributed an index of 0,5 points. If ‘climate change’ occurs in a document, for instance, 36 times, it only scores 0,5 points in the abstract level subset. As such, if a document scores 2 points, it is likely that a combination of search words belonging to the abstract level subset comprise that score.



**Figure 6.1**

Indexing of the various subsets according to the three orders of policy change  
(Cashore & Howlett, 2007; Howlett & Cashore, 2009)

However, throughout this iterative process in which the validity of the indexing was tested, it appeared that the refined data-set still contained false positives. The primary reason for this was the difference in corpus sizes, or the difference in lengths of texts. For example, the webscrape retrieved numerous environmental impact assessments and municipal budget outlines. It is likely that a 300-page document discussing the municipal budget for the coming year mentions terms such ‘sustainability’ or ‘solar panels’, thereby disproportionality boosting the score of the document. Another selection criterion was therefore applied to further refine the data-set. In collaboration with the expert, a threshold was developed entailing that at least 2,5% of the total amount of words in a document should involve the search terms that were formulated. Whereas this threshold appeared to be able to cancel out false positives such as the ones we mentioned above, it was noticed that this threshold left out true positives as well. Therefore as a final step, the following threshold was formulated: documents having scored at least 5 points and in which at least 1% of the total amount of words are search terms. The documents that meet these criteria were therefore considered relevant (and so climate change and sustainability-related) documents for the purpose of this chapter. Out of the 4,873,766 documents retrieved, a total of 143,425 documents met the threshold. Within the resulting dataset, I mined the texts for search terms specific to LLCEIs.

#### 6.3.4 Text mining for the second time: LLCEIs

Having formulated the thresholds to ensure that the dataset comprises of government documents about climate change and sustainability, search words specific to LLCEIs were formulated. In order to assess the extent to which LLCEIs receive attention in the selected documents, firstly a list of 19 synonyms of LLCEIs was created that are commonly used by governments to depict LLCEIs, e.g. local energy initiative, collective citizen initiative, local energy cooperative, and so on (see Appendix F) (having a closer look at the appendix shows that more than 19 synonyms were



formulated, but these include different spellings of identical words). These synonyms were largely derived from experiences the researcher has had with in-depth case studies and policy documents pertaining to the support for LLCEIs by governments and intermediaries that can be found in the previous chapters. To resolve the issue of search word polysemy (e.g. when the search word ‘local initiative’ could potentially refer to something different from an LLCEI), certain search words were attributed a set of context terms (such as ‘citizens’, ‘village’, ‘community’) that needed to co-occur whenever this search word is found (see Appendix F).

As a next step, a list of search terms was formulated that would capture the ways in which local governments cover the topic of LLCEIs. Here, the various objectives, support tools and instruments that are expected to be employed by local governments vis-à-vis LLCEIs are operationalized (described in Sections 6.2.2 and 6.2.3). As such, this chapter applies a theory-driven approach to text-mining, which deviates from the data-driven approach that the majority of text-mining studies apply. Various subcategories containing search words were formulated that would shed light onto the ways and extent to which LLCEIs occur in municipal documents. The following a priori categories were defined that were derived from the core concepts that have been outlined in Sections 6.2.2 and 6.2.3: approach, policy goal, instrument, experiment, intermediary, municipal council, and involvement (see Appendix G). Each category consists of smaller subcategories containing a set of associated search words. For instance, the category ‘instrument’ comprises inter alia of the subcategory ‘instrument – financial’, which contains search words such as ‘financial support’, ‘start-up costs’, and ‘loan’. Similar as how the validity of the selection criteria was determined for creating the data-set (described in Section 6.3.3), here another process of trial-and-error was followed to ascertain the validity of the search terms. For instance, it was found that the concept ‘alleviating barriers’ needed to be adjusted to retrieve synonyms of ‘alleviate’ and ‘barrier’ as well, and to also take into account instances where the word ‘barrier’ comes before ‘alleviate’. Other concepts were broadened, e.g. ‘economy’ as a policy goal was complemented with the search words ‘job’ and ‘employment’.

### 6.3.5 Co-occurrence and frequency analysis

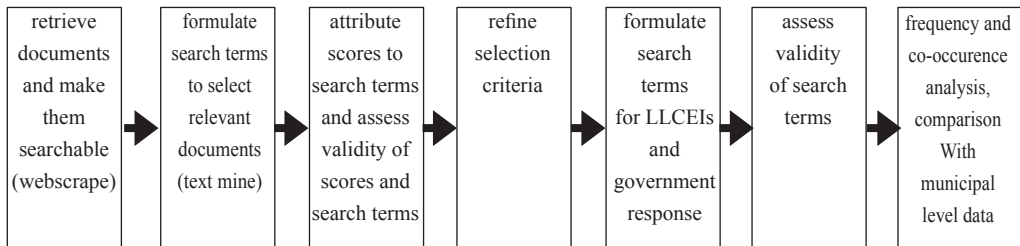
To assess government attention for LLCEIs in climate change and sustainability council documents, the frequencies of LLCEI keywords are counted as well as instances in which LLCEI keywords co-occur with the search words concerning government’ objectives, instruments or tools. For the latter, those concepts are exposed that occur in the same unit of text, in this case, sentences. This is known as a co-occurrence based method of analysis. The assumption here is that concepts that occur in the same unit of text have a tendency to be related (Rodriguez-Esteban, 2009; Weeber *et al.*, 2001). In text mining efforts, sentences are often used as unit of analysis and appear to be effective in assessing the co-occurrence of concepts (Ding *et al.*, 2001; Krallinger *et al.*, 2008; Matsuo & Ishizuka, 2004; Weeber *et al.*, 2001). In the analysis, common abbreviations in the Dutch language are listed as exceptions

for the rule where the algorithm considers a sentence as a bag of words between two periods.

This means that whenever an LLCEI synonym co-occurs with, for instance, the keyword ‘subsidy’, it is assumed that the government that published the document in concern used the word ‘subsidy’ in the context of LLCEIs. As such, this chapter looks at the thematic analysis of LLCEIs in council documents. Such analysis does not consider the context in which words occur nor the positive or negative attributions of keywords. As such, the co-occurrences can only be interpreted as proxy-indicators for the general shape and content of local governments’ agenda setting and attention giving to LLCEIs.

### 6.3.6 Recapitulation of the data-collection and analysis process.

In sum, two levels of analysis are applied in this chapter: (i) the attention allocated by local governments to LLCEIs (i.e. total word frequencies and co-occurrences), and (ii) the influence of urbanization degree, number of inhabitants and problem pressure on local governments’ attention allocated to LLCEIs. The entire data-collection and analysis process is visualized in Figure 6.2.



**Figure 6.2**

Process of web scrape and text mining

## 6.4 An overview of Dutch local government attention to LLCEIs

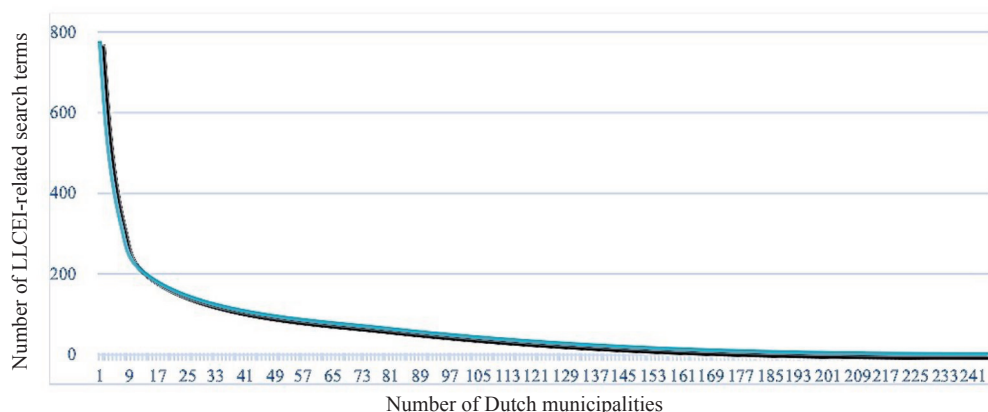
### 6.4.1. LLCEI search terms

Over 143,000 climate documents were mined for LLCEIs search terms. From this collection of documents, 1,838 documents were retrieved that contained search terms related to LLCEIs. In 245 of the 341 municipalities, LLCEI search terms were observed, meaning the LLCEIs were mentioned at least once in the retrieved documents. As such, from the 341 municipalities where documents were retrieved from, 96 municipalities did not mention LLCEI search terms in their documents. Table 6.3 presents an overview of the descriptive statistics. Figure 6.3 presents a graph showing the number of times LLCEIs are mentioned by Dutch municipalities. As can be seen in Table 6.3, the extreme minimum and maximum values (i.e. 777 times and 1 time LLCEI related search terms are found) are put into perspective by the mean of 65.

**Table 6.3**  
Descriptive statistics

Number of documents retrieved	4,873,766
Number of climate documents retrieved ( <i>i.e. documents having scored at least 5 points and in which at least 1% of the total amount of words are climate-related search terms</i> )	143,425
Number of climate documents retrieved with LLCEI search terms	1,838
Number of municipalities from which documents were retrieved	341
Number of municipalities that mentioned LLCEIs at least once	245
Minimum number of times LLCEIs are mentioned in municipal climate documents	1
Maximum number of times LLCEIs are mentioned in municipal climate documents	777
Mean of number of times LLCEIs are mentioned in municipal climate documents	65
Median of number of times LLCEIs are mentioned in municipal climate documents	33
Standard deviation of number of times LLCEIs are mentioned in municipal climate documents.	95.65

As can be seen in Figure 6.3, the majority of the municipalities mention LLCEI search terms less than 35 times in all of their climate related documents. Municipalities that are 'high score' outliers are Amsterdam (777 LLCEI search terms), Arnhem (649 LLCEI search terms), 's-Gravenhage (565 LLCEI search terms) and 's-Hertogenbosch (492 LLCEI search terms), all of which are urban municipalities. Amsterdam and The Hague are large municipalities (respectively 821,000 inhabitants and 514,000 inhabitants), while Den Bosch and Arnhem have each around 150,000 inhabitants. Lochem and Moerdijk, both lowly urbanized municipalities and respectively around 34,000 and 37,000 inhabitants, mentioned LLCEI search terms respectively 276 and 250 times.



**Figure 6.3**  
Number of LLCEI-related search terms by Dutch municipalities  
(SD = 95.65, Median = 33, Mean = 65)

What also sheds light into the extent to which LLCEIs are embedded in the local climate discourse, is when the number of documents in which LLCEI search terms are found is compared to the total number of climate-related documents retrieved by the webscrape. Table 6.4 presents the ‘high score’ outliers discussed briefly above, as well as two Frisian municipalities (Leeuwarden and Súdwest-Fryslân) that have been subject to extensive analysis in Chapters 4 and 5.

**Table 6.4**

Overview of a selection of municipalities and the number of climate and LLCEI related documents found.

Municipality	Number of LLCEI search terms found	Number of documents in which LLCEI search terms are found	Number of climate-related documents	Percentage of climate documents in which LLCEIs are mentioned	Number of LLCEIs in municipality
<i>Amsterdam</i>	777	109	1083	10%	6
<i>Arnhem</i>	649	37	265	14%	2
<i>'s-Gravenhage</i>	565	30	816	4%	5
<i>'s-Hertogenbosch</i>	492	77	345	22%	1
<i>Lochem</i>	276	34	88	39%	1
<i>Moerdijk</i>	250	21	121	17%	1
<i>Leeuwarden</i>	210	18	139	13%	5
<i>Súdwest-Fryslân</i>	125	20	90	22%	12

Table 6.4 indicates that the relatively high numbers of search terms need to be juxtaposed with the number of unique climate documents retrieved from the information management system of a municipality. As such, Súdwest-Fryslân ‘only’ mentioned LLCEIs 125 times, but did so in 22% of their climate documents. Alternatively, while The Hague mentioned LLCEI-related search terms 565 times, the municipality only did so in 4% of its climate documents. As could be learned from Chapter 5, as well as a study looking into the role of local government in supporting LLCEIs (Hoppe *et al.*, 2015), both Súdwest-Fryslân and Lochem direct substantial attention to LLCEIs, which is reflected in the percentage of climate documents in which LLCEI search terms are mentioned (respectively 22% and 39%).

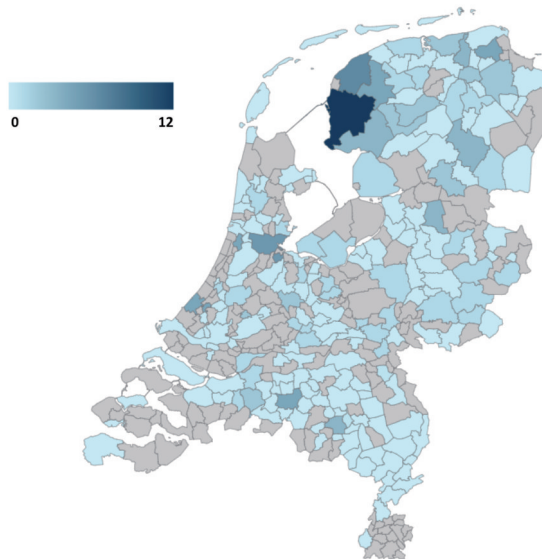
Furthermore, Súdwest-Fryslân is the municipality with the most LLCEIs located in its jurisdiction. As stated above in 245 of the 341 municipalities LLCEI search terms were observed. As such, from the 341 municipalities where documents were retrieved from, 96 municipalities did not mention LLCEI search terms in their documents. To put this into perspective, 184 out of these 341 municipalities (204 out of the in total 380 municipalities) have at least one LLCEI located in their jurisdiction, while 157 out of 341 (176 out of the in total 380 municipalities) municipalities have no LLCEIs located in their territory. Compared to the 96 municipalities that did not mention LLCEI-related search terms at all,

one can argue that LLCEIs have to a certain degree entered the agenda of municipalities. Even for those municipalities that have no LLCEIs situated in their territory.

**Table 6.5**  
Number of LLCEIs situated in municipalities

Number of LLCEIs	Number of municipalities
12	1 (Súdwest-Fryslân)
7	1 (Waadhoeke)
6	1 (Amsterdam)
5	5 (amongst others, Leeuwarden)
4	5
3	9
2	35
1	147
0	176

Figure 6.4 provides a map of the Netherlands that indicates the number of LLCEIs that are located in each municipality.



**Figure 6.4**

Map of the Netherlands showing the number of LLCEIs in each municipality, the legend indicates that the shades of blue correspond with the number of LLCEIs that are located in that municipality.

#### 6.4.1. Policy-related LLCEI search terms

In order to demonstrate in which ways LLCEIs have come to the attention to local governments, co-occurrences of search terms that capture specific approaches, policies

and goals with LLCEI-related search terms were counted. This section presents the results of the analysis of the degree of specificity in terms of goals and means in which LLCEIs are mentioned in policy documents of local governments.

Table 6.6 shows the policy-related search terms that co-occurred with LLCEI-related search terms. The search term ‘facilitate’, a type of governing mode, was mentioned the most in concurrence with an LLCEI-related search term (873 co-occurrences in 148 municipalities). Furthermore, other modes of governing that were mentioned often and by a fair number of municipalities are ‘collaborate’ (631 co-occurrences in 128 municipalities) and ‘stimulate’ (740 co-occurrences in 149 municipalities). As such, one can argue that local governments seem to incline to enabling modes of governing when it comes to their approach to supporting LLCEIs.

Another policy-related search term that co-occurred a notable number of times with an LLCEI-related search term is that of ‘participate’<sup>4</sup>, a search term that belongs to the sub-category ‘means of involvement’. The number of co-occurrences (803 co-occurrences in 138 municipalities) suggests that local governments aim to involve LLCEIs in certain processes. ‘Purchase energy’, another search word that belongs to the subcategory ‘means of involvement’ also co-occurred frequently (531 co-occurrences in 48 municipalities). As such, the number of counts implies a certain way local governments seek to engage LLCEIs and support the movement by functioning as a launching customer.

**Table 6.6**

Number of co-occurrences in municipalities of policy-related search terms with LLCEIs

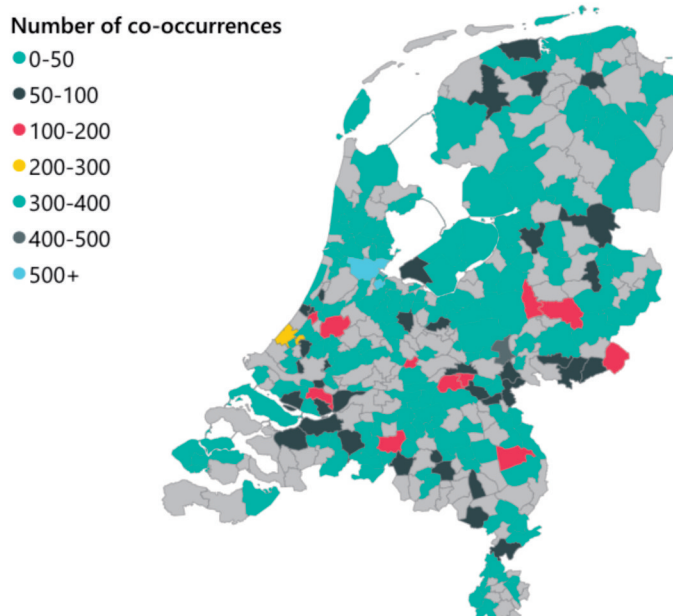
<b>Policy-related search terms</b>	<b>Number of municipalities</b>	<b>Number of co-occurrences</b>
<i>Approach - stimulate</i>	149	740
<i>Approach - facilitate</i>	148	873
<i>Means of involvement - participation</i>	138	803
<i>Approach - collaboration</i>	128	631
<i>Policy goal - energy</i>	78	224
<i>Approach - invest</i>	75	211
<i>Approach - coordinate</i>	73	236
<i>Instrument - subsidy</i>	71	318
<i>Intermediary - structure</i>	63	249
<i>Instrument- financial</i>	62	287
<i>Instrument - information</i>	59	173
<i>Instrument - knowledge</i>	57	136

<sup>4</sup> The search term participate unfolds in the following Dutch search words; participeren (participate), deelnemen (partake), for a complete overview of policy-related search words, see appendix G

**Table 6.6**  
Continued from page 257

<b>Policy-related search terms</b>	<b>Number of municipalities</b>	<b>Number of co-occurrences</b>
<i>Instrument - knowledge</i>	57	136
<i>Approach - network</i>	56	197
<i>Means of involvement – purchase energy</i>	48	531
<i>Approach - accelerate</i>	42	93
<i>Policy goal – public support</i>	39	140
<i>Instrument - partnership</i>	36	115
<i>Approach – scaling up</i>	35	86
<i>Policy goal - climate</i>	35	99
<i>Policy goal – local economy</i>	34	94
<i>Instrument - advise</i>	30	127
<i>Intermediary – Environmental federations</i>	26	142
<i>Means of involvement - influence</i>	20	47
<i>Policy goal - market</i>	19	59
<i>Experiment</i>	19	64
<i>Approach - encourage</i>	13	36
<i>Policy goal - awareness</i>	12	27
<i>Instrument - ESCO</i>	12	34
<i>Instrument - research</i>	10	43
<i>Policy goal - livability</i>	9	68
<i>Approach- alleviate barrier</i>	8	15
<i>Municipal council – material support</i>	8	31
<i>Instrument – construction fees</i>	6	63
<i>Means of involvement - consultation</i>	6	15
<i>Instrument – property tax</i>	3	15
<i>Policy goal - acceptance</i>	2	5
<i>Instrument – support by civil servants</i>	2	3
<i>Instrument - workshop</i>	2	5

Figure 6.5 shows a map of the Netherlands in which the number of co-occurrences of LLCEIs search terms and policy-related search terms are indicated for the individual municipalities. The figure shows that the category of 0-50 co-occurrences is observed the most.



**Figure 6.5**

Map of the Netherlands with categories of number of co-occurrences. The legend indicates seven categories with distinct colours which correspond with the number of co-occurrences.

Zooming into the various approach-related search terms that co-occurred with LLCEIs, Table 6.7 shows that one can confirm that the overall mode of governing that is pursued resembles an enabling mode of governing. The number of co-occurrences of the approach of ‘coordinate’ (which included the individual search terms ‘coordinate’, ‘initiate’, ‘direct’, ‘initiate’, ‘steer’, and ‘guide’), is notably less than the other approaches that signal a more enabling and facilitative mode of governing.

**Table 6.7**

Number of co-occurrences in municipalities of approach-related search terms and LLCEIs

<b>Approach-related search term</b>	<b>Number of co-occurrences</b>	<b>Number of municipalities</b>
<i>Stimulate</i>	740	149
<i>Facilitate</i>	873	148
<i>Collaborate</i>	631	128
<i>Invest</i>	211	75
<i>Coordinate</i>	236	73
<i>Network</i>	197	56
<i>Accelerate</i>	93	42
<i>Scale-up</i>	86	35
<i>Encourage</i>	36	13
<i>Alleviate barriers</i>	15	8



In terms of specific policy goals that are mentioned in close vicinity with LLCEI search terms, one can observe that the number of co-occurrences and municipalities overall is less when compared with the number of co-occurrences on approach-related search terms. This suggests that the end to which local governments support LLCEIs is not always defined. Public support as a policy goal is mentioned relatively frequently (140 counts, 39 municipalities). Chapter 5 indeed showed that public support is an indicator for local governments to support LLCEIs, and that LLCEIs play a role in fostering public support for local low-carbon energy. As expected, climate and low-carbon energy search terms also co-occurred frequently with LLCEI-related search terms. Other, more indirect policy goal-related search terms, i.e. ‘liveability’ and ‘local economy’, which are aspects often mentioned by initiators of LLCEIs to be core values, were not mentioned by many municipalities (respectively 9 and 34 municipalities).

**Table 6.8**

Number of co-occurrences in municipalities of policy goal-related search terms and LLCEIs

<b>Policy goal-related search term</b>	<b>Number of co-occurrences</b>	<b>Number of municipalities</b>
<i>Energy goal</i>	224	78
<i>Public support</i>	140	39
<i>Climate</i>	99	35
<i>Local economy</i>	94	34
<i>Market</i>	59	19
<i>Awareness</i>	27	12
<i>Liveability</i>	68	9
<i>Acceptance</i>	5	2

The number of co-occurrences of policy instrument-related search terms yield interesting insights into the types of instruments mentioned in conjunction with LLCEIs (see Table 6.9). ‘Financial’ and ‘subsidy’ have the highest number of counts and are mentioned by the most municipalities. Chapter 4 showed that the overall majority of LLCEIs received start-up capital from their respective local governments. Chapter 5 also showed that local governments are inclined to providing start-up subsidies to LLCEIs. The number of co-occurrences suggests that this can be observed in other regions (next to Fryslân and Overijssel) as well.

**Table 6.9**

Number of co-occurrences in municipalities of policy instrument-related search terms and LLCEIs

<b>Policy instrument-related search term</b>	<b>Number of co-occurrences</b>	<b>Number of municipalities</b>
<i>Subsidy</i>	318	71
<i>Financial</i>	287	62

**Table 6.9**  
Continued from page 260

<b>Policy instrument-related search term</b>	<b>Number of co-occurrences</b>	<b>Number of municipalities</b>
<i>Information</i>	173	59
<i>Knowledge</i>	136	57
<i>Partnership</i>	115	36
<i>Advise</i>	127	30
<i>ESCO</i>	34	12
<i>Research</i>	43	10
<i>Construction fees</i>	63	6
<i>Property tax</i>	15	3
<i>Support by civil servants</i>	3	2
<i>Workshop</i>	5	2

While Chapter 5 showed that some local governments adjusted property taxes or construction fees, the number of municipalities mentioning these search terms is rather low; only three municipalities mentioned ‘property tax’ in combination with LLCEIs, and only six municipalities mentioned ‘construction fees’ in the direct vicinity of LLCEI-related search terms. This may imply, similar to what has been observed with regard to the type of approaches mentioned in the documents retrieved, that local governments opt for types of policy instruments that are not associated with more authoritative modes of governing (i.e. spatial planning). This observation is also confirmed by the co-occurrences of ‘information’, ‘knowledge’ and ‘partnership’, which are also mentioned frequently and by a notable number of municipalities.

Table 6.10 shows that participation co-occurred a notable number of times with an LLCEI-related search term. The number of co-occurrences (803 co-occurrences in 138 municipalities) suggests that local governments aim to involve LLCEIs in certain processes. ‘Purchase energy’ also co-occurred frequently (531 co-occurrences in 48 municipalities). As such, the number of counts of this search term implies that local governments seek to engage LLCEIs and support the movement by functioning as a launching customer.

**Table 6.10**

Number of co-occurrences in municipalities of involvement-related search terms and LLCEIs

<b>Involvement-related search term</b>	<b>Number of co-occurrences</b>	<b>Number of municipalities</b>
<i>Participation</i>	803	138
<i>Purchase energy</i>	531	48
<i>‘Having a say’</i>	47	20
<i>Consultation</i>	15	6

## 6.5 Conclusions

This chapter set out with the research question of “*in which ways and to which degree of specificity in terms of goals and means, are LLCEIs mentioned in policy documents of local governments in The Netherlands?*”

In 245 out of the 341 municipalities in The Netherlands (the information management systems of 39 municipality were not accessed), LLCEI search terms were observed, meaning the LLCEIs were mentioned at least once in the retrieved documents. As such, from the 341 municipalities where documents were retrieved from, 96 municipalities did not mention LLCEI search terms in their documents. To put this into perspective, 184 out of 341 municipalities (in total 204 out of 380 municipalities) have at least one LLCEI located in their jurisdiction, while 157 out of 341 (in total 176 out of 380 municipalities) municipalities have no LLCEIs located in their territory. Compared to the 96 municipalities who did not mention LLCEI-related search terms at all, one can argue that LLCEIs have to a certain degree entered the agenda of municipalities. Even for those municipalities that have no LLCEIs situated in their territory. In line with Oteman *et al.* (2017), this study gave indication of a relatively widespread uptake of LLCEIs in local policies and governance arrangements.

Overall, co-occurrences of LLCEI-related words and approach-related search terms (e.g. facilitate, collaborate, stimulate, accelerate), were observed the most in comparison to other categories of policy-related search terms. This is an indication that LLCEIs penetrated a rather abstract policy level. More specific policy-related search terms, such as specific policy instruments or goals occurred relatively less. This suggests that, at least in the found documents, local governments incline towards more generic accounts of how they substantiate their attention for LLCEIs. This indeed was also observed in Chapter 5, where local governments were found to reside to impromptu responses to the emergence of LLCEIs. More strategic and programmatic attention to LLCEIs was found, as Chapter 5 presented, at the regional level. In sum, ‘stimulate’, ‘facilitate’ and ‘collaboration’ as approaches; ‘participate’ as means of involvement; ‘energy’ as policy goal; and ‘subsidy’ as policy instrument are the search terms that occurred the most in their respective categories. In contrast to what was expected and what other studies have indicated; acceptance and awareness co-occurred relatively less (Wolsink, 2012; Walker *et al.*, 2007; Viardot, 2013).

This being said, the co-occurrence analysis also provided insights into the mode of governing that are assumed to portray the municipal attention for LLCEIs. The co-occurrences of approach-related search terms and policy instrument-related search terms indicate that search terms associated with enabling modes of governing occurred the most. Search terms that can be depicted as concepts belonging to more authoritative modes of governing occurred comparatively less.

The analysis also showed that theory-driven web scraping and text mining has potential for (climate) policy research. The method showed that specific aspects and particular

themes pertaining to the climate policy domain could be retrieved rather effectively amongst a large group of Dutch municipalities. Still, the way the text mining method was applied in this chapter is rather generic, as more advanced text analysis methods are available (except not for the researcher at the time of this study). More advanced methods can determine the sentiment (i.e. positive or negative) of a sentence, which gives more insights into whether local governments mention LLCEIs in a supportive context. Thus, future studies policy studies in general could benefit from web scraping and text mining methods as an approach to assessing agenda setting and government attention to policy issues quantitatively.

The limitations of this study mainly have to do with its underlying assumptions. For one, by solely investigating published municipal documents, the risk exists that support provided by municipalities to LLCEIs that cannot be traced in documents is left out of the research scope of this study. Furthermore, although the indexing of documents was established on multiple trial-and-errors, search terms were developed with solely one domain expert. Nonetheless, the reliability of the search terms is rather strong, as the documents found are produced by individuals that are involved with municipalities, as such, the linguistics and vocabulary are assumed to be rather similar. This being the case, theory-driven text-mining for policy research is a promising field to further uncover. This study concerns the first effort to assess government attention for LLCEIs on a national scale in the Netherlands. Based on the results of the study, replication of the approach is also suggested for other countries. This would provide insights into the extent to which community energy has entered the climate policy domain. This can be considered an important means to assess the degree to which EU Member States (in this study, the focus was on local government documents, and not on the implementation of the EU Renewable Energy Directive) have developed legislation and regulatory frameworks to acknowledge, govern and support renewable energy communities.

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# Chapter 7

## Conclusions



The separate yet strongly connected parts of this dissertation come together in this final chapter. At the outset of this doctoral study, it was made clear that this thesis aimed to fulfill one paramount objective: to provide a comprehensive and profound account of the array of factors that influence the success and further development of LLCEIs. Chapters 2 and 3 were a significant step towards that objective. These chapters showed the plethora of factors involved in LLCEI success as well as the complexities that vex the ambitions and operations of LLCEIs. Chapters 4 and 5 delved into the specificities of the governance arrangements that are argued to be crucial for the further development of LLCEIs. Chapter 6 provided an overview of the extent to which and in which ways LLCEIs have entered the agenda of Dutch local governments.

This chapter provides a synthesis of these accounts and reflects on the findings of this dissertation. Section 7.1 provides summaries of the answers to the research questions that have been elaborately discussed in the individual chapters of this dissertation. Section 7.2 provides directions for future research. Lastly, Section 7.3 reflects on the implications of the findings for society, government and the energy market.

## **7.1 Answering the research questions**

This subsection recapitulates the answers to the research questions of this dissertation. In this dissertation, the two main research questions were:

- 1 *What are the factors that contribute to explaining the variation in success of Local Low-Carbon Energy Initiatives (LLCEIs) in the Dutch region of Fryslân?*
- 2 *How do governance actors support or obstruct the success and further development of LLCEIs?*

Each of the sub-questions that help to answer the main research questions will be discussed further below.

*1A What are the variables that influence the success of LLCEIs in the academic literature?*

Sub-question 1A was answered in Chapter 2. In an extensive literature study, the topic of LLCEI success was approached from various scientific disciplines such as sociology, social geography, institutional theory and literature on non-profit organizations. This multidisciplinary approach was an important step towards grasping the various aspects that relate to LLCEI success. As a result, a comprehensive theoretical framework was created comprising of fourteen independent variables and one dependent variable (i.e. success of LLCEIs). The theoretical framework proposed that the success of LLCEIs is influenced by a group of factors that can roughly be divided into three dimensions: the LLCEI itself; the interaction between the LLCEI and the local community; and the governance settings at hand.

*IB To what extent do the factors of sub-question 1A contribute to explaining variation the success of low-carbon energy initiatives in the Dutch region of Fryslân?*

The theoretical framework that was created in Chapter 2 was subsequently tested empirically using a cross case study design with fourteen Frisian LLCEIs. The analysis of the Frisian LLCEIs showed that factors stemming from the three different areas all mattered in different ways for LLCEI success. Instead of viewing success as a one-dimensional dependent variable, four indicators were used to measure it. These involved: the number of customers the LLCEI recruited for the regional energy supplier; the number of customers of the regional energy supplier relative to the total number of households in the locality; the realized low carbon energy and energy efficiency projects for individual households, and lastly realized collective low carbon energy projects. The analysis showed that not all factors were important for the same measure of success. This complicates any effort to give a concise answer to the first of the two main research questions.

This being the case, bonding social capital was positively and significantly correlated to both measures of customer success, while the use of cultural heritage and bridging social capital were only positively and significantly correlated to the number of customers relative to the total number of households in the locality. For success measured in terms of projects realized for individual households, the following factors appeared to be of importance: the presence of project champions; the flexibility to use time; the institutional embeddedness of the LLCEI; the linkage with local government; and the presence of a supportive governance arrangement. The following factors mattered to success for collective projects: the presence of relevant human capital; the flexibility to use time; and the ability to raise funds. There were also a number of strong yet hardly non-significant positive correlations. All of these were not significant at the standard .05 level, but would be significant at the .1 level that is also sometimes used when studying a small number of cases. The factors project champion and linkage with intermediaries were positively correlated to collective success but less significant than the standard .05 level. Similarly, human capital, size and visibility were positively (yet by a small margin non-significantly) correlated to individual household projects success. For success measured in number of customers, the linkage with government as well as a supportive governance arrangement were positively and almost significantly correlated. Lastly, institutional embedding was positively and almost significantly related to success in terms of the relative number of customers on the total number of households in the locality.

The findings of Chapter 3 demonstrate that the success of LLCEIs is closely tied to the socio-spatial settings and institutional structures at hand. Notwithstanding these unique case-specific influences, there is the important role that governance arrangements and governance actors may have in providing for a fertile soil in which these grassroots initiatives are more likely to succeed and further develop. This was exactly the focus of the second part of this doctoral thesis.

As became apparent from sub-questions 1A and 1B that answered the first main research question, not all LLCEIs are success stories. They are in need of support. Sub-questions 2A, 2B, and 2C unravel the content, shape and scale of this support.

*2A To what extent does the further development of LLCEIs depend on the completeness and coherence of the strategies and roles employed by intermediaries?*

This research question is a follow-up question for the answer to the first main research question of this dissertation. The answer to sub-question 2A starts with a similar observation as the one underlying the answer to research question 1. The support that LLCEIs require to further develop, is threefold: the need for capacity building and embedding in the local community; the alleviation of barriers related to existing institutions and established practices; and (3) opening up the existing fossil-fuels and centralized production based energy regime for the acceptance and uptake of LLCEIs. The central assumption that guided this research question is that the success of support for LLCEIs is determined by the extent to which it addresses these issues altogether. Here, intermediaries were suggested as a part of the solution as they are suited to deal with the complex interplay of these issues. To answer the research question, specific strategies, roles and accompanying activities that intermediaries may employ to support LLCEIs were derived from the literature and integrated in a comprehensive analytical framework.

The results of the empirical analysis show that in the Frisian context, the intermediary support structure, comprising of the Energy Workshop, umbrella cooperative Ús Koöperaasje, regional energy supplier Energie VanOns, and the province of Fryslân is rather complete and coherent as it addresses the needs of LLCEIs for further development. As the number of LLCEIs increased, so did the overall coherence of the support provided by intermediaries. The different intermediary actors started institutionalizing their collaborative activities, ensuring that the various aspects that pertain to the successful support of LLCEIs were integrated in a comprehensive support structure. As such, the support structure not only provides LLCEIs with direct measures of capacity-building, but also helped LLCEIs with the embedding of their projects in their local communities. Whenever possible, learned lessons were standardized and shared amongst the LLCEIs. Additionally, an institutional infrastructure was created which gave weight to the Frisian community energy sector. This entails that the Frisian LLCEI grassroots movement became more organized and institutionalized. An overarching business model was established which provided the LLCEIs with a steady flow of income when they recruited customers for the regional energy supplier that was established for their cause.

As LLCEIs still have to find their way within the boundaries of the existing regime, the intermediaries link LLCEIs to existing policy and institutional frameworks. The intermediaries also look forward in the sense of engaging in innovative processes that could have the potential to break through the existing regime, such as creating a specific guarantee of origin for LLCEIs as a response to green washing of guarantees



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of origin, and striving to develop novel financial constructions such as an Energy Service Company for homeowners.

For some of these innovations pushed forward by these intermediaries as well as the intermediary support structure itself, government played an important facilitating role by providing subsidies and loans. Apart from all the important roles and activities fulfilled by intermediaries to support the success and further development of LLCEIs, governments remain a major influence as to shaping the playing field in which LLCEIs are situated. Existing practices, institutional arrangements and policy frameworks may hamper the development of LLCEIs. As such, the innovative ways in which governments respond to the emergence of LLCEIs was the focus of the next chapter.

*2B In what ways do local and regional governments innovate in governing to respond to the emergence of LLCEIs?*

As was already suggested in the answer to the previous sub-question, existing institutional and policy frameworks and settings shape the future prospects of LLCEIs. Subnational government in particular can have a role in promoting the development of LLCEIs by engaging in innovative practices of governing. In order to substantiate this role, a meta-governing approach of experimentation was conceptualized that characterizes the innovations in governing that emerge when governments respond to the emergence of LLCEIs. It is argued that governments employ two specific capacities to enhance their governing capacities vis-à-vis LLCEIs: institutional adaptation and policy innovation. Institutional adaptations and policy innovations in turn could be categorized on a continuum ranging from an authoritative mode of governing to an enabling mode of governing. The results of the analysis of the Dutch regions of Fryslân and Overijssel provide interesting insights in the ways that subnational governments respond to the emergence of LLCEIs.

The results show a balancing process of authoritative and enabling modes of governing particularly characterized the type of policy innovations that were developed and the institutional adaptation that took place. Both provinces govern LLCEIs at arm's length and issue significant capacity-building strategies that vary in terms of their conditions. Municipalities, however, incline towards impromptu and opportunistic responses, some of them having lasting effects by patching up existing institutional settings, others having more of an episodic character.

Although LLCEIs are perceived by governments as additions to their own strategies or vehicles that can help them to achieve their climate mitigation targets, LLCEIs still find themselves in an arena that is restricted by political preferences for spatial quality, ambiguous sources of legitimacy and restrictive legislation. This points to a two-sided interpretation of the balancing process of both modes of governing. On the one hand, governments, in innovative ways, employ authoritative and enabling modes of governing in their response to the emergence of LLCEIs. On the other hand, governments integrate authoritative and conventional elements in enabling

mechanisms to ensure a degree of influence over the self-organizational processes of LLCEIs. As such, in these meta-governing arrangements, traditional mechanisms can be used innovatively and innovative enabling practices may come with rather traditional elements.

The results of this comparative case study yield interesting insights into the ways in which governments respond. However, one of the limitations of this study is that it does so on a relatively small scale (and with extreme cases). Furthermore, the (embedded) cases only show instances in which governments actually respond in particular ways to the emergence of LLCEIs. The extent to and in which ways LLCEIs have come to the attention of local governments in the Netherlands was the focus of Chapter 6.

*2C In which ways and to which degree of specificity in terms of goals and means, are LLCEIs mentioned in policy documents of local governments in The Netherlands?*

Chapter 6, in which this research question was answered, provides useful insights into how LLCEIs enter Dutch local policy arrangements. By means of web scraping and text mining methods, the policy documents of 341 municipalities were analyzed in order to investigate the ways and degrees of specificity in terms of goals and policy means that LLCEIs are mentioned. The underlying assumption is that by counting co-occurrences of LLCEI-related and policy-related words, one could assess the extent to which LLCEIs have come to the attention of local governments. The search terms, coinciding categories, and selection criteria were formulated through an iterative process in which a domain expert was involved.

Results show that co-occurrences of LLCEI-related words and policy approach-related search terms (e.g. facilitate, collaborate, stimulate, accelerate), were observed the most in comparison to other categories of policy-related search terms. This is an indication that LLCEIs have reached a rather abstract policy level. More specific policy-related search terms, such as specific policy instruments or goals occurred less often. This suggests that, at least in the documents retrieved, local governments incline towards more generic accounts of how they substantiate their attention for LLCEIs. This indeed was also observed in Chapter 5, where local governments were found to reside to impromptu responses to the emergence of LLCEIs. In sum, search terms like ‘stimulate’, ‘facilitate’ and ‘collaboration’ as approaches; ‘participate’ as means of involvement; ‘energy’ as policy goal; and ‘subsidy’ as policy instrument occurred the most in their respective categories

## **7.2 Implications for future research**

This dissertation took the activities and operations that grassroots initiatives engage in and the barriers they encounter as a source of academic inspiration, instead of studying and theorizing how these activities may add to a transition of existing socio-technical systems. In doing so this dissertation has provided a rich empirical account of fourteen cases in which the practical complexities and particularities involved in the success of

LLCEIs was fleshed out in a profound way. Other studies have focused on one or few cases (e.g. Forrest & Wiek, 2015; Rogers, Simmons, Convery, & Weatherall, 2012; Sperling, 2017; Süsser, Döring, & Ratter, 2017), which limits the strength of their theoretical implications as well as their external validity. Large-N studies, on the other hand, fail to grasp the intricacy of the underlying mechanisms involved (e.g. Feola & Nunes, 2014; Seyfang, Park, & Smith, 2013). Other multiple case studies have focused only on a few theoretical factors (e.g. van der Schoor & Scholtens, 2015). Indeed, in order to grasp this complexity and make sense out of it, this dissertation provides three different theoretical frameworks (in Chapters 2, 4 and 5) – each being a crucial piece of this complex puzzle. Other studies have commonly focused on a specific aspect (or few aspects) that assists in explaining success (e.g. von Bock und Polach, Kunze, Maaß, & Grundmann, 2015), while this dissertation provides a comprehensive picture of the mechanisms and factors involved.

Leading up to these theoretical frameworks were three extensive literature studies that provided insights in how a relatively novel phenomenon, that is LLCEIs, could be related to other academic disciplines and fields of research. In so doing, this doctoral thesis has drawn on several fields of research that could be conceived as somewhat unconventional. As such, one of the key merits of this dissertation is its multidisciplinary character. The potency of this multidisciplinary approach was validated by the findings of this dissertation. For instance, in Chapter 4, the support provided by intermediaries could be analyzed from the perspective of endogenous development theory, which assumes that localities can use cultural symbols such as regional language and folklore to revitalize the local economy. Furthermore, the intricate relation between an LLCEI and the local community was usefully substantiated by propositions that were derived from organizational theory and social geography. Chapter 3 indeed confirmed the importance of a fruitful interaction between an LLCEI and its local community for LLCEI success.

The theoretical (and empirical) contributions of this dissertation are therefore manifold. Firstly, it was revealed that the success of LLCEIs depends on a configuration of factors that arise from capacities related to the LLCEI itself, the embeddedness of the LLCEI in the local community, and the governance settings at hand. Importantly, the dissertation showed that these sets of factors are also heavily intertwined. This research has been the first in its kind to conduct a variable-oriented cross-case comparison (on fourteen cases) to explain for variation in success of LLCEIs. The results have been promising enough to state that future research should focus on the same three aspects influencing LLCEI success but this time in other countries to assess whether the framework also applies to other institutional settings.

Secondly, the dissertation has demonstrated that locality is a choice for LLCEIs. LLCEIs that focus on a locality that can be considered a system of local social relations are better capable to realize their projects through these relations. As the low-carbon energy installations realized by the LLCEIs in this study not necessarily had a great impact on the landscape (i.e. roof-based solar PV), the intricate connection between the

local community and a place still played a role in their success (compare van Veelen & Haggett, 2016). As such, it is highly recommended that future research further looks into the mechanisms of such place attachment for low-carbon energy developments with a limited impact on the landscape.

Thirdly, this dissertation complements the existing body of knowledge by substantiating the various strategies, roles and activities intermediaries may employ to foster the success and further development of LLCEIs (Creamer *et al.*, 2018). One of the most dominant perspectives in this regard is the Strategic Niche Management school of thought (e.g. Hargreaves, Hielscher, Seyfang, & Smith, 2013; Ruggiero, Martiskainen, & Onkila, 2018; Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014; Smith, Hargreaves, Hielscher, Martiskainen, & Seyfang, 2015) that substantiates the role of intermediaries in mainstreaming innovations to bring about a system transition. Again, instead of choosing a single lens to examine the support for LLCEIs provided by intermediaries, other perhaps unconventional perspectives showed their merit in analyzing the Frisian intermediary support structure. The results showed that LLCEIs benefit from, amongst others a business incubator approach and the Asset-Based Community Development approach as these strategies were able to support LLCEIs in different ways, crucial for their further development. The Asset-Based Community Development approach, for instance, builds on the capacities and assets that are present, instead of focusing on needs and deficiencies. The framework developed to map out the various strategies, roles and activities of intermediaries is useful for researchers that want to assess the coherence and completeness of support structures in other contexts so that possible caveats in the support structure can be illuminated.

Fourthly, this doctoral research provided in-depth theoretical and empirical insights into the ways in which governance arrangements take shape to support LLCEIs. The roles and activities of various key actors in the community energy sector were fleshed out. This dissertation shows that success and governance of LLCEIs is very much a polycentric endeavor in which multiple scales, spaces and arenas come together and overlap. In the context of more networked forms of governance in the climate policy domain, local and regional government remain important drivers of policy innovation and institutional adaptation that can provide a productive breeding ground for these LLCEIs to further develop. Theoretical notions and frameworks created for the international climate governance were applied to the local context. Governments not only facilitate the grassroots movement, but indeed – as also observed in the UK context (Markantoni, 2016) – also implement top-down and more authoritative oriented measures. The conditions and criteria for LLCEI support are not always clear at the outset. The support for LLCEIs as such is heavily fragmented; at arm's length governing by governments is increasing. Future research should look further into the implications of these emerging governance arrangements for issues such as accountability, legitimacy, the principle of legal certainty, and safeguarding democratic values. In similar vein, an aspect that has been highlighted briefly in this thesis but does deserve more attention is the gender aspect involved in the LLCEI movement. One promising avenue to address these issues and that increasingly receives attention

in the community energy literature is that of ‘energy democracy’ (e.g. Simcock, 2016; Van Veelen, 2018; REScoop.EU, 2015).

Lastly, this dissertation provided a rich account of the Frisian-Dutch LLCEI movement. By focusing on LLCEIs in one region, several potentially influential background variables could be kept at a constant such as spatial planning policies, available subsidies and grants, and the presence of one Distribution System Operator. Studying LLCEIs within a relatively homogenous institutional context allowed the researcher to illuminate and differentiate between the agentic capacities of LLCEIs.

### **7.3 Societal and policy implications**

Through the course of history, societal structures and social institutions have changed. Tribes and communities that dictated social behavior and instilled people with a sense of identity have almost perished in modern western liberal-democracies. In the wake of individualism and globalization, people still search for safe havens in all sorts of (also online) communities. The potential of LLCEIs is therefore clear: to invigorate this sense of belonging and identity, a sense of place, and to carry out a shared vision to make the world a better place for future generations. Although seemingly successful in terms of the sheer number of customers that some of these LLCEIs recruited, there is still much more to win. With few exceptions, LLCEIs struggled to recruit customers, members, and sufficient participants for their projects. They struggled to reach beyond the group of typically green-minded people who are (already) willing to pay more for an energy bill if it means that their energy comes from a local, sustainable source. For decades, energy security and energy supply have been, and still are, taken for granted in the Netherlands. LLCEIs that succeed in finding a way in which they can reach those individuals that are not necessarily green-minded, strike gold. Communicating in ways other than the local newspaper or the local village council is already a step in the right direction. LLCEIs have not used social media to their full potential, as most of them are relatively inactive. Even more important, as could be observed in the case studies, is a personal approach. The LLCEIs that met face-to-face with people and which put in effort to recruit each individual customer and participant were successful in attracting relatively large numbers of customers and participants. The unique selling point of LLCEIs is ultimately the fact that they are closer to home than your usual multinational energy firm. Trust is therefore a key facilitator for the realization of distributed generation and collective ownership of low-carbon energy.

The majority of the projects pursued by LLCEIs imply substantial financial investments. This leaves various societal groups disengaged from the LLCEI movement such as children, students, young families, unemployed people, and low-income households. This is not an issue that is solely related to the LLCEI movement per se; notions such as energy poverty and energy justice have hardly trickled down to the Dutch national climate change policy discourse. The fact that LLCEIs emerge from the bottom-up does not ensure that these issues are dealt with accordingly, nor is it a guaranteed recipe for the acceptance of low-carbon energy installations. If the full potential of LLCEIs is to

be realized, taking into consideration societal groups that are disproportionately susceptible to the consequences of climate change is an important prerequisite.

LLCEIs align with the western liberal agenda of a participative society: a society that is empowered and actively solves their own problems with their own solutions. Within the realm of decentralized energy production, the European federation of LLCEIs, REScoop, pursues the values of energy democracy, which imply an enhanced sense of democratic and community control of energy generation, distribution, and the energy system itself (REScoop.eu, 2015). In the broader context of the energy transition such a participative society was conceptualized by Maarten Hajer as the ‘Energetic Society’, or “a society of articulate individuals and companies with fast learning curves, who themselves form a source of energy” (Hajer, 2011, p. 29). According to Hajer, it is the task of the government to enable and facilitate this societal change. This was again confirmed in the Dutch National Energy Agreement (2013), where the importance of the Energetic Society for the Dutch energy transition was mentioned once again. In this dissertation, I illuminated that in particular local and regional facilitators and governments have an important role to play to encourage and enable this process

This dissertation showed that intermediaries provide (tailored) support to LLCEIs which importantly builds LLCEIs’ capacities. Furthermore, the Frisian context showed that by creating an institutional infrastructure in which LLCEIs could be embedded, LLCEIs were granted an opportunity to become players of significance on the energy market. In doing so, the Frisian intermediary support structure anticipated the new Energy directive’s call to provide for a level playing field for LLCEIs.

Staying on the subject of the new Energy directive, throughout this study the term LLCEI was used, and a specific definition was given. During the course of this study, the Council of the European Union proposed a definition for renewable energy communities. According to the new energy directive, a renewable energy community is a legal entity:

- which, according to applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects owned and developed by that community;
- whose shareholders or members are natural persons, local authorities, including municipalities, or SMEs;
- whose primary purpose is to provide environmental, economic or social community benefits for its members or the local areas where it operates rather than financial profits.

Two aspects of the definition provided by the council differ from mine. Firstly, my definition also includes those activities of LLCEIs related to energy efficiency. As the study showed, LLCEIs are also active in stimulating its members of install energy efficiency measures in their own houses. Whereas my definition did not specifically

refer to the element of control by shareholders or members, the very legal entity that in general Dutch LLCEIs choose (i.e. a cooperative form), members control the decision-making processes within the LLCEI. An important resemblance of both definitions is the local character of these LLCEIs. In this dissertation, I profoundly argued for the role of place and how LLCEIs use different spatial networks to realize their local, place-specific goals. Although my definition and that of the council differ, the results of my research remain pivotal in understanding what is needed to accelerate the LLCEI movement.

This being the case, subnational governments are still in search of their role in establishing collaborations with LLCEIs that emerge from the bottom-up on the one hand, and developing mechanisms to mobilize active citizenship in the generation of low-carbon energy on the other hand. In this process – that is characterized by an absence of institutionalized communication between municipalities on this matter – there is a notable degree of fragmentation and variability in the support for LLCEIs. At times LLCEIs are rewarded by local government with a great deal of skepticism and in other instances with significant start-up capital with hardly any strings attached. This uncovers an important friction; that of the co-existence of representative and participative structures of democracy. Grassroots initiatives are judged on their degree of public support (in Dutch ‘draagvlak’), but how this is defined is not always clear. Additionally, governments predominantly engage with the project champions, who are often the ‘usual suspects’ of the community (Taylor, 2007) and not ‘their’ constituency. As such, the extent to which LLCEIs truly represent the interests of their locality is not always clear, and governments struggle to determine this as well. Overarching criteria and guidelines for the support of LLCEIs should harness the legal principle of equality, as well as the representativeness of the LLCEI.

As LLCEIs are managed by volunteers, they lack certain capacities such as a back office or financial capital that professional project developers do have. The advantages of their (often presumed) public support and community acceptance for their envisioned low-carbon energy installations are undermined by the absence of these capacities. Financial investment funds that are indirectly managed by public actors (such as the provincial investment funds) should make exceptions for socially innovative low-carbon energy developments, that is, LLCEIs. Additionally, in various occasions the feasibility of the business case depended on the physical connection to the grid. As such, the further development of LLCEIs would also benefit greatly from enhanced communication with the Distribution System Operator in order to determine locations that are both close to the grid and which have sufficient capacity.

One of the key questions that remains is what the future outlook of LLCEIs will be. As could be observed from the case studies, many LLCEIs are carried by committed, enthusiastic volunteers. Voluntary organizations such as local sports clubs and community centers are familiar with the everlasting challenge to retain volunteers. As such, one of the defining characteristics of the grassroots energy movement – it’s

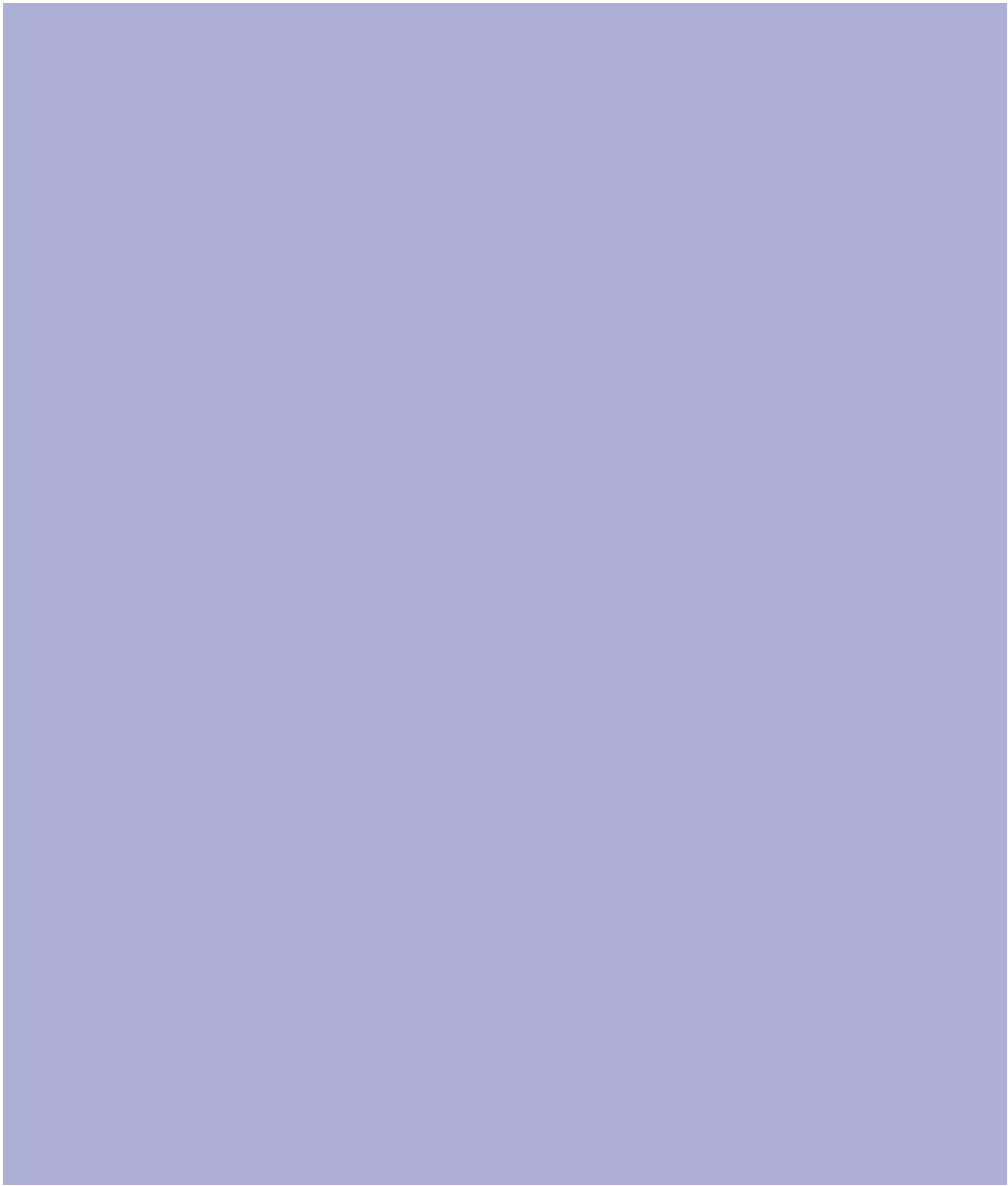
bottom-up, activist and voluntary nature – is also one of its weaknesses. While LLCEIs are booming in Europe (over 1,500 LLCEIs have connected to the European federation REScoop, a representative non-profit association for LLCEIs), it remains difficult to speculate about the sustainability of the movement itself. Especially since this dissertation showed cases of de facto discontinued LLCEIs, or LLCEIs that were at the brink of termination. One solution could be to merge individual LLCEIs and to centralize certain administrative tasks. But as history has shown, Dutch local energy companies dating from the early 20th century also merged and in the end grew out to be the very multinationals that the LLCEIs compete with. The grassroots energy transition is one that is infused with challenges and uncertainties, but holds great potential.

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## **Appendices**



## Appendix A: First wave of Frisian LLCEIs

**Table A1.**  
First wave of Frisian LLCEIs.

Name of initiative	Date of establishment	Type of wind turbine(s)
<i>Stichting Wynmole Reduzum (+ Idaerd and Friens)</i>	1992	225 kW "Micon M700" wind turbine.
<i>Dorpsmolen Tjerkweerd</i>	1986	One 80 kW 'Lagerwey' wind turbine. After a while a second wind turbine, a Micon of 225 kW. These were replaced in 1997 by 5 wind turbines of 600 kW each. In 2000, eight 1,3 MW wind turbines replaced the 1997 wind turbines. The community has a share in those wind turbines.
<i>Dorpsmolen Ternaard</i>	1992	Five 80 kW 'Lagerwey' wind turbines.
<i>Dorpsmolen Dearsum</i>	1987	One 160 kW wind turbine.
<i>Stichting WIEK / Windenergie Kubaard</i>	1993	Two 80 kW 'Lagerwey' wind turbines. In 2013, the Lagerweys were replaced by two 750 kW "Micons 750/48" wind turbines and one 300 kW "Bonus" wind turbine.
<i>Stichting Doarpsmûne Reahus</i>	1993	One 80 kW 'Lagerwey' wind turbine.
<i>Stichting Dorpsmolen Pingjum</i>	1994	One 80 kW '18-80 Lagerwey' wind turbine. In 2009, the wind turbine was dismantled, the foundation participated in a large scale wind farm with 7.75% worth of shares.

<b>Projects financed by wind turbine(s)</b>
Financed solar PV panels for the local school (4,4 kWp), the sport centre (5,5 kWp), and sports café (3,3 kWp).
Subsidized an array of socio-cultural community projects with a total budget of €10,000. Yearly income of around €40.000 is spent in the village.
Solar PV panels on the village house, co-financed the youth center, and assisted in realization business area.
Financed a manure digester installation. After 10 years the wind turbine broke down (in 1998). Repairs needed for the manure digester could not be financed, leading to the closing of the manure digester as well. In 2006, the wind turbine was dismantled.
Financed 48 solar PV panels for the local school, and insulation measures for the village house. Subsidized an array of socio-cultural community projects with 25% of the income generated by the low-carbon energy projects in the village. Financed EPA scans for individual households.
Financed solar PV panels for the local school, a playground, and the renovation of the village house. Subsidizes various activities in the village.
Financed solar PV panels on the village house, 110 solar PV panels on the local school, the renovation of the roof of the sports center and solar PV panels on the roof. Subsidizes socio-cultural community activities.

**Table A.**  
Continued from page 287

<b>Name of initiative</b>	<b>Date of establishment</b>	<b>Type of wind turbine(s)</b>
<i>Stichting Wynmole Reduzum (+ Idaerd and Friens)</i>	1992	225 kW "Micon M700" wind turbine.
<i>Dorpsmolen Tzum / Stichting MAST</i>	1994	One 225 kW "Micon M700" wind turbine.
<i>F.K.W.W.I. Wommels</i>	1996	One 250 kW wind turbine, replaced later on by one 750 kW 'NEG MICON' wind turbine.
<i>Moleferiening uté Lyte</i>	1994	One 225 kW "Micon M700" wind turbine.
<i>Fereining Doarpsmunen Wyns, Bartlehiem, Tergreft</i>	1993	Two 225 kW "Micon M700" wind turbines.
<i>Stichting Wynturbine De Twa Doarpen</i>	1994	One 80 kW "Lagerwey 18-80" wind turbine.
<i>Dorpsmolen Skuzum</i>	1996	One 225 kW "Micon M750" wind turbine.

<b>Projects financed by wind turbine(s)</b>
Financed solar PV panels for the local school (4,4 kWp), the sport centre (5,5 kWp), and sports café (3,3 kWp).
Financed solar PV panels on the village house and the local school. Subsidizes socio-cultural community activities
Financed equipment for various sport associations.
Financed solar PV panels on the village house and subsidized solar PV panels for individual households.
/
Subsidizes socio-cultural community activities.
Subsidizes socio-cultural community activities.

## Appendix B: Population of Frisian LLCEIs

**Table B.**

Population of Frisian LLCEIs and their projects, ordered according to organizational age

Name of initiative	Date of establishment (day-month-year)	Area of operation/ locality	Number of house-holds
Amelander Energie Coöperatie	2009	Municipality / Island	1,590
Energie Coöperatie Achter de Hoven	30-6-2012	Urban district	1,370
Energie-coöperatie de Eendracht – Oostellingwerf	July 2012	Municipality	11,104
Lokale Energie Coöperatie Opsterland (LECO)	February 2013	Municipality	12,340
Coöperatie Duurzaam Koudum	8-2-2013	Village	1165
Leefbaar met Energie Feanwâlden (LEF)	2-3 February 2013	Sub-region, group of villages	1,500
Coöperatie Vlieland Energie	15-10-2013	Municipality / Island	550
Energie Coöperatie Dongeradeel (Ecodon)	3-12-2013	Municipality	10,185
Doniawerstal Energie	12-12-2013	Sub-region, group of villages	2,755
Energie Coöperatie Aengwirden	End of 2013	Sub-region, group of villages	690
Energie Coöperatie Gaasterland	3-1-2014	Sub-region, group of villages	2,165

<b>Number of clients in May 2017</b>	<b>Percentage of clients relative to total number of households</b>	<b>Low-carbon energy projects</b>
636	40%	Realized a solar PV farm of 23,000 solar PV panels. 145 hybrid heat pumps, helped dozens of households with insulation measures.
7	0,5%	Organized collective buying of solar PV panels for around 120 households, realized a crowd-funded solar PV roof of 81 panels on school. Arranged energy saving measures for households.
70	0,6%	Realized a collective solar PV project of 200 panels with use of the national tax-reduction scheme.
3	0,02%	Plans to install 5000 solar PV panels on roofs of firms in Gorredijk. Is in the process of realizing a collective solar PV panel project of 200 panels.
/	/	Organized collective buying of solar PV panels for individual households (already 4 have taken place). Organizes household level thermal scans and energy saving measures for households.
5	0,3%	Organized collective buying of solar PV panels for individual households.
/	/	Realized a solar PV farm of 3680 panels, 1MW installed capacity.
52	0,5%	Explores opportunities for a collective solar PV project on the roof of a firm by making use of the national tax-reduction scheme.
111	4%	Realized 225 solar PV panels on a roof of an agricultural firm in Tjerkgaarst by making use of the national tax-reduction scheme.
12	1,7%	Realized 137 solar PV panels on the community center.
77	3,6%	Realized a collective solar PV project of 250 solar PV panels by making use of the national tax-reduction scheme. Around 370 solar PV panels were effectuated by the collective buying of solar PV panels for individual households.



**Table B.**  
Continued from page 291

Name of initiative	Date of establishment (day-month-year)	Area of operation/ locality	Number of house-holds
Duurzaam Akkrum-Nes (DAN)	13-1-2014	Two villages	1,845
Trynergie	3-2-2014	Sub-region, group of villages	3,515
Energie coöperatie Ternaard (ENCOTER)	April 2014	Village	525
Energie Coöperatie Westeinde (ECW)	21-5-2014	Urban District	1,815
Terherne “De Poask”	26-5-2014	Village	370
Coöperatie Pingjum	10-6-2014	Village	270
De Sintrale/ Duurzame Energie Coöperatie Schier-monnikoog	June 2014	Municipality / Island	495
EKON (Energzij Kooperaasje Om (de) Noorder-polder)	26-6-2014	Multiple villages	5,703
Energiecoöperatie Duurzaam Woudsend (EDW)	17-7-2014	Sub-region, group of villages	635

Number of clients in May 2017	Percentage of clients relative to total number of households	Low-carbon energy projects
55	2,9%	/
110	3,1%	Organized individual household-level measures and plans are made to realize a collective roof-based solar PV panel project that makes use of the national tax-reduction scheme. The project involves 7 roofs having each 200 solar PV panels, amounting to 1400 panels in total. Organized multiple times the collective buying of solar PV panels for individual households. Some of the collective buying was organized before the actual establishing of the cooperative. 2012: 137 solar PV panels, 32,880 Wp 2013: 524 solar PV panels, 125,640 Wp 2014: 314 solar PV panels, 79,565 Wp 2015: 281 solar PV panels, 72,386 Wp 2016 till May: 93 solar PV panels, 24,129 Wp
4	0,8%	Emerged from Foundation wind turbines Ternaard. Cooperative itself buys solar PV panels for members, members pay monthly rent. 15 households had each up to 12 solar PV panels installed.
9	0,5%	Has a green light for a large solar PV farm of 3,6 acres, 12,000 solar PV panels. Developed a roadmap for energy neutral district, and organized individual household energy saving measures. Organized multiple times the collective buying of solar PV panels for individual households, which effectuated at least 520 panels
23	6,2%	
30	11,1%	Owns wind turbines dating from the 1990s.
/	/	/
5	0,08%	Realized 1206 solar PV panels with a capacity of 350 kWp on a roof of an agricultural business.
22	3,5%	Has a wind turbine dating from 1999. Realized 638 solar PV panels (individual household level). Realized a collective solar PV panel project (of 210 panels) on the roof of the local community center.

**Table B.**  
Continued from page 293

Name of initiative	Date of establishment (day-month-year)	Area of operation/ locality	Number of house-holds
Griene Enerzjy Koöperaasje Easterein (GEKE)	3-10-2014	Village	385
Energie Kúbaard	17-10-2014	Village	95
Enerzjy Koöperaasje Garyp	24-10-2014	Village	720
De Bildste Energie Coöperatie	1-11-2014	Municipality	4,494
Coöperatie “Duurzaam Heeg”	8-11-2014	Village	920
Enerzjy Koöperaasje Westergeast	13-11-2014	Village	230
Enerzjy Koöperaasje Easterwier-rum (EKE)	22-12-2014	Village	135
Energie Coöperatie Westelling-werf, (ENCOWE)	5-1-2015	Municipality	11,127
Duorsume Enerzjy Boalser t (DEBo)	29-2-2015	City	5,530
KRIGEL (Nij Beets)	17-3-2015	Village	660
Energiecoöperatie ‘Meinoar Grien’	8-4-2015	Municipality	3,632
Grieneko	19-5-2015	Sub-region, group of villages	310

<b>Number of clients in May 2017</b>	<b>Percentage of clients relative to total number of households</b>	<b>Low-carbon energy projects</b>
29	7,5%	/
35, 46 in dec. 2018	48,4%	Realized a collective solar PV project of 200 panels. Has 2 wind turbines of each 34 meters that were constructed in 1994.
50	6,9%	Realized a 27,000 solar PV panel farm on a former waste disposal site.
30	0,7%	Has its own energy front office (“energieloket”). Plans for realizing a collective solar PV panel roof (of 200 panels) in seven villages by making use of the national tax-reduction scheme. Found 7 owners that make their roofs available. Similar project as Trynergie.
44, 55 in dec. 2017	5,9%	Realized a collective project of 255 solar PV panels on two roofs by making use of the national tax-reduction scheme. Seeks participants for a second project with a similar scale.
16	7%	Realized a collective solar PV panel roof of 200 panels by making use of the national tax-reduction scheme.
49	36,3%	/
6	0,05%	Organized household level thermal scans.
24	0,4%	Has a physical front office that is open every Friday from 8 till 9 pm.
24	3,6%	Explores possibilities for a collective solar PV panel roof. Organized energy saving measures for households, such as thermal scans.
15	0,4%	Plans to develop three collective roof-based solar PV projects by making use of the national tax-reduction scheme. One project of 200 solar PV panels has been realized.
28, 49 in nov. 2018	15,8%	Started project for making around 30 houses energy neutral. Did not follow through, but LLCEI managed to assist in making 6 houses energy neutral. Collective buying of solar PV panels for individual households effectuated around 250 panels. Realized two collective solar PV projects of 220 solar PV panels each.

**Table B.**  
Continued from page 295

Name of initiative	Date of establishment (day-month-year)	Area of operation/ locality	Number of house-holds
Coöperatie Boksum Energie(k)	9-7-2015	Village	170
Wommelser Enerzjy Koöperaasje (WEK)	18-9-2015	Village	940
Wijnjewoude Energie Neutraal (WEN)	15-10-2015	Village	845
Energie Coöperatie Spannum	26-10-2015	Two villages	125
Enerzjy Koöperaasje Aldeboarn	October 2015	Village	645
Poppenwier Enerzjy Koöperaasje	2015 4-12-2015	Village	75 475
Terschelling Energie	20-2-2016	Municipality / Island	2,450
Enerzjy Koöperaasje De Harkema	29-2-2016	Village	1,730
Dorp Centraal	9-3-2016	Sub-region, group of villages	1,235
Nij Altoenae Energie Neutraal 2020 (NEN 2020)	June 2016	Village	120
Coöperatie Energiek Goutum	Mid 2016	Village	1,115
Enerzjy Koöperaasje Duorsum Berltsum-Wier	22-6-2016	Two villages	1,150
Energie Coöperatie Ijlst	2016	City	1,390

<b>Number of clients in May 2017</b>	<b>Percentage of clients relative to total number of households</b>	<b>Low-carbon energy projects</b>
25	14,7%	/
47	5%	Realized a collective solar PV panel roof of 200 panels by making use of the national tax-reduction scheme.
6	0,71%	Organized individual household-level insulation measures. Plans for realizing an energy park with solar PV panels, energy storage and biogas.
16	12,8%	/
6	0,9%	/
23	30,7%	/
10	2,1%	Organized household level thermal scans.
/	/	/
/	/	Realized insulation measures for around 20 households.
13	1%	/
3	2,5%	Realized a collective solar PV panel roof of 224 panels by making use of the national tax-reduction scheme.
7	0,6	/
/	/	Explores opportunities for a collective solar PV panel roof of 200 panels.
/	/	Has plans for 1500 solar PV panels on multiple roofs.

## Appendix C: Overview of interviewees and participant observation

**Table C1.**  
Overview of interviewees

Function	Organization	Case
Chair	Amelander Energie Coöperatie	Amelander Energie Coöperatie
Coordinating civil servant low-carbon energy	Municipality of Ameland	Amelander Energie Coöperatie
Project leader	Energy firm	Amelander Energie Coöperatie
Secretary	Trynergie	Trynergie
Member of the board	Trynergie	Trynergie
Alderman	Municipality of Tytsjerksteradiel	Trynergie
Chair	Energie Coöperatie Gaasterland	Energie Coöperatie Gaasterland
Policy advisor Sustainable Development	Municipality of Súdwest- Fryslân	Energie Coöperatie Gaasterland, Coöperatie Duurzaam Heeg
Civil servant Environment and Village coordinator	Municipality of de Fryske Marre	Energie Coöperatie Gaasterland, Doniawerstal Energie
Secretary	Doniawerstal-Energie	Doniawerstal-Energie
Member of the Board	Doniawerstal-Energie	Doniawerstal-Energie
Member of the Board	Doniawerstal-Energie	Doniawerstal-Energie
Chair	Coöperatie Duurzaam Heeg	Coöperatie Duurzaam Heeg
Member of the Board	Coöperatie Duurzaam Heeg	Coöperatie Duurzaam Heeg
Chair, secretary, treasurer, project leader, technical advisor	Energie Coöperatie Westeinde	Energie Coöperatie Westeinde
Chair	Energie Coöperatie Westeinde	Energie Coöperatie Westeinde
Policy advisor district and village policy	Municipality of Leeuwarden	Energie Coöperatie Westeinde
Energy coordinator	Municipality of Leeuwarden	Energie Coöperatie Westeinde, Energie Coöperatie Achter de Hoven
Policy advisor Sustainability	Municipality of Leeuwarden	Energie Coöperatie Westeinde, Energie Coöperatie Achter de Hoven
Projectleader Empowerment and Mienskip	Municipality of Leeuwarden	Energie Coöperatie Westeinde, Energie Coöperatie Achter de Hoven

**Table C1.**  
Continued from page 298

<b>Function</b>	<b>Organization</b>	<b>Case</b>
Teamleader Advice and Development	Municipality of Leeuwarden	Energie Coöperatie Westeinde, Energie Coöperatie Achter de Hoven
Secretary and treasurer	Energie Coöperatie Achter de Hoven	Energie Coöperatie Achter de Hoven
Chair (interviewed twice)	Grieneko	Grieneko
Civil servant Environment	Municipality of Littenseradiel	Grieneko, Energie Kûbaard, Energzy Koöperaasje Easterwierrum
Chair	Energie Kûbaard	Energie Kûbaard
Member of the Board	Energzy Koöperaasje Easterwierrum	Energzy Koöperaasje Easterwierrum
Secretary (interviewed twice)	Energzy Koöperaasje Om (de) Noorderpolder (EKON)	Energzy Koöperaasje Om (de) Noorderpolder (EKON)
Civil servant Sustainability	Municipality of Menameradiel	Energzy Koöperaasje Om (de) Noorderpolder (EKON)
Chair (interviewed twice)	Wijnjewoude Energie Neutraal	Wijnjewoude Energie Neutraal
Project leader, Advisor of Board	Wijnjewoude Energie Neutraal	Wijnjewoude Energie Neutraal
Advisor Water and Environment	Municipality of Opsterland	Wijnjewoude Energie Neutraal, Lokale Energie Coöperatie Opsterland
Chair	Lokale Energie Coöperatie Opsterland	Lokale Energie Coöperatie Opsterland
Chair	Energie Coöperatie “De Eendracht”	Energie Coöperatie “De Eendracht”
Ex-Chair	Energie Coöperatie “De Eendracht”	Energie Coöperatie “De Eendracht”
Policy advisor Environment	Municipality of Oostellingwerf	Energie Coöperatie “De Eendracht”
Advisor	Ús Koöperaasje	For all cases
Advisor	Doarpswurk	For all cases
PR manager	Grid operator	For all cases
Provincial Executive	Province of Fryslân	For all cases
Theme and proces coordinator regional development	Province of Fryslân	For all cases
Project leader and advisor Sustainable Innovations	Province of Fryslân	For all cases



**Table C2.**  
Instances of participant-observation data collection.

<b>Goal and output</b>	<b>Organization</b>	<b>Event</b>	<b>Case</b>
Workshop about how the province responds to LLCEIs. Survey among 8 provincial civil servants, workshop in which the results were discussed.	Province of Fryslân	Survey and workshop	For all cases
Focus group sessions were about what actors are involved in the realization of a low-carbon energy project, and what hurdles have to be overcome. Two transcripts of two sessions.	Trynergie, Municipality of Tytsjerksteradiel, Province of Fryslân	Focusgroup, two sessions	Trynergie
Meeting about how local governments experience LLCEIs and how Doarpswurk can support local governments. Transcript of the workshop.	Doarpswurk, Municipalities of Súdwest-Fryslân, de Fryske Marre, Opsterland, and Tytsjerksteradiel	Workshop	Trynergie, Wijnjewoude Energie Neutraal, Duurzaam Heeg, Doniawerstal-energie, Lokale Energie Coöperatie Opsterland
Focus groups where participants reflected on preliminary findings of the doctoral study. Transcript of the session.	Municipality of Leeuwarden, Province of Fryslân, Trynergie, Mijn Gaasterland, Energie Coöperatie Westeinde, Grieneke, Doarpswurk	Focusgroup	Trynergie, Mijn Gaasterland, Energie Coöperatie Westeinde, Grieneke

## Appendix D: Municipalities not included

**Table D**  
Municipalities not accessed by means of webscrape.

	<b>Municipality</b>	<b>Information Management System</b>
1	Aalburg	Website
2	Alblasserdam	Website
3	Asten	Website
4	Beesel	Website
5	Bernheze	Website
6	Bladel	Website
7	Bodegraven-Reeuwijk	Parlaeus
8	Boekel	Website
9	Brielle	Website
10	De Fryske Marren	CompanyWebcast
11	Delft	CompanyWebcast
12	Delfzijl	CompanyWebcast
13	Doesburg	Notubiz
14	Ermelo	Notubiz
15	Gouda	Website
16	Haarlemmermeer	Website
17	Harderwijk	CompanyWebcast
18	Haren	CompanyWebcast
19	Heemskerk	Website
20	Heeze-Leende	CompanyWebcast
21	Houten	Notubiz
22	IJsselstein	Website
23	Loon op Zand	CompanyWebcast
24	Marum	CompanyWebcast
25	Montfoort U	CompanyWebcast
26	Papendrecht	Website
27	Peel en Maas	CompanyWebcast
28	Renswoude	Notubiz
29	Reusel-De Mierden	GemeenteOplossingen
30	Simpelveld	iBabs
31	Staphorst	Notubiz
32	Tytsjerksteradiel	iBabs
33	Utrechtse Heuvelrug	Notubiz
34	Vaals	iBabs
35	Waalre	Website
36	Westerwolde	Website
37	Woudrichem	CompanyWebcast
38	Zederik	Website
39	Zoeterwoude	Website

## Appendix E: Search terms

Theme	Search word	Score
<i>Abstracte doelen/beleidsvoorkeuren (max 2 punten)</i>		
Duurzaamheid	Duurzaamheid	0,5
Duurzaamheid	verduurzamen	0,5
Duurzaamheid	verduurzaming	0,5
Duurzaamheid	duurzaamheidstransitie	0,5
Duurzaamheid	Duurzame ontwikkeling	0,5
Duurzaamheid	zelfvoorzien	0,5
Duurzaamheid	onafhankelijk	0,5
Duurzaamheid	circulair	0,5
Duurzaamheid	Biobased econom	0,5
Duurzaamheid	cradle-to-cradle	0,5
Duurzaamheid	Mobiliteit	0,5
Duurzaamheid	Transport	0,5
Duurzaamheid	C2C	0,5
Klimaat	Klimaat	0,5
Klimaat	Klimaatverandering	0,5
Klimaat	klimaatneutraal	0,5
Klimaat	klimaatbestendig	0,5
Klimaat	klimaatmitig	0,75
Klimaat	klimaatadapt	0,75
Klimaat	Klimaatvisie	1,5
Klimaat	Klimaatagenda	1,5
Klimaat	Klimaatambitie	1,5
Klimaat	Klimaatstrategie	1,5
Klimaat	Klimaatnot	1,5
Klimaat	Klimaatbeleid	1,5
Klimaat	Energiebeleid	1,5
Klimaat	Klimaatprogramma	1,5
Klimaat	Energievisie	1,5
Klimaat	Duurzaamheidsvisie	1,5
Klimaat	Klimaatvisie	1,5
Klimaat	Energievisie	1,5
Klimaat	Duurzaamheidsagenda	1,5
Klimaat	klimaatagenda	1,5
Klimaat	Energieagenda	1,5
Klimaat	Ambitiedocument	1,5
Klimaat	Duurzaamheidsambitie	1,5
Klimaat	Klimaatambitie	1,5
Klimaat	Energieambitie	1,5
Klimaat	Duurzaamheidsnotitie	1,5
Klimaat	Duurzaamheidsnota	1,5
Klimaat	Energienotitie	1,5

**Table E**  
Continued from page 302

<b>Theme</b>	<b>Search word</b>	<b>Score</b>
Klimaat	Energienota	1,5
Klimaat	Duurzaamheidsbeleid	1,5
Klimaat	Milieubeleid	1,5
Klimaat	Klimaatbeleid	1,5
<i>Geoperationaliseerde beleidsdoelen en instrumenten (max 3 punten)</i>		
C02	Co2 neutraal	0,75
C02	Co2 reductie	1,5
C02	Co2 uitstoot	1,5
Eenheden	Petajoule	2
Eenheden	PJ	2
Eenheden	Kilowattuur	2
Eenheden	KWH	2
Eenheden	Megawatt	2
Eenheden	MW	2
Eenheden	gigawatt	2
Eenheden	GW	2
Eenheden	terajoule	2
Eenheden	tj	2
Eenheden	Kiloton	2
Eenheden	Kton	2
Energie	hernieuwbare energie	0,75
Energie	duurzame energie	0,75
Energie	energiezuinig	0,75
Energie	energievoorziening	0,75
Energie	energiebewust	0,75
Energie	groene stroom	0,75
Energie	Energietransitie	0,75
Energie	energiemaatregelen	1
Energie	duurzame innovatie	1
Energie	energiemanagement	1
Energie	elektrisch rijden	1,5
Energie	Milieuzone	1,5
Energie	energiebespar	1,5
Energie	energie bespar	1,5
Energie	energieproduc	1,5
Energie	energie produc	1,5
Energie	energie opwek	1,5
Energie	energieopwek	1,5
Energie	energieopslag,	1,5
Energie	energie efficiëntie	1,5
Energie	energieefficiëntie,	1,5
Energie	energieopgave,	1,5

**Table E**  
Continued from page 303

<b>Theme</b>	<b>Search word</b>	<b>Score</b>
Energie	Energiedoelen	1,5
Energie	Productie van	1,5
Energie	Programmaplan	2,5
Energie	waterstof,	2,5
<i>Geoperationaliseerde beleidsdoelen en instrumenten (max 3 punten)</i>		
Energie	biobrandstof,	2,5
Energie	Zon	2,5
Energie	Zonne-energie	2,5
Energie	Zonnestroom	2,5
Energie	Wind	2,5
Energie	Windenergie	2,5
Energie	Windstroom	2,5
Energie	Bio-energie	2,5
Energie	Biomassa	2,5
Energie	Biogas	2,5
Energie	Groen gas	2,5
Energie	Warmte	2,5
Energie	Restwarmte	2,5
Energie	Aardwarmte	2,5
Energie	bodemenergie	2,5
Energie	Bodemthermie	2,5
Energie	Geothermie	2,5
Energie	Bioenergie	2,5
Energie	energieneutra	2,5
Uitvoering	Duurzaamheidsstrategie	2,5
Uitvoering	Energiestrategie	2,5
Uitvoering	Klimaatstrategie	2,5
Uitvoering	Regionale energiestrategie	2,5
Uitvoering	Programma duurzaam	2,5
Uitvoering	Programma klimaat	2,5
Uitvoering	Klimaatprogramma	2,5
Uitvoering	Duurzaamheidsprogramma	2,5
Uitvoering	Duurzaamheidsuitvoeringsprogramma	2,5
Uitvoering	Uitvoeringsagenda	2,5
Uitvoering	Pva	2,5
Uitvoering	Plan van aanpak	2,5
<i>Specifieke toepassingen (max 5 punten)</i>		
Bio-energie	vergistingsinstallatie(s)	4,5
Bio-energie	bio-energieinstallatie	4,5
Bio-energie	bioenergieinstallatie	4,5
Geothermie	aardwarmteproject	4,5
Geothermie	bodemenergieproject	4,5

**Table E**  
Continued from page 304

<b>Theme</b>	<b>Search word</b>	<b>Score</b>
Geothermie	Warmtepomp	4,5
Geothermie	Geothermieproject	4,5
Toepassing	laadpaal/laadpalen,	3,5
Toepassing	slimme netten,	4,5
<i>Specifieke toepassingen (max 5 punten)</i>		
Warmte	warmteopslag	1,5
Warmte	Koude-warmteopslag (KWO)	2,5
Warmte	warmte-koudeopslag (WKO)	2,5
Warmte	warmtenet/	2,5
Wind	windmolen	4,5
Wind	windturbine	4,5
Wind	Dorpsmolen	4,5
Wind	windparken	4,5
Wind	windmolenpark	4,5
Wind	windturbinepark	4,5
Wind	windmolenproject	4,5
Wind	windturbineproject	4,5
Zon	zonnepanelen	3,5
Zon	zonnepark	4,5
Zon	zonneveld	4,5
Zon	zonnepanelenpark	4,5
Zon	veldopstelling	4,5
Zon	zonnepanelenproject	4,5
Zon	Grondgebonden zon	4,5

## Appendix F: Synonyms for LLCEIs

LLCEI synonyms	Context words
Burgerinitiatie	Enkel in combinatie met 'loka', 'klimaat', 'duurza', 'energie', 'zelfvoorzien', 'wind', 'zon' – woordafstand belangrijk
energiecoöperatie	
energie coöperatie	
buurtinitiatie	
energiecooperatie	
energie cooperatie	
loka energie initiatie	
loka energie-initiatie	
Dorpsinitiatie	
kleinschalig initiatie	
Wijkinitiatie	
Loka initiatie	Enkel in combinatie met individu, lokaliteit, en algemeen subjectwoorden
Burgercollectie	
buurtcollectie	
Inwonerscollectie	
Dorpscollectie	
Wijkcollectie	
actief burgerschap	
Loka duurza energie initiatie	
coöperatie	Enkel in combinatie met 'lokaliteit' subjectwoorden (buurt, wijk, dorp, kern) en 'burger' subjectwoorden (bewoner, burger, inwoner, omwonenden). Daarbij mogen deze subjectwoorden (uit 'lokaliteit' en 'burger') zowel VOOR als NA het woord coöperatie voorkomen.
Mienschap	in combinatie met 'initiatie', 'klimaat', 'duurza', 'energie', 'zelfvoorzien', 'wind', 'zon' – woordafstand belangrijk

## Appendix G: policy-related search terms

Search word	Context word	Category
pilot	/	Experiment
experiment	/	Experiment
living lab	/	Experiment
proeftuin	/	Experiment
ondersteuningsstructuur	/	Intermediair - structuur
platform	/	Intermediair - structuur
loket	/	Intermediair - structuur
op armlengte van	/	Intermediair - armlengte
milieu federatie	/	Intermediair - milieufederaties
natuur en milieufederatie	/	Intermediair - milieufederaties
natuur en milieu	/	Intermediair - milieufederaties
milieufederatie	/	Intermediair - milieufederaties
buiten de deur	/	Intermediair - armlengte
bewustw	/	Beleidsdoel - bewustwording
accept	/	Beleidsdoel - acceptatie
bespa	/	Beleidsdoel - besparing
opwek	/	Beleidsdoel - energiedoel
opgewek	/	Beleidsdoel - energiedoel
draagvlak	/	Beleidsdoel - draagvlak
economi	/	Beleidsdoel - lokale economie
klimaat	/	Beleidsdoel - klimaat
energievoorziening	/	Beleidsdoel - energiedoel
energieopgave	/	Beleidsdoel - energiedoel
krimp	/	Beleidsdoel - krimp
coördine	/	Aanpak - coördineren
regisse	/	Aanpak - coördineren
samenwerk	/	Aanpak - samenwerken
samen te werken	/	Aanpak - samenwerken
facilite	/	Aanpak - faciliteren
ondersteun	/	Aanpak - faciliteren
verbinden	/	Aanpak - netwerk
invester	/	Aanpak - investeren
geïnvesteed	/	Aanpak - investeren
opschale	/	Aanpak - opschalen
opgescha	/	Aanpak - opschalen
versnel	/	Aanpak - versnellen
accelere	/	Aanpak - versnellen
aanjage	/	Aanpak - aanjagen
aangejaagd	/	Aanpak - aanjagen
stimul	/	Aanpak - stimuleren
begeleid	/	Aanpak - coördineren
co-creatie	/	Aanpak - samenwerken



**Table G**  
Continued from page 307

<b>Search word</b>	<b>Context word</b>	<b>Category</b>
launching customer	/	Aanpak - investeren
wegnemen belemmering	wegnemen	Aanpak - wegnemen belemmering
wegnemen knelpunt	wegnemen	Aanpak - wegnemen belemmering
wegnemen barrière	wegnemen	Aanpak - wegnemen belemmering
co-productie	/	Aanpak - samenwerken
coproductie	/	Aanpak - samenwerken
coproduceren	/	Aanpak - samenwerken
co-produceren	/	Aanpak - samenwerken
subsidie	/	Instrument - subsidie
subsidies	/	Instrument - subsidie
gesubsidieerd	/	Instrument - subsidie
subsidieren	/	Instrument - subsidie
projectsubsidie	/	Instrument - subsidie
financi ondersteun	/	Instrument- financieel
financi bijdrage	/	Instrument- financieel
opstartkosten	/	Instrument- financieel
opstartkapitaal	/	Instrument- financieel
notariskosten	/	Instrument- financieel
seed money	/	Instrument- financieel
gemeentelijke gelden	/	Instrument- financieel
lening	/	Instrument- financieel
geld beschikbaar gesteld	/	Instrument- financieel
geld beschikbaar stellen	/	Instrument- financieel
garantstelling	/	Instrument- financieel
haalbaarheidsonderzoek	/	Instrument - onderzoek
haalbaarheidsstudie	/	Instrument - onderzoek
onroerendzakenbelasting	verla	Instrument - onroerendzaakbelasting
onroerendzakenbelasting	aanpas	Instrument - onroerendzaakbelasting
onroerendzakenbelasting	aangepast	Instrument - onroerendzaakbelasting
ozb	verla	Instrument - onroerendzaakbelasting
ozb	aanpas	Instrument - onroerendzaakbelasting
ozb	aangepast	Instrument - onroerendzaakbelasting
leges	verla	Instrument - leges
leges	aanpas	Instrument - leges
leges	aangepast	Instrument - leges
leges	uitgestel betaling	Instrument - leges
leges	uitstel	Instrument - leges
leges	vrijgesteld	Instrument - leges
leges	vrijstelling	Instrument - leges
legesverordening	verla	Instrument - leges
legesverordening	aanpas	Instrument - leges

**Table G**  
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<b>Search word</b>	<b>Context word</b>	<b>Category</b>
legesverordening	aangepast	Instrument - leges
legesverordening	uitgestel betaling	Instrument - leges
legesverordening	uitstel	Instrument - leges
legesverordening	vrijgesteld	Instrument - leges
legesverordening	vrijstelling	Instrument - leges
legesreductie	verla	Instrument - leges
legesreductie	aanpas	Instrument - leges
legesreductie	aangepast	Instrument - leges
legesreductie	uitgestel betaling	Instrument - leges
legesreductie	uitgestel	Instrument - leges
legesreductie	vrijstelling	Instrument - leges
legesreductie	vrijgesteld	Instrument - leges
pachtprijs	verla	Instrumenten - pacht
pachtprijs	aanpas	Instrumenten - pacht
pachtprijs	aangepast	Instrumenten - pacht
verklaring van geen bezwaar	/	Gemeenteraad - verklaring geen bezwaar
verklaring van geen bedenking	/	Gemeenteraad - verklaring geen bezwaar
grond beschikbaar stel	/	Gemeenteraad - materieel
dak beschikbaar stel	/	Gemeenteraad - materieel
betrok	/	Wijze van betrokkenheid - participatie
betrek	/	Wijze van betrokkenheid - participatie
particip	/	Wijze van betrokkenheid - participatie
consulta	/	Wijze van betrokkenheid - consultatie
consulte	/	Wijze van betrokkenheid - consultatie
zeggenschap	/	Wijze van betrokkenheid - zeggenschap
deelneming	/	Wijze van betrokkenheid - participatie
deelname	/	Wijze van betrokkenheid - participatie
deelnemen	/	Wijze van betrokkenheid - participatie
inspraak	/	Wijze van betrokkenheid - zeggenschap
inspreken	/	Wijze van betrokkenheid - zeggenschap
co-creëren	/	Aanpak - samenwerken
bestemmingsplanwijziging	/	Gemeenteraad - bestemmingsplanwijziging
ruimte beschikbaar stel	/	Gemeenteraad - materieel
bewustz	/	Beleidsdoel - bewustwording
energiearmoede	/	Beleidsdoel - energiearmoede
democra vernieuw	/	Beleidsdoel - democratische vernieuwing
vernieuw democra	/	Beleidsdoel - democratische vernieuwing
nieuw democra	/	Beleidsdoel - democratische vernieuwing
leefbaarheid	/	Beleidsdoel - leefbaarheid
leefba	/	Beleidsdoel - leefbaarheid
plattelandontwikkeling	/	Beleidsdoel - plattelandontwikkeling

**Table G**  
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Search word	Context word	Category
ontwikkeling rura	/	Beleidsdoel - plattelandsontwikkeling
rura ontwikkeling	/	Beleidsdoel - plattelandsontwikkeling
decentra opwek	/	Beleidsdoel - energiedoel
opwek decentra	/	Beleidsdoel - energiedoel
decentra opgewek	/	Beleidsdoel - energiedoel
loka opwe	/	Beleidsdoel - energiedoel
opwe loka	/	Beleidsdoel - energiedoel
baan	/	Beleidsdoel - locale economie
banen	/	Beleidsdoel - locale economie
werkgelegenheid	/	Beleidsdoel - locale economie
socia innov	/	Beleidsdoel - sociale innovatie
innovatie	/	Beleidsdoel - technologische innovatie
techno innov	/	Beleidsdoel - technologische innovatie
markt	/	Beleidsdoel - markt
marktwerking	/	Beleidsdoel - markt
sturen	/	Aanpak - coördineren
sturing	/	Aanpak - coördineren
regie	/	Aanpak - coördineren
gedelege	/	Aanpak - coördineren
delege	/	Aanpak - coördineren
initiëren	/	Aanpak - coördineren
geïnitieerd	/	Aanpak - coördineren
netwerk	/	Aanpak - netwerk
aanmoedig	/	Aanpak - stimuleren
belemmering wegge	/	Aanpak - wegnemen belemmering
belemmering wegne	/	Aanpak - wegnemen belemmering
knelpunt wegge	/	Aanpak - wegnemen belemmering
knelpunt wegne	/	Aanpak - wegnemen belemmering
barrière wegge	/	Aanpak - wegnemen belemmering
barrière wegne	/	Aanpak - wegnemen belemmering
financi bijgedra	/	Instrument- financieel
verle vergunn	/	Instrument - vergunning (verlenen)
vergunn verle	/	Instrument - vergunning (verlenen)
medewerk vergunning	/	Instrument - vergunning (medewerking)
vergunn medewerk	/	Instrument - vergunning (medewerking)
ambtelijk ondersteun	/	Instrument - ambtelijke ondersteuning
ondersteun ambte	/	Instrument - ambtelijke ondersteuning
kennis	/	Instrumenten - kennis
expertise	/	Instrumenten - kennis
advies	/	Instrumenten - advies
adviseren	/	Instrumenten - advies
inform	/	Instrumenten - informatie

**Table G**  
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Search word	Context word	Category
geïnformee	/	Instrumenten - informatie
cursus	/	Instrumenten - cursus
workshop	/	Instrumenten - workshop
inspiratiesessie	/	Instrumenten - workshop
train	/	Instrumenten - training
capaciteit bouw	/	Instrumenten - capaciteit bouwen
bouw capaciteit	/	Instrumenten - capaciteit bouwen
samenwerkingsverband	/	Instrumenten - samenwerkingsverband
partnerschap	/	Instrumenten - samenwerkingsverband
esco	/	Instrumenten - ESCO
energy service company	/	Instrumenten - ESCO
omgevingsvergunning verle	/	Gemeenteraad - omgevingsvergunning
verle omgevingsvergunning	/	Gemeenteraad - omgevingsvergunning
stel grond beschikbaar	/	Gemeenteraad - materieel
beschikbaar stel grond	/	Gemeenteraad - materieel
stel ruimte beschikbaar	/	Gemeenteraad - materieel
beschikbaar stel ruimte	/	Gemeenteraad - materieel
stel dak beschikbaar	/	Gemeenteraad - materieel
beschikbaar stel dak	/	Gemeenteraad - materieel
belemmering ophef	/	Aanpak - wegnemen belemmering
belemmering opgehev	/	Aanpak - wegnemen belemmering
belemmering oplos	/	Aanpak - wegnemen belemmering
belemmering opgelos	/	Aanpak - wegnemen belemmering
belemmering verwijder	/	Aanpak - wegnemen belemmering
belemmering weghalen	/	Aanpak - wegnemen belemmering
belemmering weggehaald	/	Aanpak - wegnemen belemmering
knelpunt ophef	/	Aanpak - wegnemen belemmering
knelpunt opgehev	/	Aanpak - wegnemen belemmering
knelpunt oplos	/	Aanpak - wegnemen belemmering
knelpunt opgelos	/	Aanpak - wegnemen belemmering
knelpunt verwijder	/	Aanpak - wegnemen belemmering
knelpunt weghalen	/	Aanpak - wegnemen belemmering
knelpunt weggehaald	/	Aanpak - wegnemen belemmering
barrière ophef	/	Aanpak - wegnemen belemmering
barrière opgehev	/	Aanpak - wegnemen belemmering
barrière oplos	/	Aanpak - wegnemen belemmering
barrière opgelos	/	Aanpak - wegnemen belemmering
barrière verwijder	/	Aanpak - wegnemen belemmering
barrière weghalen	/	Aanpak - wegnemen belemmering
barrière weggehaald	/	Aanpak - wegnemen belemmering
lever	elektriciteit	Wijze van betrokkenheid - afnemen
lever	stroom	Wijze van betrokkenheid - afnemen

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<b>Search word</b>	<b>Context word</b>	<b>Category</b>
lever	energie	Wijze van betrokkenheid - afnemen
afnemen	elektriciteit	Wijze van betrokkenheid - afnemen
afnemen	stroom	Wijze van betrokkenheid - afnemen
afnemen	energie	Wijze van betrokkenheid - afnemen
inkoop	elektriciteit	Wijze van betrokkenheid - afnemen
inkoop	stroom	Wijze van betrokkenheid - afnemen
inkoop	energie	Wijze van betrokkenheid - afnemen
inkopen	elektriciteit	Wijze van betrokkenheid - afnemen
inkopen	stroom	Wijze van betrokkenheid - afnemen
inkopen	energie	Wijze van betrokkenheid - afnemen
in te kopen	elektriciteit	Wijze van betrokkenheid - afnemen
in te kopen	stroom	Wijze van betrokkenheid - afnemen
in te kopen	energie	Wijze van betrokkenheid - afnemen
beschikbaar stellen daken	/	Gemeenteraad - materieel
stellen daken beschikbaar	/	Gemeenteraad - materieel
beschikbaar gesteld daken	/	Gemeenteraad - materieel
beschikbaar gesteld dak	/	Gemeenteraad - materieel
bouwloket	/	Intermediair - structuur
energieloket	/	Intermediair - structuur
samenwerkingspartner	/	Instrumenten - samenwerkingsverband
samenwerkingsovereenkomst	/	Instrumenten - samenwerkingsverband
experimenteerruimte	/	Experiment
pilots	/	Experiment
opschaling	/	Aanpak - opschalen
ambte inzet	/	Instrument - ambtelijke ondersteuning
inzet ambte	/	Instrument - ambtelijke ondersteuning
ambte budget	/	Instrument - ambtelijke ondersteuning

## Summary

Against the backdrop of the ever increasing urgency of climate change, initiatives comprising of groups of citizens that want to take matters into their own hands by generating low-carbon energy in their local environment have been booming throughout Western-Europe in recent years. These grassroots civil society low-carbon energy initiatives increasingly become part of the subnational climate change mitigation and energy governance landscape. Despite their potency in view of consumer-owned distributed generation, raising public support for the low-carbon energy transition, as well as enhancing citizen participation in the organization of the energy system, local low-carbon energy initiatives (LLCEIs) struggle to become viable alternatives to energy supplying actors of the centralized, private oriented energy system. Their development is pestered by a range of factors that stem from different sectors, spaces and actors. Not only does the energy sector influence the success and development of LLCEIs, the local economy, and government are examples of other sectors that shape the arena in which LLCEIs find themselves in. An array of actors (e.g. energy companies, distribution system operators, governments) is involved in this arena and act in accordance to their interests. LLCEIs interact with them. This inevitably means that in order to achieve their ambitions, LLCEIs engage with local, regional, and national spaces.

LLCEIs seem to bridge the divide between state, market and society because of the hybridity of their operations. LLCEIs encompass civic initiatives that are involved with private goods (i.e. low-carbon energy applications) in the pursuit of targets that have public value (e.g. climate mitigation, CO<sub>2</sub> reduction). Assessing the factors and mechanisms that contribute to success is therefore complex as the researcher needs to be attentive to the various theoretical concepts, notions and frameworks that each present a slice of the pie to understanding LLCEIs themselves and the elements of the institutional and social environment in which LLCEIs operate. The various ways in which LLCEIs emerge (e.g. how they are organized, what their ambitions are, the scale of their project) presents another challenge in making inferences about the phenomenon as such. Studies looking into LLCEIs often address but a few pieces of the puzzle of the success of LLCEIs. This dissertation fills this gap by providing a categorisation of influential factors that are able to shed light on the entirety of factors that contribute to LLCEI success. Additionally, although the European Parliament and the Council agreed upon the importance of Member States having effective support schemes for LLCEIs in place, little systematic research has been done thus far that uncovers the specificities of such support structures. This dissertation addresses this knowledge gap as well.

As such, this dissertation aims to shed light on these factors that hamper further development and contribute to the success and effective governance of LLCEIs. In doing so, I have chosen the Netherlands, and in particular the province of Fryslân, as the area of study. The Netherlands is home to over 350 local cooperatives (and even more than 480 when project cooperatives and wind cooperatives are also taken into

account), of which Fryslân has the highest number of LLCEIs per capita in the Netherlands. Fryslân is also home to one of the largest installed capacity of community-owned solar PV.

This PhD thesis is guided by two central research questions:

- 1 *What are the factors that contribute to explaining the variation in success of Local Low-Carbon Energy Initiatives (LLCEIs) in the Dutch region of Fryslân?*
- 2 *How do governance actors support or obstruct the success and further development of LLCEIs?*

The results of this PhD study show that the factors that underlie the success and development of LLCEIs can roughly be divided in four clusters of factors that receive extensive analytical attention in this dissertation:

- (i) the LLCEI itself: their bottom-up and voluntary nature often implies a lack of capacities and resources to realize their ambitions;
- (ii) the relationship between the LLCEI and its community: LLCEIs aim to generate low-carbon energy in their locality and therefore require embedding in their local communities;
- (iii) the presence of institutional hurdles and barriers stemming from the fossil fuel-based energy regime that favor the status quo hamper the development and success of LLCEIs;
- (iv) and the extent to which actors in the governance landscape provide support to LLCEIs.

The first objective of this doctoral study was to take inventory of the plethora of factors that are likely to contribute to the success and development of LLCEIs (Chapter 2). While the academic body of literature has increased in recent years along with the growth in number of LLCEIs, only a few attempts have been made to amalgamate the factors that influence the development and success of LLCEIs in a comprehensive theoretical framework. Therefore, the second objective of this doctoral thesis is to arrive at such a theoretical framework (Chapter 2). The third objective is to obtain empirical insights into the success of LLCEIs (Chapter 3) and the support structures in the Dutch-Frisian setting (Chapters 4 and 5). Lastly, by delving into the dynamics involved in the subnational governance arrangements, the fourth objective of this study is to determine the conditions that are important for supportive governance arrangements for LLCEIs (Chapters 4, 5, and 6).

In order to assess LLCEI success, three groups of factors (i) those related to the LLCEI itself; (ii) factors related to the interaction between an LLCEI and the local community; and (iii) the presence of supportive governance settings and linkages with local government and intermediaries were analysed using a variable oriented cross-case

design of fourteen Frisian LLCEIs. These three groups entailed fourteen sub items: i.e. for group i: project champion, human capital, size, time flexibility, funds, board composition; for group ii: cultural heritage, institutional embedding, visibility, community involvement, bonding capital, bridging capital; and for group iii: linkage with government and intermediaries, and supportive governance arrangement. The results showed that the success of LLCEIs is influenced by multiple factors belonging to the three groups of factors. In other words, a LLCEI that performs well internally still requires to a certain degree the support of governance settings and a fruitful connection with the community. A LLCEI that is well embedded in the community to a certain degree is also dependent on the support from the governance arrangement and needs to have sufficient capacity to act. Lastly, an LLCEI that finds itself in a supportive governance arrangement still needs to link up with the community and possess a certain degree of organizational capacity in order to be successful.

To further LLCEI development and ascertain their success, support provided to them needs to support in building their capacities, alleviate institutional hurdles and barriers stemming from the fossil fuel-based energy regime, and open up the system for the uptake, acceptance or breakthrough of LLCEIs. Evidence suggests that so-called “intermediaries” form an important part of the solution in addressing these issues. Despite previous attempts at analysing intermediary roles and activities vis-à-vis the development of community energy, the reality of the various roles and strategies intermediaries can employ and the kind of support LLCEIs require to further develop has not yet been synthesized in a comprehensive analytical framework. This dissertation filled this gap by developing such a framework (Chapter 4). In my effort to make sense out of the sheer variation in the work of intermediaries supporting LLCEIs, I used four theoretical perspectives, of which some have hitherto not been associated with community energy. They are: endogenous development, business incubator, asset-based community development, and strategic niche management. The combination of these four perspectives helped to understand the underlying rationale and assumptions of the support provided to LLCEIs. I reflected on the analytical framework by evaluating the intermediary support structure in the Province of Fryslân. From the analysis, I concluded that the Frisian case provided modest support to the claim that intermediary support is effective in addressing the needs of LLCEIs as the strategies and roles observed represent a complete and coherent support structure.

Furthermore, the future perspective of active citizenship in the production of locally generated low-carbon energy is largely dependent on the existing institutional and policy frameworks and settings. Subnational governments, in particular, can have a prominent role in this process by engaging in institutional adaptation and policy innovation. Within this context, I conceptualized a meta-governing approach of experimentation, characterizing the innovations in governing (i.e. policy innovation and institutional adaptation) that emerge when governments respond to the emergence of LLCEIs. By comparing the Dutch regions of Overijssel and Fryslân, I showed that the type of policy innovations that were developed and the institutional adaptations that took place could be characterized as a balancing process of



authoritative and enabling modes of governing. Both provinces governed LLCEIs at arm's length and issue significant capacity-building strategies that vary in terms of their conditions. Municipalities, however, inclined towards impromptu and opportunistic responses, some of them having lasting effects by patching up existing institutional settings, others having more of an episodic character. In these meta-governing arrangements, traditional mechanisms can be used innovatively and innovative enabling practices may come with rather traditional elements. Frictions may arise in this dynamic field as innovative instances of governing challenge conventional modes of governing. Governments still search for ways to account for public budget that is spent without immediate results (i.e., capacity building) against the backdrop of complex, intertwined, and 'policy silo' transcending societal problems. The combination of experimental and conventional elements is therefore a reasonable response that is indicative of a multiplicity of solution paths that can be advanced

An important precursor to such abovementioned policy innovations and institutional adaptation is, however, government attention. By using a web scraping and content analysis methodology, I provided an overview of the extent to which and in what ways LLCEIs have been adopted in policy agendas of local governments in the Netherlands (N = 341). Results showed that co-occurrences of LLCEI-related words and policy approach-related search terms (e.g. 'facilitate', 'collaborate', 'stimulate', and 'accelerate'), were observed the most in comparison to other categories of policy-related search terms. This was an indication that LLCEIs have reached a rather abstract policy level (i.e. general, and abstract policy ambitions and approaches as compared to more concrete and specific measures and targets). More specific policy-related search terms, such as specific policy instruments or goals occurred less often. This suggested that, at least in the documents retrieved, local governments inclined towards more generic accounts of how they substantiate their attention for LLCEIs. Search terms like 'stimulate', 'facilitate' and 'collaboration' as approaches; 'participate' as means of involvement; 'energy' as policy goal; and 'subsidy' as policy instrument occurred the most in their respective categories.

In sum, this dissertation showed that the success of LLCEIs revolves around a plethora of factors that stem from multiple actors and arrangements. Indeed, in order to grasp this complexity and make sense out of it, this dissertation provided four different theoretical frameworks (in Chapters 2, 4, 5 and 6) – each being a crucial piece of this complex puzzle. I showed that the success of LLCEIs is influenced by factors that are locally bound and pertain to the LLCEI itself and the community it is situated in. To achieve a high degree of success, positive interactions with governance actors (e.g. intermediaries, local and regional government) and a supportive governance context matter as well. This dissertation also provides an account of the role of local and regional government in encouraging this bottom-up movement. Still, there is no cookie-cutter approach to roll out successful LLCEIs. LLCEI success is context dependent and as the study showed is also greatly dependent on socio-spatial settings and configurations.

As this dissertation focused on LLCEIs in one region, several potentially influential background variables could be kept constant such as spatial planning policies, available subsidies and grants, and the presence of one Distribution System Operator. Studying LLCEIs within a relatively homogenous institutional context allowed the researcher to illuminate and differentiate between the agentic capacities of LLCEIs. Future research should focus on the same three aspects influencing LLCEI success but this time in other countries to assess whether the frameworks also apply to other institutional settings. Therefore, future research should focus on the same three aspects influencing LLCEI success but this time in other countries to assess whether the frameworks also apply to other institutional settings. An important aspect that deserves more attention in LLCEI research is that of gender. Another promising avenue that increasingly receives attention in the community energy literature is that of ‘energy democracy’ (and in relation to this matter the legitimacy of the LLCEI movement). As some Frisian LLCEIs pursued low-carbon energy projects with a limited impact on the landscape, future research should also look into the mechanisms of place attachment for these type of bottom-up developments.



## Samenvatting

Terwijl de urgentie van klimaatverandering alsmaar toeneemt, is de afgelopen jaren in West-Europa een sterke toename van het aantal burgerinitiatieven te zien. Zij willen het heft in eigen handen nemen door duurzame energie in de lokale omgeving op te wekken.

Deze lokale duurzame-energie-initiatieven (LDEI's) die ontstaan uit de burgermaatschappij maken steeds nadrukkelijker deel uit van de huidige klimaatmitigatie en energie-governance-arrangementen. De LDEI's hebben moeite om zich te ontwikkelen tot een levensvatbaar alternatief voor gevestigde energieleveranciers die het gecentraliseerde en geprivatiseerde energiesysteem karakteriseren. Dit ondanks hun potentieel in het licht van consument-eigen gedistribueerde opwekking, en het feit dat zij het draagvlak voor de energietransitie en de burgerparticipatie binnen het energiesysteem vergroten.

Een scala aan factoren bemoeilijkt de ontwikkeling van burgerinitiatieven. De energiesector, maar ook de lokale economie en de overheid zijn bepalend voor de vraag of LDEI's zich succesvol kunnen ontwikkelen. Een veelheid aan actoren, waaronder energiebedrijven, netbeheerders, provincies en gemeenten, is betrokken in dit speelveld. Zij acteren in lijn met hun belangen. LDEI's interacteren met deze actoren. Om hun ambities waar te maken, is het onvermijdelijk dat LDEI's engageren met lokale, regionale en nationale netwerken.

LDEI's lijken de scheiding tussen de staat, markt en maatschappij te overbruggen door de hybriditeit van hun activiteiten. LDEI's zijn maatschappelijke initiatieven die zich bezighouden met private goederen (CO<sub>2</sub>-arme energietoepassingen), maar ook met doelstellingen met publieke waarde (klimaatmitigatie, CO<sub>2</sub>-reductie). Het vaststellen van de factoren en mechanismen die bijdragen aan het succes is daarom een ingewikkelde aangelegenheid. Zo moet de onderzoeker bedacht zijn op de verschillende theoretische concepten, noties en raamwerken die deel uitmaken van de puzzel die leidt tot het begrijpen van het fenomeen LDEI's en de elementen van de institutionele en sociale omgeving waarin zij opereren. De verschillende manieren waarop LDEI's ontstaan vormt een andere uitdaging bij het maken van inferenties over het fenomeen. Hoe zijn ze georganiseerd, wat zijn hun ambities, wat is de schaal van de projecten die ze nastreven?

Onderzoek naar LDEI's richt zich vaak op maar enkele puzzelstukken van het geheel dat bijdraagt aan het succes van LDEI's. Deze dissertatie gaat verder, en categoriseert de invloedrijke factoren die bijdragen aan het succes van LDEI's, zodat een totaalinzicht ontstaat. Hoewel het Europees Parlement en de Europese Raad overeenstemming hebben over de belangrijke rol van lidstaten om effectieve ondersteuningsstructuren voor LDEI's te creëren, is nog maar weinig systematisch onderzoek gedaan naar de randvoorwaarden en specifieke eigenschappen van dergelijke ondersteuningsstructuren. Deze dissertatie beoogt deze leemte te vullen.

Als zodanig is het doel van deze dissertatie om inzicht te bieden in factoren die de verdere ontwikkeling van LDEI's in de weg staan, alsmede in omstandigheden die bijdragen aan het succes en de effectieve governance van LDEI's.

Met dit doel voor ogen heb ik de provincie Fryslân gekozen als onderzoeksgebied. In Nederland zijn meer dan 350 lokale coöperaties gevestigd. Als projectcoöperaties en windcoöperaties worden meegeteld, zijn het er zelfs meer dan 480. In Fryslân zijn de meeste LDEI's per inwoner te vinden. Provinsje Fryslân is ook een van de provincies met het grootste geïnstalleerde zonne-PV-vermogen dat in eigendom is van burgerinitiatieven.

Twee centrale onderzoeksvragen zijn leidend in dit doctorale onderzoek:

- 1 *Wat zijn de factoren die bijdragen aan het verklaren van de variatie in succes van Lokale Duurzame Energie Initiatieven (LDEI's) in de provincie Fryslân?*
- 2 *Hoe ondersteunen of verhinderen governance actoren het succes en de verdere ontwikkeling van LDEI's?*

De resultaten van deze doctorale studie laten zien dat de factoren die ten grondslag liggen aan het succes en de verdere ontwikkeling van LDEI's ruwweg onderverdeeld kunnen worden in vier clusters die extensieve analytische aandacht genieten in deze dissertatie:

- (i) De LDEI zelf. De uitgangspositie van LDEI's, van onderaf en vrijwillig, impliceert vaak dat er een tekort is aan middelen en capaciteiten om hun ambities te realiseren.
- (ii) De relatie tussen de LDEI en de gemeenschap. LDEI's hebben als doel om duurzame energie op te wekken in hun lokaliteit. Dit vereist inbedding in de lokale gemeenschap.
- (iii) De aanwezigheid van institutionele hindernissen en barrières die hun oorsprong hebben in het op fossiele brandstoffen gebaseerde energieregime. Deze begunstigen de status quo en verhinderen de ontwikkeling van LDEI's.
- (iv) De mate waarin actoren in het governance landschap ondersteuning bieden aan LDEI's.

Het eerste doel van deze doctorale studie was om de verscheidenheid aan factoren te inventariseren die waarschijnlijk bijdragen aan het succes en de ontwikkeling van LDEI's (Hoofdstuk 2). Terwijl de hoeveelheid aan wetenschappelijke literatuur over LDEI's is toegenomen, net zoals het aantal LDEI's, zijn slechts enkele pogingen gedaan om de factoren die de ontwikkeling en het succes van LDEI's beïnvloeden samen te voegen in een uitgebreid theoretisch raamwerk.

Het tweede doel van deze dissertatie is derhalve om een dergelijk theoretisch raamwerk te formuleren (Hoofdstuk 2).

Het derde doel is om empirisch inzicht te krijgen in het succes van LDEI's (Hoofdstuk 3) en de ondersteuningsstructuren in de Nederlands-Friese context (Hoofdstukken 4 en 5).

Ten slotte: het vierde doel is om de voorwaarden voor effectieve governance-arrangementen voor LCDEI's te duiden door de dynamieken van de sub-nationale governance-arrangementen uit te diepen (Hoofdstukken 4, 5 en 6).

Om het succes van LDEI's vast te stellen zijn de volgende groepen van factoren geanalyseerd met behulp van een variabel georiënteerd cross-case onderzoeksontwerp van veertien Friese LDEI's:

- (v) Factoren in relatie tot de LDEI;
- (vi) factoren in relatie tot de interactie tussen een LDEI en de lokale gemeenschap ;
- (vii) De aanwezigheid van een ondersteunende governance-structuur en de connectie met de lokale overheid en intermediairs.

Deze drie groepen beslaan veertien subitems. Voor de eerste groep: project kampioen, menselijk kapitaal, grootte, flexibiliteit van tijd, financiële middelen, bestuurssamenstelling. Voor de tweede groep: culturele erfenis, institutionele inbedding, zichtbaarheid, betrokkenheid van de gemeenschap, bindend sociaal kapitaal, overbruggend sociaal kapitaal. En voor de derde groep: connectie met overheid en intermediairs, en ondersteunende governance-arrangementen. De resultaten laten zien dat het succes van LDEI's wordt beïnvloed door diverse factoren die behoren tot de drie groepen van factoren hierboven beschreven. Met andere woorden, een LDEI die intern goed presteert, heeft nog steeds in bepaalde mate de ondersteuning van governance-arrangementen en een vruchtbare verbinding met de lokale gemeenschap nodig. Een LDEI die goed is ingebed in de lokale gemeenschap is tegelijkertijd afhankelijk van de ondersteuning van governance-arrangementen en heeft ook voldoende capaciteit nodig om actie te ondernemen. Ten slotte, een LDEI dat zich in een ondersteunend governance-arrangement bevindt, moet zich nog steeds binden aan de lokale gemeenschap en dient ook een bepaalde mate van organisatorische capaciteit te hebben om succesvol te zijn.

Om de ontwikkeling van LDEI's verder te brengen en om hun succes te verzekeren, is het vereist dat de ondersteuning het volgende biedt:

- het opbouwen van capaciteit;
- het wegnemen van institutionele hindernissen en barrières;
- het bestaande energie-regime openstellen voor de opname, acceptatie en doorbraak van LDEI's.

Empirisch bewijs suggereert dat zogenaamde “intermediairs” onderdeel kunnen zijn van de oplossing voor deze kwesties. Ondanks pogingen om de rollen en activiteiten van intermediairs te analyseren in relatie tot de ontwikkeling van burgerinitiatieven in de energietransitie, is de realiteit van de verschillende rollen en strategieën die intermediairs kunnen inzetten en de soort ondersteuning die LDEI's nodig hebben om zich verder te ontwikkelen nog niet gesynthetiseerd in een uitgebreid analytisch raamwerk.

Deze dissertatie overbrugt deze kloof door een dergelijk raamwerk te formuleren (Hoofdstuk 4). In mijn poging om de variatie in het werk van intermediairs die LDEI's ondersteunen te begrijpen, heb ik vier theoretische perspectieven toegepast die tot nu toe nog niet zijn geassocieerd met de wetenschappelijke literatuur over burgerinitiatieven in de energietransitie. Dit zijn de theorieën van endogene ontwikkeling, bedrijfsincubator, asset-gebaseerde gemeenschapsontwikkeling en strategisch niche-management. De combinatie van deze vier perspectieven heeft bijgedragen aan het begrijpen van de onderliggende ratio en aannames van de ondersteuning die wordt geboden aan LDEI's. Ik heb op het analytisch raamwerk gereflecteerd door de Friese intermediaire ondersteuningsstructuur te evalueren. Op basis van deze analyse concludeer ik dat de Friese casus een bescheiden onderbouwing is voor de claim dat de ondersteuning die aangeboden wordt door intermediairs effectief is in het aanspreken van de behoeften van LDEI's doordat de strategieën en rollen die geobserveerd zijn een complete en coherente ondersteuningsstructuur vertegenwoordigen.

Het toekomstige perspectief van actief burgerschap in het genereren van lokale duurzame energie is grotendeels afhankelijk van de bestaande institutionele en beleidsraamwerken en omgevingen. Decentrale overheden kunnen een prominente rol spelen in dit proces door te engageren in institutionele adaptatie en beleidsinnovatie. Binnen deze context heb ik een meta-governance-benadering voor experimentatie geconceptualiseerd. Deze benadering karakteriseert de innovaties in het bestuur die ontstaan op het moment dat overheden reageren op het oprijzen van LDEI's, zoals beleidsinnovatie en institutionele adaptatie. Door Overijssel en Fryslân te vergelijken, kan ik demonstreren dat het type beleidsinnovaties die waren ontwikkeld en de institutionele adaptaties die plaatsvonden, gekarakteriseerd kunnen worden als een proces van balanceren van autoritaire en 'in staat stellende' modi van bestuur. Beide provincies bestuurden LDEI's op armlengte afstand en implementeerden substantiële capaciteitsopbouwstrategieën die variëren in vorm en voorwaarden.

Gemeenten neigden naar geïmproviseerde en opportunistische reacties, waarvan sommige blijvende effecten hadden doordat bestaande institutionele omgevingen werden opgelapt. Andere reacties hadden een meer episodisch karakter met beperkte structurele invloed. Binnen deze meta-governance-arrangementen kunnen traditionele mechanismen innovatief aangewend worden, en kunnen innovatieve 'in staat stellende' praktijken gesierd worden met traditionele elementen. Fricities kunnen ontstaan in dit dynamische veld omdat innovatieve bestuursmaatregelen met conventionele bestuursmaatregelen kunnen botsen. Overheden zijn nog steeds op zoek naar manieren om publiek geld dat wordt gebruikt zonder directe resultaten, zoals bij de capaciteitsopbouw van LDEI's, te verantwoorden in een context van complexe, verweven en beleidskoker transcenderende maatschappelijke problemen. De combinatie van experimentele en conventionele elementen is dan ook een verstandelijke reactie die indicatief is voor de veelheid aan oplossingen.

Een belangrijke voorbode voor dit soort beleidsinnovaties en institutionele adaptatie is de aandacht van de overheid voor LDEI's. Ik heb met behulp van een webscraping- en

content-analysemethodologie geïnventariseerd in welke mate en op welke manieren LDEI's zijn opgenomen in de beleidsagenda's van Nederlandse gemeenten (N=341). De resultaten laten zien dat LDEI-gerelateerde zoekwoorden (burgerinitiatief, energiecoöperatie, inwonersinitiatief) en beleidsbenaderinggerelateerde zoekwoorden (faciliteren, samenwerken, stimuleren, versnellen) samen vaker voorkomen dan andere categorieën van beleidgerelateerde zoektermen. Dit is een indicatie dat LDEI's op een abstract beleidsniveau voorkomen. Meer specifieke beleidgerelateerde zoektermen, zoals specifieke beleidsinstrumenten of doelstellingen, kwamen minder vaak voor. Dit suggereert dat voor de documenten die vergaard zijn met de webscrapemethode, gemeenten de neiging hebben om hun aandacht voor LDEI's in meer algemene termen in te vullen. Zoektermen als 'stimuleren', 'faciliteren', en 'samenwerken' als benaderingen, 'deelnemen' als manier van betrokkenheid, 'energie' als beleidsdoel en 'subsidie' als beleidsinstrument kwamen het meest voor in de respectievelijke categorieën.

Samenvattend, in deze dissertatie toon ik aan dat het succes van LDEI's draait om een overvloed aan factoren die voortvloeien uit verschillende actoren en arrangementen. Om deze complexiteit te bevatten en begrijpen heb ik drie verschillende theoretische raamwerken geformuleerd (Hoofdstukken 2, 4 en 5) die elk afzonderlijk een cruciaal stukje zijn van deze complexe puzzel. Ik toon aan dat het succes van LDEI's wordt beïnvloed door factoren die lokaal gebonden zijn en betrekking hebben op de LDEI zelf alsmede de lokale gemeenschap waarin de LDEI is gevestigd. Om een hoge mate van succes te behalen zijn positieve interacties met governance actoren (intermediairs, gemeenten en provincie) en een ondersteunende governance context van belang. Deze dissertatie geeft ook een beschrijving van de rol van de lokale en regionale overheid om deze bottom-up beweging aan te moedigen. Nog altijd is er geen blauwdruk voorhanden om een succesvolle LDEI uit te rollen. Succes van LDEI's is afhankelijk van de context, en zoals dit onderzoek ook aantoont, sterk afhankelijk van sociaal-ruimtelijke arrangementen en configuraties.

Diverse potentieel invloedrijke achtergrondvariabelen, zoals ruimtelijk beleid, beschikbare subsidies en de aanwezigheid van één netbeheerder, konden als constante worden gehouden omdat deze doctorale studie zich richtte op LDEI's in één regio. Door onderzoek te doen naar LDEI's in een relatief homogene institutionele context, kon ik differentiëren tussen de eigenlijke capaciteiten van LDEI's en deze ook grondig belichten. Toekomstig onderzoek zal moeten focussen op de drie aspecten die het succes van LDEI's beïnvloeden, maar dit keer toegepast in andere landen om vast te stellen of de theoretische raamwerken ook van toepassing zijn op andere institutionele omgevingen. Een belangrijk aspect dat meer aandacht verdient in onderzoek naar LDEI's is dat van gender. Een ander veelbelovend terrein dat in toenemende mate aandacht krijgt in de wetenschappelijke literatuur over LDEI's is dat van 'energiedemocratie', en in relatie hiermee de legitimiteit van de LDEI-beweging. Aangezien sommige Friese LDEI's duurzame-energieprojecten najoegen met een beperkte impact op het landschap (zonnedaken), zal toekomstig onderzoek ook moeten kijken naar de mechanismen van place attachment voor dit soort bottom-up ontwikkelingen.





## About the author

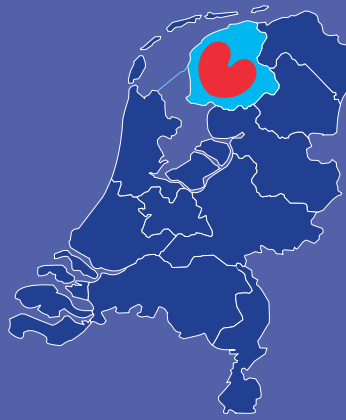
Wynzen Douwe Beau Warbroek was born on 2 August 1990 in Ede, the Netherlands. He did not follow the secondary school the usual way. Beau started at one of the lowest levels of education and worked his way up. He graduated the Higher General Secondary Education before following an additional two years of pre-university education. He holds a Bachelor's degree in European Public Administration from the University of Twente. For his thesis, he looked into the effectiveness of policy instruments in stimulating renewable energy in the EU. At this time, Beau became interested in the energy transition as a problem of governance. Looking back at a fruitful collaboration with the Department of Governance and Technology for Sustainability (CSTM, University of Twente), he wanted to continue his study at the University of Twente. Right at the start of the master program Public Administration, Beau became aware of the opportunity to become a PhD researcher. Having this as a top priority, he was determined to prolongate his academic career. As such, he graduated the master Public Administration cum laude at the University of Twente. During the Master program, Beau became intrigued by the bottom-up energy transition. He wrote his thesis about the success and failure of local low-carbon energy initiatives in the Dutch province of Overijssel.

In the autumn of 2014, Beau continued his research into the citizen-based energy transition by starting his PhD research at CSTM at the University of Twente. His research was part of a research program funded by the Dutch province of Fryslân. Beau has multiple publications in international peer-reviewed journals and presented his work at several international conferences such as the International Conference on Public Policy and the Royal Geographical Society (with the Institute of British Geographers) International Conference. In addition to his research work, he taught at Master level, supervised several Master students, and took seat in the PhD council of the Netherlands Institute of Government.









**In this doctoral thesis I delve into the reality of citizen-based low-carbon energy initiatives in the Dutch province of Fryslân and strive to understand their success. In doing so, I focus on the factors in their direct sphere of influence, as well as the dynamics involved when they interact with their localities and the wider range of governance actors. Regarding the latter, I specifically investigate how subnational governments and intermediary actors respond to the emergence of these grassroots initiatives.**

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