

Utrecht University - Faculty of Geosciences

Master thesis

# Local is Beautiful

The emergence and development of  
local renewable energy organisations



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## **Abstract**

In order to alleviate urgent and pressing environmental issues, which are partly caused by our current energy production and demand, a transformation of the existing energy market is necessary. Decentralising the production and consumption of renewable energy on a community or household level through establishing local renewable energy organisations is suggested to enable this transformation. During the last two to three years the emergence of these organisations in the Netherlands has shown a substantial growth. Due to their recent emergence little is known about the factors that stimulate or hamper the appearance and development of this phenomenon. Therefore this research aims to identify common explanatory variables that determine the emergence of local renewable energy organisations and attempts to assess whether these variables determine their appearance and development. This is captured by the main research question, which attempts to answer: *which factors influence the emergence and development of local renewable energy organisations in the Netherlands?* In order to answer the main research question, a comprehensive literature review on the innovation diffusion, micro generation and community renewable energy as well as several expert interviews are conducted to identify common factors that explain the emergence and development of local renewable energy organisations. In total 33 explanatory variables are anticipated to determine their founding process. These identified variables are empirically tested by means of a case study analysis covering thirteen cases and a survey. This resulted in the confirmation of 22 explanatory variables that influence the emergence and development of local renewable energy organisations in the Netherlands.

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## 1. The bitter need for an energy transition

A transition from non-renewable energy towards renewable energy is necessary in order to deal with pressing problems in regard to climate change and our dependence on energy derived from fossil fuels. However, the Netherlands predominantly depends on fossil fuels for its electricity production whereas renewable sources accounted for just 3,5 per cent of the total energy consumption in 2010 (Haar *et al.* 2011, p.98).<sup>1</sup> To alter this situation the Dutch government has the ambition to realize an annual two per cent decrease in energy demand, a 20-30 per cent reduction of CO<sub>2</sub> emission by 2020 and a 20 per cent share of renewable energy production in relation to total energy production in 2020 (Agentschap NL 2010, p.2 Scordato 2010, p.203 and *Hernieuwbare energie in Nederland 2009*, p.11).

In order to achieve the previous mentioned targets, the Dutch government has implemented a range of different policies and strategies to stimulate the production of renewable energy and electricity. As a result, Dinicia and Arentsen (2003) state that the support system for renewable energy in the last decades has been one of the most complex and complicated systems employed in Europe. The studies conducted by Agnolucci (2007) and Rooijen and Wees (2006) confirm this notion by describing the range of instruments implemented and terminated in the Netherlands. A major intervention that changed the structure of the Dutch energy sector was the liberalization of the green energy market in 2001. The general assumptions of liberalizing the energy market are based on the ideas that competition between energy suppliers improves their efficiency, which results in lower energy prices for consumers and reduces entry barriers for other non-conventional actors to enter the market (Agterbosch 2006, p.17 and Jacobsson and Johnson 2000, p.636). Another commonly expressed merit of liberalization is the ability for end-users to select an energy supplier that relates closest to their prevailing preference based on for example price or method of generation (Faiers *et al.* 2007, p.4381). In the Netherlands, liberalization of the green energy market in combination with financial support measures that were designed to promote the demand for green energy resulted in a rapid increase in the demand for renewable energy. According to Agnolucci (2007), Rooijen and Wees (2006), Kwant (2003, p.267) and Reijnders (2002) the situation in the Netherlands was characterized by a disparity between the demand and supply of renewable energy. The extensive increase in demand could therefore not be met by domestic production alone, which encouraged energy suppliers to cover the shortfall by importing renewable energy instead of expanding the domestic production (Agnolucci 2007, Dinica and Arentsen 2003 and Reijnders 2002). Despite substantial demand for renewable energy, large-scale deployment of renewable technologies for the generation of renewable energy proceeds at a continental pace in the Netherlands (Agterbosch 2006, p.16).

### 1.1 Realising an energy transition

To overcome the above described disparity and enable an energy transition, Bergman and Eyre (2011, p.337), Allen *et al.* (2008, p. 530) and Watson *et al.* (2008, p.3095) argue that generating renewable energy close to where it is consumed could contribute to as much as 40 per cent of the electricity demand by 2050<sup>2</sup> and thus has the potential to meet a considerable share of our present domestic energy demand. In addition, aspects like peak oil, dependency on fossil fuels (Jagoda *et al.* 2011, p.1266), fuel poverty<sup>3</sup>, fuel security, energy loss resulting from distributing it over long distances (Allen *et al.* 2008, p. 530 and Greenpeace 2005) and

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<sup>1</sup> This is confirmed by Centraal Bureau voor de Statistiek (CBS). Retrieved on 20<sup>th</sup> of July from: <http://www.cbs.nl/nl-NL/menu/themas/industrie-energie/publicaties/artikelen/archief/2012/2012-3621-wm.htm>

<sup>2</sup> This holds for the UK domestic market. Under radical assumptions it is even estimated to reach an eighty per cent reduction in carbon emissions by 2050 (Bergman and Eyre 2011, p.337).

<sup>3</sup> Fuel poverty occurs when households have to spend more than ten per cent of their income on energy in order to maintain a satisfactory warm home (Sauter and Watson 2007, p. 2771 and Watson *et al.* 2008, p. 3095).

environmental impacts of our current energy production and consumption are supplementary reasons to generate energy on a local and decentralised rather than national and centralised scale (Haar et al. 2011, p.99, Verbong and Geels 2010, p.1218, Allen et al. 2008, p.528, Watson et al. 2008, p.3095, Sauter and Watson 2007, p.2771 and Agterbosch 2006, p.14). An additional advantage of small-scale provision is that it might increase (local) awareness and empowers people to actively participate and reduce their energy demand as well (Bergman and Eyre 2011, p.335, Haar et al. 2011, p.99, Sauter and Watson 2007, p.2771 and Fisher 2006, p.131).

However, despite these merits of decentralising energy production, it is not clear whether this method will fulfil its potential. According to Meijer et al. (2010 and 2007) it is vital to address the perceived uncertainties associated with renewable innovation projects in order to stimulate emerging local entrepreneurial initiatives. Besides perceived uncertainty, other elements related to bureaucratic, behavioural, institutional, economical, social and technical barriers are also assumed to hamper its potential (Watson et al. 2008, p.3095 and Bergman and Eyre 2011, p.335). Despite these barriers there currently exist a wide variety of locally initiated civil, public and/or private organisations in the Netherlands aiming at the provision and consumption of renewable energy within their vicinity (Agentschap NL 2010).

### *1.2 Conceptualising decentralised generation*

The scientific literature identifies a couple of concepts that are commonly applied to address this phenomenon. However, a coherent terminological reference remains absent due to various interpretations on the degree of consumer participation or ownership and what is considered local. In terms of consumer participation, the literature distinguishes three models: co-construction, co-production and co-provision (Sauter and Watson 2007, p.2773 and Watson 2004, p.1982, van Vliet and Chappels 1999).

Co-provision is considered the most comprehensive one since it implies an active consumer role, which encompasses the development of energy systems (co-construction), the delivery and generation of energy services (co-production) and the ownership and operation of these systems and services (cf. Watson 2004, p.1982-1983). Van Vliet and Chappells (1999) have defined co-provision as “*the provision (including generation, treatment, distribution and consumption) of utility services by a range of new intermediaries (e.g. consumers themselves, other organisations or sub-networks), alongside or intermingled with centrally provided services (e.g. public network or grid-provision)*”.

This broad definition enables the inclusion of a wide range of (local) activities and initiatives with different organisational characteristics in the field of energy supply and demand. Besides variation in consumer participation, this phenomenon is also observed and examined from different scopes or spheres. Verbong and Geels (2010, p.1218) and Allen et al. (2008, p.530) refer to it as decentralised generation, which entails a diversity of actors including local utilities and companies, consumer co-operations, housing associations or municipalities, who simultaneously provide and consume energy. More specifically, Warren and McFadyen (2010, p.205), Walker and Cass (2007, p.459) and Watson (2004, p.1983) emphasise a central role for communities in the process of decentralising generation. However, the concepts of decentralised generation and community renewable energy do not transcend far enough in order to analyse the contribution of individual households in this process. The notion of micro-generation (Watson 2004, p.1981, Watson et al. 2008, p.3095 and Bergman and Eyre 2011, p.336) limits the scope to individual households and therefore enables to assess the provision and consumption regarding electricity and heat on an individual, i.e. micro, scale.

### *1.3 Defining local renewable energy organisations*

Based on the preceding paragraph it becomes clear that decentralised generation appears in various forms and is understood differently. Consequentially, to demarcate its scope, this research limits its focus to a specific aspect of decentralised generation, which is referred to as *local renewable energy organisations*. Local renewable energy organisations are defined

as: *local organisations, which are initiated and managed by actors from civil society, that aim to educate or facilitate people on energy use and efficiency, enable the collective procurement of renewable energy or technologies or actually provide, i.e. generate, treat or distribute, renewable energy derived from various renewable resources for consumption by inhabitants, participants or members who live in the vicinity of the renewable resource or where the renewable energy is generated.*

The following aspects are considered during the process of defining local renewable energy organisations. To begin with, a definition of what is considered local is a prerequisite. The *New Oxford American Dictionary* describes local as “*belonging or relating to a particular area or neighbourhood*” and Agentschap NL (2011, p.4) emphasizes the geographical demarcation of an area as being local. In light of this, the notion of micro generation is considered too narrow because it only encompasses individual households. On the other hand, the concept of community renewable energy encompasses the participation of community members and therefore is more suitable and applicable in this perspective.

Alternatively, the size and dimension in terms of number and spread of participants or members can determine whether an organisation is considered local. When an organisation simply aims at providing renewable energy for a housing block or neighbourhood the number of users and/or providers is relatively low and more local in comparison to organisations that aim at a provincial level since their membership is not necessarily confined to inhabitants living within city or municipal boundaries.

Furthermore, initiatives to establish a local renewable energy organisation emerge from all spheres of society. They encompass both private and public founded projects as well as civil initiatives and can also be observed as partnerships between two or more parties from different spheres. Related to their societal background, these organisations appear in different organisational arrangements depending on the dispersal of ownership regarding the applied renewable technologies. The applied technologies can be owned by private organisations, which rent space from municipalities or civilians to operate them or offer other parties the possibility to lease a renewable energy technology. Alternatively, municipalities can also support or exploit renewable technologies and allocate the potential benefits while taking responsibility for guaranteeing the continuation of an organisation (Agentschap NL 2011, p. 4-6). However, the focal point is on local arrangements founded by civilians or inhabitants, which enables community members to own and utilize renewable energy technologies.

To conclude, local renewable energy organisations have various goals such as educating people on energy use and efficiency or facilitate community members in insulating their residences or procuring renewable energy technologies. Besides education on energy services, a local renewable energy organisation can also provide services like facilitating the collective procurement of renewable technologies or renewable energy in order to gain economies of scale. Some organisations even venture beyond this and actually generate renewable energy through a collectively owned facility or deliver energy extracted from local renewable sources. Therefore, local renewable energy organisations not necessarily concentrate primarily on the generation of renewable energy but pursue various models or a combination of models to enable an energy transition.

#### *1.4 Knowledge gap*

So far most literature on the expansion of renewable energy in the Netherlands has focused on the developments of policy instruments (Agnolucci 2007, Rooijen and Wees 2006, Dinica and Arentsen 2003 and Kwant 2003), the implications of the liberalisation of the green electricity market (Dinica and Arentsen 2003 and Reijnders 2002) or on the diffusion of specific renewable energy technologies such as wind energy (Agterbosch 2006), biomass and biomass combustion (Meijer et al. 2007 and 2010, Negro 2007) and solar power (Jager 2006). In relation to decentralizing renewable energy provision, the literature discusses various aspects like the possible advantages and disadvantages of different micro generation methods (Allen et al. 2008), the technical implications of embedding distributed energy supply to the central grid (Passey et al. 2011 and Schneider and Pehnt 2006), the implications in regard to social

acceptance (Sauter and Watson 2007 and Wünsterhagen et al. 2007) and the economical and financial considerations (Watson 2004 and Watson et al. 2008). Where Bergman and Eyre (2011) lay emphasis on the potential of distributed generation for creating a new energy paradigm, Verbong and Geels (2010) conclude that such a development requires strong policy interventions since its implementation depends on external developments and investments. Fisher (2006) focuses more on the characteristics and motives of pioneering actors in the field of micro generated energy and attempts to relate these attributes to renewable energy technologies. Furthermore, there is a growing body of empirical studies providing data on community-based energy supply and demand (Walker et al. 2010, Devine-Wright and Devine-Wright 2009, Denis and Parker 2009, Rogers et al. 2008, Kahn et al. 2007 and Devine-Wright 2005).

Moreover, some authors (Davies and Diaz-Rainey 2011, Ferreira et al. 2011, Scordato 2010, Toke et al. 2008 and Harmelink et al. 2006) paid attention to the differences between European Member States in regard to various policy instruments and their effectiveness to foster decentralised generation of renewable energy. In line with this, the previously described literature provides several factors that might explain the slow pace in which decentralised renewable energy organisations and technologies expands in the Netherlands. Explanatory factors such as the perceived uncertainty and motivation of entrepreneurs (Meijers et al. 2007 and 2010), public priorities in research and development concerning renewable energy (Scordato 2010), or implications concerning social, economical, behavioural, cultural, technical and institutional barriers are often mentioned.

Although Colijn (2006), Jager (2006) and Vermeulen and Hovens (2006) have researched aspects related to the development of decentralised renewable energy generation, there is little scientific research on the factors that either stimulate or obstruct the emergence and development of local renewable energy organisations in the Netherlands. Therefore, a knowledge gap regarding the identification and assessment of possible explanatory factors that might determine the emergence and development of local renewable energy organisations in the Netherlands is identified.

### *1.5 Research objective and main research question*

The aim of this research is to identify which explanatory factors foster or hamper the emergence of local renewable energy organisations in the Netherlands in the recent past. Therefore this research aims to generate a) explanatory and b) prescriptive knowledge by:

- a) - Identifying common factors that foster or hamper the emergence and development of local renewable energy organisations in the Netherlands.  
- Assessing whether these explanatory variables actually explain the emergence and development of local renewable energy organisations in the Netherlands.
- b) Providing policy makers with recommendations on how to stimulate the emergence and development of local renewable energy organisations.

In order to achieve these objectives the main research question is formulated as follows:

*Which factors influence the emergence and development of local renewable energy organisations in the Netherlands?*

### 1.6 Research framework and sub-questions

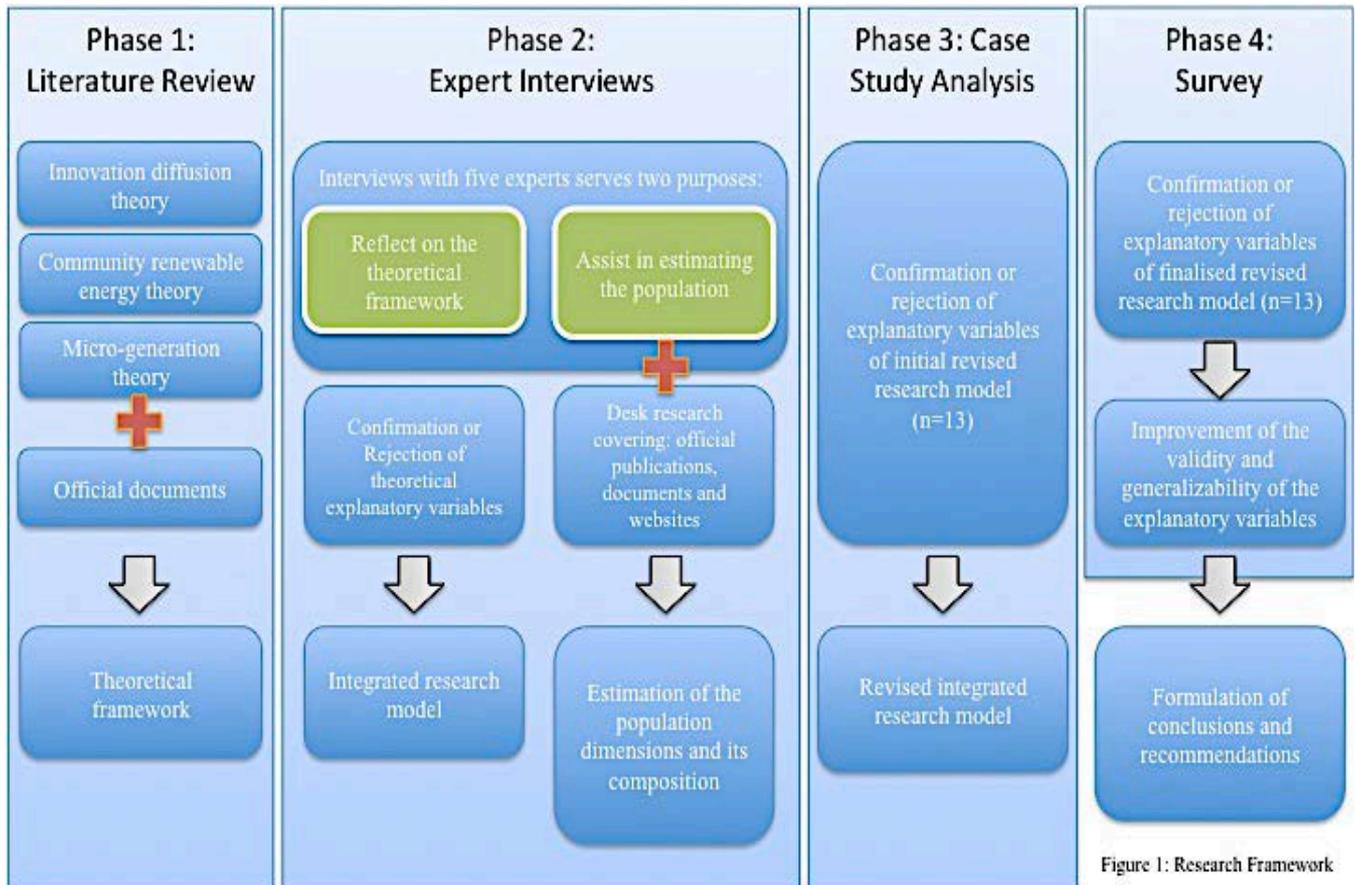


Figure 1: Research Framework

The following sub-questions are formulated in order to answer the main research question:

- What relevant explanatory factors for the emergence and development of local renewable energy organisations can be derived from the existing academic literature?
- What relevant explanatory factors do experts in this field identify?
- Which of the previously identified factors foster the emergence and development of actual local renewable energy organisations?
- Which of the previously identified factors hamper the emergence and development of actual local renewable energy organisations?

To answer these sub-questions the research is segregated into four phases, as is graphically represented in figure 1. The first phase encompasses a comprehensive literature review. The purpose of this literature review is to develop a theoretical framework to explain the emergence and development of local renewable energy organisations, which is based on the innovation diffusion, micro generation and community renewable energy literature. However, merely reviewing these bodies of literature might be insufficient since there is limited scientific empirical evidence available on the emergence or development of local renewable energy organisations in the Netherlands. Therefore additional data is gathered from readily accessible sources, such as official websites and documents, which is used to complement the academic findings. Reviewing these bodies of literature and contemplating on the additional sources, allows answering the first sub-question.

During the second phase experts in the field of decentralised generation are consulted in order to supplement, alter or confirm the potential explanatory variables extracted from the academic literature, which enable to answer the second sub-question. The consulted experts are first asked what factors they indicate as stimulant or detrimental to the emergence and development of local renewable energy organisations in the Netherlands. Secondly, they are

confronted with the theoretical framework and have the possibility to add, remove or alter any of the explanatory variables. Integrating the expert's suggestions with this theoretical framework results in an integrated research model, which further improves the applicability of this theoretical framework to the Dutch situation.

Furthermore, the purpose of the experts' interviews is twofold since they are also consulted in regard to approximating the population dimensions and providing several examples of good practices. Besides seeking advice of these experts, a desk research complements the estimation of the population dimensions. This desk research encompasses searching the Internet for various organisations or individuals that maintain a record on existing local renewable energy organisations in the Netherlands. Through combining the results of the desk research with suggestions from the consulted experts results in an approximation of the population dimensions, which forms the basis for selecting cases during the empirical part of the research.

The third phase encompasses the empirical testing of the integrated research model through conducting a case study analysis covering thirteen cases. These thirteen case studies enable to collect detailed and qualitative knowledge that either confirm or reject the influence of the explanatory variables embodying the integrated research model and which provide a preliminary answer on the final two sub-questions. Semi-structured interviews with initiators of these thirteen cases are planned and enable to enquire in-depth knowledge on the different explanatory factors that are of crucial importance for the emergence and development of these particular cases. This results in the confirmation and rejection of the explanatory variables, which form the foundation of the revised integrated research model.

Next, the revised integrated research model act as a venture point to formulate and conduct a survey, which is covered in the following phase. The purpose of the survey is to enhance the validity and generalizability of the explanatory variables confirmed by the case study analysis through testing them on a larger sample of cases and therefore improves our understanding on which factors foster or hamper the emergence of actual local renewable energy organisations. Finally, the data gathered through the case studies and the survey are both subjected to a thorough analysis in order to establish the extent to which each variable explains the emergence of local renewable energy organisations. Based on the combined results the final phase is to formulate conclusions and recommendations.

### *1.7 Outline*

In order to answer the main research question this research is structured as follows: to begin with, chapter two centres on constructing a suitable research model, which encompasses a comprehensive literature review on the possible explanatory variables derived from the academic literature. The academic findings are complemented with suggestions of several experts and results in an integrated research model. The following chapter elaborates on the methodological aspects necessary for conducting the empirical part of this research, which includes an approximation of the population dimensions and its composition. After elaborating on the applied methods, the integrated research model is empirically tested on thirteen Dutch local renewable energy organisations through a case study analysis, which is the focal point of chapter four. To further improve the validity of the empirical results succeeding the case study analysis a survey is conducted, which is concentrated upon in chapter five. A reflection on the applied methodology of both the case studies and the survey is discussed in chapter six. The final chapter centres on formulating conclusions and recommendations.

## 2. Constructing a suitable research model

This chapter centres on constructing a suitable research model to assess which explanatory variables encourage or hamper the emergence and development of local renewable energy organisations. This is pursued through first reviewing the innovation diffusion, community renewable energy and micro generation literature. Scientific search engines like Scopus, Google scholar and Web of Science are used to find relevant academic articles and books, which form the theoretical foundation of this research. Through searching on key elements or aspects of local renewable energy organisations like renewable energy, decentralised or distributed generation, local in terms of community- and micro-generation and innovation diffusion, resulted in numerous related articles of which the most relevant are selected after reading their abstracts.

The theoretical foundation in terms of a bare framework is derived from the innovation diffusion literature. However, to study the emergence and development of local renewable energy organisations, theoretical explanatory variables are extracted from the community renewable energy and micro-generation literature since the concepts of renewable energy, locality and civic involvement are inherent to these bodies of literature. Reviewing these bodies of literature is the focal point of the first paragraph and enables to answer the sub-question regarding what relevant explanatory factors that influence, i.e. stimulate or hamper, the emergence and development of local renewable energy organisations are identified in the scientific literature.

Where reviewing the scientific literature allows constructing a theoretical framework, integrating the suggestions of five experts in the field of decentralised generation, further adjusts the theoretical framework to the current Dutch situation and enables to assess the emergence and developments of local renewable energy organisations in the Netherlands. Therefore, the second paragraph aims to answer the sub-question: which relevant explanatory factors concerning the emergence and development of local renewable energy organisations in the Netherlands do experts in the field identify?

Based on the integration of the academic findings with the expert suggestions, hypotheses are formulated, which is elaborated upon in the succeeding paragraph. The final paragraph concludes and briefly summarizes the findings of this chapter.

### 2.1 Constructing a theoretical foundation

The prevailing assumption behind privatizing the European energy markets is to open up the energy market, which would result in reduced consumer prices and the creation of opportunities for non-conventional actors to enter the market (Agterbosch 2006, p.17 and Jacobsson and Johnson 2000, p.636). Despite the theoretical incentive for non-conventional actors to enter the energy market, in many European countries including the Netherlands, this process is still dominated by large-scale privately managed companies (Walker *et al.* 2010, p.2656 and Devine-Wright 2005, p.57). Consequentially, this assigns locally or decentralised oriented organisations, which experiment with different and innovative technical and social configurations, to a grassroots niche.

Furthermore, local renewable energy initiatives<sup>4</sup> are regarded to reside in an infant stage of development (Watson *et al.* 2006, p.6). However, despite being regarded as an immature phenomenon and being assigned to grassroots niches, the number of local renewable energy organisations in the Netherlands is growing (Agentschap NL 2010)<sup>5</sup>. This development is part of a trend away from the present conventional top-down and centralised structures of energy provision towards innovative bottom-up and decentralised managed methods of energy provision. As a result their emergence and development can be analysed from an innovation diffusion perspective (Allen *et al.* 2008, p.530-531). Following this statement, the innovation

<sup>4</sup> Several authors like Devine-Wright and Devine-Wright 2009, p.306, Kellett 2007, p.392, Kahn 2007, p.354 and Collins 2004, p.15 refer to this as *Energy Service Companies* (ESCOs).

<sup>5</sup> This is confirmed by other sources like e-Decentraal and P-NUTS as well.

diffusion literature is consulted in order to construct a theoretical basis, which structures the research, assists in identifying possible explanatory variables and assesses their influence on the emergence and development of local renewable energy organisations.

From this body of literature, the integrated framework developed by Dieperink *et al.* (2004, p.780) is selected since this general framework can be applied to understand the emergence and developments of diverse environmental innovations such as local renewable energy organisations (cf. *Ibid*, p. 782). The authors made an integrative framework based on an inventory of various empirical results covering several studies, which provide possible explanatory variables for the diffusion of renewable energy technologies in the build environment and is shown in figure 2. The integrated framework encompasses a decision-making process and six categories in which the explanatory variables are grouped.

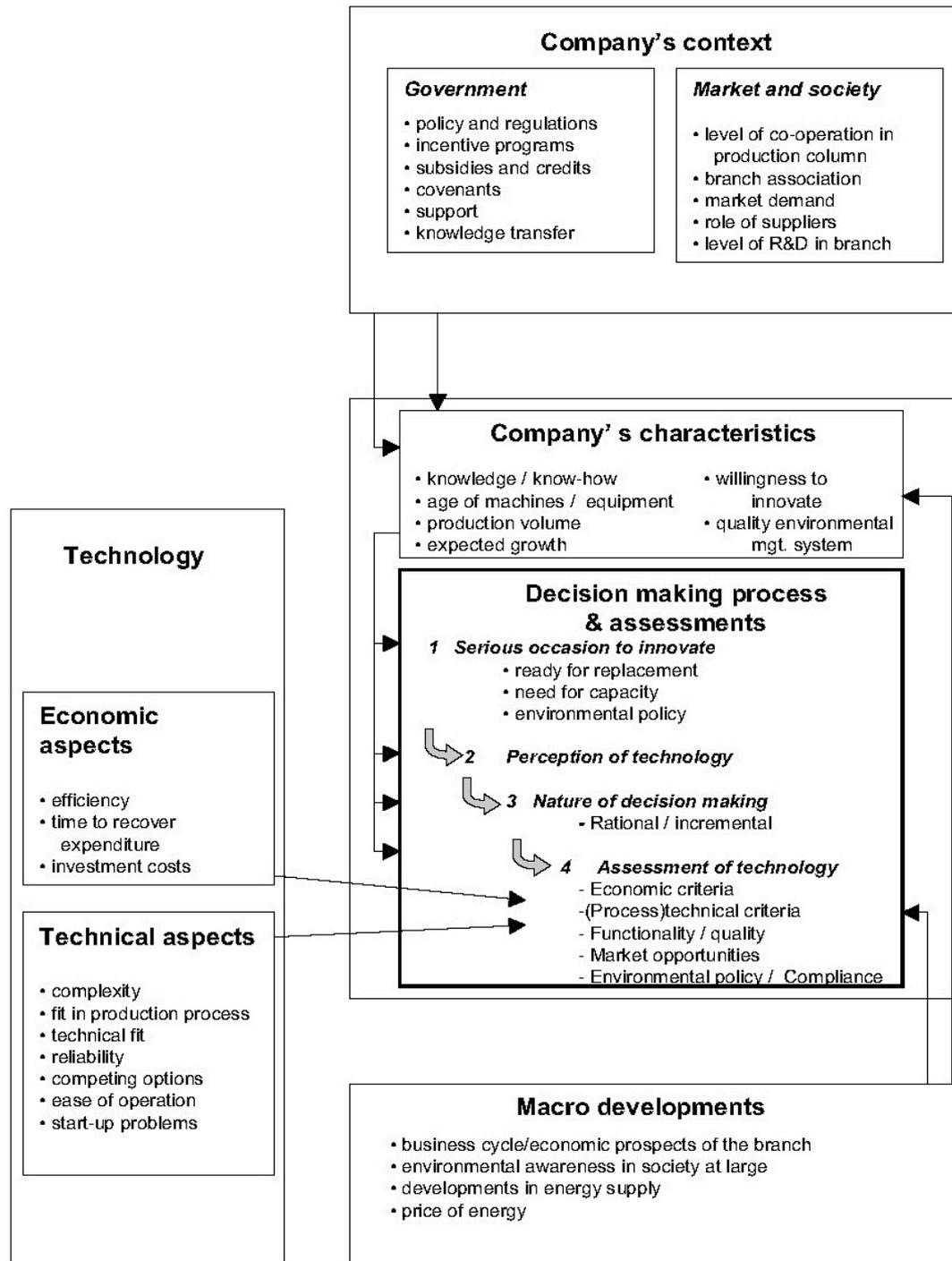


Figure 2: Integrative framework of Dieperink *et al.* (2004).

### 2.1.1 Decision-making process

The dependent variable is the result of the decision-making process and consequentially has a central role in this framework. The decision making-process is further distinguished into four steps: the emergence of an occasion, an unconstrained perception towards the innovation, the nature of decision-making and the assessment of the innovation (Dieperink *et al.* 2004, p.776).

The first step requires the presence or emergence of a serious occasion before individuals or organisations will consider adopting an innovation. Occasions appear in response to the need to replace existing technologies, increase capacity or new environmental policies and regulations. Furthermore, increased environmental awareness, reduced dependency on centralised energy systems or fossil fuels or the appeal to be associated with green or sustainable development might also explain why individuals and organisation see an opportunity to partake in adopting innovative renewable energy technologies.

The second step requires a non-constraining perception of the quality of the innovation. Jager (2006, p.1937) mentions that early adopters or pioneers generally make independent decisions and are guided by their needs, whereas later adopters are more influenced by their social network, i.e. peers. Therefore the decision to adopt an innovation is influenced by the perception regarding the innovation, which can be shaped by the social context.

The third step involves the nature of the decision-making itself, which is determined by the organisation's characteristics. For instance, the organisational configuration might affect whether a decision is made on basis of consensus, democratically or by selected representatives.

The final step in the decision-making process entails the assessment of the innovation by weighting the diverse interests. Here economic considerations often play a key role as well as the technological aspects. Additionally, environmental and organisation aspects can also influence the actual assessment and hence exclusively focusing on the frequently dominant economic and technical criteria is regarded insufficient (Vermeulen and Hovens 2006, p.2734 and Dieperink *et al.* 2004, p.779).

### 2.1.2 Categorisation of the independent variables

The identified explanatory variables are clustered into six categories; the organisational characteristics, the organisation's context (which is exerted by governments and the market and society at large), the economic and technical characteristics of the envisioned renewable energy technology and the influences from the macro-context. The explanatory variables are allocated to one of these six identified clusters of independent variables and are assumed to have a profound influence on one or more of the four steps in the decision-making process.

First, the organisational arrangement, cultural configurations, present knowledge, willingness to innovate and familiarity with the innovation itself are described as organisational characteristics and might explain the nature of the decision-making process and determine which criteria are used during the assessment stage.

Secondly, governments and the market and society at large are capable of impinging the organisational context. Governments can affect the adoption of innovations through implementing policies or by setting standards. Consequentially, governmental intrusions can exercise a substantial impact on the organisational characteristics. Besides, governmental interference can influence the decision-making process directly through regulatory procedures in terms of setting standards, issuing permits and granting planning permissions, which might foster the emergence of an adoption occasion. In addition to regulatory procedures, adoption decisions could be affected through economic instruments like grants, subsidies, funds and feed-in-tariffs or by communication mechanisms that support the transfer of knowledge. Moreover, from the field of induced innovation<sup>6</sup> it is suggested that stable and consistent

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<sup>6</sup> The literature on induced innovation studies the extent to which policy tools influence the rate of diffusion of a phenomenon (Davies and Diaz-Rainey 2011, p.1227).

policies that are sustained for a longer period of time are essential for innovations in order to reach large-scale adoption (Davies and Diaz-Rainey 2011, p.1236).

In addition to governmental interference, the market and society are also capable of impinging the organisational context. Actors operating in the surrounding of the potential adopter can play a key role in the adaption process by persuading or discouraging them and ultimately forming or altering their perception of an innovation. In line with the previous, Vermeulen and Hovens (2006, p.2732) found that suppliers and installers of innovative technologies are influential actors that could significantly affect the adopter's decision. Additionally, consumers, affiliated organisations, competitors, lobby groups and knowledge institutions amongst others can exert influence on the perceived understanding of an innovation and thus the decision-making process as well.

The next two independent variables are concerned with the technical and economical characteristics of an innovation. The technical features encompass the efficiency in terms of output, ease of operation or maintenance, perceived complexity and reliability and how well it can be fitted into the existing systems. Besides these technological characteristics, economic features of an innovation are also contemplated during the assessment phase in the decision-making process. Economic features such as the time needed to recover the invested amount, the investment costs itself (Bergman and Eyre 2011, p.338, Jagoda 2011, p.1270, Sauter and Watson 2007, p.2776 and Jacobsson and Johnson 2000, p.629) and the ratio between price and performance are considered during the assessment stage of the decision-making process. High investment costs, long pay back periods and low price performance ratios tend to create unfavourable adoption conditions and will only satisfy a small market segment, i.e. niche, which seeks different type of benefits (Jacobsson and Johnson 2000, p.631). In light of this Vermeulen and Hovens (2006, p.2734) state that the assessment of economic features of an innovation provides a significant explanation for the adoption of a relatively established innovations. Alternatively, economic characteristics tend to be less substantial during the adoption decision of rather immature or young innovations.

The final independent variable covers the impact of macro developments on both the organisational characteristics and the assessment stage of the decision-making process. Poor economic prospects (Jagoda *et al.* 2011, p.1269), fluctuating energy prices (Praetorius *et al.* 2010, p.749), emerging entry barriers associated with conventional and vested interested in the energy market (Jacobsson and Johnson 2000, p.633) and the degree of environmental awareness on the impact of anthropogenic climate change are examples of macro developments that could exert a profound influence on the decision to adopt an innovation.

## 2.2 Adapting the theoretical framework

Where the innovation diffusion literature provides building blocks to construct a theoretical foundation, it remains too abstract to study the emergence and development of local renewable energy organisations. Decentralisation of energy provision through local renewable energy organisations appears on multiple levels, ranging from individual households to regional cooperative arranged organisations, and can involve a diverse composition of actors with different motives, responsibilities and forms of ownership. Besides, renewable energy can be generated through multiple technologies. Therefore, there exist many different ways or modes in which these technical and social aspects can interact with each other. From the complete spectrum of possible interactions, Walker and Cass (2007, p.462) distinguish five commonly applied modes. In line with the previously stated definition of local renewable energy organisations and the focus on organisations initiated from the civil society, this part of the literature review zooms in on the 'community' and 'household' mode out of the five modes discussed by Walker and Cass (2007). Consequentially, the community renewable energy and micro-generation literature are examined to supply supplementary theoretical explanatory variables, which complement the previously discussed integrated framework. Where the first section embarks with briefly elaborating on the diverse modes in which both concepts occur, the following sections discuss various alterations and adjustments to the decision-making process and the explanatory variables constituting the organisational

characteristics, governmental intrusions, influences from the market and society, technical and economical characteristics of the applied renewable technology and macro developments.

### *2.2.1 Positioning community renewable energy and micro generation*

The roots of community renewable energy and micro generation can be traced back to the early seventies (Walker 2011, p.779, Walker *et al.* 2010, p.2656, Walker *et al.* 2007, p.68 and Devine-Wright 2005, p.58), when the proposed merits of a micro, local or communitarian approach were first expressed by pioneering authors like Schumacher (1974) and Callenbach (1975). After a couple of decades these principles again gained popularity and emerged in the present policy discourse as a possible solution to mitigate the pressing issues related to anthropogenic climate change.

As seems inherent to the process of decentralising energy generation, both community renewable energy and micro generation obscure the boundaries between energy supply and demand. As a consequence, on one end of the spectrum the concepts of micro generation and community renewable energy are applied by public, private or hybrid utilities that experiment with various forms of co-provision to broaden their portfolio of technologies and services. On the opposite end of the spectrum, civil actors in terms of individual households or communities engage in generating renewable energy in order to heat their homes and reduce their energy bills as well as their dependence on central utilities (cf. Fisher 2006, p.118). However, partly due to the reincarnated accent on the affiliated benefits of a micro or community-based approach, these notions have been characterized as ubiquitous since they encapsulate a range of different understandings (Walker 2011, p.777).

To begin with, in relation to community renewable energy an often-made distinction is between communities of locality and communities of interest (Walker 2008, p.4402). Where communities of locality are confined to the people that live in a defined area and communities of interest consist of people that share a common interest but do not necessarily reside in the same local area. More recently, Walker (2011, p.777 and 778) identified additional interpretations of community that are closely linked to the former two.<sup>7</sup> Based on these various interpretations it becomes clear that community cannot be regarded as synonymous to locality and place (Walker 2011, p.778 and Walker *et al.* 2010, p.2658), to cohesive (Walker *et al.* 2010, p.2657) or to small-scale projects (Devine-Wright 2005, p.59 and Toke 2005, p.302). Despite these essential nuances, the range of different understandings of community allows to accommodate an equal variety of community-based projects that differ in scale, interconnectedness, interest, participation and organisational arrangements. This flexibility can be interpreted as advantageous since it supports different types and forms of local renewable energy provision. Alternatively, the detrimental aspect of its malleability also enables the inclusion and legitimisation of poorly conceived projects that hardly concern the community and merely support private interest (Walker *et al.* 2007, p.78).

Secondly, the application of micro generation is not simply confined to individual households but also encompasses the provision of renewable energy technologies that enable micro generation by public-, private- or civil-based organisation (Bergman and Eyre 2011, p.346, Allen *et al.* 2008, p.530 and Collins 2004, p.15). This implies that micro generation and community renewable energy are intermingled with each other, since community based organisations can facilitate the procurement of renewable energy technologies by individual households. Despite the lack of well-defined boundaries, micro generation remains distinctive in the sense that it generates energy on site, where on site generation by individuals within a community grid is only one possible mode in which community renewable energy can be pursued. However, like community renewable energy, micro generation appears in various configurations or models with variation in motivation, the applied technologies and the

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<sup>7</sup> Where the notion of community as place affiliates with community of locality, the other interpretations, i.e. communities of identity, process and network, relate closer to communities of interest (Walker 2011, p.777-778).

degree of co-provision, i.e. the role of the consumer in terms of ownership, responsibility and control (Sauter and Watson 2007, p.2773 and Watson 2004, p.1982).

In order to distinguish between on the one hand individual or community-based organisations and other types of renewable energy entities on the other, the social composition of local renewable energy organisations can be analysed on the basis of a process and outcome dimension, which is graphically represented in figure 3. Where the process dimension focuses on the level of participation or involvement of a community and its individual members, the outcome dimension concerns the spatial and social distribution of the associated benefits generated by the organisation (Walker and Devine-Wright 2008, p.498).

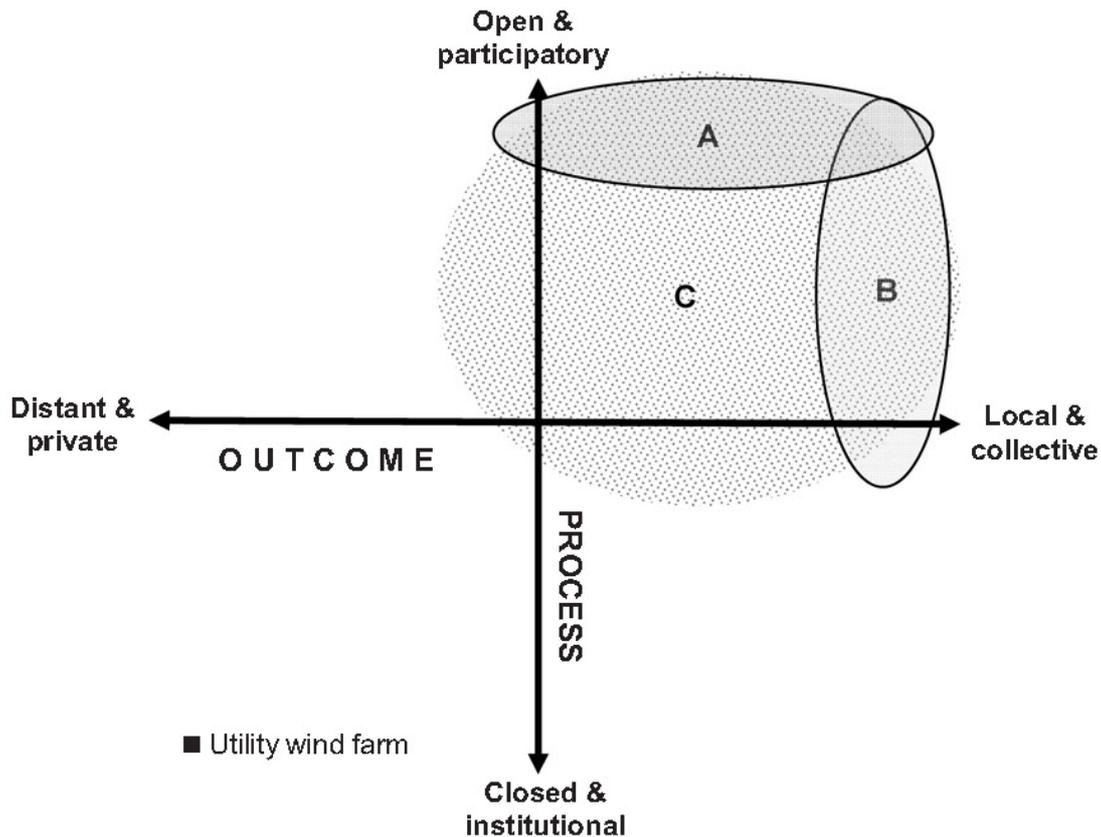


Figure 3: Positioning community renewable energy and micro generation according to process and outcome dimensions (Derived from Walker and Devine-Wright (2008, p.498).

In terms of process, individuals and communities can be involved through planning, setting up and running a local renewable energy organisation. Alternatively, the provision of benefits generated by a local renewable energy organisation (irrespective of its societal background) is related to the degree in which individuals or community members own the project. According to the two dimensions, an local renewable energy organisation that is both 'by' and 'for' the community members would be placed at the very top right (Walker and Devine-Wright 2008, p.498). However in general local renewable energy organisations are likely to be allocated to the upper right quadrant, marked by C in figure 3. Local renewable energy organisations that emphasise a high degree of local involvement generally are located in the area labelled A. On the other hand, organisations allocated to area B accentuate a fair distribution of possible benefits amongst the (community) members.

### 2.2.2 Adaptations concerning the decision-making process

Originally, the integrated framework of Dieperink et al. (2004) is formulated according to elements derived from empirical studies on the diffusion of renewable energy technologies in the built environment. To assess the appearance of local renewable energy organisations,

diffusion is understood as the emergence, i.e. establishment, and development of these organisations. Due to the focus on the emergence or establishment of local renewable energy organisations, the dependent variable in the applied research model is the outcome of the founding process, which is the actual establishment of such organisations. The founding process is largely based on the original decision-making process and also encompasses four phases: the appearance of an occasion, the local perception towards local renewable energy organisations, local support and acceptance and the assessment of the applied technology.

First, in order to embark in the process of founding a local renewable energy organisation, a serious occasion has to occur. This can range from fluctuating energy prices and the desire to become independent and self-sufficient to a growing dissatisfaction with the incompetence of the government and the market to meet their environmental targets. An occasion merely serves to prompt the idea to establish a local renewable energy organisation. During the second phase, various actors within the social network or direct surroundings influence the local perception of the founders and the community through for example advocating the merits of such an organisation or amplifying the contested features of renewable energy technologies. Another phase in the process to establish a local renewable energy organisation is to ensure the organisation receives sufficient local support and acceptance, which is frequently stressed as a crucial aspect in the academic literature. It is suggested that a high level of local support significantly increases the chances of actually establishing a local renewable energy organisation, where minor support can be detrimental. Finally, harvesting renewable energy sources can be achieved through utilizing numerous technologies. Therefore, an assessment on either the technological features such as grid connectivity or reliability as well as the economic characteristics like investment costs and the time to recover the investment costs, provide necessary knowledge that potentially determines the founding of a local renewable energy organisation.

### *2.2.3 Modifications regarding the organisational characteristics*

Besides the explanatory variables outlined by Dieperink *et al.* (2004), the micro generation and community renewable energy literature provide several additional variables regarding the organisational characteristics of local renewable energy organisations. First, during the deployment of local renewable energy organisations, developers from all three spheres of society often encounter opposition from people or communities that reside close to the place where a project is realised (Wünsterhagen *et al.* 2007). The rise of opposition can often be traced back to negligence of the process dimension and the impact of visual or aesthetic aspects frequently associated with renewable energy technologies (Warren and McFadyen 2010, p.205 and Toke *et al.* 2008, p.1136). Embedded in the academic literature, it is advocated that more direct and substantial involvement of local people or the community in general reduces opposition and enhances local support and acceptance of a project (Haar *et al.* 2011, p.101, Denis and Parket 2009, p.2092, Walker and Devine-Wright 2008, p.499, Roger *et al.* 2008, p.4218, Walker 2008, p.4402, Toke *et al.* 2008, p.1136, Walker and Cass 2007, p.464, Wünsterhagen *et al.* 2007 and Devine-Wright 2005, p.66). Furthermore, by involving local people in the process it is suggested that their knowledge and understanding, i.e. awareness, on renewable energy improves and therefore their support for renewable energy in general (Haar *et al.* 2011, p.99, Walker 2011, p.779, Walker *et al.* 2010, p. 72, Warren and McFadyen 2010, p.210, Walker and Devine-Wright 2008, p.499 and Toke *et al.* 2008, p.1140-1). Additionally, this enhanced awareness in regard to renewable energy might have a wider catalytic affect on the micro-scale in terms of the application of renewable energy technologies in households (Walker 2011, p.778, Devine-Wright and Devine-Wright 2009, p.305, Walker and Devine-Wright 2008, p.500 and Rogers *et al.* 2008, p.4218).

Secondly, in terms of outcome, support and acceptance of local people or the community towards a local renewable energy organisation is found to correlate with their expectancy of receiving a fair and equal share of the benefits generated by a local project (Cass *et al.* 2010, p.267). Theoretically, a local renewable energy organisation can provide the community with financial and non-financial benefits. The financial benefits frequently originate from reduced

energy costs (Walker 2008, p.4402 and Kellett 2007, p.392), which might be amplified if the gains are re-circulated through or returned to the community (Kahn 2007, p.354 and Walker et al. 2007, p.68). Besides financial benefits, these organisations are expected to deliver a range of benefits, which fail to materialise in conventional top-down corporate developed projects (Toke 2005, p.307). Examples are the usage of electricity or heat provided by the project, economic spin-offs such as local contracting (Kahn 2007, p.354) and the enhancement of social capital and cohesion (Devine-Wright 2005, p.59). However, when the allocated benefits are perceived as unfair or unequally distributed, this might cause hostility and consequentially result in a decline in local support for the project (Walker 2011, p.779 and Walker and Devine-Wright 2008, p.499).

Contrary to the proposed advantages associated with local involvement and equal distribution of potential benefits, the dimensions of an organisation or project in terms of number of installations or the generated output are understood to impact the establishment of a local renewable energy organisation. Larger projects often require higher investments, are more vulnerable to disparities in the division of related benefits, demand more effort to remain a high level of participation and subsequently have a profound effect on the degree of interpersonal trust and social cohesion (Haar et al. 2011, p.102 and Walker et al. 2010, p.2661) and diffusion of relevant knowledge (Denis and Parker 2009, p.2093) within a community. Therefore, an increase in size might result in discrepancies in both process and outcome dimensions, cumulates pressure on a local community and turn out counter effective, which results in less successful or even abandoned projects (Walker et al. 2010, p.2661). In light of this, Warren and McFadyen (2010, p.210) stress that a communitarian approach is not the magic bullet that provides a solution for the problems frequently associated with the deployment of renewable energy. They argue that large-scale projects have substantial advantages in relation to community projects in terms of reduced economics of scale and are accompanied with less administrative burdens.

#### 2.2.4 Adjustments related to government intrusions

The second category of explanatory variables that is modified according to the findings of the micro generation and community renewable energy literature regards the influence of the government. The first alteration is frequently mentioned and firmly embedded in both bodies of literature and centres on the demoralizing impact of institutional barriers. Institutional barriers arise from long bureaucratic procedures and/or the absence of a long-term and consistent policy framework. Where policy measures can be designed to support local organisations by providing subsidies that lower the up-front investment costs or allow exporting energy surpluses to the grid in return for financial compensation, the lack of such financial support is perceived as obstructive (Bergman and Eyre 2011, p.338, Watson et al. 2008, p.3096 and Watson et al. 2006, p.13). Moreover, unstable or inconsistent policies create uncertainties in the decision-making of potential adaptors of a renewable energy technology (Allen et al. 2008, p.541). The Dutch policy environment in regard to the stimulation of renewable energy technologies and innovation has been subject to frequent changes and thus is characterised as unstable (Toke et al. 2008, p.1138, Agnolucci (2007), Rooijen and Wees (2006) and Dinicia and Aretsen 2003), which resulted in lower levels of deployment of renewable energy technologies and innovations.<sup>8</sup>

In addition to inconsistent policies, the perceived effort to obtain a planning or licensing application is suggested to discourage the emergence of local renewable energy organisations (Allen et al. 2008, p.540 and Watson et al. 2006, p.14). In the Netherlands, for example, about eighty per cent of the proposed wind power projects failed to proceed due to rejected planning applications (Toke et al. 2008, p.1134 and Jacobsson and Johnson 2000, p.635). Furthermore, the present energy regulation, which is designed for centralised generation, in

<sup>8</sup> Jager (2006, p.1935) describes a situation in which the Dutch government had introduced a subsidy designed to stimulate individuals to obtain micro generation technologies, but was forced to terminate it again in 2004 due to the financial turmoil caused by an unanticipated large number of requests.

combination with the consensus approach in the Netherlands results in lengthy processes that discourage the emergence of local renewable energy organisations (Haar *et al.* 2011, p.109). Consequentially, Haar *et al.* (2011, p.108) stress that relying on subsidies is not feasible since inconsistent policies and a bureaucratic burden might stagnate the emergence and development of a local community renewable organisation.

Apart from these institutional barriers, governmental bodies can stimulate the emergence and development of local renewable energy organisations through facilitating the transfer of knowledge. Jager (2006, p.1942) showed that facilitating the transfer of knowledge has a positive effect on the deployment of renewable energy technologies. However, he also stresses that while information provision is necessary to reduce perceived complexities, it is insufficient in itself to foster the deployment of innovative renewable energy technologies.

### *2.2.5 Refining the influence of the market and society*

In addition to the explanatory variables identified by Dieperink *et al.* (2004), the community renewable energy and micro generation literature provide two supplementary variables. First, the availability of external expert knowledge and advice on founding a community renewable energy organisation is vital in formulating the local perception and enhancing local support and acceptance (Walker 2011, p.780, Walker *et al.* 2010, p. 2661, Denis and Parker 2009, p.2094, Rogers *et al.* 2008, p.4225, Walker 2008, p.4402 and Toke 2005, p.307). On the other hand unavailable or absent external knowledge and advice is argued to significantly obstruct the emergence and development of local renewable energy organisations.

Secondly, the presence of local protection or opposition organisations that strongly oppose to renewable energy technologies or organisations on the basis of the supposed aesthetic or visual impact of renewable energy technologies is also found to be discouraging (Toke *et al.* 2008, p.1137).

### *2.2.6 Modifying the technical characteristics*

The integrated framework of Dieperink *et al.* (2004) entails various technical features of a renewable energy technology that might influence the founding process of a local renewable energy organisation. However, reviewing the micro generation and community renewable energy literature provides supplementary explanatory variables. To begin with, members of a local renewable energy organisation can experience a sense of self-reliance and reduced dependency on distant and top-down structured conventional energy corporations, which commonly depend on foreign fossil fuels often derived from unstable regimes (Verbong and Geels 2010, p.1218, Watson *et al.* 2008, p.3095, Sauter and Watson 2007, p.2771 and Collins 2004, p.8).

Related to increased control and reduced dependency, a local renewable energy organisation supplies its (community) members with more reliable energy since decentralised generation enables addressing issues with load management (Walker 2008, p.4402). Additionally, it reduces energy flows on the network and therefore alleviates fluctuations in domestic energy demand and thus reduces the possibility of a power cut (Passey *et al.* 2011, p.6281 and Schneider and Pehnt 2006, p.216).

Another distinctive feature that is argued to affect the founding process of a local renewable energy organisation is the visibility of several renewable energy technologies. Large and exposed projects commonly impose substantial impact on the neighbouring community in terms of visibility, which in scenic environments is frequently associated as a primary source of opposition and tends to negatively dominate the attitude of people in the vicinity of the project (Warren and McFadyen 2010, p.205). Contrary, in certain situations the visibility of a renewable energy project could foster local acceptance due to increased acquaintance and awareness on the relevance of renewable energy (Devine-Wright 2005, p.67).

In contrast to the previously described advantages of various technical features, the same features might challenge the establishment of local renewable energy organisations. First, the applied renewable energy technologies are often characterised as innovative and therefore

perceived as being immature, risky or unreliable (Bergman and Eyre 2011, p.339, Rogers et al. 2008, p.4224, Fisher 2006, p.140 and Watson et al. 2006, p.13). Secondly, another perceived barrier of applying renewable energy technologies concerns contextual factors such as the appearance of an opportunity to creatively utilize renewable energy to meet local demand (Walker 2011, p.780). In case local supply and demand are not well balanced, this might have adverse impact on the quality of the energy, which is caused by voltage fluctuations resulting from unpredictable availability of renewable sources (Passey et al. 2011 and Verbong and Geels 2010, p.1218). A final complication related to technical attributes of renewable energy technologies is associated with the possibility to export energy excesses to the grid, which require technical adaptations of the conventional centralised system. The current system is designed and optimised to control energy flows in one direction, i.e. from the power plant to the consumer. With decentralised generation energy flows become bidirectional, which requires changes to the network if distributed generation is to contribute significantly to the energy mix (Allen et al. 2008, p.540).

Finally, if network changes are realised and owners of renewable energy technologies are financial compensated for their energy surpluses delivered to the grid, these energy flows have to be monitored to establish the amount of energy imported and exported. Therefore, Allen et al. (2008, p.542) and Watson et al. (2006, p.22) stress that installed technologies should be equipped with smart meters to provide owners with direct feed-back on their energy consumption, which further fosters behavioural change.

### 2.2.7 Adjusting the economic characteristics

In addition to the technical features of an applied renewable energy technology, its economic attributes are considered as well. First, the most apparent financial benefit concerns direct saving on the regular energy bills due to domestically or collectively generated energy, which either enables to lower the energy consumption or to export energy surpluses to the grid in return for financial compensation. Furthermore, lower energy bills also diminish fuel poverty (Sauter and Watson 2007, p.2771 and Dobbyn and Thomas 2005, p.12). Moreover, generating and consuming energy locally, decreases costs affiliated to efficiency losses occurring from the transmission and distribution of energy through centralised systems (Sauter and Watson 2007, p.2776, Schneider and Peht 2006, p.208 Greenpeace 2005 and Collins 2004, p.9).

Secondly, economic constraints arise due to high up-front investments that are required for some renewable energy technologies (Watson et al. 2006, p.13). For example, photovoltaic systems require a significant higher initial investment in comparison to micro wind turbines or insulating residents. On the other hand, large-scale deployment is expected to lower the up-front investments costs.

Furthermore, where realising the application of small-scale renewable energy technologies on individual households requires rather low investments, establishing a local renewable energy organisation aiming at collectively generating renewable energy through realising a relative large project regularly requires a significant up-front investment. Such projects are commonly funded through multiple financial sources like grants, subsidies, funds and/or individual investment. Consequentially, drawing on multiple financial sources to finance such a project is perceived as a complex endeavour (Walker 2011, p.780, Denis and Parker 2009, p.2093, Walker 2008, p.4402 and Rogers et al. 2008, p.4224).

Apart from the discussed financial benefits, Berman and Eyre (2011, p.336) stress that local renewable energy organisations have more to offer in terms of soft or indirect benefits. For example, local renewable energy organisations are advocated to generate intangible and symbolic benefits such as an increased harmony within the community (Kahn 2007, p.354) and grant the owners of visible renewable energy technologies a sense of pride and a 'green' image (Warren and McFadyen 2010, p.209 and Walker et al. 2007, p.68). A final symbolic benefit concerns an enhanced awareness regarding energy use and efficiency (Bergman and Eyre 2011, p.336, Watson et al. 2008, p.3101 and Dobbyn and Thomas 2005, p.6). Being a member or owning a renewable energy technology enables them to connect their domestic energy use to larger environmental issues since it materialises the rather vague concept of

'energy' by providing an alternative to actually mitigate anthropogenic climate change with tangible and visible solutions (Haar *et al.* 2011, p.99, Sauter and Watson 2007, p.2771, Dobbyn and Thomas 2005, p. 72 and Collins 2004, p.6). However, Sauter and Watson (2007, p.2777) emphasise to take this statement cautiously, since various empirical studies showed ambiguous results concerning the supposed enhancement in awareness of people possessing renewable energy technologies.

### *2.2.8 Alterations concerning the macro developments*

The micro generation and community renewable literature stipulates several nuances regarding the explanatory variables, which are categorised as macro developments. A primary barrier identified by the academic literature encompasses the existence of market entry barriers (Allen *et al.* 2008, p.531) or system resistance (Collins 2004, p.11). The traditional companies dominating the centralised energy systems are usually focused on system optimisation through incremental rather than radical change, since they have made sunk investments in the existing technologies such as power plants and the required infrastructure. Furthermore, these entry barriers might also arise from significant political influence and the accompanied social network with its prevailing norms and beliefs (Bergman and Eyre 2011, p.342 and Verbong and Geels 2010, p.1214). Consequentially the vested corporations are reluctant to invest in necessary network changes, which allow connecting local organisations to the grid or would ease the entrance of local renewable energy organisations to the energy market (Walker 2008, p.4403).

Secondly, unequally allocated taxable allowances result in an unlevelled playing field, which discourages the establishment and development of local renewable energy organisations. Centralised energy companies generally receive favourable tax concessions in comparison to decentralised energy organisations, which result in discrepancies in the initial investments for renewable energy technologies since these can significantly be reduced by taxable allowances (Watson *et al.* 2008, p.3100, Watson *et al.* 2006, p.15 and Collins 2004, p.20).

A final barrier identified by the scientific literature encompasses the lack of common understanding or awareness on the impacts of energy use on the environment and its relation to global issues such as anthropogenic climate change (Bergman and Eyre 2011, p.338 and Collins 2004, p.5). According to Watson *et al.* (2008, p.3100 and 2006, p.14) this lack of understanding is related to the bounded rationality that ordinary people face. In general the public is incapable of grasping the complex environmental effects and the exhaustive economic and technical assessments required for making a rational decision to procure or invest in renewable energy technologies. In addition, it is assumed that people unaware of the environmental impact are also less inclined to enquire information on the advantages or benefits associated with renewable energy technologies. Consequentially, the degree of environmental awareness plays an important role in improving the local involvement and support and often determines the occasion to invest in renewable energy technologies (Jager 2006, p.1942).

### *2.2.9 Constructing the theoretical framework*

By reviewing the innovation diffusion, community renewable energy and micro generation literature, the integrated framework of Dieperink *et al.* (2004) is modified in order to assess the emergence and development of local renewable energy organisations in the Netherlands. The alterations discussed in the previous seven sections are represented in figure 4 and briefly summarised below.

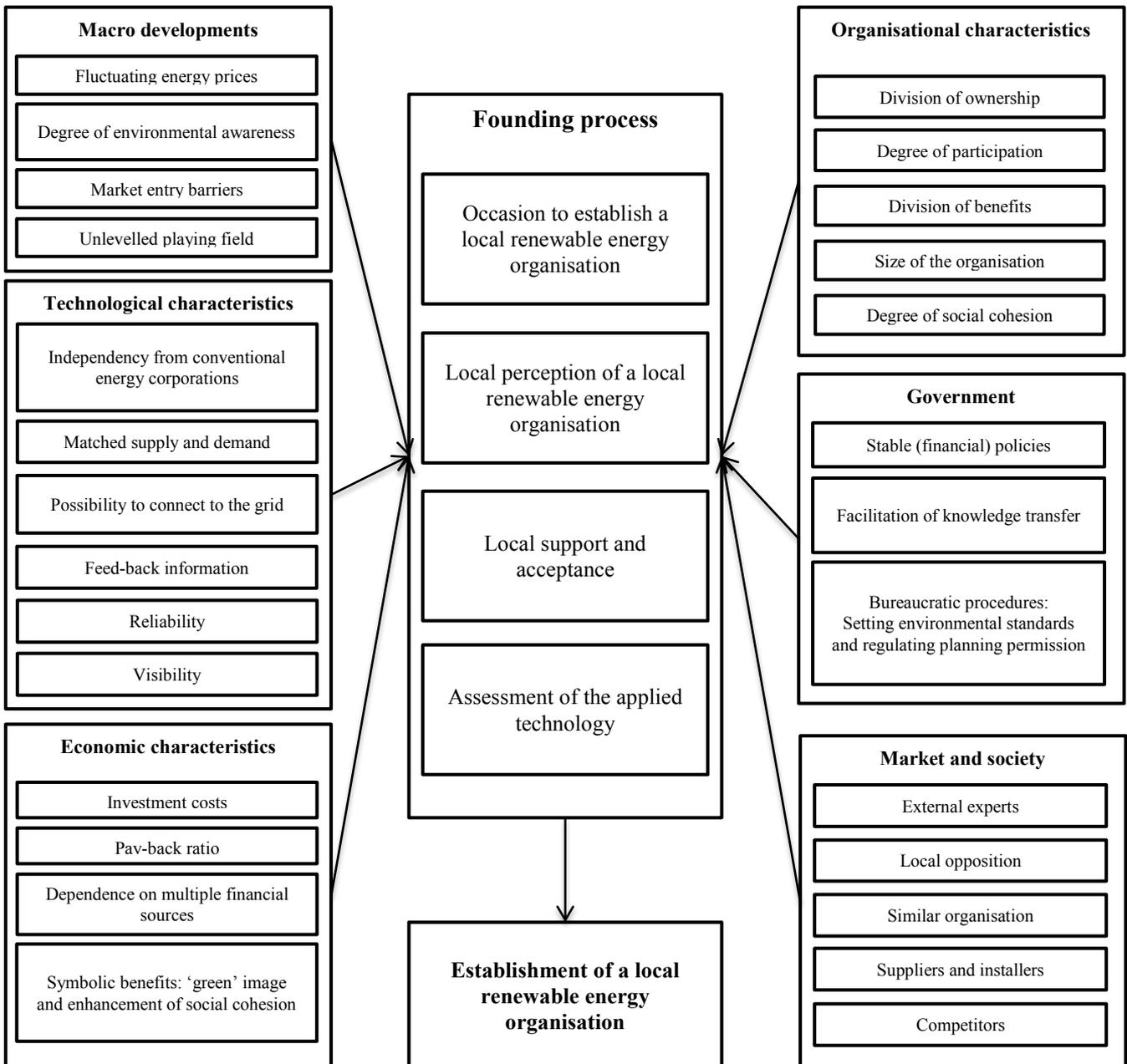


Figure 4: Theoretical framework

To start with, diverse organisational characteristics have a profound influence on several phases in the founding process. From the consulted bodies of literature it became clear that the division of ownership amongst the participating actors is an important factor. Affiliated to this aspect, the level of participation (process dimension) and the allocation of possible benefits (outcome dimension) are found to affect the extent of social acceptance of local renewable energy projects and thus the founding of such local organisations. Furthermore, the degree of social cohesion, which determines interpersonal trust and the transfer of knowledge, present within a community is mentioned as another explanatory variable in establishing a local renewable energy organisations. Besides these organisational arrangements, the size of the organisation in terms of energy generated or number of participants is a final feature that is advocated to affect the founding of local renewable energy organisations.

Within the social context of local renewable energy organisations, governmental intrusion is frequently emphasised as a key factor that determines their diffusion. Governmental bodies influence the founding process through the extent to which (financial) stimulation policies are

consistent, facilitating the transfer of knowledge and the degree of bureaucratic procedures that entail setting environmental standards and regulating planning permissions.

Besides governmental intervention, market and civil based actors influence the emergence of local renewable energy organisations through shaping several phases of the founding process. The availability of external experts, local opposition parties, similar local renewable energy organisations, suppliers and installers of renewable energy technologies and competitors are other actors who might affect the founding process of a local renewable energy organisation.

According to the scientific literature diverse technological characteristics are considered during a founding process. First, renewable energy technologies can provide a sense of self-reliance and reduced dependency on distant and top-down structured conventional energy corporations. Furthermore, these technologies are perceived reliable in terms of energy provision, which further strengthens the urge to become independent. Visibility of these technologies stemming from some distinctive features is found to either foster local support due to improved acquaintance or obstruct local perception and support based on visual or aesthetic arguments. However, on the contrary novel or innovative technologies are also often associated as immature, risky or unreliable. Furthermore, certain renewable technologies are more suitable or applicable to a particular situation and thus the type of renewable technology influences the match between the demand and supply of energy. Finally, the provision of feedback on the generated and/or consumed energy as well as the possibility to connect a project or organisation to the grid is found to affect the founding process.

In addition, the academic literature also distinguished several economic features that affect the founding process. First economical indicators such as the initial investment costs and the pay back period as well as drawing from multiple financial sources are factors that either encourage or discourage potential adopters. Besides financial gains, symbolic benefits in terms enhanced social cohesion within the community and the association with a 'green' image are supplementary variables that could explain the occasion to establish a local renewable energy organisation.

Finally, macro developments like fluctuating energy prices and the societal awareness on the environmental impact of our energy production and consumption might provide an occasion to consider the establishment of a local renewable energy organisation. Additionally, market entry barriers and an unlevelled playing field discourage the emergence of decentralised generation.

### *2.3 Experts revisions of the theoretical research model*

Where the previous paragraph focused on constructing a theoretical framework based on findings from the academic literature, this paragraph further adjusts and adapts this theoretical framework to the Dutch situation. This is achieved through asking five experts to share their visions on the emergence and development of local renewable energy organisations in the Netherlands. Among the consulted experts is Ruud de Bruijne who is a specialist from the public sphere. Furthermore, Siward Zomer and Pauline Westendorp are consulted since they are able to provide considerable expertise from a civil and entrepreneurial perception. Finally, Dion van den Bersselaar and Lot van Hooijdonk work for organisations affiliated with civil society. Ultimately, the obtained additional insights are integrated with the theoretical framework, which forms an integrated research model that is presented in figure 5. As a consequence, this paragraph aims to answer the sub-question: which relevant explanatory factors for the emergence and development of local renewable energy organisations in the Netherlands do experts in the field identify?

#### *2.3.1 Refining the organisational characteristics*

The consulted experts provided several suggestions to improve the theoretical framework. In regard to the organisational characteristics Bersselaar (2012) emphasised that local renewable energy organisations could experience difficulties with the degree of local participation due to the tendency of initiators or members of the board of directors to cumulate expert knowledge

concerning for example market regulation or technological features. Moreover, due to their enhanced expertise on these specific aspects, initiators tend to intervene in national issues such as the unbalanced playing field<sup>9</sup> instead of concentrating on rather local aspects. This degree of comprehensive and specific knowledge within these organisations might provoke a gap between the organisation and its (potential) members or costumers, which troubles the communication and therefore has an adverse affect on the local support for and acceptance of the organisation.

Moreover, according to Bersselaar (2012), Bruijne (2012) and Zomer (2012), another factor that determines the emergence and development of local renewable energy organisations is their ability to evolve from voluntary organisations into professional organisations. Since most initiatives merely consist of ideas or ideals and largely depend on volunteers who invest considerable effort in establishing a local renewable energy organisation, it is perceived difficult to advance into a professional organisation, which actually provides local renewable energy or services. Issues regarding the most suitable organisational arrangement, dealing with technical and bureaucratic requirements for energy provision, managing and maintaining a member administration, the acquisition of new members or customers and maintaining or sustaining the installed technologies and an adequate service level (Hooijdonk 2012) are examples which local renewable energy organisations have to tackle in order to transform into professional organisations. The aspects related to organisational conditions are implicitly encapsulated in the explanatory variables concerning the division of ownership and benefits, degree of participation and the size of the organisation. The technical aspects are mainly incorporated by the variables embodying the technical characteristics. Furthermore, several of these prerequisites can be outsourced to organisations like Greenchoice, Trianel or Anode, which effectively decreases the perceived complexities but enhances the dependency on an external party (Bruijne 2012).

### *2.3.2 Modifications concerning governmental influences*

The expert interviews resulted in several modifications in regard to the affect of governmental intrusions on the founding process of local renewable energy organisations. First, as a result of liberalizing the Dutch energy market, local governments and municipalities, which owned or had shares of Dutch energy corporations prior to the liberalisation, obtained a significant amount of funds through selling their share of these corporations. Several local governments and municipalities have partly reserved these funds to foster the development of decentralised generation and to meet their climate or environmental targets (Bruijne 2012).

Furthermore, Zomer (2012) mentions that the exchange of knowledge and experience is vital for the emergence and development of local renewable energy organisations. However, it is emphasised that governmental bodies should focus on allocating these funds to facilitate the transfer of knowledge and refrain from interfering or attempting to regulate the emergence or development of these bottom-up initiatives<sup>10</sup>. This statement is based on the observation that local Dutch governments find it hard to position or collaborate with local renewable energy organisations (Zomer 2012) since the transition towards decentralised energy provision has blurred the traditional boundaries between energy supplier and energy consumer. On the one hand, local renewable energy organisations are considered market actors and should therefore be approach and treated with care to prevent market distortions by favouring one organisation over the other. Where on the other hand, they are perceived as civil actors, which originally are excluded in the process (Zomer 2012). These varying perceptions to approach or handle local renewable energy organisations might foster confusion and obstruct the necessary support from local governments. Therefore it is assumed that (local) governmental bodies

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<sup>9</sup> According to Bersselaar (2012), local renewable energy organisations should leave the responsibility of solving these national issues to a branch organisation such as e-Decentraal.

<sup>10</sup> See also the line of argumentation of Thijs de la Court. Retrieved from: <http://thijsdelacourt.nl/post/19288836477/duurzaamheid-en-sociale-innovatie> on 15th of March 2012.

should merely concentrate on facilitating knowledge transfer or providing expert knowledge instead of attempting to regulate their emergence or development (Zomer 2012).

Thirdly, as has been mentioned before, the Dutch subsidy scheme compared to other European Member States like Germany, Denmark and Belgium, proved inconsistent and frequently inaccessible for individual households (Zomer 2012). According to the academic literature this is assumed to obstruct the emergence and development of local renewable energy organisations. Alternatively, Zomer (2012) argues that these preconditions are not necessarily detrimental since a prolonged period of inconsistent stimulation policies amplified the dissatisfaction with the national governmental approach and forced Dutch pioneers to search for innovative solutions to generate renewable energy and mitigate environmental problems without available and stable subsidies (Zomer 2012). In addition to dissatisfaction arising from prolonged period of inconsistent stimulation policies, dissatisfaction with the incompetence of private actors and governmental bodies to meet their environmental targets and foster or enable an energy transition provokes civil actors to establish a local renewable energy organisation (Bruijne 2012 and Zomer 2012).

### *2.3.3 Adjustments to the influence of the market and society*

In addition to the previously identified influential private and societal actors, Bruijne (2012) emphasises that there is a growing need to be able to share practical information and receive support from other already operational and successful local renewable energy organisations. This urgency stems from perceived difficulties concerning diverse technical and bureaucratic requirements that these organisations have to meet in order to provide renewable energy or facilitate renewable energy related services to their members and customers.

Another refinement, which is mentioned by Bersselaar (2012), concentrates on the potential positive influence of external parties. Collaborating with an external party such as other local renewable energy organisations, renewable energy suppliers or installers or affiliated organisations can amplify the creditability of a local renewable energy organisation and improve its degree of local support and acceptance.

Furthermore, where the integrated framework mentions the presence of competitors as influential actors in the market, it became clear that local renewable energy organisations in general are established 'by' and 'for' the local community and therefore do not primary focus on generating profits. Consequentially, they rather choose to cooperate than compete with each other, which led to exclude this variable.

### *2.3.4 Customising the technical characteristics*

The academic literature insinuates that renewable energy technologies provide a sense of independency. However, based on the expert interviews, this sense of independency appears to be twofold. First, privatising the energy market resulted in a small number of large national and international operating energy organisations with extensive political power. Despite the notion that a liberal market would serve customer needs such as the demand for renewable energy, the general public grew increasingly dissatisfied with the incompetence or lacking willingness of these large organisations to meet the increased demand for renewable energy (Bruijne 2012, Hooijdonk 2012 and Zomer 2012). Secondly, due to a market that is dominated by vested corporations, fluctuating energy prices and growing dependency on foreign fossil fuels, the general public became progressively concerned with their future energy consumption, energy expenditures and its related environmental impact, which fuelled the ideal to gain control over their own energy provision without relying on energy exporting countries (Bruijne 2012 and Hooijdonk 2012).

### *2.3.5 Adapting the economical characteristics*

In regard to the economical characteristics of renewable energy technologies, the consulted experts suggested several adjustments. First, based on the findings from the academic

literature it is suggested that an increase in size in terms of the number of participants has a negative effect on the dissemination of knowledge and enhancement of social cohesion and interpersonal trust. Besides issues arising from an increase in number of participants, an increase in output demands higher investment costs and thus increases the dependency on external investors. Alternatively, Westendorp (2012) advocates that despite these social advantages, small projects experience difficulties with becoming cost effective, which challenges their development and in some cases their existence. Therefore, local renewable energy organisations should increase the scale of their activities and the number of members or costumers in order to ensure regular and certain financial incomes that cover the necessary expenditures and initial investments. Furthermore, when considering the price per generated unit of renewably energy (electricity), in particular solar energy, renewable energy technologies are not yet as competitive as conventional technologies. However, due to the disparity between on the one hand the relative low price per unit of generated energy and the significantly higher price for the consumption of this unit on the other hand, enhances the possibility to design an affordable or even profitable project (Hooijdonk 2012). Therefore, generating renewable energy on a limited scale is possible but merely cost-effective when the generated energy can be deducted from the total annually consumed energy, which therefore is based on the price per unit of consumed energy instead of the price per unit of generated energy.<sup>11</sup>

Secondly, although prices for procuring renewable energy technologies as well as their pay back periods remain significant in order to enable large-scale adoption by individual households (Hooijdonk 2012), progressively declining prices combined with the discrepancy between the price of unit of generated and an unit of consumed energy allow investments in certain renewable energy technologies to become gradually more affordable. In addition, it becomes more affordable when single households collectively procure renewable energy technologies due to economics of scale, which lowers the investment costs and improves the cost-effectiveness of these technologies (Westendorp 2012 and Zomer 2012).

Despite progressively declining prices and collective procurement, most local renewable energy organisations partly rely on conventional financial institutions for the realisation of their projects. However, these financial institutions remain cautious to invest in these bottom-up organisations and innovative technologies (Bruijne 2012), which further accentuates the difficulty of depending on external financial sources.

### *2.3.6 Modifications in relation to macro developments*

The first adjustment provided by the consulted experts regarding the explanatory variables embodying the macro developments concerns the unlevelled playing field for decentralised energy organisations operational in the Netherlands (Bruijne 2012). This unequal playing field partly stems from the fact that the present energy system is designed with a centralised method of energy provision in mind and is regulated as such (Bruijne 2012, Westendorp 2012 and Zomer 2012). Furthermore, the liberalisation only concerned the generation of energy and lacks to encompass the distribution and transportation of energy, which is still controlled and regulated by a public entity. Consequentially the costs associated with the transportation of

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<sup>11</sup> In Dutch this phenomenon is also known as ‘salderen’. The price of a unit of energy is quantified in kWh. Where producers of electricity receive about six to seven cents for each kWh, a consumer on the other hand pays about 22 to 23 cents for each kWh. The difference is caused by distribution costs, energy tax and value added tax. When a consumer has a solar panel that produces electricity, he or she can deduct the produced energy from his or her total energy bill and consequentially save about 22 or 23 cent for each kWh that is generated by the solar panel for direct use and not imported from the grid. Contrary if the solar panels produce more electricity than the owner consumes annually, the surplus is compensated with six to seven cents. Since it is legally not possible to generate (renewable) energy somewhere else than on your own property (actually the WOZ indicates the boundaries) in order to deduct your share of generated energy, collective projects have to design a profitable business case based on six to seven cents for each kWh, which currently is practically impossible even with modern solar panels.

energy are currently treated as social costs and therefore are unequally allocated amongst various energy organisations. In addition, all actors who generate energy and wish or have to distribute their energy through the grid are required to make a prediction of the amount of energy to be delivered to the grid (Bruijne 2012). Finally, although the owners, members or costumers of a local renewable energy organisation can consume their own generated energy, they are still subjected to pay the energy tax, which confuses and discourages potential initiatives (Zomer 2012). To materialise, this means that the electricity generated with a photovoltaic panel mounted on a community building and owned by an individual household situated on the other side of the street, which therefore relies on the grid to receive its own electricity, yet has to pay energy taxes, carries the same responsibilities and is equally charged for utilizing the grid as a large power plant, which exports vast amounts of energy over long distances to foreign countries (Bruijne 2012 and Westendorp 2012).

### *2.3.7 Constructing the integrated research model*

In addition to the explanatory variables identified by the academic literature, the experts provided several supplementary variables. Through integrating their proposed modifications with the explanatory variables extracted from the scientific literature, an initial research model is constructed. This model is graphically presented in figure 5, which is succeeded by a brief summary of the explanatory variables derived from the expert interviews.

Where part of the expert suggestions verified or provided minor refinement to the theoretical explanatory variables, the interviews also supplied various supplementary variables. To begin with, one addition to the organisational characteristics encompasses the rather adverse affect of too much internal expertise cumulate by the board of directors or the initiators. Moreover, in regard to the potential influence of governmental interference on the founding process of local renewable energy organisations, it is assumed that governmental bodies should focus on facilitating the transfer of knowledge or provide knowledge on vital aspect of establishing or developing local renewable energy organisations rather than attempting to regulate their emergence and development. Furthermore, experts have suggested that a prolonged period of inconsistent stimulation policies as well as dissatisfaction arising from the incompetence of the national government to meet their environmental targets proved to be an occasion to initiate civil based local renewable energy organisations. Through contemplating on the influence of private and societal actors on the establishment or development of a local renewable energy organisation, the consulted experts emphasised that there is a growing need to share practical information and receive support from other local renewable energy organisations. In relation to the technical characteristics of renewable energy technologies, a nuance between independency from energy corporations and energy exporting countries is advanced. A supplementary variable concerning the economic characteristics of a renewable energy technology centres on the dimensions in terms of the number of members or costumers as well as the output generated. In light of this, organisations characterised by limited dimensions are assumed to experience difficulties with becoming cost effective.

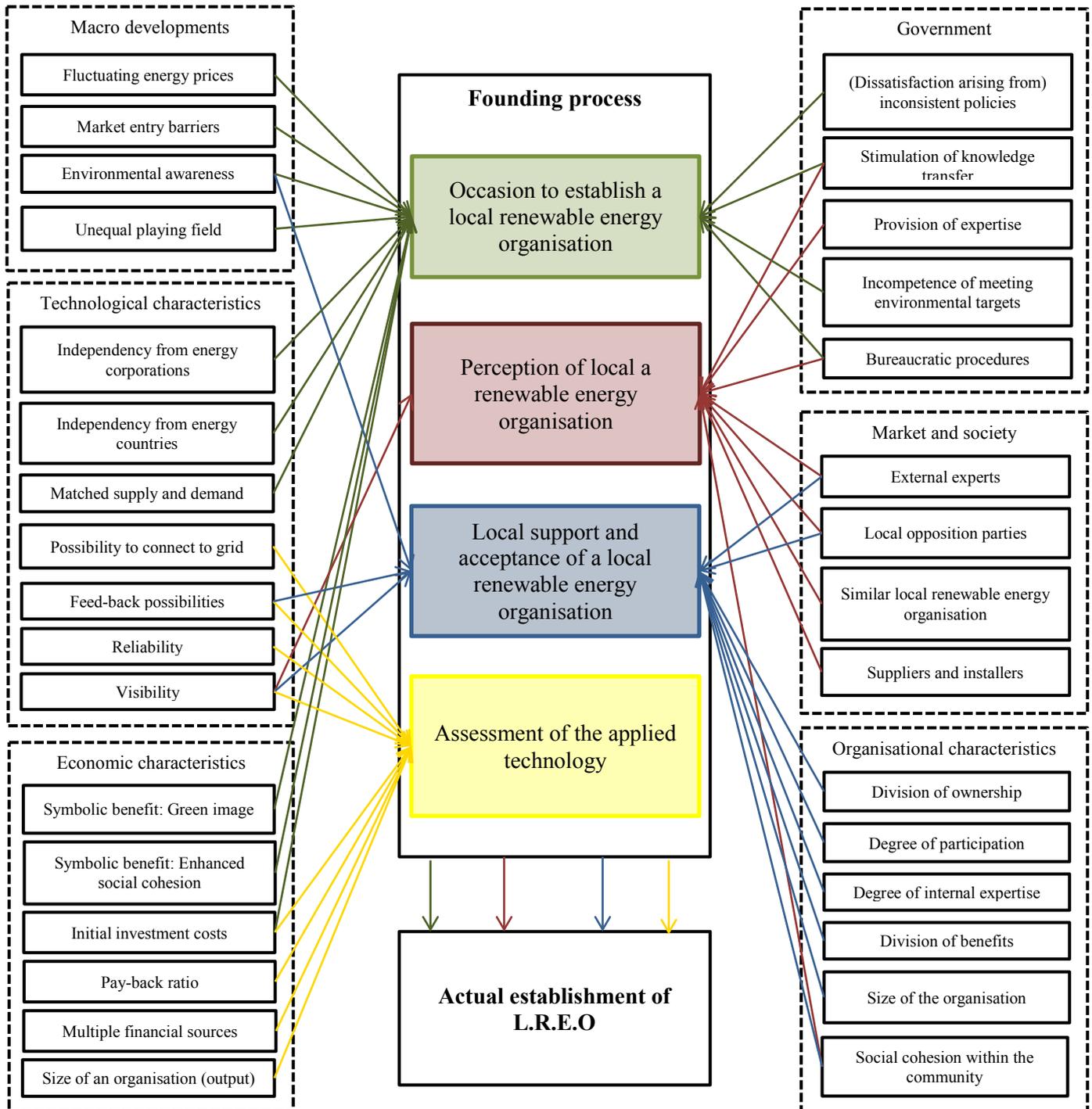


Figure 5. Integrated research model

## 2.4 Formulating the hypotheses

This paragraph centres on formulating the hypotheses, which are framed according to the explanatory variables extracted from the academic literature provided by the experts. The integrated research model supports the formulation and phrasing of the hypotheses. Therefore the four steps embodying the founding process form the foundation on which the main hypothesis is phrased. Furthermore, in order to test the main hypothesis, separate hypotheses are formulated in regard to each founding step, which are based on the explanatory variables categorised within the six identified clusters and are represented by the arrows in figure 5.

The main hypothesis is formulated as follows: The appearance of one or several occasions to establish a local renewable energy organisation, an unconstrained positive local perception of the merits or disadvantages of a local renewable energy organisation, the presence of local support and acceptance regarding a local renewable energy organisation and an advantageous assessment of the technical and economic features of the applied renewable technology improve the chances of founding a local renewable energy organisation.

The formulated hypotheses concerning the occasion to establish a local renewable energy organisation are shown in table 2.1. Table 2.2 presents the hypotheses regarding the local perception of the founders and community towards establishing a local renewable energy organisation. The hypotheses related to the local support and acceptance of a local renewable energy organisation, are listed in table 2.3. Finally, table 2.4 shows the hypotheses associated with the assessment of the applied renewable technology. Finally, the hypothesised positive or negative impact of a hypothesis on the corresponding step in the founding process is marked with a plus or minus, respectively.

<b>Table 2.1 Hypotheses concerning the occasion</b>			
<i>Category</i>	<i>Hypotheses</i>		<i>+/-</i>
Macro developments	H1	Fluctuating (or rising) energy prices stimulate the emergence of an occasion.	+
	H2	High levels of environmental awareness within society provide a serious occasion.	+
	H3	The presence of market entry barriers in terms of centrally designed energy system and vested interests reduce the possibility of an occasion.	-
	H4	An unbalanced playing field for local renewable energy organisations stemming from the same responsibilities as conventional energy corporations, socialised distribution costs and present taxations reduces the appearance of an occasion.	-
Governmental intrusions	H5	Inconsistent policies discourage the appearance of an occasion to establish a local renewable energy organisation.	-
	H6	Dissatisfaction arising from a prolonged period of inconsistent policies encourages the emergence of an occasion to establish a local renewable energy organisation.	+
	H7	Dissatisfaction with the incompetence of the national government to meet their environmental targets enhances the emergence of an occasion to establish a local renewable energy organisation.	+
	H8	Long and bureaucratic procedures to obtain permits or permissions prevent the occurrence of an occasion to establish a local renewable energy organisation.	-
Technical characteristics	H9	The possibility to exploit a local renewable source that matches local demand provides an occasion to establish a local renewable energy organisation.	+
	H10	Renewable energy technologies provide a sense of independency from conventional energy corporations and thus support the appearance of an occasion to establish a local renewable energy organisation.	+
	H11	Renewable energy technologies provide a sense of independency from energy producing countries and thus support the appearance of an occasion to establish a local renewable energy organisation.	+
Economical characteristics	H12	A potential symbolic benefit in terms of a green image provides an occasion to establish a local renewable energy organisation.	+
	H13	A potential symbolic benefit in terms of the enhancement of social cohesion within a community provides an occasion to establish a local renewable energy organisation.	+
	H14	Progressively decreasing initial investment costs of renewable energy technologies provide an occasion to establish a local renewable energy organisation.	+

<i>Category</i>	<i>Hypotheses</i>		<i>+/-</i>
Organisational characteristics	H15	A high level of social cohesion within a community (which entails interpersonal trust, social capital building and knowledge transfer) improves the local perception of local renewable energy organisations.	+
Market and society	H16	Availability of external expert knowledge reduces the perceived complexity of establishing a local renewable energy organisation and thus enhances the local perception on local renewable energy organisations.	+
	H17	The presence of local opposition negatively affects the local perception of a local renewable energy organisation.	-
	H18	The existence of other and similar local renewable energy organisations positively affects the local perception on local renewable energy organisations.	+
	H19	The advice and experience of suppliers and installers of renewable energy technology influence the local perception on local renewable energy organisations.	+
Governmental intrusions	H20	Governmental support in terms of providing expertise improves the local perception of founding a local renewable energy organisation.	+
	H21	Governmental support in terms of facilitating the possibility to share vital knowledge improves the local perception of founding a local renewable energy organisation.	+
	H22	Long and bureaucratic procedures to obtain permits or permissions negatively effect the local perception of establishing a local renewable energy organisation.	-
Technical characteristics	H23	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect the local perception.	+
	H24	Visible technologies stimulate local opposition (NIMBYism), which negatively affect the local perception.	-

<i>Category</i>	<i>Hypotheses</i>		<i>+/-</i>
Organisational characteristics	H25	Co-ownership of locals improves local support for and acceptance of a local renewable energy organisation.	+
	H26	A non-constraining participation possibility for locals, i.e. open participation, enhances local support for and acceptance of a local renewable energy organisation.	+
	H27	Extensive internal knowledge concerning decentralised generation creates a barrier between the organisation and its (potential) members or costumers and therefore hampers local participation.	-
	H28	Extensive internal knowledge concerning decentralised generation creates a barrier between the organisation and its (potential) members or costumers and therefore decreases local support for and acceptance of a local renewable energy organisation	-
	H29	Equal and fair distribution of potential benefits in favour of the participants or the community enhances local support for and acceptance of a local renewable energy organisation.	+
	H30	A high level of social cohesion within the community (which entails interpersonal trust, social capital building and knowledge transfer) improves local support for and acceptance of a local renewable energy organisation.	+
	H31	Small organisations, in terms of number of members, have higher levels of interconnectedness within their communities in comparison to large organisations.	

Macro developments	H32	High levels of environmental awareness within society improve local support for and acceptance of a local renewable energy organisation.	+
Market and society	H33	The support of an external party (either an organisation or other local renewable energy organisation) improves the creditability of a local renewable energy organisation.	+
	H34	The support of an external party (either an organisation or other local renewable energy organisation) improves the local support for and acceptance of a local renewable energy organisation.	+
	H35	The presence of local opposition negatively affects local support for and acceptance of a local renewable energy organisation.	-
Technical characteristics	H36	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect local support for and acceptance of a local renewable energy organisation.	+
	H37	Visible technologies stimulate local opposition (NIMBYism), which negatively affect local support for and acceptance of a local renewable energy organisation.	-
	H38	The possibility to provide feedback on the generated and/or consumed energy positively affects local support for and acceptance of a local renewable energy organisation.	+

**Table 2.4 Hypotheses concerning the assessment of the applied renewable energy technology**

<i>Category</i>	<i>Hypotheses</i>		<i>+/-</i>
Technological characteristics	H39	The possibility to provide feedback on the generated and/or consumed energy positively affects the assessment of the applied technology.	+
	H40	A proven and reliable technology has a positive affect on the assessment.	+
	H41	Visible technologies improve the awareness of the local renewable energy organisation and positively affect the assessment of the applied technology.	+
	H42	The possibility to connect the project to the grid positively affects the assessment of the applied technology.	+
Economic characteristics	H43	Depending on multiple financial sources to finance the selected renewable technology negatively affects its assessment.	-
	H44	The initial investment cost is an important factor that is considered during the assessment. A low initial investment has a positive effect on the assessment of the applied technology.	+
	H45	The pay back period is an important factor that is considered during the assessment. A short pay back period (depends on efficiency and investment costs) has a positive effect on the assessment of the applied technology.	+
	H46	Small projects in terms of output experience difficulties with becoming cost effective, which negatively affects the assessment of the applied technology.	-

## 2.5 Conclusion

This chapter concentrated on constructing a suitable research model. This was first pursuit through reviewing the innovation diffusion, micro generation and community renewable energy literature. From the innovation diffusion literature the integrated framework of Dieperink *et al.* (2004) was derived and customised to study the emergence and development of local renewable energy organisations by extracting supplementary explanatory variables from the latter two bodies of literature. The second part of this chapter further adjusted the theoretical framework to the Dutch situation. Through integrating the alterations and suggestions of experts in the field of decentralised generation, allows studying the emergence

and development of local renewable energy organisations in the Netherlands. The extracted variables explaining the founding process of local renewable energy organisations are clustered into six categories embodying the organisational characteristics, governmental intrusion, influences from the market and society, technical and economic characteristics and macro developments.

Consulting the academic literature as well as interviewing five experts provided the following explanatory variables. To begin with, in regard to the organisational characteristics, the impact of the division of ownership amongst the participating actors, the level of participation and the allocation of possible benefits are emphasised. Furthermore, the degree of social cohesion present within a community, the tendency to cumulate specific internal expertise and the size of an organisation in terms of energy generated or number of participants, are final organisational attributes that are advocated to affect the founding of local renewable energy organisations. Within the social context, governmental bodies influence the founding process through inconsistent stimulation policies, the degree of bureaucratic procedures that encompass setting environmental standards and regulating planning permissions and by facilitating the transfer of knowledge or the provision of expertise. In addition, dissatisfaction arising from a prolonged period of inconsistent stimulation policies as well as the incompetence of the national government to meet their environmental targets, both influence the emergence of local renewable energy organisations. Besides governmental intervention, market and civil based actors in terms of the available external experts, local opposition parties, similar local renewable energy organisations and suppliers and installers of renewable energy technologies, are indicated to affect the founding process of a local renewable energy organisation. Furthermore, during the founding process diverse technological characteristics are considered such as, the ability to become independent from conventional energy corporations and energy exporting countries, the possibility to match a local source with local demand for renewable energy, the possibility to provide feedback on the generated and consumed energy as well as the reliability and visibility of the applied technology. In addition, several economic indicators like the initial investment costs, the pay back period and the cost effectiveness that is determined by the organisational dimensions as well as drawing from multiple financial sources affect the founding process. Besides these indicators, symbolic benefits in terms enhanced social cohesion within the community and the association with a 'green' image are supplementary variables mentioned by the consulted bodies of literature. Finally, fluctuating energy prices, the degree of societal awareness on the environmental impact of our energy production and consumption, market entry barriers and an unlevelled playing field are macro developments that influence the emergence and development of local renewable energy organisations.

### 3. Methodology

This chapter centres on the methods applied to gather the necessary data to answer the main research question and final two sub-questions. The following paragraphs each emphasises more accurately how the expert interviews, population estimation, case study analysis and survey contribute to the research at large, starting with validating the vital role of the expert interviews and justifying the steps taken in estimating the population dimensions. Paragraph 3.3 succeeds with illuminating on the methods used to select suitable cases from the estimated population and conducting a case study analysis. The final paragraph focuses on the methods used for conducting the survey and justifies its application.

#### 3.1 Justifying the expert interviews

As is mentioned previously, the consultation of experts is necessary in order to adjust the theoretical framework to study the emergence and development of Dutch local renewable energy organisations. However, these interviews serve two purposes. Besides verifying the theoretical explanatory factors derived from the previously conducted literature review, they assist in establishing the population dimensions. To ensure a diversity of insights and understandings, which support to better understand the dimensions of this phenomenon and prevent the appearance of biases resulting from various interpretations of local renewable energy organisations and their development, specialists originating from varying spheres of society are selected and contacted, which is shown in table 3.1.

<i>Name</i>	<i>Background</i>	<i>Affiliated organisations</i>
Ruud de Bruijne	Public sphere	Agentschap NL and e-Decentraal
Siward Zomer	Private and civil sphere	SiZo project groep and Amstelvogels
Pauline Westendorp	Private and civil sphere	NewNRG, opgewekt.nu and Wij krijgen kippen
Dion van den Berselaar	Civil	Koninklijke Nederlandsche Heidemaatschappij (KNHM)
Lot van Hooijdonk	Civil	Provinciale Milieu Federatie Utrecht

Among the consulted experts is one specialist from the public sphere: Ruud de Bruijne who is a specialist from Agentschap NL and secretary of e-Decentraal. The latter is a recently found organisation that represents decentralised renewable energy organisations in the Netherlands. Furthermore, Siward Zomer, who is co-author of P-NUTS and director of ‘SiZo project groep’ and Amstelvogels, as well as Pauline Westendorp, who is director of NewNRG and opgewekt.nu and project leader of Wij krijgen kippen, are consulted since they are able to provide considerable expertise from a civil and entrepreneurial perception. Finally, two experts working for organisations affiliated with civil society are interviewed. First, Dion van den Berselaar who works for the non-profit organisation Koninklijke Nederlandsche Heidemaatschappij (KNHM) is included since he coordinates and advises civil initiatives that stimulate communal cohesion. Secondly, Lot van Hooijdonk who is director of Provinciale Milieu Federatie Utrecht is interviewed since this non-profit organisation exploits its provincial network to establish an inventory of the number of local renewable energy organisations active in the Netherlands.

The experts are enquired to express their opinion on which factors stimulate or hamper the emergence and development of local renewable energy organisations in the Netherlands and share their visions in regard to the content of the theoretical framework. Furthermore, they are asked to provide an estimation of the number of local renewable energy organisations in the Netherlands in accordance to the definition applied in this research. Questions regarding the emergence and development of this phenomenon during the preceding decade and recent past, including future predictions on its expansion, are asked as well. Finally, in order to enhance the case selection, experts are asked to mention several examples of best practises. An overview of the questions asked to the experts can be found in appendix A.

An indication of the population of local renewable energy organisation is necessary since estimations of the number of existing organisations ranges widely. In addition to interviewing experts to establish the population dimensions, several other sources are consulted. Data on numerous local renewable energy organisations is collected through thoroughly examining and analysing the websites of various organisations, like P-NUTS, NewNRG, Wij Krijgen Kippen<sup>12</sup>, and individuals such as Henri Bontenbal<sup>13</sup>, which invest considerable effort in sustaining a list of local renewable energy organisations in the Netherlands. In addition, several local renewable energy organisations post links on their websites to other similar organisations, which are explored as well. Finally, from the organisations found on these lists a potential membership with lobby organisation e-Decentraal is also recorded.

Combining these sources result in a comprehensive list with names of local renewable energy organisations, which are currently in operation in the Netherlands. However, there is a considerable variation among the various local renewable energy organisations and therefore specific data is gathered on several characteristics such as the municipality in which they are located, their organisational arrangement, founding year, primary targeted renewable source, the number of members and/or costumers, the possibility of civilians or inhabitants to participate and their ability to exercise control over the organisation.<sup>14</sup>

Furthermore, where the consulted websites sustain lists with organisations initiated by actors with varying backgrounds, the focus of this research is on projects or organisations initiated or controlled by civil actors. Consequentially an additional characteristic regarding the background of the initiator is added.

Finally, many projects are in a conceptual stage and merely exist of a formulated idea and therefore lack a specific or professional approach to actually become a local renewable energy organisation. Therefore, it is impossible and impractical to include these organisations in the population estimation. However, despite the recent emergence of this phenomenon, various organisations already managed to become operational and transformed into more professional organisations. To distinguish the latter professional organisations from the former ones, data on two additional criteria are collected. First, all official organisations, which are active in the Netherlands and irrespective of their organisational arrangement, have to register with de Kamer van Koophandel (KvK). Secondly, to be able to communicate with potential and actual members, professional organisations are assumed to maintain an official website.

### *3.2 Estimating the population dimensions and its composition*

The concept of generating renewable energy through cooperative local, community-based or nation wide initiatives has been practiced for a couple decades in the Netherlands. However, recently new local renewable energy initiatives or organisations are emerging. Where the former collective renewable energy initiatives were frequently established as a statement to oppose nuclear energy, the current local renewable energy organisations are in general characterized by a combination of social responsibility, collaborative entrepreneurship and dissatisfaction with the incompetence of the market and national government to foster the expansion of renewable energy. Furthermore, where the number of former local initiatives remained insignificant, the current trend towards decentralised methods of generating renewable energy is swelling due to an intensified growth of local renewable energy organisations during the last two to three years. However, accurate figures on the total number of local renewable energy organisations differ due to various interpretations of the concept of local renewable energy organisation and the diverse stages in which these organisations are operational. Therefore the purpose of this paragraph is to approximate how

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<sup>12</sup>For P-NUTS one can visit: <http://www.p-nuts.nu/category/inzendingen/> and for the list of NewNRG see: <http://nieuwenuts.wikispaces.com/Nog+meer%3F>. For local initiatives in Amsterdam see <http://www.wijkrijgenkippen.nl/energiemaatschappijen/>.

<sup>13</sup> Henri Bontenbal's homepage can be found through <http://henribontenbal.wordpress.com/>.

<sup>14</sup> This is referred to as 'nieuwe nuts'.

many local renewable energy organisations are recently initiated and continue to successfully exist in the Netherlands.

Based on the applied definition of local renewable energy organisations and the attributes discussed in the previous paragraph, the expert's estimations on the number of professional organisations range considerably. Where Hooijdonk (2012) and Westendorp (2012) estimate there exist between 200 and 300 organisations,<sup>15</sup> Zomer (2012) modestly argues that currently around 50 organisations are active. Bruijne (2012) confirms the latter statement by emphasising that about 50 organisations subscribed to e-Decentraal and predicts that this number will double at the end of 2012.

By combining the data gathered from the interviews with the findings obtained through the desk research, which covers six different lists, resulted in a total of 132 local renewable energy organisations<sup>16</sup>. Unfortunately, of seventeen organisations a registration with the KvK was not found, which settles the total on 115 organisations. From this total, a majority of 51 organisations is initiated by civil actors and an additional thirteen constitute a partnership between civilians and a public or private organisation. Furthermore one organisation is initiated by actors from all three spheres of society. From the remaining 50 organisations, private actors initiated 27 organisations, where 21 organisations are founded by a public entity and just two organisations are established as a partnership between a public and private actor. This composition in relation the background of the initiating parties is graphically presented in figure 6. Since the focus of this research is on civil based organisations, the succeeding part of this paragraph concentrates on the composition of this fragment of the estimated population.

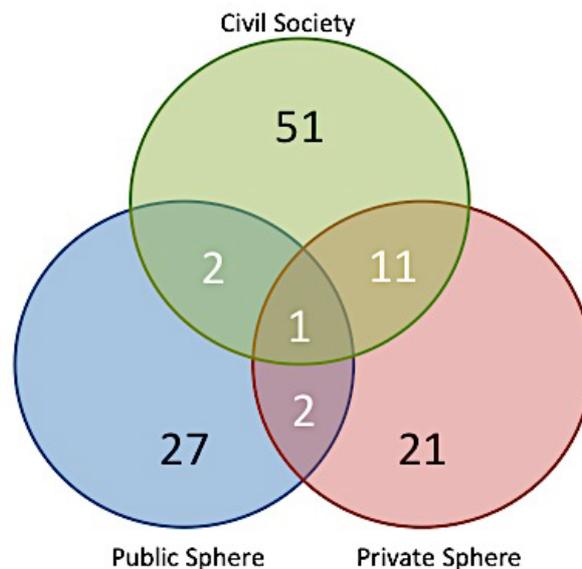


Figure 6. Population composition based on the background of the initiating party.

From the total of 65 civil based organisations, 36 and 22 organisations choose a cooperative arrangement or established a foundation, respectively. A minority of seven organisations organise their activities in a corporate arrangement of which more than half constitute a partnership. A cooperative arrangement has the formal goal to ensure and safeguard the (material) interest of its members since the members collectively own the organisation. Furthermore each member has one vote and therefore the ability to express his or her

<sup>15</sup> The estimation of Hooijdonk (2012) includes organisations irrespective of the background of the initiating actor.

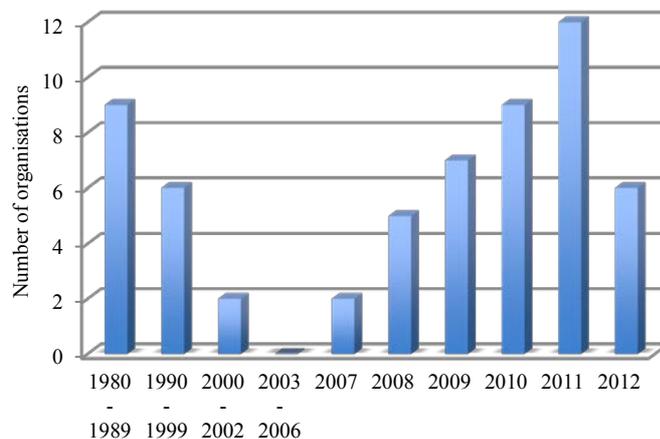
<sup>16</sup> A recent overview of the included organisations is published by the author on the following website: [http://nl.lokaleduurzameenergiebedrijven.wikia.com/wiki/Lijst\\_met\\_informatie\\_over\\_LDEB\\_in\\_Nederland](http://nl.lokaleduurzameenergiebedrijven.wikia.com/wiki/Lijst_met_informatie_over_LDEB_in_Nederland)

preference in selecting the board of directors (KvK 2010), which indicates that these organisations qualify as ‘nieuwe nuts’. On the contrary through establishing a foundation enables the initiators to pursue idealistic goals in a much less democratic manner (KvK 2012) and therefore not necessarily quantify as ‘nieuwe nuts’. In some cases, local renewable energy organisations embark as a foundation and eventually shift towards a cooperative or corporate arrangement.

Furthermore, at the start of this chapter it was emphasised that some organisations have been active in the field of decentralised generation for over two decades, where others have been active only recently. Although the desk research failed to provide the founding year of seven organisations, it is found that fifteen organisations are established prior to the liberalisation of the energy market of which the majority is founded during the late eighties. When further ascending in time, just two organisations are established in the first years following the liberalisation. On the contrary, the remaining 41 organisations have been established since 2007. According to the experts, this phenomenon has shown a considerable growth in the last two to three years, which is clearly confirmed by the collected data, which is demonstrated in table 3.2 and presented in figure 7.

<i>Founding year</i>	<i>Number of organisations</i>
Not available	7
1980 - 1989	9
1990 - 1999	6
2000 - 2002	2
2003 - 2006	0
2007	2
2008	5
2009	7
2010	9
2011	12
2012 <sup>17</sup>	6

Figure 7: Number of established civil based organisation from 1980 until present



Besides the observed variation in organisational arrangement or founding year, local renewable energy organisations show variation in their primarily targeted renewable resource. Despite the fact that several organisations tend to concentrate on more than one renewable source, only the primary targeted source is mentioned for simplicity reasons. In addition, the desk research failed to provide the favoured renewable source of six organisations, which is unclear or for some cases not relevant since their primary purpose is to insulate households or increase local awareness. Aside from these six organisations, wind energy is the most exploited source and the main focus of 25 organisations. Curiously, just eleven have been established subsequent to liberalisation where the majority have their roots in the late eighties or early nineties. The second largest group consist of organisations primary orientating on solar energy, which totals 23 organisations. When examining their founding year it appears that none of these organisations in this data set are founded prior to 2008. Where wind and solar oriented organisations seems to dominate this market, a small group of organisations aims at less popular sources such as biomass (five) and geothermal (two). From the remaining four organisations it was unclear on which renewable source they mainly concentrate and are therefore classified as orienting on multiple sources. The results are shown in table 3.3 and graphically presented in figure 8.

<sup>17</sup> Note that this research is done in 2012 and therefore this figure is based on the first five months.

<b>Table 3.3 Primary targeted renewable resource of civil based organisations</b>	
<i>Primary source</i>	<i>Number of organisations</i>
Not available	6
Wind	25
Solar	23
Biomass	5
Geothermal	2
Multiple	4

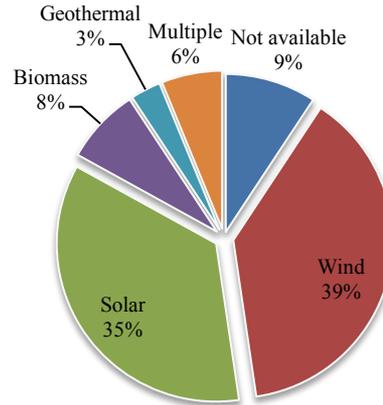


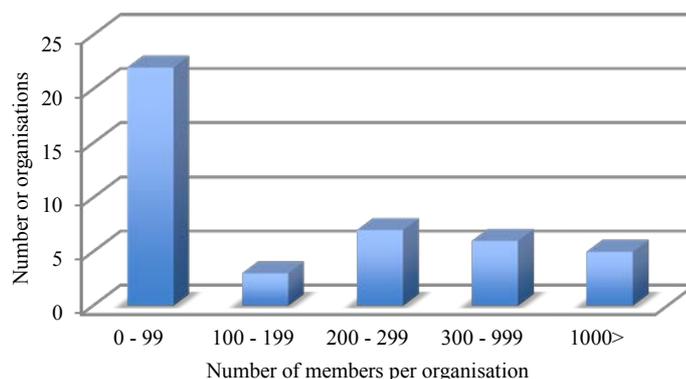
Figure 8: Pie chart containing the primary targeted renewable resource.

Furthermore, local renewable energy organisations show a considerable variation in the number of members. The notion of local members is further divided into three categories. During the process of founding a local renewable energy organisation, organisations generally embark with keeping community members that sympathise with the ideals of the organisation updated through for example a newsletter. This provides a rough indication of the local interest in an organisation and constitutes the first category. However, not all organisations favour this form of membership and rather aim at a more restrictive membership. The second category embraces members that voluntarily commit themselves to the organisation and pay an annual contribution. Consequentially, this category offers a better indication of the local interest or support. Besides members a local renewable energy organisation might provide energy related services to its members and costumers. Often members, who pay contribution, have the possibility to become a customer by for example procuring renewable energy or renewable technologies with a discount through the organisation. Therefore the last category encompasses the customers of the organisation. However, it should be emphasised that a majority of the organisations makes a distinction between members and costumers. Hence, members are generally not synonymous to costumers and the number of paying members and costumers can differ.

Although various organisations mention their number of member on their websites or in regular newsletters, the number of members for 22 organisations is lacking. The amount of members of the remaining 43 organisations, which voluntarily commit themselves to the organisation by paying a contribution, shows a considerable spread ranging from as little as two members to over three thousand with a small bias towards organisations with less than hundred members. Table 3.4 and figure 9 demonstrates the differences in the number of members of 43 civil based organisations.

<b>Table 3.4 Number of members of civil based organisations</b>	
<i>Number of members</i>	<i>Number of organisations</i>
Not available	22
0 - 99	22
100 - 199	3
200 - 299	7
300 - 999	6
1000>	5

Figure 9: Number of members of civil based local renewable energy organisations



In addition to the previous described characteristics, two supplementary characteristics are incorporated. First, geographical data is gathered, which is further specified to the municipality and province in which the organisation is located. Adding a geographical aspect provides a better understanding in the various motives to establish a local renewable energy organisation or the other steps in the founding process. Secondly, a division is made between various commonly applied business models that include collectively procuring renewable energy technologies or collectively purchasing renewable energy in order to gain economics of scale. A third business model is to educate members of the community on energy efficiency and facilitate them with achieving energy efficiency or procuring renewable technologies. The final two business models are the delivery of energy and collectively generating renewable energy through a commonly owned facility. The last two business models are less common due to high initial investments to obtain an energy delivery licence or due to legislative restriction on collectively generating energy. In practice, the last business model is legally not possible and therefore most organisations mentioned this business model as a long-term (LT) option. Despite the legal restrictions some organisations openly challenge the legislation and experiment with collectively generating renewable energy. Through including data on the business model might improve our comprehension on the founding process and possibly explain some variation between the cases.

The final aspect on which this analysis of the population composition focuses is the number of times an organisation is mentioned at one of the examined lists and whether they are a member of e-Decentraal. In addition, the number of times an organisation is mentioned during the interviews with the consulted experts is recorded as well. The results show that ‘Amelander Energie Coöperatie’ and ‘Zutphense Energie Transitie’ are the only organisations that are cited in all the examined lists and have subscribed with e-Decentraal. However, they were not mentioned by one of the experts. On the other hand, experts frequently referred to Texel Energie, Lochem Energie, Thermo Bello and Grunneger Power but these organisations either lack a membership with e-Decentraal or are not cited on all the examined lists. To summarise, these and other most commonly cited and frequently mentioned organisations are listed in table 3.5. In case an organisation is mentioned on one of the examined lists it is marked with a ‘X’. Furthermore, the last column demonstrates the number of times an organisation is mentioned by the consulted experts.

<i>Organisations</i>	<i>Examined lists</i>						
	<i>P-NUTS</i>	<i>Henri Bontenbal</i>	<i>Wij krijgen kippen</i>	<i>NewNRG</i>	<i>Zonnehoven</i>	<i>Member of e-Decentraal</i>	<i>Number of times mentioned by experts</i>
Amelander Energie Coöperatie (AEC)	X	X	X	X	X	X	-
Zutphense Energie Transitie (ZET)	X	X	X	X	X	X	-
Zonvogel	-	X	X	X	X	X	-
CALorie	-	X	X	X	X	X	-
Lochem Energie	-	X	X	X	X	X	3
Onze Energie	X	X	X	X	X	-	-
Texel Energie	X	X	X	X	X	-	5
Thermo Bello	X	-	X	X	X	X	3
Zonne-energie in Oosterhesselen	X	X	-	X	X	X	1
Energie U	X	X	X	-	X	-	1
Grunneger Power	X	X	-	-	X	X	3
Duurzaam Energiebedrijf Apeldoorn (de-A)	X	X	-	-	X	X	-
Noordhollandse Energie Coöperatie (NHEC)	X	X	X	X	-	-	2

Boer en buur	X	X	X	X	-	-	1
Boer zoekt buur	X	X	-	X	X	-	1
Windvogel	X	X	X	X	-	X	1
Deltawind	X	X	X	X	-	X	1
Kennemerwind	X	X	X	X	-	X	-

### 3.3 Validating the application of a case study analysis

The reason for conducting a case study analysis is threefold. First it supports to enrich our understanding of the concept of local renewable energy organisations and in particular supports to understand which factors hamper or stimulate their emergence and development. Secondly, the consulted academic literature and experts provided a broad range of possible variables that explain the emergence of local renewable energy organisations. However, it is not feasible to base the survey on too many explanatory variables and therefore a case study analysis, which allows testing a greater quantity of variables (Saunders *et al.* 2009, p.324), enables to filter out the most prominent and important ones that form the foundation of the survey. Thirdly, since most of the frequently cited organisations are willing to contribute to the research through participating in the case study analysis improves the creditability of the research and might provides some additional leverage for other organisations to partake in the survey. Where the first section of this paragraph illuminates on the steps taken and criteria used to select appropriate and suitable case, the second section discusses the methods used to obtain, process and analyse the data.

#### 3.3.1 Case selection

Collecting specific data on various general organisational characteristics allows making an elaborate case selection for both the case study analysis and the survey. Despite several pre-established criteria concerning the organisational characteristics elaborated upon in paragraph 3.2, the number of suitable local renewable energy organisations to include in the case study analysis remains numerous. Consequentially, a sample is selected since it is impractical to subject all organisations to in-depth interviews (Saunders *et al.* 2009, p.212). Because the majority of the local renewable energy organisations have been established recently and a significant quantity of these organisations still resides in an immature stage, it is assumed that a substantial number of the most cited organisations are also examples of best practices in the Netherlands. Therefore, to delineate the amount of suitable organisations and guide the selection procedure, the number of times an organisation is cited on the examined lists is accounted. This results in a hierarchy of frequently cited organisations, which implies that organisations high on this hierarchy are well-known and well-established examples. Through selecting and examining these best practices, improves our understanding on the factors that are determinant for the establishment and development of these commonly most successful organisations.

Included in the most cited and often mentioned organisations listed in table 3.5 are three cooperative organisations, Windvogel, Deltawind and Kennemerwind, which are founded more than two decades ago. Due to their relatively long existence in this market they are well-known organisations with a substantial number of members and/or costumers, which have proven that generating renewable energy on a cooperative basis is possible, profitable and feasible. Despite their reputation, they are excluded from the case study analysis since the focus of this research is on the emergence and development of those organisations that are established in the recent past. Furthermore their membership is not restricted to inhabitants of a local or regional area, which is a vital aspect of local renewable energy organisations. Through excluding these organisations the sample size shrinks to fifteen cases.

However, Windvogel is known to experiment with a decentralised approach through recently founding a local project referred to as Amstelvogels. Amstelvogels uses the existing expertise and organisational facilities that Windvogel provides but in contrast to Windvogel, Amstelvogels focuses on inhabitants of the municipality of Amsterdam and therefore has a

local approach. In light of this, Windvogel as a potential case study is substituted by Amstelvogels, which increases the sample size to sixteen cases.

Furthermore, the organisation 'Boer en buur' is a successor of 'Boer zoekt buur', which are both initiated and established by the same initiator. Despite some minor differences there is a considerable overlap and due to time constraints, convenience and efficiency the interviews with these two organisations are combined. Since 'Boer zoekt buur' is founded first the questions are mainly addressed to this organisation. As a consequence the total sample encompasses fifteen potential organisations to be included in the case study analysis.

In total thirteen out of the fifteen potential cases were willing to collaborate. Only Texel Energie and Zonvogel were not able or willing to participate in this part of the research. In the case of Thermo Bello and Amelander Energie Coöperatie, the initiators were unable to make a face-to-face appointment. However, the initiator of Thermo Bello referred to detailed documentation<sup>18</sup> on its establishment and development, which was examined to answer the bulk of the questions. For answers on the questions that could not be found in the documentation, he was willing to provide answers over the phone. In case of Amelander Energie Coöperatie, the initiator was willing to answer all the questions over the phone. An overview of the participating local renewable energy organisations participating in the case study analysis including the date, person interviewed and his or her affiliation with the organisation is shown in table 3.6.

#	<i>Person interviewed</i>	<i>Date</i>	<i>Organisation</i>	<i>Affiliation with the organisation</i>
1	Siward Zomer	03-04-2012	Amstelvogels (AV)	Initiator and project leader
2	Rob Dekens	05-04-2012	Zonne-energie in Oosterhesselen (ZO)	Initiator and chairman
3	Tonnie Tekelenburg	10-04-2012	Lochem Energie (LE)	Initiator and member of the board of directors
4	Marleen Kwast	11-04-2012	Duurzaam Energiebedrijf Apeldoorn (de-A)	Secretary and member of the board of directors
5	Hans Botman	16-04-2012	Energie U (EU)	Treasurer and member of the board of directors
6	Iddo de Goederen	18-04-2012	Zutphense Energie Transitie (ZET)	Initiator and Chairman of the board of directors
7	Jurgen ven der Heijden	19-04-2012	CALorie (CA)	Initiator and Board of directors
8	Marcel Gort	23-04-2012	Onze Energie (OE)	Initiator and regulator of the board of directors
9	Anne Stijkel	26-04-2012	Boer zoekt buur (BZB)	Initiator and chairman of the board of directors
10	Gerwin Verschuur	07-05-2012	Thermo Bello (TB)	Initiator and chairman of the board of directors
11	Johan Kiewiet	09-05-2012	Amelander Energie Coöperatie (AEC)	Initiator and chairman of the board of directors
12	Bert Haverkamp	10-05-2012	Noordhollandse Energie Coöperatie (NHEC)	Chairman of the board of directors
13	Frans Stokman	14-05-2012	Grunneger Power (GP)	Initiator and member of the board of directors

<sup>18</sup> Verschuur 2010 and Verschuur et al. 2010.

### 3.3.2 Methods for collecting the data

As is mentioned in paragraph 1.5, one objective of this research is to provide explanatory knowledge on the factors that foster or hamper the emergence of local renewable energy organisations in the Netherlands. In light of this, Saunders *et al.* (2009, p.323) state that a researcher is most likely to conduct interviews in order to be able to infer possible relations between variables. Consequentially, through conducting semi-structured interviews, data on the organisational characteristics and the explanatory variables embodying the integrated research model are collected.

Besides improving our understanding on this phenomenon through a detailed analysis of the gathered data, the ambition of this research is to formulate conclusions and recommendations that are based on a wider sample of cases. Therefore the purpose of conducting a case study analysis is twofold. To begin with, testing the hypotheses provide preliminary findings, which comprehend our understanding on the factors that foster and hamper the emergence and development of local renewable energy organisations in the Netherlands. The second purpose of the analysis is to distil explanatory variables that are rejected in order to formulate a manageable survey, which is merely based on explanatory variables that are confirmed by the case study analysis.

In order to achieve this and obtain an understanding of which factors are determinant for the establishment and development of the selected cases, an interview with one of the founders or someone who was closely involved in the establishment of the organisations is arranged. Generally, local renewable energy organisations are founded by a small group of dedicated individuals who intensively work together and as a consequence frequently share the same interpretations and visions regarding the founding of the local renewable energy organisation. Hence, it is assumed sufficient to interview one involved person per case.

Despite a thorough desk research on the organisational characteristics of the selected organisations some attributes were unclear or proved to be unattainable and therefore the first part of the interview aims to fill the blanks and verify the data obtained through the desk research. Apart from questions regarding the general characteristics, the remaining questions in the interview are formulated in an open manner, which allow the one being questioned to elaborate on his or her perspective concerning a specific question and improves the collection of in-depth and case-specific data (Saunders *et al.* 2009, p.337). The questionnaire that is submitted to the respondents can be found in appendix B.

### 3.3.3 Methods for processing and analysing the data

As a result of incorporating open questions, the obtained answers can diverge significantly. One method to systematically compare and analyse these answers is to categorise or quantify it (Saunders *et al.* 2009, p.482 and 492). Therefore the collected data from the interviews is evaluated according to a five-point ordinal scale, which allows assessing the relative position of each case in relation to the others (Saunders *et al.* 2009, p.418). The applied scale ranges from a very negative impact to a very positive impact. In case an explanatory factor is perceived to have had a very negative impact it is marked with a one. On the other hand, if one judges that an explanatory variable has had a very positive impact, it is labelled with a five. If an explanatory variable is considered neither negative nor positive, it is evaluated with a three. However, a scale ranging from very negative to very positive is unsuitable to evaluate the answers regarding the emergence of an occasion to establish a local renewable energy organisation. Therefore, the interviewees are asked how relevant an explanatory factor is for the occasion to establish their organisation. Consequentially, this scale is adjusted and ranges from completely irrelevant for the emergence of an occasion on the one hand, to completely relevant on the other.

The categorised output is thoroughly analysed, which is achieved by segregating the analysis into three phases. The first and primary part of the analysis compares the actual empirical results with the corresponding expected scores. The following phase of the analysis assesses the main hypothesis. The final and supplementary analysis concentrates on possible patterns

in the data that insinuate a relation between an organisational attribute and an explanatory variable.

In order to assess the influence of an explanatory variable, which is the focal point of the primary analysis, first the average of all thirteen evaluated answers on the corresponding explanatory variable is computed. Secondly, this average score is compared with its related hypothesised score. Consequentially, if the average score equals the hypothesised score there is empirical ground to validate the anticipated impact of the corresponding explanatory variable. Contrary, if the average score deviates from the hypothesised score, there is insufficient empirical ground to verify the impact of the related explanatory variable.

Establishing the hypothesised scores is based on the anticipated impact of an explanatory variable on the founding process. If an explanatory variable is predicted to positively affect one of the steps in the founding process, its hypothesised score is expected to be greater than three. Similarly, the hypothesised score for an explanatory variable, which is expected to negatively influence one of the steps in the founding process, is anticipated to be less than three. Additionally, for some explanatory variables such as the visibility of renewable technologies, it is uncertain whether it has a positive or negative impact on the founding process. Consequentially, the hypothesised score is expected to deviate from three in either a negative direction (less than three) or positive direction (greater than three).

Moreover, in regard to the emergence of an occasion, the provided answers are evaluated on the extent of their relevance, hence an irrelevant factor receives a score less than three and a relevant factor is assigned a score greater than three. Because the hypotheses are formulated according to the suggested impact of the underlying explanatory variables, which are anticipated to be relevant to one or more steps in the founding process, the hypothesised score for all hypotheses concerning the appearance of an occasion and irrespective of their positive or negative impact are greater than three.

Comparing the actual evaluated scores and the hypothesised scores of an underlying explanatory variable provides a preliminary indication of its empirical validity. However, for some organisations an explanatory variable might be highly relevant or possess a strong influence on their founding process, where on the contrary, the same variable is perceived as insignificant to other organisations, which moderates the average score. As a result, an average score might mask the relevance of an explanatory variable to some organisations. Hence, merely focusing on average scores is insufficient since the gathered data on an explanatory variable might diverge significantly and enhances the risk of incorrectly rejecting a hypothesis. As a consequence, apart from the average score an indication on the spread between the evaluated answers is necessary for a sound assessment on the potential impact of an explanatory variable. In order to capture possible deviation in the evaluated answered, the standard deviation is added to the assessment.

Due to a five-point scale evaluation, there is a possibility that every case is appointed the same score. Therefore there is a theoretical situation in which there is no deviation between the evaluated answers, i.e. a standard deviation of zero. On the other hand, in a hypothetical situation in which half of the cases experienced that an explanatory variable has been extremely relevant or positive, i.e. are evaluated with a five, and the remaining half perceived the same variable as extremely irrelevant or negative, i.e. are evaluated with a one, the maximum deviation between the answers and the average, i.e. standard deviation, is a little over two. Therefore, these absolute ends of the spectrum demarcate the possible outcomes of the spread in the evaluated answers. To understand and obtain some perspective on how to include the standard deviation in the primary assessment, one should consider that the smaller a standard deviation, i.e. closer to zero, the more consistent a question is answered by the respondents, which indicates the significant positive or negative influence of the underlying explanatory variable on the founding process. Alternatively, the greater a standard deviation or the closer it is to two, the more divided the answers are concerning the impact of the related explanatory variables. Consequentially, despite a marginally insufficient average score, a relative high standard deviation could indicate the relevance of an explanatory variable to a segment of the participating organisations and therefore alter the conclusion to initially reject the hypothesised impact of this explanatory variable. Contrary, in case the

standard deviation is significantly low, it further supports the conclusion to reject the anticipated influence of a variable characterised by a marginally insufficient average score. Besides this primary assessment, a supplementary assessment is conducted. This part of the assessment concentrates on curious difference between the evaluated scores and attempts to link them to variations in certain organisational attributes. In order to visualise significant differences in the evaluated average scores, which might be explained by variation between the organisational attributes, first an organisational attribute is segregated into several distinctive categories. Secondly, each organisation is assigned to one distinctive category and finally through comparing the average scores of each category with each other, enables to accentuate major differences. Since the aim of this additional assessment is to unveil curious differences, the focus is on deviations in average score between the categories that are greater than one.

### *3.4 Justifying the application of a survey*

Besides semi-structured interviews, surveys are also used for conducting explanatory research in order to verify hypothesised relations between variables (Saunders *et al.* 2009, p.362). Additionally, due to time limitations it is not feasible to subject all civil based organisations to a case study analysis. Therefore the purpose of conducting a survey is to reach and include all civil based organisations identified during the population estimation, which assists to improve our understanding of the expected relation between variables and further enhances the validity of the findings resulting from the case study analysis.

#### *3.4.1 Case selection*

Paragraph 3.2 estimated that 65 civil based local renewable energy organisations are currently in operation in the Netherlands. From this amount, thirteen are included in the case study analysis, which potentially leaves 52 civil based organisations to partake in the survey. However, not all 52 organisations are included in the survey due to several reasons. First, fifteen organisations have been established prior to the liberalisation of the energy market. An additional two are founded just after the liberalisation but several years before 2007, which, based on table 3.2, marked the emergence and remarkable growth of local renewable energy organisations on which this research concentrates. Furthermore, ‘Zon op Nederland’ turned out to be an umbrella organisation that embraces several local projects throughout the Netherlands. One of these projects is called ‘Zon op Noord’ and is included as a separate organisation in the estimated population. However, the same person initiated or coordinated both organisations and therefore just one is included in the survey. Moreover, it became clear that ‘de Groene Reus’ is the successor of ‘Stichting Duurzame Wijken Almere’, which reduces the sample size further. Finally, although all 52 organisations have an official website several lacked contact details to which an invitation could be sent. Consequentially the survey was sent to 32 organisations.<sup>19</sup>

#### *3.4.2 Methods for collecting the data*

Respondents were able to complete the survey during a three-week time window starting from the 18<sup>th</sup> of May until the 10<sup>th</sup> of June. To improve the number of respondents, a reminder to join the research was sent at the beginning of the second and third week. After this three-week window in total seventeen organisations participated. However, data on thirteen organisations is used since two organisations failed to complete the survey and an additional two appeared to be established during the early nineties. Nonetheless, due to the participation of these thirteen organisations a response rate of over 40 per cent is achieved.

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<sup>19</sup> Appendix C shows an overview of which organisations were invited to join and whether and when they participated in the survey.

The website 'Thesis Tools' is used to design and distribute the survey in order to collect data on the explanatory variables encompassing the revised integrated research model. Prior to acquiring information on the four steps in the founding process, the survey embarks with nine open questions regarding general characteristics encompassing the name, location, applied business model, organisational arrangement, founding year, primary renewable source and the amount of members and costumers. Furthermore, the majority of the survey consists of a structured and manageable list of propositions based on the explanatory variables, which are formerly confirmed during the case study analysis. In addition to these propositions, several questions address contextual factors such as the degree of open participation, the extent of co-ownership, the division of potential benefits, the possibility of receiving feedback, the degree of internal expertise and whether they collaborate or are engaged in a partnership with an external party.<sup>20</sup>

### *3.4.3 Methods for processing and analysing the data*

In contrast to the interviews conducted for the case study analysis, the survey questions are formulated as propositions and are answered on a five-point ordinal scale ranging from completely negative or irrelevant to completely positive or relevant. Therefore the output of the survey consists of answers ranging from one to five and do not require an evaluation as was necessary for the answers obtained through the interviews.

Furthermore, where an interview allows the interviewer to elaborate on a question in case a respondent fails to understand the question directly, this is not possible during a survey. Through assessing both the answer itself and its context, the answers obtained through the interviews are evaluated and marked with a three in case a factor was perceived neither negative nor positive. However, since this is not possible with collecting data by means of a survey, respondents participating in the survey are given the option 'not relevant' or 'no idea' in case they perceive a certain explanatory variable as unrelated, fail to comprehend the question or lack sufficient insights to answer the question. Consequentially, such answer implies that the underlying explanatory variable is irrelevant or unrelated to the founding process of an organisation. Hence, questions that are answered by this option are appointed a 'zero score'.

Similar to the primary analysis on the data gathered through the case studies, the analysis on the data obtained through the survey either confirms or rejects the underlying explanatory variables by comparing the average score with the hypothesised score. However, in order to make a sound assessment on the validity of the underlying explanatory variables, the number of zero scores for each hypothesis is recorded. A significant number of these scores not only implies the irrelevance of a potential explanatory variable, it also aggravates the average score. In case a hypothesis is expected to have a positive influence on the founding process, the presence of zero scores diminishes the average score and might result in the rejection of a hypothesis. Excluding these zero scores inherently improves the average score. However, a relative large number of zero scores also indicate that an explanatory variable is irrelevant or unrelated to the founding process and therefore this would lead to the rejection of an underlying explanatory variable, although the exclusion of zero scores results in a significant average score. On the contrary, when an explanatory variable is anticipated to have a negative outcome, the presence of zero scores falsely strengthens the validation of this variable because these zero scores indicate the irrelevance of an underlying explanatory variable instead of a negative impact. Consequentially, where on the one hand the number of zero scores provides an initial indication of the extent to which a factor is related or relevant for the founding of a local renewable energy organisation, it should be considered cautious since it might blur a sound assessment on the other.

Furthermore, apart from affecting the average score the presence of zero scores also has an impact on the standard deviation. Where the evaluated scores of the case studies range from

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<sup>20</sup> The survey can be found on: [link:%20http://www.thesistools.com/web/?id=274859](http://www.thesistools.com/web/?id=274859) or through contacting the author.

one to five, the parameters of the survey extends from zero to five. Hence in theory a standard deviation of a variable in the survey can reach a maximum of 2,59.<sup>21</sup> Due to the presence of zero scores, the standard deviations found in the survey vary more widely than those found during the case study analysis.

Therefore the conclusion whether an explanatory variable positively or negatively determines the founding process of local renewable energy organisations is assessed through analysing a combination of indicators including the average score, standard deviation and the number of zero scores. However, in some cases testing an explanatory variable requires additional input such as the presence of local opposition or a non-constraining participation possibility. In order to formulate a sound conclusion, the assessment focuses on the scores of those organisations that meet these predetermined requirements, which in some cases is compared to the scores of organisations that lack that certain attribute.

Finally, to assess the extent to which an explanatory variable determines one or more steps of the founding process, the corresponding average score resulting from both the case study analysis as the survey are used to calculate an overall average score, which is referred to as the total average score. The results of these calculations are presented in appendix D. A total average score between four and five implies a strong positive relation. Similarly, a score between one and two indicates a significant negative relation. In addition, scores between two and three or between three and four demonstrate a rather modest negative or positive impact, respectively.

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<sup>21</sup> A standard deviation of 2,59 is only possibly in case half of the respondents appoint the maximum score of 5 points to a variable where the other half indicates its insignificance through assigning zero points.

## 4. Case study analysis

The hypotheses, which are formulated in paragraph 2.4, form the foundation of a semi structured interview for collecting the required data on the founding process of the thirteen organisations that collaborated and participated with the case study analysis. Data is collected on the general characteristics and each of the four steps of the founding process: the occasion to establish a local renewable energy organisation, the local perception towards a local renewable energy organisation, the degree of local support for a local renewable energy organisation and the criteria on which the preferred renewable energy technology is selected. Based on the obtained data, this chapter aims to answer the last two sub-questions concerning which of the factors previously identified by the scientific literature and the consulted experts are determinant for the success or failure of actual local renewable energy organisations in the Netherlands. This is pursued by first describing the general organisational characteristics of the participating organisations. The following three paragraphs present and analyse the collected data, which entail a primary analysis, analysis of the main hypothesis and a supplementary analysis. Based on these analyses, several hypotheses require minor adjustments before incorporating them in the survey, which is the focal point of the fourth paragraph. The last paragraph summarises and concludes the findings of this chapter.

### 4.1 Organisational characteristics of the participating organisations

Prior to analysing the data on the founding process of the thirteen participating organisations, data concerning the municipality and province in which they are located, the applied business model(s), their organisational arrangement, founding year, primary and secondary targeted renewable source and the number of sympathisers, paying members and/or costumers is obtained. An overview of the gathered data regarding these organisational characteristics is presented in table 4.1.

Organisation	Geographical location		Business model					Organisational arrangement	Founding Year	Source		Number of members		
	Municipality	Province	Collective procurement energy	Collective procurement technology	Education and facilitation	Delivery of energy	Collective generation <sup>22</sup>			Primary	Secondary	Sympathisers	Paying members	Costumers
AV	Amsterdam	Noord Holland					X	Cooperation	2011	Wind	-	-	400	400
ZO	Coevorden	Drenthe		X			(LT)	Cooperation	2010	Sun	-	-	12	0
LE	Lochem	Gelderland	X	X			(LT)	Cooperation	2011	Sun	Wind	930	250	40
de-A	Apeldoorn	Gelderland				X	(LT)	Foundation	2010	Biomass	Sun	-	520	0
EU	Utrecht	Utrecht	X	X	X		(LT)	Foundation	2010	Wind	Sun	-	260	40

<sup>22</sup> Collectively generating renewable energy through a co-owned project for individual consumption is legally not possible in the Netherlands. Therefore a large part of the interviewed organisations has diverted their business model and defines collective generation as a long-term (LT) goal. However, some organisations like AV openly disobey the energy law in order to provoke the national government to rethink the energy law. In case of TB it is possible since TB owns an isolated distribution network including an installation.

ZET	Zutphen	Gelderland	X				(LT)	Cooperation	2012	Wind	Sun	250	0	0
CA	Castricum	Noord Holland		X	X		(LT)	Cooperation	2010	Sun	-	250	60	120
OE	Amsterdam	Noord Holland	X				(LT)	Cooperation	2009	Wind	Sun	-	220	110
BZB	Various	Various		X				Foundation	2008	Sun	-	-	750	750
TB	Culemborg	Gelderland			X	X	X	Corporation (B.V.)	2008	Geo-thermal	Sun	-	200	198
AEC	Ameland	Friesland	X	X			(LT)	Cooperation	2009	Sun	-	-	226	1075
NHEC	Various	Noord Holland			X	X	(LT)	Cooperation	2009	Biomass	Sun	-	500	750
GP	Groningen	Groningen		X	X	X	(LT)	Cooperation	2011	Sun	-	-	3500	61

#### 4.2. Primary analysis on the hypotheses

The primary part of the assessment constitutes a comparison of the hypothesised scores with the actual average scores of each individual hypothesis. Based on the comparison between the hypothesised score and the average score, which is complemented with data on the spread between the evaluated answers, i.e. the standard deviation, a hypothesis and its underlying explanatory variable is either confirmed or rejected. To enable a systematic analysis, the collected data on the four steps in the founding process are presented and assessed during the following four sequential sections of this paragraph. The tables provide a quick overview by listing the following indicators: the total score<sup>23</sup>, hypothesised score, average score, standard deviation<sup>24</sup> and the conclusion, i.e. confirmed or rejected, of each hypothesis. The sections following a table elaborate on the conclusions whether to confirm or reject the corresponding hypotheses.

##### 4.2.1 Explaining the emergence of an occasion

An assumed prerequisite for the establishment of a local renewable energy organisation is the emergence of an occasion. Based on the scientific literature and expert's visions, it is suggested that in particular macro developments and governmental intrusions play a vital role in the appearance of an occasion. The hypotheses and their corresponding scores concerning these two categories are presented and analysed during the first two sections. Furthermore, a combination of either or both technological and economic features of the applied renewable technology are also suggested to stimulate the occurrence of an occasion. Consequentially, an analysis on the hypotheses regarding the technological and economical characteristics including the corresponding scores is the focal point of the last two sections.

###### 4.2.1.1 The role of macro developments

Fluctuating energy prices, a high level of environmental awareness within society, the presence of market entry barriers and an unbalanced playing field are the four macro variables that are hypothesised to affect the emergence of an occasion. Table 4.2 demonstrates the total

<sup>23</sup> The total score constitutes an accumulation of the individual scores of each case on the corresponding hypothesis.

<sup>24</sup> The vast majority of the standard deviations are less than one. More accurate, 28 standard deviations out of the total of 43 are less than one, which is roughly two third. This indicates that the answers on these hypotheses are relatively consistent, especially those that are closer to zero. On the contrary, about a fifth of the answers show a considerable spread with a standard deviation of over 1,25, which indicate that these answers divert widely. In total 8 out of the 43 standard deviations were greater than 1,25, which is 18,6 per cent. Despite 46 hypotheses, there are 43 standard deviations since there are two clusters of two hypotheses that are answered by the same question (H23/H24 and H38/H39) and one hypothesis that is not evaluated according to a five-point scale (H31).

score, hypothesised score, average score and standard deviation of the four hypotheses. The final column shows the conclusion whether a hypothesis is confirmed or rejected.

<i>Hypotheses regarding the macro developments</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H1</i>	Fluctuating (or rising) energy prices stimulate the emergence of an occasion.	42	3 >	3,23	1,42	Confirmed
<i>H2</i>	High levels of environmental awareness within society provide a serious occasion.	58	3 >	4,46	0,97	Confirmed
<i>H3</i>	The presence of market entry barriers in terms of centrally designed energy system and vested interests reduce the possibility of an occasion.	24	3 >	1,85	0,38	Rejected
<i>H4</i>	An unbalanced playing field for local renewable energy organisations stemming from the same responsibilities as conventional energy corporations, socialised distribution costs and present taxations reduces the appearance of an occasion.	22	3 >	1,69	0,48	Rejected

*Detailed analysis that supports the conclusions on H1 until H4:*

- H1** Organisations frequently mention fluctuating energy prices as a relevant factor for their establishment since they are concerned with future energy prices and its impact on the budgets of households in the future. Moreover, rising energy prices eases the possibility to create a sound and profitable business plan. Despite these advantages the average score is just greater than three. However, there is a considerable spread, which indicates that organisations are divided whether it is a relevant factor for their founding. The spread might be explained by the fact that fluctuating prices rarely are the main motivation and often act as a complementary argument to establish a local renewable energy organisation. However, there is enough empirical evidence to confirm that fluctuating or rising energy prices stimulate the emergence of an occasion.
- H2** Enhanced awareness concerning climate change and the urgency to mitigate it is a common inspiration for establishing a local renewable energy organisation and is clearly confirmed by a significant average score. Botman (2012), Heijden (2012) and Stijkel (2012) mentioned that ‘planet’, as one pillar of sustainable development, is an important aspect to establish their organisation. Based on a significant average score and modest standard deviation, there is sufficient empirical ground to verify that a high level of environmental awareness within society provides a serious occasion.
- H3** None of the organisations did experience market entry barriers as an obstacle for founding their organisation, which is reflected in the low average score. Additionally the substantial low standard deviation indicates a significant consistency in which the organisations agree on the rejection of this hypothesis and the underlying explanatory variable. Alternatively, Zomer (2012a), Kwast (2012), Botman (2012) and Stokman (2012) experienced market entry barriers rather as a motivation or opportunity for their establishment. Although not relevant for the founding, market entry barriers are mentioned by Dekens (2012) and Haverkamp (2012) to discourage them in a latter stage, especially in regard to collectively generating renewable energy. However, others emphasize that one should focus on those activities that are possible in this market irrespective of these barriers (Goederen 2012 and Heijden 2012). Despite the possible obstruction of entry barriers in a latter stage, there is not enough empirical

confirmation to verify that market entry barriers reduce the appearance of an occasion.

- H4** The suggested discouragement to establish a local renewable energy organisation resulting from an unlevelled playing field lacks the necessary empirical validation. Actually Zomer (2012a), Dekens (2012) and Botman (2012) mentioned that they were rather triggered or strengthened by the fact that a bottom-up organisation would perform better than the conventional organisations dominating the energy market. In addition, Kwast (2012), Kiewiet (2012) and Verschuur (2012) stated that they were not averted by market entry barriers or an unlevelled playing field since they engaged in a partnership with an existing organisations or acquired an existing organisation that already possessed the necessary certificates or permits.<sup>25</sup> To summarize, there is no ground to empirically validate that the establishment of local renewable energy organisations is discouraged by an unlevelled playing field. With a low average score and standard deviation this hypothesis is uniformly rejected.

#### 4.2.1.2 The role of governmental intrusions

Governmental bodies are hypothesised to influence the emergence of an occasion through inconsistent stimulation policies. Additionally, dissatisfaction arising from a prolonged period of inconsistent stimulation policies and the incompetence of meeting the environmental targets are factors that are relevant for the emergence of an occasion. Long and bureaucratic procedures are a final variable that is anticipated to influence the occurrence of an occasion. Table 4.3 provides an overview of the results related to these four hypotheses.

<i>Hypotheses regarding governmental intrusions</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H5</i>	Inconsistent stimulation policies discourage the appearance of an occasion to establish a local renewable energy organisation.	34	3 >	2,62	1,19	Rejected
<i>H6</i>	Dissatisfaction arising from a prolonged period of inconsistent policies encourages the emergence of an occasion to establish a local renewable energy organisation.	40	3 >	3,08	1,89	Confirmed
<i>H7</i>	Dissatisfaction with the incompetence of the national government to meet their environmental targets enhances the emergence of an occasion to establish a local renewable energy organisation.	57	3 >	4,38	1,12	Confirmed
<i>H8</i>	Long and bureaucratic procedures to obtain permits or permissions prevent the occurrence of an occasion to establish a local renewable energy organisation.	29	3 >	2,23	1,30	Rejected

*Detailed analysis that supports the conclusions on H5 until H8:*

- H5** The observation that the average score is marginally lower than the hypothesized score in combination with a higher than average standard deviation suggest that some organisation might have been discouraged by inconsistent stimulation policies. From the interviews it became clear that inconsistent subsidies are mainly influential on

<sup>25</sup> Where AEC engaged in a partnership with Greenchoice, de-A collaborates with Waterschap and VAR. TB acquired Vitens.

small projects or those focusing on individual households, because in such projects individuals tend to own the technology and can lower their initial investment through a subsidy such as SDE or SDE+.<sup>26</sup> Therefore inconsistent subsidies could have been detrimental to those organisations focusing on such projects. Due to relative high initial investments for renewable (solar) technologies in the recent past, some organisations, which are established a couple of years ago, experienced difficulties to become operational or profitable without proper subsidies (Tekelenburg 2012, Stijkel 2012 and Kiewiet 2012). Furthermore, the inconsistency might give individuals the incentive to wait or speculate for better times (Goederen 2012). Finally, being granted a subsidy, which is often referred to as a lottery, is the first step but actually receiving it is a second (Tekelenburg 2012, Kwast 2012 and Kiewiet 2012). However, the majority of the interviewed organisations is not discouraged by lacking subsidies and avoids this potential obstacle through designing a business case without relying on this kind of subsidies. Despite the possible negative affect on small or individual projects, there is insufficient empirical ground to justify that inconsistent stimulation policies discourage the occasion to establish a local renewable energy organisation.

- H6** Organisations are divided on the aspect whether a prolonged period of inconsistent subsidies provides an occasion. Roughly half of the respondents (Zomer 2012a, Tekelenburg 2012, Kwast 2012, Botman 2012, Goederen 2012 and Stokman 2012) perceived this as extremely relevant where the other half was indifferent, which is clearly reflected in the standard deviation. With an average score of just over three, this implies that a prolonged period of inconsistent subsidies is an important factor for at least half of the sample and therefore there is enough empirical validation to confirm that dissatisfaction arising from a prolonged period of inconsistent stimulation policies stimulates the emergence of an occasion.
- H7** Except for one organisation, all interviewees emphasized that governmental failure in achieving their environmental targets was an (important) argument to establish their organisation, which is demonstrated in the significant average score. A related observation is that besides governmental failure, Zomer (2012a), Tekelenburg (2012), Kwast (2012), Botman (2012) and Gort (2012) also mentioned the disability of the market to foster the expansion of renewable energy as an additional encouragement to found their organisation. To conclude, the interviews provide sufficient empirical confirmation to validate that the incompetence of national, regional or local governments to achieve their environmental standards, enhances the emergence of an occasion.
- H8** The majority of the organisations take bureaucratic procedures to obtain permits or permission for granted, which consequentially, did not negatively affect their establishment. However, Goederen (2012) perceived these bureaucratic procedures<sup>27</sup> as ‘unreasonable’ and ‘unjust’, where Tekelenburg (2012) and Kiewiet (2012) state that it has hampered their development and without these obstacles larger projects would have been achieved. The relevance of bureaucratic procedures expressed by these interviewees resulted in an increase in the standard deviation but proved insufficient to alter the average score. Considering the above analysis as well as the average score and standard deviation, there is not enough empirical ground to confirm that long and bureaucratic procedures prevent the occurrence of an occasion.

<sup>26</sup> More information on SDE and SDE+ can be found on: <http://www.agentschapnl.nl/nl/programmas-regelingen/stimulering-duurzame-energieproductie-sde>.

<sup>27</sup> These bureaucratic procedures for example prevent to collectively generate energy and enable individuals to deduct their share of generated energy from their energy bill. In Dutch this is known as ‘salderen’.

#### 4.2.1.3 The role of technological characteristics

The possibility to exploit a local renewable source that matches local demand and the ability to become independent from either conventional energy corporations as well as energy exporting countries, are variables that are associated with renewable energy technologies and are expected to influence the emergence of an occasion to establish a local renewable energy organisation. Table 4.4 summarises the results of the gathered data on the influence of these technological characteristics on the emergence of an occasion.

<b>Table 4.4 The role of technological characteristics on the emergence of an occasion</b>						
<i>Hypotheses regarding the technological characteristics</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H9</i>	The possibility to exploit a local renewable source that matches local demand provides an occasion to establish a local renewable energy organisation.	38	3 >	2,92	1,55	Confirmed
<i>H10</i>	Renewable energy technologies provide a sense of independency from conventional energy corporations and thus support the appearance of an occasion to establish a local renewable energy organisation.	56	3 >	4,31	1,32	Confirmed
<i>H11</i>	Renewable energy technologies provide a sense of independency from energy producing countries and thus support the appearance of an occasion to establish a local renewable energy organisation.	51	3 >	3,92	1,26	Confirmed

*Detailed analysis that supports the conclusions on H9 until H11:*

**H9** Although the average score regarding the possibility to exploit a local renewable source that matches local demand is only just insufficient, the considerable spread indicates the importance of this aspect for some organisations. The results show a significant deviation due to the various contexts. For example, the presence of an existing biomass or geothermal installation and the possibility to use or acquire the installation is a major factor for three cases (Kwast 2012, Verschuur 2012 and Haverkamp 2012). For two other cases the appearance of an occasion to construct or participate in a wind project enhanced the momentum to establish their organisations (Botman 2012 and Goederen 2012). However, two other organisations that primary focus on wind, were not stimulated by such a possibility and actually indicated to be the initiators that enabled such opportunity (Zomer 2012a and Gort 2012). Apart from one case, organisations, which primary focus on solar technologies, commonly firmly rejected this hypothesis. This might be explained by the fact that photovoltaic panels are more easily applied and less expensive<sup>28</sup> in comparison to other renewable technologies and therefore are less dependent on the appearance of such opportunity. When merely basing the conclusion on the just insufficient average score, there is not enough empirical ground to confirm this hypothesis. However, despite the marginal lower average score, the substantial standard deviation and the potential strong

<sup>28</sup> There are various visions on whether photovoltaic energy is more or less expensive in comparison to other renewable technologies. If one considers this statement in regard to project size in terms of the expenses for the realisation of a project, solar panels projects are in general less expensive (depending on the size of the project) than for example a wind project. However, a wind turbine is more efficient and therefore generates more electricity, which improves the financial returns but requires much more funds to realise.

relation with certain renewable sources provide sufficient leverage to conclude that there is adequate empirical evidence to validate that the opportunity to exploit a local renewable source that matches local demand provides an occasion.

- H10** Apart from two cases, the ability or urgency to be less dependent from conventional energy corporations was a major argument for all respondents to establish a local renewable energy organisation, which is clearly demonstrated by the average score. Despite the opposing answers of Zomer (2012a) and Gort (2012), the above average standard deviation results from the answers of the remaining respondents acknowledging the relevance of becoming independent in relation to the founding of their organisations. Remarkably, the tendency to become less dependent on (inter-) national energy corporations seems to be partially driven by an economical motivation. This economical motivation encompasses the tendency to stimulate the local economy through attempting to recirculate energy expenditures within the local community instead of allowing it to benefit distant corporations (Dekens 2012, Tekelenburg 2012, Heijden 2012, Verschuur 2012 and Kiewiet 2012). Despite the irrelevance of this factor for the former two cases, the significant average score indicates that there is enough empirical confirmation to firmly validate that independency from (inter-) national energy corporations provides a serious occasion.
- H11** The majority of the organisations are driven by the ideal to become less dependent on external parties including energy-exporting countries. However, in comparison to the previous notion of becoming less dependent from energy corporations, the urgency to become autonomous from energy producing countries is a less rooted motivation for the establishment of a local renewable energy organisation, which is confirmed through a lower average score. Nevertheless, the average score still demonstrates that there is sufficient empirical evidence to confirm that becoming less dependent on energy exporting countries is a serious motivation for the establishment of a local renewable energy organisation.

#### 4.2.1.4 The role of economical characteristics

Potential symbolic benefits in terms of a green image or the enhancement of social cohesion within the community and the progressively declining initial investment costs for renewable energy technologies are economical characteristics anticipated to affect the emergence of an occasion to establish a local renewable energy organisation. The various scores including the conclusions regarding the potential influence of these economical variables on the emergence of an occasion are presented in table 4.5.

<i>Hypotheses regarding the economical characteristics</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H12</i>	A potential symbolic benefit in terms of a green image provides an occasion to establish a local renewable energy organisation.	45	3 >	3,46	1,27	Confirmed.
<i>H13</i>	A potential symbolic benefit in terms of the enhancement of social cohesion within a community provides an occasion to establish a local renewable energy organisation.	55	3 >	4,23	1,09	Confirmed
<i>H14</i>	Progressively decreasing initial investment costs of renewable energy technologies provide an occasion to establish a local renewable energy organisation.	30	3 >	2,31	1,38	Rejected

*Detailed analysis that supports the conclusions on H12 until H14:*

- H12** The associated ‘green’ image of a local renewable energy organisation turns out to be a relevant argument for the establishment of a local renewable energy organisation. However, ‘green’ is a broad notion and is also understood as ‘sustainable’ or ‘climate neutral’ in this context. For example, Kwast (2012) and Stokman (2012) emphasised that their green image allows them to differentiate from the established energy corporation, where Goederen (2012), Heijden (2012) and Verschuur (2012) argue that their communities are (strongly) affiliated with environmental or sustainability issues and therefore a green image is a vital aspect for their establishment. The various interpretations of a green image might explain the deviation in responses and implies that some organisations were not strongly guided by this aspect in regard to their establishment (Zomer 2012a, Dekens 2012, Botman 2012 and Haverkamp 2012). Nonetheless, there is sufficient empirical evidence to confirm that a green image associated with local renewable energy organisations provides an occasion.
- H13** Except for two cases, the enhancement of social cohesion within the targeted community commonly appears to be an important argument for the establishment of a local renewable energy organisation. Dekens (2012), Tekelenburg (2012), Heijden (2012) and Kiewiet (2012) expressed that their organisations pursue the improvement of social cohesion through (economical) development of their community. Their motivation to improve social cohesion is closely related to the mentioned urgency to become less dependent on foreign energy corporations or countries as discussed in H10 and H11. Furthermore, the degree of social cohesion differs widely and often relates to the level of urbanisation. For example, social cohesion in rural communities is generally stronger but faces problems concerning the liveability, which some organisations attempt to challenge through the establishment of a local renewable energy organisation (Dekens 2012 and Tekelenburg 2012). On the other hand, several organisations operate within urban communities and envision their organisation as a vehicle to improve the social cohesion (Botman 2012, Heijden 2012 and Stokman 2012). To summarize, there is enough empirical evidence to confirm that the improvement of social cohesion stimulates the occasion to establish of a local renewable energy organisation.
- H14** Decreasing prices for renewable technologies appears irrelevant when solitary considering the average score. However, the standard deviation suggests that for several organisations this could be an important motivation. Moreover, a pattern seems to emerge between decreasing prices of solar panels on the one hand and the establishment of organisations primary oriented on solar technologies on the other. In addition, none of the organisations, which primary exploit another renewable source, referred to decreasing technology prices as an important factor. Out of the six organisations primary focusing on solar technology, (Tekelenburg 2012, Heijden 2012 and Stokman 2012) mentioned decreasing prices to be a favourable argument for their establishment. Some of the organisation, which primary focus on other renewable sources, experiment with solar projects to diversify their operations through exploiting solar power (Kwast 2012, Botman 2012, Goederen 2012 and Haverkamp 2012). When their statements in relation to their secondary source are incorporated, the average score drastically improves to 3,60. Despite the above discussion, there is not enough empirical ground to confirm that decreasing prices for a broad spectrum of renewable energy technologies stimulates the appearance of an occasion.

*4.2.2 Explaining the local perception*

Explanatory variables stemming from various categories are expected to influence the forming of the local perception towards a local renewable energy organisation. In regard to organisational characteristics, the degree of cohesion within the community is hypothesised to

influence the local perception and is discussed in the first section. Furthermore, actors from the market and civil society are suggested to significantly affect the local perception, which is the focal point of the second section. Besides market and societal actors, the third section focuses on the anticipated affect of governmental actors on the local perception. Additionally, the last section centres on the visibility of the preferred renewable technology, which is hypothesised to either challenge or improve the local perception.

#### 4.2.2.1 *The role of organisational characteristics*

A high degree of social cohesion within a community is the only organisational characteristic that is predicted to affect the local perception towards a local renewable energy organisation. Table 4.6 presents the various indicators and the conclusion regarding its hypothesised positive impact on the local perception.

<i>Hypothesis regarding the organisational characteristics</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H15</i>	A high level of social cohesion within a community (which entails interpersonal trust, social capital building and knowledge transfer) improves local perception of local renewable energy organisations.	56	3 >	4,31	0,85	Confirmed

#### *Detailed analysis that supports the conclusion on H15:*

**H15** In order to confirm or reject the notion that high levels of social cohesion improve the local perception regarding a local renewable energy organisation, the interviewees were first asked to define the degree of social cohesion within their community. The degree of social cohesion varied substantially since in some cases it is described as limited, where others characterised it as strong or intense. Secondly, the interviewees were asked to indicate whether the degree of social cohesion has had any influence on the local perception in regard to their local renewable energy organisations. None of the respondents expressed a negative relation between the indicated level of social cohesion and the local perception. Contrary, the respondents commonly stated that the indicated degree of social cohesion relates with the local perception towards their organisation, which is verified by the average score and modest standard deviation. Generally, a positive recognition concerning a local renewable energy organisation appeared stronger in communities that are characterised by higher levels of social cohesion in comparison to communities that are distinguished by lower levels of social cohesion. Despite the absence of a strong correlation, there is enough empirical ground to validate that high levels of social cohesion improve the local perception concerning a local renewable energy organisation.

#### 4.2.2.2 *The role of actors from the market and society*

Actors from the market and society are expected to play a vital role in forming the local perception towards a local renewable energy organisation. In particular the availability of external expert knowledge, the presence of local opposition, the existence of other similar local renewable energy organisations and the advice or expertise of suppliers and installers of renewable energy technologies are anticipated to affect the local perception. The indicators as

well as the conclusions concerning the influence of these various actors from the market and societal sphere on forming the local perception are presented in table 4.7.

<i>Hypotheses regarding the market and society</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H16</i>	Availability of external expert knowledge reduces the perceived complexity of establishing a local renewable energy organisation and thus enhances the local perception on local renewable energy organisations.	46	3 >	3,54	0,88	Confirmed
<i>H17</i>	The presence of local opposition negatively affects the local perception of a local renewable energy organisation.	34	< 3	2,62	0,87	Confirmed
<i>H18</i>	The existence of other and similar local renewable energy organisations positively affects the local perception on local renewable energy organisations.	55	3 >	4,23	0,93	Confirmed
<i>H19</i>	The advice and experience of suppliers and installers of renewable energy technology influence the local perception on local renewable energy organisations.	49	< 3, 3 >	3,77	0,83	Confirmed

*Detailed analysis that supports the conclusions on H16 until H19:*

**H16** The majority of the organisations lack the funds to employ an external consultancy agency or have sufficient internal expertise and therefore did not seek external advice in terms of a consultancy agency or were affected by their presence. However, for a couple organisations the support of a consultancy agency was important and did positively influence the local perception (Zomer 2012a, Verschuur 2012 and Haverkamp 2012). Furthermore, Zomer (2012a), Dekens (2012), Stijkel (2012) and Stokman (2012) emphasised the support of organisations like ‘Wij krijgen kippen’, ‘Milieu Federaties’ or ‘e-Decentraal’, which enable to share knowledge with other organisations working on decentralised generation. Based on the average score, there is just enough empirical evidence to confirm that external expertise in terms of external advice has a positive influence on the local perception. In case external expertise is interpreted broader through including organisations, which enable the transformation of knowledge on decentralised generation, the data assumes that this would have had a greater positive affect on the local perception.

**H17** From the interviews it became clear that opposition challenged several organisations although frequently not severe (Dekens 2012, Tekelenburg 2012, Botman 2012, Gort 2012 and Stijkel 2012). The presence of opposition challenged the local perception in four of the cases, was not of any influence in one case and, interesting, had a positive impact on the local perception of TB (Verschuur 2012)<sup>29</sup>. The generally negative impact of local opposition is visible in the average score, which also incorporates the scores of the organisations that do not face opposition. When isolating the results of the former organisations by excluding the scores of the latter organisations, their average score drops to 2,17 and thus further strengthens the conclusion that there is sufficient empirical evidence to confirm that local opposition has a negative impact on the local perception.

<sup>29</sup> Opposition arose due to doubt whether the project would be realistic and if it could be achieved, i.e. opposition emerged due to scepticism. This forced the advocates to clearly explain the content, aim and requirements for establishing TB, which ultimately had a rather positive impact on the perception of the initiators and the inhabitants who expressed their scepticism.

- H18** The majority of the interviewees have studied or consulted other local renewable energy organisations for inspiration or advice on certain aspects on founding their own organisation, which is evidently demonstrated by the high average score. Furthermore, if in general inspiration or advice is sought by analysing another local renewable energy organisation, it might be expected that the pioneers in the sample, i.e. those established prior or during the boom<sup>30</sup>, would have no or less references and therefore show lower evaluated scores. However, the collected data does not confirm this assumption. The average score for organisation established in 2008 or 2009, is 4,4 indicating that a reference was actually more important for this sample. This might partially be explained by the fact that Texel Energie, which is the most cited reference by the interviewees, was already established in 2007. Nonetheless, due to a significant average score and modest standard deviation, there is sufficient empirical evidence to verify that other similar organisations positively affect the local perception.
- H19** From the studied theory it was not clear whether suppliers or installation businesses would have a positive or negative impact on the local perception. In practice, none of the respondents expressed that these external parties had a negative influence on the local perception. However, the data shows that the organisations are divided since roughly half of the cases were unaffected by a supplier or installation business (Kwast 2012, Botman 2012, Goederen 2012, Heijden 2012, Gort 2012 and Stijkel 2012), where the remaining organisations mentioned to sustain a good relation with a supplier or installation business. Such variation between the answers insinuates a significant standard deviation, however, none of the organisation expressed a negative impact and therefore the range of evaluated answers stayed within reasonable boundaries. However, where several respondents interpreted suppliers as those providing renewable *technologies* others understood this concept as the supplier of renewable *energy* such as Greenchoice, Trianel or Anode. When reflecting on the above discussion, including this subtle nuance, there is enough empirical validation to confirm that a supplier or installation business has a positive affect the local perception.

#### 4.2.2.3 The role of governmental intrusions

Governmental bodies influence the forming of the local perception through providing support in terms of available expertise or facilitating the transfer of knowledge. Furthermore, long and bureaucratic procedures are also hypothesised to affect the local perception towards a local renewable energy organisation. The results concerning the influence of these governmental related variables on the local perception are shown in table 4.8.

<i>Hypotheses regarding governmental intrusions</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H20</i>	Governmental support in terms of providing expertise improves the local perception of founding a local renewable energy organisation.	39	3 >	3,00	0,82	Rejected

<sup>30</sup> As is shown in table 3.2 and figure 7, pioneering organisations are established in 2007, 2008 and 2009.

H21	Governmental support in terms of facilitating the possibility to share vital knowledge improves the local perception of founding a local renewable energy organisation.	43	3 >	3,31	0,85	Confirmed
H22	Long and bureaucratic procedures to obtain permits or permissions negatively effect the local perception of establishing a local renewable energy organisation.	34	<3	2,62	0,87	Confirmed

*Detailed analysis that supports the conclusions on H20 until H22:*

**H20** Eleven organisations stated not to have received any support in terms of expertise from a local, regional or national governmental entity. However, it should be emphasised that despite lacking governmental support, several local renewable energy organisations stated to sustain a good relationship with their local or regional government (Zomer 2012a, Dekens 2012, Kwast 2012, Botman 2012, Heijden 2012, Gort 2012 and Verschuur 2012). To a limited extent this might be explained by the financial support that several organisations received from their local or regional government (Dekens 2012, Gort 2012 and Verschuur 2012). Furthermore, according to Tekelenburg (2012), lacking governmental support might create the image that an organisation is able to succeed without any governmental assistance and hence improve the local perception. Only two of the organisations mentioned to that a local, regional or national government either had a negative (Stijkel 2012) or positive (Gort 2012) impact on the local perception. These opposing statements counterbalance the average score and ultimately determine its insignificance. Therefore, there is not enough empirical evidence to confirm that governmental support has a positive influence on the local perception.

**H21** Besides providing expert knowledge, a local, regional or national government might support local renewable energy organisations through facilitating the transformation of knowledge on decentralised generation. Again the data shows that governmental support in this respect was lacking. Nine interviewees stated that their local or regional government did not provide such a platform to share knowledge. From these nine organisations, several organisations have even initiated the possibility to transfer knowledge themselves (Zomer 2012a, Kwast 2012, Botman 2012, Heijden 2012 and Stokman 2012). In addition, Kiewiet (2012) expressed to be demotivated to invest additional effort in attending such meeting due to limited practical progress that is achieved. Alternatively, Dekens (2012), Gort (2012) and Verschuur (2012) expressed that in their cases the transfer of knowledge was somehow facilitated by a local or regional government and proved to have a positive affect the local perception. Due to the experiences of the latter three organisations, there is a marginal positive effect reflected in the average score, which confirms that there is just enough empirical ground to verify that government support in terms of facilitating the transfer of knowledge improves the local perception.

**H22** It is assumed that the presence of bureaucratic procedures negatively affects the local perception of establishing a local renewable energy organisation. In practice legal procedures prevent local renewable energy organisations from deploying certain business models and forces them to change their business models or strategies and focus on other activities or possibilities. According to Tekelenburg (2012), Botman (2012), Goederen (2012), Heijden (2012) and Kiewiet (2012) these procedures have negatively affected the local perception. In contrast, Zomer (2012) and Stokman (2012) indicated that these restrictions provided a stimulation to find an innovative solution and therefore had a positive impact on their local perception. Despite the unanticipated motivation mentioned by the latter two interviewees, the negative experience of the former five interviewees, the average score and insignificant standard deviation provide enough empirical ground to validate that bureaucratic procedures negatively affect the local perception.

#### 4.2.2.4 The role of technological characteristics

In terms of technological characteristics, only the visibility of renewable energy technologies is expected to affect the local perception towards a local renewable energy organisation. However, on the one hand it is anticipated to enhance symbolic merits such as an improved awareness, where on the other hand it is predicted to stimulate local opposition. Table 4.9 summarises the results of the gathered data on the hypothesised influence of this technological characteristics on forming the local perception.

<b>Table 4.9 The role of technological characteristics on the local perception</b>						
<i>Hypotheses regarding the technological characteristics</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H23</i>	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect the local perception.	49	3 >	3,77	1,01	Confirmed
<i>H24</i>	Visible technologies stimulate local opposition (NIMBYism), which negatively affect the local perception.	49	<3	3,77	1,01	Rejected

*Detailed analysis that supports the conclusions on H23 and H24:*

**H23/24** Similar to hypothesis 19, the visibility of the applied technology is hypothesised to either have a positive or negative impact on the local perception. The data contains just one answer, which associates visibility with a negative local perception (Dekens 2012). From the remaining twelve interviewees, Zomer (2012a), Heijden (2012), Verschuur (2012), Kiewiet (2012) and Haverkamp (2012) stated that visibility had neither a positive nor negative impact on the local perception. Alternatively, the remaining seven organisations emphasised that visibility enables an abstract concept as renewable energy to become more tangible (Kwast 2012 and Gort 2012) and improves their reputation (Goederen 2012, Stijkel 2012 and Stokman 2012), which enhances the local perception. Considering the above, it became clear that there is insufficient empirical evidence (just one observation) that confirms a negative impact of visible technologies, which is therefore rejected. On the other hand, over half the cases confirmed the positive affect of a visible technology on the local perception, and therefore there is sufficient empirical ground to accept that visible technologies enhance the local perception.

#### 4.2.3 Explaining the local support and acceptance

A crucial phase in the actual establishment and development of a local renewable energy organisation is the degree of local support and acceptance. Theoretically this is mainly affected by factors determining the organisational structure. The gathered and analysed data regarding the impact of these organisational attributes on the local support are elaborated on in the first section. Additionally, the degree of public environmental awareness is a macro variable that is also predicted to affect the degree of local support and acceptance, which is discussed in the second section. Moreover, the following section centres on the influence of actors from the market or social context on the degree of local support. Finally, technological characteristics such as the possibility to provide feedback on the generated or consumed energy and the visibility are anticipated to affect the degree of local support as well, which is the focal point of the last section.

#### 4.2.3.1 The role of organisational characteristics

Co-ownership and a non-constraining participation possibility for locals are hypothesised to affect the degree of local support. Furthermore, the extent of internal expertise or knowledge on aspects related to decentralised generation is predicted to affect the local participation as well as the local support. Additionally, an equal and fair distribution of potential benefits, the degree of social cohesion within a community and the organisational dimensions in terms of the number of members are crucial factors expected to also affect the degree of local support and acceptance. The results related to the impact of these organisational characteristics on the degree of local support and acceptance, are presented in table 4.10.

<i>Hypotheses regarding the organisational characteristics</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H25</i>	Co-ownership of locals improves local support for and acceptance of a local renewable energy organisation.	56	3 >	4,31	0,85	Confirmed
<i>H26</i>	A non-constraining participation possibility for locals, i.e. open participation, enhances local support for and acceptance of a local renewable energy organisation.	52	3 >	4,00	0,91	Confirmed
<i>H27</i>	Extensive internal knowledge concerning decentralised generation creates a barrier between the organisation and its (potential) members or costumers and therefore hampers local participation.	48	< 3	3,69	1,03	Rejected
<i>H28</i>	Extensive internal knowledge concerning decentralised generation creates a barrier between the organisation and its (potential) members or costumers and therefore decreases local support for and acceptance of a local renewable energy organisation.	52	< 3	4,00	1,15	Rejected
<i>H29</i>	Equal and fair distribution of potential benefits in favour of the participants or the community enhances local support for and acceptance of a local renewable energy organisation.	54	3 >	4,15	0,90	Confirmed
<i>H30</i>	A high level of social cohesion within the community (which entails interpersonal trust, social capital building and knowledge transfer) improves local support for and acceptance of a local renewable energy organisation.	51	3 >	3,92	0,86	Confirmed
<i>H31</i>	Small organisations, in terms of number of members, are distinguished by higher levels of interconnectedness in comparison to large organisations.	N.A	N.A	N.A	N.A	Rejected

*Detailed analysis that supports the conclusions on H25 until H31:*

**H25** The vast majority of the organisations acknowledge that co-ownership of members or locals enhances the local support, which is evident in the average score. One exception is AV since its members officially have to subscribe with Windvogel (Zomer 2012a). Therefore local members are co-owners of a national organisation and it is difficult to establish whether their participation has a positive or negative influence on its local support. BZB faces a similar issue, because the participating farmers utilise the organisational features of the overarching foundation, Triple I-S. However, a fundamental difference between BZB and other local renewable energy organisations is that locals can financially participate in a project but are not co-

owners of the technology. Farmers own the technology and locals are compensated with farm products. Therefore, co-ownership is not a relevant aspect for this organisation. Despite these exceptions, it is commonly agreed upon that co-ownership improves local support, which is reflected by the average score and modest standard deviation. Consequentially, there is significant empirical evidence to firmly validate that co-ownership of locals improves local support.

- H26** All of the interviewed organisations allow everyone, including local businesses or local (sport-, hobby-, etc.) communities, to become members of their organisations. However, open membership is often confined by municipal boundaries. The average score demonstrates the common confirmation that a non-constraining participation possibility enhances local support. However, despite an open participation possibility, Zomer (2012a), Dekens (2012), Tekelenburg (2012) and Botman (2012) expressed to experience difficulties with attracting (additional) members due to either low local awareness of their organisation, low interest in energy issues, unwillingness to be committed to such organisations or the discouragement resulting from a financial contribution. Hence, a non-constraining participation possibility alone is not sufficient to persuade locals to subscribe and improve local support. Nonetheless, the empirical findings form enough ground to confirm that a non-constraining participation possibility has a positive affect on the local support.
- H27** The previous hypothesis already briefly related to difficulties of attracting local members. This barrier might also appear due to extensive internal expertise and the difficulties or disability to communicate the merits, opportunities or drawbacks of decentralised generation to the community. From the nine organisations that stated to possess substantial internal expertise on decentralised generation, only Zomer (2012a) confirms that their degree of internal expertise might negatively affect local participation or membership. Furthermore, Botman (2012) and Goederen (2012) acknowledge that extensive internal expertise might be detrimental if an organisation focuses too much on the details. However, they were not able to determine whether their relative high level of internal expertise has had any affect on the participation of locals. On the other hand, some organisations expressed that extensive internal expertise enables them to actually communicate their message and mission better (Kwast 2012) or generates local trust and therefore improves their creditability (Tekelenburg 2012, Heijden 2012, Kiewiet 2012 and Stokman 2012). When consulting the average score and standard deviation there is insufficient empirical evidence to confirm that extensive internal expertise has a negative affect on local participation. Moreover, these indicators reflect the answers of all organisations including those that indicated to have low levels of internal expertise at their disposal. When extracting the answers of the latter and concentrate on the scores provided by organisations with extensive internal expertise, the average score even extends (to 3,89) and the standard deviation remains roughly the same (1,05), which further strengthens the previous conclusion to reject this hypothesis.
- H28** This hypothesis closely relates to the previous one, but expects that substantial internal expertise has a negative affect on the local support instead of local participation. Here again, the empirical evidence lacks to verify the hypothesised score. When merely concentrating on the scores of organisations that expressed to possess relative substantial internal expertise, the average score raises to 4,33 and standard deviation drops to 1, which indicates an improved consistency regarding their disagreement with this hypothesis and a reinforcement to reject that extensive internal expertise has a negative impact on the local support.
- H29** Except for BZB<sup>31</sup>, generally members of an organisation can express their agreement or disagreement through a personal vote on various occasions or meetings. Therefore,

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<sup>31</sup> BZB is characterized by the fact that the farmers own the technology and potential participants financially support them in procuring it. In return they receive farm products, which accumulated are worth more than their initial investment.

members can approve or reject a proposition to allocate potential benefits. Apart from two organisations, which provide a financial return or dividend on the investment of its members, potential benefits are frequently allocated to new renewable energy related projects unless the members decide otherwise. The common tendency to allocate potential benefits to favour the members or the community has a strongly positive affect on the local support. This positive affect is reflected in the relative high average score and modest standard deviation and therefore there is enough empirical support to verify that equal and fair distribution of potential benefits, which favour the local community, enhances the local support.

**H30** For the confirmation or rejection of H15, respondents were asked to define the degree of social cohesion in their communities. In relation to their answer, respondents are also asked whether this degree of social cohesion has a positive or negative affect on the local support. When concentrating on those organisations, which stated that their communities are characterised by a significant degree of social cohesion (Dekens 2012, Kwast 2012, Verschuur 2012 and Kiewiet 2012), it becomes clear that a significant degree of social cohesion has a strong positive affect on the local support for their organisations. However, despite classifying their communities in terms of lower levels of social cohesion, other interviewees mentioned that local support for their organisations gains from frequent interaction between members and inhabitants of their community (Botman 2012 and Heijden 2012), which also has a positive affect on the local support. The fact that local renewable energy organisations often act as a meeting point and attract similar minded people, who are generally more aware of their energy consumption, might be an explanation for this. In addition, despite a relative low existing cohesion within a city or municipality, a local renewable energy organisation might improve local support through attracting various (sport, hobby, etc.) communities within the region and utilise these existing social networks (Goederen 2012 and Stokman 2012). Considering the above findings, the majority of the organisations found that the existing social cohesion had a positive affect on the local support, irrespective of the present degree of social cohesion. However, the empirical data suggest that organisation active within communities characterised by high levels of social cohesion experience stronger local support. Therefore, there is just sufficient empirical evidence to validate that high levels of social cohesion enhance local support. In addition, where all organisations concentrate on a small geographical area such as a municipality, one focuses on a larger provincial level (Haverkamp 2012). In comparison to a city, village or municipality, a province seems to be too abstract and difficult to relate to for potential members and consequentially results in a poor degree of social cohesion. On the other hand, another organisation focuses on a city district and finds that inhabitants relate stronger to the city than their city district and faces varying local support (Gort 2012). Therefore these findings also suggest that choosing the right geographical dimensions, i.e. not too large or too small, determines the degree of local support.

**H31** In order to determine whether small organisations in terms of the quantity of members have higher levels of social cohesion and therefore also higher levels of local support, first 'small' has to be defined. Paragraph 3.2 elaborated on the notion of local members, which was segregated into three categories. This hypothesis focuses on the second category, which embraces members that voluntarily commit themselves to the organisation and pay an annual contribution since this category offers a good indication of the local support. Comparing the number of paying members in this sample, a majority of five organisations has about 200 to 260 paying members. Four cases have among 400 to 750 paying subscribers. GP is by far the largest organisation with about 3500 paid subscribers. Consequentially, the remaining three cases (ZO, CA and ZET) are the smallest organisations in this context, ranging from 12 to 60 paying members. Despite their relative small size, only one case categorized its community in terms of high social cohesion (Dekens 2012). On the other hand, the other two described the social cohesion in their communities as less

intensive and suburban, respectively, which indicates lower levels of social cohesion (Heijden 2012 and Goederen 2012). According to H31, the degree of social cohesion is expected to be less intense for organisations with larger number of (paying) members. However, when comparing the social cohesion of organisations with 200 until 260 members with the smallest category, there is no significant difference. Especially TB and AEC are characterised by high levels of social cohesions, where LE and OE expressed that the social cohesion varied considerably ranging from significant in the surrounding villages (LE) and some part of the community (OE) to rather poor in its urban region (LE) and the remaining city district (OE). Furthermore, when comparing the levels of social cohesion of the larger organisations with the smallest category, there is still no significant difference. Just one of the former organisations is characterised by a poor social cohesion but contrary, others expressed to have a rather intense and integrated degree of social cohesion. Through taken the previous into account, it becomes clear that there is not enough empirical ground to confirm that small organisations in terms of (paying) members are distinguished by higher levels of social cohesion. However, the data suggest that local renewable energy organisations, which are active in rural or more remote regions, have higher levels of social cohesion than those deploying their activities in urban areas.

#### 4.2.3.2 The role of macro developments

A high level of public environmental awareness is the solitary macro related explanatory variable predicted to have an impact on the degree of local support. Table 4.11 presents the various indicators and the conclusion on the hypothesised impact of this macro variable on the degree of local support and acceptance of local renewable energy organisations.

<i>Hypothesis regarding a macro development</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H32</i>	High levels of environmental awareness within society improve local support for and acceptance of a local renewable energy organisation.	55	3 >	4,23	0,83	Confirmed

#### *Detailed analysis that supports the conclusion on H32:*

**H32** In general, the local support for local renewable energy organisations is fuelled by an increase in national environmental awareness. A significant average score and a relative low standard deviation indicate that increased national environmental awareness also improves local support. However, Dekens (2012), Tekelenburg (2012) and Verschuur (2012) state that improved national awareness did neither positively nor negatively affect local support for their organisations. Where the former two interviewees were cautious to relate national levels of environmental awareness to their local support, the statement of Verschuur (2012) might be explained by the fact that its community (the neighbourhood EVA-Lanxmeer) consists of people that are above average aware of environmental issues and specifically choose to live in this neighbourhood and therefore are already conscious on the detrimental effects of our current method of energy generation and consumption on the environment. Despite these three cases, there is sufficient empirical evidence to verify that high levels of environmental awareness within society have a positive affect on the local support.

#### 4.2.3.3 The role of actors from the market and society

Several actors originating from the market or social sphere are expected to influence the level of local support. First, the support from an external party ranging from a private organisation to another local renewable energy organisation is hypothesised to influence the creditability as well as the degree of local support and acceptance of an organisation. Besides supportive parties, local renewable energy organisations might be challenged by the presence of local opposition, which influences their extent of local support. The results related to the influence of these actors from the market or society on the extent of local support, are shown in table 4.12.

<i>Hypotheses regarding the market and society</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H33</i>	The support of an external party (either an organisation or other local renewable energy organisation) improves the creditability of a local renewable energy organisation.	57	3 >	4,38	0,87	Confirmed
<i>H34</i>	The support of an external party (either an organisation or other local renewable energy organisation) improves the local support for and acceptance of a local renewable energy organisation.	55	3 >	4,23	0,60	Confirmed
<i>H35</i>	The presence of local opposition negatively affects local support for and acceptance of a local renewable energy organisation.	34	< 3	2,62	0,87	Confirmed

*Detailed analysis that supports the conclusions on H33 until H35:*

**H33** The vast majority of the organisations mentioned to receive external support through for example a partnership or close relation with an external party. Platforms that support knowledge transfer, such as Wij krijgen kippen, Provinciale Milieu Federaties, e-Decentraal, KNHM or Transition Towns (Zomer 2012a, Dekens 2012, Botman 2012, Stijkel 2012 and Stokman 2012), or local businesses (Kwast 2012, Heijden 2012 and Kiewiet 2012) are examples of parties that are mentioned to provide external support. Furthermore, partnerships with other local renewable energy organisations (Zomer 2012a and Goederen 2012) or support from local governments (Botman 2012, Heijden 2012, Gort 2012 and Verschuur 2012) are also frequently stated examples of an external partner. An existing partnership or relationship with these external parties is found to have a highly positive affect on the creditability of the interviewed organisations. The high average score and tolerable standard deviation validate these findings. Consequentially, there is strong empirical ground to confirm that the support of an external party improves the creditability of a local renewable energy organisation.

**H34** Through engaging in a partnership or establishing a relation with an established or familiar external party improves local publicity and creditability, which in return is commonly found to positively affect local support. Although the average is negligible lower, the standard deviation demonstrates a more uniform agreement on this hypothesis in comparison to the previous one, which lead to the conclusion that there is robust empirical evidence to confirm that the support of an external party enhances the local support and acceptance of a local renewable energy organisation.

**H35** Dekens (2012), Tekelenburg (2012), Botman (2012), Gort (2012), Stijkel (2012) and Verschuur (2012) expressed to have been challenged by the presence of local opposition. However, the average score and standard deviation are based on the answers of all organisations including the remaining seven that did not experienced any form of opposition. When excluding the latter seven and concentrating on the scores of the organisations facing local opposition, the average score drops to 2,17, strengthening the expectation that the presence of local opposition is detrimental for the degree of local support. However, as is discussed in H17, local opposition appeared to have had a positive affect on the local support of TB, which significantly increases the standard deviation. Despite this remarkable observation, the collected empirical data is sufficient to verify that local opposition has a negative affect on the local support for a local renewable energy organisation.

#### 4.2.3.4 The role of technological characteristics

Two technological features associated with renewable energy technologies are predicted to affect the local support of local renewable energy organisations. Similar to section 4.2.2.4, the visibility of renewable energy technologies is expected to either affect the degree of local support through accentuating symbolic merits or by encouraging local opposition. Besides, the possibility to provide feedback on the generated and/or consumed energy is anticipated to have an impact on the local support as well. Table 4.13 summarises the results regarding the influence of these technological characteristics on the local support of local renewable energy organisations.

<i>Hypotheses regarding the technological characteristics</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H36</i>	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect local support for and acceptance of a local renewable energy organisation.	49	3 >	3,77	1,01	Confirmed
<i>H37</i>	Visible technologies stimulate local opposition (NIMBYism), which negatively affect local support for and acceptance of a local renewable energy organisation.	49	< 3	3,77	1,01	Rejected
<i>H38</i>	The possibility to provide feedback on the generated and/or consumed energy positively affects local support for and acceptance of a local renewable energy organisation.	53	3 >	4,08	0,86	Confirmed

*Detailed analysis that supports the conclusions on H36 until H38:*

**H36/37** Due to distinctive visible attributes of certain renewable energy technologies, the concept of renewable energy becomes tangible and is often seen as a vehicle to boost local publicity (Zomer 2012a, Tekelenburg 2012, Kwast 2012, Gort 2012 and Stokman 2012). In addition, visibility of in particular micro applicable technologies such as photovoltaic panels stimulates neighbours or community members to consider procuring such technology as well (Stijkel 2012 and Haverkamp 2012). However, a few statements level out the initial mentioned merits. First, some people perceive visible technologies as ugly or anaesthetic (Kiewiet 2012). Secondly, a visible technology is not necessarily related with a specific local renewable energy organisation (Tekelenburg 2012 and Heijden 2012), so a local renewable energy organisation might on the one hand benefit or suffer from the fluctuations in public

opinion concerning renewable technologies. On the other hand, unless communicated clearly, a realised project is not always related to the efforts of a local renewable energy organisation. Third, local support resulting from visible technologies might differ between various renewable technologies. Geothermal or biomass installations lack the distinctive visible features that solar or wind technologies possess and therefore visibility is generally considered less important for these technologies (Verschuur 2012). Furthermore, Botman (2012) and Goederen (2012) emphasise that visibility has had a positive affect for their solar projects but rather provokes malignant reactions when wind turbines are concerned. When limiting the analysis to solar technologies (including the six organisations that primary focus on solar technologies and three others which mentioned to initiate solar projects as additional or temporary projects), the average score extends to 4,33 with a standard deviation of 1,12. The average score on visibility calculated for the four wind oriented organisation still reaches an acceptable 3,75 with a rather modest standard deviation of 0,96. Finally, the average score for biomass installations or heat extraction plants is just over three (3,34). Overall, empirical data confirms that the visibility of especially solar panels and wind turbine enhance the local support (H37). Despite some hints of the possible emergence of opposition for either wind or solar technologies, there is insufficient empirical ground to validate that visibility has a negative affect on local support (H38).

**H38** Feedback on the generated or consumed energy occurs in various forms through for example the annual energy bill (Kwast 2012, Gort 2012, Verschuur 2012, Kiewiet 2012 and Haverkamp 2012), an annual meeting of the members (Zomer 2012a, Dekens 2012 and Verschuur 2012), regular updates on the website or newsletter (Zomer 2012a, Verschuur 2012 and Stokman 2012), smart meters (Tekelenburg 2012 and Stokman 2012), personal contact through an office (Verschuur 2012, Haverkamp and Stokman 2012) or more abstract through enabling members or costumers to share their experiences with others (Heijden 2012 and Stijkel 2012). However, Tekelenburg (2012), Botman (2012) and Heijden (2012) express some scepticism in regard to feedback. Feedback might be too exaggerated since only a fraction of our society is aware and willing to understand or publicly share their energy consumption (Tekelenburg 2012 and Botman 2012). Furthermore, additional investments are necessary in order to monitor the energy production, which are often not worthwhile (Heijden 2012)<sup>32</sup>. Despite the various possibilities to provide feedback and the expressed scepticism on feedback, Dekens (2012), Botman (2012), Gort (2012) and Kiewiet (2012) acknowledge that the possibility of feedback neither has a positive nor negative influence on the local support. However, the other interviewees proclaimed that feedback has a positive affect on the local support. This is reinforced when the significant average score and temperate standard deviation are considered. Consequentially, there is enough empirical evidence to justify that the possibility to provide feedback on the generated and consumed energy positively affects local support.

#### *4.2.4 Explaining the assessment of the applied renewable technology*

Choosing a preferred renewable technology depends on which factors are included during the assessment and is dominated by weighting certain technological and economical attributes. The founding of a local renewable energy organisation might be challenged by a negative assessment on either or both its technological and economical attributes. Where the expected influence of diverse technological characteristics on the assessment of the applied renewable energy technology is discussed in the first section, the second section concentrates on the anticipated impact of economical characteristics.

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<sup>32</sup> Enabling members of costumers to share their experiences is a rather low cost possibility to provide feedback and is therefore practiced by CA (Heijden 2012).

#### 4.2.4.1 The role of technological characteristics

The possibility to provide feedback on the generated and/or consumed energy, the possibility to connect a project to the grid as well as the reliability and visibility of the technology are technological characteristics that are hypothesised to affect the assessment on the applied renewable energy technology. The indicators and the conclusions in regard to the predicted impact of these technological characteristics on the assessment of the applied technology are demonstrated in table 4.14.

<i>Hypotheses regarding the technological characteristics</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H39</i>	The possibility to provide feedback on the generated and/or consumed energy positively affects the assessment of the applied technology.	41	3 >	3,15	0,55	Rejected
<i>H40</i>	A proven and reliable technology has a positive affect on the assessment.	59	3 >	4,54	0,66	Confirmed
<i>H41</i>	Visible technologies improve the awareness of the local renewable energy organisation and positively affect the assessment of the applied technology.	49	3 >	3,77	0,93	Confirmed
<i>H42</i>	The possibility to connect the project to the grid positively affects the assessment of the applied technology.	39	3 >	3,00	0,00	Rejected

*Detailed analysis that supports the conclusions on H39 until H42:*

**H39** Only Zomer (2012a) mentioned that the possibility to provide feedback was considered during the assessment of the applied technology. The other twelve cases did not incorporated feedback opportunities in their assessment to establish which technology to apply. This consistency is reflected in a significantly low standard deviation and a marginal positive deviation in the average score. Remarkably, apart from AV, the eight interviewees, which stated that feedback is an essential element to improve local support (H40), none has considered feedback possibilities during the assessment which technology to apply. When reflecting on this remarkable observation and including the slightly positive outcome of the average score and the significant low standard deviation one has to conclude that there is insufficient empirical evidence to conclude that the possibility to provide feedback is considered during the assessment of the applied technology. Consequentially, sufficient empirical grounds to confirm a hypothesised positive influence on the assessment is lacking and therefore the assumed positive impact of the possibility to provide feedback on the assessment is rejected despite a slightly positive average score.

**H40** Reliability of a renewable technology is understood in various manners. Reliability can be perceived in terms of quality (Dekens 2012, Heijden 2012, Kiewiet 2012, Haverkamp 2012 and Stokman 2012), continuity or consistency (Kwast 2012, Goederen 2012, Gort 2012 and Verschuur 2012) or a proven technology (Botman 2012, Gort 2012 and Stijkel 2012). Reliability in terms of quality is vital since local renewable energy organisations are a relatively new concept, which are often confronted with scepticism. When being challenge by failing technology will have a detrimental affect on their reputation and therefore quality is a frequently heard argument. Curiously, reliability expressed in terms of quality is exclusively

mentioned in relation to solar technologies. Apparently, the quality of solar panels fluctuates, where this seems not much of an issue for other technologies such as wind turbines or biomass installations. For the latter two technologies, reliability understood in terms of continuity or consistency tends to be more relevant. However, when the technology of a project fails or breaks the output and return of the project drops as well. Therefore, with a more pragmatic understanding of reliability, one might prefer solar technology to wind technology since the breakdown of one solar panel is less severe than one wind turbine. Hence, reliability is improved when segregating or diversifying the output. However, a critical remark on reliability in terms of continuity or consistency is that renewable technologies depending on wind (or sun) are inherently unreliable since their output relies on the amount and presence of the source (Botman 2012). Nonetheless, reliability in general is a frequently assessed feature prior to application of the technology, which is clearly reflected by the highest average score amongst all the hypotheses. Complemented with a significant low standard deviation, there is significant empirical evidence to firmly validate that a proven and reliable technology has a positive affect on the assessment.

**H41** Where insulating residences is more efficient and more effective than (collectively) procuring renewable energy technologies (Botman 2012), the majority of the local renewable energy organisations concentrates on collectively procuring renewable energy technologies or generating renewable energy. Visibility and the associated symbolic benefits are a commonly stressed argument to procure renewable energy technologies. As is already elaborated upon in different contexts (H23, H24, H38 and H39), the tangibility and generated publicity are important considerations to opt for visible technologies. Both tangibility and publicity improve the local awareness concerning the existence and goals of a local renewable energy organisation<sup>33</sup>. When analysing the answers regarding the visibility of solar panels, the average score increases to 4,17. Visibility as a distinct aspect during the assessment of other technologies was evaluated significantly lower. The average score for wind remained roughly equal (3,75) and dropped significantly to just 3 for biomass or geothermal installations. Consequentially, there is enough empirical ground, with a bias towards photovoltaic panels, to justify that visible technologies have a positive affect both the awareness and the assessment.

**H42** Where the privatisation of the energy market in the Netherlands concentrated on the production of energy, the distribution and management of the grid is yet under public control. According to the Dutch energy law, every energy producer has the right to use the grid. However, besides collectively owning a renewable energy facility as a financial asset, the collective operation, generation and consumption of renewable energy is currently only legally possible on a micro, i.e. household level. When considering the above situation, hypothesising whether the possibility to connect a project to the grid is irrelevant. The incompatibility of this hypothesis is also reflected in the average score and standard deviation. The majority emphasised the irrelevance of the question and in some occasions the question caused confusion. Therefore, it has to be concluded that this hypothesis is irrelevant for the Dutch situation and that there is no empirical grounds to validate it.

#### *4.2.4.2 The role of economical characteristics*

Besides the previously discussed technological attributes, various economical characteristics are also hypothesised to affect the assessment of the applied renewable energy technology. Among the economical features are the dependency on multiple financial sources to finance the procurement of the preferred technologies, the initial investment costs, the pay back period and the quantity of produced energy or number of members, which determines the cost

<sup>33</sup> Recall that during the analysis of H38 and H39, Tekelenburg (2012) and Heijden (2012) emphasised that the realisation of a project is not necessarily related to the local renewable energy organisation.

effectiveness of an organisation. The results related to the impact of these economical features on the assessment of the applied renewable energy technology, are shown in table 4.15.

<i>Hypotheses regarding the economical characteristics</i>		<i>Total score</i>	<i>Hypothesized score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Conclusion (confirm or reject)</i>
<i>H43</i>	Depending on multiple financial sources to finance the selected renewable technology negatively affects its assessment.	46	< 3	3,54	0,78	Rejected
<i>H44</i>	The initial investment cost is an important factor that is considered during the assessment. A low initial investment and has a positive effect on the assessment of the applied technology.	57	3 >	4,38	0,77	Confirmed
<i>H45</i>	The pay back period is an important factor that is considered during the assessment. A short pay back period (depends on efficiency and investment costs) has a positive effect on the assessment of the applied technology.	56	3 >	4,31	0,75	Confirmed
<i>H46</i>	Small projects in terms of output experience difficulties with becoming cost effective, which negatively affects the assessment of the applied technology.	49	<3	3,77	0,83	Rejected

*Detailed analysis that supports the conclusions on H43 until H46:*

**H43** Local renewable energy organisations that facilitate the collective procurement of individual photovoltaic panels commonly do not depend on external financial funds since the members or end-users procure (or lease, Kiewiet 2012) and own the solar panels (Tekelenburg 2012, Heijden 2012 and Stokman 2012). Consequentially, with every new member, the number of installed panels can potentially be increased (Heijden 2012). In general, organisations focusing on solar technologies expressed that the lack of dependency on external funds was an important feature that positively affected the assessment (Tekelenburg 2012, Heijden 2012, Stijkel 2012 and Kiewiet 2012). However, larger projects like wind turbines are generally too expensive to be solitary financed by community members and therefore an external investor or bank is necessary (Zomer 2012a, Botman 2012, Gort 2012 and Verschuur 2012). Furthermore, the development costs for bigger projects are larger, which yield an enhanced financial risk in case a large project is terminated (Botman 2012). Despite the prerequisite of attracting external capital to finance larger projects, which enhances the dependency on these external investors, respondents mentioned that this dependency did not negatively affect the assessment. This is verified when isolating the individual scores of the seven organisations not primary focusing on solar, resulting in an average score of 3,14 and standard deviation of 0,34. Therefore there is not enough empirical basis to validate that the dependency on external financial sources has a negative affect on the assessment.

**H44** The initial investment cost is frequently considered during the assessment. This is clearly reflected in the significant average score and relatively consistency between the answers indicated by the standard deviation. A couple organisations stated that a lower initial investment enables to strengthen their business case (Dekens 2012, Goederen 2012, Heijden 2012 and Kiewiet 2012). However, whether initial investments dropped enough to enable a profitable business case is perceived differently since Kwast (2012) indicated that a sound business case based on solar or wind technologies is not yet possible. Although the latter aspect mainly depends on

perception and calculations, there is sufficient empirical evidence to conclude that the initial investment cost is considered during the assessment and that a lower investment cost has a positive affect as well.

- H45** Besides the initial investment cost, the payback period of the potential technology is generally also incorporated in the assessment. Since the payback period partially depends on the height of the initial investment, most organisations include both economic indicators in their assessment. However, aside from the initial investment cost, potential revenues also determine the payback period. As is elaborated in footnote 11, as long as a solar panel does not produce more energy than the owner consumes, the price for a generated kWh is higher than when excesses are exported to the grid. Therefore a crucial aspect that determines the payback period and the (economical) assessment is the possibility to deduct the amount of generated energy from one's total energy bill and the amount of energy a household consumes annually. Since this is legally permitted for individual households up to a certain level of kWh in the Netherlands, the payback period for average households investing in micro technologies such as solar panels is relatively low (Tekelenburg 2012, Goederen 2012, Heijden 2012, Kiewiet 2012 and Stokman 2012). For larger projects that depend on external funds, the payback period is an important indicator as well (Botman 2012, Gort 2012 and Verschuur 2012). Considering this, there is sufficient empirical ground to conclude that the payback period is incorporated during the assessment and that a short payback period has a positive affect on the assessment.
- H46** In order to determine whether the amount of produced energy, i.e. capacity of the project, has an influence on the cost effectiveness of the project, the interviewees are first asked to what extent the capacity of the applied technology has had a positive or negative impact on the generated revenues of the organisation. Obviously, it became clear that a bigger project in which more energy is generated or technologies are procured and sold through an organisation has a positive impact on the revenues. GP for example receives ten euro for each sold solar panel and NHEC and TB earn more when their costumers demand more energy (Haverkamp 2012 and Verschuur 2012). However, since several local renewable energy organisations often pursue more than one business model simultaneously, sometimes the profitability is undermined. This situation might occur when an organisation on the one hand enables the collective procurement of renewable energy for which it often receives a margin of the consumed energy and on the other hand stimulates energy efficiency (Botman 2012) or individual generation through solar panels (Kiewiet 2012), which decrease the consumed energy. Similarly, TB, NHEC and GP have a licence to deliver energy and receive more revenues if the demand for energy increases. However, besides delivering energy they deploy other activities that reduce the energy demand of their members and costumers, which interferes with the profitability (Verschuur 2012, Haverkamp 2012 and Stokman 2012). Despite the vital importance of generating a profit in order to sustain the organisation, the organisations often emphasised that transforming the energy market is their main objective. Secondly, the interviewees are asked to what extent the capacity of the applied technology determined the assessment. Guided by the average score, the majority of the respondents acknowledged that the capacity of the applied technology was considered during the assessment. Curiously, when concentrating on the scores of organisations primary focusing on wind turbines, their average score increases to 4,75, indicating the relative importance of the large capacity of wind turbines on their assessment. Despite these findings the interviews did not provide enough data and insights to confirm that projects determined by a limited capacity experience difficulties with becoming cost effective, which in turn was expected to have a negative effect on the assessment.

### 4.3 Analysing the main hypothesis

Where the primary assessment focuses on testing the 46 individual hypotheses, which are based on the explanatory variables that theoretically influenced one or more steps in the founding process, this section elaborates on testing the main hypothesis, which focuses on the impact of each of the four steps on the founding of a local renewable energy organisation. In order to determine whether the impact of one of the four steps is significant to the establishment of a local renewable energy organisation is judged on the overall influence of the corresponding explanatory variables.

Prior to examining the four steps of the founding process separately, first the main hypothesis is recalled, which is stated in paragraph 2.4 and is formulated as follows: The appearance of one or several occasions to establish a local renewable energy organisation, an unconstrained positive local perception of the merits or disadvantages of a local renewable energy organisation, the presence of local support and acceptance regarding a local renewable energy organisation and an advantageous assessment of the technological and economic features of the applied renewable technology improve the chances of founding a (professional) local renewable energy organisation.

First, each interviewee expressed that at least three explanatory variables were determinant for the occasion to establish their local renewable energy organisation. However, on average the respondents acknowledged that a minimum of seven, out of the total fourteen possible variables, have had an impact on the occasion to establish their organisations. When considering that from the fourteen tested hypotheses five hypotheses are rejected, indicates that the remaining relevant explanatory factors provide enough empirical validation to verify that the appearance of several occasions improves the possibility of establishing a local renewable energy organisation.

Second, four different external parties, the visibility of the applied technology and the degree of social cohesion within the communities are hypothesised to be of influence on the local perception. From the interviews it became clear that at least two of these actors or aspects had a positive impact on the local perception. On average organisations expressed to have experienced a positive impact of minimal three of these actors or aspects in regard to their local perception. Alternatively, the majority of the organisations expressed none of the actors or aspects had a negative impact. However, several did experience some opposition, which commonly had a detrimental impact on their local perception. In total just two hypotheses are rejected and consequentially eight are confirmed. Although the negative impact of local opposition was confirmed, the hypothesised negative impact of visible technologies was rejected. Furthermore, the degree of social cohesion tends to relate with the extent of local perception within the community (H15) and consequentially, the transformation of information within a community concerning decentralised generation in general or a local renewable energy organisation in particular, affects the degree of local perception. According to the empirical findings, in general several actors or aspects positively affect the local perception and hence contribute to the formulation of an unconstrained positive local perception of the merits regarding the concept of local renewable energy organisation.

Third, in general respondents acknowledged that at least nine of the discussed explanatory variables had a positive impact on their local support. Furthermore, on average they disagreed with the possible positive impact of just three factors. This resulted in the rejection of four hypotheses, where the remaining eleven hypotheses are confirmed. Moreover, as is briefly discussed in H31, the degree of local support ranged from poor to intense between the cases. Despite the observation that some organisations are characterised by low or poor levels of local support, the majority of the organisations expressed to benefit from at least some local support. Consequentially, the empirical results verify that the presence of local support and acceptance is vital for the founding of a local renewable energy organisation.

Fourth, the respondents generally agreed that about half of the technological or economical attributes have had a positive impact on their assessment of the applied technology. Contrary, the other attributes were regularly not perceived to have had a negative impact or were not

considered at all. This resulted in the confirmation of four hypotheses and rejection of the remaining four. However, the attributes incorporated in the assessment positively determine the assessment of the selection of the applied renewable technology. Therefore an advantageous assessment of the empirically confirmed technological and economic features of the applied renewable technology improves the chances of founding a local renewable energy organisation.

Finally, considering the confirmation of the positive impact of four separate steps in the founding process on the possibility to establish a local renewable energy organisation, it can be stated that there is enough empirical ground to verify the validity of the main hypotheses.

#### 4.4 Supplementary analysis

Although the questions constituting the interview are based on the theoretical impact of the explanatory variables, the interviews provide supplementary insights on possible relations between certain organisational attributes and several explanatory variables, which initially are unanticipated. Gathered data on the organisational attributes therefore can contain unexpected valuable insights of which some are implicitly stated or accentuated during the primary analysis. This part of the analysis attempts to unveil or verify these unexpected relations between on the one hand the organisational characteristics and the other hand the evaluated average scores on certain explanatory variables.

This paragraph explores variation in the following organisational features. To begin with geographical differences in terms of rural and urban situated organisations are examined in the first section, which is succeeded with variation in the number of (paying) members. Variation in organisational arrangements is discussed in the third section, which is followed by the final section elaborating on the differences between the primary harvested renewable sources.

##### 4.4.1 Explaining differences between rural and urban organisations

The sample contains several local renewable energy organisations that are active within considerable urban municipalities that have over 150.000 inhabitants<sup>34</sup>. For example, AV and OE focus on the municipality of Amsterdam, EU deploys its activities within the municipality of Utrecht, de-A is situated in the municipality of Apeldoorn and GP concentrates mainly on the municipality of Groningen. On the other end of the spectrum ZO, LE, TB and AEC are located in more rural municipalities with less than 40.000 inhabitants. Additionally, the 28 farmers participating with BZB are generally situated in rural areas as well. However, categorising CA, ZET and NHEC proved more difficult since the municipality of CA has around 35.000 inhabitants but is located in a rather suburban region. Contrary, Zutphen is situated in the east part of the Netherlands in a rather rural region but has 47.000 inhabitants. Finally, NHEC focuses on a provincial level instead of a municipal level. To amplify potential contrasts between urban and rural oriented organisations, the latter three organisations are excluded from this part of the analysis. The differences in average scores between rural and urban situated organisations, which are greater than one are shown in table 4.16 and further elaborated upon below.

Significant higher scores for:	Hypotheses		Degree of deviation
Rural organisations	H5	Inconsistent policies discourage the appearance of an occasion to establish a local renewable energy organisation.	2,00
	H10	Renewable energy technologies provide a sense of	1,40

<sup>34</sup> An overview of the number of inhabitants and the dimensions in square kilometres is derived from: <http://home.planet.nl/~pagklein/gemprov.html> on the 18<sup>th</sup> of May 2012.

		independency from conventional energy corporations and thus support the appearance of an occasion to establish a local renewable energy organisation.	
	H11	Renewable energy technologies provide a sense of independency from energy producing countries and thus support the appearance of an occasion to establish a local renewable energy organisation.	1,40
	H15	A high level of interconnectedness within a community (which entails interpersonal trust, social capital building and knowledge transfer) improves the local perception of local renewable energy organisations.	1,20
Urban organisations	H6	Dissatisfaction arising from a prolonged period of inconsistent policies encourages the emergence of an occasion to establish a local renewable energy organisation.	2,00
	H23	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect the local perception.	1,20
	H24	Visible technologies stimulate local opposition (NIMBYism), which negatively affect local perception.	1,20
	H46	Small projects in terms of output experience difficulties with becoming cost effective, which negatively affects the assessment of the applied technology.	1,40

First, during the primary analysis, it was emphasised that inconsistent policies (H5) tend to have more impact on projects enabling households to procure and individually own renewable energy technologies, which frequently concerns solar technologies. The significant difference observed by this hypothesis might therefore be explained by the observation that four out of the five rural organisations primary focus on solar energy, where only one urban organisation is primary oriented on solar technologies. In addition, three rural organisations mentioned to have been granted one or more subsidies of which two have actually received just a fraction after investing a significant amount of effort to acquire it. Although the data indicates a significant relation between inconsistent policies and subsidies and rural located organisations, an explicit explanation is lacking and therefore a bias towards solar oriented organisations seems more likely.

Second, the ambition to become less dependent on either vested energy corporations (H10) and energy exporting countries (H11) is expressed as a greater motivation for the establishment of rural local renewable energy organisations in relation to urban situated ones. A possible clarification, which is briefly mentioned during the primary analysis of H13, insinuate that rural regions in the Netherlands experience difficulties regarding their liveability in terms of decreasing population, less funds for public facilities and low economical activity (Dekens 2012 and Tekelenburg 2012). Furthermore, several initiators mentioned that establishing a local renewable energy organisation is a method or a vehicle to alleviate the adverse affects of a diminishing liveability or fuel the local economy through capturing and locally recirculating a proportion of the energy related revenues instead of allowing it to merely benefit distant corporations or countries. Therefore, dependency on either energy corporations or energy exporting countries could be an additional and valuable motivation for the establishment of a rural local renewable energy organisation.

Furthermore, based on the answers provided by the respondents, the degree of social cohesion in rural communities is generally stronger than in urban communities, which is also expressed in the average scores concerning the theoretical relation between social cohesion and the local perception of a local renewable energy organisation (H15). This bias could be explained by a higher degree of social cohesion, which improves the transfer of knowledge or information concerning the existence, motivation, goals or achievements of a local renewable energy organisation. Curiously, rural organisations also tend to benefit from higher levels of local support (H31), which might be a complementary result of an increased level of social cohesion.

As is elaborated upon in H6, organisations are considerably divided whether a prolonged period of inconsistent policies provides a serious occasion for the establishment of local renewable energy organisation. Based on the segregation between urban and rural organisations in this data set, it becomes clear that the initiators of urban organisations are stimulated stronger by this factor. However, a clear explanation for this observation is not straightforward.

Additionally, this data set also indicates that urban located organisations emphasise a greater importance concerning the impact of visible technologies on the local perception of local renewable energy organisations (H23 and H24). Although not explicitly mentioned by any of the organisations, this might be explicated by the fact that visible technologies within urban areas are observed by more people and therefore the assumed ‘sustainable’ or ‘green’ image (H12) reaches more people and might influence the perception of a larger public, which seems a valuable feature for urban organisations since their local support proved to be less than that of rural organisations based on the empirical data (H31).

The final variation in average scores between urban and rural located organisations concerns the capacity of the applied technology. The empirical results in this data set suggest that urban organisations incorporate the capacity of a certain technology more often in the assessment on the applied technology than rural organisations. However, as is discussed in the primary analysis of H46, a bias towards wind oriented organisations seems more likely since the sample of urban organisations includes three organisations primary focusing on wind energy where none of the rural organisations intend to concentrate on wind energy.

#### 4.4.2 Explaining differences in organisational dimensions

Besides variation in the responses of urban and rural organisations, differences in the average scores of small and large organisations, in terms of number of paying members, could also provide additional interesting insights. Categorising the cases according to the number of sympathisers, paying members or costumers is discussed in paragraph 3.2. Based on the justification of this categorisation the number of paying members is used to classify the participating cases. Consequentially, where ZO, CA and ZET have less than 100 members and are specified as small organisations, AV, de-A, BZB, NHEC and GP have at least 400 members and are classified as large organisations. The quantity of members of the remaining organisations ranges between the 200 and 260 and therefore are too numerous to be classified as small and too little too to be classified as large organisations.

Although, the category ‘small organisations’ contains only three organisations, which moderates the validity of the statements, this analysis merely compares the average scores of the former category with the average scores of large organisations since the purpose of this supplementary analysis is to amplify major differences. The average scores of the corresponding hypotheses that show the most considerable difference between small and large organisations are displayed in table 4.17 and further discussed below.

Significant higher scores for:	Hypotheses		Degree of deviation
Small organisations	H8	Long and bureaucratic procedures to obtain permits or permissions prevent the occurrence of an occasion to establish a local renewable energy organisation.	1,40
	H25	Co-ownership of locals improves local support for and acceptance of a local renewable energy organisation.	1,40
	H28	Extensive internal knowledge concerning decentralised generation creates a barrier between the organisation and its (potential) members or costumers and therefore decreases local support for and acceptance of a local renewable energy organisation.	1,27
	H44	The initial investment cost is an important factor that is	1,20

		considered during the assessment. A low initial investment and has a positive effect on the assessment of the applied technology.	
	H45	The pay back period is an important factor that is considered during the assessment. A short pay back period (depends on efficiency and investment costs) has a positive effect on the assessment of the applied technology.	1,20
Large organisations	H7	Dissatisfaction with the incompetence of the national government to meet their environmental targets enhances the emergence of an occasion to establish a local renewable energy organisation.	1,13
	H9	The possibility to exploit a local renewable source that matches local demand provides an occasion to establish a local renewable energy organisation.	1,80
	H22	Long and bureaucratic procedures to obtain permits or permissions negatively effect the local perception of establishing a local renewable energy organisation.	1,40

As is formerly discussed, classifying the sample in smaller categories reduces the validity of the results. In light of this and due to the relative small sample size of the organisations defined as small, the differences between the averages scores of both categories might be ambiguous since the average score of a small number of evaluations is highly vulnerable to the impact of an outlier. This is clearly demonstrated in H8 where the average score of the category containing small organisations is determined by one outlier (ZET). Alternatively all other organisations either small or large perceived this hypothesis completely differently in comparison to the outlier. Moreover, the difference shown in H7 is caused by a similar situation. Furthermore, H28 tested the theoretical negative impact of substantial internal expertise on the local support. The variance shown in table 4.17 includes the scores of all organisations, irrespective of their indicated degree of internal expertise. When only considering the organisations that indicated to possess significant internal expertise, the variation between small and large organisations drops to an insignificant degree (0,5). As a consequence the visualised variations of these hypotheses are not further elaborated upon.

Despite the irrelevance of the variation observed in H7, H8 and H28, the disparities visualised in the other observations are more valuable. First, small organisations all firmly emphasised the importance of co-ownership of their members in relation to their degree of local support, where large organisations seems to be divided on this aspect. An explicit explanation is not evident from the data. However, a clarification might be found in the social context since ownership is shared between more members and as a result membership might become less personal. In addition, differences in organisational arrangement might illuminate the variation in co-ownership between small and large organisations as well.

Second, the data suggest that economic indicators (H44 and H45) are considered more important during the assessment of the applied technology for small organisation in comparison to large organisations. Once more, a logical explanation for this observation is absent. However, when concentrating on the differences in business models between the two categories, it becomes apparent that the small organisations mainly focus on the collective procurement of renewable energy or technologies, where large organisations seem to have shift their attention towards the delivery and (collective) generation of renewable energy. Consequentially, a possible justification for the variation of incorporating the initial investment and payback period in the assessment of the applied technology might be found in the various business models that are applied.

Based on the results of this data set, large organisations more often emphasise that the possibility to exploit a local renewable source that matches local demand was a motivation to establish their local renewable energy organisation (H9). In addition to this observation, the analysis on H9 in the previous section, also convincingly links this explanatory variable to the primary renewable source on which an organisation focuses, in particular biomass and wind energy. However, wind or biomass projects commonly are bigger projects in comparison to

solar projects and therefore require more funds, participants and costumers to realise. Furthermore, these projects tend to produce more output for which local demand is necessary. Therefore, a relation between the size of an organisation on the one hand and the possibility to exploit a renewable source that matches local demand on the other seems a valuable complementary explanation to the variation observed in H9.

Finally, large organisations expressed that bureaucratic procedures had a less negative impact on the local perception of their organisation in relation to small organisations (H22). Here again, similarities in business models between these two categories could provide a clarification. As observed in the preceding, small organisations commonly concentrate more on collective procurement of renewable energy or technologies and in the long-term on the collective generation of renewable energy. The latter business model frequently is pursued by newly established local renewable energy organisations. However, in the process of establishing their organisations this initial business model has to be altered since it is legally not possible in the Netherlands. When initially communicating the possible merits of a business model that is legally not possible, might provide an explanation for the observed bias regarding the negative impact of bureaucratic procedures on the local perception of small organisations.

#### *4.4.3 Explaining differences in organisational arrangement*

There is a diverse spectrum of organisational arrangements that each has its possibilities and limitations depending on the underlying goals or motivations of a future organisation, which are briefly discussed in paragraph 3.2. Consequentially, the organisational arrangements in which local renewable energy organisations appear differ as well. However, the organisational arrangements of local renewable energy organisations, which are founded by civilians, show a considerable bias towards a cooperative structure. Furthermore, to a lesser extent some choose to organise their activities through a foundation, where corporate arrangements are rare.

When segregating the cases according to their organisational arrangements, nine of the organisations have chosen a cooperative form, three cases organise their activities through a foundation where only TB selected a corporate form. Since the former two are the most favoured arrangements, the analysis solitary concentrates on the remarkable differences in average scores between these two organisational arrangements.

Based on fundamental differences in ownership and democracy between a cooperative arrangement and a foundation, one might expect to find significant difference in the average scores of both arrangements concerning the impact of co-ownership (H25) and open participation (H26) on the local support. Despite minor variation<sup>35</sup> favouring a cooperative structure for both hypotheses, the empirical results failed to provide a significant spread between cooperative structured organisations and foundations. Generally, the averages scores between the two organisational arrangements are remarkably similar. Despite the consistency amongst the average scores, the data provide one significant difference in H9, which indicates that the occasion to establish a foundation is generally more affected by the possibility to exploit a local renewable source that matches local demand. However, as discussed earlier, the variation in H9 is more likely to be explained by size of an organisation and the primary renewable source exploited by the organisation. Consequentially, segregating the cases based on their organisational arrangements failed to provide valuable supplementary findings.

#### *4.4.4 Explaining differences concerning a primary renewable resource*

The last component of the supplementary analysis concentrates on the difference in average scores based on the primary renewable resource on which an organisation focuses. Four different renewable sources are present across the thirteen cases of which solar (six) and wind (four) constitute the majority. The remaining three organisations either extract energy from

<sup>35</sup> The variation is 0,78 and 0,89 for respectively H25 and H26.

biomass (de-A and NHEC) or drinking water (TB). Since both are too small to form separate classes, this section of the supplementary analysis merely focuses on the variation between solar and wind oriented organisations and were relevant emphasises the difference with the latter two categories. The most significant variations in average scores between organisations attuned to solar and wind energy are shown in table 4.18 and are further elaborated upon below.

Significant higher scores for:	Hypotheses		Degree of deviation
Solar organisations	H5	Inconsistent policies discourage the appearance of an occasion to establish a local renewable energy organisation.	1,42
	H10	Renewable energy technologies provide a sense of independency from conventional energy corporations and thus support the appearance of an occasion to establish a local renewable energy organisation.	1,58
	H11	Renewable energy technologies provide a sense of independency from energy producing countries and thus support the appearance of an occasion to establish a local renewable energy organisation.	1,17
	H13	A potential symbolic benefit in terms of the enhancement of social cohesion within a community provides an occasion to establish a local renewable energy organisation.	1,25
	H15	A high level of interconnectedness within a community (which entails interpersonal trust, social capital building and knowledge transfer) improves local perception of local renewable energy organisations.	1,33
Wind organisations	H6	Dissatisfaction arising from a prolonged period of inconsistent policies encourages the emergence of an occasion to establish a local renewable energy organisation.	1,33
	H7	Dissatisfaction with the incompetence of the national government to meet their environmental targets enhances the emergence of an occasion to establish a local renewable energy organisation.	1,17
	H9	The possibility to exploit a local renewable source that matches local demand provides an occasion to establish a local renewable energy organisation.	1,42
	H46	Small projects in terms of output experience difficulties with becoming cost effective, which negatively affects the assessment of the applied technology.	1,42

When considering the hypotheses presented in table 4.16 and table 4.18, a substantial overlap becomes apparent. This is caused by the fact that out of the six organisations primary focusing on solar technologies, five are previously defined as rural. In addition, from the four organisations attuned to wind energy, three are classified as urban. However, analysing the data from a different perspective, i.e. primary source instead of geographical differentiation, might provide other valuable insights.

First, when isolating the evaluated scores of solar oriented organisations in regard to hypothesis five, the average score appears greater than three, which insinuates that the emergence of an occasion to establish a solar oriented organisation is commonly perceived to be obstructed by inconsistent policies or subsidies. Although, variation in either rural situated organisations as organisations attuned to solar energy both showed a significant relation with the discouragement of establishing a local renewable energy organisation arising from inconsistent subsidy policies, this bias is more likely to be explained by the preference of a primary renewable resource than the reality of being located in a rural area.

Secondly, although the explanation for the deviation regarding the independency from energy corporations (H10) and energy exporting countries (H11) can partially be derived from a distinction between rural and urban located organisations, the bias towards solar oriented organisations demonstrated in table 4.18 might complement the former observation. Tekelenburg (2012), Heijden (2012), Kiewiet (2012) and Stokman (2012) mentioned that the applicability of solar panels is one distinctive feature that distinguishes it from other renewable technologies. In other words, due to the relative easy and versatile applicability of solar panels, the realisation of a solar project is perceived to be less complicated than realising for example a wind project. In addition, installing solar panels is relatively easy and can be done by a local installation business without relying on external and specialised organisations. Consequentially, pursuing a greater degree of independency might partially be explained by the observation that the establishment of a rural organisation is often stimulated by the urgency to alleviate a decreasing liveability or aim to economically develop their region. In order to improve liveability or economic development these organisations might prefer solar technologies to other technologies due to its versatile and relative easy applicability.

Third, the enhancement of the social cohesion in a region as the motivation to establish a local renewable energy organisation is generally acknowledged by both wind as solar oriented organisations (H13). However, the difference is partially due to a negative response of one organisation attuned to wind energy. Furthermore, all solar oriented organisations firmly acknowledged that improving social cohesion is an important argument for their establishment, which further extends the variation between the two categories. Despite the significant variation an explicit explanation based on the empirical results remains absent.

Fourth, this data set indicates a positive relation between the degree of social cohesion within the solar oriented organisations and the local perception towards local renewable energy organisations (H15). Here again, there is no explicit relation between the degree of social cohesion and solar oriented organisations. Alternatively, the observation that solar oriented organisations commonly are located in rather rural regions tends to be a more suitable explanation for the deviation concerning the local perception toward the concept of local renewable energy organisations.

Remarkably, where the emergence of an occasion to establish a solar oriented organisation is commonly perceived as more obstructive by inconsistent subsidies (H5), the motivation to establish a local renewable energy organisation due to dissatisfaction arising from a prolonged period of inconsistent policies (H6) was a greater motivation for the founding of organisations attuned to wind energy. This might partially be explained by their increased dissatisfaction concerning the incompetence of the national government to meet their environmental targets (H7). However a clear and explicit explanation for this rather contradictory observation is not provided by the empirical data.

The possibility to exploit a renewable resource that matches local demand (H9) has formerly been linked to both large organisations and foundations. Where the former relation proved valuable and complementary as is discussed in section 4.4.2, the most convincing relation concerns the associated connection with the primary renewable source on which an organisation focuses. Through segregating the empirical data according to the various primary renewable sources exploited by the organisations, it became clear that there is empirical ground to validate this statement. When the evaluated scores of de-A, NHEC and TB are considered as well, the empirical data further strengthens the observation that the possibility to exploit or participate in a wind, biomass or geothermal project for which a local demand exists, proves to be an important occasion to establish an organisation attuned to these sources of renewable energy.

The final hypothesis that is examined considers the capacity of the applied technology (H46). Similar to H9, H46 has been linked to other variations as well. However, as has been discussed in detail previously, organisations embarking in wind projects indicate that capacity of a wind turbine has positively determined their assessment on the selection of the applied technology. Consequentially, a bias towards the targeted primary renewable source seems a more convincing explanation than a bias towards urban situated organisations.

#### 4.4 Revisions of several hypotheses for constructing a survey

While conducting the interviews it became clear that various respondents understood several aspects differently. Despite these varying interpretations, hypotheses H16, H19 and H40 are confirmed. However, to reduce the chances of misinterpretation during the survey, this paragraph illuminates on minor nuances and the formulation of supplementary hypotheses, which are listed in table 4.19.

First, hypothesis H16 centres on the potential influence of available external expertise or knowledge on the local perception towards a local renewable energy organisation. Besides available expert knowledge in terms of consultancy businesses, several respondents acknowledge that they had access to external expertise via organisations like e-Decentraal, Wij krijgen kippen, Provinciale Milieu Federaties, ODE and KNHM, which reduced the perceived complexities of establishing their organisations and therefore improved their local perception towards this phenomenon. Consequentially, hypothesis H16 is revised and a supplementary hypothesis (H16a) is formulated, which specifies external knowledge as organisations that enable the transfer of knowledge on decentralised generation.

Second, originally hypothesis H19 emphasised that external advice and experience provided by organisations that either install or supply renewable energy technologies was of influence on the local perception. However, during the interviews it became apparent that interviewees interpreted 'supplier' also in the context of an organisation that supplies renewable energy like for example Greenchoice, Trianel or Anode. With this in mind, an additional hypothesis (H19a) that centres on the advice and experience of a renewable energy supplier is added.

Third, the highest average score based on the evaluated answered was appointed to hypothesis H40. This achievement might be explained by the fact that reliability is perceived in varying manners, as is elaborated upon in detail in the section 4.2.4.1. To improve the data collection on this hypothesis during the survey, the concept of reliability is further segregated according to the various understandings expressed by the interviewees. A renewable technology is perceived reliable in terms of quality, continuity or consistency and proven or established. Therefore, three supplementary hypotheses are formulated in accordance to the expressed interpretations of reliability.

<b>Table 4.19 Revision and supplementary hypotheses</b>	
H16	Availability of external expert knowledge provided by consultancy businesses reduces the perceived complexity of establishing a local renewable energy organisation and thus enhances the perception on local renewable energy organisations.
H16a.	Availability of external expert knowledge, provided by organisations such as e-Decentraal, Wij krijgen kippen, Provinciale Milieu Federaties, ODE and KNHM, reduces the perceived complexity of establishing a local renewable energy organisation and thus enhances the perception on local renewable energy organisations.
H19a	The advice and experience of suppliers of renewable energy such as Greenchoice, Trianel or Anode influence the perception on local renewable energy organisations.
H40a	A reliable technology in terms of proven or established technology has a positive affect on the assessment.
H40b	A reliable technology in terms of a consistency and continuity has a positive affect on the assessment.
H40c	A reliable technology in terms of quality has a positive affect on the assessment.

#### 4.5 Conclusions

This chapter concentrated on answering, which identified explanatory variables foster or hamper the actual emergence and development of local renewable energy organisations in the Netherlands. This is pursuit through conducting thirteen in depth case studies with prominent Dutch local renewable energy organisations. The first paragraph summarises the finding of the primary analysis, which is succeeded by a conclusion on the main hypothesis. The last paragraph accentuates the most prominent findings of the supplementary analysis.

4.5.1 Conclusions on the primary analysis

The following variables are found to foster or hamper one or more steps of the founding process and thus determine the emergence and development of local renewable energy organisations. Figure 10 presents a graphical overview in which the confirmed hypotheses are represented by the arrows.

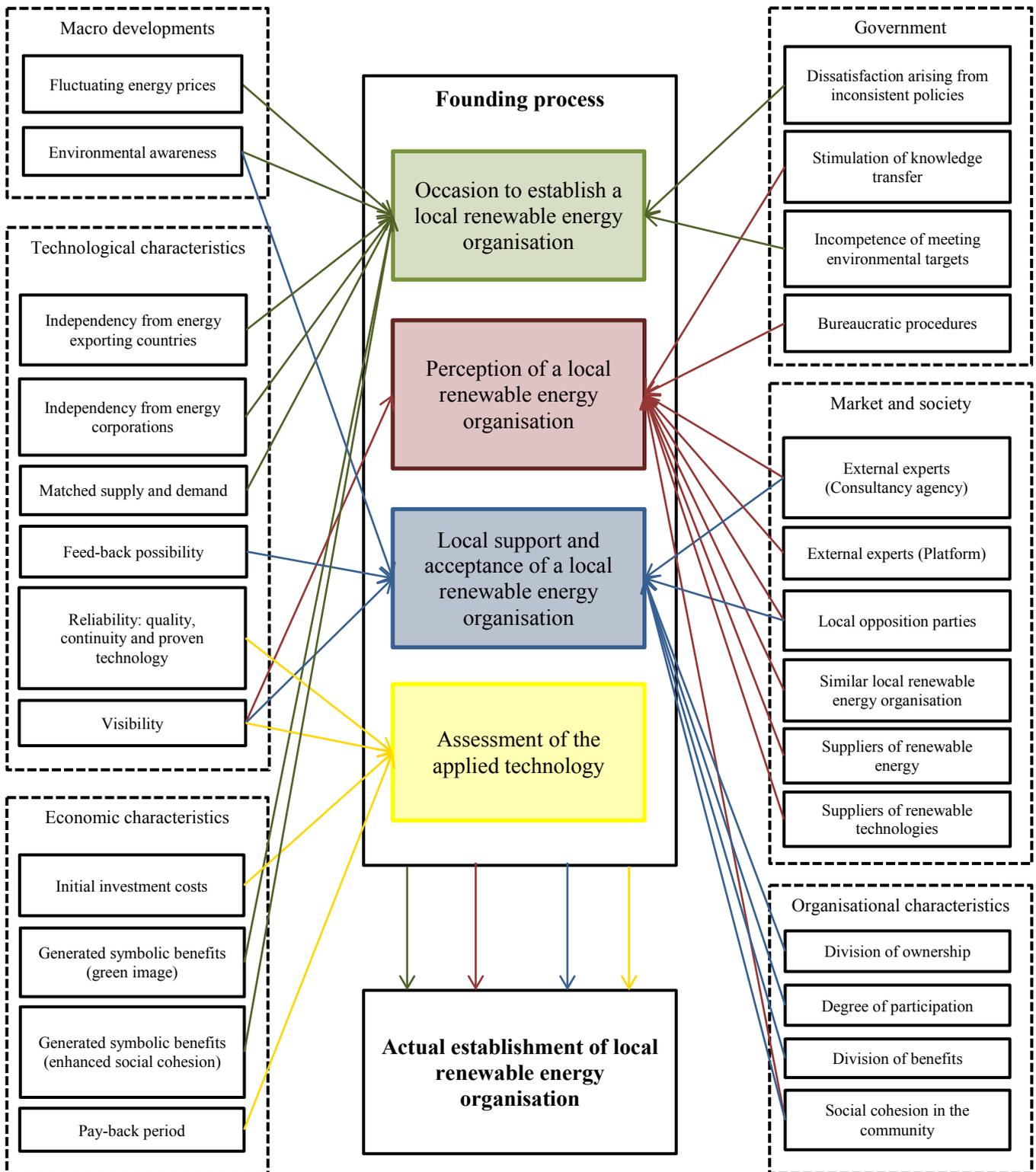


Figure 10: Revised integrated research model

In regard to the emergence of an occasion, the findings from the case study analysis confirmed that fluctuating energy prices and a high level of public environmental awareness are two vital variables from the macro context. In addition, dissatisfaction arising from a prolonged period of inconsistent stimulation policies and the incompetence of the national government to meet their environmental targets are relevant explanatory variables for the emergence of an occasion stemming from governmental interference. Besides, technological and economical characteristics are also found to foster the emergence of an occasion. In particular, the urgency to become independent from conventional energy corporations and energy exporting countries, the possibility to exploit a local renewable source that matches local demand and the symbolic benefits in terms of a green image and enhanced social cohesion are verified as vital variables for the appearance of an occasion to establish a local renewable energy organisation.

Furthermore, the empirical findings emphasise the crucial role of actors from the market and society in forming the local perception towards a local renewable energy organisation. Where on the one hand the availability of external expertise, other existing local renewable energy organisations and suppliers and installers of renewable energy technologies have a positive impact on the local support, the presence of local opposition is confirmed to have a negative affect. Besides actors from the societal and private sphere, governmental bodies are found to positively affect the local perception by facilitating the transfer of knowledge. Alternatively, long and bureaucratic procedures are found to have a negative affect on the local perception. In addition, the degree of social cohesion as an organisational characteristic and the visibility of renewable energy technologies as a technological characteristic are also found to have a positive affect on forming the local perception.

When considering the local support and acceptance, it is found that organisational attributes play a crucial role in establishing a local renewable energy organisation. More specifically, co-ownership of locals, non-constraining participation of locals, fair and equal distribution of potential benefits and the degree of social cohesion within the community positively determine the local support of a local renewable energy organisation. Moreover, in relation to variables originating from the macro context, the case study analysis verified that a high level of public environmental awareness positively affects the local support of a local renewable energy organisation. When contemplating on the impact of actors from the market and civil sphere on the local support, it became clear that engaging in a partnership or receiving support from an external party enhances the creditability and consequentially also increases the local support. In addition, the empirical findings confirm that visibility and the possibility to provide feedback on the generated and/or consumed energy are technological attributes that improve the local support of a local renewable energy organisation.

The final step in the founding process entails the assessment on the applied renewable energy technology. This step is predominantly determined by the technological and economical characteristics of the applied renewable energy technology. In regard to the technological attributes, the empirical findings validated that the reliability and visibility of an applied renewable technology determine the assessment. In terms of the economical characteristics, it is found that the initial investment costs as well as the pay back period have a profound impact on the assessment of the applied renewable energy technology.

#### *4.5.2 Conclusions on the main hypothesis*

Besides separately testing the impact of the 46 hypotheses on the four founding steps, the impact of each of the four steps on the founding of a local renewable energy organisation is tested by the main hypothesis. On average the interviewees acknowledged that out of the fourteen proposed variables, at least seven prompted an occasions to establish their organisation. Furthermore, where in general a minimum of three actors or factors had a positive influence on the local perception, only some organisations expressed to have experienced some opposition. Hence, in general the examined variables contributed to the forming of an unconstrained positive local perception towards the concept of local renewable energy organisation. Moreover, on average at least nine of the tested variables regarding the

local support are acknowledged by the interviewees to have had a positive affect. Despite ranging levels of local support, the majority of the interviewees expressed to benefit from at least some degree of local support, which validates that the presence of local support for the establishment of a local renewable energy organisation is vital. Finally, half of the tested technological and economical attributes are considered or incorporated in the assessment on the applied renewable technology and hence affect the founding of a local renewable energy organisation. Consequentially, the empirical results provided enough ground to verify that each of the four steps of the founding process improve the chances of establishing a local renewable energy organisation.

#### *4.5.3 Conclusions on the supplementary analysis*

The primary goal of the supplementary analysis is to accentuate major differences in average scores between organisations with various organisational characteristics. Therefore this part of the analysis is segregated into four sections. Where dividing the cases based on their organisational arrangements failed to provide any valuable additional findings, differences between urban and rural and small and large organisations as well as differences concerning the primary targeted renewable source supplied valuable findings of which the most prominent ones are summarised in this section.

When considering the differences between urban and rural based organisations, it was found that the ambition to become less dependent on either vested energy corporations and energy exporting countries is expressed to be a greater motivation for the establishment of rural local renewable energy organisations. The reality that rural regions in the Netherlands experience difficulties regarding their liveability in terms of decreasing population, less funds for public facilities and low economical activity might provide a possible clarification. Furthermore, several interviewees mentioned that establishing a local renewable energy organisation is a vehicle to stimulate the local economy through capturing and locally recirculating the energy expenditures and revenues instead of allowing it to benefit distant corporations or countries. Affiliated to alleviating the adverse affects of a declining liveability, enhanced independency from either energy corporations or energy exporting countries is a valuable motivation for the establishment of a rural local renewable energy organisation. Furthermore, urban located organisations expressed that visible technologies had a greater impact on the local perception of their local renewable energy organisations. Although not explicitly mentioned, urban areas are characterised by a higher density and thus more people observe visible technologies located within urban areas. As a consequence the assumed 'sustainable' or 'green' image reaches more people and might explain the observed preference of urban organisation towards visible renewable technology.

In regard to the differences between small and large organisations, small organisations all emphasised the importance of co-ownership of their members in relation to their degree of local support. Despite an explicit explanation stemming from the interviews, a clarification might be found in the social context since ownership of a large organisation is shared between more members, which make a membership less personal. Besides, large organisations more often emphasise that the possibility to exploit a local renewable source that matches local demand was a motivation to establish their local renewable energy organisation. However, the primary analysis on H9 also convincingly links this explanatory variable to the primary renewable source on which an organisation focuses, in particular biomass and wind energy. However, to realise a wind or biomass project, more funds, participants and costumers are required. Furthermore, these projects generally produce more output for which local demand is necessary. Therefore, a relation between the size of an organisation on the one hand and the possibility to exploit a renewable source that matches local demand on the other, is a valuable complementary explanation.

Finally, difference between solar and wind oriented organisations provided several interesting insights. To begin with, when isolating the evaluated scores of solar oriented organisations concerning the impact of inconsistent stimulation policies on the occasion to establish a local renewable energy organisation, the average score becomes significant. This insinuates that the

emergence of an occasion to establish a solar oriented organisation is hampered by inconsistent policies or subsidies. Secondly, although the explanation for the deviation regarding the independency from energy corporations and energy exporting countries can partially be derived from a distinction between rural and urban located organisations, the bias towards solar oriented organisations complements this observation. This can be explained by the relative versatile and easy applicability of photovoltaic panels, which reduces the perceived complexity of establishing a local renewable energy organisation in comparison to other technologies such as wind or biomass. Third, where the possibility to exploit a renewable resource that matches local demand has formerly been linked to both large organisations and foundations, the most convincing relation concerns the associated connection with the primary renewable source on which an organisation focuses. More specifically, the possibility to exploit or participate in a wind, biomass or geothermal project for which a local demand exists, proves to be an important occasion to establish an organisation attuned to one of these sources of renewable energy.

## 5. Survey

The case study analysis enabled to examine thirteen well-known examples of Dutch local renewable energy organisations in detail, which resulted in the confirmation of 31 hypotheses. Through testing these 31 confirmed hypotheses by means of a survey on a wider sample of cases, enhances the validity of the underlying explanatory variables and is the focal point of this chapter. Therefore, this chapter attempts to further strengthen the empirical evidence on the extent to which the previously confirmed explanatory variables are determinant for the emergence and development of actual local renewable energy organisations in the Netherlands. In order to achieve this, the first paragraph elaborates on the organisational characteristics of the participating organisations. Secondly, the gathered data is presented and analysed in paragraph 5.2, which is succeeded by the last paragraph that summarises and concludes on the empirical findings of this chapter.

### 5.1 Organisational characteristics of the participating organisations

The first section of the survey encompasses nine open questions, which provide data on the municipality and province in which the organisations are located, their applied business model(s), organisational arrangement, founding year, primary targeted resource and the number of sympathisers, paying members and/or costumers. The obtained data on these organisational characteristics of the thirteen organisations that participated in the survey are presented in table 5.1.

**Table 5.1 Organisational characteristics of organisations participating in the survey**

Respondent number	Geographical location		Business model					Organisational arrangement	Founding Year	Primary source	Number of members		
	Municipality	Province	Collective procurement energy	Collective procurement technology	Education and facilitation	Delivery of energy	Collective generation of energy <sup>36</sup>				Sympathisers	Paying members	Costumers
3	Amsterdam	Noord Holland			X	X		Cooperative arrangement	2011	Biomass	235	40	25
5	Oosterhout	Noord Brabant	X	X	X	X	X	Cooperative arrangement	2012	Multiple	10	-	-
6	Zeewolde	Flevoland	X		X		X	Cooperative arrangement	2011	Sun	-	85	80
7	Amersfoort	Utrecht	X	X		X	X	Cooperative arrangement	2012	Biomass	150	20	-
8	Amersfoort	Utrecht			X		X	Foundation	2010	N.A.	-	200	-
9	Dalfsen	Overijssel	X		X	X	X	Foundation	2010	Biomass	200	-	-
10	Dongen	Noord Brabant	X	X	X	X	X	Cooperative arrangement	2012	Multiple	150	250	-
12	N.A.	Limburg			X	X		Cooperative arrangement	2011	Wind	-	70	-

<sup>36</sup> Although collectively generating renewable energy through a co-owned project for individual consumption is legally not possible in the Netherlands, the majority of the respondents mentioned it as one of their business models. Due to an absence of personal contact, there is no clear explanation for this observation. However, the reality that these organisations generally are established in the recent past and therefore have a greater change of residing in an early stage of development might provide an explanation since they could be less aware of the legal consequences of this business model.

13	Noordenveld	Drenthe	X	X	X	X	X	Cooperative arrangement	2011	Sun	200	45	76
14	Houten	Utrecht	X		X	X		Corporate arrangement B.V.	2010	Sun	-	5	30
15	Almere	Flevoland	X	X	X	X	X	Cooperative arrangement	2012	Sun	50	20	5
16	Amsterdam	Noord Holland					X	Cooperative arrangement	2011	Sun	150	50	3
17	N.A.	Noord Holland		X	X			Cooperative arrangement	2011	Sun	-	19	-

## 5.2 Improving the generalizability the confirmed hypotheses

The following four sections present and analyse the obtained data gathered through the survey on each of the four steps encompassing the founding process. The tables present data on the total score, average score, hypothesised score and standard deviation of the previously confirmed hypotheses. Besides these indicators, the number of times a question is answered as 'not relevant' or 'no idea' is recorded as well and is referred to as the 'number of zero scores'. Although these scores are assigned zero points, they are included in the calculation of the average score and standard deviation and hence have the potential to aggravate both scores. Therefore the sections succeeding the tables elaborate and justify the outcome of the conclusion to confirm or reject a hypothesis.

### 5.2.1 Explaining the emergence of an occasion

During the case study analysis on the first fourteen hypotheses considering the emergence of an occasion, five hypotheses are rejected and consequentially the remaining nine hypotheses are translated into nine corresponding propositions. The first section concentrates on the two propositions stemming from the macro context. Another two propositions affiliated to governmental interference are analysed in the second section. Where the succeeding section centres on three propositions concerning the technological characteristics of the applied renewable energy technology, the last section focuses on the final two propositions related the economical characteristics. Since the propositions on the emergence of an occasion are formulated in terms of relevance, the option to answer a question with 'not relevant' is excluded. As a consequence there are no zero scores for the hypotheses concerning the emergence of an occasion.

#### 5.2.1.1 The role of macro developments

From the initial four explanatory macro related variables, the case study analysis confirmed the influence of fluctuating energy prices and a high level of environmental awareness within society on the emergence of an occasion. Consequentially, to establish whether the survey results further improve the validity of these two variables, table 5.2 shows the various indicators including the conclusion on the affect of these macro variables on the occasion to establish a local renewable energy organisation.

**Table 5.2 The role of macro developments on the emergence of an occasion**

<i>Hypotheses regarding the macro developments</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H1	Fluctuating (or rising) energy prices stimulate the emergence of an occasion.	51	3,92	1,19	3>	0	Confirmed

H2	High levels of environmental awareness within society provide a serious occasion.	56	4,31	0,75	3>	0	Confirmed
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*Detailed analysis that supports the conclusions on H1 and H2:*

- H1** Just one organisation mentioned that the influence of fluctuating energy prices, was irrelevant for the emergence of an occasion regarding its establishment. Alternatively, nine organisations acknowledged the relevance of this aspect on their establishment. The remaining three organisations expressed neither its relevance nor its irrelevance. Consequentially, the survey provides additional empirical validation to confirm that fluctuating energy prices stimulate the emergence of an occasion.
- H2** All organisations except one assigned a score of at least four to this proposition, which resulted in a significant total and average score and modest standard deviation. As a result, there is substantial empirical ground to validate that a high level of environmental awareness within society provide a serious occasion, which further strengthens the empirical findings from the case study analysis.

### 5.2.1.2 The role of governmental intrusions

Originally, four explanatory variables concerning governmental interferences were predicted to affect the emergence of an occasion. However, dissatisfaction arising from a prolonged period of inconsistent stimulations policies as well as dissatisfaction stemming from the incompetence of the national government to meet their environmental targets are the only two variables confirmed by the case study analysis. Table 5.3 presents the various indicators and conclusions on the influence of these two governmental related variables on the occasion to establish a local renewable energy organisation.

**Table 5.3 The role of governmental intrusions on the emergence of an occasion**

<i>Hypotheses regarding governmental intrusions</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H6	Dissatisfaction arising from a prolonged period of inconsistent policies encourages the emergence of an occasion to establish a local renewable energy organisation.	43	3,31	1,25	3>	0	Confirmed
H7	Dissatisfaction with the incompetence of the national government to meet their environmental targets enhances the emergence of an occasion to establish a local renewable energy organisation.	50	3,85	1,28	3>	0	Confirmed

*Detailed analysis that supports the conclusions on H6 and H7:*

- H6** Five organisations acknowledged that dissatisfaction resulting from a prolonged period of inconsistent policies stimulated the emergence of an occasion to establish their organisation. Contrary, an equal number of respondents expressed its indifference and three organisations indicated that this proposition was irrelevant for their establishment. Despite some division between respondents there is sufficient empirical evidence to validate this hypothesis. Hence these results further improve the empirical findings from the case study analysis.
- H7** Dissatisfaction arising from the incompetence of the national government to meet their environmental targets appears a stronger incentive to establish a local renewable energy organisation than dissatisfaction arising from inconsistent policies. Just two

organisations indicated that this was irrelevant for their establishment in comparison to nine organisations that emphasised its relevance. This is reflected in the average score and consequentially, the survey provides additional empirical grounds to further validate that dissatisfaction resulting from the incompetence of the national government to meet their environmental targets encourages the emergence of an occasion.

### 5.2.1.3 The role of technological characteristics

The case study analysis confirmed the hypothesised impact of all three explanatory variables affiliated with renewable energy technologies on the emergence of an occasion to establish a local renewable energy organisation. Therefore data on the impact of the possibility to exploit a local renewable energy source that matches local demand and the urgency to become independent from conventional energy corporations and energy exporting countries on the emergence of an occasion are collected and presented in table 5.4.

<i>Hypotheses regarding the technological characteristics</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H9	The possibility to exploit a local renewable source that matches local demand provides an occasion to establish a local renewable energy organisation.	52	4,00	1,35	3>	0	Confirmed
H10	Renewable energy technologies provide a sense of independency from conventional energy corporations and thus support the appearance of an occasion to establish a local renewable energy organisation.	53	4,08	1,50	3>	0	Confirmed
H11	Renewable energy technologies provide a sense of independency from energy producing countries and thus support the appearance of an occasion to establish a local renewable energy organisation.	47	3,62	1,45	3>	0	Confirmed

*Detailed analysis that supports the conclusions on H9 until H11:*

**H9** Nine organisations expressed that the possibility to exploit a local renewable energy source that matches local demand was a relevant aspect that positively determined their establishment. Although two organisations mentioned its irrelevance to their founding, the average score and tolerable standard deviation indicate that these findings supply supplementary empirical evidence to verify that the possibility to exploit a local renewable source that matches local demand provides an occasion to establish a local renewable energy organisation.

**H10** The determination to become independent from conventional energy corporations is a significant driver for the majority of the organisations. All nine organisations that expressed the relevance of this aspect, assigned the maximum score to this proposition. Alternatively, independency from conventional energy corporations was an irrelevant aspect for the founding of three organisations. The contrast between these organisations is demonstrated by a rather significant standard deviation. Nonetheless, due to the expressed determination of the former nine organisations, these findings provide additional empirical validation to confirm that independency from conventional energy corporations enhances the emergence of an occasion to establish a local renewable energy organisation.

**H11** Although independency from energy exporting countries is acknowledged to be less relevant for the founding of a local renewable energy organisation as opposed to becoming independent from conventional energy corporations, a majority of eight respondents also addressed this aspect as relevant for their establishment, which positively affected the average score. Similar to H10, the expressed irrelevance of this aspect was emphasised by three organisations, which contrasts with the former scores and consequentially results in a rather significant standard deviation. Despite the standard deviation, the survey supplies sufficient additional empirical evidence to further validate that independency from energy exporting countries stimulates the emergence of an occasion to establish a local renewable energy organisation.

#### 5.2.1.4 The role of economical characteristics

Potential symbolic benefits in terms of a green image and an enhancement of the social cohesion are the only two economical related characteristics that are confirmed to affect the emergence of an occasion by the case study analysis. Consequentially, the various scores including the conclusions on the expected impact of these two economical attributes on the emergence of an occasion are demonstrated in table 5.5.

<i>Hypotheses regarding the economical characteristics</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H12	A potential symbolic benefit in terms of a green image provides an occasion to establish a local renewable energy organisation.	56	4,31	0,75	3>	0	Confirmed
H13	A potential symbolic benefit in terms of the enhancement of social cohesion within a community provides an occasion to establish a local renewable energy organisation.	54	4,15	1,14	3>	0	Confirmed

#### *Detailed analysis that supports the conclusions on H12 and H13:*

**H12** Where eleven organisations emphasised that symbolic benefits in terms of a green image was a relevant factor for the establishment of their organisation, the remaining two mentioned to be indifferent regarding this aspect. The significant average score and modest standard deviation encompass substantial empirical evidence to confirm this notion, which provides additional empirical grounds to verify that symbolic benefits in terms of a green image enhance the occasion to establish a local renewable energy organisation.

**H13** Besides the relevance of a green image discussed formerly, the enhancement of social cohesion within a community as a symbolic benefit associated with local renewable energy organisations is also expressed to encourage the emergence of an occasion, which is reflected by the average score. However, two respondents expressed that this aspect was irrelevant for their establishment, which caused an increase in spread compared to H12. Nonetheless, the results supply sufficient empirical ground to confirm that the enhancement of social cohesion within a community through establishing a local renewable energy organisation provides a serious occasion for founding a local renewable energy organisation. Hence these results further validate the findings from the case study analysis.

### 5.2.2 Explaining the local perception

The previous chapter tested ten hypotheses covering the anticipated influence on the local perception towards a local renewable energy organisation, which resulted in the rejection of two and confirmation of eight hypotheses. Furthermore, two hypotheses are added in order to prevent misinterpretation on the influence of external knowledge and renewable energy suppliers on the local perception. Consequentially, ten hypotheses are converted into an equal number of statements of which the first proposition affiliated to the organisational characteristics is analysed in the first section. A majority of six propositions concern the hypothesised influence of actors from the market and societal sphere on the local perception, which is the focal point of the second section. The succeeding section elaborates on two propositions, which concentrate on the anticipated influence resulting from governmental intrusions on the local perception. The final section encompasses one proposition regarding the predicted impact of a technological attribute on the local perception.

#### 5.2.2.1 The role of organisational characteristics

The anticipated positive impact of a high level of social cohesion within the community is the solitary organisational characteristic that is assumed to affect the local perception. Since the case study analysis confirmed this hypothesised impact, the survey results regarding the influence of this organisational characteristic on the local perception is displayed in table 5.6.

<i>Hypothesis regarding the organisational characteristics</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised scores</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H15	A high level of social cohesion within a community (which entails interpersonal trust, social capital building and knowledge transfer) improves local perception of local renewable energy organisations.	33	2,54	1,90	3>	4	Rejected

#### *Detailed analysis that supports the conclusion on H15:*

**H15** Prior to asking the respondents whether the degree of social cohesion had a positive or negative impact on the local perception, they are asked to indicate the extent of social cohesion within their communities on an ordinal scale ranging from ‘very poor’ to ‘very intense’. None of the respondents defined their local communities as (very) poor. However, seven respondents marked the degree of social cohesion within their communities with a three, indicating that their communities are neither characterised by poor nor intense levels of social cohesion. Considering the average score regarding the proposition that high levels of social cohesion improves the local perception, suggests that there is not enough empirical evidence to confirm this hypothesis. However, as the relative large standard deviation also indicates, there is a significant spread amongst the collected answers. When isolating the answers of the six respondents that defined their communities in terms of (very) intense social cohesion, it becomes apparent that four respondents acknowledge that high levels of social cohesion within their communities positively affects the local perception. However, the other two were unable to answer this question, i.e. answered the question with ‘no idea’. Due to the latter two answers, the average score of these six organisations characterised by high levels of social cohesion still reaches a marginal

score of exactly three. Therefore, there is not enough empirical evidence to validate that a high level of social cohesion within a community improves the local perception towards local renewable energy organisations. Hence the survey proved unable to supply supplementary empirical grounds to enhance the validity of this hypothesis.

### 5.2.2.2 The role of actors from the market and society

The initial four hypotheses regarding the influence of actors from the market and society on the forming of the local perception are confirmed by the case study analysis. However to prevent misinterpretation two supplementary hypotheses are added to the survey. Therefore, data on the anticipated influence of available external experts in terms of consultancy businesses and organisations that enable the transfer of knowledge, the presence of local opposition, other similar local renewable energy organisations and the advice and expertise of suppliers of renewable energy technologies as well as suppliers of renewable energy on the forming of the local perception towards a local renewable energy organisation are gathered, analysed and demonstrated in table 5.7.

**Table 5.7 The role of actors from the market and society on the local perception**

<i>Hypotheses regarding the market and society</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H16	Availability of external expert knowledge provided by consultancy businesses reduces the perceived complexity of establishing a local renewable energy organisation and thus enhances the local perception on local renewable energy organisations.	25	1,92	1,75	3>	5	Rejected
H16a	Availability of external expert knowledge provided by organisations like e-Decentraal, Wij krijgen kippen, Provinciale Milieu Federaties, ODE and KNHM reduces the perceived complexity of establishing a local renewable energy organisation and thus enhances the local perception on local renewable energy organisations.	45	3,46	1,76	3>	2	Confirmed
H17	The presence of local opposition negatively affects the local perception of a local renewable energy organisation.	12	0,92	1,44	<3	9	Rejected
H18	The existence of other and similar local renewable energy organisations positively affects the local perception on local renewable energy organisations.	50	3,85	1,28	3>	1	Confirmed
H19	The advice and experience of suppliers and installers of renewable energy technology influence the local perception on local renewable energy organisations.	24	1,85	1,82	3>	6	Rejected
H19a	The advice and experience of suppliers of renewable energy such as Greenchoice, Trianel or Anode influence the local perception on local renewable energy organisations.	40	3,08	1,89	3>	3	Confirmed

*Detailed analysis that supports the conclusions on H16 until H19(a):*

**H16** Where interpretations of ‘external advice’ diverged during the case studies and resulted in a marginal confirmation of the underlying hypothesis, the survey displays a more coherent image. In regard to the hypothesised positive impact of consultancy businesses on the local perception (H16), just three organisations acknowledged this statement. One organisation firmly disagreed by expressing a negative influence on

- the local perception. In addition, five organisations mentioned that a possible influence of a consultancy business was ‘not relevant’ to their situation<sup>37</sup>. This is reflected by an insignificant average score, which provides insufficient ground to validate the possible positive impact of a consultancy agency on the local perception.
- H16a** Alternatively, external advice provided by entities enabling the transfer of knowledge regarding local renewable energy organisations proved to positively affect the local perception. In contrast to H16, the irrelevances of H16a, i.e. number of zero scores, was mentioned by just two respondents. Furthermore, where the average score of H16 was aggravated by one negative response, none of the respondents expressed a negative impact on the local perception in relation to H16a. Consequentially, there is enough empirical evidence to verify that external advice provided by organisations enabling the transformation of knowledge on local renewable energy organisations have a positive impact on the local perception, which further improves and specifies the empirical validation regarding the positive impact of external advice on the local perception.
- H17** According to the average score, the presence of local opposition tends to have an extremely negative influence on the local perception. However, as is discussed in section 3.4.3, the inclusion of zero scores in calculating the average score might disguise the relevance or irrelevance of an explanatory variable and therefore could lead to an incorrect conclusion. In light of this, a majority of nine organisations indicated that the impact of local opposition on their local perception was ‘not relevant’. When these zero scores are excluded the average score rises to three, which indicates that local opposition neither has a positive nor negative impact on the local perception. However, since this hypothesis considers the presence of local opposition on the local perception, only the scores of those organisations that acknowledge to be challenged by local opposition should be considered. According to the respondents, local opposition challenges four organisations. However, from these four respondents two expressed that the present local opposition neither had a positive nor negative impact. In addition, the other two respondents stated that although local opposition was present it had no influence on their local perception, i.e. they answered with ‘not relevant’. As a consequence none of the organisations that acknowledge to be subjected to local opposition expressed that it had a negative impact on the local perception. Therefore there is not enough empirical ground to validate that the presence of local opposition negatively affects the local perception towards a local renewable energy organisation, which leads to conclude that the survey lacks to provide additional empirical ground to improve the validity of this hypothesis.
- H18** Contrary to the presence of local opposition, the existence of other or similar local renewable energy organisations is found to have a positive influence on the local perception. None of the respondents acknowledged that other or similar organisations had a negative impact on the local perception. Only one respondent mentioned that this aspect was ‘not relevant’. Based on the average score and acceptable standard deviation, there is enough empirical evidence to validate that the existence of other or similar local renewable energy organisations positively affects the local perception and hence improves the generalizability of this hypothesis.
- H19(a)** As is discussed in paragraph 4.4, the notion of supplier was either interpreted as supplier of renewable technologies (H19) or as supplier of renewable energy (H19a). Where the survey respondents expressed that a supplier of renewable energy (H19a) generally had a positive impact on the local perception, this was not found for suppliers of renewable technologies (H19). This disparity is further amplified when considering the number of zero scores between these hypotheses. Where six

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<sup>37</sup> When excluding the five zero scores, the average score for the remaining eight organisations increases to just over three. Although this would indicate a marginal confirmation of this hypothesis, it is rejected since a significant number of respondents expressed the irrelevance of a consultancy agency to their situation.

organisations assigned a zero score in regard to a supplier of renewable technology, only three organisations did so in regard to a supplier of renewable energy. Furthermore, only three respondents expressed that a supplier of renewable technologies had a positive affect on their local perception. On the other hand, a majority of seven respondents emphasised that a supplier of renewable energy positively affected the local perception<sup>38</sup>. Considering that six respondents expressed that a supplier of renewable technology was ‘not relevant’ in terms of local perception combined with an insignificant average score, leads to conclude that there is not enough empirical ground to verify that a supplier of local renewable technologies has a positive impact on the local perception. On the contrary, there is enough empirical evidence to validate that a supplier of local renewable energy has a positive impact on the local perception, which further improves and specifies the empirical findings concerning the advice and experience of a supplier on the local perception.

### 5.2.2.3 The role of governmental intrusions

Data and conclusions on two governmental interferences that are anticipated to, on the one hand, positively affect the local perception in terms of facilitating the transfer of knowledge and on the other hand negatively influence the local perception through long and bureaucratic procedures are presented in table 5.8.

<i>Hypotheses regarding governmental intrusions</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H21	Governmental support in terms of facilitating the possibility to share vital knowledge improves the local perception of founding a local renewable energy organisation.	28	2,15	1,68	3>	4	Rejected
H22	Long and bureaucratic procedures to obtain permits or permissions negatively effect the local perception of establishing a local renewable energy organisation.	15	1,15	1,28	<3	6	Rejected

*Detailed analysis that supports the conclusions on H21 and H22:*

**H21** Three organisations acknowledged that governmental support in terms of facilitating knowledge transfer proved to positively affect the local support. However, one organisation mentioned that it had a significant negative affect. Additionally, four others expressed that this aspect was ‘not relevant’ for formulating the local perception. Therefore, there is not enough empirical evidence to verify this hypothesis and further improve the generalizability regarding a potential positive impact of governmental support in terms of facilitating the transfer of knowledge on the local perception.

**H22** Similar to the assessment on H17, confirming or rejecting the expected negative impact of long bureaucratic procedures on the local perception, which is merely based on the average score, might be deceptive. Four organisations emphasised that long bureaucratic procedures had a negative impact on the local perception and three expressed their indifference. However, six organisations expressed that these

<sup>38</sup> The differences between on the one hand the number of positive scores and on the other hand the number of zero scores partly explains the significant standard deviation of both hypotheses.

procedures were irrelevant for forming the local perception. Since these zero scores are incorporated in calculating the average score, they have a profound negative affect on the average score and therefore imply that long bureaucratic procedures have an extremely negative impact on the local perception. When excluding these zero scores and merely concentrating on the former four organisations a more moderate average score (2,14) emerges. However, despite this significant average score its composition is based on seven cases while six other cases emphasised the irrelevance of this hypothesis. Hence there is too little empirical evidence to validate that long and bureaucratic procedures negatively affect the local perception and therefore the survey fails to supply additional empirical evidence to further improve the verification to this hypothesis.

#### 5.2.2.4 The role of technological characteristics

From the case study analysis it became clear that visible renewable energy technologies have a positive affect on the local perception. Therefore, table 5.9 demonstrates the survey results concerning the anticipated positive affect of this technological attribute on forming the local perception towards a local renewable energy organisation.

<i>Hypotheses regarding the technological characteristics</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H23	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect the local perception.	47	3,62	1,39	3>	1	Confirmed

*Detailed analysis that support the conclusions on H23:*

**H23** Besides one respondent who emphasised that the visibility of the applied technology had a negative impact on the local perception, the majority acknowledged that it had a (very) positive impact on the local perception. Despite one negative score and the supplementary negative influence of one zero score, the average score provides sufficient empirical evidence to confirm that visible technologies positively affect the local perception and hence further supports the generalizability of this hypothesis.

#### 5.2.3 Explaining the local support and acceptance

Out of the original fourteen hypotheses concentrating on the local support and acceptance of a local renewable energy organisation, four are rejected and a majority of ten are confirmed. These ten confirmed hypotheses are translated into ten corresponding propositions of which the first four propositions relate to the organisational characteristics of a local renewable energy organisation and are discussed in the first section. One proposition originates from the macro context and is elaborated upon in the second section. Moreover, three propositions regarding the influence of actors from the private and societal sphere on the local support are the focal point of the third section. Finally, the last section centres on the impact of two technological related variables on the local support.

##### 5.2.3.1 The role of organisational characteristics

Co-ownership of locals, non-constraining participation of locals, equal and fair distribution of the potential benefits and a high level of social cohesion within the local community are the

four variables related to the organisational characteristics previously confirmed by the case study analysis. The gathered data on the expected impact of these explanatory variables are shown in table 5.10 and enable to conclude whether the survey provides enough empirical evidence to further validate their hypothesised impact on the local support.

**Table 5.10 The role of organisational characteristics on the local support**

<i>Hypotheses regarding the organisational characteristics</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised scores</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H25	Co-ownership of locals improves local support for and acceptance of a local renewable energy organisation.	48	3,69	1,25	3>	1	Confirmed
H26	A non-constraining participation possibility for locals, i.e. open participation, enhances local support for and acceptance of a local renewable energy organisation.	50	3,85	1,34	3>	1	Confirmed
H29	Equal and fair distribution of potential benefits in favour of the participants or the community enhances local support for and acceptance of a local renewable energy organisation.	42	3,23	1,64	3>	2	Confirmed
H30	A high level of social cohesion within the community (which entails interpersonal trust, social capital building and knowledge transfer) improves local support for and acceptance of a local renewable energy organisation.	46	3,54	1,39	3>	1	Confirmed

*Detailed analysis that supports the conclusions on H25 until H30:*

- H25** Eleven organisations stated that their members are co-owners of their organisation of which ten organise their activities through a cooperative arrangement. As a result, the other two organisations mentioned that members lack co-ownership, which might be a direct result of their preference regarding an organisational arrangement. One has chosen to found a foundation where the other arranged a corporate structure. Since this hypothesis centres on the possible positive impact of co-ownership on the local support, the latter two organisations are excluded from the assessment. Although one respondent of this sample was unable to answer the question, the average score shows a negligible increase (3,73) in comparison to the average score computed on the total sample. Nevertheless, the survey supplies sufficient empirical ground to confirm that co-ownership of locals improves local support, which further enhances the verification of this hypothesis.
- H26** Where eleven organisations are characterised by a non-constraining participation possibility, two organisations mentioned that participation with their organisation is constrained. Since it is hypothesised that a non-constraining participation possibility enhances local support, the primary focus is on the former category. From this group, one respondent was unable to answer this question by acknowledging that this aspect was 'not relevant'. Partly due to this zero score, the average score of these eleven organisations slightly drops (3,82) but remains within acceptable boundaries. Consequentially, there is enough empirical ground to verify that a non-constraining participation possibility for locals improves the local support. Furthermore, the empirical validation of this hypothesis is further improved by this result.
- H29** All respondents mentioned that potential benefits are allocated to favour the local community through various means. However, two respondents were unable to answer the question or expressed that this aspect was unrelated to the local support of their organisations. Furthermore, one respondent expressed that the allocation of potential benefits towards its community has a negative impact on the local support. These latter three scores contrast with the generally positive attitude towards allocation of

future benefits in favour of the local community. Due to the disparity between on the one hand two zero scores and one negative score and on the other hand eight (very) positive scores is clearly reflected by standard deviation. However, due to a generally positive attitude there is enough empirical evidence to confirm that equal and fair distribution of potential benefits that favours the local community or the members enhances the local support for a local renewable energy organisation, which provides supplementary empirical grounds to improve the validity of this hypothesis.

**H30** According to the average score and number of zero scores, in general respondents acknowledge that a significant level of social cohesion improves the local support. However, as is previously discussed during the assessment of H15, six organisations characterised the degree of social cohesion within their communities as ‘intense’ or ‘very intense’. When concentrating on the scores of these organisations it becomes apparent that all respondents either positively answered the questions or were uncertain and chose to answer neither positive nor negative. The accumulated score of these six organisations equals 25 and settles the average score on 4,17. The total score of the other seven organisations reaches 21, which results in a lower average score of three. Based on this comparison and the discussed indicators, there is sufficient empirical ground to verify that a high degree of social cohesion within a community improves the local support. Consequentially, these results enhance the generalizability of this hypothesis.

#### 5.2.3.2 The role of macro developments

In regard to the macro context, the case study analysis confirmed that a high level of public environmental awareness enhances the local support. The various scores that are analysed to conclude whether the survey results provide additional empirical ground in order to verify the hypothesised positive impact of this explanatory variable are displayed in table 5.11.

<i>Hypothesis regarding a macro development</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H32	High levels of environmental awareness within society improve local support for and acceptance of a local renewable energy organisation.	47	3,62	0,65	3>	0	Confirmed

#### *Detailed analysis that supports the conclusion on H32:*

**H32** None of the respondents stated that an increased national awareness regarding climate change or environmental issues, negatively affected the local support. From the thirteen respondents seven indicated that it positively impacted the local support of their organisation, where on the other hand six organisation mentioned that this neither had a positive nor negative impact on the local support for their organisations. This means that none of the organisations was unable to answer this question or stated that it is unrelated to their degree of local support. The absence of zero scores and negative valuations regarding this hypothesis resulted in substantial low standard deviation. Considering the discussed indicators the empirical evidence provides enough ground to verify that a high level of environmental awareness within society enhances the local support for local renewable energy organisations. Therefore the survey supplies supplementary empirical evidence that further strengthens the validation of this hypothesis.

### 5.2.3.3 The role of actors from the market and society

From the private and societal sphere several actors are expected to have a profound affect on the local support. The case study analysis confirmed that the support of an external party improves the creditability of a local renewable energy organisation as well as its degree of local support. Furthermore, the presence of local opposition is anticipated to negatively affect the degree of local support. Consequentially, the findings of the survey concerning the expected influence of these actors originating from the market or society on the local support are shown in table 5.12.

<i>Hypotheses regarding the market and society</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H33	The support of an external party (either an organisation or other local renewable energy organisation) improves the creditability of a local renewable energy organisation.	41	3,15	1,91	3>	3	Confirmed
H34	The support of an external party (either an organisation or other local renewable energy organisation) improves the local support for and acceptance of a local renewable energy organisation.	38	2,92	1,55	3>	2	Confirmed
H35	The presence of local opposition negatively affects local support for and acceptance of a local renewable energy organisation.	17	1,31	1,49	<3	7	Rejected

*Detailed analysis that supports the conclusions on H33 until H35:*

**H33** Prior to establishing whether external support improves the creditability of a local renewable energy organisation, respondents are asked if their organisations either engage in a partnership or receive support from an external organisation. It became apparent that ten of the organisations either receives external supports or is involved in a partnership with an external organisation. From this group just one organisation was unable to answer this question or expressed the irrelevance of this aspect on its creditability. Nonetheless, in general organisations that receive external support or engage in a partnership expressed to gain from this collaboration in terms of enhanced creditability, which is reflected by an increase in average score (3,8) and a lower standard deviation (1,48) compared to the indicators that cover the complete sample. Consequentially, the empirical results provide sufficient evidence to verify that the support of an external party improves the creditability of a local renewable energy organisation and hence increases the validity of this hypothesis.

**H34** In light of the previous hypothesis, respondents are also asked to indicate whether the possible support of an external party or a partnership improves the local support for their local renewable energy organisation. Where organisations all indicated that the collaboration with an external party had a positive impact on their creditability, they are more hesitant to verify that this collaboration improves the local support. One respondent even acknowledges that the cooperation imposes a negative relation with the local support. Despite this observation, isolating the scores of those organisations that indicated to collaborate with an external party, increases the average score to 3,5 and simultaneously the standard deviation drops to 1,42. Although the initial average score insinuates the rejection of this hypothesis, there is sufficient empirical evidence to confirm that the cooperation with an external party not only improves the

credibility but also the local support. Consequentially, the survey enhances the generalizability of this hypothesis.

**H35** Four organisations acknowledged to experience some local opposition as is discussed in the assessment of H17. Other organisations that do not face local opposition tend to indicate that this question is ‘not relevant’ for their organisation, which explains the relative large number of zero scores. When focusing on the scores of the former four organisations, only one organisation expressed that the presence of local opposition negatively affected its local support. Two respondents mentioned that local opposition neither had a negative nor positive affect and the last respondent was unable to answer this question or expressed the irrelevance of local opposition to its local support. When excluding the latter score and calculating the average score based on the former three responses, it appears marginally lower than three (2,67). However due to the fact that just one respondent confirmed this hypothesis combined with a significant number of zero scores including one that is subjected to local opposition and a marginal average score, leads to conclude that there is not enough empirical ground to validate that the presence of local opposition negatively affects the local support. Hence these results fail to improve the validity of the findings provided by the case studies.

#### 5.2.3.4 The role of technological characteristics

The hypothesised enhancement of symbolic advantages related to the visibility of renewable energy technologies and the possibility to provide feedback on the produced and/or consumed energy are two technological attributes that are confirmed by the case study analysis to positively affect the local perception. To conclude whether the empirical data gathered by the survey further validate these findings, the results on the anticipated influence of these two technological characteristics are demonstrated in table 5.13.

<i>Hypotheses regarding the technological characteristics</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H36	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect local support for and acceptance of a local renewable energy organisation.	51	3,92	0,64	3>	0	Confirmed
H38	The possibility to provide feedback on the generated and consumed energy positively affects local support for and acceptance of a local renewable energy organisation.	43	3,31	1,55	3>	2	Confirmed

*Detailed analysis that supports the conclusions on H36 and H38:*

**H36** Based on the case study analysis, visible technologies were found to have a positive affect on the local support. This is verified by the findings resulting from the survey since none of the respondents mentioned that the visibility of the applied renewable technologies has a negative affect on the local support. In combination with the absence of zero scores, this resulted in a substantial low standard deviation and rather significant average score. Therefore there is enough empirical ground to confirm that visible technologies positively affect the local support of a local renewable energy organisation and hence further strengthens the empirical evidence provided by the case studies.

**H38** From the total of thirteen organisations, ten enable their members or costumers to receive feedback on the amount of consumed and/or generated energy. From this group one was unable to answer this question or expressed that the provision of feedback is unrelated to the local support. However, the remaining nine commonly indicated that providing feedback to their members or costumers has a positive impact on the local support. Isolating their scores results in a minor increase of the standard deviation (3,60) and lower standard deviation (1,35). When taking this into account, the empirical results proved adequate empirical ground to validate that the possibility to provide feedback positively affects the local support and therefore these results further enhance the generalizability of this hypothesis.

#### 5.2.4 Explaining the assessment of the applied renewable technology

Out of the eight initial hypotheses regarding the assessment of the applied renewable technology, four are rejected and the other half is confirmed. However, from the interviews it became apparent that there are various understandings of reliability and therefore paragraph 4.4 further segregated the original hypothesis concerning the reliability into three separate hypotheses, which each emphasise one interpretation of this concept. Consequentially, in total six hypotheses are translated into an equal number of propositions. The first four propositions consider the technological characteristics expected to determine the assessment of the applied renewable energy technology and are elaborated on in the first section. The following section concentrates on the final two propositions regarding the economical characteristics that are anticipated to affect the assessment of the applied renewable energy technology as well.

##### 5.2.4.1 The role of technological characteristics

Interviewees differently perceived the notion of reliability and therefore the survey distinguishes three interpretations of this concept. The survey collected data on reliability in terms of a proven or established technology, consistency and continuity of energy provision and the quality of the technology. Furthermore, visibility as a technological attribute was confirmed by the case study analysis to determine the assessment of the applied renewable energy technology. Consequentially, table 5.14 presents the survey results in relation to these four technological characteristics.

**Table 5.14 The role of technological characteristics on the assessment of the applied renewable energy technology**

<i>Hypotheses regarding the technological characteristics</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised scores</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H40a	A reliable technology in terms of proven or established technology has a positive affect on the assessment.	49	3,77	1,17	3>	1	Confirmed
H40b	A reliable technology in terms of a consistency and continuity has a positive affect on the assessment.	34	2,62	1,61	3>	3	Rejected
H40c	A reliable technology in terms of quality has a positive affect on the assessment.	45	3,46	1,61	3>	2	Confirmed
H41	Visible technologies improve the awareness of the local renewable energy organisation and positively affect the assessment of the applied technology.	47	3,62	1,66	3>	2	Confirmed

*Detailed analysis that supports the conclusions on H40(a) until H41:*

**H40a** In relation to the other two understandings of reliability, reliability in terms of a proven or established technology appears to be the most valued interpretation based

on the average score and the number of zero scores. Apart from one zero score, all respondents indicated that the assessment of the applied renewable technology was partially determined by the choice for a proven or established renewable technology. Through excluding the zero score, this consistency between the answers becomes clearly visible and is reflected by a diminishing standard deviation (0,29). When these observations are taken into account there is sufficient empirical ground to verify that reliability in terms of a proven or established renewable technology positively determines the assessment of the applied renewable technology.

- H40b** Where the assessment on H40 in section 4.2.4.1 insinuated that reliability understood as consistency and continuity tend to be favoured by organisations primary focusing on wind or biomass, the findings from the survey fail to support this statement. Only three respondents stated that this interpretation of reliability was considered during their assessment on the applied technology. Remarkably, none of these organisations primarily focuses on either wind or biomass. Apart from this observation, three respondents lacked sufficient insights to answer this question or indicated that this aspect was not considered. More than half (seven) of the respondents indicated that consistency or continuity neither had a positive nor negative impact on the assessment of the applied renewable technology. This resulted in lower average score than anticipated, which lead to conclude that there is not enough empirical evidence to validate that reliability in terms of consistency or continuity positively determines the assessment of the applied renewable technology.
- H40c** In contrast to H41b, reliability in terms of quality is generally more valued during the assessment of the applied technology. With just two zero scores and ten respondents, which acknowledged that quality of the applied technology was incorporated during the assessment, the average score demonstrates that reliability in terms of quality commonly is considered during the assessment. However, where the analysis on H40 in section 4.2.4.1 observed that this understanding of reliability was primarily mentioned by solar oriented organisations, the survey results indicate a more diverse image in which half of the organisations focus on solar energy. Nonetheless since this sample constitutes six solar-minded organisations of which five emphasise to consider quality during the assessment of the applied technology, still implies the significance of this aspect for organisations attuned to solar energy. In light of the previous, the empirical finding support to validate that reliability in terms of quality positively affects the assessment of the applied technology.
- H41** Despite two zero scores, the remaining eleven organisation each mentioned that visibility was considered and positively determined the assessment of the applied renewable technology, which is reflected by the average score. The relatively high standard deviation is due to the two zero scores since their exclusion drastically decreases the standard deviation (0,47), which demonstrates that the remaining organisations all emphasise the positive impact of visible technologies on their assessment of the applied technology. Hence the survey supplies supplementary empirical evidence that confirms the positive affect of visibility on the assessment of the applied technology, which further enhances the generalizability of the findings resulting from the case studies.

#### *5.2.4.2 The role of economical characteristics*

The case study analysis verified that both the initial investment costs as well as the pay back period are two important economical characteristics that determine the assessment of the applied renewable energy technology. To conclude whether the empirical data gathered by the survey further validate these findings, the results on these two economical characteristics are demonstrated in table 5.15.

**Table 5.15 The role of economical characteristics on the assessment of the applied renewable energy technology**

<i>Hypotheses regarding the economical characteristics</i>		<i>Total score</i>	<i>Average score</i>	<i>Standard deviation</i>	<i>Hypothesised score</i>	<i>Number of zero scores</i>	<i>Conclusion</i>
H44	The initial investment cost is an important factor that is considered during the assessment. A low initial investment and has a positive effect on the assessment of the applied technology.	48	3,69	1,25	3>	1	Confirmed
H45	The pay back period is an important factor that is considered during the assessment. A short pay back period (depends on efficiency and investment costs) has a positive effect on the assessment of the applied technology.	48	3,69	1,38	3>	1	Confirmed

*Detailed analysis that supports the conclusions on H44 and H45:*

**H44** None of the respondents acknowledged that the initial investment cost of the applied renewable technology negatively determined its assessment. However, two organisations expressed that the initial investment neither had positive nor negative impact on their assessment. Alternatively, ten respondents mentioned that it positively determined their assessment of the applied technology. With just one zero score, the generally positive answers are reflected in the average score. Contemplating on the above, there is enough empirical ground to validate that the initial investment cost is considered during the assessment of the applied renewable technology, which further verifies the validity of this hypothesis.

**H45** In addition to the initial investment cost, the pay back period is another economical characteristic that is commonly considered during the assessment of the applied renewable technology. However, where the answers of the respondents were more uniform concerning the initial investment cost, i.e. two very positive scores and two indifferent scores, they demonstrate a more diverse pattern for the pay back period, which encompasses double the amount of ‘very positive’ and indifferent scores, which despite an equal average score results in an increased standard. Despite the increased standard deviation, there is enough empirical evidence to verify that the pay back period is commonly considered during the assessment of the applied renewable technology and hence improves the generalizability of the case study findings.

### 5.3 Conclusions

This chapter focused on providing additional evidence on the explanatory variables confirmed by the case study analysis in order to enhance the validity and generalizability of the anticipated influence of underlying explanatory variables on the founding process of local renewable energy organisations in the Netherlands. This is achieved through conducting a survey, which generated supplementary data on thirteen local renewable energy organisations. The survey enable to further improve the validity of 27 hypotheses and 23 underlying explanatory variables. Figure 11 presents an overview these 23 explanatory variables and the extent to which these variables determine one or more steps of the founding process.

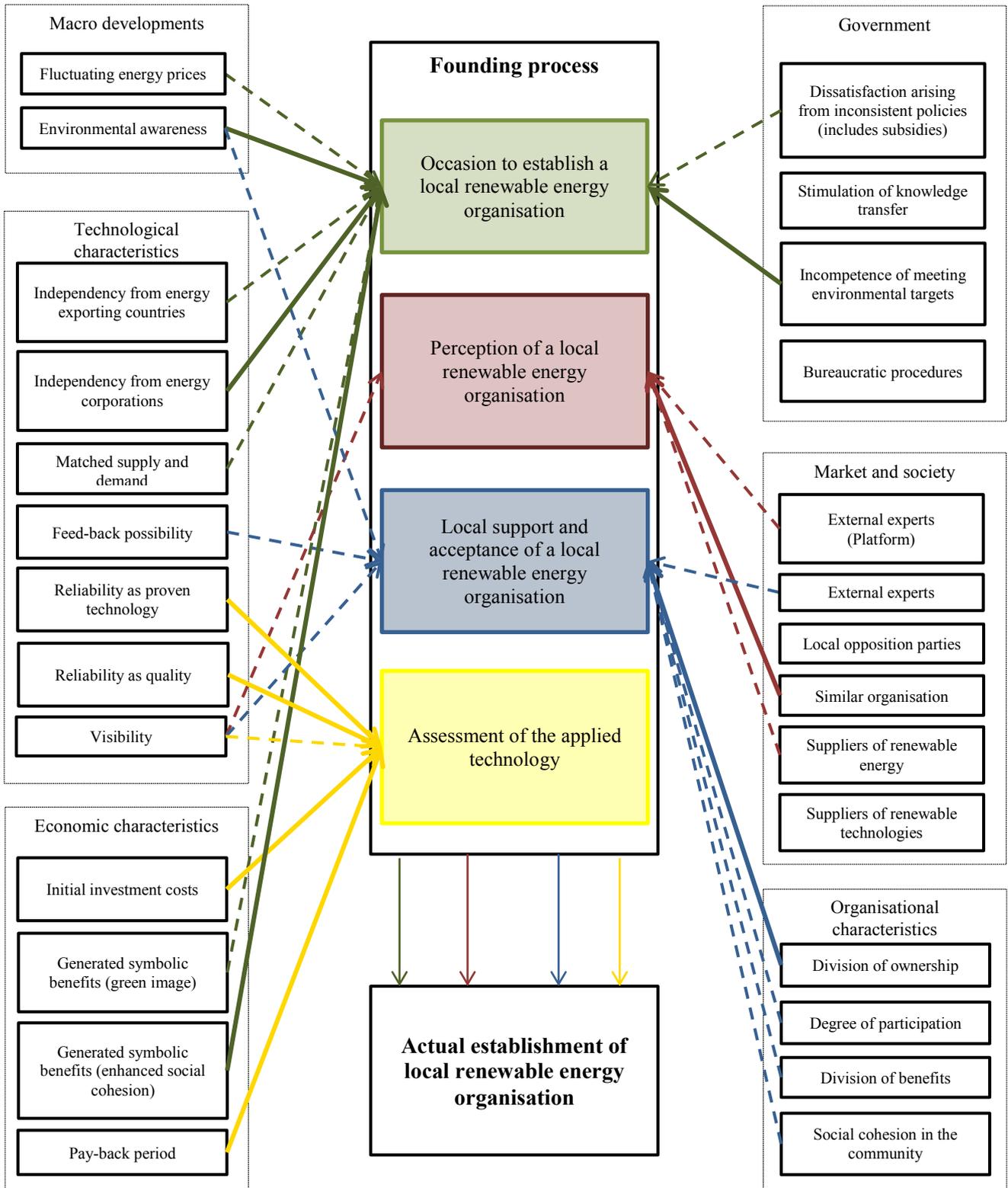


Figure 11: The extent of influence of the explanatory variables on the founding process

Thick arrows reflect the total average scores that indicate a strong positive or negative relation, i.e. scores between four and five or between one and two. Alternatively, total average scores between two and three and between three and four are represented by the thin dashed arrows. Furthermore, only the explanatory variables for which enough empirical evidence is found in both the case study analysis and the survey are included.

When considering the emergence of an occasion, fluctuating energy prices and a high level of environmental awareness within society are two variables from the macro that prompt the emergence of an occasion. Furthermore, dissatisfaction arising from a prolonged period of inconsistent policies as well as dissatisfaction stemming from the incompetence of the national government to meet its environmental targets are explanatory variables originating from governmental interference that provide an occasion to establish a local renewable energy organisation. The possibility to exploit a local renewable energy source that matches local demand and the urgency to become independent from conventional energy corporations and energy exporting countries are variables derived from technological characteristics of renewable energy technologies that stimulate the emergence of an occasion. Finally, the potential symbolic benefits in terms of a green image and the enhancement of social cohesion within the local community are economical related attributes that foster the emergence of an occasion to establish a local renewable energy organisation.

In relation to the forming of the local perception, available external expertise and knowledge from organisations that enable the transfer of knowledge, the existence of other and similar local renewable energy organisations and the advice and experience of suppliers of renewable energy are vital aspects and actors from the private and societal sphere that influence the local perception. Moreover, the visibility of renewable energy technologies is also found to affect the local perception towards a local renewable energy organisation.

Furthermore, co-ownership, a non-constraining participation possibility for locals, an equal and fair distribution of potential benefits and a high level of social cohesion within the community are four explanatory variables derived from the organisational context that are found to affect the local support. Additionally, a high level of environmental awareness within society as a macro development is also verified to influence the local support. When considering the impact of actors from the market and society on the local support, it becomes clear that engaging in a partnership or receiving support from an external party enhances the creditability and also increases the local support. Finally, visibility and the possibility to provide feedback on the produced and/or consumed energy are technological characteristics that are empirically verified by the survey as well.

The last step in the founding process entails the assessment of the applied renewable energy technology. The empirical findings collected by the survey confirmed that technological attributes such as reliability in terms of a proven and established technology as well as in terms of quality and the visibility of the applied renewable energy technology are considered during the assessment of the applied renewable technology. Besides, the initial investment costs and pay back period are economical characteristics that are found to determine the assessment of the applied renewable energy technology.

## 6. Positioning the research in a broader context

In order to approximate the population dimensions, construct a research model, guide the gathering of empirical data and categorise and assess this data to answer the main research question, various methods are applied. While this research has justified the taken steps, the applicability of some methods is constrained by diverse factors such as the available time and resources as well as the collaborative attitude and willingness of contacted people and organisations to participate with this research. Therefore this chapter reflects on the applied methods by first discussing the difficulties and methods applied to estimate the population and select representative samples for the case study analysis and survey. The second paragraph discusses the methods used to gather, process and analyse the data provided by the case studies and survey.

### 6.1 Reflecting on the population estimation and case selection

Before embarking with this research, a comprehensive understanding on the population of local renewable energy organisations in the Netherlands was absent. This is mainly due to the recent emergence and a rapid development of this phenomenon at the moment as well as in the recent past, which makes it hard to establish the population dimension. However, in order to approximate the population and its composition, several inventories of various individuals and organisations are combined with estimations of the consulted experts. Although relying on various sources, it is emphasised that the estimation made by this research is not inclusive since the consulted inventories might have been obsolete due to the rapid developments in this market. Furthermore, since this phenomenon has been latent for long and only lately mushroomed, it is difficult to conclude whether the recently emerged organisations are operational and whether they will continue to exist (Bruijne 2012 and Zomer 2012). In addition, despite gradually increasing numbers, it is estimated that a large fraction of these organisations fail to mature since the extent of enthusiasm might decline due to the difficulties of establishing and operating a local renewable energy organisation (Hooijdonk 2012). Furthermore, although this research focuses on civil-based organisations, which encompasses the majority of the population, the population also contains a substantial quantity of local renewable energy organisations initiated by both private and governmental actors. These various aspects explain the difficulties of estimating the current population as well as the observed spread between the various approximations provided by the experts. Consequentially, it is emphasised that the population estimation of this research merely provides an approximation of the dimensions of this phenomenon on a particular time and by no means can be considered complete.

In addition to these contextual difficulties of estimating the population, the applied methods to distinguish operational organisations from organisations that merely consist of an idea and still reside in an infant stage, might be contested. A registration with the KvK in combination with an official website was assumed sufficient to make this distinction. Although this method generally allows accentuating professional organisations, there is a possibility that immature organisations are included in the population estimation. To register an organisation with the KvK and place a website online does not necessarily require much effort and consequentially is no assurance that an organisation has formulated a concrete business plan and goals and is actually operational.

As became clear from estimating the population and its composition, local renewable energy organisations originate from different spheres of society, pursue various business models, target a diversity of renewable sources, have ranging number of sympathisers, members and/or customers and appear in various arrangements. Hence, the population is characterised as heterogeneous. Consequentially, this raises the question whether the samples used for the case study analysis and the survey, are a sound representation of the estimated population.

By analysing the organisational characteristics of the organisations that collaborated with the case study analysis and survey, illuminates whether both samples can be regarded as a sound representation of the estimated population. First, in terms of organisational arrangement, a

cooperative form or foundation is the most common arrangement in which these organisations occur. This is reflected in both samples since the case study sample contains nine cases that appear in a cooperative arrangement and three that organise their activities through a foundation. The vast majority of the organisations constituting the survey sample have chosen a cooperative structure as well, where only two organisations established a foundation and one prefers to structure its activities through a corporate arrangement. Furthermore, as is discussed in paragraph 3.2 and shown in table 3.2, the majority of the local renewable energy organisations are established during the last two to three years. All organisations included in both samples are founded in the recent past. However, where the case study analysis contains five organisations established in 2008 or 2009 and eight cases that are established in the last two years, none of the organisations included in the survey sample are founded prior to 2010. Additionally, when considering the primary targeted renewable source, it is found that the main focus of organisations established since 2007 is on solar energy, which is succeeded by organisations attuned to wind energy. This is closely mirrored by the case study sample since it consists of six solar oriented organisations and four organisations primary concentrating on wind energy. Although geothermal and biomass are less targeted renewable sources, they are also represented in the sample. When contemplating on the survey sample, the largest part also concentrates on energy extracted from the sun. However, where the second largest group in the estimated population consists of wind-oriented organisations, the survey sample contains just one organisation merely focusing on wind energy. Alternatively, the share of organisations primary focusing on biomass in the survey sample is considerably greater than those included in the estimated population. Finally, the population shows a substantial spread between organisations in regard to the number of members, with a bias towards organisations with less than hundred members. Where the case study sample contains three organisations with less than hundred members, the larger part of the organisations in the sample has between 200 and 250 subscribers. On the other hand, none of the organisations included in the survey have more than hundred members. Furthermore, comparable to the estimated population, the case study sample contains several large organisations with a minimum of four hundred members ranging to over three thousand. Consequentially, both samples show a variation that is significantly comparable with the variation observed in the estimated population and are therefore regarded as a sound representation of the total population.

### *6.2 Reflecting on the applied methods*

Where the previous paragraph elaborated on the methods for estimating the population and justifying a sound representation of the selected case, this paragraph discusses the methods used to gather, process and analyse the data provided by the case studies and survey. To begin with, a model for assessing the emergence and development of local renewable energy organisations was absent and had to be constructed. Although the model of Dieperink *et al.* (2004) is suitable for testing the diffusion of environmental innovations it had to be adjusted to examine the emergence and development of local renewable energy organisations. However, where this research consulted the innovation diffusion, micro generation and community renewable energy literature for further adjustments to the model, other bodies of literature might provide valuable explanatory variables.

Secondly, although a respectable amount of thirteen civil based organisations are studied through semi structure interviews, it can be argued that one interview with an initiator or closely affiliated person for each organisation provides insufficient insights on the factors that determined the foundation of an organisation. However, where conducting more interviews with several stakeholders of each organisation inherently provides more fertile data, this was not feasible due to time constraints. Alternatively, where selecting fewer case studies but increasing the number of interviews with relevant stakeholders per case study was possible, the aim of this research is to identify which various explanatory variables determine the emergence of this phenomenon in the Netherlands and not to describe which factors determined the appearance of one or two organisations. Furthermore, local renewable energy organisations show a considerable variation in organisational attributes and through focusing

on a limited number of organisations would make it difficult to draw conclusion on a wider sample or the population (Saunders *et al.* 2009, p.158). Through interviewing a larger sample provides a broader understanding and allows formulating more general conclusion on the emergence of these organisations in the Netherlands.

Furhtermore, where more respondents would improve the validity of the explanatory variables, the number of organisations participating in the survey was just greater than the amount of organisations subjected to the case study analysis. However, Saunders *et al.* (2009, p.324) provide several explanations for this observed discrepancy. Organisations are more likely to contribute to the research through an interview when the research is interesting or relevant for their organisation. On the contrary, organisations that are contacted through the Internet or email might feel reluctant to join the survey since they hesitate to share the requested information with someone that have never met, lack the time to complete a survey or do not understand the questions. Besides these possible explanations, the complete estimated sample of civil-based organisations contained 65 organisations of which almost half of the organisations have contributed to the research by either participating as a case study or through completing the survey.

Another possible bias might result from the evaluation of the provided answers gathered through the interviews. Despite the necessity to categorise and evaluate the collected answers for conducting a structured assessment, these processes are affected by the perception of the researcher and hence can contain biases. In order to reduce the appearance of these biases, all interviews are recorded and complemented with written annotations of the provided answers. Furthermore, the collected data, i.e. recordings and annotations, are analysed and evaluated within one day subsequent to the interview (Saunders *et al.* 2009, p.485).

Additionally, in regard to the supplementary analysis, a bias might arise from segregating the case study sample in smaller categories. While further segregating the relative small sample of thirteen cases into smaller categories, inherently lowers the validity of the succeeding conclusion since it concerns a smaller group of observations. However, the main objective of this additional assessment is to accentuate possible relations between organisational attributes on the one hand and explanatory variables on the other. Consequentially it is emphasised that the results of this assessment should be considered cautiously.

## 7. Conclusion and recommendations

This chapter concludes with answering the main research question in the first paragraph and formulating recommendations for both policy makers and local renewable energy organisations in the second. The last paragraph centres on suggestions for further research on local renewable energy organisations in the Netherlands

### 7.1 Conclusion

This research concentrated on answering the following research question: which factors influence the emergence and development of local renewable energy organisations in the Netherlands? To answer this question, the research first identified common factors that determine the emergence and development of local renewable energy organisations and secondly, empirically tested whether these factors explain the appearance and development of local renewable energy organisations in the Netherlands.

A suitable model to explain the emergence and development of this phenomenon was absent and therefore a comprehensive literature review and five interviews with experts provided a theoretical framework and explanatory variables that formed the foundation for constructing an integrated research model. This integrated model encompasses 32 explanatory variables that are anticipated to determine one or more steps of the founding process of a local renewable energy organisation. In order to empirically test the identified variables, they are translated into 46 hypotheses and initially tested by means of a case study analysis covering thirteen cases. Besides, a survey is conducted to further improve the generalizability and validity of the case study results, which ultimately resulted in the confirmation of 26 hypotheses and 23 underlying explanatory variables. The confirmed impact of these 23 explanatory variables are graphically represented in figure 11 and displayed in table 7.1.

<i>Founding step</i>	<i>Explanatory variables</i>	<i>+/-</i>
Emergence of an occasion to establish a local renewable energy organisation	Fluctuating energy prices	+
	A high environmental awareness within society	+
	Independency from energy corporations	+
	Independency from energy exporting countries	+
	Possibility to exploit a local source that matches local demand	+
	Symbolic benefit in terms of a green image	+
	Symbolic benefit in terms of an enhancement of the social cohesion	+
	Dissatisfaction arising from inconsistent stimulation policies	+
	Dissatisfaction arising from incompetence of national government to meet its environmental targets	+
Local perception of a local renewable energy organisation	Available external expertise in terms of organisations that allow the transfer of knowledge	+
	Similar local renewable energy organisations	+
	Suppliers of renewable <i>energy</i>	+
	Visibility of renewable energy technologies	+
Local support and acceptance of a local renewable energy organisation	Co-ownership of locals	+
	A non-constraining participation possibility for locals	+
	Equal and fair distribution of potential benefits	+
	Degree of social cohesion with the local community	+
	Collaborating with an external expert	+
	A high environmental awareness within society	+
	Possibility to provide feedback on the consumed and/or generated energy	+
Visibility of renewable energy technologies	+	

Assessment of the applied renewable energy technology	Reliability in terms of a proven and established technology	+
	Reliability in terms of quality	+
	Visibility of renewable energy technologies	+
	Initial investment costs	+
	Pay back period	+

According to the findings resulting from both the case study analysis and the survey, nine explanatory variables are found to stimulate the emergence of an occasion to establish a local renewable energy organisation. However, it became clear that some variables are mentioned more often than others. First, respondents of both the case studies and the survey firmly acknowledged that a high degree of national awareness regarding the detrimental environmental impact of our current manner of producing and consuming energy is a major driver for the emergence of an occasion. Furthermore, enhancing the social cohesion as a motivation for the establishment of a local renewable energy organisation is frequently acknowledged since a local renewable energy organisation is envisioned as a vehicle to unite local and similar minded people or as a means to economically develop a region by unifying or attracting local people and businesses to alleviate adverse affects of a decreasing liveability. Moreover, becoming independent from conventional energy corporations and dissatisfaction arising from the incompetence of the national government to meet their environmental targets provide relative strong incentives for establishing a local renewable energy organisation as well. Besides these prominent four variables determining the emergence of an occasion, both the case studies and survey provided empirical evidence to validate that fluctuating energy prices, dissatisfaction arising from a prolonged period of inconsistent stimulation policies, the possibility to exploit a local renewable source that matches local demand, independency from energy exporting countries and a green image also determine the emergence of an occasion to establish a local renewable energy organisation.

Besides the emergence of an occasion, the local perception towards a local renewable energy organisation is also found to influence their founding. The interviews supplied enough empirical evidence for the verification of eight explanatory variables. However, to prevent misinterpretation regarding ‘external experts’ and ‘suppliers’ these notions are further defined, which resulted in two additional hypotheses. From these ten hypotheses, the survey supplied enough empirical ground to validate the anticipated impact of four variables. First, the presence of other similar local renewable energy organisations and the visibility of renewable energy technologies positively influence the local perception. Furthermore, external experts in terms of organisations that allow the transfer of knowledge related to decentralised generation was also found to positively affect the local perception. Similarly, there is sufficient empirical ground to verify that the advice and experience of a supplier of renewable *energy* has a positive impact on the local perception as well.

A third step in the founding process encompasses the degree of local support an organisation receives. According to the empirical results, eight variables are found to positively affect the local support. The first four variables that positively affect the local support are related to the organisational characteristics, which are the co-ownership of locals or members, a non-constraining participation possibility for locals, equal and fair distribution of potential benefits and a high degree of social cohesion within the local community. Based on the findings of both the case studies and the survey, it becomes apparent that co-ownership of locals or members is the most valued factor that is perceived to determine the degree of local support. Furthermore, collaborating with an external party, the degree of environmental awareness within society and the possibility to provide feedback on the produced or consumed energy are found to positively affect the local support as well. Finally, the visibility of renewable energy technologies improve the publicity and reputation of an organisation and enable to make an abstract notion such as renewable energy more tangible, which is also found to positively influence the local support.

Considering the assessment of the applied renewable energy technology, the case study analysis only confirmed half of the originally eight explanatory variables. Additionally, from the interviews it became clear that ‘reliability’ was perceived differently and therefore the

hypothesis regarding the reliability of a renewable technology was divided into three separate hypotheses. According to the empirical findings of both the case study analysis and the survey, reliability in terms of a proven or established technology as well as in terms of quality complemented with the initial investment costs and pay back period of a technology are the four main criteria that determine the assessment of the applied renewable energy technology. Although less significant, the visibility of the applied renewable energy technologies is also found to determine the assessment of the applied renewable energy technology.

## 7.2 From incubation towards large-scale deployment

The concept of local renewable energy organisations is regarded as a novel or innovative approach to decentralising energy supply but is still in an introductory or infant stage (Allen *et al.* 2008, p.530-531 and Fisher 2006, p.117). Such novel innovations frequently reside in niches, which might foster their deployment process since niches can act like ‘incubation rooms’ (Verbong and Geels 2010, p.1215). From its niche decentralised generation can challenge the existing energy system and possibly alter the prevailing centralised energy system paradigm through generating ideas or practices that can be taken up in the mainstream approach or as innovation fields of which the mainstream actors can learn (Bergman and Eyre 2011, p.345). On the other hand, by remaining to operate from a niche, large-scale emergence and adoption of local renewable energy organisations might be unattainable. Since one of the objectives of this research is to formulate recommendations on how to foster the transition of local renewable energy organisations from incubation towards large-scale deployment, this paragraph embarks with formulating recommendations for policy makers and concludes with endorsements for local renewable energy organisations.

### 7.2.1 Recommendations for policy makers

The Dutch government has had a rather constraining influence on improving the share of (generated) renewable energy in the Netherlands as became apparent from both the literature and the interviews. Verbong and Geels (2010, p.1219) stress that a transition towards decentralised generation is uncertain and consequentially strong policy support is a prerequisite. However, strong policy support is lacking, which is partly due to inconsistent stimulation policies and present bureaucratic procedures. As is discussed previously, inconsistent stimulation policies create uncertainties in the decision-making of emerging organisations (Allen *et al.* 2008, p.541) and tend to provoke a speculative behaviour in which individuals or projects might suspend their procurement in hope for better times, which frustrates the appearance and development of local renewable energy organisations (Bergman and Eyre 2011, p.338, Watson *et al.* 2008, p.3096 and Watson *et al.* 2006, p.13). Controversially, a *prolonged* period of inconsistent policies causes dissatisfaction and encourages the urgency to search for innovative solutions (Zomer 2012). It therefore is important to either choose to provide structural stimulation policies, which enables local renewable energy organisations to engage and develop projects in the long-term, or choose to quite stimulation policies all together, which forces future projects to design sound business cases without public funding (Haar *et al.* 2011, p.108). The majority of the interviewees actually expressed to have neglected any governmental support during their founding process since it was found to frustrate further development and consequentially emphasise that it is possible to establish a local renewable energy organisation without financial public support. Although the empirical results failed to confirm that long and bureaucratic procedures prevent the occurrence of an occasion, they possess a constraining effect on the development of local renewable energy organisations.<sup>39</sup> A particular bureaucratic procedure that hampers further development of this phenomenon regards the inability or lacking willingness of national, regional or local governments to allow the deployment of a business model in which

<sup>39</sup> Furthermore, the case study analysis was able to link long and bureaucratic procedures with a detrimental affect on the local perception (H22). However, this was not confirmed by survey.

inhabitants of a local community collectively own and generate (renewable) energy for their own consumption (Haar *et al.* 2011, p.109). Many emerging organisations embark with the aim to realise this business model within their community, however a large number of these organisations fail to become operational since they are unable to pass this obstacle. Alternatively, organisations that prove to be creative and focus on the possibilities rather than the limitations prove to be more successful in overcoming this hurdle. Despite the existence of several creative pioneers, allowing the deployment of this business model is expected to drastically foster the emergence and development of local renewable energy organisations in the Netherlands.

Finally, as became clear from the interviews and the data retrieved from the survey, the ability to share related knowledge is perceived extremely valuable. This knowledge is commonly found through consulting already existing local renewable energy organisations and organisations such as *Wij krijgen kippen*, *e-Decentraal* and *Provinciale Milieu Federaties*, which support the transfer of related knowledge on the establishment and operation of a local renewable energy organisation. Enabling knowledge transfer is a typical public service and where some regional or local governments start to engage in facilitating the development of these organisations, in many cases public support was found to be absent or bogged down to ambitious targets but lacked practical implementation. Contrary, organisations that experience some support in this way, expressed that it was valuable to their founding process. Therefore, it is emphasised that governmental bodies should aim at facilitating the transfer of knowledge.

### *7.2.2 Recommendations for emerging local renewable energy organisations*

Where governmental intrusions can have a substantial impact on the development of local renewable energy organisations in the Netherlands, it became clear that these organisations are able to enhance their own development and success by considering several organisational and contextual features.

To begin with, the academic literature advocates that to improve the local support for an organisation it is vital to allow all inhabitants and businesses of a local community to participate and become a co-owner of the organisation (Haar *et al.* 2011, p.101, Denis and Parket 2009, p.2092, Walker and Devine-Wright 2008, p.499, Roger *et al.* 2008, p.4218, Walker 2008, p.4402, Toke *et al.* 2008, p.1136, Walker and Cass 2007, p.464, Wünsterhagen *et al.* 2007 and Devine-Wright 2005, p.66). However, several organisations experience difficulties with attracting (additional) members due to either low local awareness of their organisation, low interest in energy issues, unwillingness to be committed to such organisations or the discouragement resulting from a financial contribution. Hence, a non-constraining participation possibility is a prerequisite but merely concentrating on this attribute without addressing or considering these possible obstacles is not sufficient in order to persuade locals to subscribe and improve the local support.

Secondly, a fair distribution of potential benefits, which are allocated to improve the local community or realise other renewable energy related projects, is also found to improve the local support (Walker 2011, p.779 Cass *et al.* 2010, p.267 and Walker and Devine-Wright 2008, p.499). Especially in regard to the presence of local opposition, a fair distribution of benefits might challenge or alleviate the degree of opposition.

Third, emphasising the 'green' image of a local renewable energy organisation is useful in order to distinguish the organisation from conventional energy corporations. In addition, this aspect is found most valuable for organisations of which their community is characterised by a relative high degree of environmental awareness.

Fourth, the degree of social cohesion tends to be determined by the scope, i.e. level of locality, on which an organisation focuses. In case an organisation concentrates on a scale that is too large such as a province or even nation wide, it appears too abstract for potential members to relate to. Alternatively, a too narrow understanding of locality might interfere with the level of social cohesion as well since in some cases inhabitants relate stronger to their city or village than to a district within that city or village.

Furthermore, visible technologies enable local renewable energy organisations to make an abstract notion as (local) renewable energy tangible and understandable. Additionally, visible technologies also enhance the chances of gaining publicity to improve the local perception as well as the local support (Devine-Wright 2005, p.67). Commonly, this is more evident for renewable technologies that possess distinctive features like wind and solar power compared to biomass or geothermal installations, which are less distinctive. However, unless clearly communicated, a realised visible project is not necessarily linked with the efforts of an organisation.

Moreover, feedback on the generated and/or consumed energy can be provided through various manners and is found to have positive impact on the local support. However, some interviewees mentioned that only a fraction of our society is aware and willing to understand or publicly share their energy consumption. Additionally, feedback often requires additional investments in order to monitor the energy production and/or consumption. Consequentially, enabling members or costumers to share their experiences with other community members is a relative inexpensive method to provide feedback, which enhances awareness and challenges scepticism regarding individual energy efficiency, consumption or generation through renewable energy technologies.

Besides, the concept of local renewable energy organisation is relatively new and anticipated to challenge the existing energy paradigm and hence is often confronted with scepticism. In order to counter scepticism and succeed in becoming an operational organisation, the undertaken projects have to work properly to convince society and the community of its capability and relevance. This is confirmed by Watson *et al.* (2008, p.3096) and Sauter and Watson (2007, p.2777) who argue that if decentralised generation is to be accepted by a broader public than merely innovators or pioneers, local renewable energy organisations should take the lead instead of settling with a back-up role, since their active role could counter scepticism concerning reliability. In light of this, reliability both in terms of quality as well as a proven or established technology is a crucial aspect to consider during the founding of a local renewable energy organisation.

### *7.3 Possible venture points for further research*

This research identified common explanatory variables from the academic literature for the emergence and development of local renewable energy organisations in the Netherlands and empirically tested whether these variables determine their appearance. However, due to the recent emergence, rapid development and various forms in which local renewable energy organisations appear as well as factors determining the scope of this research such as time and resource constraints, further research on this phenomenon is necessary in order to broaden our understanding on the emergence and development of local renewable energy organisations. Therefore this paragraph elaborates on possible venture points for further research on this phenomenon.

First, prior to this research a suitable model for explaining the emergence and development of local renewable energy organisations was lacking and therefore this research embarked with constructing a research model. Although a comprehensive literature review complemented with suggestions from experts resulted in an integrated research model, explanatory variables for the emergence and development of these organisations might be missing. Furthermore, the integrated research model allows testing the emergence of these organisations through segregating the founding process in four more or less sequential phases. Where this model assumes a linear founding process, it became clear that the founding process is more suitably defined as an iterative process. Consequentially, additional research on the integrated research model is necessary when further research on this phenomenon is conducted.

Secondly, this research merely concentrated on civil based organisations. Although civil based organisations constitute more than half of the population, actors from the private or public sphere also establish a substantial number of local renewable energy organisations. To obtain a comprehensive understanding on the factors that influence the emergence and

development of organisations from all spheres of society, further research on local renewable energy organisations originating from the public and private sphere is necessary.

Moreover, the number of local renewable energy organisations has shown a remarkable growth and is predicted to expand in the future. Consequentially, due to a dynamic market new organisations are established, which might face novel challenges or perceive certain variables differently and therefore further research on newly established organisations assists in improving and maintaining our understanding of this phenomenon.

Furthermore, the supplementary analysis enabled to explore unanticipated relations between certain organisational attributes and various explanatory variables. Despite little empirical ground to verify these relations, the data occasionally insinuated that a variable is relevant for a specific group of local renewable energy organisations. The first remarkable relation put forward by the supplementary analysis concerns the observation that rural organisations more frequently mentioned that independency from energy corporations and energy exporting countries is an important factor for the establishment of their organisations. In addition, the findings insinuate that a prolonged period of inconsistent stimulation policies strongly inspires urban organisations to found their organisations as an alternative to the failure of governments and the market to expand the share of renewable energy. Finally, the supplementary analysis insinuates that in relation to organisations attuned to other renewable sources, solar oriented organisations experience a stronger negative affect of inconsistent stimulation policies. Consequentially, further research on these possible relations serves to improve our understanding on the emergence and development of a specific segment of the population.

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## Appendices

### Appendix A: Questionnaire submitted to the consulted experts

Naam:

Organisatie:

Datum:

De definitie gebruikt in mijn onderzoek voor lokale duurzame energiebedrijven is:  
*Local renewable energy organisations are local organisations, which are initiated and managed from the civil society, that aim to provide (i.e. generation, distribution and consumption) renewable energy (derived from various renewable sources and generate both electricity and heat) to actors (inhabitants, organisations, public entities etc.) who reside close to where the renewable energy is generated.*

Populatieomvang:

- Wanneer u een brede interpretatie neemt van gedecentraliseerd opwekken van duurzame energie (bijv. alle organisatie vormen, opgericht en geïnitieerd door zowel burgers, bedrijven of overheid) beschouwd, hoeveel organisaties die gericht zijn op het decentraal opwekken van energie zijn er momenteel actief in Nederland?
- Wanneer u de hierboven genoemde definitie beschouwd, hoeveel lokale duurzame energiebedrijven zijn er momenteel actief in Nederland?
- Kunt u een aantal lokale duurzame energiebedrijven noemen die als succesvol worden beschouwd?

Ontwikkeling van lokale duurzame energiebedrijven in Nederland:

- Is het aantal lokale duurzame energiebedrijven toegenomen, afgenomen of stabiel gebleven in de afgelopen tien jaar (sinds de liberalisering van de groene energie markt)? En hoe was deze ontwikkeling in het recente verleden?
- Verwacht u dat dit aantal in de toekomst zal toenemen, afnemen of juist stabiliseren?

Verifiëren van theoretisch model:

- Welke factoren hinderen of stimuleren de verspreiding (of juist stagnatie) van lokale duurzame energiebedrijven in Nederland?
- Als u naar het model kijkt, zijn er factoren die u zou toevoegen, veranderen of verwijderen?
- Welke factoren zijn naar uw mening van doorslaggevend belang in de verspreiding van lokale duurzame energiebedrijven?

## Appendix B: Questionnaire submitted to the case studies

Dit onderzoek is gericht op de mogelijke factoren die het oprichtingsproces van lokale duurzame energie bedrijven (LDEB) in Nederland verklaren. Het oprichtingsproces bestaat uit vier categorieën; het ontstaan van een gelegenheid of motivatie voor de oprichting van een LDEB, de perceptie (beeldvorming) van de oprichters ten aanzien van een LDEB, lokale steun voor en acceptatie van een LDEB en een analyse van de eigenschappen van de toe te passen duurzame techniek door de LDEB. Allereerst volgen een aantal algemene vragen omtrent de kenmerken van uw LDEB.

Naam LDEB :  
 Initiators/oprichters :  
 Organisatievorm :  
 Jaar van oprichting :  
 Duurzame bron :  
 Duurzame techniek :  
 Aantal leden :  
 Waarvan lokaal :  
 Aantal klanten :  
 Waarvan lokaal :  
 Jaarlijkse energie productie :

### Gelegenheid:

1	<p>In hoeverre vormden macro ontwikkeling zoals fluctuerende of stijgende energieprijzen een gelegenheid voor het oprichten van de LDEB? En de mate van bewustzijn m.b.t. klimaat verandering? (doorslaggevend, ondergeschikt etc.)</p> <p>Prijsschommeling:</p> <p>Bewustzijn:</p>
2	<p>In hoeverre ontmoedigen macro ontwikkelingen op de Nederlandse energie markt zoals de toetreding barrières tot de energiemarkt de gelegenheid voor het oprichten van de LDEB? En ongelijke behandeling van LDEB's ten opzichte van centrale energie bedrijven?</p> <p>Toetreding barrières (regulering, centraal ontworpen systeem, gevestigde orde):</p> <p>Ongelijke behandeling (energiebelasting, regulering bij gebruik van het net):</p>
3	<p>In hoeverre ontmoedigen overheidsinvloeden zoals inconsistente stimulerings- of subsidieregelingen de gelegenheid voor het oprichten van de LDEB? En bureaucratische procedures voor het verkrijgen van bijvoorbeeld de juiste vergunningen, salderen of zelf leveren?</p> <p>Instabiele stimuleringsregelingen:</p> <p>Bureaucratische procedures:</p>

4	<p>Hebben deze overheidsinvloeden tot ontevredenheid bij de oprichter(s) geleid?          En in hoeverre vormde de <u>ontevredenheid</u> (m.b.t. inconsistente stimulerings- of subsidieregelingen) een gelegenheid voor het oprichten van de LDEB?          En <u>ontevredenheid</u> t.o.v. het (waarschijnlijk) niet realiseren van haar duurzame energie doelstellingen? (30% CO<sup>2</sup> reductie, 20% duurzame energie)</p> <p>Ontevredenheid:</p> <p>Inconsistente stimuleringsregelingen:</p> <p>Behalen van duurzame targets:</p>
5	<p>In hoeverre vormde de match tussen een lokale duurzame energie bron (wind, zon, biomassa, thermische warmte etc.) en de lokale vraag naar energie een gelegenheid voor het oprichten van de LDEB?</p>
6	<p>In hoeverre vormde de drang naar autonomie (van grote energiebedrijven of energieproducerende landen) een gelegenheid voor het oprichten van de LDEB?</p> <p>Huidige energiebedrijven:</p> <p>Energie producerende landen:</p>
7	<p>In hoeverre vormde andere symbolische kenmerken van duurzame energie zoals een 'groen' imago en het <u>verbeteren</u> van de sociale cohesie in de gemeenschap een gelegenheid voor het oprichten van de LDEB?</p> <p>Groen imago:</p> <p>Sociale cohesie:</p>
8	<p>In hoeverre vormde dalende prijzen voor duurzame technologieën (bijvoorbeeld zonnepanelen) een gelegenheid voor het oprichten van de LDEB?</p>
9	<p>Vormde andere dan de hierboven genoemde ontwikkelingen een gelegenheid voor het oprichten van de LDEB?</p>

**Perceptie (beeldvorming):**

10	Hoe intensief is het contact en het vertrouwen tussen de leden van de gemeenschap waar de LDEB zich op richt (dorp, wijk, vereniging etc.)? En in hoeverre heeft dit invloed gehad op de beeldvorming van de oprichters t.o.v. het oprichten van een LDEB?
	Intensief/passief contact en vertrouwen:  Bijdrage:
11	In hoeverre hebben externe partijen invloed gehad op de beeldvorming van de oprichters t.o.v. van het oprichten een LDEB? Denk hierbij aan consultants of adviseurs, tegenstrijdige belangengroepen, andere LBED's of leveranciers en monteurs.
	Consultants/adviseurs:  Tegenstrijdige belangengroepen:  Andere LDEB's:  Leveranciers/monteurs:
12	In hoeverre heeft overheidshulp in de vorm van ter beschikking gestelde expertise invloed gehad op de beeldvorming van de oprichters t.o.v. het oprichten van een LDEB? En eventuele manieren van kennisoverdracht gestimuleerd door de overheid?
	Expertise:  Kennisoverdracht:
13	In hoeverre hebben de mogelijke bureaucratische procedures omtrent de regulering van decentrale energie opwekking, invloed gehad op de beeldvorming van de oprichters t.o.v. het oprichten van een LDEB?
	(saldering, zelflevering, vergunningen etc.)
14	In hoeverre heeft de zichtbaarheid van de toegepaste duurzame techniek invloed gehad op de beeldvorming van de oprichters t.o.v. het oprichten van een LDEB?
15	Zijn er nog andere partijen, gebeurtenissen of aspecten die invloed hebben gehad op de vorming van de (uw) perceptie van de oprichters t.o.v. van het oprichten van een LDEB?
	(Banken/platformen)

**Lokale steun en acceptatie:**

16	Is vrije toetreding voor burgers en/of omwonende tot de LDEB als lid of klant mogelijk? En in hoeverre draagt deze (on)mogelijkheid tot vrije toetreding bij aan de lokale steun voor en acceptatie van de LDEB?
	Mogelijk:  Bijdrage:
17	Is er veel interne expertise op het gebied van decentrale energie opwekking (bijvoorbeeld saldering, regulatie, zelf-levering)? In hoeverre draagt deze interne expertise bij aan de mate van participatie van burgers en/of omwonende? En in hun steun voor en acceptatie van de LDEB?
	Interne expertise:  Bijdrage aan lokale burger participatie:  Bijdrage aan steun:
18	Zijn de leden of klanten van de LDEB ook mede-eigenaar van de LDEB? En in hoeverre draagt de mate van medezeggenschap van leden of klanten bij aan de lokale steun voor en acceptatie van de LDEB?
	Mede-eigenaar:  Bijdrage:
19	Hoe worden de potentiële winsten uit de LDEB verdeeld over de leden of klanten, m.a.w. hebben leden invloed op de winstverdeling? En in hoeverre draagt dit bij aan de lokale steun voor en acceptatie van de LDEB?
	Winstverdeling:  Bijdrage:
20	In hoeverre draagt de mate van contact en vertrouwen tussen de leden van de gemeenschap waar de LDEB zich op richt (dorp, wijk, vereniging etc.), bij aan de lokale steun voor en acceptatie van de LDEB? (zie vraag 10)

21	In hoeverre draagt de mate van algemene bewustzijn t.o.v. klimaat verandering in de Nederlandse maatschappij en de lokale gemeenschap bij aan de lokale steun voor en acceptatie van de LDEB?
	Nationaal:  Lokaal:
22	Heeft de LDEB te maken met lokale oppositie? Zo ja, in welke mate draagt de aanwezigheid van deze oppositie bij aan de lokale steun voor en acceptatie van de LDEB?
	Oppositie:  Bijdrage:
23	Ontvangt de LDEB steun van derden? Zo ja, in hoeverre draagt deze steun bij aan de lokale geloofwaardigheid? En steun en acceptatie van de LDEB?
	Steun van (of samenwerking met) derden:  Bijdrage geloofwaardigheid:  Bijdrage steun:
24	In hoeverre draagt de zichtbaarheid van de toegepaste duurzame techniek bij aan de lokale steun voor en acceptatie van de LDEB?
25	Hebben klanten en leden de mogelijkheid om te achterhalen hoeveel energie is opgewekt of verbruikt, met andere woorden is er feedback? In hoeverre draagt dit aspect bij aan de lokale steun voor en acceptatie van de LDEB?
	Feedback:  Bijdrage
26	In welke mate ontvangt de LDEB lokale steun en acceptatie? Is hiervoor een andere verklaring te noemen dan de hierboven gestelde suggesties?
	Mate van steun (breed/gedeeltelijk/geen idee/matig/nauwelijks):  Andere verklaring:

**Analyse van de toegepaste duurzame techniek:**

27	<p>In hoeverre heeft de mogelijkheid voor feedback meegewogen in de keuze voor de toegepaste duurzame techniek?</p>
28	<p>In hoeverre heeft de mate van betrouwbaarheid van de duurzame techniek meegewogen in de keuze voor de toegepaste duurzame techniek? (positief/negatief)</p>
29	<p>In hoeverre heeft zichtbaarheid van de duurzame techniek meegewogen in de keuze voor de toegepaste duurzame techniek? (positief/negatief)</p>
30	<p>Is de LDEB gefinancierd door verschillende partijen? In hoeverre heeft de betrekking van verschillende partijen (en daarmee de afhankelijkheid) voor de financiering meegewogen in de keuze voor de toegepaste duurzame techniek?</p> <p>Financiering:</p> <p>Meegewogen:</p>
31	<p>Levert de LDEB de opgewekte energie direct aan haar leden en klanten of via een distributeur? (Zo ja gaat dit via het centrale net?) In hoeverre heeft de mogelijkheid of verplichting voor aansluiting aan het net meegewogen in de keuze voor de toegepaste duurzame techniek?</p> <p>Levering aan leden:</p> <p>Via het net:</p> <p>Meegewogen:</p>

32	Hebben economische factoren zoals de kostprijs en terugverdientijd meegewogen in de keuze voor de toegepaste duurzame techniek?
	Kostprijs:  Terugverdientijd:

33	Heeft de capaciteit (totale output) van de toegepaste techniek invloed op de winstgevendheid van de LDEB? En in hoeverre heeft de capaciteit meegewogen in de keuze voor de toegepaste duurzame techniek?
	Winstgevendheid:  Meegewogen:

**Afronding:**

34	Zijn er naast de behandelde onderwerpen nog andere aspecten, gebeurtenissen of kenmerken die invloed hebben gehad op het oprichtingsproces van deze LDEB?

**Appendix C: Invited organisations to participate with the survey**

Organisation	First contact	Second contact	Third contact	Received on:
<b>Achterhoekse Zonneenergie Cooperatie A.U.</b>	18-05	29-05	06-06	
<b>ADEM Houten</b>	18-05	29-05		30-05
<b>Amsterdam Energie</b>	18-05			20-05
<b>Bergen Energie</b>	18-05	29-05	06-06	
<b>Burgervlotbrug en de Locht</b>	18-05	29-05		
<b>Cooperatie Duurzaam Zwaag</b>	18-05	29-05	06-06	07-06
<b>De Groene Reus</b>	18-05	29-05		31-05
<b>DE Ramplaan</b>	18-05	29-05	06-06	
<b>De stoere houtman (Energie schone houtvrouw)</b>	18-05	29-05	06-06	
<b>Eemstroom</b>	18-05			21-05
<b>Energie Cooperatie Noordseveld</b>	18-05	29-05		30-05
<b>Energie Dongen</b>	18-05	29-05		29-05
<b>Groene energiebank Salland BV</b>	18-05			28-05
<b>Heetec - Stichting Duurzaam Heeten</b>	18-05	29-05	06-06	
<b>Kroetenwind</b>	18-05	29-05	06-06	
<b>Meewind</b>	18-05	29-05	06-06	
<b>Regge Stroom</b>	18-05	29-05		
<b>Solar Green Point</b>	18-05	29-05	06-06	
<b>Stichting Duurzaam Oosterhout</b>	18-05			21-05
<b>Stichting Schoonschip</b>	18-05	29-05	06-06	
<b>Texel Energie</b>	18-05			21-05
<b>Vereniging Duurzaam Soesterkwartier</b>	18-05			24-05
<b>Vogelwijk Energie (K)</b>	18-05	29-05	06-06	
<b>Werkplaats topdorpen</b>	18-05			18-05
<b>Wynmole Reduzum</b>	18-05			18-05
<b>Zeeenergie Cooperatieve Vereniging Duurzame Energie Zeewolde U.A.</b>	18-05			21-05
<b>Zeeuwse stroom</b>	18-05	29-05		29-05
<b>Zon op Noord</b>	18-05	29-05	06-06	06-06
<b>Zoneco</b>	18-05	29-05	06-06	
<b>Zonnehoven</b>	18-05	29-05	06-06	
<b>Zonvogel</b>	18-05	29-05	06-06	
<b>Zuidenwind</b>	18-05	29-05		29-05

**Appendix D: Total average scores**

Hypotheses		Average score case studies	Average score survey	Total average score	Hypothesised score
<b>H1</b>	Fluctuating (or rising) energy prices stimulate the emergence of an occasion.	3,23	3,92	3,58	3 >
<b>H2</b>	High levels of environmental awareness within society provide a serious occasion.	4,46	4,31	4,39	3 >
<b>H6</b>	Dissatisfaction arising from a prolonged period of inconsistent policies encourages the emergence of an occasion to establish a local renewable energy organisation.	3,08	3,31	3,20	3 >
<b>H7</b>	Dissatisfaction with the incompetence of the national government to meet their environmental targets enhances the emergence of an occasion to establish a local renewable energy organisation.	4,38	3,85	4,12	3 >
<b>H9</b>	The possibility to exploit a local renewable source that matches local demand provides an occasion to establish a local renewable energy organisation.	2,92	4,00	3,46	3 >
<b>H10</b>	Renewable energy technologies provide a sense of independency from conventional energy corporations and thus support the appearance of an occasion to establish a local renewable energy organisation.	4,31	4,08	4,20	3 >
<b>H11</b>	Renewable energy technologies provide a sense of independency from energy producing countries and thus support the appearance of an occasion to establish a local renewable energy organisation.	3,92	3,62	3,77	3 >
<b>H12</b>	A potential symbolic benefit in terms of a green image provides an occasion to establish a local renewable energy organisation.	3,46	4,31	3,89	3 >
<b>H13</b>	A potential symbolic benefit in terms of the enhancement of social cohesion within a community provides an occasion to establish a local renewable energy organisation.	4,23	4,15	4,19	3 >
<b>H15</b>	A high level of interconnectedness within a community (which entails interpersonal trust, social capital building and knowledge transfer) improves local perception of local renewable energy organisations.	4,31	2,54	3,43	3 >
<b>H16</b>	Availability of external expert knowledge reduces the perceived complexity of establishing a local renewable energy organisation and thus enhances the local perception on local renewable energy organisations.	3,54	1,92	2,73	3 >
<b>H16a</b>	Availability of external expert knowledge provided by organisations like e-Decentraal, Wij krijgen kippen, Provinciale Milieu Federaties, ODE and KNHM reduces the perceived complexity of establishing a local renewable energy organisation and thus enhances the local perception on local renewable energy organisations.	3,54	3,46	3,50	3 >
<b>H17</b>	The presence of local opposition negatively affects the local perception of a local renewable energy organisation.	2,62	0,92	1,77	< 3
<b>H18</b>	The existence of other and similar local renewable energy organisations positively affects the local	4,23	3,85	4,04	3 >

	perception on local renewable energy organisations.				
<b>H19</b>	The advice and experience of suppliers and installers of renewable energy technology influence the local perception on local renewable energy organisations.	3,77	1,85	2,81	< 3 >
<b>H19a</b>	The advice and experience of suppliers of renewable energy such as Greenchoice, Trianel or Anode influence the local perception on local renewable energy organisations.	N.A.	3,08	3,08	3 >
<b>H21</b>	Governmental support in terms of facilitating the possibility to share vital knowledge improves the local perception of founding a local renewable energy organisation.	3,31	2,15	2,73	3 >
<b>H22</b>	Long and bureaucratic procedures to obtain permits or permissions negatively effect the local perception of establishing a local renewable energy organisation.	2,62	1,15	1,89	<3
<b>H23</b>	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect the local perception.	3,77	3,62	3,70	3 >
<b>H25</b>	Co-ownership of locals improves local support for and acceptance of a local renewable energy organisation.	4,31	3,69	4,00	3 >
<b>H26</b>	A non-constraining participation possibility for locals, i.e. open participation, enhances local support for and acceptance of a local renewable energy organisation.	4,00	3,85	3,93	3 >
<b>H29</b>	Equal and fair distribution of potential benefits in favour of the participants or the community enhances local support for and acceptance of a local renewable energy organisation.	4,15	3,23	3,69	3 >
<b>H30</b>	A high level of social cohesion within the community (which entails interpersonal trust, social capital building and knowledge transfer) improves local support for and acceptance of a local renewable energy organisation.	3,92	3,54	3,73	3 >
<b>H32</b>	High levels of environmental awareness within society improve local support for and acceptance of a local renewable energy organisation.	4,23	3,62	3,93	3 >
<b>H33</b>	The support of an external party (either an organisation or other local renewable energy organisation) improves the credibility of a local renewable energy organisation.	4,38	3,15	3,77	3 >
<b>H34</b>	The support of an external party (either an organisation or other local renewable energy organisation) improves the local support for and acceptance of a local renewable energy organisation.	4,23	2,92	3,58	3 >
<b>H35</b>	The presence of local opposition negatively affects local support for and acceptance of a local renewable energy organisation.	2,62	1,31	1,97	< 3
<b>H36</b>	Visible technologies enhance symbolic merits (improved awareness, feeling green etc.) of renewable energy technologies and positively affect local support for and acceptance of a local renewable energy organisation.	3,77	3,92	3,85	3 >
<b>H38</b>	The possibility to provide feedback on the generated and consumed energy positively affects local support for and acceptance of a local renewable energy organisation.	4,08	3,31	3,70	3 >
<b>H40</b>	A proven and reliable technology has a positive affect on the assessment.	4,54	N.A.	N.A.	3 >
<b>H40a</b>	A reliable technology in terms of proven or established technology has a positive affect on the assessment.	4,54	3,77	4,16	3 >
<b>H40b</b>	A reliable technology in terms of a consistency and continuity has a positive affect on the assessment.	4,54	2,62	3,58	3 >

<b>H40c</b>	A reliable technology in terms of quality has a positive affect on the assessment.	4,54	3,46	4,00	3 >
<b>H41</b>	Visible technologies improve the awareness of the local renewable energy organisation and positively affect the assessment of the applied technology.	3,77	3,62	3,70	3 >
<b>H44</b>	The initial investment cost is an important factor that is considered during the assessment. A low initial investment and has a positive effect on the assessment of the applied technology.	4,38	3,69	4,04	3 >
<b>H45</b>	The pay back period is an important factor that is considered during the assessment. A short pay back period (depends on efficiency and investment costs) has a positive effect on the assessment of the applied technology.	4,31	3,69	4,00	3 >

## Appendix E: Article Trouw "Trend: doe-het-zelven met energie"

# deVerdieping TROUW

dinsdag 24 juli 2012 € 1,40



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**Oorlogsonderzeeër**

De laatste vermiste duikboot in het vizier bij Noorwegen

VANDAAG 3

**Asbest Utrecht**

Bewoners zijn boos en bezorgd: Hoe weet ik dat ik niet ziek ben?

VANDAAG 4|5

**Blijven smeren**

De zon schijnt, maar smeren? Vijf labels over bakken in de zon

NEDERLAND 7

**CDA-senator**

Uitspraak Europees Hof over SGP en de vrouw is te abstract

PODIUM 15

**Huwelijk in India**

Trouwen buiten eigen kaste of familie is nog steeds gevaarlijke zonde

DE VERDIEPING

## Trend: doe-het-zelven met energie

■ Lokale clubs die zelf duurzame stroom opwekken ondervinden last van wetten

Marianne Wilschut

Het aantal lokale initiatieven om zelf duurzame energie op te wekken stijgt snel. Vrijwel iedere week start een groep burgers, bedrijven, woningcorporaties, scholen en zelfs sportclubs hun eigen energieproductie. Dat blijkt uit een inventarisatie die 'HIER opgewekt', een kennisplatform voor deze doe-het-zelvers op de groene energiemarkt, donderdag presenteert. Maar de initiatieven kampen met het probleem dat ze onder de huidige energiewet veel belasting over de eigen groene energie moeten betalen.

**'Idealisme en grote frustratie over energiebedrijven spelen een rol bij lokale initiatieven'**

Inmiddels zijn er minstens 280 duurzame lokale initiatieven, meldt 'HIER opgewekt'. Dit is een voorzichtige schatting. "Waarschijnlijk zijn het er een paar honderd meer", zegt projectmanager Katrien Prins. "Vaak begint het met een groepje buurtbewoners die samen hun huizen gaan isoleren en zonnepanelen aanschaffen. Hiervan ontstaan verenigingen die collectief groene energie inkopen en opwekken. Er zijn er die uitgaan tot plaatselijke energiebedrijven zoals TevelEnergie, Thermo Bello in Culemborg en Grunneger Power."

Belangrijke motivatie om duurzame energie op te wekken is dat de initiatieven zelf actie willen ondernemen tegen klimaatverandering en zich niet meer thuisvoelen bij de bestaande grote energiebedrijven, stelt Frank Boon, student duurzame ontwikkeling aan de Universiteit Utrecht. Hij studeert binnenkort af op onderzoek naar de energie doe-het-zelvers. "Idealisme en frustraties over energiebedrijven die sinds de privatisering steeds groter zijn geworden spelen daarbij een rol." Nu de energienota almaar stijgt, zien mensen volgens hem hun geld liever niet in de zakken van managers van grote energiebedrijven verdwijnen.

Ook het feit dat deze bedrijven groene energie uit het buitenland halen valt niet in goede aarde.

Hoewel de initiatieven nog geen enorme hoeveelheden duurzame energie opwekken, zijn ze voor de overgang van fossiele naar groene energie van groot belang, denkt Bart Jan Krouwel, voorzitter van e-Decentraal, een organisatie die namens de bij haar aangesloten lokale initiatieven lobbyt bij de overheid. "De drang bij de burger om meer zeggenschap over energie te krijgen zal eerder toedien afnemen. Als de roep van onderaf om groene energie steeds groter wordt, zullen ook grote concerns meer in beweging komen."

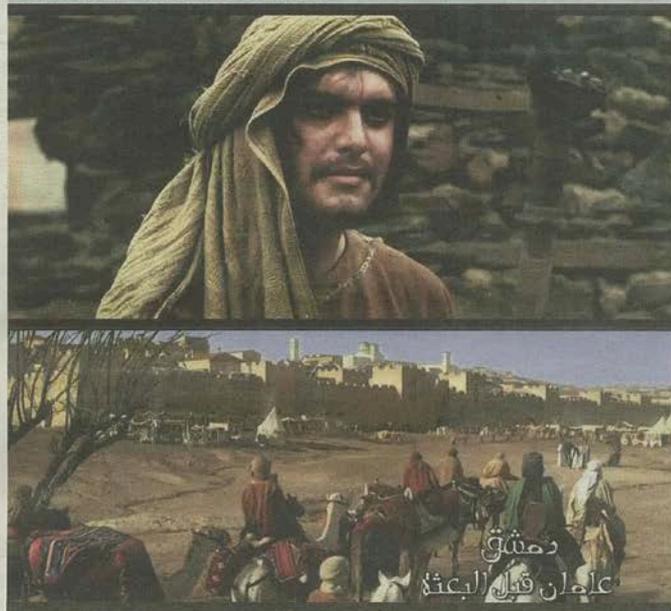
Veel lokale initiatieven ervaren de huidige Energiewet echter als een belemmering voor hun groei. Een vereniging van buurtbewoners die samen besluit om bijvoorbeeld op het dak van een naburig volkstuincomplex zonnepanelen niet te leggen, moet in vergelijking met grote energiebedrijven namelijk relatief veel energiebelasting over de door hen opgewekte duurzame stroom betalen. De overheid aarzelt om de Energiewet te versoepelen. Boon: "Ze ontvangt vijf tot zes miljard euro aan energiebelasting. Dat schrapt de regering liever niet uit de begroting."

"Uiteindelijk frustreren de overheid daarmee de ontwikkeling van de economie", denkt Krouwel. "Deze initiatieven kunnen de werkgelegenheid stimuleren. Bovendien ontlasten zij het bestaande energienetwerk." e-Decentraal pleit dan ook voor een maatschappelijke kosten-batenanalyse. "Wij hebben al aangeboden om daar de helft van te betalen, maar we hebben nog niets van minister Verhagen gehoord."

**DUURZAAMHEID & NATUUR 8|9**  
Verbeter de wereld, begin in Ballinge

advertentie

Volg duurzaamheid en natuur op twitter  
@TrouwGroen

**Grootste Arabische tv-serie**

Beelden uit de tv-serie. Boven Omar, de 'metgezel' van de profeet Mohammed. Onder de karavaan bij Damascus.

## Mag 'metgezel' Mohammed wél afgebeeld worden?

■ Televisie-serie over tweede kalief verdeelt moslims

Eldert Mulder

De opnames duurden driehonderd dagen, dertigduizend mensen deden mee. Dat de tv-serie Omar Al-Farooq een van de grootste Arabische tv-producties ooit is, bestrijden weinigen, maar verder is de eensgezindheid ver te zoeken.

De productie, deze ramadan ondanks veel ophef in tal van moslimlanden uitgezonden, botste op fatwa's pro en contra. De producenten zijn de Saoedische tv-kanalen MBC en de tv van het staatskanaal Qatar. De serie beschrijft het leven van Omar, tweede kalief van het moslimrijk, toonbeeld van sobere onkreukbaarheid en een 'metgezel' van de profeet Mohammed. Het probleem: mag je een toneelspeler de rol geven van een metgezel van de profeet? Nee, vinden velen. Omar behoort tot een categorie mensen die te bijzonder zijn om te mogen worden afgebeeld. Hij was een 'metgezel', hij behoort tot de vier 'rechtgeleide

kaliefen' die het moslimrijk na de dood van Mohammed leiding gaven, en hij was een van de tien personen aan wie Mohammed het paradijs zou hebben beloofd.

En Algerijse krant gooidde een blok hout op het vuur met het gerucht dat de volstrekt onbekende Syrische hoofdrolspeler, Samir Ismail, een christen zou zijn. De regisseur ontkende dat in alle toonaarden, maar de schade was al aangericht.

Opvallend verdeeld is Saoedi-Arabië. De Dar-al-Hita, de hoogste instantie die toezicht houdt op de fatwa's in het koninkrijk, veroordeelt de serie. Maar een voormalige chef van de religieuze politie ziet geen bezwaar. Zijn argument: de Koran verbiedt het afbeelden van de 'metgezellen' niet. Sterker nog – maar dat zei hij er niet bij – de Koran rept niet met een woord over die metgezellen.

De huistheoloog van Al-Jazeera, Joesef Al-Karadawi, steunt de serie.

Hij is een favoriet van de Moslimbroeders, onder wie de nieuwe Egyptische president Morsi. Maar de Azzam, de belangrijkste Egyptische sprekerbuis van de soennitische Islam, is tegen.

Tegenstanders op internet vrezen dat de hoofdrolspeler later wel eens in een andere serie een schurkenrol zou kunnen krijgen. Dan zouden kijkers de edele Omar vermengen met die schurk. De regisseur had iets soortgelijks voorzien. Hij wilde geen bekende acteur, omdat de kijkers dan zouden moeten denken aan zijn eerdere rollen. Dan bood een gouden kans aan de onbekende Samir Ismail.

Voor de sjieten deugt de serie per definitie niet. Zij haten de 'metgezellen', omdat die het kalifaat zouden hebben geroofd van Ali, Mohammeds schoonzoon. Sjieten weten hun afkeer in een specifiek ritueel: 'het uitschelden van de metgezellen', onder wie dus ook de Omar van deze serie.