The role of community benefits in community acceptance of multifunctional solar farms

Does the community benefit?

MSc Thesis Land Use Planning | Kimo van den Berg

COLOPHON

Images front page: solar farm 'De Kwekerij' in Hengelo (Gelderland) offering multiple types of community benefits. Pictures made by Jonny Lawson in solar farm 'De Kwekerij', retrieved by permission on July 14, 2020.

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PREFACE

During my studies Spatial Planning at Wageningen University my interest in the rural landscape and its future challenges increased. Due to the minor Urban Environmental Management, I was able to learn more about sustainable energy technologies and my interest for it grew. Another important aspect of spatial planning I have always found interesting, is the attitude of people towards spatial interventions. The introduction of sustainable energy technologies in the rural landscape is a good example of a spatial intervention which often encounters high levels of opposition by local communities.

During my internship at the municipality of Schouwen-Duiveland in the province of Zeeland, I wrote a report about the physical and aesthetic influence of solar farms on the landscape and opportunities to reduce the impact on the landscape. An opportunity appeared to be multifunctional solar farms, which reduces the impacts of dense solar farms on the surroundings and which can provide other benefits to be used by people. In combination with the high level of opposition solar farm developments encounter in this municipality, the topic for my final master thesis was discovered. I was curious about the role of community benefits in multifunctional solar farms and how they could change people's attitudes towards solar farm developments.

For this research, I would like to thank a few people. First of all, I would like to thank my supervisor Barbara Tempels for providing critical and encouraging feedback, helpful tips and for the support during this research project. Your comments helped me to stay critical and to improve my thesis. Second, I would like to thank the municipality of Schouwen-Duiveland for offering me a workplace during my thesis and in addition, I would like to thank my external supervisor Baukje Bruinsma for providing tips and feedback on my thesis. Third, I would like to thank all interviewees who were eager to participate in the interviews. Without them, I was not able to collect data. Finally, I would like to thank my family and friends for their support during this thesis.

After this thesis, I will finish my master studies and my time at the Wageningen University will end. Although, I have always enjoyed my time there, I am glad that I have finished my studies and that I have completed this thesis.

I hope you enjoy reading my thesis!

Kimo van den Berg

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ABSTRACT

Solar farm developments contribute to sustainable energy goals set by the Dutch government, but often face high levels of opposition on the local level due to their expected negative impacts. Community benefits are a promising tool to reduce the level of opposition, as they are often able to do in wind farm developments. In this research, the role of community benefits in multifunctional solar farm developments is analysed through three case studies. The results of this research show that community benefits can increase community acceptance of solar farm developments, however, if not applied properly, they can also have adverse effects. The exact role of community benefits depends on the location, the level of community involvement, the organisation of the planning process and trust in the developers. A high level of community involvement fosters trust in the intentions of developers, provides opportunities for the community to influence the type of benefits and therefore, the benefits are more easily considered as beneficial by the community. As a result, the benefits are able to outweigh the disbenefits resulting from the development, which positively influences community acceptance of the solar farm. However, when community involvement is lacking and community benefits are not applied properly, they can even increase opposition.

Key words: community benefits | community acceptance | solar farm developments | distributional justice | procedural justice | trust

SUMMARY

In order to comply to sustainable goals, set by the Dutch national government, sustainable energy generation through wind and solar technologies is emphasized. Nowadays, about 100 solar farms have been developed in rural areas and this number is increasing. Support for sustainable energy is in general considerable. However, support for solar farm developments on the local level is often lower due to aesthetic, environmental and economic impacts arising on the local level. Other arguments relate to the lack of equitable compensation and to the distribution of costs and benefits resulting from the developments. Community benefits are commonly provided in on-shore wind farm developments in order to compensate people for possible impacts and thereby try to increase community acceptance of the development, while the provision of these benefits is less known in solar farm developments. Therefore, the exact role of community benefits in community acceptance of solar farm developments is not clear. This research aims to explore the role of community benefits in community acceptance of solar farm developments. A qualitative research approach and a case study research design will be used to explore this role. Three cases were analysed in-depth: existing solar farm 'De Kwekerij' and two future plans for solar farm 'Zonnewoud' and 'Abdissenbosch'. In each case, four stakeholders were interviewed and in total 12 semi-structured interviews were conducted.

The results of this research show that different type of community benefits have been provided in solar farm developments: in-kind benefits, environmental enhancement or mitigation, local services and financial benefits. Community benefits were not only provided as way to compensate people for possible impacts caused by the solar farm development or to increase acceptance, but also to comply to criteria set by the government, to attract more visitors to the area, as a result of technical aspects due to the connection capacity, or the benefits were wished by the community. The influence of community benefits on the distribution of costs and benefits is influenced by the location, the reasons of developers to provide community benefits and the level of community benefits. In two cases, the distribution of costs and benefits became more equitable due to the provision of benefits, because the benefits were able to overcompensate the disbenefits associated with the development. While in the other case, the distribution remained unequitable.

The perception of community benefits is also influenced by the location and the planning process. In two cases, community benefits were considered as positive, because the community had influence on the type of community benefits and therefore considered the development as added value for the surroundings. As a consequence, the community benefits were able to contribute to community acceptance of the solar farm developments. However, in the other case, the perception towards community benefits was negative, because the citizens did not consider the provided benefits as necessary and therefore they were not useful to them. In this case, community benefits were not able to contribute to community acceptance, but even led to an increase of opposition to the project.

This research shows that the provision of community benefits can contribute to a more equal distribution of costs and benefits and therefore, the role of community benefits can be considered as positive contribution to community acceptance. However, this depends on the location, community involvement, planning process and trust in the intentions of the developer.

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CHAPTER 1

Introduction

This chapter introduces the topic of this research, the societal and scientific relevance of the research and the research problem. In addition, it describes the research objective and research questions.

1 INTRODUCTION

In order to reach the goals, set in the Paris climate agreement, the greenhouse gas (GHG) emissions should be reduced. To reach the point of a zero emissions society, renewable energy plays an important role. Renewable energy sources can, compared to fossil-fuelled or nuclear energy generators, generate energy with minimal environmental harm (Sovacool, 2009). To be able to lower GHG emissions and in order to be less reliant upon fossil energy sources, governments all over the world are promoting renewable energy (Batel, Devine-Wright, & Tangeland, 2013). As a consequence, sustainable energy technologies, such as wind turbines and solar panels, are nowadays being developed at increasing rate (Nuortimo, Härkönen, & Karvonen, 2018). Solar energy is a promising renewable energy source to contribute to the increase of renewable energy production (Carlisle J. E., Kane, Solan, Bowman, & Joe, 2015). It is also the renewable energy technology with the most positive image, which seems to result in a greater deployment of solar power in many countries (Nuortimo, Härkönen, & Karvonen, 2018). Other factors contributing to the increase of solar energy are the availability and price decrease of solar panels (Nuortimo, Härkönen, & Karvonen, 2018).

The national government of The Netherlands has set the goal to have an almost fully sustainable and CO_2 neutral energy production in 2050. In 2020, 14% of the total energy should be generated from sustainable energy sources and in 2030 this will be 37%. To reach these goals, the government is especially focused on wind and solar energy. Off- and onshore wind turbines are being developed and solar panels appear on roofs[1]. However, the available roof surface for solar panels is limited and will not be sufficient to comply with the sustainable energy goals of The Netherlands (Cesar, Slooff, Erberveld, & Lange, 2018). Therefore, more solar farms are being developed in rural areas. The Solar Trade Association (STA) defines solar farms (also known as solar parks or solar fields) as *"the large-scale application of solar photovoltaic (PV) panels to generate green, clean electricity at scale, usually to feed into the grid."*[2] The amount of solar farms in The Netherlands is increasing. In 2017, this amount was 22, whereas in 2019 this number increased to more than 80 (PBL, 2019). Nowadays, almost 100 solar farms have been developed (Kadaster, 2020). Especially in the last two years, a significant increase can be identified. Not only the amount, but also the size of solar farms is increasing. Whereas the first solar farms had a size of about two hectares, in 2019 the average size is about 20 hectares (Kadaster, 2020).

In general, considerable support for sustainable energy exists. However, due to the aesthetic, environmental and economic impacts of sustainable energy developments on the local level, local residents are more critical about sustainable energy technologies and as a result, they are often less supportive (Zoellner, Schweizer-Ries, & Wemheuer, 2008). In the news, many articles arise about opposition to solar farms. The news website NOS, for example, writes about "the threatened

[1] Retrieved January 8, 2020 from https://www.rijksoverheid.nl/onderwerpen/duurzame-energie/meer-duurzame-energie-in-de-toekomst
[2] Retrieved March 7, 2020 from https://www.solar-trade.org.uk/solar-farms/

landscape"[3] and the increasing opposition to solar farm developments. Local news websites such as PZC (Provinciale Zeeuwse Courant)[4] or RTV-Oost[5], also write about opposition to solar farms caused by possible aesthetic impacts on the landscape and environmental concerns. Another example is the plan for a solar farm nearby Wageningen (see figure 1). 48 objections have been submitted to this plan. Arguments were related to aesthetic impacts on the landscape, obstructing the view of local residents, the possibility of glare and the reduction of house prices[6]

Figure 1 Sign of protest to the plan for a solar farm in the Binnenveld nearby Wageningen[7].

This discrepancy in the difference between public acceptance of sustainable energy technologies on different levels is called the "national-local gap" (Sütterlin & Siegrist, 2017, p. 358). On the local level, even opposition towards renewable energy technologies can arise (Sütterlin & Siegrist, 2017). This causes several limitations to the implementation of such developments. According to Anderson, Schirmer, & Abjorensen (2012, p. 688), *"new and complicated technologies involving the construction of controversial infrastructure have a history of struggling in their early phases of proposal and implementation because of poor participatory processes"*. As a consequence, community opposition can increase, with the result of delayed or even cancelled projects (Anderson et al., 2012). However, the acceptance of and opposition to sustainable energy projects differs per community. According to

[3] Retrieved March 15, 2020 from https://nos.nl/nieuwsuur/artikel/2275542-het-bedreigde-landschap-de-weerstand-tegen-zonneparken-groeit.html
[4] Retrieved March 20, 2020 from https://www.pzc.nl/schouwen-duiveland/7-000-zonnepanelen-passen-niet-in-oudste-polder-schouwen-duiveland~aa58280b/
[5] Retrieved March 20, 2020 from https://www.rtvoost.nl/nieuws/326193/Wanneperveen-is-massaal-tegen-aanleg-zonnepark-We-koesteren-ons-mooie-landschap
[6] Retrieved March 20, 2020 from https://www.gelderlander.nl/wageningen/bijna-vijftig-bezwaren-tegen-zonnepark-aan-haarweg~af92fea1/
[7] Retrieved from https://www.mooiwageningen.nl/2019-3-mooi-wageningen-in-beroep-tegen-zonnepark-haarweg/ on March 20, 2020.

Anderson et al. (2012, p. 687), while in some communities opposition to renewable energy projects is high, other communities accept such projects more easily.

In order to improve the local acceptance of renewable energy projects, developers often provide community benefits to compensate local communities for the possible ills associated with the renewable energy project (Terwel, Koudenburg, & Ter Mors, 2014). In general, the idea is that community benefits can contribute to acceptance of energy projects by communities (Cowell, Devine-Wright, & Devine-Wright, 2016). Community benefits are commonly provided in wind energy developments, such as onshore wind farms. The form of compensation ranges from providing annual funds to the community, to constructing new recreational facilities in a neighbourhood (Cowell et al., 2016). In solar farm developments, community benefits can indirectly be provided through additional benefits that solar farms more often offer. These benefits are being formed when different functions in a solar farm are combined in order to create a multifunctional solar farm. The combination of functions leads to multifunctional landuse, which has the advantage of preserving space and reducing the impacts on the landscape (PBL, 2019). Moreover, the combinations of multiple functions in a solar farm can have additional benefits for the surrounding environment and the community. Examples of such benefits are biodiversity enhancement or the provision of a new recreational facility when the solar farm is made accessible to people.

Multiple use of solar farms is also emphasized in a last year released code of conduct for solar farm developments in the rural landscape. This code of conduct was released in November 2019. The code is not an official statutory law, but it offers guidelines for the physical and process oriented development of solar farms and includes the integration, design and maintenance of solar farms. The code was an initiative of HollandSolar, a branch organisation of solar energy and is signed by nine environmental and energy organisations[8]. Altogether, these organisations represent more than two million Dutch people, citizen groups, 170 solar energy related companies, 400 energy cooperatives and about 1000 local nature- and environmental organisations. According to HollandSolar, large-scale solar energy is needed to comply to the sustainable energy goals of The Netherlands. However, many people are concerned about these large-scale solar farm developments in the landscape. Therefore, this code is developed to limit the spatial impact of solar farms and to take care that solar farms offer added value to the area and the surrounding communities. Although many requirements already exist for solar farm developments in The Netherlands, the code assigns extra requirements over and above the statutory requirements for solar farm developments. These requirements apply to all members of HollandSolar and should be included in all new solar farms on land developed by the members in The Netherlands. The code includes three guiding principles: involving surrounding residents and stakeholders in the process, provided added value for surroundings and the possibility to return to a pre-disturbed state. From these guiding principles in the code, the first two, involving surrounding residents in the process and providing added value for the surrounding environment, can be considered as form of community benefits. For example, involving surrounding citizens can be done through financial participation, while providing added value for the surroundings can be done by improvement of the landscape, nature or environmental enhancement or by the development of a recreational facility for the community, such as a playground.

[8] Retrieved March 31, 2020, from https://hollandsolar.nl/gedragscodezonopland

An example of a solar farm offering these additional benefits is solar farm ''De Kwekerij'' in Hengelo. The solar farm has multiple functions: it offers space for nature development, it functions as recreational area, it provides employment and it has an educational function[9]. In this way, the solar farm functions as 'production landscape' for the local community[10]. A remarkable fact about this solar farm is, that almost no opposition by inhabitants arose to the development of the park. This is an example of an energy project which was accepted with relative ease (Anderson et al., 2012), while other projects often face strong opposition by surrounding communities (Sütterlin & Siegrist, 2017). In this specific case, several benefits have been provided for the community and the solar farm is designed with respect for the surrounding area and the local inhabitants. This example shows that the provision of community benefits provides a promising avenue for increasing the community acceptance of solar farms, and thus implementing more sustainable energy developments on a larger scale.

1.1 Problem description

Public acceptance of sustainable energy technologies is important to introduce them successfully into society and to make the energy transition happen (Huijts, Molin, & Steg, 2012; Nuortimo, Härkönen, & Karvonen, 2018). Various barriers which can delay or impede sustainable energy developments have been identified. A frequently mentioned barrier is public acceptance and the permitting of the developments. According to Hanger et al. (2016), this has resulted in delayed or even cancelled projects and in addition, has put many projects in jeopardy. The implementation of sustainable energy technologies, such as solar farms often leads to strong opposition on local level (Sütterlin & Siegrist, 2017). In scientific literature, much attention is given to public acceptance of sustainable energy developments (Nuortimo, Härkönen, & Karvonen, 2018). However, when specifically looked at public acceptance of solar farms on the local level, research focusing on community acceptance of solar farms is significantly lacking (Roddis, Carver, Dallimer, Norman, & Ziv, 2018). Sütterlin & Siegrist (2017) argue that more data about public acceptence of renewable energy technologies is needed for a more successful realization of such technologies into society. Moreover, existing research often deals with community acceptance of wind energy developments (Hanger et al. 2016) and less studies are focused on community acceptance of solar energy developments.

Another knowledge gap in scientific literature is about the consideration of distributive elements in renewable energy projects: *"despite some recent academic attention the distributive elements of renewable energy development have been relatively overlooked, perhaps because it is often regarded uncritically as an environmental and social good."* (Roddis et al., 2018, p. 354). In addition, the majority of studies assess the distribution of costs and benefits on the basis of financial goods which often are internalised by landowners. While the potential negative impacts of sustainable energy developments, such as landscape changes, health impacts and the reduction of public amenity value are imposed on the local community nearby the development (Simpson & Clifton, 2016). Instead of the distributional

[9] Retrieved April 20, 2020 from https://www.ijsselmoves.nl/nr-0119/nr0119-interview/solarpark-de-kwekerij/
[10] Retrieved January 14, 2020, from Dorpenacademie: https://dorpenacademie.nl/initiatief/solarpark-de-kwekerij-in-hengelo-gld/

effects, priority in academic literature is given to citizen interaction and engagement in the decision making process, which can be related to procedural justice (Simpson & Clifton, 2016).

In order to manage distributional effects and to compensate communities for the social and environmental impacts caused by sustainable energy development on the local level, developers can provide community benefits (Yenneti & Day, 2016). The provision of community benefits is often considered as strategy to foster local support for sustainable energy technologies (Walker, Wiersma, & Bailey, 2014). According to Cowell et al. (2016, p. 20), *"it is generally thought that community benefits 'work' by improving the local social acceptability of projects. (…) However, there is limited and contradictory evidence that the provision of community benefits promotes local social acceptability, improves trust in developers, or speeds up the delivery of infrastructure development."* In addition, Walker et al. (2014, p. 52) argue for a "*broader need to consider how community benefits will be perceived by local communities, and to take action to prevent perceptions of bribery and cynicism from emerging."* Another research gap is the focus on community benefits in relation to solar farm developments. Existing research often relates to community benefits in relation to onshore wind farms (Aitken, 2010; Cowell et al., 2011; Walker et al., 2014; Cowell et al., 2016). To the authors knowledge, research on the influence of community benefits on the acceptance of solar farms is lacking.

1.2 Research objective and research questions

The acceptance of solar farms nearby communities is an important aspect in order to realise such renewable energy developments in order to contribute to the energy transition. The societal objective of this research is to understand how acceptance of renewable energy projects can be improved in order to introduce them more successfully into society and thereby foster the energy transition. Based on the knowledge gaps, the scientific objective of this research is to contribute to the understanding of the relationship between community benefits and public acceptance. More specifically, this research aims to explore the role of community benefits in multifunctional solar farm developments on the local level in order to support community acceptance. The research objective leads to the following research question:

> *What role do community benefits of multifunctional solar farms play in order to support community acceptance?*

In order to answer the main research question, the question is divided into several sub research questions:

1. *What types of community benefits have been or will be provided in multifunctional solar farms in the Netherlands?*

The first sub question identifies the types of community benefits provided in solar farm developments in The Netherlands. This is based on an inventory of existing solar farms and provided community benefits. In addition, future solar farm developments and the provision of community benefits in those plans will be analysed.

2. *What influence do community benefits have on the distribution of costs and benefits in multifunctional solar farm developments?*

The second sub question identifies whether community benefits can outweigh the negative externalities resulting from solar farm developments and as a result contribute to a more equal balance of costs and benefis associated with solar farm developments.

3. *How do people perceive the provision of community benefits in multifunctional solar farms?*

The third sub question examines the perception of people towards community benefits and how this perception has influenced the effectiveness of the provision of community benefits in order to contribute the acceptance of the solar farm development.

The exploration of the role of community benefits in community acceptance of solar farms will lead to an understanding of the effectiveness of community benefits in planning processes for the developments of solar farms. This research will lead to recommendations for the provision of community benefits in solar farm developments that can be used by spatial planners, policy makers or renewable energy developers.

CHAPTER 2

Theoretical framework

This chapter describes existing theories and concepts underlying the topic of this research. Theories like social acceptance, procedural and distributional justice, community benefits and the influences of community acceptance will be elaborated. In the conceptual framework, the concepts will be operationalised.

2 THEORETICAL FRAMEWORK

2.1 SOCIAL ACCEPTANCE

Acceptance is a broad and complex definition, which is open to different interpretations and therefore many definitions exists. However, in many studies about acceptance, an explicit definition is often not given: *"the term acceptance seems to be a practical, everyday term that is commonly understood and does not require any explicit definition"* (Busse & Siebert, 2018, p. 237). When a definition of acceptance is provided in literature, a broad diversity exists and a common understanding is missing (Busse & Siebert, 2018). Various terms are used to describe acceptance of renewable energy or other innovations (Hanger et al., 2016). Terms such as public acceptance, public perception, social acceptance, public support and NIMBY are used inconsistently (Hanger et al., 2016). Some definitions overlap, while others contradict each other (Busse & Siebert, 2018). It is challenging to provide a generalized definition of the term acceptance, since the meaning and use is dependent on the context (Busse & Siebert, 2018). Hanger et al. (2016, p. 81) give a more specific definition of acceptance in relation to renewable energy technologies (RET) and describe it as *"a range of potential attitudes towards RET that are other than active opposition, including apathy, passive acceptance, approval, and finally active support"*.

A contribution to specify the term acceptance is made by Wüstenhagen, Wolsink and Bürer (2007). They describe the typology of acceptance and argue that acceptance of renewable energy technologies takes place on different levels and in different spheres (Hanger et al., 2016). Therefore, three dimensions of acceptance are identified, which take place on the socio-political, market and community level (see figure 2) (Wüstenhagen et al., 2007).

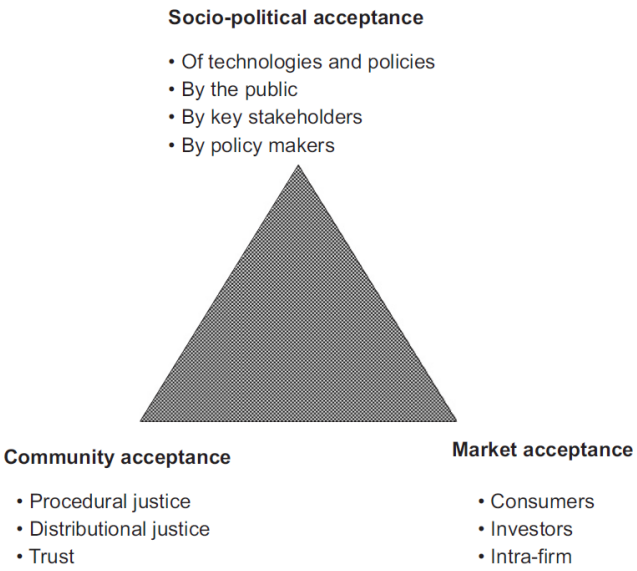

Figure 2 Three dimensions of social acceptance of renewable energy (Wüstenhagen et al., 2007).

2.1.1 Socio-political acceptance

The most general level of social acceptance is socio-political acceptance. This dimension of acceptance operates at the level of technologies, policies, key stakeholders and the general public. At this level, effective frameworks and policies can be developed in order to foster acceptance of renewable energy on the market and community level (Sovacool & Ratan, Conceptualizing the acceptance of wind and solar electricity, 2012). The acceptance of sustainable energy at this level is high. As a consequence of this general positive image of renewable energy, policymakers believed that social acceptance on the local level would not be an issue (Wüstenhagen et al., 2007). However, because of the discrepancy between public support of renewable energy on the local and global level (Sütterlin & Siegrist, 2017), they were misled.

2.1.2 Market acceptance

This dimension of acceptance operates at the level of markets and is situated at the meso-level between socio-political and community acceptance. This type of acceptance involves the adoption of sustainable energy technologies by consumers and businesses that support the manufacturing of such technologies (Sovacool & Ratan, Conceptualizing the acceptance of wind and solar electricity, 2012). Moreover, on this level, market adoption and the diffusion of innovation is important. The diffusion of innovation of energy technologies is more complex than other products, because they depend on the location of infrastructures (Roddis et al., 2018). On this level, a link with socio-political acceptance exists, since multinationals can be influential stakeholders, who can use their position to influence the development of energy policies and other political decisions regarding sustainable energy provision.

2.1.3 Community acceptance

This level of acceptance is the most specific and takes place at the local level (Sovacool & Ratan, Conceptualizing the acceptance of wind and solar electricity, 2012). It is about the acceptance of renewable energy by communities affected by the development of a technology nearby (Roddis et al., 2018). Therefore, it plays an important role in order to realise renewable energy projects on the local level. Anderson et al., (2012) argue that community acceptance does not necessarily mean that a project is supported or approved by a community, but *"acceptance implies a passive stance by a community towards a project"* (p. 688). On this level, the "national-local gap" of acceptance of renewable energy, as described by Sütterlin and Siegrist (2017), comes to light and the debates around the concept of NIMBY (not in my backyard) unfolds (Wüstenhagen et al., 2007). The national-local gap assumes that opposition to renewable energy projects especially arise on the local level, since residents are directly affected by impacts on the local level associated with energy projects (Sütterlin & Siegrist, 2017). This can also be identified in solar farm developments, which often face high opposition of the local level. As a result, this research focuses on acceptance of such developments by local communities. Therefore, the role of community benefits on community acceptance is analysed in this research.

2.2 Factors influencing community acceptance

Due to the unclear definition of acceptance and the inconsistent use of various terms, agreement on a specific method to measure acceptance is missing. However, several researchers have identified factors in academic literature which are expected to influence community acceptance of renewable energy (Sovacool & Ratan, 2012; Hanger et al., 2016; Roddis et al., 2018; Anderson et al., 2012; Wüstenhagen et al., 2007). Wüstenhagen et al. (2007) discuss factors influencing community acceptance which are shaped by the planning process, namely procedural, distributional justice and trust. In addition, different types of impacts resulting from developments, such as aesthetic, environmental and economic impacts influence the acceptance of renewable energy projects by communities (Roddis et al., 2018; Hanger et al., 2016). Lastly, the attitude people have towards sustainable energy developments which is determined by several factors influence community acceptance (Roddis et al., 2018). Although factors influencing community acceptance differ per study, in scientific literature, three main categories of influences can be found: attitudinal influences, negative externalities and the planning process (see figure 3). These will be explained in the next section.

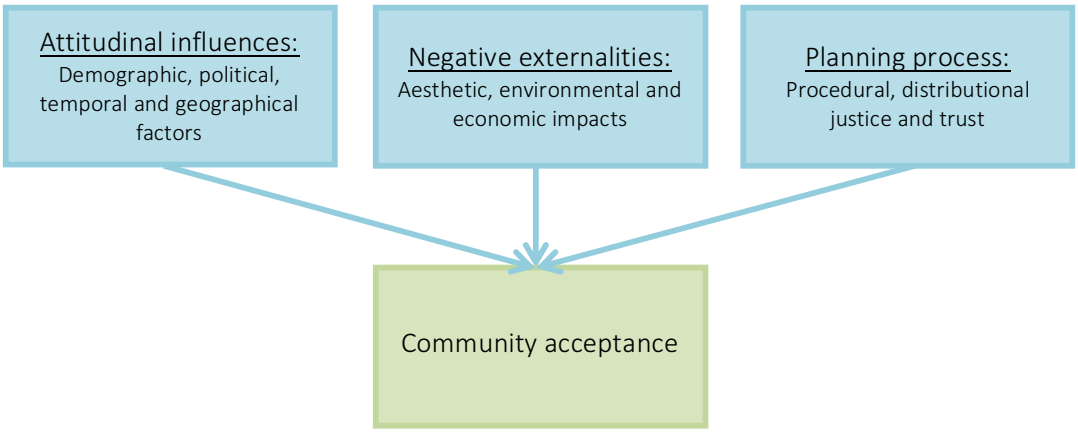

Figure 3 Factors influencing community acceptance as identified by Wüstenhagen et al. (2007), Hanger et al. (2016) and Roddis et al. (2018).

2.3 Planning process

Community acceptance is influenced by three issues, namely procedural and distributional justice and trust (Wüstenhagen et al., 2007). These types of justice and the amount of trust people have in the stakeholders are shaped by the organisation of the planning process.

2.3.1 PROCEDURAL JUSTICE

Procedural justice relates to a fair decision making process with opportunities for relevant stakeholders to participate (Wüstenhagen et al., 2007). A fair decision making process can lead to more positive outcomes of community acceptance. When citizens perceive the decision making process as fair and open, they are more likely to participate and in the end this can produce more satisfied outcomes of the process (Shaw, Hill, Boyd, Monk, Reid, & Einsiedel, 2015). Therefore, *"procedural justice is basic to community acceptance, shaping and being shaped by community participation in decision-making"* (Shaw et al., 2015, p. 43).

2.3.2 DISTRIBUTIONAL JUSTICE

Another important factor influencing community acceptance is distributional justice. Distributional justice relates to *"the unequal allocation of environmental benefits and ills, and the uneven distribution of their associated responsibilities"* (Jenkins, McCauley, Heffron, Stephan, & Rehner, 2016, p. 176). This form of justice stands for an even distribution of costs and benefits over the society. Distributional justice on itself is influenced by the arrangement of a project: *"the economic, governance, and regulatory arrangements underlying a project are important factors that create or undermine distributional justice, shaping who benefits financially, who bears the risks, and how risks are managed. Several scholars have noted that questions of ownership may shape community response"* (Shaw et al., 2015, p. 43). According to Shaw et al. (2015), the uneven distribution of costs and benefits of a project can only be explained by procedural justice, since the trade-offs about the distribution of costs and benefits can be negotiatied in this process. This is why the concepts of procedural and distributional justice strongly relate to each other and therefore, together they are often labeled as "fairness" (Shaw et al., 2015).

2.3.3 TRUST

Finally, trust from the local community in the developers and the government plays an important role for community acceptance of renewable energy developments in the neighbourhood (Wüstenhagen et al., 2007). It is influenced by the amount of trust the community has in the provided information and in the intensions of developers and the government (Wüstenhagen et al., 2007). Trust in the government and other organisations stems from the community perceptions towards the competences of governments and other organisations and whether these organisations share the same values as them (Shaw et al., 2015). Especially on the provincial or federal level of governments, the intentions of the government to pursue sustainable energy projects can be perceived as doubtful by communities. Communities can sometimes perceive the purposes of energy developments as form of capital development and therefore *"governments are seen as advocates for the developments rather than neutral arbiters of social interest"* (Shaw et al., 2015, p. 42). As a consequence, communities can be doubtful about the intentions of the government and about the government's ability to guarantee a fair process and to protect natural values (Shaw et al., 2015). Trust in the motives of involved organisations can be fostered by procedural fairness. When procedural fairness is experienced during the process, the feelings of trust are fostered (Shaw et al., 2015).

2.4 NEGATIVE EXTERNALITIES

Despite sustainable energy technologies cause less environmental harm compared to traditional fossil-fuelled based energy generation, renewable energy developments can still generate negative externalities (Welsch, 2016). According to Welsch (2016, p. 4), *"externalities are unpriced, unintended and uncompensated side effects of one agent's actions that directly affect the welfare of another agent"*. Externalities created by electricity generation are mainly negative, such as health risks, disamenity effects and the contribution to climate change (Welsch, 2016). However, the amount and type of externalities differ per energy technology and spatial scale.

2.4.1 SCALE OF EXTERNALITIES

While externalities from fossil-fuelled energy generation, such as greenhouse gas emissions, have effects on global scale, externalities from renewable energy technologies, are mostly limited to the surrounding environment (Welsch, 2016). This is in contrast to the benefits associated with renewable energy, because these arise mostly at regional, national or even international level (Yenneti & Day, 2016). Because renewable energy has a lower energy density compared to fossil power, larger production sites are needed (Welsch, 2016). This causes sustainable energy technologies to take up large areas of land, which especially is the case for hydro, wind and solar energy technologies (Welsch, 2016). The large production sites needed for renewable energy, often impact the surrounding environment with noise, land and habitat loss or visual impacts (Yenneti & Day, 2016). These impacts especially arise on the local level where sustainable energy technologies are being developed (Yenneti & Day, 2016). Concerns of local communities about the impacts of renewable technologies on the landscape and environment are increasing (Chiabrando, Fabrizio, & Garnero, 2009). These negative externalities can result in resistance by local people affected by the development, which influences community acceptance. Roddis et al. (2018) have identified impacts of renewable energy technologies that influence community acceptance, which can be divided into aesthetic, environmental and economic impacts.

2.4.2 AESTHETIC IMPACTS

Aesthetic impacts include the impacts renewable energy developments have on the landscape, the scenic area, the existing land cover and the wildness of the landscape (Roddis et al., 2018). Because of their impacts, large-scale solar farms are more likely to be less supported by the public compared to smaller projects (Carlisle et al., 2015). As a result, when the solar farm has less impact on the landscape (Roddis et al., 2018) and is less visible (Carlisle et al., 2015), they are more likely to be accepted. The impact of a solar farm on the landscape is, among others, dependent on the size of the solar farm and the distance of the observer to the solar farm (van der Zee, Bloem, Galama, Gollenbeek, van Os, Schotman, & de Vries, 2019). Moreover, distance also influence the perceived impacts of the solar farm. When distance between the observer and the solar farm increases, the impact decreases (Fernandez-Jimenez, et al., 2015). Whether an impact is perceived as 'cost' by people, is highly subjective. As Roddis et al. (2018) argues, the visual impacts of solar farms on the landscape can be perceived as a cost by some people, because the cultural ecosystem services offered by a scenic landscape can be affected by the introduction of solar farms in the landscape. However, other people

might consider the addition of renewable energy technologies to the landscape as aesthetic contribution. Therefore, the perceived impacts are very personal.

2.4.3 Environmental impacts

Environmental impacts relate to the impacts of renewable energy developments on biodiversity, soil and health. Solar panels are considered as the renewable energy technology causing the least environmental impact, because it does not generate noise or pollutants (Tsoutsos, Frantzeskaki, & Gekas, 2005). However, solar farms still can have environmental impacts on the area it will be developed in. It can influence the soil and vegetation of the surrounding environment. In addition, solar farms often take up large areas of land and are surrounded by fences and as a result, they can form a barrier in the landscape for the movement of species (Hernandez et al., 2014). Furthermore, because solar panels cover the soil, the incidence of light on the soil is reduced, with the result of a lower soil quality and reduced growth of vegetation (van der Zee et al., 2019).

2.4.4 Economic impacts

Economic impacts include the impacts renewable energy technologies have on property prices, the agricultural production and tourism. Due to the expected impact of solar farms on the scenic landscape, concerns exist about the impact of solar farms on scenic recreation and tourism (Roddis et al., 2018). Another issue residents can be worried about is the reduction of property prices nearby a solar farm (Jones, Hillier, & Comfort, 2014). Factors which possibly influence property prices are noise nuisance, visibility pollution and reflection of the sun. A minor effect has been found by Dröes & Koster (2019), who found that property prices reduced with 3% after a solar farm has been developed nearby. However, more research into this topic is needed for valid results. A common argument against renewable energy is that it conflicts with other land uses and ecosystem services, such as agricultural production or the protection of biodiversity (Roddis et al., 2018). Nowadays, 63% of the solar farms are located on agricultural areas (Kadaster, 2020). Because of the influence of solar panels on the soil, it is possible that soil productive areas will be affected by solar farm development (Tsoutsos et al., 2005). Moreover, *"the ''sentimental bind'' of the cultivator and his cultivable land is likely to be the reason of several social disagreements and displeasure"* (Tsoutsos et al., 2005, p. 292). All in all, depending on the amount and type of negative externalities, renewable energy technologies can have irreversible changes on the land and environment: *"some of this land may be utilized for energy in such a way that returning to a pre-disturbed state necessitates energy input or time, or both, whereas other uses are so dramatic that incurred changes are irreversible"* (Hernandez et al., 2014, p. 771).

2.4.5 Influence of location

People are often concerned about aesthetic and environmental impacts of solar farms on the surroundings (Roddis et al., 2018). These impacts differ per location. For example, when a solar farm is being developed in a rural area with an open landscape and with presence of nature, it is more likely that such a development will have greater aestethic and environmental impacts compared to a situation in which a solar farm is developed in an urban area, such as an industrial area. Therefore, the location of a solar farm is important to consider, since it influences the amount and type of impacts the solar farm can cause. The impact of a development will also be greater when a larger number of people is confronted with it, which is also dependent on the location (van der Zee et al., 2019). As a result, local residents nearby a solar farm might be more often confronted with the solar farm than others.

2.5 Attitudinal influences

The acceptance of renewable energy technologies differs per community, since it is influenced by socio-economic, cultural, historical and institutional characterstics (Anderson et al., 2012). Moreover, acceptance differs per person and is influenced by the attitude individuals have towards renewable energy. These attitudinal influences are determined by demographic, policital, temporal and geographical characteristics (Roddis et al., 2018).

In a sutudy about public attitudes towards solar energy developments, Carlisle et al. (2015) have found that the age of people and the social deprivation of the community are important demographical characteristics influencing the attitudes towards solar energy developments. For example, they have found that younger people are less opposed to renewable energy compared to older people. However, also evidence was found that middle-aged people were more opposed to renewable energy compared to both younger and older people. In addition, political and environmental beliefs influence acceptance of renewable energy. For example, they have found that when people are more concerned about climate change, their attitude towards renewable energy is often more positive.

Geographical characteristics are determined by the country and region one is living in and by the population density. Moreover, place attachment plays a role in the acceptance of renewable energy developments. Due to sustainable energy developments changes might occur in a place. "*When change is pro-posed to a place, it can be perceived as a "disruption" or "threat" and can be met with action in order to preserve the community or neighbourhood to which individuals are closely attached"* (Carlisle J. , Kane, Solan, & Joe, 2014, p. 126). As a result local people can oppose such developments, because they consider it as threat to the identity of the place (Sütterlin & Siegrist, 2017). However, local acceptance and the degree of opposition depends on the perception of residents towards the proposal for energy developments in their neighbourhood and whether this corresponds with their feelings about this place. Furthermore, it is expected that opposition to a renewable energy project decreases through time (Roddis et al., 2018). Especially in the period before and after realisation of developments opposition might be high and afterwards it is expected to decrease (van der Zee et al., 2019). These characteristics determine the attitudes of people towards renewable energy technologies nearby their neighbourhood (Roddis et al., 2018).

2.6 COMMUNITY BENEFITS

2.6.1 DISTRIBUTION OF COSTS AND BENEFITS

The previously mentioned negative externalities of solar farm developments can be considered as 'costs' for the community. Whether something is perceived as cost or benefit is very personal, as was explained by Roddis et al. (2018), in the example of the visual impacts of renewable energy technologies. For one, the visual impact can be perceived as costs, because it affects the scenic landscape, while for others a renewable energy technology might be a contribution to the landscape. This makes it difficult to quantify costs and benefits (Roddis et al., 2018). However, the distribution of costs and benefits is an important argument for the community acceptance of renewable energy technologies (Wüstenhagen et al., 2007). Shaw et al. (2015, p. 46) describe how the distribution of costs and benefits is often perceived by communities affected by renewable energy projects: *"rural communities often felt that they bear the risks and impacts of projects intended to produce energy for urban centres (…) and economic benefits for multinational and institutional developers"*. Cowell et al. (2016) call this issue the *"distributive unfairness"* of costs and benefits.

Renn, Webler, & Kastenholz (1996) argue that when all affected actors in a project have equal access to the risks and benefits of this project, the situation can be considered 'equitable' and no further justification is needed. However, they only speak of this situation when no actors are losing compared to others. This is in contrast to a situation in which someone benefits more from a project or someone has to take a greater part of the risks compared to others. They call this an 'inequitable' situation. According to them, this situation calls for justification. However, they argue that such a situation might still be considered as fair, but only when "*the privilege of one party and the surplus risk of another party can be justified by arguments to which both parties agree"* (Renn et al., 1996, p. 147). In order to justify this inequitable situation, it is important that it provides additional benefits to which all actors agree. In addition, these additional benefits should be able to overcompensate the disbenefits of the situation and all participants should agree to this. As Shaw et al. (2015) described, communities nearby renewable energy developments often feel that they have to deal with the risks and impacts of the projects, while the economic benefits flow to developers. This can be considered as a situation in which the developer benefits more from a project and in which communities have to deal with a greater part of the risks. In this situation, additional benefits should be provided, which can be in the form of community benefits.

2.6.2 COMMUNITY BENEFITS

Additional benefits can compensate communities for possible ills caused by renewable energy projects. These benefits are called community benefits or we can speak of community compensation (Terwel et al., 2014). Community benefits are *"some form of additional, positive provisions for the area and people affected by major development"* (Cowell et al., 2011, p. 539). Developers can provide community benefits in order to manage distributional effects of renewable energy projects (Cowell et al., 2011; Yenneti & Day, 2016). According to Claro (2007), these compensation mechanisms acknowlege inequality and can be considered *"as a way of eliminating this unfairness by transferring resources from the beneficiaries of the project to those badly affected by it"* (Claro, 2007, p. 190). An important question in the provision of community benefits is to who these benefits should belong,

because community benefits relate to the community. However, a clear spatial boundary for the definition of community is missing (Munday, Bristow, & Cowell, 2011). According to Munday et al. (2011), the community in the concept of community benefits is the area which is closely located to a renewable energy development and consists of people who are affected by this development. They argue that an important aspect to take into consideration is the question of who benefits in the community. Some benefits might be provided for just a few community members, whereas other benefits might relate to the whole community. This depends on the type of community benefits and the spatial scale they relate to. Some benefits, such as employment of people for energy projects, may accrue to people working for local companies, but living elsewhere, whereas other benefits directly accrue to communities located nearby energy developments.

It is often thought that community benefits can help to manage conflicts and thereby reduce the local opposition to renewable energy technologies (Yenneti & Day, 2016). The provision of community benefits is common in the UK to increase local acceptance of wind farm developments (Walker et al., 2014). This is often done by the developer providing monetary benefits to communities nearby, in the form of funds or investments. This fund is managed by an organisation who is responsible for the goal the money is spent on (Walker et al., 2014). Examples of spendations of this fund are donations to local organisations or providing money to reduce energy bills of community members. In other countries, such as Germany, Spain or Denmark, local communities can often benefit from wind power developments nearby through economic incentives or by ownership or involvement in the wind farm through shares (Aitken, 2010).

2.6.3 TYPES OF COMPENSATION

The provision of community benefit differs per case and per kind. A distinction can be made between the types of compensation offered to a community: monetary compensation and public goods compensation (Mansfield, van Houtven, & Huber, 2002). Monetary compensation can be considered as compensation by means of providing money to individuals (Terwel et al., 2014). Examples of this type of compensation are community ownership through shares, setting up a community benefit fund (Cowell et al., 2011), the provision of a gift card to be spent in local shops (Terwel et al., 2014) or discount on the energy bill (Walker et al., 2014). Public goods compensation can be considered as the provision of goods to a community by the government or a company (Mansfield et al., 2002). Examples of these public goods, also reffered to as in-kind benefits (Cowell et al., 2011), are the development of a community centre, a recreational park, planting additional trees and flowers or other environmental improvements (Mansfield et al., 2002). Public goods do not necessarily have to be material goods, they can also relate to a contribution to or an investment in a neighbourhood improvement project (Terwel et al., 2014).

2.6.4 CATEGORIES OF COMMUNITY BENEFITS

These examples of different types of community benefits can be divided into different categories. In two studies, Munday et al. (2011) and Cowell et al. (2011) identified several categories of community benefits provided in wind farm developments. In these two studies, the categories of community benefits are named differently. However, they relate to each other and they overlap. When these are combined, the following categories can be dinstinguished:

- **Conventional economic benefits (Munday et al., 2011)**

These benefits relate to use local manufacturers and contractors for development and maintenance of renewable energy projects. Moreover, the income for landowners by land rental belongs to this category. However, it is questionable whether this category of community benefits can be called community benefits, because the local landowners and businesses might benefit from these community benefits. However, the local people affected by the renewable energy development might not benefit from this.

- **Flows of financial benefits to local communities (Munday et al., 2011)**

This includes the opportunity of ownership in the project by means of shares. Other examples of these financial benefits for local communities are the reduction of energy prices, sponsorship of a local event by project developers or setting up a community fund to provide money to a community.

- **Provision of in-kind benefits (Cowell et al., 2011)**

In this case, the project developer provides a physical asset to the community. Examples of such assets are footpaths, parkinglots, recreational facilities or a community centre.

- **Provision of other local services (Munday et al., 2011)**

Other than providing economic or in-kind benefits to a community, a developer can also provide additional local services in order to compensate an affected community. Examples of such local services are educational programmes offered to communities. In energy developments, this can be education about sustainability and renewable energy.

- **Environmental mitigation or enhancement (Cowell et al., 2011)**

In order to mitigate or compensate environmental impacts associated with renewable energy developments, a developer can offer measures to enhance nature, biodiversity and the landscape. Examples of such measures are planting extra flowers or trees or adding natural elements to a renewable energy projects to enhance biodiversity, such as insect hotels or pools.

Within the previously mentioned categories of community benefits, a distinction can be made between the type of compensation: monetary or public goods compensation, as identified by (Mansfield et al., 2002). By relating the type of compensation to a category of community benefits, an overview can be made of the offered community benefits (see table 1).

Type of compensation	Category of community benefits	Example(s)
Monetary compensation	Conventional economic benefits	Using local manufacturers and contractors Land rental income by landowners
	Flows of financial benefits to local communities	Ownership through shares Reduction of energy prices Community benefit fund
Public goods compensation	Provision of in-kind benefits	Developing footpaths, community centre, recreational facility
	Provision of other local services	Educational programmes
	Environmental mitigation or enhancement	Planting flowers/trees Adding natural elements

Table 1 An overview of community benefits (based on Cowell et al. (2011) and Munday et al. (2011)) related to the type of compensation (based on Mansfield et al. (2002)).

2.6.5 MONETARY VERSUS PUBLIC GOODS COMPENSATION

Non-monetary compensation, or public goods compensation, is considered as more effective in gaining local acceptance than monetary compensation (Claro, 2007). Monetary compensation can, compared to no compensation at all, perform even worse in the case of public acceptance (Claro, 2007). Reasons for this vary, however, it is often argued that this might be influenced by the fact that people feel that health impacts or other risks associated with the development cannot be compared with money. In addition, people might feel ashamed when they are seen as *"someone whose approval can be bought"* (Claro, 2007, p. 191). According to Mansfield et al., (2002), offering money as compensation to a community does not differ from providing public goods to the community, because in both cases, the community will be compensated. However, what differs between the cases is the perception of the type of compensation, because "*schools and parks are usually not thought of as "bribes" in the same way as cash payments"* (Mansfield et al., 2002, p. 370). This also relates to the perception of the intentions of a developer and and their extent to which they care about the public interest. People can be suspicious about the intentions of commercial developers (Shaw et al., 2015). When monetary compensation is offered, people are less likely to believe that a developer is concerned with the public interest (Terwel et al., 2014). Therefore, when compensation in the form of public goods is provided, it is believed that the developer cares more about public interest.

2.6.6 ADVERSE EFFECTS

Although it is generally thought that community compensation can reduce local opposition to renewable energy technologies (Yenneti & Day, 2016), the provision of community benefits can also have adverse effects (Terwel et al., 2014). Some cases have shown that the provision of community benefits was considered as a tool to 'buy' support of the local community (Terwel et al., 2014; Walker et al., 2014) or as *"some form of reparation for impacts"* (Cowell et al., 2011, p. 547). In some cases, this generated local opposition rather than community support. However, this response to the provision of community benefits differs per case and is influenced by the procedure used to determine the amount and type of community compensation that is offered (Terwel et al., 2014). In order to gain trust of the community, developers can involve the community to discuss the provision of the type and

amount of community benefits. Consultation with the local community about the type and amount of compensation has a positive influence on the image of the developer and makes the intentions of the developer more appropriate (Terwel et al., 2014). The effects on community compensation are even more positive, when community members have the opportunity to influence the type and amount of compensation. According to Walker et al. (2014), the impact of community benefits is likely to be higher when the influence or control of a community is higher, because community members might then have the feeling that they were able to reach a good deal with the developer about the type of community benefits.

2.7 Conceptual framework

The theoretical framework has provided insights in the concepts influencing community acceptance and relationships between these concepts. These concepts and relations are summarized in the figure below (see figure 4). Community acceptance is influenced by the negative externalities resulting from solar farm developments, attitudinal influences from individuals and the planning process that preceded the development of a solar farm. Attitudinal influences play a role in community acceptance. In this research, these influences will be taken into account, however, these influences will not be studied, since it is out of the scope of this research. The planning process of renewable energy projects affects the negative externalities resulting from these projects and how costs and benefits are shared over the developer and the local community, since the process can provide opportunities to negotiate about the costs and benefits between stakeholders (Shaw et al., 2015). When the distribution of costs and benefits is not considered equal, and therefore unfair, community benefits can be provided in order to compensate people for the unequal distribution and thereby reaching a more equitable situation. This relationship is summarized in figure 4.

From the theoretical framework, it is clear that the concepts used in this research are complex, because they exist in several types and can be divided into different categories. Different types and many categories of community benefits exist. This research focusses on the community benefits provided within solar farms related to public goods compensation, because the provision of this type of compensation leads to spatial implications. Monetary compensation does not directly lead to spatial interventions. However, they will be taken into account in this research. Therefore, this research especially focuses on the three categories of community benefits relating to public goods compensation: provision of in-kind benefits, provision of other local services and environmental mitigation or enhancement (Cowell et al., 2011; Munday et al., 2011). These community benefits in solar farms can be directly provided for local residents living nearby the solar farm.

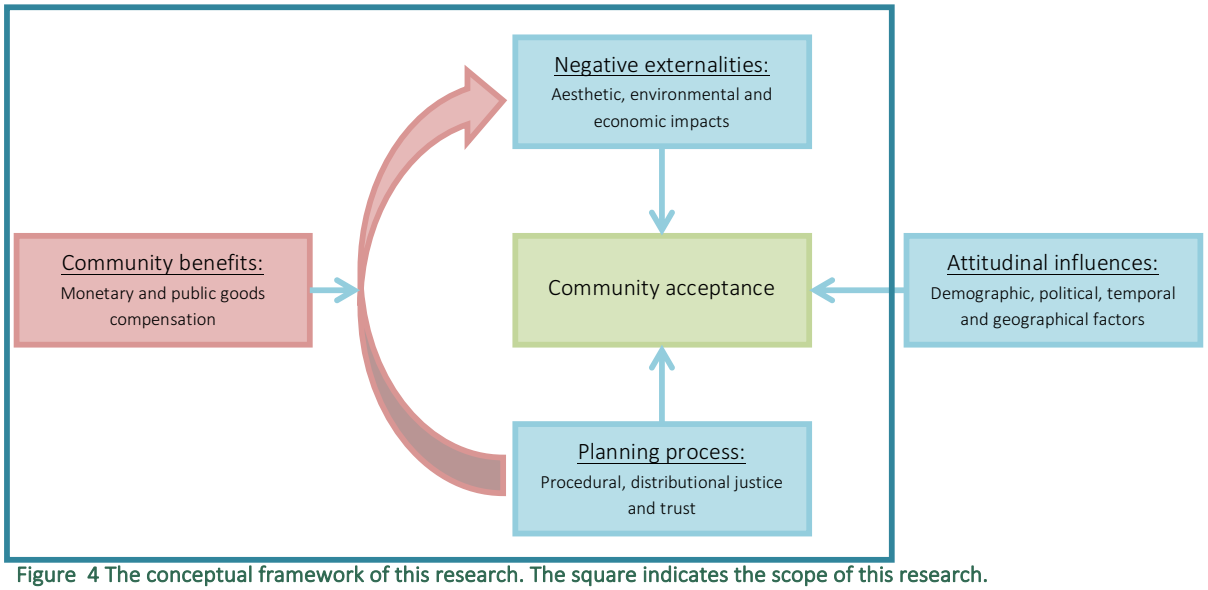

Figure 4 The conceptual framework of this research. The square indicates the scope of this research.

CHAPTER 3

Research methodology

This chapter describes the methods used in this research. The research approach, design and the worldview of the researcher will be discussed. Moreover, the data collection and analysis methods will be elaborated. Lastly, measures taken to enhance credibility and trustworthiness of this research will be described.

3 RESEARCH METHODOLOGY

This chapter describes the research methodology of this research. This research uses a qualitative approach to explore the role of community benefits in community acceptance of multifunctional solar farms. The process of data collection is divided into two phases. In phase one, the research is exploratory in order to get an overview of provided community benefits in solar farms and detect interesting cases. This exploration is done through desk research and document analysis. After this phase, three case studies are selected. In phase two, the research is more explanatory in order to examine cases in-depth to seek for relationships between community benefits and community acceptance. This is done through semi-structured interviews.

3.1 QUALITATIVE RESEARCH

The qualitative research approach is appropriate to explore certain phenomena (Kumar, 2014). Therefore, this approach is appropriate for the research objective of this research, to explore the role of community benefits in community acceptance of multifunctional solar farms. A distinctive characteristic of the qualitative approach is that people and settings in the research are considered as a 'whole' and they are not reduced to variables. Therefore, it can be considered as holistic research approach (Taylor, Bogdan, & DeVault, 2015). This approach enables to understand contextual influences and takes this into account in the research (Hennink, Hutter, & Bailey, 2020, p. 10). The context is especially important for the acceptance of solar farms, since it is influenced by various variables as is mentioned by Roddis, et al. (2018). Variables influencing the acceptance of solar farms are for example the size of the solar farm, but also its impact on the surrounding environment. These impacts differ per location and per case. In addition, in qualitative research, people are studied in their natural settings and contextual influences on the behaviour and experiences of people are identified (Kumar, 2014). Moreover, qualitative research deals with the meaning and value that people attach to things, *"the approach allows you to identify issues from the perspective of your study participants and understand the meanings and interpretations that they give to behaviour, events or objects."* (Hennink et al., 2020, p. 10). In this research, the meaning and interpretation of community benefits are studied in order to examine their role in community acceptance of solar farms.

3.2 RESEARCH DESIGN

The design of this study is through case studies. A case study is an appropriate design, because in this approach, particular cases are selected and are thoroughly studied. This enables to explore cases holistically and in-depth. As a result, this can provide much information about important aspects (Kumar, 2014). According to Kumar (2014, p. 155), the case study design *"is a very useful design when exploring an area where little is known or where you want to have a holistic understanding of the situation, phenomenon, episode, site, group or community"*. The advantage of case studies is that they can provide more detailed information compared to a large sample. The drawback of this is that each case is different different and is influenced by its context, which makes it more difficult to generalise

these findings (Kumar, 2014). The aim of qualitative research, however, is not to be able to generalise the findings from the research (Twining, Heller, Nussbaum, & Tsai, 2017).

The selection of cases can influence the generaliability of the results from case studies (Flyvbjerg, 2006). Selecting an average case might not be the most suitable strategy to collect the greatest amount of information available about a certain phenomenom. These cases often do not contain the most information and therefore, atypical cases are more suitable to gain the greatest amount of information available. According to Flyvbjerg (2006, p. 229), *"atypical or extreme cases often reveal more information because they activate more actors and more basic mechanisms in the situation studied"*. These cases are more suitable to gain in-depth information about the causes and consequences of a certain problem, while representative cases are often not able to produce this type of findings. Therefore, cases should not just be selected randomly, but based on their validity (Flyvbjerg, 2006) and on the amount of information the case can provide (Kumar, 2014).

In this research, cases are selected according to the following criteria. First of all, the solar farms should be multifunctional in order to provide additional benefits and functions than only energy generation. Benefits in the form of the provision of public goods will be analysed. In addition, multifunctional solar farms should be accessible in order to be able to make use of the benefits provided in the solar farm. It is interesting to examine cases in which a diversity of public goods is provided as compensation measure. More specifically, cases will be selected when they provide public goods in the following categories: in-kind benefits, other local services or when environmental mitigation or enhancement measures are taken. Moreover, the acceptance rate and level op opposition to the solar farm development provide insights in the role of community benefits, therefore this is also a selection criteria.

In this research, solar farm 'De Kwekerij', 'Zonnewoud' and 'Abdissenbosch' are selected as case studies. These solar farms are multifunctional, accessible and offer a wide range of community benefits related to public goods compensation. In addition, the acceptance rate and level of opposition differs per case. While in solar farm 'De Kwekerij', almost no opposition arose to the development, in 'Zonnewoud' the level of opposition was remarkably high. Therefore, both cases can be considered as 'atypical' in which community acceptance was in one case very high, while in the other it was very low. In the case of 'Abdissenbosch', the level of opposition was high at the beginning of the process and decreased over time.

3.3 Data collection method

Two phases in the process of data collection can be identified. The research in phase one is exploratory, while in phase two it is more explanatory. Therefore, different methods will be used to collect data.

3.3.1 Phase 1

The aim of phase one is to get an overview of possible community benefits that are or will be provided in solar farm developments. Therefore, existing multifunctional solar farms in The Netherlands and the provided community benefits are explored. In addition, future plans for solar farm developments that make use of community benefits provision are analysed. The community benefits are analysed according to their type and scale. This is done through desk research. During the desk research, secondary sources are analysed. Secondary sources that are used are governmental publications, news

articles and websites. Examples of governmental publications are spatial plans of solar farms and policies relating to solar farm developments. News articles can be used to find out whether public opposition arose during the development and websites can be useful to gain information about specific solar farms in The Netherlands. Altogether, secondary sources can provide information about the existing and future multifunctional solar farms and the community benefits provided during the development. In this phase, sub research question one is answered. This phase results in an overview of community benefits that can be provided in solar farm developments. Moreover, this phase also results in an inventory of cases, which was used to select interesting cases of multifunctional solar farms providing community benefits for the second phase of this research.

3.3.2 PHASE 2

Phase two is an in-depth analysis of the perception and influence of community benefits. This in-depth exploration is done through case study research. Three cases are selected according to their multifunctionality, accessibility, provided community benefits and the level of acceptance. These cases are analysed in-depth. In order to gain information about the perceptions and influences of community benefits in the cases, primary data is collected by means of interviews. Interviews are useful to collect in-depth information, particularly for complex situations and issues, since interview questions can be explained (Kumar, 2014). Moreover, interviews are an appropriate tool when dealing with subjective issues that can be value laden, such as acceptance issues (Sovacool & Ratan, 2012). In this research, semi-structured interviews are used as tool for data collection. Semi-structured interviews are an appropriate tool to explore people's attitudes and perceptions towards certain issues, since it enables the researcher to ask for more information when answers are unclear or incomplete (Barriball & While, 1994). What is more, during the interviews, the researcher is able *"to probe for underlying values, beliefs and assumptions of participants shaping their interpretations"* (Azungah, 2018, p. 387). The aim of the interviews in this research is to collect data about the perceptions of participants towards community benefits and how this has influenced their acceptance of the project. In addition, interviews can be used to gain information on the type of community benefits provided per specific case. In this phase, sub questions two and three are answered.

Three types of stakeholders are interviewed: solar farm developers or initatiors, civil servants and citizen groups. Interviewing solar farm developers or initiators has the aim to explore what kind of community benefits have been provided for the development of the solar farm and how this has influenced the acceptance by the community. Civil servants can explain more about the planning process, the involvement of the community and about the influence the community in the planning process and the type of community benefits. These topics relate to procedural and distributional justice. Citizen groups, such as community groups or workgroups, represent a large number of citizens. By interviewing such groups, more information can be extracted about the perception of community benefits by the wider community, since they represent a greater amount of citizens. This helps to understand how community benefits were perceived in the process and whether the benefits could outweigh the negative externalities associated with solar farm developments. In the end, by combining the different perspectives of the stakeholders, the role of community benefits in community acceptance of solar farms is analysed.

Interviewees are selected according to judgemental or purposive sampling (Kumar, 2014). In this sampling method, people are selected who, according to the researcher, can provide the required information needed to achieve the research objectives. After a few interviewees are selected, snowball sampling can be used to expand the amount of interviewees (Kumar, 2014). After the interviews, participants are asked to identify other people who might be interesting to interview. This continues until no new information is collected and the saturation point has been reached.

Prior to the interview, all participants are informed about how the data will be treated and protected. The data will be treated confidentially and anonymously. The names of the interviewees will not be published in the report and are only known by the researcher. Prior to the interviews, permission was asked to record the interview in order to transcribe the interviews later. In addition, handwritten notes were taken during the interview in order to write down important topics. The method of interviewing can also have drawbacks. For example, answers will vary per person and participants might provide socially desirable answers (Sovacool & Ratan, 2012). Therefore, the researcher does everything to the best of his ability to make sure people are feeling comfortable during the interviews and have the ability to provide open answers to their own perspective. Interviewees will be conducted by telephone, and therefore, participants can choose their own place to be interviewed and the researcher will not interrupt people when answering questions. What is more, the interview is conducted according to an interview protocol, which makes sure that the same base of question is beingasked to each respondent. This interview protocol can be found in appendix 1.

The data collection methods and the data source used for this research are summarized in the table below (see table 2):

(Sub) research question(s)		Method(s)	Data	Data source
SQ 1	What kind of community benefits have been provided for multifunctional solar farm developments in the Netherlands?	Desk research	Secondary documents	Policy documents, spatial plans, websites, news articles
		Semi-structured interviews	Transcripts	Solar farm developers Civil servants Citizen groups
SQ 2	How do people perceive the provision of community benefits in solar farm development?	Semi-structured interviews	Transcripts	Solar farm developers Civil servants Citizen groups
SQ 3	What influence do community benefits have on the distribution of costs and benefits of solar farm development?	Semi-structured interviews	Transcripts	Solar farm developers Civil servants Citizen groups
RQ	What role can community benefits of solar farm development play in order to support community acceptance?	Desk research	Secondary documents	Policy documents, spatial plans, websites, news articles
		Semi-structured interviews	Transcripts	Solar farm developers Civil servants Citizen groups

Table 2 Summary of research methods used to answer the sub research questions and the research question.

3.4 Data analysis

After data is collected through desk research in phase one and through semi-structured interviews in phase 2, it is analysed. The method of this data analysis differs per phase.

3.4.1 Phase 1

In order to find out which multifunctional solar farms exists in The Netherlands, an overview of developed solar farms is used. From this overview, existing solar farms are analysed spatially. By zooming in and analysing each solar farm individually, the spatial characteristics can be identified. Examples of such characteristics are the size, the energy generation capacity (in MWp), the location, the characteristics of the area (urban or rural) and multifunctionality. All existing solar farms will be analysed (see figure 5).

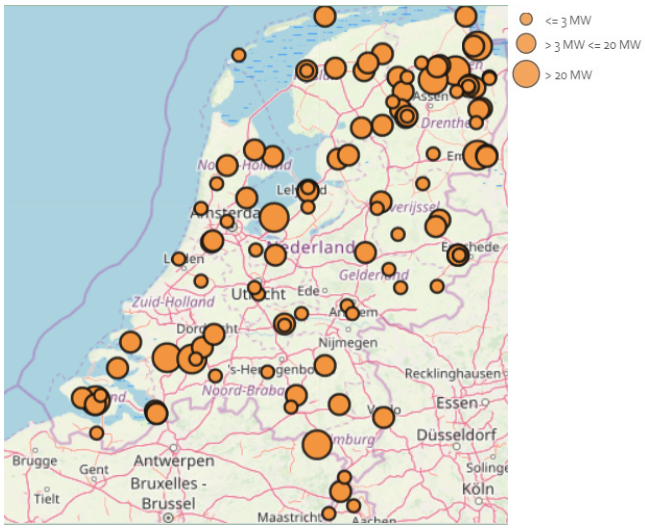

Figure 5 Overview of developed solar farms in The Netherlands from January 1, 2020 categorised according to energy production in MW (Zon op Kaart, 2020).

This is done by looking at the spatial layout of the solar farm by looking on Google Maps. In a multifunctional solar farm, space is left available for functions other than energy production.

Whether a solar farm is multifunctional can be determined by looking at the spatial layout of the solar farm from an aerial view on Google Maps. This is done by looking at amount of uncovered surface in the solar farm (see figure 6 and 7). As described in the code of conduct for on shore solar farm developments, the uncovered surface in solar farms should be at least 25% to have enough space available for other functions. As a consequence, multifunctional solar farms often leave more space between the rows of solar panels, which can be identified from their spatial layout.

Figure 6 Spatial layouts of two monofunctional solar farms. Retrieved March 30, 2020 from Google Maps.

Figure 6 displays two spatial layouts of monofunctional solar farms. The solar farm on the left figure is located in an urban area in Nieuw-Dordrecht in the province of Drenthe. The solar farm on the right figure is located in a rural area in Heerhugowaard in the province of Noord-Holland. As can be seen on both figures, the solar farms only consist of concatenated solar panels and only a small amount of uncovered surface is present. Therefore, less space is left available for other functions than energy generation.

Figure 7 Spatial layouts of two monofunctional solar farms. Retrieved March 30, 2020 from Google Maps.

Figure 7 displays two spatial layouts of multifunctional solar farms. The solar farm on the left figure is located in a rural area in Hengelo in the province of Gelderland. The solar farm on the right figure is located in a rural area in Beltrum also in the province of Gelderland. As can be seen on both figures, space between the solar panels and within the solar farm is left available. This space has the opportunity to be used for other functions than energy generation.

When the layout of the solar farm is identified as multifunctional, desk research is carried out in order to provide more background information and to verify whether these solar farms were multifunctional. After a multifunctional solar farm is identified, it will be analysed in-depth by using secondary sources to find out which type of community benefits are offered. In addition, future multifunctional solar farm developments are analysed in order to find out which community benefits will be provided. During the desk research, the documents found are scanned in order to determine their relevance for this research. When documents appear to be relevant, they will be analysed in-depth to find specific information related to community benefits. In order to guide and structure the analysis, a framework

of criteria is developed. This has the aim to analyse documents in the same way. The framework includes the following criteria:

- Multifunctionality
- Accessibility
- Provision of in-kind benefits
- Provision of other local services
- Environmental mitigation or enhancement measures
- Financial benefits

First of all, it is analysed whether a solar farm is provides multiple functions in order to provide benefits. People should be able to make use the provided benefits in solar farms and therefore accessibility of the solar farm is important, leading to the second criterion of accessibility. When the solar farm is multifunctional and accessible, they are analysed according to the type of benefits they provide, resulting from the theoretical framework. The results from this analysis are mainly descriptive and helps to understand the characteristics and the context of the solar farm cases. Moreover, the document analysis can help to identify relevant stakeholders which might be interesting to conduct an interview with. The data analysis of phase one only provides basic information about the cases which is not sufficient to understand the role of community benefits in community acceptance. This is explored in phase two.

3.4.2 PHASE 2

After conducting the interviews and transcribing the interviews, the data are analysed through coding. The transcripts can be found in the external appendix 5. Coding is used to organise and understand the textual data (Basit, 2003). Codes are labels that assign meanings to descriptive information. In order to assign codes, the transcripts are read carefully to understand the meaning of the responses (Kumar, 2014). It is important to consider that different words will be used by respondents to express the same meanings. Therefore, the code that will be assigned to text, should represent the meaning of the response. According to Basit (2003, p. 152), coding *"allow the researcher to communicate and connect with the data to facilitate the comprehension of the emerging phenomena and to generate theory grounded in the data."* To code the data, open coding is applied. Open coding means that codes are assigned to text and these codes are obtained from the text (Blair, 2015). The next step is axial coding. In this step, the subcategories of codes are compared and assigned to a more general, overarching, categorie. The last step is selective coding, in this step categories are organised and are linked together in order to develop the theory. The programm ATLAS.ti is used, which enables to code a large number of interviews while still keeping overview of the data. The codes used in the analysis and the coding process can be found in appendix 2.

An inductive approach is applied to analyse the data of this research. This approach entails *"going through data line by line thoroughly and assigning codes to paragraphs or segments of texts as concepts unfold relevant for the research questions"* (Azungah, 2018, p. 391). As a consequence, the data analysis is driven by the experiences of the participants. Concepts will emerge from the data analysis and can be related to existing literature in order to give them meaning. It should be taken into account that within this approach the results of the research are influenced by the research questions and objective defined by the researcher. However, in contrast to the deductive approach, the results

directly emerge from the data analysis and are therefore not influenced by predetermined expectations. According to Azungah (2018, p. 393), *"deriving themes from the raw data using the inductive approach pre-empts the possibility of a researcher forcing a predetermined result"*.

Twining et al. (2017) argue that inductive reasoning starts with the analysis of the data and thereafter the data and its conclusions are tested against existing literature. In existing literature, much is already known about community compensation, for example people's perception towards different types of community compensation or which type of compensation is most effective in improving support for projects. However, the perception and effectiveness of community compensation differs per person and per case. Hence, it is important to look from *"the participant experiences"* (Azungah, 2018, p. 391) in order to get the most valid results per case. By looking from this perspective, it can be determined whether community benefits have been effective to improve local acceptance, according to the participants. These reasons make the inductive approach suitable for this research.

3.5 Worldview of the researcher

The influence community benefits can have on community acceptance of solar farms is based on the perception and the attitude of people towards community benefits, which is highly subjective. Therefore, the approach to this qualitative research is social constructivism. According to social constructivists, *"individuals develop subjective meanings of their experiences—meanings directed toward certain objects or things"* (Creswell & Creswell, 2017, p. 8). Because these meanings are subjective, they differ per person. Rather than dividing these meanings into only a small range of categories, the researcher looks for the multiplicity and complexity of meanings (Creswell & Creswell, 2017). The meanings of individuals are given shape through a process of interaction with other people and in addition, they are influenced by the cultural and historical factors. This makes it important for the researcher to understand the context in which people live and operate and how this context has influenced the views of participants (Creswell & Creswell, 2017).

3.6 Credibility and trustworthiness

In qualitative research, reliability and validity of the research is often replaced by credibility and trustworthiness. Some measures can be taken to enhance credibility and trustworthiness of the research: data triangulation, method triangulation and participant checking (Twining et al., 2017). Data triangulation refers to using data gained from various participants and in different contexts. In this research several stakeholders of solar farm development are interviewed, such as civil servants, energy developers and community members. This ensures that perspectives from different stakeholders are included in the research. Method triangulation refers to multiple methods being used to collect data (Twining et al., 2017). In this research, the methods used to collect data is desk research and semi-structured interviews. From these different types of methods, different types of data will be collected and included in the research. Participant checking refers to the opportunity participants have to review transcripts of the interviews and to give comments when necessary (Twining et al., 2017). After the interview has been conducted and transcripts of the interview are written, participants get the opportunity to review the transcripts. This ensures participants agree with the results, which increases the credibility of the data.

CHAPTER 4

Results phase 1

In this chapter, the results of the analysis of phase one will be discussed. In this phase, existing and future solar farm developments were analysed in order to find out what type of community benefits have been or will be provided.

4 Results phase 1

4.1 Community benefits in existing multifunctional solar farms

The analysis of existing solar farms can be found in appendix 3 and displays all existing solar farms in The Netherlands according to the municipality and province in which they are developed, the amount of energy they produce, the location they are developed in (rural or urban area) and whether they are multifunctional according to their spatial layout. As mentioned in the introduction, about 100 solar farms have already been developed in The Netherlands. This amount is still increasing, since many plans for future solar farm developments exists. Figure 8 displays the existing and future solar farms in The Netherlands. Especially in the northern part of The Netherlands solar farm developments are common.

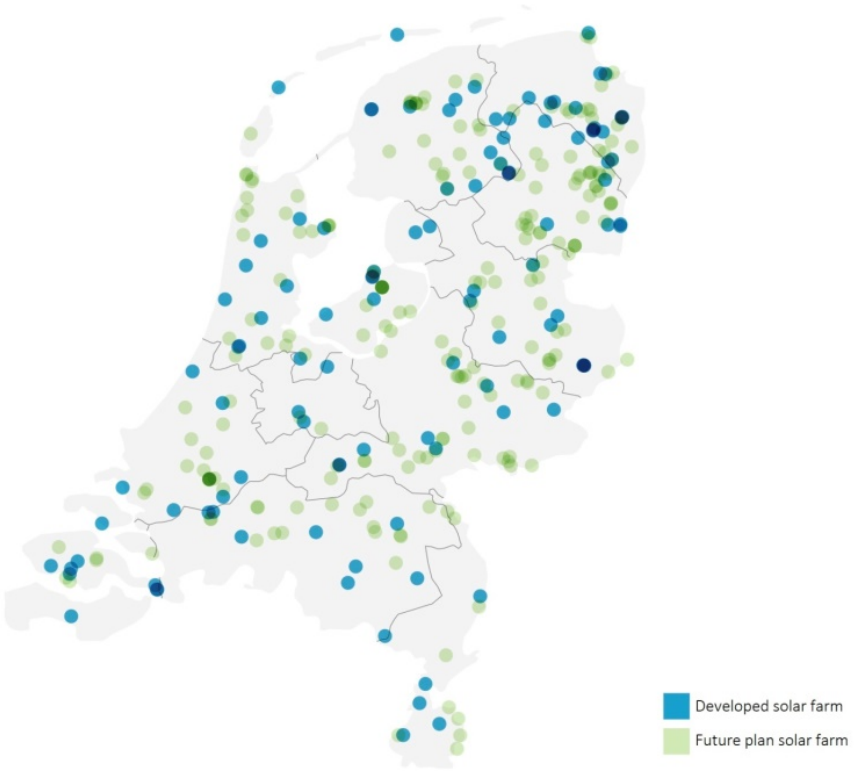

Figure 8 An overview of existing solar farms and future plans for solar farm developments (RTL Nieuws, 2020).

From the analysis in appendix 3, only 2 out of 110 existing solar farms are identified as multifunctional. All other solar farms are identified as monofunctional according to their spatial layout, which means they do not leave space available for functions other than energy generation. Solar farms which are identified as multifunctional are solar farm 'Laarberg' in Beltrum and solar farm 'De Kwekerij' in Hengelo. Both solar farms are located in the province of Gelderland and both are developed in a rural area. In this section, both solar farms will be described and the type of community benefits they offer will be analysed.

4.1.1 SOLAR FARM 'LAARBERG'

Solar farm 'Laarberg' is located nearby the city of Groenlo in Gelderland and is developed in the rural area next to the business park of Laarberg (see figure 9). The solar farm consists of about 6.600 solar panels and is able to generate 2,23 MWp of energy. It is developed by Greenspread and was finished in June 2018.

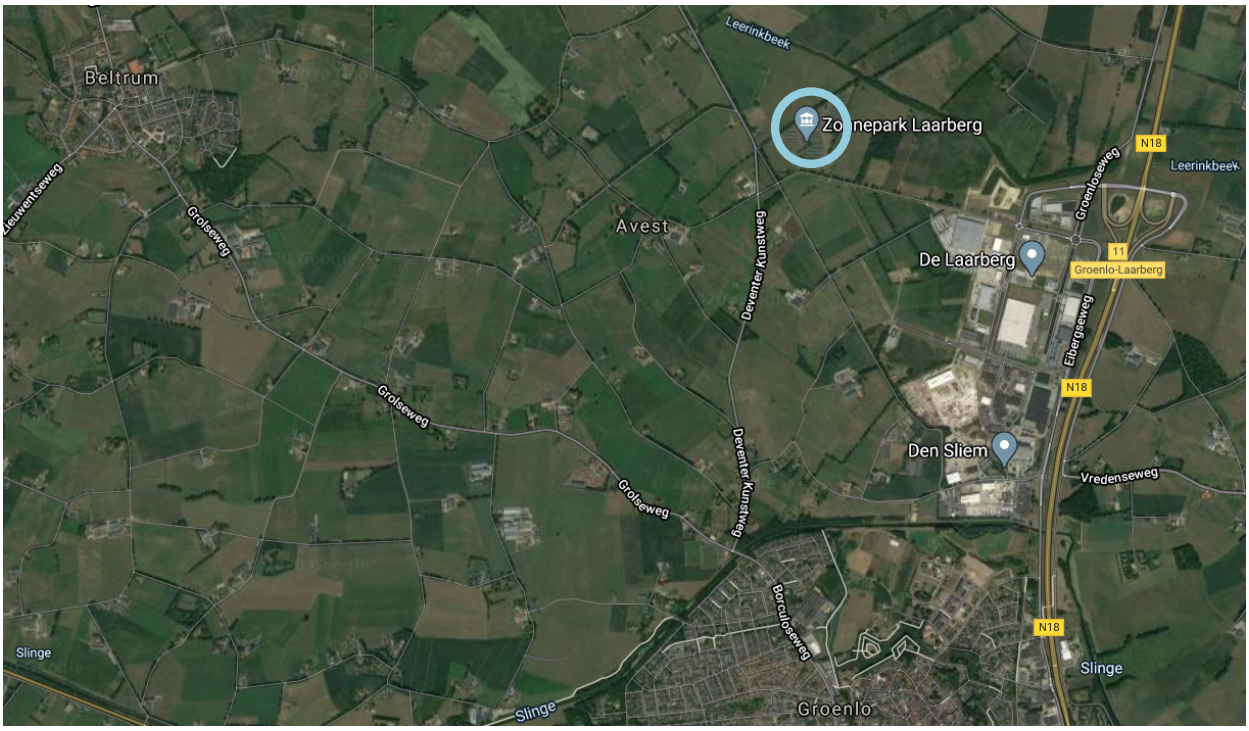

Figure 10 The location of solar farm Laarberg (as indicated by the circle). Retrieved from Google Maps on April 2, 2020

As can be seen on the overview of the solar farm, a large part of the surface is uncovered and much space is left available between the solar panels (see figure 10). This space can be used for other functions. Solar farm 'Laarberg' offers multiple functions. The solar farm contributes to

Figure 9 Overview of solar farm Laarberg. Retrieved April 2, 2020 from https://solarmagazine.nl/nieuws-zonne-energie/i16298/greenspread-opent-zonnepark-laarberg-van-2-23-megawattpiek

enhancement of biodiversity and the landscape[11]. The existing wooded banks are conserved and expanded in the solar farm and additional fruit trees are planted. This creates a habitat for several birds and bad species. Moreover, natural elements, such as insect hotels and pools are added to the solar farm. Another function is water retention. Water coming from the business park Laarberg can be collected in the solar farm and therefore, the solar panels are developed on a higher level. Next to the solar farm, a charging station is developed to charge electrical bikes of cyclists. The park is financed partly through crowdfunding, which offers financial benefits to local citizens[12]. The design was made by Greenspread and is focused on nature development in the solar farm. Citizens were not involved in the design of the solar farm and could therefore not influence the community benefits. The provided community benefits in solar farm Laarberg are summarized in the figure below (see figure 11).

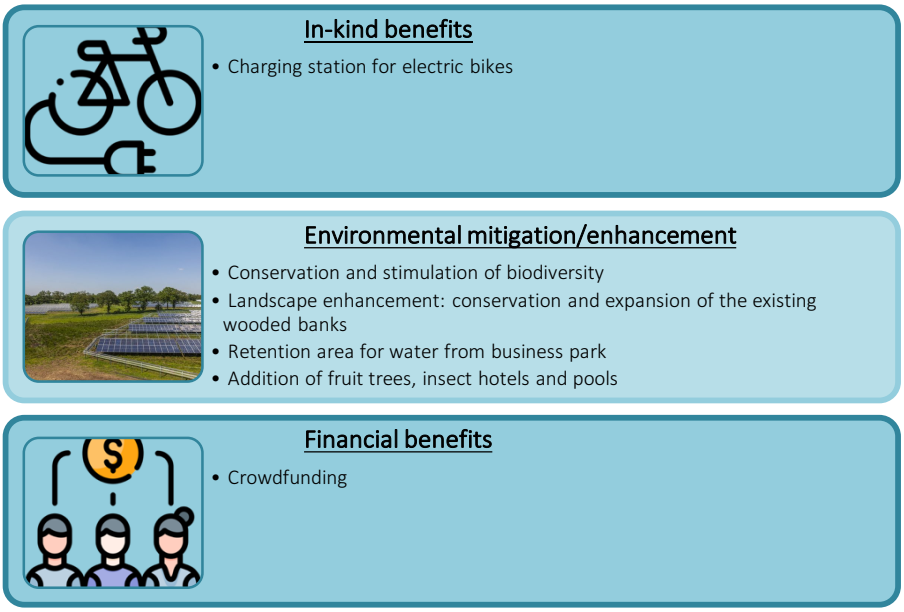

Figure 11 Different categories of community benefits offered by solar farm Laarberg. Picture 1/3 retrieved April 2, 2020 from https://www.flaticon.com/search?word=bike%20charge, Picture 2 retrieved April 2, 2020 from https://www.laarberg.nl/actueel/

The benefits provided by solar farm Laarberg especially relate to nature development and climate adaptation measures. The addition of natural elements in the park creates a habitat for various bird and bat species. Moreover, only a few benefits are provided directly to surrounding citizens, such as the possibility of financial participation and the charging station which can be used to charge electric bicycles.

[11] Retrieved March 26, 2020, from https://www.greenspread.nl/actueel/nieuws-en-opinie/nieuws/greenspread-opent-zonnepark-laarberg/
[12] Retrieved March 26, 2020, from https://solarmagazine.nl/nieuws-zonne-energie/i16298/greenspread-opent-zonnepark-laarberg-van-2-23-megawattpiek

4.1.2 SOLAR FARM 'DE KWEKERIJ'

Solar farm 'De Kwekerij' is located along the borders of the village Hengelo in Gelderland (see figure 12). The solar farm is developed in the rural area next to the village. The park consists of about 7.000 solar panels and is able to generate 2 MWp of energy. It is developed by NL Solarpark 'De Kwekerij' and was finished in August 2016.

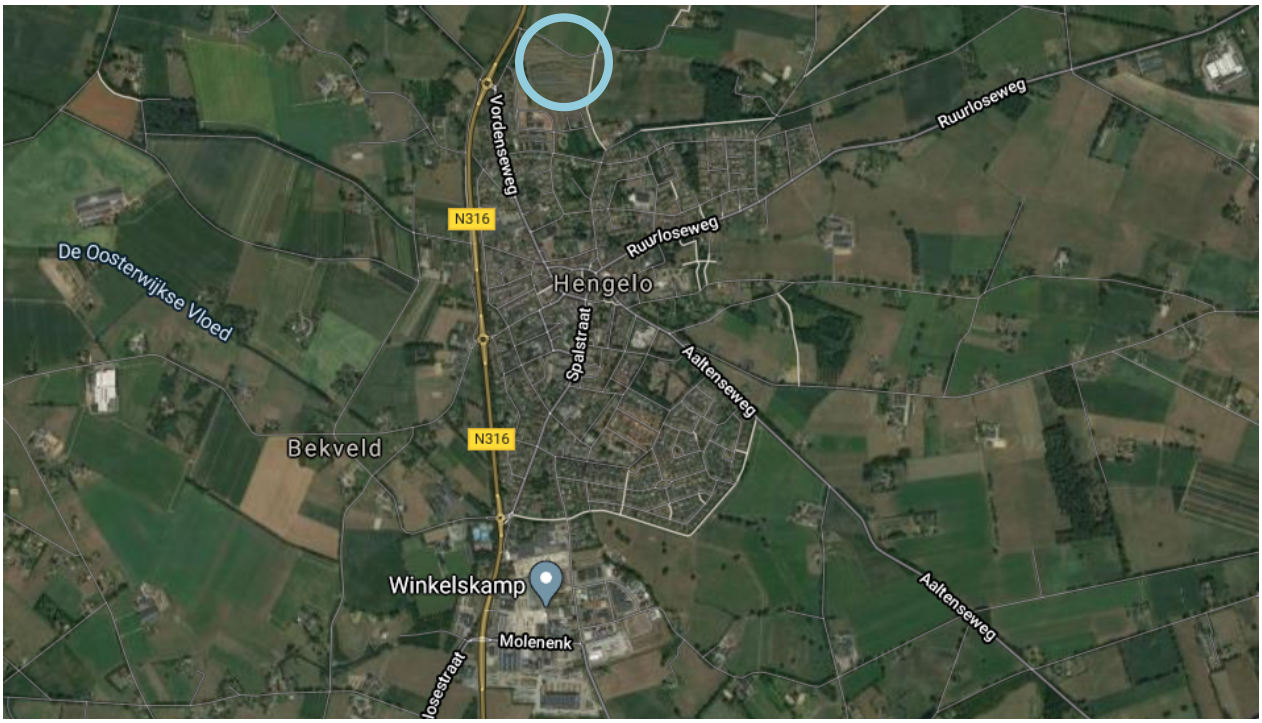

Figure 12 The location of solar farm 'De Kwekerij' (as indicated by the circle). Retrieved from Google Maps on April 3, 2020.

From the overview of solar farm 'De Kwekerij', it can be seen that space is available for other functions within the solar farm (see figure 13). Solar farm 'De Kwekerij' offers multiple functions. It generates energy and it functions as recreation and nature area[13]. Nature is developed in order to enhance biodiversity in the area. In addition, natural elements, such as insect hotels and pools are added to the park in order to create a habitat for several species. Moreover, the park function as retention area for water in the area. Through these functions, the solar farm contributes to Global Goals For Sustainable Development. Goal 11, 13 and 15 are addressed by solar farm 'De Kwekerij'[14]. Goal 11 is about sustainable cities, villages

Figure 13 Aerial overview of solar farm 'De Kwekerij'. Retrieved April 3, 2020 from https://econnetic.nl/case/solarpark-de-kwekerij/

[13] Retrieved April 3, 2020, from https://nlsolarparkdekwekerij.nl/over-ons/
[14] Retrieved April 20, 2020 from https://www.vng-international.nl/wp-content/uploads/2017/08/Doel-13-Multifunctioneel-solarpark-gemeente-Bronckhorst.pdf

and communities. The solar farm is developed nearby the village Hengelo. In this way, the solar farms contributes to make the village and its community more sustainable. Goal 13 is about taking action to climate change. By generation sustainable energy, the solar farm contributes to the reduction of fossil fuels and GHG emmissions and thereby to mitigate climate change. Goal 15 is, among others, about preserving and enhancing biodiversity. Because the design and the spatial layout of the solar farm takes into account biodiversity and contributes to nature development, biodiversity in the area can be preserved and enhanced through the solar farm.

The park is accessible to people and several elements, such as playground equipment and walking paths were added to the park and therefore it functions as recreation area. A foundation was set up which is responsible for maintenance of the park and it offers education about sustainability by organising guided tours through the solar farm and by giving presentations to external organisations. In every step of the planning process of solar farm 'De Kwekerij', surrounding citizens were involved[15]. They had a voice in the design, which resulted in a design that is adapted according to their wishes. Therefore, citizens had influence in the community benefits offered by the solar farm. The provided community benefits in solar farm 'De Kwekerij' are summarized in the figure below (see figure 14).

Figure 14 Different categories of community benefits offered by solar farm 'De Kwekerij'. Photo 1: https://www.lente-akkoord.nl/zonne-energie-opwekken-tussen-schapen-vlinders-en-spelende-kinderen/, Photo 2/3: https://www.zuid-holland.nl/onderwerpen/ruimte/ruimtelijke/handreiking/inspiratie/zonnepark-kwekerij/

[15] Retrieved April 3, 2020 from https://www.vng-international.nl/wp-content/uploads/2017/08/Doel-13-Multifunctioneel-solarpark-gemeente-Bronckhorst.pdf

4.2 COMMUNITY BENEFITS IN FUTURE SOLAR FARM DEVELOPMENTS

As was done for existing solar farm developments, future solar farm developments were also analysed. This analysis can be found in appendix 4. Although in only two existing solar farms community benefits were provided, more existing future solar farm developments providing community benefits were found. Ten future plans for solar farm developments which include multiple functions and provide community benefits were found and they were analysed according to the community benefits they will provide. A summary of the provided community benefits categories can be found in table 3.

		Categories of provided community benefits				
Type of solar farm development	Solar farm	In-kind benefits	Local services	Environmental mitigation or enhancement	Financial benefits	Community benefits influenced by citizens
Existing solar farms	Laarberg	✓	×	✓	✓	×
	De Kwekerij	✓	✓	✓	×	✓
Future solar farms	De Punt	×	×	✓	✓	×
	Bergen	✓	✓	✓	✓	✓
	Braambergen	✓	✓	✓	×	×
	Wagenberg	✓	✓	✓	✓	✓
	Emmaberg	✓	✓	✓	✓	×
	Klarenbeek	✓	×	✓	✓	✓
	Mikkelhorst	✓	✓	✓	✓	×
	Noordbroek	×	×	✓	✓	✓
	Abdissenbosch	✓	✓	✓	✓	✓
	Zonnewoud	✓	✓	✓	✓	×

Table 3 The community benefits categories provided in the twelve analysed cases.

As can be seen in table 3, the most provided category of community benefits is environmental mitigation or enhancement, which is provided in twelve cases. Thereafter, in-kind benefits and financial benefits are the most provided categories of community benefits. Both categories are provided in ten cases. The least provided categories of community benefits is local services, which is provided in eight cases. These categories can be analysed in more detail by looking at the type of community benefits. The amount of type of community benefits provided per case is summarized in the chart below (see figure 15).

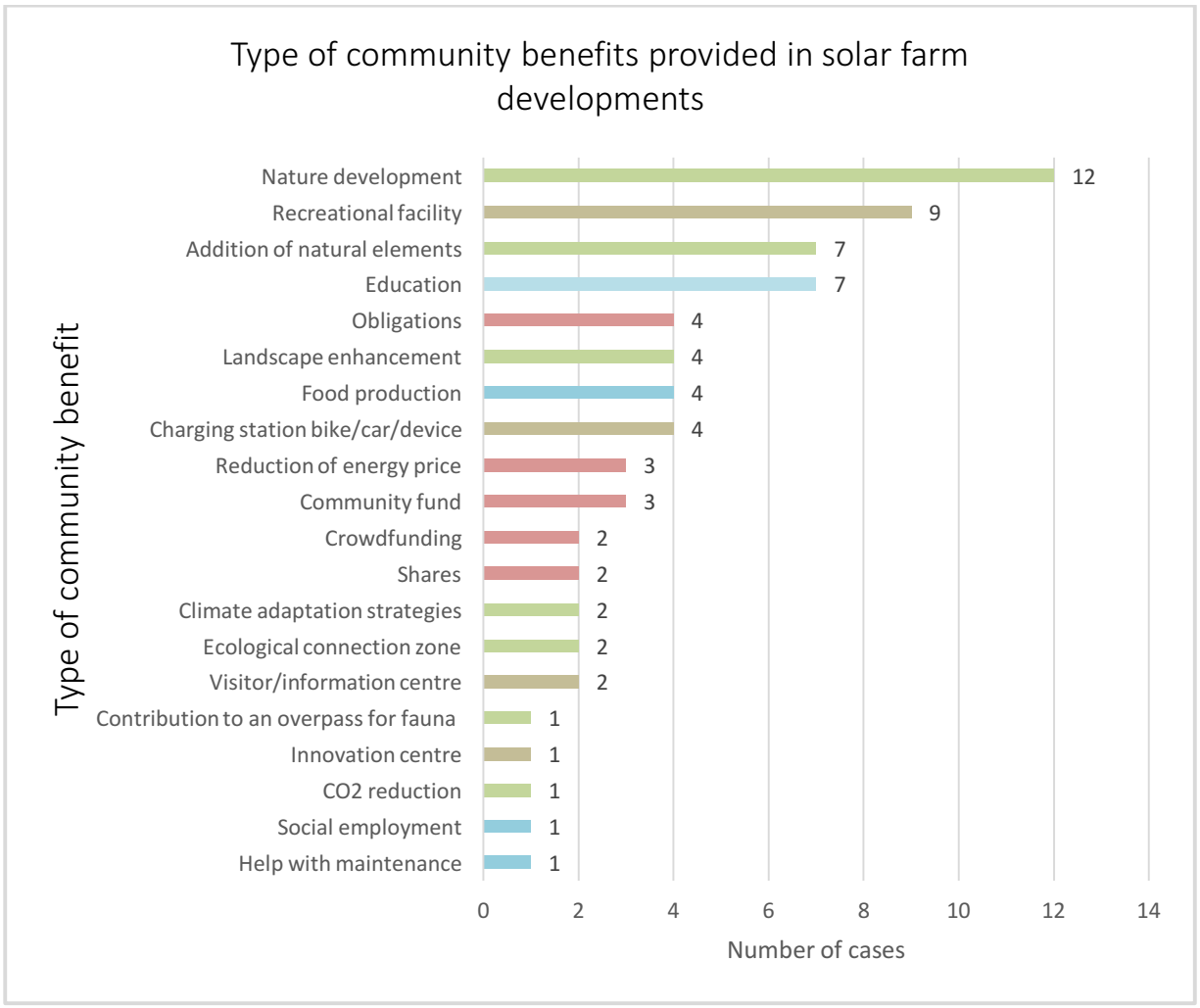

Figure 15 The amount and types of community benefits provided in the analysed cases.

The different types of community benefits can be related to a category of community benefits. In this way, the most provided type of community benefit per community benefit category can be identified (see table 4).

Environmental mitigation/enhancement (provided in 12 cases):	Financial benefits (provided in 10 cases):
• Nature development (12x) • Natural elements: insect hotel (7x) • Landscape enhancement (4x) • Ecological connection zone (2x) • Climate adaptation strategies (2x) • CO_2 reduction (1x) • Contribution to an overpass for fauna (1x)	• Obligations (4x) • Community fund (3x) • Reduction of energy price (3x) • Shares (2x) • Crowdfunding (2x)
Categories of community benefits	
In-kind benefits (provided in 10 cases):	Local services (provided in 8 cases):
• Recreational facility (9x) • Charging station bicycle/car/device (4x) • Visitor/information centre (2x) • Innovation centre for agriculture, horticulture and energy storage (1)	• Education (7x) • Food production (4x) • Help with maintenance (1x) • Social employment (1x)

Table 4 The type and amount of provided community benefits in the twelve analysed solar farm development cases.

Although the provided communities differ per solar farm, some similarities can be found. Twelve solar farms were analysed. All solar farms offer community benefits related to the type "environmental mitigation or enhancement". All analysed cases offer some kind of nature development, such as the addition of plants, flowers and trees, which is the most common provided example of this type of community benefits. After nature development, the addition of natural elements, such as bee and insect hotels or pools are the second most provided example belonging to this type of community benefits. Thereafter, landscape enhancement measures were only provided in four cases. An example of this community benefit is preserving and expanding historical landscape structures, such as wooded banks, as was done in the case solar farm 'Laarberg'. In solar farm 'De Kwekerij', the old landscape structure of a former nursery garden was restored by the development of the solar farm. The least provided types of community benefits in the analysed cases are contributing to an ecological connection zone or to an overpass for fauna, climate adaptation strategies and CO_2 reduction. These benefits are only provided in one or two cases. The community benefit category "environmental mitigation or enhancement" is not only provided within the solar farm, but also on external locations outside the solar farm. An example of this is the contribution to the broader ecological connection zone by the solar farm development. Therefore, this benefit does not only serve the local scale, but also serves broader scales, such as the regional or national scale. Another example is the provision of external compensation for the solar farm development by contributing to an overpass for fauna between to nature reserves. This overpass even crosses national boundaries, since one of the nature reserves is located in Germany. This shows that community benefits are not only provided in the local area where the development will take place, but also on broader spatial scales.

After environmental mitigation or enhancement, financial and in-kind benefits are the second most provided categories of community benefits in the analysed cases. Both categories were provided in ten cases. Financial benefits belong to monetary compensation and include financial participation

through shares, obligations or crowdfunding. Financial benefits through obligations of the solar farm are most provided in the analysed cases. Thereafter, the provision of a community fund which can be spent on several goals in order to improve the community or area and the reduction of energy prices as result of the solar farm development are the second most provided financial benefits in the cases. A difference can be found in the type of community funds. Some plans only offered the possibility to set up a community fund, while other community funds were more specified. The case of solar farm 'Noordbroek' for example, offers €0,50 per generated MWh of energy which will be made available in a community fund. Another case, solar farm 'Abdissenbosch', offers a community fund of €125.000. Although the community funds differ in type and amount, in all cases, involved community groups, such as a workgroup, were able to determine the goal of the community fund. Therefore, the community was able to determine the goal on which the money out of the fund can be spent. Lastly, the least provided type of community benefits belonging to financial benefits are shares and crowdfunding.

In-kind benefits are, as financial benefits, the second most provided category of community benefits in the analysis. In-kind benefits relate to the provision of a physical asset to the community, in these cases the development of a visitor or information centre, providing recreational space in the solar farm, developing charging stations for cars, devices or bicycles or the development of an innovation centre. The most common provided type of community benefit relating to the category "in-kind benefits" is the provision of a recreational facility. When this benefit is provided in a solar farm development, a walking or cycling path or additional recreational elements, such as playgrounds or benches, are developed in or around the solar farm. In this way, the solar farm functions as a recreational park for citizens. From the analysed cases, not every solar farm is accessible to people. However, in these cases the physical assets, such as a walking or cycling paths and other recreational facilities are often developed around the solar farm. The second common provided in-kind benefits in solar farms are charging stations. These charging station differs per type and location. Some solar farms offer charging stations for electric bikes or electric devices which are then often located within or at the entrance of the solar farm. One solar farm provides an external charging station for electrical cars at a local gas station. The least provided in-kind benefits are a visitor, information or innovation centre. Only two plans for solar farms provide these type of benefits.

The least provided category of community benefits are local services. In this type of benefit, a service is offered to a community which is affected by a sustainable energy project. In the analysed cases these services are education about the necessity of the solar farm or about the energy transition, food production by planting crops between the panels or on local scale by means of a community garden, but also cattle can graze between the panels. In addition, sometimes it is possible to help with maintenance of nature in the solar farm or the service of social employment is offered. From the analysed cases, seven cases offer education about the solar farm, the aim of sustainable energy and the energy transition. Education in solar farms is often offered by information boards informing visitors about a specific topic or by guided tours through the park. Food production is only known as local service provided in four future plans. These plans offer opportunities to grow crops between the solar panels. One case, solar farm 'De Kwekerij', offers the opportunity to help with maintenance of the park and another case, solar farm 'De Mikkelhorst', offers social employment opportunities in the solar farm.

In six cases, citizens or citizens group were given opportunities to participate in the design process and thereby determine the design and spatial lay-out of the solar farm. By including people in the design process of the solar farm, the provision of community benefits can be influenced by them. A good example of this is the case of solar farm 'Klarenbeek'. In this case, the plan was to develop a large-scale solar farm of 21 hectares, which only focussed on efficiency and profit for the developer. However, after a high level of opposition to the plan arose, a new plan was made by a neighbourhood committee and was proposed to the developer. At the end, this design was approved by the developer. This changed the plan from a large-scale solar farm of 21 hectares to a "*design that fits the size and scale of the landscape*"[16], according to the committee. Moreover, this design provides several community benefits as recreation, nature development and landscape enhancement. As a result, the plan was accepted by the surrounding community. This shows the importance of involving the local community in the planning process of solar farms.

[16] Retrieved April 17, 2020 from https://www.zonneparkklarenbeek.nl/#wateraanvoorafging

CHAPTER 5

Results phase 2

In this chapter, the results of the analysis of phase two will be discussed. In this phase, three cases are selected and the influence community benefits have on the distribution of costs and benefits associated with solar developments is analysed. In addition, the perception of people towards the provision of community benefits is analysed in order to find out how effective they are in contributing to the acceptance of the solar farm development.

5 Results phase 2

In this phase, three case studies were analysed in-depth: solar farm 'De Kwekerij', solar farm 'Zonnewoud' and solar farm 'Abdissenbosch'. The results of each case will be discussed in this chapter.

5.1 Case: solar farm 'De Kwekerij'

The first case to be analysed in this research is solar farm 'De Kwekerij'. As was mentioned in the introduction, almost no opposition to this solar farm development arose and it was therefore accepted more easily, although it is located opposite a residential area.

5.1.1 Background information

Solar farm 'De Kwekerij' is located in a former nursery garden next to the borders of the village Hengelo in the province of Gelderland (see figure 16). In this park 7.000 panels are developed which generate energy for 550 households. On this location, the former plan was to develop a residential area consisting of about 200 houses. However, due to the expected population decline in the region, the municipality decided to develop less houses. Instead of 200 houses, only 50 were developed. As a result, a big surface became available. Therefore, the idea of a solar farm emerged and the initiative was taken by de municipality Bronckhorst.

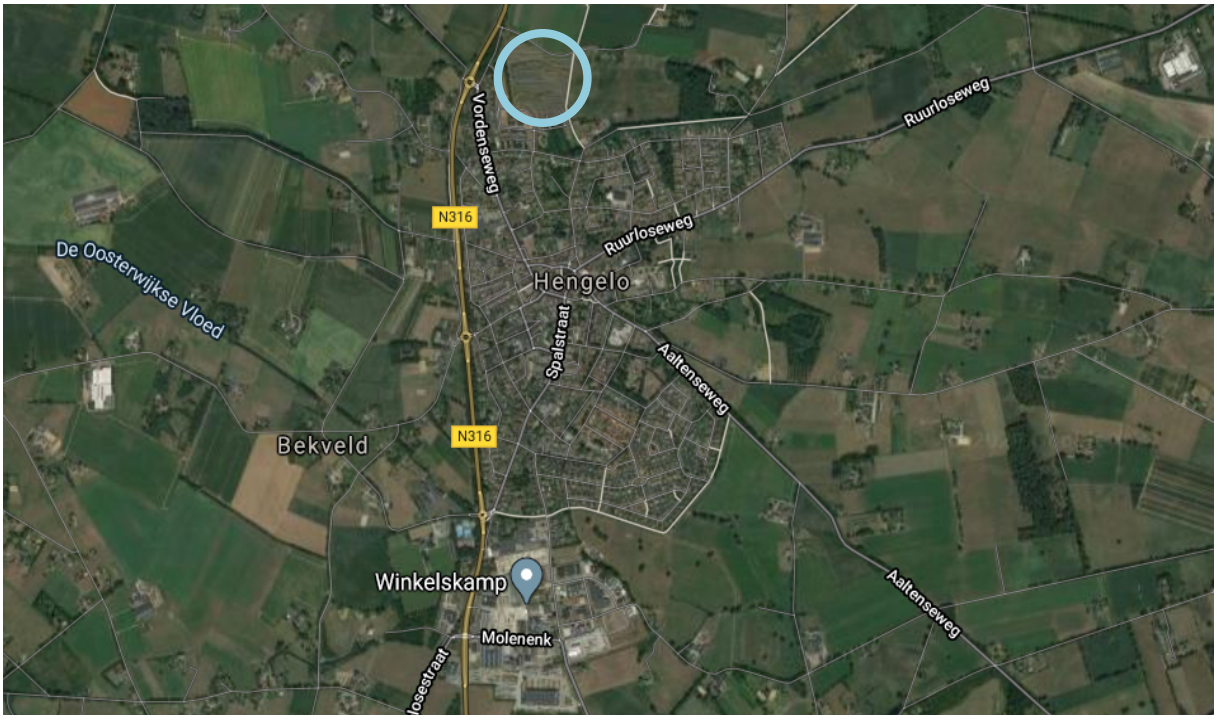

Figure 16 The location of solar farm 'De Kwekerij' (as indicated by the circle). Retrieved from Google Maps on April 3, 2020.

5.1.2 PLANNING PROCESS

The idea of a solar farm emerged around 2011. Because many people were not familiar with such developments and the concept of a solar farm was relatively new, some people had to get used to this idea. Moreover, some concerns by the municipality were that the development of a solar farm would cause a high level of opposition by citizens, as wind energy did at that time in the municipality. As a result, the idea of a multifunctional solar farm emerged. The civil servant had the idea that by adding multiple functions to the solar farm, the support for the development might increase and it has the advantage that the solar farm can pursue multiple objectives for the municipality. During the development process of solar farm 'De Kwekerij', the municipality Bronckhorst cooperated with the organisation NL Greenlabel and the solar farm developer IQ-SOLAR. The design was made by NL Greenlabel and is created through a clear vision: "*solar farms should be a pleasure, not a burden to the community*"[17]. The aim was to develop a recreational park in which nature and sustainability are intertwined. The involvement of NL Greenlabel contributed to a sustainable park, since their vision is that in their projects, all materials, products and plants used, should be sustainable and this sustainability should be measurable. The solar farm is different than common solar farms, since it is not designed to have the maximum generation capacity possible and therefore it is not the most efficient solar farm[18]. As a consequence, space for other functions in the park became available. The solar farm offers functions as education, recreation, nature development and climate adaptation. The solar farm is developed on a parcel with existing structures of a former nursery garden and has therefore a park-like layout (see figure 17). Walking paths and recreational elements are added to the solar farm. In this way, it functions as recreational park. Moreover, natural elements as pools, insect hotels and several plants are added to contribute to nature development in the area. In addition, education is offered through guided tours in the solar farm and a foundation was set-up which coordinate maintenance of the park. Because of the combination of these functions, the solar farm can offer several benefits for surrounding communities, as was analysed in the previous section.

[17] Retrieved April 5, 2020 from https://nlsolarparkdekwekerij.nl
[18] Retrieved April 20, 2020 from https://www.vng-international.nl/wp-content/uploads/2017/08/Doel-13-Multifunctioneel-solarpark-gemeente-Bronckhorst.pdf

Figure 17 Design plan of solar farm 'De Kwekerij'. Retrieved January 14, 2020, from Dorpenacademie: https://dorpenacademie.nl/initiatief/solarpark-de-kwekerij-in-hengelo-gld/

5.1.3 COMMUNITY INVOLVEMENT

During the whole planning process, citizens were involved in the project and where represented by three local citizens having the role of community representatives. Several sessions were organised in which citizens were able to discuss their ideas and wishes related to the solar farm. Some design changes were made as a result of the input of these sessions. The park is accessible to people and the community wanted the park to be closed in the evening. An idea was proposed to give the key of the gate to two community members who are now responsible for opening and closing the gate of the solar farm every morning and evening. According to NL Gebiedslabel, *"a participatory approach thus not only prevents lengthy and expensive procedures, but also contributes to the sense of responsibility of users and local residents in the park"*[19]. Another wish of the community was to lower the solar panels, because according to surrounding citizens, some solar panels were developed too high and people wanted to preserve their unobstructed view on the rural area. Moreover, when the solar farm was developed, only one main entrance existed to enter it. This changed due to the wishes of the community, because they wanted two additional entrances to enter the park. Citizens also had influence on the community benefits offered by the solar farm. The first idea was to develop a watch tower nearby the park to provide an overview over the solar farm, but the community considered this object as too high. As a consequence, the idea to develop a watch tower was revised and instead

[19] Retrieved April 30, 2020 from https://www.nlgebiedslabel.nl/nproject/nl-solarpark-de-kwekerij/#prettyPhoto

picknick tables were added. Now they are often used by citizens to organise meetings and parties in the solar farm. In the end, several changes which were wished by the community, were made in the design. This means the community had influence in the provision of the type and amount of community benefits. Overall, citizens considered the planning process as very prositive, because they were involved to a high extent and the communication and the provision of information was good. Moreover, an agreement was made between the developer and the community in which the design and rules relating to the use of the solar farm are described. According to a citizen, this gave the community the feeling that they had influence in the process.

5.1.4 ACCEPTANCE

As can be observed in figure 16, solar farm 'De Kwekerij' is located nearby the borders of the village Hengelo. Because of its location nearby a community, support for the project was important in order to realise the project. Although many solar farms struggle to be developed, solar farm 'De Kwekerij' could be developed without almost no opposition. However, at the start of the process some concerns arose relating to the glare that solar panels possibly could cause. However, due to the high level of community involvement, these concerns were solved. According to citizens, the reason for the high level of support for this solar farm is that it has multiple functions and it is accessible to people. 'De Kwekerij' is the example of a solar farm which is not locked by fences, but is accessible to people and therefore, it can be seen as invitation for surrounding citizens to make use of the park. Another reason for the high level of acceptance is the goal of the solar farm. According to NL Gebiedslabel, the central goal of this solar farm is not to maximise profit, but instead, offering additional value for the neighbourhood is most important[20]. Acceptance of this solar farm cannot only be related to the added value it offers, but also the location plays an important role. The former plan on this location was to develop a residential area and as a result a great part of the area would change to private property. However, due to this solar farm, a new public space has been developed for surrounding citizens. This contributed to the acceptance of this solar farm.

5.1.5 REASONS FOR COMMUNITY BENEFITS PROVISION IN SOLAR FARM 'DE KWEKERIJ'

Developers of solar farms provide community benefits for several reasons. In some cases, it might be the aim of the developer to offer benefits for the surrounding community, while in other cases, it might be a criterion in order to gain permission for the solar farm development. The exact reason for the provision of community benefits differs per case. In solar farm 'De Kwekerij', the reason for the provision of community benefits was not necessarily a criterion, it was more of a wish by the developer and the municipality, but also technical aspects played a role. According to the civil servant involved in this project, *"for many colleagues, the idea of a solar farm at that location was something to get used to. It was fairly unknown. I had the idea, it would be nice if there will be a solar farm with multiple functions. Because I was afraid that in those years, solar parks would go in the same direction as wind farms that also generate a lot of resistance. Thus, in this way you can achieve that a solar farm gets*

[20] Retrieved April 30, 2020 from Retrieved April 30, 2020 from https://www.nlgebiedslabel.nl/nproject/nl-solarpark-de-kwekerij/#prettyPhoto

more support and can pursue multiple objectives" (appendix 5.4)[i]. On the one hand, the multifunctional solar farm was a wish by the civil servant and the multiple functions were especially added with the aim to get more support for the development, while also pursuing other goals for the municipality. On the other hand, technical issues played a role, *"we have facilitated this [multifunctionality]. We have indicated our wishes, because we are landowner. The developer has elaborated further on this together with the company that deals with the green part. There was a balance between production, but it also had to do with the connection options to the electricity grid"* (appendix 5.4)[ii]. According to the civil servant, when more solar panels would have been developed on this location, more electricity could be generated. However, this would ask for more connection options, which results in higher costs. Therefore, the maximum amount of solar panels was developed on this location and still uncovered space was available for other functions. Moreover, the developer of the solar farm played the major role in the provision of community benefits. *"The developer came up with a sketch and it was exactly what I was looking for. This was due to the fact that NL Green Label had the ambition to design these types of areas in this way"* (appendix 5.4) [iii]. This perspective shows that the main idea of this design including community benefits was proposed by the developer NL Green Label. Because of their ambition to make solar farms a pleasure to the community, this resulted in a multifunctional solar farm fitting in the landscape.

5.1.6 Distribution of costs and benefits in solar farm 'De Kwekerij'

In the case of solar farm 'De Kwekerij', the level of resistance to the development was low. According to a local citizen, who also had the role of community representative during the process, in the beginning of the process, some uncertainties emerged about glare and noise caused by the solar panels. In addition, the plan was to add a stage to the recreational area of the solar farm in order to organise performances and other activities. This resulted in concerns about extra noise generation. However, because of the involvement of citizens and the information provided by the developer, this resistance decreased. All in all, the community representative does not see any negative effects of this solar farm, *"yes, I actually do not see any negative effects. Except for how it will be in twenty-five years, then it will be over, but yes, that is still so far, because it has already been established that the municipality can say that we will take over that land, we want, well imagine, the housing development must increase, then they can still build there. At least that is not possible for the first twenty-five years."* (appendix 5.1)[iv]. From this perspective, the community representative does not see any negative effects of the solar farm development. He actually considers it as very positive, because the housing development will not take place in the coming twenty-five years. Because he does not consider any negative effects, but sees many advantages, it indicates that the positive aspects resulting from this solar farm can outweigh the negative ones associated with it.

Another local citizen did not expect and was also not concerned about negative effects resulting from the solar farm development. However, she argues that this multifunctional solar farm changed her feelings of safety. Because of the accessibility of this solar farm, she feels more safe compared to a non-accessible solar farm, *"precisely because you walk between those panels every day, but also between the transformer, it also gives a feeling of familiarity. For me that is not an unsafe feeling, while if there was a large two-meter fence around it, I would have had that feeling much sooner."* (appendix 5.2)[v]. This shows that because of her familiarity with the park, she does not feel unsafe between the

panels anymore. Moreover, she argues that some other citizens were concerned about glare caused by the solar panels. However, she was not concerned about negative effects. Therefore, she thinks that the positive aspects of the solar farm can outweigh the negative ones, *"yes, because that solar park is there, there is nothing else, what I said, housing development, industry or a forest, which might take away your view. And the opportunity for recreation right in front of your door is very pleasant."* (appendix 5.2)[vi]. From this perspective, the citizen considers the solar farm development as beneficial to the preservation of her view, since any other development might affect this view. She argues, *"well, I literally look out over the park. I am happy that there is a park and that there are no houses there. The park also provides me an unobstructed view. Do you understand? The park is there, but because of this we look over the park and we have an unobstructed view."* (appendix 5.2)[vii]. This indicates that the unobstructed view is very important to her and she considers this development as a way to preserve her view. Therefore, she especially sees the positive effects of this solar farm.

According to the civil servant involved in the development, in the beginning of the process, some questions were asked about radiation and glare that possibly could be generated by the solar panels. However, he argues that especially due to the location, little resistance arose to the solar farm, because the location would otherwise be a residential area. He is not sure whether the benefits resulting from the solar farm can outweigh the negative effects, *"it depends on how you communicate it as initiator. I notice that not every developer is open to looking at what the neighbourhood wants, that the neighbourhood is involved and can help design. However, additional investments must be made by the developers and more must be directed by the municipality."* (appendix 5.4)[viii]. The civil servant is especially aware of the additional efforts that must be made by the developer and the municipality in order to provide additional benefits through the solar farm. Therefore, he considers the costs and benefits from the perspective of the developer and the municipality. However, he argues that *"a multifunctional solar farm costs extra. You do not just get it financed with the proceeds from the solar farm. On the other hand, there are fewer side costs, such as appeal proceedings at the Council of the State."* (appendix 5.4)[ix]. From this perspective, a multifunctional solar farm providing community benefits costs more than a common solar farm. However, according to the civil servant, it might lead to less side costs because of less objections by the community. Therefore, the extra investments that should be made by the developer and the municipality can be beneficial to lower side costs and additional procedures.

The investor also argues that the main concern of the solar farm was the unobstructed view citizens had from their houses which could be affected by the solar farm development. Moreover, some concerns were related to the possibility of glare caused by the solar panels. However, the investor does not see any negative effects for the neighbourhood. According to him, additional investments had to be done to develop the solar farm. However, he thinks the extra investment was worth it, because everyone appreciates the development and a lot of positive things will come back in return in the long term, *"but yes, you see how happy everyone is now and as long as the solar farm produces energy, the park is also maintained, so for the community there are no costs involved. So it pays for itself very quickly in many areas. You have to visualize that well and make it clear to people, in the long term you get a lot in return, which is also financial value. But yes, you have to take a long breath and see it."* (appendix 5.3)[x]. This indicates that although higher investment costs for the investor, he expects to get a lot in return in the long term. Not only for himself, but also for the local community. Moreover, he argues that the community can benefit from the solar farm, while there are no costs involved for them.

This indicates that the benefits resulting from this solar farm development can outweigh the negative effects associated with it.

5.1.7 Perceptions towards the provision of community benefits in solar farm 'De Kwekerij'

The multiple functions added to the solar farm played a role in the acceptance of this solar farm. As the civil servant argues, *"if it had only been solar panels, it would have been a bit different on that location. It is precisely the combination to which people say we accept it and we recognize the benefits of it. The acceptance rate has therefore increased considerably. This was also the approach to get that done."* (appendix 5.4)[xi]. From this point of view, the combination of multiple functions and benefits of the solar farm played a major role in acceptance. Moreover, the civil servant sees more benefits of adding multiple functions to a solar farm: *"I see that when you can add multiple functions to such a park, the support and the willingness to participate will increase. That has its advantages."* (appendix 5.4)[xii]. From his perspective, the multiple functions are not only beneficial to the support of the solar farm, but also stimulate the willingness to participate in the process and are therefore considered as positive. In addition, he sees several benefits for other stakeholders, *"as a result, they create added value for the surroundings and as a municipality we can put several objectives in it. Not only energy transition, but also enhancement of biodiversity and a bit of recreation. People can walk through it, they can walk, walk the dog and the kids can play. The park is therefore a nice visiting card for the municipality."* (appendix 5.4)[xiii] This shows that the offered benefits do not only apply to the surroundings and the local community, but also to the municipality self. All in all, due to these benefits on different levels and for several stakeholders, the perception towards the community benefits by the civil servant can be considered as very positive.

The investor of solar farm 'De Kwekerij' sees the benefits of this solar farm especially in the integral design. According to him, it has *"…, a good integral design, that really has added value from which we all benefit in the long term."* (appendix 5.3)[xiv]. The investor recognizes the benefits of the solar farm on the long term. However, according to him, the development of a multifunctional solar farm is more expensive, compared to a monofunctional solar farm full of solar panels. In this case, the additional green infrastructure and recreational part of the solar farm involved a big part of the total budget for its development, about ten percent (appendix 5.3). For development of the green infrastructure, an extra subsidy, provided by the province, was necessary. According to the civil servant, the province wanted to contribute to the solar farm through an additional subsidy, because this project was the first of its kind in The Netherlands (appendix 5.3). This indicates the importance and interest the province dedicated to this project. According to the developer, an extra investment was needed because of the beautiful and luxurious style of the green infrastructure. On the one hand, he argues, *"of course you could have done it more soberly, then you can save a lot of investment costs."* (appendix 5.3)[xv]. But on the other hand, although the higher investment costs, he sees the benefits of this solar farm., *"… they just got back a beautiful park, which they are very happy with, which is managed and which costs them nothing. That is the great advantage for the neighbourhood."* (appendix 5.3)[xvi]. From this perspective, he sees an advantage of the solar farm, offering the community a new recreational facility which costs them nothing. Therefore, his perception towards the benefits offered through the solar farm is positive.

The community representative argues that, compared to a newly developed residential area nearby his house, he likes to have a park over there. He especially likes the design of the solar farm, *"so it is just very nicely designed and there is a lot of wildlife and a lot of greenery, yes, what more do you want?"* (appendix 5.1)[xvii]. In this argumentation, he does not consider 'De Kwekerij' as solar farm, but more as a recreational park. He makes use of the park every day, by walking in it and he also observed that many other people use the solar farm. *"… they have developed beautiful routes and what does us all good, is that many people use the park and we are delighted that many people use the park. Well, then they go out for a run in the evening or go out with their dog, and that is all going well."* (appendix 5.1)[xviii]. This shows that he is appreciates that many other people use the park. According to him, the design of the solar farm played an important role for his acceptance. *"… it is also functional of course, but, no, a solar park without this entourage, I would not like that. And then I might have voted against it, or said, at least make sure to develop a forest wall around it, then it does not even have to be arranged with all kinds of additions. But yes, this is an enrichment, because you have to see it in this way, on this side a park with solar panels is located, on the other side of the village the forest is located. The people from this side sometimes walk in the forest and those from that side come here for a walk …"* (appendix 5.1)[xix]. From this perspective, the community representative appreciates the multifunctionality and the design of the solar farm and he argues he would possibly not accept a plain solar park without greenery. Therefore, the functionality and the entourage of this solar farm played an important role in the acceptance. He even calls this solar farm an enrichment for the surrounding neighbourhood and the rest of the village. This indicates a very positive perception towards the benefits offered in this solar farm.

The other local citizen, living opposite to the solar farm is happy with it. She especially appreciates the multiple functions of the solar farm. *"Yes, I think that is great. I find that very positive. It is also very nicely laid out. It is laid out very natural, with beautiful water features, with playgrounds for children, with a grove. Yes, I make use of it daily, I walk through it daily with my dog. …. Yes, we just enjoy it very much, also because the nature in the park is very beautiful. And the funny thing is that, if you walk through the park daily or weekly, you see the nature developing and that you actually hardly see those solar panels."* (appendix 5.2)[xx]. She likes the design of the solar farm, the recreational function and nature development in the solar farm. Just as the other citizen did, she considers the solar farm more as a recreational park than a solar farm, because she hardly sees the solar panels anymore. In addition, she argues that she does not only appreciate the recreational aspect, but she also appreciates that it provides added value for many more people, *"so I think that recreational aspect is certainly an added value for a lot of people"* (appendix 5.2)[xxi]. The recreational function and nature development within the park even increased her acceptance, *"I like the fact that I can recreate there and that in a beautiful way, that the solar farm has been laid out and that beautiful nature has been created around it or actually in the park, that it is beautifully laid out, which I can enjoy. I think this increases my acceptance compared to a park with a fence around it, where I had to walk around it."* (appendix 5.2)[xxii]. From this perspective, the accessibility, the recreational function and nature development of this solar farm resulted in an increase of acceptance by this citizen. Therefore, the perception of this citizen towards the community benefits offered in this solar farm can be considered as very positive.

5.2 CASE: SOLAR FARM 'ZONNEWOUD'

The second case to be analysed in this research is solar farm 'Zonnewoud'. The solar farm has not been developed and the licensing procedure for the development is still pending. This case is selected, because a petition has been started against the solar farm, which is signed by about 1.500 people. Moreover, one notice of objection is submitted to the plan. While solar farm 'De Kwekerij' was accepted with relative ease, this plan encounters more resistance.

5.2.1 BACKGROUND INFORMATION

The plan is to develop solar farm 'Zonnewoud' in 2021. The surface of the solar farm will be about seven hectares big. It will be developed in Horsterwold, a forest located nearby the village Zeewolde, located in the province of Flevoland (see figure 18). Horsterwold is a forest with a surface of 3.700 hectares and is owned and managed by Staatsbosbeheer, the state and forest agency of The Netherlands. Horsterwold was developed with the aim to function as production and recreational forest. Staatsbosbeheer has assigned this location as development area in order to broaden and strengthen recreational facilities in the forest with the aim to attract more visitors to this area. Therefore, a few years ago, a tender was issued for entrepreneurs to offer recreational and market developments to the area. However, according to Staatsbosbeheer, there was a lack of qualitative good plans for this tender and therefore the tender was ended without any winner. After this, the idea of a solar farm on this location arose for several reasons. First of all, it contributes to the goal of Staatsbosbeheer to become more sustainable by generating sustainable energy. Second, the solar farm can generate proceeds for nature developments and lastly, it can contribute to the recreational goals in the area by offering an additional recreation facility and thereby attract more visitors. Therefore, Staatsbosbeheer issued a tender again and asked developers to design a solar farm with multiple functions to offer added value for recreation and to enhance landscape and ecological values in the area.

Figure 18 The location of solar farm 'Zonnewoud' (as indicated by the circle). Retrieved from Google Maps on June 18, 2020.

5.2.2 PLANNING PROCESS

Five tenders were submitted for the design of the solar farm and one final tender had to be chosen to be developed. During the tender process, a sounding board consisting of local organisation and local residents was set up. Through this sounding board, local residents had a voice in the process to choose the developer and the associated design of the solar farm. Together with this board and other stakeholders, Staatsbosbeheer scored the submitted designs. In the end, two final designs with the highest score remained. The difference between both designs was that one design consisted of more recreational elements, while the other had a more artistic design. Finally, the design of the solar farm with the recreational elements was chosen, because it had more to offer and was therefore more attractive to visitors. Actually, Staatsbosbeheer had chosen the other design with the artistic design, but because the sounding board choose the other, they took into account their advice. The solar farm developer Sunvest won the tender, because they paid close attention to experience of the solar farm. This was also a main criterion of Staatsbosbeheer. In addition, the landscape integration of the design of the solar farm provides additional value for the area. In their plan, 64% of the solar farm surface will be covered with solar panels and the rest of the space will be available for other functions, such as recreation and biodiversity and landscape enhancement. Therefore, the solar farm will be multifunctional, offering several functions as education, recreation, food production and experience (see figure 19). Area-specific plant species will be planted in order to contribute to nature development. Moreover, the park will be accessible to people to walk in the park and several recreational elements, such as watch towers, benches and walking paths contribute to recreation and experience of the solar farm. In addition, education is offered through information boards and the food forest. Therefore, the solar farm can offer several benefits for the community.

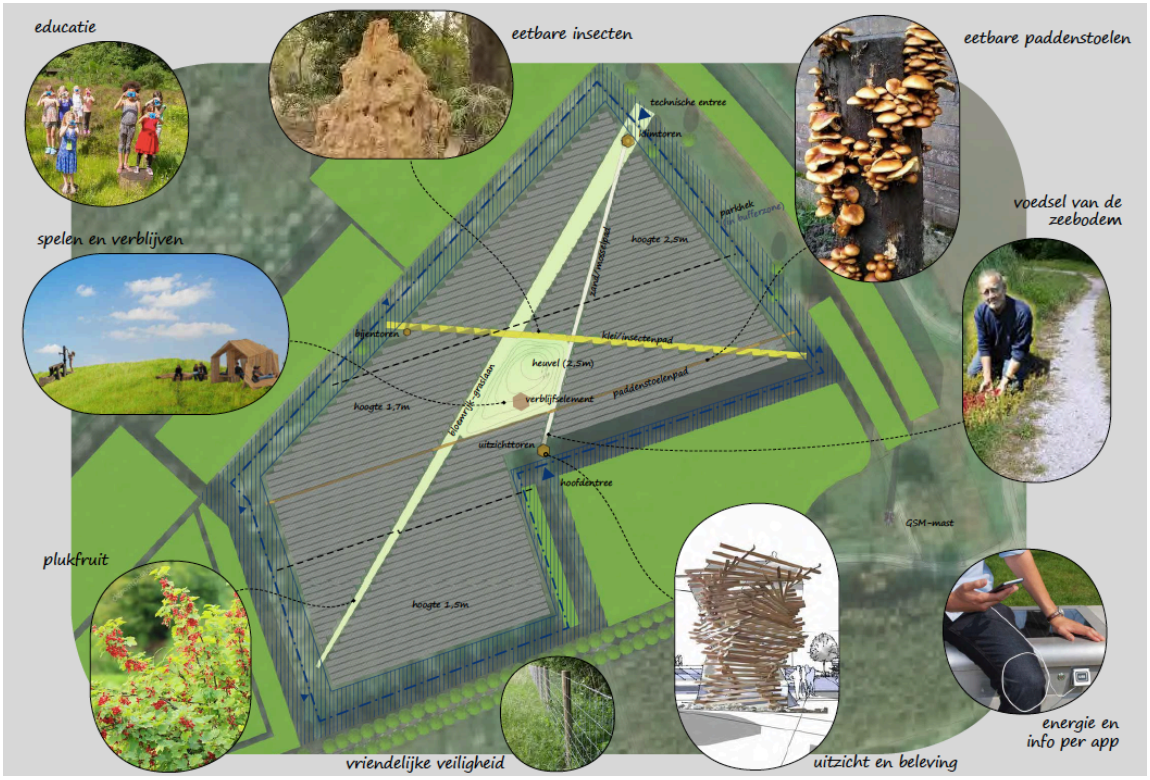

Figure 19 Map of solar farm 'Zonnewoud' indicating several community benefits. Retrieved June 20, 2020 from https://sunvest.nl/wp-content/uploads/2020/04/Landschappelijk-Inpassingsplan-'Zonnewoud'.pdf

5.2.3 COMMUNITY INVOLVEMENT

The design of the solar farm takes into account the criteria set by Staatsbosbeheer. The main criterion was to create added recreational value through the solar farm and to include landscape and ecology in the design. According to the developer, local citizens were not involved in the design process, since the developer already had some design principles because of the criteria set by Staatsbosbeheer. After the tender was won, an information evening about the solar farm development and opportunities to participate financially was organised. However, according to the initiator of the petition, only citizens of the neighbourhood Horsterveld-Noord were approached. Moreover, only a few citizens participated in the information evening and those were mainly against the plans for the solar farm. During the evening, citizens could give their opinion and share their wishes related to solar farm 'Zonnewoud'. According to the developer, these comments will be included in the final version of the plan, but only when these wishes fit the requirements as set by Staatsbosbeheer. However, according to citizens, the concept plan for the development was already submitted to the municipality in order to get permission for the development of the solar farm. Therefore, some citizens argue that this information evening was only organised to 'inform' citizens and, according to them, their wishes and concerns regarding the solar farm were not heard (appendix 5.5 and 5.6). During the information evening, some concerns arose about the recreational elements which will be added to the solar farm. The plan is to develop the recreational elements once the solar farm has been developed and therefore, concerns arose that these recreational elements might not be developed at all. As a result, an additional criterion was set by the municipality, which includes that the solar farm and the recreational elements should be developed at the same time in order to retrieve the permit.

5.2.4 ACCEPTANCE

To the plan of solar farm 'Zonnewoud', one notice of objection was submitted, which indicates some opposition to the development of the solar farm. According to the developer, opposition against this solar farm especially arose from one person. This person submitted a notice of objection and, in addition, started a petition against the plans of the solar farm which was signed 1.544 times. Therefore, the objector represents around 1.500 people in the objection to the solar farm. Objection to the solar farm is based on several arguments. The main argument relates to the location, since the plan is to develop a solar farm in an area consisting of nature and forest, which is used by many people for recreational purposes. Another argument relates to communication to and involvement of citizens during the planning process. According to the objector, communication was *"completely insufficient"* (appendix 5.5). Altogether, these arguments led to opposition to the solar farm development. Although community benefits were provided, the acceptance rate of the solar farm remained low.

5.2.5 REASONS FOR COMMUNITY BENEFITS PROVISION IN SOLAR FARM 'ZONNEWOUD'

Reasons for the provision of community benefits differ per stakeholder. For example, the initiator of solar farm 'Zonnewoud', Staatsbosbeheer, argues: *"…, the former provincial chief who said, I want this to be a solar park with a recreational function. I don't care if it produces less, but it should be a recreational park. Well, we also achieved that by saying, we are going to award it to a party that makes a recreationally good design, so to that party a lot of points were awarded."* (appendix 5.8)[xxiii]. This

shows that the multifunctional solar farm with a recreational function on this location was a criterion of the province. Therefore, Staatsbosbeheer issued a tender for a multifunctional solar farm and included the criterion to add a recreational function to it. According to the provincial structural vision for solar energy of the province of Flevoland, multiple use of space in solar farm developments is preferred and local inhabitants should be able to benefit from the solar farm[21]. Thus, in this case the provision of community benefits resulted from the criterion of the province. The developer provided community benefits in their plan, because they wanted to comply with the criteria of the tender set by Staatsbosbeheer. According to the developer, "*a tender was issued with the request to lay down a solar park with added value for the neighbourhood and added value for visitors to the forest*." (appendix 5.7)[xxiv]. In order to comply to the tender criteria and to have the highest change to win the tender, a design of the solar farm with added value was made. According to the developer, *"we would never have won if we had completely filled the solar farm with solar panels. Thus for me, it is not about how to deal with it, but it is more of a requirement."* (appendix 5.7)[xxv]. This shows that the reason for the provision of community benefits or to offer added value for the neighbourhood was considered as a requirement to win the tender. Thus, this indicates that it was not the specific aim of the developer to provide these benefits for the community, but it was a way to win the tender. Not only a recreational function was added to the solar farm, another important aspect was nature and ecology within the solar farm. These functions resulted from the fact that recreation and nature are central aims of Staatsbosbeheer and therefore the criteria were to include these functions in the solar farm on the property of the State and Forest agency. Moreover, the solar farm development has the aim to attract more visitors to this specific location, because this is the wish of Staatsbosbeheer. To reach this goal, this location was designated as development area, which is *"… a location in or near the forest where visitors are drawn to in a different way with the result that people visit the forest more often."* (appendix 5.7)[xxvi]. According to Staatsbosbeheer, a way to attract more visitors, is by developing a solar farm with recreational functions.

Local citizens, living in the surrounding community of the location for the solar farm development, also have an opinion about the reason for the provision of community benefits. According to one citizen, *"in my opinion, the added value devised by the developer is only intended to make the plan saleable. In such cases, you only have to hire a consultancy firm that comes up with something in the direction you want. That is how it works unfortunately."* (appendix 5.5)[xxvii]. This shows that the community benefits are of no value for this citizen and that these are only added with no other aim than selling the project. This reasoning is also in line with the argument the other citizen proposed for the provided community benefits in this case: *"… well I am concerned about the pitfall of these kinds of concepts that by … developing solar parks with "added value", a kind of environment is being created in which we suddenly have to like that. Because this too is presented as a half playground."* (appendix 5.6)[xxviii]. This citizen argues that the benefits are added to this solar farm with the aim to be liked by people. Moreover, she is concerned that through these added value offered in solar farms, an environment is being created in which such developments have to be appreciated by people and as a result, become very normal.

[21] Retrieved May 20, 2020 from https://www.flevoland.nl/getmedia/a43c5151-1521-44d6-9017-c4758155bd8a/Structuurvisie-zon-dv.pdf

5.2.6 DISTRIBUTION OF COSTS AND BENEFITS IN SOLAR FARM 'ZONNEWOUD'

In the case of solar farm 'Zonnewoud', many citizens object the plans for the solar farm development in their area. Objection to the solar farm is based on several arguments. However, the main argument relates to the location, since the plan is to develop a solar farm in an area with nature and forest. According to the initiator of the petition, the area fulfils an important function for the local residents of Zeewolde. It is used by local residents as recreation area. The solar farm will negatively affect the natural values and disturb aesthetics, *"the location of the solar farm at the entrance of the forest area will cause serious disturbance to the view and thus seriously affects the nature experience."* (appendix 5.5)[xxix]. In addition, his concern is that existing vegetation will be minimised in order to make sufficient sunlight available for the solar panels. However, according to Staatsbosbeheer, the nature reserve does not have a protected status and the natural values were already limited in this area. Therefore, they do not consider it as valuable nature reserve. Moreover, according to the citizen, only small scale developments are allowed according to the land use plan, while the development of the solar farm can be considered as large-scale development. A criterion of the municipality to retrieve a permit for the development is that returning to a pre-disturbed state should be possible once the solar farm is removed in the long term. According to the objector, this is impossible. "*For this reason alone, it is recommended not to sacrifice the forest in this area, but to let it function within the framework of forest and nature. One must therefore miss forest and nature for 25 years."* (appendix 5.5)[xxx]. All in all, the citizens are concerned that because of all these expected negative externalities of this solar development, the development will negatively affect the recreation area which is used daily by local citizens. The objector only sees negative effects resulting from this development and does not mention any benefit. However, he understands that the municipality has the objective to generate sustainable energy, but he mentions that this should not lead to negative effects on nature, *"the municipality's argument that one has an objective with regard to the generation of clean energy should at the same time not lead to a serious attack on nature."* (appendix 5.5)[xxxi]. Altogether, this citizen does not see any benefits resulting from this solar farm development and therefore, he does not agree that the possible benefits are able to outweigh the negative effects of the development.

The other citizen, the owner of the food forest in Zeewolde, also objects the solar farm development, however, she is less concerned about negative effects which might result from this development, but she still mentions some of them. For example, she mentions the possibility of a fire hazard caused by solar panels in dry conditions and she feels insecure about the effects of electricity when people walk there. *"…, yes, I think it is unnecessarily seeking for danger where we can install it much safer on roofs."* (appendix 5.6)[xxxii]. Moreover, she is especially concerned about the loss of land and nature for energy production, *"but I am much more concerned, my concern is much more about the ease by which we sacrifice land and nature for this growing energy issue that cannot even be borne by the electricity grid."* (appendix 5.6)[xxxiii]. According to her, she is not interested in the possible benefits resulting from the solar farm development, because she sees too many disadvantages resulting from it. She argues that she does not see a balance between the pros and cons of this solar farm, *"no, it probably works well in one direction, namely that, I suspect it is good for the solar panels to be cooled down in some way, …, so I think that it is very good for the solar panels to be mixed with nature. I do not think it benefits nature at all."* (appendix 5.6)[xxxiv]. This indicates that she sees a benefit for solar panels to be mixed with nature, but nature itself does not benefit from the development. Therefore, she does not

see benefits for the surroundings and the community. As a result, the benefits are not able to outweigh the disbenefits resulting from the solar farm development.

The developer is aware that a number of concerns of local citizens about the solar farm development exist. He argues that these concerns especially relate to a development on this location rather than specifically being a solar farm development. From his perspective, the solar farm development causes few negative effects for the local community, *"I understand that there was some objection from that one person, because he simply disagrees with this in principle. But I think there are few negative consequences for people. This land is left quite fallow. Nobody looks out over it. We make a park that can be visited by people, I understand that some people might not be interested in it, but you do not have to go there either. So I think those negative consequences are very minimal."* (appendix 5.7)[xxxv]. According to the developer, the location is very suitable for the solar farm development, since the land is undeveloped and out of sight for local inhabitants, because the nearest house is located about 400 meters from the solar development. He argues *"… it is not that someone can suffer from glare or radiation."* (appendix 5.7)[xxxvi]. Therefore, he does not think that negative effects of the solar farm should be compensated, because according to him, the solar farm offers added value for the neighbourhood, *"I think you try to minimize the negative consequences with that intention. You are actually trying to make it a nice park for visitors. That was actually our starting point, to make this an added value for the neighbourhood, instead of a park where you have to compensate for negative effects. We do not think we should compensate for anything here, because it is a park that could actually contribute a lot to the neighbourhood."* (appendix 5.7)[xxxvii]. He sees the added value for the community in the provision of a new recreational park, which can be visited by people and therefore, he argues that no compensation measures are needed to be taken. As a result, this indicates that from this perceptive, the benefits are able to overcompensate the disbenefits associated with the solar farm development.

In accordance with the developer, the initiator of the solar farm is also aware of possible negative externalities. According to him, concerns especially arose because of the influence of the development on the recreational area and on existing nature within that area. He argues that the aim to be more sustainable is a global one, while the negative externalities are often felt at local scale. Therefore, he mentions the importance to create co-benefits in sustainable energy projects. In this plan co-benefits are the provision of opportunities for recreation, education and nature development, but also the opportunity to participate financially. Moreover, he considers the solar farm as a tool to give something in return for other areas, *"with the proceeds of this solar farm, SBB [the State and Forest Agency] can do a lot of good things for nature in other places, while we would otherwise not have the resources."* (appendix 5.8)[xxxviii]. From this perspective, the solar farm can generate resources in order to enhance nature in other areas. Staatsbosbeheer does not consider this as direct benefit for the surrounding area of community, but as benefit for other places. Moreover, he mentions, *"I call solar farms "nature doublers": with the proceeds of a solar farm after 20 years, you can buy an equal area of agricultural land and design it as nature, while the area under the solar farm will become available again as nature after 20 years. Then you have doubled the amount of nature after 20 years. Although the proceeds can also be spent on things other than the expanding of nature, it does indicate the potential of a solar farm."* (appendix 5.8)[xxxix]. Again, Staatsbosbeheer mentions the potential of the solar farm as tool to generate proceeds in order to improve nature elsewhere. Therefore, he considers

the proceeds of the solar farm as beneficial for other areas. As a result, from his perspective, the benefits resulting from the solar farm are able to overcompensate the disbenefits.

5.2.7 Perceptions towards the provision of community benefits in solar farm 'Zonnewoud'

Not only the reason for the provision of community benefits differs between stakeholders, also different perceptions of stakeholders towards these benefits exist. For example, Staatsbosbeheer argues: *"possible negative effects are mainly felt locally, while the reason for sustainability is on global scale. That is potentially threatening to the support for the energy transition. It is therefore important to pay explicit attention to creating positive co-benefits for the immediate environment. In this way, the energy transition, the project and the organizations involved are gaining support. It reduces the resistance and leads to fewer objections."* (appendix 5.8)[xl]. This indicates that the initiator of the solar farm is aware of possible negative effects, in this case concerns about effects on nature and the recreation area, for the local community resulting from sustainable energy projects. Therefore, he argues that it is important to include benefits for the surrounding community in such projects, otherwise the chance exists that projects like these will not be supported by the community. In this case, he perceives the provision of community benefits as positive, because according to him, it helps to lower opposition and to reduce the amount of objections and thereby improves the support for the solar farm development. The multifunctional use of this solar farm was appreciated by the city council and they approved the plan for the development with a narrow majority. According to the initiator, acceptance by the city council corresponds to acceptance of the project by the local residents, since local citizens are represented by the city council. From his perspective, the provision of co-benefits resulted in lower resistance and therefore, they are considered as effective tool for acceptance of the solar farm.

The developer considers the existing plan for a multifunctional solar farm as more effective to create support compared to a common solar farm, a monofunctional parcel full of solar panels, *"I think that when you develop a fence on this location and fill it with solar panels, I think it would not be accepted. That is simply not possible, that just does not go through."* (appendix 5.7)[xli]. From this perspective, it is less clear how effective the provision of community benefits was considered in this case. However, it becomes clear that this form, an accessible solar farm offering several benefits, does play a role in the acceptance of the solar farm. Therefore, the developer considers the provision of community benefits as positive.

The two different citizens consider the community benefits offered in this case, especially the recreational elements, as unnecessary. One citizen argues that sufficient play facilities are available for children in the wider area, and therefore, an extra facility does not provide any additional value for the neighbourhood. *"In our residential area there are many facilities where our children can play. The green zone of our [residential area] is even larger than the planned solar park and there are many play facilities in this zone, including a cable car. An additional facility is not necessary and, moreover, a busy road would have to be crossed."* (appendix 5.5)[xlii]. The citizen does not consider the provision of community benefits as something positive. In the previous section, this citizen argued that community benefits were only added to sell the project. This indicates a negative perception towards the provision of community benefits. The other citizen even argues that the more functions are added to a solar farm, the worse it actually is: *"…, the more multifunctional tasks or things we attach to this, the worse*

I actually find it. And certainly in the way it is organized in this solar park, namely that the solar park of the seven hectares, I believe, covers five hectares and that the two hectares that are then multifunctional, which already consists of a very wide edge to ensure sunlight on the solar farm and that edge is simply mowed and is labelled as multifunctional …" (appendix 5.6)[xliii]. This perspective indicates a very negative perception towards community benefits and multifunctionality of the solar farm. Moreover, the citizen argues that the term multifunctionality, which is labelled to this solar farm, is used incorrectly, since much of the surface labelled as multifunctional by the developer is functioning as free space between the solar panels without any function. In addition, she argues that multiple functions do not provide added value to her: "…, *I think that we already have that added value without the panels, actually, because we have terribly beautiful forests around Zeewolde and we also have play areas on the beach."* (appendix 5.6)[xliv] This is in line with the reasoning of the other citizen, who also argues that enough recreational facilities and beautiful areas already exists in the area.

5.3 CASE: SOLAR FARM 'ABDISSENBOSCH'

The third case to be analysed in this research is solar farm 'Abdissenbosch'. The permit for the solar farm has been granted, but it has not been developed. This case is selected, because at the start of the process, opposition to the plans of the solar farm arose. However, during the process, the level of opposition declined.

5.3.1 BACKGROUND INFORMATION

Solar farm 'Abdissenbosch' will be developed on a former landfill site 'Het Kreupelbusch' owned by Bodemzorg Limburg (see figure 20). The former landfill is located alongside the border of Germany, between two nature reserves, the Brunssummerheide (in The Netherlands) and the Teverener Heide (in Germany). The plan is to develop 30.000 solar panels on this location. Due to the slope of the terrain, it is a suitable location for a solar farm[22].The total surface of the former landfill is about 45 hectares. However, twelve hectares of this surface will be used as space for the development of the solar farm, from which seven hectares of this area will be covered with solar panels. The solar farm will be developed nearby the neighbourhood 'Abdissenbosch', belonging to the municipality Landgraaf, located in the province of Limburg. The solar farm will be part of the bigger plan 'Energy park Abdissenbosch'. This energy park will consist of a solar farm and three wind turbines. The park is able to produce between 37 and 48 MWh of energy per year[23].

Figure 20 The location of solar farm 'Abdissenbosch' (as indicated by the circle). Retrieved from Google Maps on June 18, 2020.

[22] Retrieved May 1, 2020 from https://www.landgraaf.nl/over-landgraaf/projecten-en-plannen_41924/item/zonnepark-Abdissenbosch_35524.html
[23] Retrieved May 1, 2020 from https://energieparkAbdissenbosch.nl

5.3.2 PLANNING PROCESS

The initiative for the solar farm was taken by Bodemzorg Limburg and Enovos Green Power. Bodemzorg Limburg was looking for opportunities to provide a socially responsible function to former landfills. 'Energy park Abdissenbosch' contributes to this goal. At the moment, the terrain has been designed as walking park in order to compensate people for the ills caused by the former landfill. In addition, it functions as important connection zone between the two nature reserves. Therefore, consultancy firm Arcadis was asked to made a design for the solar farm which takes into account nature, experience and technic. As a result, a plan for a multifunctional solar farm was made (see figure 21). Functions as nature development, recreation and education were added to the solar farm. Natural elements, such as pools and insect hotels will be added to enhance nature on the terrain. Walking paths and benches are added to contribute to recreation in the area. In addition, education is offered through information boards. As a result, the solar farm can offer several benefits for the community.

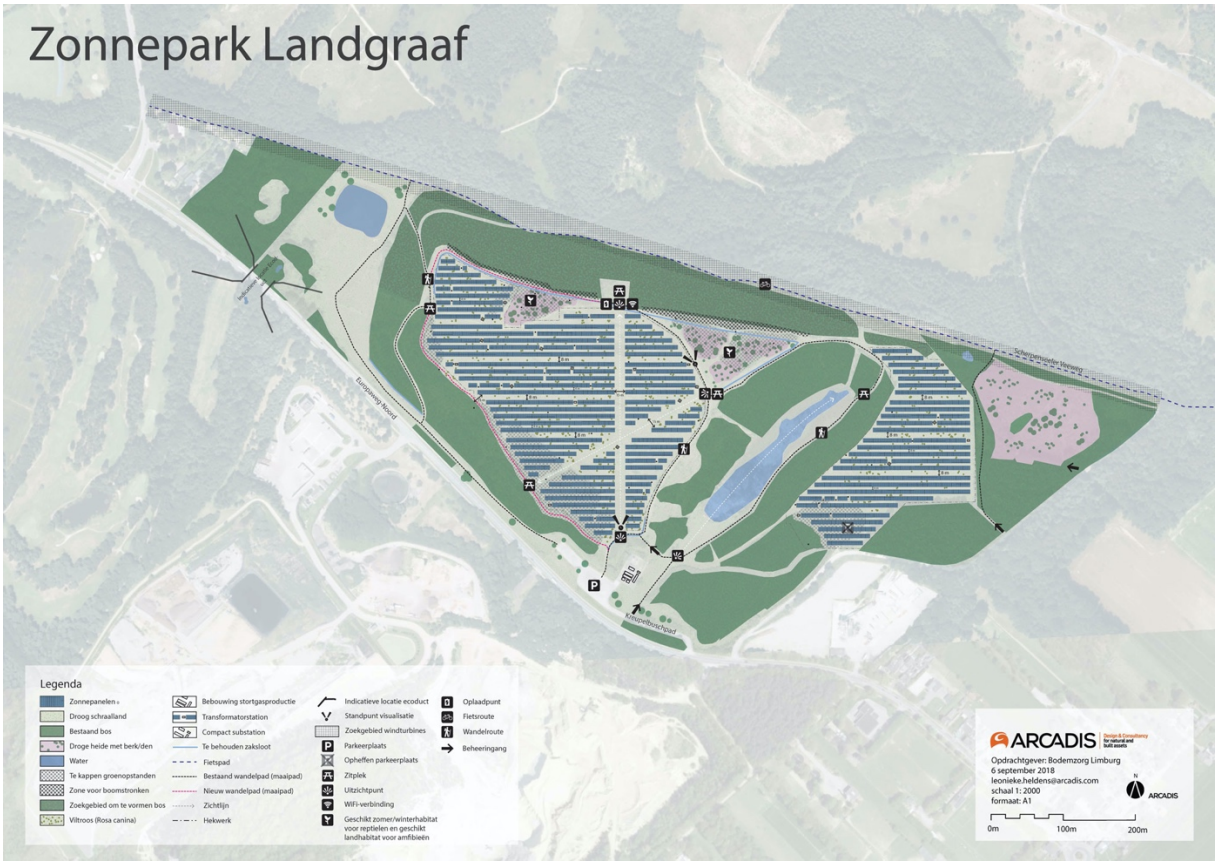

Figure 21 Map of solar farm Landgraaf. Retrieved May 4, 2020, from Arcadis: https://www.landscape-architects.nl/nl/projects/zonnepark-landgraaf

5.3.3 COMMUNITY INVOLVEMENT

During the planning process, a workgroup has been established to involve surrounding citizens in the plan for the solar farm. The aim of this group is to discuss opinions and ideas about the project and to increase involvement of local stakeholders and citizens[24]. According to the chairman, he joined the workgroup in order to make a connection between citizens and the municipality in this project, because otherwise he expected that opposition to the plans would arise due to the influence of the solar farm development on the walking area of citizens. That is why he felt it was important to involve the community in the process. The workgroup had influence in the plans and as a result, some design changes were made. For example, the workgroup thought it was important to preserve and enhance natural values and biotopes, they wanted the area to remain accessible to people after the solar farm development and in addition, they wanted information boards that provide education for visitors. These wishes were taken into account in the design. As compensation measure, a community fund will be set up, which consists of a maximum of 125.000 euros, which will be provided by the developer. The workgroup was able to determine the aim of this community fund. From this fund, citizens could be financially compensated, but they could also choose to spent the money on additional nature enhancement in the area. When financial compensation was chosen, the community fund should be divided over 2.000 families and therefore, only a small amount of money will remain per family. For this reason, the workgroup chose to spend the community fund on enhancement of natural values and additional recreational elements in the solar farm area.

5.3.4 ACCEPTANCE

In the beginning of the process, some concerns arose about the development of solar farm 'Abdissenbosch'. These concerns especially related to questions about accessibility of the terrain after the development and about the influence of the solar farm on the nature in the area. People were concerned that nature would be negatively affected by the solar farm. However, because the workgroup had influence in the design of the solar farm and because some preconditions were set by the municipality and province for the solar farm development, many concerns disappeared. Concerns not only arose by citizens, but also in the municipality and the province some concerns were present. An important aspect was that the destination of the area is nature and according to the province, a solar farm should not be developed in a nature reserve, especially not in a protected area (appendix 5.11). The plan was to change the protected status of the area. However, this did not happen. In the end, Arcadis made a nature inclusive design for the solar farm in which nature was enhanced. This changed the thoughts of the province and as a result they provided an exemption to develop the solar farm in a protected nature reserve. Although some concerns existed in the beginning of the process, no notice of objection against the plan was submitted and in the end, the plan had a high acceptance rate.

[24] Retrieved May 1, 2020 from https://www.landgraaf.nl/over-landgraaf/projecten-en-plannen_41924/item/zonnepark-Abdissenbosch_35524.html

5.3.5 REASONS FOR COMMUNITY BENEFITS PROVISION IN SOLAR FARM 'ABDISSENBOSCH'

The community benefits offered in the plan for solar farm 'Abdissenbosch' mainly refer to environmental enhancement, since nature development and improvement has a main role in the plan. According to the initiator of the solar farm, *"the area is designated as a golden-green nature reserve and as a result many compensatory nature measures have to be taken at the request of the province and municipality."* (appendix 5.11)[xlv]. In this case, the added value or benefits offered by the solar farm can be considered as criterion for the solar farm development set by the province and municipality. This criterion was a result of the location of the solar farm development, a protected nature reserve. The other functions, recreation and education, were chosen at the request of local residents, which had united in a workgroup (appendix 5.11).

The civil servant also mentions that the compensation of nature and the addition of other environmental benefits were criteria of the province and municipality. He argues: *"the initiator had to demonstrate towards the province and the municipality in which way nature is being compensated …"* (appendix 5.12)[xlvi]. The province set the requirement that nature which will be developed on that location should be of a higher quality compared to existing nature. Moreover, according to the civil servant, *"when it comes to education or walking structures, these are all extras. The province did not make those demands. The province simply stated that certain areas and certain plants and animal species should be given space and the initiator must then demonstrate how he will do this and how he will maintain that in the coming years."* (appendix 5.12)[xlvii]. This argumentation shows the importance the province dedicates to nature enhancement by the solar farm development, since the other functions were only extras and where not demanded by the province. However, the additional benefits of the solar farm for the surrounding community was a requirement of the municipality, *"…, the municipality simply demanded that the workgroup together with the initiator went looking for, okay, what can the initiator give the surroundings in return?"* (appendix 5.12)[xlviii]. From this perspective, the municipality thought it was important to give the surrounding community something in return. As a result, the workgroup was able to determine the additional functions and benefits offered by the solar farm. Another aim of the solar farm development on this location is to attract more visitors to the nature reserve, *"we just hope, after we have worked out everything, that people will find their way back to the nature reserve, because actually it is used very little, which is a beautiful nature reserve."* (appendix 5.12)[xlix]. This will be done by improving the quality of the area and offering several functions through the solar farm.

The starting point for the design of the solar farm was the current use of the area. According to the designer, *"so in the current situation it is already publicly accessible and you can already walk there and we actually said, how can we give that area an extra plus? Well, on the one hand by nature development, but on the other hand by adding such an information point, things like that."* (appendix 5.10)[l]. From this perspective, additional benefits were added to the solar farm in order to limit the influence on existing land use, extensive recreation and nature development. In addition, the aim is to improve the quality of that area through the solar farm development. Another reason for multifunctionality of the solar farm was influenced by the location, namely technical aspects and the existing function of the area. *"So both the location, because of the connection capacity, but also because of that nature function and that actually caused that there was also space for integration and*

actually we had to do it, because otherwise we would probably not be able to work it out with the province." (appendix 5.10)[li]. This again shows the argument of the connection capacity, which results in a restriction of the amount of solar panels and as a result, more space becomes available for other functions. Moreover, the criterion to compensate nature as set by the province is mentioned again for the reason that nature development was added as additional function of the solar farm. According to the designer, *"…, we had to be able to show the province that the function nature could remain at that location. And you can only do that by ensuring that the quality does not deteriorate and preferably actually improves."* (appendix 5.10)[lii]. This shows that community benefits were provided to comply to the criterion set by the province and to improve the quality of existing nature in the area.

According to the chairman of the workgroup involved in solar farm 'Abdissenbosch', some concerns arose related to accessibility of the terrain after the solar farm development. Citizens thought that they would not be able to walk in the area once the solar farm has been developed. As a result, the workgroup wanted to get something in return for the solar development nearby their community. The chairman argues, *"…, we understand that the municipality wants it, but we would like to get something in return. And actually wanting something in return, that had something to do with contributing to the design of the site. That is one. And on the other hand, it had something to do with, yes, some kind of compensation for losing that walking area."* (appendix 5.9)[liii]. From this perspective, community benefits were provided as tool to compensate the local community for this development. The workgroup was able to determine the type of compensation. For them the most important aspect was that the area would remain accessible when the solar farm has been realised in order to make use of the walking area (appendix 5.9). This example shows that, from the perspective of the citizen, community benefits were provided as tool to compensate the community affected by this development.

5.3.6 Distribution of costs and benefits in solar farm 'Abdissenbosch'

In the case of solar farm 'Abdissenbosch', opposition especially arose to the addition of wind turbines to the solar farm. According to the chairman of the workgroup, *"but that resistance actually focused for 98% on the wind turbines and the solar panels, those were hardly discussed."* (appendix 5.9)[liv]. However, the main argument against the solar farm related to accessibility of the area. The chairman sees only little negative consequences of the solar farm. According to him, the pros and cons of the solar farm can outweigh each other and he even considers it as very positive, *"yes, I think that it is really clear and if you put it on a scale it turns out very positive. That also has a lot to do with the fact that it is an area that is currently used very little. ..., and it is not, it is not something that catches the eye, it is not something that makes you lose your view, it is not something that makes anyone lost property, so yes, there were no objections like that either, so that makes it a lot easier."* (appendix 5.9)[lv]. This indicates that because of the location and no objections, the citizen sees more advantages than disadvantages for this area resulting from the solar farm. Therefore, the positive effects are able to outweigh the negative effects of this development.

According to the initiator of the solar farm, concerns were especially related to the negative effects on nature and visual disturbance as a result of the solar farm development. However, he argues that the development contributes to the generation of sustainable energy and another important advantage of the solar farm is that it generates a financial contribution to the aftercare of this former landfill site.

All in all, he thinks that the potential benefits of the solar farm can outweigh the possible negative effects, *"yes, I think so. Look, it is a solar farm, it is the view, isn't it? If you develop a 100-hectare solar farm somewhere, which is a big plate, I can imagine that the view is annoying. But we design it in such a way that you, it is also an area with a lot of greenery, you do not even see it from outside the area, you have to walk in it. And of course there is a fence around it, we will plant it with greenery, so I think we know how to fit it very nicely into nature."* (appendix 5.11)[lvi]. This indicates that he sees little negative effects, since the solar farm will be developed on a location out of sight for citizens and will be fitted into nature. Therefore, he considers the solar farm as more beneficial for the area compared to a big monofunctional solar farm.

The civil servant involved in the solar farm development argues that some opposition to the park was related to possible effects on nature in the area. Moreover, some concerns were related to the possibility of noise generation by the solar farm and glare caused by the solar panels. However, the main concern was about the effects on nature. The civil servant clearly states that he does not see any negative effects, *"at this time we see no potential negative effects. All parties involved and who were involved in the development of this solar farm are satisfied with the developed plan"* (appendix 5.12)[lvii]. From this perspective, the civil servant does not see any negative effects and thinks the pros and cons of the solar panels are therefore in balance, since every stakeholder is satisfied with the plan.

The designer of the solar farm argues that from the surrounding community little opposition arose to the plans for the solar farm development. According to her, this might be due to the location, because it is a former landfill site. Therefore, concerns about noise and glare did not play a big role. However, because the area is designated as nature reserve, some concerns of local nature organisations and the province arose about effects on nature. Especially the effects of solar panels on soil, such as the influence on the amount of sunlight and water that can reach the soil under the solar panels, were important aspects. However, she thinks that the positive aspects of the solar farm can outweigh the negative ones, *"well, I think so, because certainly from the story of that nature function, look there will be solar panels, but the space between those panels will be so large that it also offers benefits for nature and certainly if we can ensure that, the surface was now just a bit of a dry grassy area, if we can offer a plus there, then I think it certainly can outweigh it."* (appendix 5.10)[lviii]. The designer especially sees benefits for nature development and since the current situation is grassland, she thinks the situation can be improved by the solar farm development. Therefore, she thinks the positive aspects of the development can outweigh the possible negative ones.

5.3.7 PERCEPTIONS TOWARDS THE PROVISION OF COMMUNITY BENEFITS IN SOLAR FARM 'ABDISSENBOSCH'

In the first place, community benefits in the form of environmental enhancement were mainly provided to get permission of the province and municipality for the solar farm development. According to the initiator of the solar farm, *"without the added value offered through the development of the solar farm, the project would not be accepted by the province and municipality."* (appendix 5.11)[lix]. This clearly indicates that the community benefits have been deployed in order to approve the solar farm development by the province and the municipality. From this perspective, the initiator considers the provision of community benefits as effective tool for the acceptance by these governmental organisations. Moreover, he argues that the area *"is becoming more accessible and we are investing extra in nature."* (appendix 5.11)[lx] and therefore, *"so yes, added up, I think that we, the natural value will improve and that local residents are happy with it"* (appendix 5.11)[lxi]. This shows that the initiator sees several benefits by the solar farm development, namely accessibility and nature enhancement. In addition, he argues "*so over our location, yes, let's say, a piece of nature development is being done and that added up led to residents agreeing."* (appendix 5.11)[lxii]. This indicates that community benefits relating to nature development led to acceptance of the plan by residents. In the end, he thinks these benefits will make people appreciate the solar farm. Therefore, the initiator has a positive perception towards the provision of community benefits.

The civil servant sees the solar farm development as an improvement for the area, *"… the final plan that will be laid out, including the route, is a much better plan than it ever was. And thus the nature only gets better. The quality only gets better than what it is now."* (appendix 5.12)[lxiii]. This indicates that the civil servant sees the project as beneficial for the nature and the quality of the wider environment. According to him, *"and the biggest concern was, yes, does the whole story not damage the current nature that is present there? And that is absolutely not the case, because the whole plan only gets better. So that is actually why everyone agreed with the plan, both the province and the workgroup …"* (appendix 5.12)[lxiv]. The civil servant argues that the involved organisations agreed with the plan, because the plan will improve the area. Therefore, the solar farm development is considered as tool for improvement for the area. In addition, the provision of community benefits has resulted in collective acceptance by several stakeholders, which indicates a positive perception towards community benefits in this case.

From the perspective of the designer of the solar farm, the addition of different functions to the solar farm can have benefits for the surrounding area. According to her, *"but I think if you can show that more than just a solar farm will be developed on this location… I think that certainly has advantages. … we already have a location, that has already been a landfill, has a nature destination and we are now just trying to add a function to it, so you can actually make that combination between different functions. So I think it provides a plus, …"* (appendix 5.10)[lxv]. This indicates that the designer expects several advantages for the area and even an improvement (a plus) of the area, because of the different functions added to the solar farm. She does not only expect advantages for the area, she also argues that the multiple functions were also beneficial to the support of the solar farm. However, also the location of the solar farm played a major role in the acceptance. *"…, but apart from multifunctionality, the location also simply plays an important role. I think when you would have projected this on a different location, then I would have been a different story. But because we are on a landfill that is not*

very visible from the neighbourhood, which is publicly accessible, which has a nature function, where we try to add those extra nature qualities, well that has actually ensured that there was little resistance from the community and that people were also willing to think along, especially in the field of nature." (appendix 5.10)[lxvi]. This indicates that the location played an important role for acceptance. However, it is also argued that the location together with accessibility and the additional nature qualities, which will be added to the solar farm, has led to less resistance and stimulated the willingness of stakeholders to participate in the process. Therefore, the perception of the designer towards the provision of community benefits can be considered as positive.

The chairman of the workgroup is very positive about the additional benefits offered by the solar farm, *"yes, I think it offers added value. And if you see it now, the area was once used as a walking area in the past and it is rarely used. And I think the moment you make it more accessible, and certainly also involve the youth more, then I think that will certainly help. Not only does it take away the resistance, but I also think it will be used more"* (appendix 5.9)[lxvii]. The chairman considers the additional benefits and functions of the solar farm as added value for the area. From the perspective of him, the provision of community benefits is a way to reduce the level of opposition to the plan, but also to attract more visitors to the area. According to him, *"it were especially the active nature people who had some objections …, they really changed their view, they really changed their view because they saw the redevelopment of the area, but also because they had influence on this all."* (appendix 5.9)[lxviii]. This indicates that the level of opposition to the solar farm decreased due to the redevelopment of the area, which resulted from the solar farm development, and even more because of the influence citizens had on this. Moreover, he thinks that people will appreciate the development when the solar farm is able to improve the accessibility of the area and when education is offered, *"yes, then I think people will actually be happy that this change has taken place"* (appendix 5.9)[lxix]. Altogether, this indicates a positive perception towards the provision of community benefits from this citizen.

CHAPTER 6

Discussion

This chapter reflects on the results of this research and applies the results to the discussed theories in the theoretical framework. Thereby the three sub-research questions will be answered. In addition, a reflection on the methodology and on the results of the research will be discussed.

6 Discussion

6.1 Provided community benefits in existing and future solar farm developments

All existing solar farms (> 1 MWp) in The Netherlands were analysed. Out of 110 analysed developed solar farms, two solar farms are multifunctional according to their spatial lay-out. These solar farms offer space for other functions than energy generation by solar panels. In addition, future solar farm development plans were analysed. From this analysis, ten future solar farms are multifunctional. In total, twelve cases of multifunctional solar farm developments were identified and analysed. Remarkably, future plans do consider the provision of community benefits more than existing solar farm developments do. Only two existing multifunctional solar farms were found in the analysis, while ten future plans consisted of multifunctional use and provided community benefits. In the theoretical framework, a distinction is made between five categories of community benefits and between two types of compensation. Four categories of community benefits were provided in the analysed cases: environmental mitigation/enhancement, financial benefits, in-kind benefits and other local services. Financial benefits belong to monetary compensation, while the three other categories belong to public goods compensation. Conventional economic benefits belonging to monetary compensation were not found in the analysed cases, because it was difficult to find out whether local manufacturers and contractors are used for the development and maintenance of the solar farm, since many solar farms are still in planning phase. Moreover, as argued in the theoretical framework, it is questionable whether conventional economic benefits can be considered as community benefit, since the community does probably not directly benefit from it.

6.1.1 Community benefits in solar farm vs. wind farm developments

In the theoretical framework it was mentioned that community benefits are often provided in wind farm developments. Nature development and enhancement of biodiversity and landscape are often mentioned as community benefit relating to environmental mitigation or enhancement. However, in this analysis other examples of mitigation or enhancement strategies were found. For example, through the contribution to an overpass for fauna, to an ecological connection zone or by adding additional plants in order to store and reduce the level of CO_2. These three examples differ from existing community benefits provided in wind farm developments as described in the theoretical framework. No differences were found between financial benefits offered in the analysed solar farm development cases compared to the financial benefits offered in wind farm developments.

More differences can be found in the in-kind benefits. For example, the provision of charging stations for cars, devices or bicycles in solar farms or the development of an innovation or visitor centre are not mentioned in the theoretical framework as community benefits provided in wind farm developments. Moreover, the provided in-kind benefits differ in location. The benefits in solar farm developments are often provided and developed within the solar farm, because enough space is

available in the park itself, while in wind farm developments, the community benefits are often provided and developed on an external location outside the wind farm. The offered community benefits also differ in scale, although they are almost all provided within the solar farm. However, for example, the innovation or visitor centre might not only beneficial for local residents, but might also attract visitors or businesses from a wider region and therefore, these type of community benefits might be beneficial on a wider scale rather than only the local scale.

A difference in the community benefits provided in solar farm developments compared to wind farm developments can also be found in the local services. Education is often mentioned as type of service that is offered in wind farm projects. However, solar farm developments offer a wider range of services, such as food production, the opportunity to help with maintenance or social employment. Compared to wind farm developments, these service can be offered in solar farm developments, because enough space is available between the solar panels and therefore crops can be grown and nature can be developed, which needs maintenance.

Several differences in the provision of community benefits in solar farm projects compared to wind farm developments can be identified. Most differences are found within the community benefit category of local services and in this category newest types of community benefits appear. A wider range of local services are provided in solar farm developments compared to wind farm developments. A reason for this might be that solar farms offer a more park-like environment and therefore, more services can be offered, such as helping with maintenance and food production. Another reason for the differences in community benefits might be the fact that literature providing examples of community benefits dates from 2011. In recent years, new innovations in technologies and services might have been discovered, which makes the provided community benefits different.

6.1.2 Differences in location and spatial scale

In existing and future solar farm developments several community benefits are offered. However, the location in which these benefits are provided and the range to which these benefits apply differ per type of community benefit. As mentioned in the previous section, some community benefits are developed within the solar farm, while others are developed externally. For example, the contribution to an overpass for fauna or an ecological connection zone will be applied outside the solar farm on an external location and therefore, it might be beneficial on a wider scale, such as the regional or national scale. The same applies to the development of the innovation centre. Although it is developed within the solar farm, it might attract people and businesses from a wider region than only local residents and businesses. Therefore, the question raises to which extent community benefits serve the local community. As already argued in the theoretical framework, the definition of “community” in the concept of community benefits has no clear spatial boundary. It is the area, which is closely located to a renewable energy development and the community includes people who are affected by this development.

Whether the community benefits will serve members of a local community differs per category of community benefit. Financial benefits are often offered to only a part of the local community by means of a zip code scheme (*PostCodeRoos regeling*). Under this scheme, members of a cooperation receive an energy tax discount on their energy bill for locally and sustainably generated electricity. This cooperation includes households living nearby the solar farm and their location must be labelled under

a certain zip code in order to participate in the cooperation. As a result, this kind of community benefit serves the local community with a clear spatial boundary by means of the zip codes and therefore, the benefits operate on the local scale.

The same applies local services, because education, food production, the opportunity to help with maintenance or social employment are also targeted at local citizens. Education can be offered to elementary or secondary schools nearby, but also to local citizens with the aim to make them more aware about the energy transition. Moreover, the other services, such as food production by means of a community garden, the opportunity to help with maintenance or social employment are also aimed at local citizens, because these type of services require more frequent maintenance, which can be done by community members living nearby the solar farm. However, the spatial boundary of the community to which local services apply is less clear compared to financial benefits, but they will especially operate on the local scale.

In-kind benefits serve both local citizens and external visitors. For example, the opportunity to recreate in a solar farm and providing charging stations will especially serve the local community, because citizens living nearby the solar farm can make use of it. However, the visitor and information centre is more aimed at attracting tourists out of the wider region to the solar farm, but it can also be used by local citizens. Moreover, the innovation centre is aimed at local businesses and other businesses out of the wider region. Therefore, it is less clear who this category of community benefits serves. However, because they are targeted at local citizens, but also at external visitors and businesses, they especially operate at the local and regional scale.

For the community benefits related to the category “environmental mitigation or enhancement”, it is also less clear to which these type of benefits belongs. Benefits as nature development, the addition of natural elements, landscape enhancement and climate adaptation measures within or nearby the solar farm will serve the local environment and therefore, are aimed at the local community. However, external measures taken outside the solar farm, such as the contribution to an ecological connection zone, an overpass for fauna or CO_2 reduction will be beneficial to the area in which the measures will be taken. This especially will be on the local scale, however, these measures will also result in benefits on the regional or even national scale, because it contributes to a wider goal of environmental enhancement.

Community benefits thus operate at different spatial scales. This means that community benefits do not only serve the local community. When community benefits apply to broader scales, it is the question how beneficial the local community considers them. When local inhabitants do not consider the provided benefits as beneficial to them, the benefits do not serve the local community. In this situation, it is the question whether the concept of “community” in community benefits is still appropriate in this context, because then it can be considered as general benefits which are not specifically added to compensate the affected local community.

6.2 THE INFLUENCE OF COMMUNITY BENEFITS ON THE DISTRIBUTION OF COSTS AND BENEFITS

As mentioned in the previous section, community benefits do not necessarily serve the local community, but can also serve broader scales. However, negative externalities resulting from solar farm developments are often imposed on the local level, while the benefits might not serve this level. Negative externalities can be considered as 'costs' for the community. Therefore, it is important to understand which 'costs' are expected by local citizens and whether community benefits are able to overcompensate these costs in order to contribute to a more equal distribution of costs and benefits associated with solar farm developments.

6.2.1 NEGATIVE EXTERNALITIES

As discussed in the theoretical framework, the negative externalities resulting from renewable energy sources are mostly limited to the surrounding environment and therefore, the impacts are mainly felt locally and affect the local community. In the different cases, some local inhabitants were concerned about the effects of the solar farm development on the surrounding environment. These concerns are summarized in the table below for each case (see table 5).

Case:	Concerns:
Solar farm 'De Kwekerij'	• Glare, noise and radiation caused by solar panels • Visual disturbance (view from houses) • Additional noise generation as result of the development of a podium within the solar farm
Solar farm 'Zonnewoud'	• Negative effects on nature • The loss of forest and nature for 25 years • Not being able to return to a pre-disturbed state after development • Disturbance of aesthetics and nature experience • Negative effects on existing recreational area • Large-scale development does not fit the location • Danger because of the possibility of a fire hazard • Effects of electricity on people when walking between the panels
Solar farm 'Abdissenbosch'	• Glare and noise caused by solar panels • Negative effects on nature • Negative effects on soil • Visual disturbance • Accessibility of the area after the solar farm development

Table 5 Concerns of citizens about the solar farm development in the three analysed cases.

As can be discovered from table 5, the concerns about negative externalities resulting from the solar farm development differ per case. However, some similarities in these concerns can be found. In the theoretical framework, a distinction was made between several categories of impacts associated with renewable energy projects, namely aesthetic, environmental and economic impacts. Aesthetic impacts relate to impacts on the landscape and the scenic area. These can be identified in all three cases, such as concerns about glare, visual disturbance and disturbance of aesthetics caused by the solar panels.

Environmental impacts, relating to impacts on biodiversity, nature, soil and health can also be identified in all three cases. Examples are concerns about noise and radiation generated by the solar panels, the loss of nature and the expected negative effects on nature and soil. In addition, one person expressed her concern about the possibility of a fire hazard and this influenced her feeling of safety, because she is not sure about the effects of electricity generation on people who walk between the solar panels. Economic impacts, such as the reduction of property prices nearby solar farms or the competition with agriculture, were not mentioned as concerns by people. Other concerns did not relate to the three categories mentioned in the theoretical framework, because these concerns related to the type of location. Examples of these concerns are about accessibility of the area, the large-scale development which does not fit the location and the effects on the existing recreational area by the solar farm development.

6.2.2 THE INFLUENCE OF LOCATION

The impacts of a solar farm on the environment differ per location. As can be seen in table 5, most concerns were mentioned in the case of solar farm 'Zonnewoud'. A reason for this might be the location, since the solar farm will be developed in a forest area and therefore many concerns about the effects on ecological values and the current state of the area were mentioned. As a result, the choice of location caused much resistance in this case. This is in contrast to the case of solar farm 'De Kwekerij'. In this case, the former plan was to develop a residential area, but instead of housing, the solar farm was developed. As a result, the solar farm development offers more benefits compared to the development of a residential area, according to the citizens. Therefore, the solar farm is appreciated more by citizens, and as a result, their attitude towards this development is more positive. For example, one citizen mentioned that instead of housing, they now have a park on this location, while the another citizen argued that she considers the solar farm as way to preserve her unobstructed view, which would have been lost when the residential area was developed. The third case, solar farm 'Abdissenbosch' is located on a former landfill location and therefore, this location has already been affected by former activities. According to the designer of this solar farm, this might have influenced the amount of concerns about this development. However, the civil servant argues that the location still belongs to a protected nature reserve, and therefore, especially concerns about effects on nature arose. These examples show that the level of opposition and the type of concerns about the solar farm development differs per location and therefore, location is an important factor to take into account.

6.2.3 REASONS FOR THE PROVISION OF COMMUNITY BENEFITS

In the theoretical framework, it was discussed that community benefits are often provided in order to compensate the affected community for possible ills caused by the renewable energy project and thereby, improve local acceptance. However, it is not sure to which extent developers explicitly provide community benefits in order to compensate people or to recover the balance between the costs and benefits in solar farm developments. As was mentioned in the results section, it can also be that developers were required to provide community benefits in order to get permission for the development. Therefore, several reasons for the provision of community benefits in different cases exist and these are summarized in the table below (see table 6).

Case Stakeholder	'De Kwekerij'	'Zonnewoud'	'Abdissenbosch'
Initiator	X *[not interviewed]*	- Criterion set by province - Attract more visitors to area - To gain more support	- Criterion to take compensatory measures set by province and municipality - Request of local residents/workgroup
Developer/designer	- Ambition to make a solar farm a pleasure to the community	- Criterion set by SBB - Requirement for tender - Highest chance to win tender	- Improve quality of the area - Criterion to take compensatory measures set by province and municipality - Due to technical reasons (connection capacity)
Civil servant	- Wish by the municipality and developer - To gain more support - Due to technical reasons (connection capacity)	X *[not interviewed]*	- Criterion to take compensatory measures set by province - Criterion to offer additional benefits for local community set by municipality - Attract more visitors to the area
Local citizens	*[No clear opinion about the reason for community benefits provision were mentioned]*	- To make the plan saleable - To create an environment in which solar farm developments will be liked and normalised	- Request of workgroup - Compensation for losing walking area

Table 6 The reasons for the provision of community benefits from the perspective of several stakeholders in the three cases.

In the theoretical framework, it was argued that the main reason for the provision of community benefits is to compensate people for impacts caused by renewable energy developments and thereby manage distributional effects. As a result, community benefits are often considered as tool to lower resistance and to increase local acceptance of such projects. This appears also to be a reason in the cases of the solar farm developments, although it is not specifically mentioned in all cases. However, also other reasons to provide community benefits are mentioned. Instead of providing benefits to increase acceptance, in some cases developers were required to provide benefits in order to comply to criteria set by different levels of governments, such as the municipality or the province. In addition, in some cases community benefits were provided with the aim to attract more visitors to the area by the solar farm development. Another reason is that due to technical reasons space became available in the solar farm which resulted in multiple functions and the provision of several community benefits.

Community benefits are thus provided for several reasons, which indicates different interests of developers and other stakeholders to provide community benefits. In the cases 'De Kwekerij' and 'Zonnewoud', it is clearly mentioned that additional functions and benefits were added in order to gain support for the development. This indicates that benefits were provided out of self-interest by the developer in order to increase the acceptance of the solar farm. Their interest is to develop the solar farm without much opposition and they consider the provision of benefits as tool to reach this. Moreover, the reason to provide benefits in order to attract more visitors to that specific area relates to the interest of the area. In the case of solar farm 'Zonnewoud', Staatsbosbeheer had the wish to attract more visitors to the area by making the forest more accessible to people and by stimulating

recreational use, which according to them, could be done by developing a solar farm with recreational functions and nature in it. The same applies to solar farm 'Abdissenbosch', in which the civil servant also hopes that the development of the solar farm can attract more visitors than is currently the case. From this perspective, community benefits were provided out of interest for the area, but also out of self-interest from the specific stakeholders, because it is their wish to attract more visitors.

In other cases, the provision of community benefits was not out of 'free will' or out of self-interest by the developers, because it was a requirement and therefore, it was done to comply to criteria set by the government. This was especially the case in solar farm 'Abdissenbosch', since many compensatory measures for nature had to be taken in order to get permission by the province to develop the solar farm. This also shows that the criteria of the province were not set in order to gain support for the development, but with the aim to compensate for the current state of the area. In addition, another criterion set by the municipality in solar farm 'Abdissenbosch', was to give the surrounding community something in return for the development, which was also requested by the workgroup in order to compensate them for the possible loss of their walking area. These reasons indicate that the provision of community benefits was requested by different stakeholders rather than provided out of free will by the developer. Another reason to provide community benefits, which did not originate from a request or out of self-interest is a more technical aspect. However, this should be considered as a side-effect rather than a reason, because it is argued that due to the limited connection capacity of solar farms to the electricity grid, a limited amount of solar panels can be developed in a solar farm and as a result, more uncovered space remains available. As a result, space for other functions becomes available, which can generate co-benefits for the community.

The different reasons of developers to provide community benefits also indicates differences in the willingness to provide community benefits. In the case of 'De Kwekerij', multifunctionality of the solar farm was a wish by the municipality, however, also the developer was eager to provide benefits for the surrounding community. Therefore, the provision of benefits was more emphasized by the developer than was done by the municipality. While in the cases 'Zonnewoud' and 'Abdissenbosch', the provision of benefits was more emphasized by the initiator and the government than was done by the developer. The reason and the willingness to provide community benefits also influences the perceptions citizens have towards the reasons for community benefits provision. In the case of solar farm 'De Kwekerij', no specific perceptions were mentioned. In this case, the benefits were also more of a given by the developer and the municipality rather than a wish by the community. However, in the case of solar farm 'Zonnewoud', more clear perceptions towards the provision of these benefits appear. Because in this case, community benefits were provided out of self-interest by the developer and in order to attract more visitors to the area, citizens consider the benefits as a way to sell the project to the local inhabitants rather than offering real added value for the surroundings. In addition, the other citizen considers it as way to create an environment in which solar farm developments will be normalised and will be liked by people. These attitudes do not correspond with the fact that community benefits are often considered as a tool to increase acceptance, as was argued in the theoretical framework. In the case of solar farm 'Abdissenbosch', the community wanted to be compensated for the loss of their walking area. Therefore, community benefits were provided in order to compensate people for their loss, which corresponds with the reason for providing community benefits as was mentioned in the theoretical framework.

6.2.4 DISTRIBUTION OF COSTS AND BENEFITS

As is argued in the theoretical framework, when a situation arises in which someone benefits more from a project or someone has to take greater part of the risks associated with a development, this situation cannot be considered as equal. In the different analysed cases, several concerns about impacts of the solar farm development exist. This shows that local residents are concerned or even feel affected by impacts associated with the solar farm development in their neighbourhood. This is in contrast to the external developer, who is often not affected by these impacts and who might even profit from the development. Therefore, an unequal situation arises in which the developer might benefit from the profits made by the solar farm development, while the local community is adversely affected by the development. In the theoretical framework, it is argued that this situation calls for justification and when this situation cannot be justified, additional benefits should be provided. However, it is also argued that, when benefits are provided, all participants should agree that the additional benefits are able to overcompensate the disbenefits resulting from the development in order to reach a more equitable situation. Therefore, it is important to understand the perception of stakeholders towards the ability of benefits to overcompensate disbenefits. The perceptions of different stakeholders are summarised in table 7.

Case	Stakeholder	Benefits overcompensate disbenefits?	Reason
Kwekerij	Community representative	Yes	Does not see any disbenefits, but many benefits resulting from the solar farm development
	Citizen	Yes	Does not see any disbenefits, but many benefits resulting from the solar farm development
	Civil servant	Doubtful	Multifunctional solar farm brings extra costs, but leads to fewer side costs in the end
	Investor	Yes	Extra investment is worth it, because in the long term you get many things in return and the community is happy with it
Zonnewoud	Initiator petition	No	Sees many disbenefits, but no benefits resulting from the solar farm development
	Citizen	No	Sees many disbenefits, but no benefits resulting from the solar farm development
	Developer	Yes	Sees few disbenefits, but many benefits resulting from the solar farm development
	Initiator solar farm	Yes	Sees few disbenefits, but many benefits resulting from the solar farm development
Abdissenbosch	Chairman of workgroup	Yes	Sees few disbenefits, but many benefits resulting from the solar farm development
	Initiator solar farm	Yes	Sees few disbenefits, but many benefits to generate proceeds for the aftercare of former landfill
	Civil servant	Yes	Sees no disbenefits and all involved stakeholders are satisfied with the plan
	Designer	Yes	Sees few disbenefits, but many benefits resulting from the solar farm development

Table 7 The perceptions of several stakeholders towards the ability of benefits offered in the solar farm developments to overcompensate the disbenefits associated with the solar farm development.

As can be discovered from table 7, two cases clearly indicate that the benefits offered through the solar farm development are able to overcompensate the disbenefits associated with the development. These are cases 'De Kwekerij' and 'Abdissenbosch'. In solar farm 'De Kwekerij', almost all stakeholders agree that the benefits are able to overcompensate the disbenefits resulting from the development. However, several perspectives on this overcompensation can be identified. The citizens especially

consider the solar farm as beneficial for the community and for the surroundings. They see many benefits resulting from the development, especially compared to the development of a residential area. However, the civil servant and the investor consider the distribution of costs and benefits especially from the perspectives of monetary costs and effort that should be invested. They argue that extra costs and effort should be invested, however, this will have many benefits in the end and will lead to lower side costs due to fewer objections. In addition, this indicates a difference in interest between stakeholders. The citizens are especially interested in the benefits of the solar farm for the community, while the civil servant and investor especially are interested in the benefits for the planning process and acceptance. According to the stakeholders, it is clear that the provided benefits are able to outweigh the disbenefits associated with the solar farm. Thus, as is argued in the theoretical framework, this situation can be judged as fair, because in this situation additional benefits were provided and all participants agree that these benefits are able to overcompensate the disbenefits resulting from the situation. However, what should be taken into account in this case is that the perspectives of stakeholders are probably influenced by the former plan to develop a residential area on this location. When both situations are compared to each other, the development of the residential area and the solar farm, the existing situation of the solar farm was able to provide more benefits to the community compared to the development of the residential area, according to the stakeholders. This might have resulted in a more positive stance towards the solar farm development in this case.

Compared to solar farm 'De Kwekerij', in the case 'Zonnewoud' not every stakeholder agrees that the benefits are able to overcompensate the disbenefits of the solar farm. Both citizens see too many disadvantages resulting from the development and they do not see any benefits. This is in contrast to the developer and the initiator of the solar farm, who especially see many benefits resulting from the development. This contrast also indicates a difference in interest. Citizens do not consider benefits for the community, but they see benefits for the developer and the initiator in order to increase acceptance or to normalise solar farm developments. Therefore, they emphasize the interest of the developer and the initiator to provide community benefits. The developer especially sees benefits for the neighbourhood resulting from the solar farm and therefore, he considers the benefits from the interest of the community. However, the initiator emphasizes the benefit of solar farms to generate proceeds for the development of nature. He especially considers this benefits from the interest of Staatsbosbeheer, namely nature development. In addition, Staatsbosbeheer mentioned that with these proceeds, many positive things can be done for nature in *other places*. This supposes that the benefits will flow to external areas, while the local area has to deal with the consequences of the development. In this case, not all stakeholders agreed that the benefits were able to overcompensate the disbenefits resulting from the development. As a result, the inequitable situation, as discussed in the theoretical framework, did not lead to a more equitable solution due to the provision of community benefits. Therefore, the situation remains inequitable, since access to the benefits and risks resulting from this project is not considered as equal by some stakeholders.

In the case of solar farm 'Abdissenbosch', every stakeholder agrees that the benefits can overcompensate the disbenefits associated with the solar farm development. In this case, the chairman of the workgroup considers the solar farm as beneficial for the community, but also for the area to attract more visitors. Therefore, he especially considers the benefits out of interest of the community. The initiator of the solar farm especially sees benefits in the generation of proceeds for the aftercare of the former landfill. This perspective indicates a self-interest rather than interest for

the community. The civil servant does not explicitly mention benefits, but he appreciates that every stakeholders is satisfied with the plan. Therefore, he especially considers the benefits in light of the involved stakeholders and the planning process. In addition, the designer of the solar farm sees benefits for nature development and improvement of the quality of the area, although she is aware of some concerns about the effects of nature. This indicates that she especially considers the benefits out of interest for the area self rather than for the community. Another important aspect in this case was to comply to the criteria set by the province to take compensatory measures for nature in order to develop the solar farm. At the end, permission to develop the solar farm was granted by the province. Therefore, it can be said that the criteria were set by the province to compensate for possible disbenefits for nature caused by the development. The permission to develop the solar farm indicates that the province agreed that enough compensatory measures were proposed in the plan and therefore, the benefits of the development could overcompensate the disbenefits related to effects on nature. Thus, also in this case, the situation can be judged as fair, because in this situation the analysed stakeholders agreed that the provided additional benefits were able to overcompensate the disbenefits resulting from this project.

6.2.5 Differences in perceptions towards the distribution of costs and benefits

Differences can be found in the perception of the distribution of costs and benefits. Some stakeholders consider the costs from the perspective of monetary costs and efforts, while others consider it from the perspective of concerns and negative externalities. This difference can also be found in the perception of benefits. Citizen often perceive benefits as benefits for the community, while civil servants and developers sometimes consider the benefits as benefits for the planning process and acceptance. In addition, sometimes benefits are especially considered by initiators as benefits for themselves.

The perception towards the distribution of costs and benefits was not only analysed from the perspective of citizens in the different cases, but also from the perspectives of other stakeholders. Remarkably, the initiators and developers appear to be very positive towards the distribution of costs and benefits in all analysed cases. This is also remarkable in the case of ‘Zonnewoud’, in which the citizens consider the distribution of costs and benefits as very negative, while the initiator and the developer consider it as more positive. What might make the developers and initiators more positive about the distribution of costs and benefits, is that they often will not be directly affected by the development, since they do not live nearby. However, they do make profit by the development. This is in contrast to the citizens, because they often live nearby the development and might therefore be directly affected by the consequences of the development. Moreover, they do not benefit from the development in the same way as developers do.

An often mentioned argument by developers is that the solar farm is located out of sight and in distance from citizens. Therefore, they do not consider direct negative effects for local communities. It should be taken into account that these negative effects can be more than only view and distance to the solar farm, because these negative effects can also relate to the influence on the recreational or nature area of local citizens. Moreover, the perception of developers and initiators towards the distribution of costs and benefits might also be more positive, because they want to portray the development in a positive daylight. As a result, the distribution of costs and benefits might be

perceived as fair, because the developers are positive about it. However, the community might not consider it this way. Therefore, especially the perspective of the community should be taken into account by spatial planners, since the community lives nearby and as a result, has to deal with possible impacts resulting from the solar farm development. Taking into account the wishes and needs of the community can contribute to a more equal distribution of costs and benefits in solar farm developments from the perspective of citizens.

6.2.6 EQUITABLE VS. INEQUITABLE SOLUTION

In the theoretical framework, a distinction is made between an equitable and inequitable solution of the distribution of risks and benefits in a situation. It is argued that an equitable solution can be achieved when all stakeholders have equal access to the risks and benefits of this solution. When this is the case and when no 'losers', stakeholders who might be more affected by risks compared to others, exist in this situation, then the solution can be considered as equitable. When this is not the case, so when stakeholders do not have equal access to risks and benefits, and therefore, someone loses more compared to others, the solution can be considered as inequitable. In all three cases, the solutions to a more equal distribution of costs and benefits in the solar farm developments were proposed differently. In solar farms 'De Kwekerij' and 'Abdissenbosch', community involvement was high and therefore, a more equal access to risks and benefits was possible, because citizens were able to limit negative effects of this development and they were able to propose their wishes related to benefits in the solar farm. However, in general, it is difficult to determine whether this has led to a more equitable solution. The citizens in the two cases cannot be considered as 'losers', although they might be affected by the negative effects, because every citizen in the two cases considers the development as positive. Thus, although the solution in both developments might not be considered as really equitable, the situation after the provision of community benefits can be considered as fairer, since everyone agreed that the benefits flowing from the development were able to overcompensate the disbenefits. In the case of 'Zonnewoud', this was different, because community involvement was low and citizens did not have big influence in the plans for the development, and therefore, the access to risks and benefits cannot be considered as equal. To reach a more equitable situation, additional benefits were provided. However, not every stakeholder agreed that the provided benefits were able to overcompensate the disbenefits. In addition, citizens feel affected by the development of the solar farm and they do not see any benefit resulting from it and therefore, they can be considered as 'losers' of the project. As a result, the situation remains inequitable despite the provision of community benefits.

6.3 Perceptions towards the provision of community benefits

As is argued in the theoretical framework, the perception towards the provision of community benefits varies from person to person. While some consider it as positive contribution to a development, others might be more critical about the intentions of the developer, because they might think that community benefits are provided to buy support rather than being beneficial to the community. The perception towards community benefits of the analysed stakeholders are summarized in the table below (see table 8).

Case	Stakeholder	Positive/negative perception	Reason
Kwekerij	Community representative	Positive	Appreciates the recreational function and nature in the solar farm. Positively influenced his acceptance of the solar farm
	Citizen	Positive	Appreciates the recreational function and nature in the solar farm. Positively influenced her acceptance of the solar farm
	Civil servant	Positive	Multiple functions and benefits positively influenced community acceptance of solar farm
	Investor	Positive	Solar farm provides a recreational park, which is an advantage for the community
Zonnewoud	Initiator petition	Negative	Additional recreational facility offered by the solar farm is not necessary. Benefits only added to sell the project
	Citizen	Negative	The more multifunctional things are attached to the solar farm, the worse she finds it
	Developer	Positive	Provision of community benefits contributed to support of the solar farm
	Initiator solar farm	Positive	Provision of community benefits contributed to support of the solar farm
Abdissenbosch	Chairman of workgroup	Positive	Benefits led to decrease in opposition and redevelopment might attract more visitors
	Initiator solar farm	Positive	Benefits positively influenced the acceptance of the solar farm by the province and municipality
	Civil servant	Positive	Benefits leads to an improvement of the area, which caused that stakeholders agreed with the plan
	Designer	Positive	Benefits led to less opposition and contributed to the willingness of stakeholders to participate in the process

Table 8 The perception of different stakeholders towards the provision of community benefits in the three analysed cases.

In the cases different perceptions towards the provision of community benefits appear. As was the case in the perceptions towards the distribution of costs and benefits, the perceptions towards the provision of community benefits in the case 'De Kwekerij' and 'Abdissenbosch' especially are positive, while this perception in the case of 'Zonnewoud' is more negative. All stakeholders in case 'De Kwekerij' consider the provision of community benefits as positive. However, the perception of stakeholders towards community benefits differ. Citizens especially consider the provision of community benefits as positive addition to the community and according to them, it contributed to their acceptance of the solar farm. Also the investor considers the solar farm as advantage for the neighbourhood. The civil servant emphasizes the contribution of the multiple functions and benefits of the solar farm to the acceptance by the community and the willingness to participate in the planning process. These perspectives show that the provision of community benefits is considered as positive in this case, because it provides added value for the community and the acceptance rate increased significantly. This corresponds to what is argued in the theoretical framework, that it is often thought

that community benefits can reduce local opposition. Although in this case, the level of local opposition was already low, community benefits were able to increase the community acceptance of the solar farm development.

This is different in the case of solar farm 'Zonnewoud', because the perception of citizens towards the provision of community benefits is more negative. This negative perception arises, because both citizens consider the benefits, especially the addition of a recreational function to the solar farm, as unnecessary. As a result, they do not consider the development as added value for the surroundings. Instead of contributing to community acceptance of the solar farm, the addition of different functions and benefits increased opposition by some citizens. The perception of some citizens towards the development became even more negative due to the provision of community benefits. This relates to the adverse effects resulting from the provision of community benefits, which is discussed in the theoretical framework. In contrast to the citizens, the developer and initiator consider the community benefits as positive. According to them, the provision of these benefits contributed to the support of the development by the community. However, the amount of influence this exactly had, is less clear, because the initiator compares the current plan to a monofunctional solar farm on the same location and argues that such a development would absolutely not be accepted by the community. Therefore, it can be argued that the provision of community benefits had some kind of influence in the support of this solar farm, but this role was very minimal. In this case, from the perspective of citizens, the provision of community benefits was not able to lower resistance to the solar farm development. In addition, it even led to adverse effects by increasing opposition to the plan.

In the case of solar farm 'Abdissenbosch', the stakeholders' perception towards the provision of community benefits are positive. The citizens especially consider the benefits as added value for the surrounding area, because it leads to an improvement of the area. Moreover, according to the chairman of the workgroup, the provision of benefits contributed to a reduction in the level of opposition to the plans. The initiator also considers the provision of benefits as positive, but from another perspective. According to him, the provision of benefits contributed to get permission for the development by the province and municipality. In this way, the solar farm development was accepted by these governments. Moreover, he argues that due to the benefits, the area will be improved. In addition, the civil servant considers the provision of benefits also as positive contribution to the acceptance of stakeholders. Due to the benefits, the area will be improved, which led to stakeholders agreeing with the plan. The designer also considers the added functions and benefits to the solar farm as an improvement for the area. In addition, she argues that due to the additional benefits for the area, more people were willing to participate in the process and less opposition to the plans arose. This indicates a positive contribution of community benefits to the planning process and acceptance of the plan.

6.3.1 Adverse effects of community benefits provision

In the theoretical framework, it is argued that the provision of community benefits can sometimes lead to an increase in the level of opposition rather than reduce opposition to sustainable energy developments. This situation can especially appear when residents question the intentions of the developer. In some situations, the provision of community benefits can be considered as tool to buy support or as a way to repair for the impacts associated with renewable energy projects. In the case 'Zonnewoud', one citizen argued that according to him, community benefits were only provided to sell

the project to the community. The other citizen argued that according to her, benefits were provided to normalise solar energy developments and as a result, to be liked by people. Both perspectives show that citizens have the idea that community benefits were only provided to buy support for the project. According to one citizen, the added functions and benefits had the same effect on her, like a red rag has on a bull, which means the added benefits only raised anger by this citizen. This indicates that she even became angrier about the development. This is in line with the adverse effects community benefits can sometimes have on the local opposition to developments.

The perception of people towards the intentions of the developer to provide community benefits is influenced by involvement of the local community to determine the type and amount of compensation, as is discussed in the theoretical framework. Consultation with the community and the possibility of the community to have influence on the community benefits positively influences people's perception towards the intentions of the developer and as a result, this contributes to the effectiveness of community benefits in supporting local acceptance. This can be identified in the cases 'De Kwekerij' and 'Abdissenbosch'. In both cases, citizens were able to negotiate about and influence the type of community benefits with the developer. This resulted in an agreed deal by stakeholders about community benefits which provided added value for citizens and therefore, the acceptance rate of the development increased.

In the theoretical framework, it is argued that monetary compensation can, compared to public goods compensation or no compensation at all, also lead to adverse effects, because when this type of compensation is offered, people are less likely to believe that the developer is concerned with the public interest. As a result, people can become more suspicious about the developer's intention. This aspect has not been identified in this research. However, in the case of 'Abdissenbosch', monetary compensation was proposed by means of a community fund. The workgroup was able to determine the goal of this community fund and they choose to spend the community fund on extra nature enhancement in the area. The reason for this was that only a small amount of money per family would remain when the community fund was divided between the neighbouring families, since about 100.000 euros had to be divided among 2.000 families. This will result in only a small amount of money per family. Therefore, enhancement of nature has more added value for the community members. This is an interesting aspect, since it was argued in the theoretical framework that monetary compensation is often considered as less effective in gaining local acceptance compared to public goods compensation.

The example of the community fund of solar farm 'Abdissenbosch' also shows that public goods compensation is preferred above monetary compensation by citizens. This indicates that improvement of nature in the area was considered as more important than individual financial benefit by the solar farm, in other words the public interest (improving the quality of the area) was preferred above the self-interest (individual financial benefit by monetary compensation). As a result, the area could be improved by the community fund. According to the chairman of workgroup 'Abdissenbosch', another important question about the financial benefit offered by the solar farm was which family would be included and which would be excluded for financial compensation. From this perspective, public goods compensation by means of nature enhancement can be considered as a fairer type of compensation for surrounding community members of the project compared to monetary compensation. This is because the solar farm will be accessible to everyone and as a result, everyone can enjoy its 'benefits'. While, only a limited number of families will benefit from monetary compensation.

6.3.2 Influence of location

Whether community benefits in the different cases were able to provide added value according to the stakeholders and therefore, positively influenced community acceptance depends on the location. In solar farm 'De Kwekerij' and 'Abdissenbosch', most stakeholders argue that due to the provision of community benefits, the solar farm offers added value for the area. However, this depends on the current state of the location. Solar farm 'De Kwekerij' is considered as added value by citizens, especially because of the recreational facility and nature development it offers. Moreover, this situation is often compared to the former plan to develop a residential area. Therefore, the solar farm can especially be considered as added value for citizens compared to the former plan. This is also the case for solar farm 'Abdissenbosch', which will be developed on a former landfill site and therefore, the area is already affected by former activities and impacts. According to several stakeholders, the solar farm development will also lead to an improvement of the area compared to the current state. Therefore, it is considered as something that can offer added value to the area. However, this certainly does not apply to the case of solar farm 'Zonnewoud'. Citizens argue that the location on which the solar farm will be developed consists of high natural values and already offers added value in its current state and therefore, the development will only negatively affect this state. Moreover, the solar farm will provide an additional recreational facility, however, because many recreational facilities are already present in the area, this is considered as unnecessary by citizens. As a result, these benefits are absolutely not considered as added value by citizens.

6.3.3 Influence of planning process

Involvement of stakeholders and trust in the intentions of the developer do not only play a role in the perception citizens have towards the provision of community benefits, it also influences community acceptance. As is argued in the theoretical framework, procedural and distributional justice, but also trust influence community acceptance. Procedural justice relates to a fair decision making process giving stakeholders the ability to participate. A fair and open decision making process positively influences community acceptance, because it contributes to the willingness of citizens to participate, which can result in more satisfied outcomes. This can be identified in two cases. In case 'De Kwekerij' and 'Abdissenbosch', the communication between the government, developer and community was good, the level of community involvement was high and as a consequence, the community was able to influence the plan. This has resulted in a positive perception of citizens towards the planning and decision making process, but also resulted in more satisfied outcomes.

In the theoretical framework, it is argued that procedural justice influences distributional justice, which relates to the equal distribution of costs and benefits over the society. Because procedural justice was experienced in both cases, consultation between the developer and the community about wishes, needs and concerns of the community took place. As a result, the community was able to have influence in the process and they had a voice in the distribution of costs and benefits in the solar farm developments. In the end, this resulted in a more balanced distribution of costs and benefits to which every stakeholder and the community agreed. Trust in the intentions of the developer and the government to develop sustainable energy projects is also influenced by procedural justice. In the theoretical framework, it is argued that feelings of trust can be fostered when procedural fairness is experienced during the process. In both cases, the citizens do not seem to be suspicious about the motives of the developer and the government for the solar farm developments. Reasons for this might

be the good communication, the open planning process and the high level of community involvement. However, at the start of the project the level of trust in the government was very low in the case of 'Abdissenbosch'. This low level of trust was caused by a former renovation project of the neighbourhood that was done a few years ago. Due to the experienced procedural justice, the community gained trust in the government and as a result, they were willing to participate and the level opposition reduced.

In the cases 'De Kwekerij' and 'Abdissenbosch' procedural justice has led to a more balanced distribution of costs and benefits and fostered trust in the motives of the developer and the government. However, this cannot be identified in the case of 'Zonnewoud'. Compared to the other cases, community involvement in this case was different. Since the solar farm was the result of a tender, community involvement was only little. As a result, the planning process in this case was considered as less fair and open by citizens. In addition, one information evening was organised to inform citizens, however, they were not able to discuss and negotiate about wishes and concerns. The general communication during the process was considered as very poor. Therefore, citizens did not have the feeling that they were involved and had influence in the process. As a result, the distribution of costs and benefits is also considered as unequal by citizens, because they only see disbenefits resulting from the development and they do not see any benefits at all.

Due to the lack of procedural fairness and openness, the citizens become suspicious about the intentions of the initiator, the developer and the municipality. As is mentioned in the theoretical framework, communities sometimes argue that sustainable energy technologies are developed as form of capital development. When the government support this development, then they are often considered as supporter of capital development rather than they care about social interest. Although not related to the intention of the government, this can also be identified in the case of 'Zonnewoud', because the initiator of the petition against the solar farm emphasizes the financial interest Staatsbosbeheer has with the development of this solar farm. Moreover, according to him, the developer only has the intention to install and exploit solar farms and therefore, he argues that the additional recreational elements of the solar farm are only added with the intention to sell the project. From the perspective of this citizen, the development can be considered as some form of capital development rather than a contribution to the societal goal to generate sustainable energy. In addition, he argues that the objective of the municipality to generate sustainable energy should not lead to an attack on nature and the recreational area of people. From this perspective, the citizens became suspicious about the intentions of the involved stakeholders for the solar farm development. This had a negative influence on the community acceptance of the solar farm. As a result of experienced differences in procedural justice, distributional justice and trust in each case, the perceptions people have towards community benefits differed per case. This caused the role of community benefits on community acceptance to be different in each case.

6.4 Reflection on methodology

This section reflects upon the methods used in order to collect and analyse data.

6.4.1 Data collection

This research consisted of two phases. Phase one is exploratory and was conducted through desk research. In this phase, all existing solar farms were analysed in order to find multifunctional solar farms. This was done via the website www.zonopkaart.nl, which provides an overview of developed solar farms in The Netherlands. The data used on this website is based on the list of applications for the SDE+ subsidy for solar farm developments in The Netherlands. This website displays all solar farms with an energy production of more than 1 MWp and the last update for the data was on January 2020. Therefore, smaller solar farms (< 1 MWp) were not considered in this research. The developed solar farms were analysed by looking at their spatial lay-out, which means that uncovered space should be available for additional functions in the solar farm. The researcher assumed that high density solar farms, which are solar farms fully covered with solar panels and therefore, no uncovered space is available for other functions, do not provide other additional functions. Therefore, existing solar farms which included uncovered space were analysed in-depth in order to discover whether they provided additional functions. Because only two existing multifunctional solar farms provided community benefits, future plans were also analysed. This was done by searching for "multifunctional solar farms" on the internet. In addition, secondary sources, such as governmental publications, news articles, websites and spatial plans were analysed to find multifunctional solar farms. This was done until the saturation point was reached, which means that no new multifunctional solar farms were found. Ten future plans for solar farms offering multiple functions were found. However, due to the lack of a proper overview of future solar farm plans, more plans for multifunctional solar farm developments might exist.

6.4.2 Interviewees

After phase one, three cases were selected to analyse in-depth. This was done in phase two by means of interviews. In different cases, interviews were conducted with several types of stakeholders. It was tried to find as many as the same type of stakeholders possible to conduct interviews with. However, not all participants, which were contacted to conduct an interview with, did responded. Therefore, the interviewed stakeholders differ per case and some stakeholder types are missing, for example the initiator of solar park 'De Kwekerij' and the civil servant in case of solar farm 'Zonnewoud'. However, the categories of stakeholders that were interviewed more or less match each other, because initiators or developers, civil servants and citizens were interviewed. These are also the main stakeholders involved in solar farm developments and in providing community benefits. Another aspect that should be taken into account is that only a limited amount of local citizens was interviewed, since it was hard to find contact details of these citizens. They were found by snowball sampling, because after the interviews participants were asked to suggest involved citizens to conduct an interview with. This resulted in five interviews with citizens, in the case of 'Abdissenbosch', only one citizen was interviewed and in the other two cases two local citizens were interviewed. These citizens differed in opinion and attitude towards the solar farm development. While in solar farm 'De Kwekerij' and 'Abdissenbosch', the citizens were in general very positive towards the solar farm development, in

solar farm 'Zonnewoud' the interviewees appeared to be very negative towards the plans for the solar farm. It should be taken into account that this might have influenced the results, since not every citizen shares the same attitude towards the development. However, despite the low amount of interviewed citizens, most citizens were representative of a citizen association, such as a workgroup or a community board, while one citizen initiated a petition. Therefore, these citizens represent a larger group of citizens and therefore, it is assumed that they represent the perspective of their citizen association.

6.4.3 Interview by phone

Due to COVID-19 measures, conducting interviews in a physical way was not possible. Therefore, interviews were conducted by the phone. Stakeholders were contacted to participate in an interview and they had the ability to choose between interview by email or by phone. Some stakeholders wanted to participate in the interview via email. However, they responded with only short answers. As a result, some interviewees were contacted by phone to provide additional information about their given answers. Thereafter, due to the many respondents who preferred to conduct the interview by email, only interviews by phone were proposed. The researcher specifically chose to conduct interviews by phone, because of several reasons. The main reason was to reach as many respondents as possible and since everyone owns a phone and not everyone is able to work with other media, such as video calling (Skype, etc.). Another reason was that it takes less effort to participate in an interview by phone compared to via video calling, because fewer steps have to be taken to make contact with each other. Therefore, participants might be more positive to participate in the interviews. Another advantage of conducting interviews by phone is that it provides the most stable connection, which plays an important role in conducting an interview. During video calling, the chance exists that the connection might be of bad quality or might even be lost, with the result of lacking information and interruption of the interview. Moreover, participants can choose their own location to participate in the interview and might therefore be more comfortable during the interview. However, conducting interviews by phone also has several limitations. For example, no personal contact is made and therefore, the participants expressions cannot be observed during the interview. However, because no personal contact is made, the presence of the interviewer does not influence the participant's answers. In addition, the absence of the researcher can influence the length of the interview, because when a physical meeting is planned, more time is often scheduled. Therefore, interviews conducted by phone might be shorter in time.

6.4.4 Coding

During the coding process, the statements of the interviewees were labelled according to certain concepts in order to give meaning to the interpretation of the interviewees. The meaning of these statements differed per participant and some were more clear than others. The researcher interpreted these statements to label them. Therefore, it should be taken into account that the interpretation of the researcher might have influenced the codes that were attached to the statements of the interviewees during the coding process. However, the researcher took care that each sentence was read carefully and that the meaning of each statement by the participants was understood. When a statement was less clear, the researcher assigned a code which was most closely related to other statements.

6.5 Reflection on the results

This section reflects upon the results of this research in the broader context and in light of existing literature.

6.5.1 Generalisability

The approach to this qualitative research is social constructivism, which means that people have different meanings about experiences, objects or things and these meaning are subjective. According to Creswell & Creswell (2017), in this approach, the researcher analyses the multiplicity and complexity of these meanings. Since these meanings are influenced by several factors, the context should be taken into account in the different cases. Therefore, the results cannot be applied to other cases and are therefore not generalizable. However, that is also not the objective of qualitative research. The qualitative research approach is suitable to explore certain phenomena (Kumar, 2014) and case study research makes it apple to explore cases in-depth and to get a holistic understanding of the case. The aim of this research was to discover perspectives towards the provision of community benefits in solar farm developments and what role this has on community acceptance of such developments. Therefore, especially actively involved stakeholders were chosen to conduct interviews with and their meanings towards the solar farm development and the provision of community benefits was analysed. To have a more general outcome, more interviewees are needed. However, this research provides some insights in people's perception towards community benefits and the role this played in community acceptance. In addition, three cases were selected in which the level of community acceptance of the development differed. The solar farm development in case 'De Kwekerij' was accepted with relative ease, while in case 'Abdissenbosch' the level of opposition was high at the started, but decreased over time, and in case 'Zonnewoud' the opposition to the plans remained high. As a result, the role of community benefits in the acceptance of solar farm developments was not only analysed in a best practice case in which the acceptance rate was high, but also in other cases in which the level of acceptance was lower. Therefore, the role of community benefits could be analysed in a broader context. Moreover, the perspectives of multiple stakeholders were analysed rather than only one group of stakeholders, with the advantage to not only learn about perceptions of community benefits by citizens, but also the effectiveness of these benefits for the acceptance of the solar farm development from the perspective of developers and governments.

6.5.2 Lack of literature

Community benefits are commonly provided in wind farm developments in the UK. Therefore, in literature the role and effects of community benefits in wind farm developments are well known. However, literature on the provision of community benefits in solar farm developments is lacking. As a result, the role and effects of community benefits in wind farm developments were compared and thereafter applied to the results of this research. However, it should be taken into account that the attitude towards wind farm developments are often different compared to solar farm developments. This might influence the role of community benefits in solar farm developments compared to wind

farm developments. The role of community benefits in wind farm developments was analysed in literature and in this research this was applied in solar farm developments.

6.5.3 Different influences of community acceptance

Resulting from the theoretical framework, community acceptance of renewable energy technologies is influenced by attitudinal influences of people, (expected) negative externalities resulting from the development and the organisation of the planning process. This research especially focused on the last two mentioned factors. Attitudinal factors were not specifically taken into account in this research, however, they determine the participants answers during the interviews and the general attitude to people towards solar farm developments. Therefore, they influence the results of this research. Moreover, it should be taken into account that more factors which might influence community acceptance exists. However, due to the scope of this research the previously mentioned factors were taken into account.

CHAPTER 7

Conclusion

This chapter answers the main research question of this research. In addition, avenues for future research and recommendations for practical application of the results are provided.

7 Conclusion

Governments all over the world are promoting sustainable energy developments in order to comply to sustainable energy goals. The Dutch government is especially focused on wind and solar energy. As a result, solar farms are developed in the rural landscape at increasing rate. However, such developments often face high levels of opposition on the local level by local communities and as a result, the projects are delayed or even cancelled. The provision of community benefits in solar farm developments seems to be a promising tool to increase community acceptance of such developments and thereby, introduce them more successfully into society. This research analysed the role of community benefits on community acceptance of multifunctional solar farms. This was done through qualitative research via a case study design and three cases were selected to be studied in-depth. Data was collected in two phases, in phase one through desk research and in phase two through interviews. The aim of this research was to contribute to the understanding of the role of community benefits in the community acceptance of multifunctional solar farm developments. The research question was: *What role do community benefits of multifunctional solar farms play in order to support community acceptance?*

In this research, the type of community benefits provided in multifunctional solar farms were identified. In addition, the role they have on the distribution of costs and benefits in such developments and the perception of people towards community benefits was analysed. Several categories of community benefits have been provided in a limited number of existing solar farms. However, a larger number of future solar farm developments provides community benefits in the form of financial benefits, in-kind benefits, local services or nature enhancement. Compared to community benefits in wind farm developments, differences have been found in the provision of community benefits in solar farm developments. Especially in the community benefits category of local services a wider range of services have been identified, such as food production, social employment or helping with maintenance. In addition, differences were found in the reasons for the provision of community benefits. In wind farm developments, this is often done to gain more support or to compensate the community for possible impacts caused by the development. However, in this research also other reasons appeared, which differed in interest of the stakeholders. Community benefits were provided because it was required to comply with criteria set by governments in order to retrieve permission for the development or to compensate the community. Some developers provided benefits out of free will, because it is their ambition, while others provided it out of the interest of the area in order to improve the quality of the area or to attract more visitors to the area. Lastly, community benefits can also be provided as a result of technical aspects.

The results of this qualitative research shows that community benefits can positively contribute to community acceptance of solar farm developments. However, they can also generate adverse effects and increase opposition if not applied properly. In this research, several factors have been identified influencing the role of community benefits, such as the location determining the expected negative externalities and the necessity of the community benefits, the reason and interest for the provision of benefits by developers and the level of community involvement to influence community benefits. Therefore, the role of community benefits depends on the context, but also on the planning process.

The perception of people towards the provision of community benefits is influenced by the necessity of the community benefits, which is dependent on the location and the planning process. A more positive perception towards community benefits arises when the location is already affected by former activities or would be affected by a former plan compared to the solar farm development. In the case 'De Kwekerij' and 'Abdissenbosch', the benefits of the solar farm were able to improve the area and as a result, they were perceived as necessity for the area. In addition, procedural justice fosters distributional justice and the level of trust citizens have in the intentions of the involved stakeholders. A high level of community involvement and procedural justice provide the ability for the community to discuss concerns about the impacts of the solar farm and provides opportunities for the community to influence the type of community benefits. When the community is able to shape the benefits according to their wishes and needs, the benefits can more easily be considered as beneficial for the community and the area. As a result, the benefits are able to outweigh the disbenefits resulting from the development, which contributes to a more equitable solution to which every stakeholder agrees. This positively influences community acceptance of the solar farm development.

However, the provision of community benefits does not necessarily have to contribute to community acceptance of the solar farm, since the provision of community benefits can even have adverse effects. In the case 'Zonnewoud', many negative externalities were expected and the development was seen as something that would negatively affect the area. As a result, the benefits provided in the solar farm were not able to improve the area and therefore, the necessity of the community benefits for the community was missing. Due to the lack of procedural justice and the low level of community involvement, the community was not able to influence the type of community benefits and concerns did not disappear. Therefore, the community became suspicious about the intentions of the developers and community benefits were perceived as something which was only added to sell the project to the community. This resulted in a negative perception towards community benefits. As a result, the benefits are not able to outweigh the disbenefits from the development and an unequitable situation, in which not every stakeholder appreciates the outcome, remains. In the end, this negatively affects community acceptance of the solar farm development.

Although the effects differ per case, the provision of community benefits can contribute to a more equitable outcome of solar farm developments. It can be said that the provision of community benefits contributes to a more equitable solution compared to a development in which no community benefits are provided. When a solar farm is developed without the provision of community benefits, the local community can be considered as 'losers', since the community might only be negatively affected by and do not benefit from the development, while the developer is not affected by and benefits from the solar farm development. In this situation, the provision of community benefits contributes to a more equitable solution, because it provides benefits for the local community. To which extent community benefits are perceived as necessity and are sufficient to mitigate the negative externalities can differ, but it still offers a more equitable solution when community benefits are provided compared to a situation without compensatory measures. To get a positive outcome in which community benefits are able to support community acceptance, it is important to involve citizens in order to clarify the intentions of the benefits and to give them the opportunity to have a voice in the decision of the type and amount of community benefits. In this way, citizens have the opportunity to shape their wishes and needs into the benefits and therefore, they consider the necessity of the community benefits for the community. Then, the role of community benefits in community acceptance can be very positive.

7.1 AVENUES FOR FUTURE RESEARCH

The provision of community benefits is common in wind farm developments. However, in solar farm developments this is less common. The scientific objective of this qualitative research was to explore the role of community benefits in multifunctional solar farm developments on the local level in order to support community acceptance. This was done through three case studies. However, because the provision of community benefits is a new phenomenon in solar farm developments, only one existing solar farm and two future plans providing community benefits were analysed. Therefore, it would be interesting to study the future plans again when they have been developed to analyse the role of community benefits and compare the role of community benefits before and after realisation of the solar farm, since especially in these phases the level of opposition can be high. In addition, the analysed cases are located in The Netherlands. In future research, international multifunctional solar farm developments can be analysed in order to compare the role of community benefits in different geographical contexts.

This research identified important factors influencing the role of community benefits, such as location, community involvement or the planning process. Relationships between these factors and the role of community benefits were identified, but they have not been verified. A direction for future research can be to verify these relationships, such as the relationship between the type of community benefits and the level of community acceptance or between the location of a solar farm development and the level of opposition to it. In addition, the perception of different stakeholders towards community benefits was analysed in this research. Future research can analyse more perceptions of a larger group of people by a quantitative research approach. This approach makes it possible to reach a larger number of citizens and thereby, analyse the perception towards community benefits of the wider community.

The general concept of community benefits was analysed in this research, because no distinction was made between the role of different categories of community benefits. It was not specifically asked how people perceive the different types of community benefits, such as financial benefits or other types of public goods compensation. An interesting direction for future research is to specify which type of community benefits are most effective in increasing local acceptance, and under which circumstances. For example, are in-kind benefits more effective in supporting community acceptance compared to environmental enhancement or local services? This helps to understand whether another type of community benefit could have led to other outcomes in the case of solar farm 'Zonnewoud' and thereby, could prevent the adverse effects of community benefits provision.

A distinction can also be made between monetary and non-monetary compensation. This research focussed on non-monetary (public goods) compensation. Future research can identify the effectiveness between both types of compensation. In addition, a distinction can be made between the spatial scale that community benefits will serve. Some provided community benefits did serve other stakeholders rather than only local citizens, such as external visitors or businesses. This leads to another interesting question about the effectiveness of community acceptance serving different spatial scales. For example, can community benefits serving the local scale increase community acceptance more compared to community benefits serving broader scales? This would also be an interesting direction for further research.

7.2 Recommendations for practical application

The societal objective of this research was to understand how acceptance of renewable energy projects can be improved in order to introduce them more successfully into society and thereby, foster the energy transition. As identified in this research, community benefits can be a promising avenue to increase acceptance. However, the provision of community benefits in solar farm developments is less common. This is changing, as can be seen in the amount of community benefits offered in future solar farm developments and the released code of conduct for solar farm developments in rural areas, which emphasize multifunctional use in solar farms and stresses the importance of providing added value for the surroundings.

Based on the findings of this research, measures that can be taken in order to increase community acceptance by the provision of community benefits were identified. The developer can simply provide community benefits, but they will not always be effective in increasing acceptance. When citizens do not consider the provided benefits as beneficial for the community, they will not be effective in increasing community acceptance and even adverse effects might arise. This research demonstrates the importance to involve citizens in the process. A fair and open decision making process fosters trust in the stakeholders and gives citizens the opportunity to discuss the provision of community benefits, which contributes to a better distribution of costs and benefits of the project. In addition, it enables to reach a more equal solution to which all stakeholders agree. Therefore, consultation with the community about the type of community benefits is recommended.

In this research, multifunctional solar farms were analysed. Monofunctional solar farms have, compared to multifunctional solar farms, the advantage that they are more efficient in energy generation and therefore, less solar farms are needed in the end. Because the demand for renewable energy is high, the number of solar farms is still increasing. However, monofunctional solar farms often have great impact on the rural landscape, which already faces many challenges, such as urbanisation, climate change and the energy transition. In addition, large-scale solar farm developments often face high levels of opposition, which impedes the energy transition. From this perspective, multifunctional solar farms can be promising. Compared to monofunctional solar farms causing great impact on the landscape, multifunctional solar farms provide the advantage that they can limit the impact on the landscape, by leaving space available for other functions and at the same time, contribute to other goals, such as climate change or nature development. Most importantly, as identified in this research, community benefits resulting from multifunctional solar farms are able to contribute to a more equitable solution for all stakeholders in solar farm developments, when they are applied properly, and thereby, they can increase community acceptance of solar farms. As a result, they are able to foster the energy transition, while limiting their spatial impacts and taking into account the needs and wishes of the surrounding communities.

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9 Appendix 1: Interview protocols

Two interview protocols were used to conduct interviews. The protocols were used for different stakeholders. Protocol 1 was used for citizens, while protocol 2 was used for initiators, developers or civil servants. The interview protocols are in Dutch.

Interview protocol 1: citizen

Naam:
Organisatie:
Functie:

Achtergrond

1. Woont u in de buurt van het (te realiseren) zonnepark?

2. Op welke manier bent u betrokken bij het zonnepark?

Acceptatie

3. Bent/was u voor of tegen de ontwikkeling van het zonnepark? En waarom?

4. Welke effecten van het zonnepark op de omgeving verwacht u en bent u hierover bezorgd?

5. Zijn er maatregelen genomen om eventueel negatieve effecten van het zonnepark op de omgeving te voorkomen of te compenseren?

6. Hebben deze maatregelen geleid tot een beter evenwicht van positieve en negatieve effecten van het zonnepark?

Functiecombinaties in zonnepark

7. Wat vindt u ervan dat het zonnepark meerdere functies heeft dan alleen energieopwekking?

8. Vindt u dat het zonnepark door de verschillende functies meerwaarde/voordelen kan bieden voor u en de omgeving?

9. Worden of zijn er tijdens de ontwikkeling voordelen aan u/de gemeenschap geboden met betrekking tot de ontwikkeling van het zonnepark?

10. Kunnen volgens u de mogelijke voordelen van het zonnepark opwegen tegen de mogelijke negatieve effecten van het zonnepark op de omgeving?

Planningsproces

11. Op welke manier bent u betrokken geweest bij de ontwikkeling van het zonnepark? Welke invloed heeft dit gehad op de voordelen/functies die het zonnepark biedt?

12. Wat voor rol heeft multifunctionaliteit/meerwaarde van het zonnepark gehad op uw acceptatie van het zonnepark?

INTERVIEW PROTOCOL 2: INITIATOR, DEVELOPER, CIVIL SERVANT

Naam:
Organisatie:
Functie:

Achtergrond

1. Voor welke organisatie werkt u en wat is uw rol binnen deze organisatie?

2. Op welke manier bent u betrokken bij zonneparken?

Acceptatie

3. Is/was er sprake van weerstand tegen het zonnepark?

4. Wat waren/zijn de belangrijkste argumenten voor/tegen de ontwikkeling van het zonnepark?

5. Waren/zijn omwonenden bezorgd over negatieve effecten van het zonnepark op de omgeving?

6. Zijn er maatregelen genomen om eventueel negatieve effecten van het zonnepark op de omgeving te voorkomen of te compenseren?

Community benefits in zonnepark

7. Verschillende functies: educatie, recreatie en natuurontwikkeling. Waarom is er gekozen voor deze functies?

8. Wat is de reden dat er gekozen is voor een multifunctioneel zonnepark in plaats van een meer efficiënt zonnepark vol met zonnepanelen?

9. Bieden deze verschillende functies van het zonnepark meerwaarde voor bewoners uit de omgeving?

10. Zijn er aanvullende voordelen voor de gemeenschap geboden tijdens de ontwikkeling van het zonnepark? En waarom is dit gedaan?

11. Kunnen de mogelijke voordelen van het zonnepark opwegen tegen de mogelijke negatieve effecten van het zonnepark?

Planningsproces

12. Waarom en op welke manier zijn bewoners uit de buurt bij de ontwikkeling van het zonnepark betrokken? Welke invloed heeft dit gehad (op het ontwerp en de inrichting)?

13. Wat voor rol heeft multifunctionaliteit/meerwaarde van het zonnepark gehad op de acceptatie van het zonnepark?

10 Appendix 2: Coding

This appendix describes the codes used during the coding process by using the coding program ATLAS.ti. Open coding was applied to analyse 12 interviews. 72 codes were used.

Open codes used during the coding process	
acceptance	information evening
accessibility	informing
added value	initiatives
after solar farm	interviewee info
agreement	involvement
attitude solar farm	less resistance
attitude solar farm doubtful	local externalities
attitude solar farm negative	location
attitude solar farm positive	low community involvement
background info	maintenance
benefits for community	minor interest
best practice	multifunctional solar farm
climate adaptation	nature
collaboration	negative attitude wind
communication	negative externalities
community decision	neighbourhood representation
community fund	no added value
community involvement	no community involvement
compensation	no negative externalities
complaints	noise
concerns	petition
consideration	planning process
criteria multifunctionality	policy
design changes	pro arguments
distribution costs-benefits	profit
education	recreation
effects on nature	resistance
effects on soil	scale
environmental benefit	security
experience	sell project
external environmental enhancement	solar farm foundation
financial benefit	stakeholders
financial participation	subsidy
glare	trust
goal of developer	vandalism
guided tours	volunteer
influence community in plans	

After open codes were applied to the transcripts of the interviews, axial coding was applied. This means codes were attached to broader subcategories overarching the different codes. 10 categories were identified to which different categories related. These categories were used to analyse the codes and the links they have with each other.

Subcategories of codes during the axial coding process	
Attitudes	Planning process
acceptance	development after solar farm
attitude solar farm	collaboration
attitude solar farm doubtful	communication
attitude solar farm negative	community involvement
attitude solar farm positive	involvement
negative attitude wind	planning process
	stakeholders
	subsidy
	trust
Resistance	Added functions
attitude solar farm doubtful	accessibility
attitude solar farm negative	added value
complaints	benefits for community
concerns	climate adaptation
goal of developer	consideration
informing	criteria multifunctionality
less resistance	education
location	experience
low community involvement	guided tours
minor interest of recreational elements	maintenance
no added value	multifunctional solar farm
no community involvement	nature
petition	no added value
resistance	policy
scale	profit
sell project	recreation
	security
	solar farm foundation
	volunteer
Background info	Distribution of costs and benefits
background info	consideration
interviewee info	distribution costs-benefits
	no added value
	profit
Benefits	Concerns
benefits for community	compensation
community fund	complaints
compensation	concerns
environmental benefit	effects on nature
external environmental enhancement	effects on soil
financial benefit	experience
financial participation	glare
nature	local externalities

no added value sell project	location negative externalities no negative externalities noise
Community involvement agreement collaboration community decision community involvement design changes influence community in plans information evening informing initiatives involvement low community involvement neighbourhood representation no community involvement	Support acceptance attitude solar farm positive best practice communication influence community in plans informing involvement less resistance pro arguments trust

11 Appendix 3: Analysis phase 1

This appendix describes the analysis of phase 1. In this analysis, the spatial layout of all existing solar farms was analysed in order to find multifunctional solar farm. This was done with data retrieved from www.zonopkaart.nl, the data used on this website is based on the list of applications for the SDE+ subsidy for solar farm developments in The Netherlands. This website displays all solar farm with an energy production of more than 1 MWp and the last update for the data was on January 2020.

Province	Location	MWp	Multifunctional	Build / rural area
Zeeland	Middelburg	14.5	No	Urban
	Hoek	2.0	No	Rural
	Nieuwdorp	11.99	No	Urban
	Borssele	55.0	No	Urban
	s-Heer Arendskerke	2.44	No	Rural
	Rilland	4.08	No	Rural
	Rilland	6.8	No	Rural
	Rilland	11.81	No	Rural
	Zierikzee	14.08	No	Urban
Zuid-Holland	Melissant	10.0	No	Rural
	Ooltgensplaat	40.0	No	Rural
	Dordrecht	7.5	No	Urban
	Dordrecht	3.51	No	Urban
	Hazers-woude dorp	1.42	No	Rural
	Katwijk	1.51	No	Urban
Utrecht	Nieuwegein	2.9	No	Urban
	Nieuwegein	2.19	No	Urban
	Eemnes	7.0	No	Rural
Noord-Holland	Nederhorst Den Berg	2.16	No	Rural
	Hoofddorp	18.01	No	Urban
	Hoofddorp	14.98	No	Urban
	Amsterdam	2.3	No	Urban
	Velsen-Noord	2.0	No	Urban
	Purmerend	5.6	No	Urban
	Alkmaar	2.42	No	Urban
	Heerhugewaard	9.36	No	Rural
	Andijk	15.24	No	Urban
	Middenmeer	3.25	No	Rural
Noord-Brabant	Moerdijk	26.77	No	Urban
	Moerdijk	2.37	No	Urban
	Breda	1.78	No	Urban
	Biezenmortel	1.63	No	Urban
	Volkel	12.25	No	Rural

	Best	5.86	No	Urban
	Veldhoven	1.5	No	Urban
	Deurne	3.78	No	Urban
	Budel-Dorplein	47.85	No	Rural
Limburg	Venlo	3.7	No	Urban
	Susteren	1.68	No	Rural
	Geleen	3.37	No	Urban
	Hoensbroek	2.3	No	Urban
	Maastricht	1.25	No	Urban
Gelderland	Geldermalsen	1.93	No	Urban
	Geldermalsen	6.7	No	Urban
	Lienden	1.33	No	Rural
	Bemmel	1.85	No	Urban
	Arnhem	2.05	No	Urban
	Hengelo	2.0	Yes	Rural
	Beltrum	2.23	Yes	Rural
	Zutphen	1.65	No	Urban
	Apeldoorn	3.85	No	Urban
Overijssel	Hengelo	1.0	No	Urban
	Hengelo	1.73	No	Urban
	Hengelo	13.5	No	Urban
	Hengelo	4.0	No	Urban
	Wierden	4.03	No	Rural
	Vriezenveen	12.15	No	Urban
	Heeten	1.85	No	Rural
	Zwolle	1.01	No	Rural
	Zwolle	5.19	No	Rural
	Dedemsvaart	2.74	No	Urban
Flevoland	Almere	34.54	No	Urban
	Lelystad	2.32	No	Rural
	Lelystad	10.0	No	Rural
	Lelystad	17.13	No	Rural
	Lelystad	2.5	No	Urban
	Emmeloord	11.46	No	Rural
	Luttelgeest	6.24	No	Urban
Drenthe	Nieuweroord	2.0	No	Rural
	Nieuw-dordrecht	30.69	No	Urban
	Barger-Compascuum	11.88	No	Rural
	Emmen	13.67	No	Rural
	2e Exloërmond	1.2	No	Rural
	Nieuw Annerveen	1.0	No	Rural
	Eelde	29.46	No	Rural
Friesland	Vlieland	1.03	No	Rural
	Ballum	5.98	No	Rural

	Franeker	8.67	No	Rural
	Franeker	1.33	No	Rural
	Leeuwarden	3.59	No	Urban
	Garyp	5.5	No	Rural
	Burgum	5.0	No	Rural
	Buitenpost	12.89	No	Urban
	Haulerwijk	7.2	No	Urban
	Donkerbroek	2.0	No	Rural
	Oosterwolde	5.5	No	Rural
	Appelscha	4.5	No	Rural
	Appelscha	2.0	No	Rural
	Appelscha	4.3	No	Rural
	Noorwolde	4.19	No	Urban
	Wolvega	3.95	No	Urban
Groningen	Marum	9.49	No	Rural
	Leek	2.35	No	Rural
	Groningen	2.09	No	Urban
	Groningen	10.0	No	Urban
	Groningen	10.82	No	Rural
	Sappemeer	103.0	No	Urban
	Eemshaven	5.5	No	Urban
	Meedhuizen	7.3	No	Rural
	Delfzijl	30.8	No	Urban
	Winschoten	2.37	No	Urban
	Winschoten	2.56	No	Urban
	Winschoten	1.55	No	Urban
	Veendam	15.47	No	Urban
	Veendam	2.12	No	Urban
	Veendam	3.1	No	Urban
	Veendam	2.6	No	Urban
	Veendam	3.21	No	Rural
	Onstwedde	13.89	No	Urban
	Stadskanaal	4.37	No	Urban

12 Appendix 4: Community benefits in future solar farm developments

This appendix describes the future plans for solar farm developments which were found during the analysis in phase 1. The basic characteristics were analysed, including size and the energy production capacity. Moreover, the types of community benefits were analysed and were linked to a community benefit category. The types of community benefits which will be offered are summarized in the table belonging to each case.

Solar farm de Punt

Solar farm de Punt will be developed nearby Barendrecht in 2021 and will consists of 7.200 solar panels and is able to generate 2,88 MWp of energy. Solar energy developer Greenspread won the tender for this solar farm, because of the high quality of their plan[25]. Greenspread has experience with developing small and unique solar farms. In this solar farm, much attention has been paid to the design and multifunctional use. Nature development plays an important role in the park and additional natural elements, such as insect hotels will be included. The solar farm will not be accessible to people. A prerequisite was the opportunity for citizens and companies from Barendrecht to participate financially in the plan. This is done via crowdfunding and a reduction of energy prices for investors. The community benefits this solar farm provides are initiated by the developer and were not influenced by the involvement of citizens.

Provision of community benefits in solar farm de Punt	
Category of community benefits	Measures for multifunctional use
In-kind benefits	✗
Local services	✗
Environmental mitigation/enhancement	✓ Nature development (flowers/herbs) ✓ Natural elements: bee and insect hotels
Financial benefits	✓ Crowdfunding ✓ Reduction of energy prices

Solar farm Bergen

In Bergen, 265 hectares of solar panels will be developed in 2022. The big solar farm belongs to an energy landscape together with windmills. Moreover, nature will be developed in this energy park. In this way, more functions than only energy production are present on this location. A visitor centre, walking paths and a mountainbike route will be developed in the park[26]. This means, the park will be accessible to people. In addition, a wish of the municipality is that agriculture still can take place under

[25] Retrieved April 2, 2020 from https://barendrechtnu.nl/nieuws/barendrecht/31952/zonnepark-de-punt-met-7-200-zonnepanelen-in-2021-naast-spoor-bij-de-1e-barendrechtseweg
[26] Retrieved April 2, 2020 from https://www.1limburg.nl/bergen-wil-miljoen-zonnepanelen-en-vier-windmolens

the solar panels. Another function that will be added to the park is an innovation centre and innovation fields with opportunities for innovation in agriculture, horticulture and energy storage. Financial benefits are offered via financial participation through shares and the opportunity of a community fund[27]. All in all, this solar farms offers several functions as nature development, recreation and education[28]. Citizens are included in the process by means of a workgroup in which people can share ideas and give suggestions for the planning process, but also the design and lay-out of the park. This means that the citizens can influence the type of community benefits offered by the solar farm.

Provision of community benefits in solar farm Bergen	
Category of community benefits	**Measures for multifunctional use**
In-kind benefits	✓ Visitor centre ✓ Recreational area: walking and mountainbike routes ✓ Innovation centre: opportunities for innovation in agriculture, horticulture and energy storage
Local services	✓ Education ✓ Food production: agriculture under solar panels
Environmental mitigation/enhancement	✓ Nature development
Financial benefits	✓ Opportunity for community fund ✓ Financial participation through shares

Solar farm Braambergen

In Almere, solar farm Braambergen will be developed on a former landfill in 2020. The park will consist of 25.000 to 35.000 solar panels and will be 10 to 12 hectares big. The area will be designed as recreational park and several routes for walkers, cyclists and mountainbikers will be developed[29]. In addition, a watch tower and a sustainable pavilion will be developed made of re-used materials and functions as information centre. On the terrain, an vineyard is already present and wine tasting sessions will be organised in the solar farm [30]. The solar park is an initiative of the waste company Afvalzorg and the design was made by Arc2 Architects. Therefore, the community benefits were initiated by the developer. No financial participation opportunities are offered.

[27] Retrieved April 8, 2020 from https://www.commissiemer.nl/projectdocumenten/00004921.pdf
[28] Retrieved April 2, 2020 from https://solarmagazine.nl/nieuws-zonne-energie/i20836/bergen-krijgt-265-hectare-zonnepanelen-en-175-hectare-natuur-er-moet-iets-achterblijven-wat-optelt
[29] Retrieved April 3, 2020 from https://www.arc2.nl/projecten/landschap-stedenbouw/duurzaamheidspark/zonnepark-braambergen-almere/
[30] Retrieved April 3, 2020 from https://www.omroepflevoland.nl/nieuws/171871/zonnepark-en-recreatie-op-oude-vuilstort-braambergen

Provision of community benefits in solar farm Braambergen	
Category of community benefits	Measures for multifunctional use
In-kind benefits	✓ Recreational park with walking, cycle and mountainbike paths. Watchtower, pavilion ✓ Information centre ✓ Vineyard: wine tasting sessions
Local services	✓ Education
Environmental mitigation/enhancement	✓ Nature development
Financial benefits	✗

Solar farm Wagenberg

Solar farm Wagenberg is located on a parcel which belongs to an ecological connection zone (in Dutch *ecological connection zone*)[31]. In and around the solar farm nature will be developed to contribute to this connection zone. In addition, walking and cycling paths will be developed in order to experience nature in the area. To inform people about the aim of the solar farm, information boards will be placed. People can participate financially in the solar farm through shares. According to the developer, solar farms offer the opportunity to look for new functions of an area. This is done together with social organisations and citizens. Users of the area can have a voice in the process and in the lay-out of the area and the solar farm. In this way, the community benefits that will be offered by this solar farm can be influenced by citizens and users of the area.

Provision of community benefits in solar farm Wagenberg	
Category of community benefits	Measures for multifunctional use
In-kind benefits	✓ Recreational: walking and cycling paths
Local services	✓ Education (information boards about park and renewable energy)
Environmental mitigation/enhancement	✓ Nature development ✓ Contribution to ecological connection zone
Financial benefits	✓ Financial participation through shares

Solar farm Emmaberg

The plan for Solar farm Emmaberg consist of 120.000 panels and will be developed in Valkenburg. This solar farm does not only reduce the amount of CO_2 by producing renewable energy, but additional plants and maintenance of the soil can help to store carbon into biomass of the soil in the solar farm[32]. This contributes to an extra reduction of CO_2. In the solar farm, nature will be developed and additional elements, such as insect hotels will be placed. In addition, crops or fruit trees will be planted between the solar panels and in the remaining uncovered space in the solar farm, which makes agriculture possible. Cycling and walking paths, playgrounds and a watch tower will be developed for recreational purposes. Moreover, charging stations for electric cars will be developed at local gas stations. Moreover, education is offered about solar panels and the energy transition in general. Financial participation is able through obligations. People have the opportunity to participate in the

[31] Retrieved April 4, 2020 from http://www.zonneparkendrimmelen.nl/wagenberg.php
[32] Retrieved April 4, 2020 from https://zonneparkemmaberg.nl/

development of the process, but their role in the process is unclear. Community benefits in this solar farm are initiated by the developer. In the end, the permit for the development of this solar farm was cancelled[33].

Provision of community benefits in solar farm Emmaberg	
Category of community benefits	**Measures for multifunctional use**
In-kind benefits	✓ Recreation park: walking and bike paths, playground for children, watchtower ✓ Charging stations for cars at local gas station
Local services	✓ Education about energy transition and solar panels ✓ Food production: planting crops between the solar panels
Environmental mitigation/enhancement	✓ Nature development ✓ CO_2 reduction through plants and soil maintenance ✓ Enhancement of landscape
Financial benefits	✓ Obligations ✓ Reduction of energy bill

Solar farm Klarenbeek

The plan for solar farm Klarenbeek was to develop a solar farm of 28 hectares in 2021, including 21 hectares of solar panels. However, many opposition arose against the park, because people were concerned about the impacts of the solar farm on the landscape and surrounding property prices[34]. Another reason for opposition was the presence of a badger habitat on the parcel of the solar farm[35]. After consultation with a neighbourhood committee, the size of the solar farm was reduced to 13 hectares and a new design was made. This design takes into account the badger habitat and includes nature development, landscape enhancement, an ecological connection zone and additional elements, as an insect hotel and pools. Moreover, walking paths are added to the park for recreation. People have the opportunity to participate financially through shares. The solar farm is designed in collaboration with the developer and the community. In the planning and design process, local residents had rights to make decisions and thereby had a big influence in the spatial lay-out of the park[36]. In this way, the provided community benefits in the park could be influenced by the community members.

[33] Retrieved April 9, 2020 from https://tvvalkenburg.tv/nieuws/weigering-zonnepanelenpark-op-de-emmaberg/
[34] Retrieved April 9, 2020 from https://www.destentor.nl/deventer/plan-voor-flink-zonneveld-bij-klarenbeek-kansrijk~a5630acd/
[35] Retrieved April 6, 2020 from https://www.destentor.nl/deventer/zonnepark-klarenbeek-na-buurtprotest-minder-mega~a9030ebcc/
[36] Retrieved April 9, 2020 from https://www.prowind.com/nl/voorst/

Provision of community benefits in solar farm Klarenbeek	
Category of community benefits	Measures for multifunctional use
In-kind benefits	✓ Recreation: Walking paths
Local services	✗
Environmental mitigation/enhancement	✓ Nature development ✓ Additional elements: insect hotel and pools ✓ Landscape enhancement ✓ Ecological connection zone
Financial benefits	✓ Financial participation through obligations

Solar farm Mikkelhorst

This solar farm belongs to care farm De Mikkelhorst[37]. This care farm provides social employment opportunities and the solar farm contributes to these opportunities. In the solar farm, nature will be developed, animals can graze and crops can be planted. In this way, food can be produced in the solar farm. In addition, walking paths will be developed. Financial participation is possible through obligations. Since the design was made by the care farm and the developer. As a consequence, the provision of community benefits in the solar farm are not influenced by local residents.

Provision of community benefits in solar farm Mikkelhorst	
Category of community benefits	Measures for multifunctional use
In-kind benefits	✓ Recreational park: walking
Local services	✓ Food production: production of crops and meat ✓ Social employment
Environmental mitigation/enhancement	✓ Nature development
Financial benefits	✓ Financial participation through obligations

Solar farm Noordbroek

Solar farm Noordbroek will be developed in the municipality Midden-Groningen on a parcel of 38 hectares. This solar farm will be developed according to the 'Gedragscode Zon op Land', which means that 75% of the parcel will consists of solar panels and 25% will be used for other functions such as nature and landscape development[38]. An important aspect of this solar farm is that it should not only have the function of energy production, but also provide added value for the surrounding citizens. In addition, natural values are enhanced through the solar farm. The spatial lay-out takes into account nature development, because two meters of space is left available between the rows of solar panels and additional elements, such as insect hotels and nest opportunities for birds and will be added. The lay-out and design of the solar farm is determined in consultation with local environmental organisations and surrounding citizens. A workgroup is set up to discuss plans, the spatial layout of the solar farm and to gain information about ideas and wishes for the solar farm. Financial participation is possible through obligations, but also a community fund is set up. The workgroup can determine what will be done with the money of the community fund, for example building a community centre,

[37] Retrieved April 7, 2020 from http://duurzaamharen.nl/projecten/polycultuur-zonnepark-de-mikkelhorst/
[38] Retrieved April 10, 2020 https://www.zonneparknoordbroek.nl/hetidee

developing a fast internet connection or organising social activities. In this way, people can influence the type and amount of community benefits offered by the solar farm.

Provision of community benefits in solar farm Noordbroek	
Category of community benefits	**Measures for multifunctional use**
In-kind benefits	✗
Local services	✗
Environmental mitigation/enhancement	✓ Nature development ✓ Natural elements: insect hotels ✓ Creation of nesting opportunities for birds
Financial benefits	✓ Community fund ✓ Financial participation through obligations

Solar farm 'Abdissenbosch'

Solar farm 'Abdissenbosch' will be developed on a former landfill nearby Landgraaf in 2020. At the moment, the area already has the function of nature and recreation area[39]. The solar farm adds another function, sustainable energy production and contributes to a more multifunctional area. The total surface of the area is 40 hectares and 12,5 hectares will be covered with solar panels[40]. Walking and cycling paths will be developed together with other recreational elements, such as benches including chargers for electrical devices and information boards for education. Moreover, nature will be developed and natural elements, such as insect hotels and pools, will be added to the solar farm. In addition, the initiator of the project will contribute to an overpass for fauna. A think group is set up to gain information about ideas, wishes and opinions of stakeholders and to increase the involvement of different stakeholders[41]. This group has an advisory role to the project developer and had a voice in the design and the spatial layout of the solar farm. As financial compensation measure, a community fund of 125.000 euros is setup [42]. The think group had the opportunity to determine on what this fund should be spend. Instead of financial compensation for each family living nearby, they choose for enhancement of natural values in the area. Therefore, citizens can influence the provision of community benefits in this case.

[39] Retrieved April 7, 2020 from https://www.planviewer.nl/imro/files/NL.IMRO.0882.OVGZONNEPARKABD11-VG01/t_NL.IMRO.0882.OVGZONNEPARKABD11-VG01.pdf
[40] Retrieved April 10, 2020 from https://www.landscape-architects.nl/nl/projects/zonnepark-landgraaf
[41] Retrieved April 10, 2020 from https://www.landgraaf.nl/dienstverlening/veelgestelde-vragen_42201/item/hoe-werkt-de-meedenkgroep_15508.html
[42] Retrieved April 8, 2020 from https://www.landgraaf.nl/document.php?m=29&fileid=137749&f=e2df7417572d6f576c32f836d4d27f28&attachment=0&c=37141

Provision of community benefits in solar farm 'Abdissenbosch'	
Category of community benefits	**Measures for multifunctional use**
In-kind benefits	✓ Recreation: walking and bike paths ✓ Charging station for electric devices
Local services	✓ Education
Environmental mitigation/enhancement	✓ Nature development ✓ Addition of pools and insect hotels ✓ Contribution to an overpass for fauna
Financial benefits	✓ Community fund for compensation

Solar farm 'Zonnewoud'

In Zeewolde, a solar farm of 7 hectares will be developed on a parcel belonging to Staatsbosbeheer. The developer Sunvest won the tender for the development of this solar farm, because their plan had significant added value for the landscape[43]. Experience of the park is an important aspect and therefore, the solar farm is accessible to people. An important criterion for the development of the solar farm, stated by Staatsbosbeheer, was that the solar farm should be multifunctional. Therefore, two-thirds of the solar farm will be covered by solar panels and the other space will be uncovered and used as recreational area. Additional elements, such as watch towers, walking paths and a playground for children will be developed. In addition, a food forest will be developed, insect hotels will be placed and education about the solar farm is offered. The financial benefit of this solar farm is that surrounding citizens can buy cheaper energy generated by this solar farm. The design and spatial layout of the solar farm is made by the developer Sunvest. During the process, Sunvest has involved several local and regional organisations to create a design with added value for the surrounding citizens[44]. A participation evening was organised for citizens. However, this was done after the design was made. Therefore, citizens have had less influence on the community benefits.

Provision of community benefits in solar farm 'Zonnewoud'	
Category of community benefits	**Measures for multifunctional use**
In-kind benefits	✓ Recreation: walking paths, watch towers, playground for children, food forest, funicular ✓ Charging station for electric devices
Local services	✓ Education ✓ Food production
Environmental mitigation/enhancement	✓ Nature development ✓ Natural elements: insect hotel

[43] Retrieved April 11, 2020 from https://pretwerk.nl/actueel/groene-ruimte/zonnepark-Zonnewoud-heeft-de-instemming-van-staatsbosbeheer/62936

[44] Retrieved April 14, 2020 from https://zeewolde-actueel.nl/algemeen/inloopavond-over-nieuw-te-bouwen-zonnepark-het-Zonnewoud

13 Appendix 5: Interviews (external)

In this appendix, the transcripts of the interviews conducted with different stakeholders the three solar farm development cases can be found. This appendix is attached externally to this thesis, because it contains confidential data. The interview transcripts are in Dutch. The interviewed stakeholders per case are:

'De Kwekerij':

- Community representative
- Citizen
- Investor
- Civil servant

'Zonnewoud':

- Initiator of a petition
- Citizen
- Developer of the solar farm
- Initiator of the solar farm

'Abdissenbosch':

- Chairman of the workgroup 'Abdissenbosch'
- Designer of the solar farm
- Initiator of the solar farm
- Civil servant

5.1 'De Kwekerij': community representative

5.2 'De Kwekerij': citizen

5.3 'De Kwekerij': investor

5.4 'De Kwekerij': civil servant

5.5 'Zonnewoud': initiator of petition

14 Appendix 6: Translation of quotes

[i] "Voor veel collega's was het idee van een zonnepark op die locatie nog een beetje wennen. Het was vrij onbekend. Ik had wel het idee, het zou mooi zijn als er een zonnepark komt met meerdere functies. Want ik was bang dat zonneparken in die jaren dezelfde kant op zouden gaan als windparken die ook heel veel weerstand op roepen. Dus zo kun je voor elkaar krijgen dat een zonnepark meer draagvlak krijgt en meerdere doelstellingen kan nastreven."

[ii] "Wij zijn meer faciliterend hierin geweest. We hebben aangegeven dit zijn onze wensen, omdat wij grondeigenaar zijn. De ontwikkelaar heeft dat verder uitgewerkt met het bedrijf dat het groengedeelte op zich heeft genomen. Er is een balans geweest tussen productie, maar het had ook te maken met de aansluitmogelijkheden op het elektriciteitsnet."

[iii] "De ontwikkelaar kwam met een schets en het was precies wat ik zocht. Dat had te maken dat NL Green Label de ambitie had om dit soort gebieden op deze manier in te richten."

[iv] "Ja, ik zie eigenlijk geen negatieve effecten. Behalve over hoe het over vijfentwintig jaar gaat, dan is het afgelopen, maar ja, dat is nog zo ver, want dat is al vastgelegd dat dan de gemeente kan zeggen we nemen die grond daarover, we willen, nou ja stel je voor, de woningbouw moet toenemen, dan kunnen ze daar nog bouwen. Maar de eerste vijfentwintig jaar kan dat in ieder geval niet."

[v] "Juist omdat je elke dag tussen die panelen loopt, maar ook tussen de transformator doorloopt, dan geeft dat ook wel een gevoel van bekendheid. Voor mij is dat niet een onveilig gevoel, terwijl als daar een groot hek van twee meter omheen zou staan, dan zou ik dat veel eerder hebben."

[vi] "Ja, want doordat dat zonnepark er is, is er dus niet wat anders, wat ik al zei huizenbouw, industrie of een bos, wat misschien je zicht weg zou nemen. En de mogelijkheid tot recreatie vlak voor je deur is wel heel prettig."

[vii] "Nou, ik kijk ook letterlijk uit over het park. Ik ben blij dat daar een park is en dat daar geen woningen staan. Het park verstrekt mij ook een vrij uitzicht. Begrijp je hè? Het park is er, maar daardoor kijken we over het park heen en hebben we dus een vrij uitzicht."

[viii] "Het ligt eraan hoe je het communiceert als initiatiefnemer. Ik merk dat niet iedere ontwikkelaar openstaat voor dat er wordt gekeken naar wat de buurt wilt. Dat de buurt erbij betrokken wordt en mee kan ontwerpen. Hierin moet wel extra worden geïnvesteerd door de ontwikkelaars en meer worden aangestuurd door de gemeente."

[ix] "Een multifunctioneel zonnepark kost wel extra. Je krijgt het niet alleen gefinancierd met de opbrengst van het zonnepark. Daartegenover staan minder kosten aan de zijkant, zoals beroepsprocedure bij de Raad van State."

[x] "Maar ja, je ziet hoe blij iedereen nu is en zolang er zonne-opbrengsten zijn, wordt het park ook onderhouden, dus heeft de gemeenschap daar geen kosten aan. Dus het verdient zichzelf heel snel terug op heel veel vlakken. Dat moet je goed in een plaatje zien te vatten en mensen duidelijk maken, op de lange termijn komt er heel veel voor terug wat ook financiële harde waarde is. Maar ja, daar moet je een lange adem voor hebben en het zien."

[xi] "Als het alleen maar zonnepanelen waren geweest, dan was het toch wel iets anders geweest op die plek. Het is juist de combinatie geweest dat mensen zeggen dat accepteren we en daar zien we het nut van in. Daarmee is de acceptatiegraad flink verhoogd. Dit was ook de insteek om dat voor elkaar te krijgen."

[xii] "Ik zie wel dat wanneer je meerdere functies in zo'n park kwijt kunt, dat daarmee het draagvlak en de participatiebereidheid groter is. Dat heeft wel z'n voordelen."

[xiii] "Hierdoor creëren ze meerwaarde voor de omgeving en als gemeente kunnen we meerdere doelstellingen daar in kwijt. Niet alleen energietransitie, maar ook verhoging van biodiversiteit en een stukje recreatie. Mensen kunnen er doorheen lopen, ze kunnen wandelen en de hond uitlaten en de kinderen kunnen er spelen. Het park is daarmee een mooi visitekaartje voor de gemeente."

[xiv] "…, een goed integraal ontwerp, dat heeft echt meerwaarde waar we met z'n allen op de lange termijn de vruchten van plukken."

[xv] "Je had het natuurlijk ook veel soberder kunnen doen, dan kan je enorm veel investeringskosten besparen."

[xvi] "… ze hebben gewoon een prachtig park waar ze heel blij mee zijn teruggekregen, wat beheerd wordt en wat ze ook niks kost. Dat is zeg maar het grote voordeel voor de buurt."

[xvii] "Dus het is gewoon hartstikke mooi ingericht en er zit veel wild en er is veel groen, ja, wat wil je dan nog meer eigenlijk?"

[xviii] "… ze hebben dus wel mooie routes aangelegd en wat ons allemaal wel deugd doet is dat heel veel mensen gebruik maken van het park. Nou, dan gaan ze 's avonds even een rondje hardlopen of ze gaan met hun hond uit, en dat gaat allemaal prima."

[xix] "… het is ook functioneel natuurlijk, maar, nee, op zich een zonnepark zonder die entourage dat zou ik niet zo mooi vinden. En dan had ik misschien wel tegen gestemd of gezegd zorg maar dat er een boswal omheen komt in ieder geval, dan hoeft het nog niet eens ingericht te worden met allerlei toestanden. Maar ja, dit is een verrijking, want je moet het zo zien, aan deze kant ligt een park met zonnepanelen, aan de andere kant van het dorp ligt het dorpsbos. De mensen van hier die gaan soms wandelen in het dorpsbos en die van die kant die komen hier wandelen …"

[xx] "Ja, dat vind ik super. Dat vind ik heel positief. Het is ook heel mooi aangelegd. Het is heel natuurlijk aangelegd, met mooie waterpartijen, met speelgelegenheid voor kinderen, met een bosje nog. Ja, ik maak er dagelijks gebruik van, ik loop er dagelijks doorheen met mijn hond. … . Ja, wij genieten er gewoon heel erg van, ook omdat de natuur in het park heel erg mooi is. En het gekke is wel dat je, als je dagelijks door het park loopt of wekelijks, dat je de natuur ziet ontwikkelen en dat je eigenlijk die hele zonnepanelen nauwelijks meer ziet."

[xxi] "Dus dat recreatieve is zeker wel een meerwaarde denk ik voor heel veel mensen."

[xxii] "Ik vind het feit dat ik daar kan recreëren en dat daar op een mooie manier, dat het zonnepark is weggezet en dat er mooie natuur omheen gemaakt is of eigenlijk in het park dan, dat het mooi is aangelegd, waar ik van kan genieten. Ik denk dat ik daardoor meer acceptatie heb als wanneer het een park was met een hek eromheen, waar ik omheen moest."

[xxiii] "…, het toenmalige provinciehoofd die zei, ik wil dat dit een zonnepark met een recreatieve functie wordt. Het kan mij niets schelen dat het dan wat minder oplevert, maar het moet een recreatief park worden. Nou, dat hebben we ook bereikt door te zeggen, we gaan het gunnen aan een partij die een recreatief goed ontwerp maakt, dus daar werden heel veel punten aan toegekend."

[xxiv] "Er werd een tender uitgezet met de vraag om een zonnepark neer te leggen met meerwaarde voor de buurt en meerwaarde voor de bezoekers van het bos."

[xxv] "We hadden nooit gewonnen als we het zonnepark helemaal hadden vol gelegd met zonnepanelen. Dus wat mij betreft is het niet zo zeer hoe ga je er mee om, het is meer een gegeven."

[xxvi] "… een locatie in of bij het bos waarbij er op een andere manier bezoekers worden getrokken waardoor er in z'n geheel mensen vaker naar het bos komen."

[xxvii] "De door de ontwikkelaar bedachte functionaliteit/meerwaarde is naar mijn mening uitsluitend bedoeld om het plan verkoopbaar te doen zijn. In dit soort gevallen hoef je maar een adviesbureau in te schakelen die iets bedenkt in de door jou gewenste richting. Zo werkt dat jammer genoeg."

[xxviii] "… nou ik ben wel bezorgd over de valkuil van dit soort concepten dat door … zonneparken met 'meerwaarde' te gaan ontwikkelen, wordt er een soort omgeving gecreëerd waarin wij dat ineens leuk gaan moeten vinden. Want ook deze wordt gepresenteerd als een halve speeltuin."

[xxix] "De ligging van het zonnepark bij de entrée van het bosgebied zal een ernstige verstoring van het beeld veroorzaken en daarmee de natuurbeleving ernstig aantasten."

[xxx] "Alleen hierdoor is het niet aan te bevelen om dit gebied op te offeren aan het 'Zonnewoud', maar het te laten functioneren binnen het kader van bos en natuur. Men moet derhalve 25 jaar bos en natuur missen."

[xxxi] "Het argument van de Gemeente dat men een doelstelling heeft met betrekking tot de opwekking van schone energie mag er niet toe leiden dat er tegelijkertijd een ernstige aanslag op de natuur wordt gepleegd."

[xxxii] "…, ja, ik vind het onnodig zoeken van gevaar daar waar we het veel veiliger op daken kunnen installeren."

[xxxiii] "Maar ik ben veel bezorgder, mijn bezorgdheid gaat veel meer over het gemak waarmee wij grond en natuur opofferen voor deze toenemende energiekwestie die ook niet eens gedragen kan worden door het elektriciteitsnet."

[xxxiv] "Nee, waarschijnlijk werkt het een kant op goed, namelijk dat, ik vermoed dat het voor de zonnepanelen goed is om op een of andere manier gekoeld te worden, …, dus ik denk dat het voor de zonnepanelen heel goed is om gemengd te worden met natuur. Ik denk dat de natuur er helemaal niets aan heeft."

[xxxv] "Ik snap dat er wat bezwaar is gekomen vanuit die ene persoon omdat die het hier gewoon principieel niet mee eens is. Maar ik denk dat er weinig negatieve gevolgen zijn voor de mensen. Dit is grond wat behoorlijk braak ligt. Er heeft niemand zicht op. We maken een park dat voor mensen bezocht kan worden, ik snap best dat mensen er ook geen interesse in hebben, maar je hoeft er ook niet naar toe. Dus ik denk dat die negatieve gevolgen heel minimaal zijn."

[xxxvi] "Het is niet zo dat iemand last kan hebben van reflectie of van straling."

[xxxvii] "Ik denk dat je met die opzet probeer je de negatieve gevolgen te minimaliseren. Je probeert er eigenlijk een leuk park van te maken voor bezoekers. Dat is eigenlijk ons uitgangspunt geweest, om hier een meerwaarde van te maken voor de buurt, in plaats van een park waarbij je de negatieve effecten moet compenseren. Wij denken niet dat we hier iets moeten compenseren, want het is een park wat eigenlijk veel zou kunnen bijdragen aan de buurt."

[xxxviii] "Met de opbrengsten uit dit park kan SBB op andere plaatsen veel goeds doen voor de natuur, waar we anders de middelen niet voor zouden hebben."

[xxxix] "Ik noem zonneparken 'natuurverdubbelaars': met de opbrengsten uit 20 jaar zonnepark kun je een gelijk oppervlak agrarische grond kopen en inrichten als natuur, terwijl de grond onder het zonnepark na 20 jaar weer beschikbaar komt als natuur. Dan heb je dus na 20 jaar de hoeveelheid natuur verdubbeld. Hoewel de opbrengst ook kan worden besteed aan andere zaken dan uitbreiding van het oppervlak natuur, geeft het wel aan wat het potentieel is van een zonnepark."

[xl] "Eventuele negatieve effecten worden met name lokaal gevoeld, terwijl de reden om te verduurzamen op wereldschaal ligt. Dat is potentieel bedreigend voor het draagvlak voor de energietransitie. Het is daarom van belang om nadrukkelijk aandacht te besteden aan het creëren van positieve co-benefits voor de directe omgeving. De energietransitie, het project en de betrokken organisaties winnen daarbij aan draagvlak. Het vermindert de weerstand en leidt tot minder bezwaren."

[xli] "Ik denk wel dat als je op deze locatie een hek zet en het vol gooit met zonnepanelen, dan denk ik dat dat niet zou worden geaccepteerd. Dat kan gewoon niet, dat gaan gewoon nooit door."

[xlii] "In onze woonwijk zijn heel veel voorzieningen waar onze kinderen kunnen spelen. De groene zone van onze [woonwijk] is zelfs groter dan het geplande zonnepark en er zijn in deze zone heel veel speelvoorzieningen, waaronder een kabelbaan. Een extra voorziening is niet nodig en bovendien zou er dan een drukke weg moeten worden overgestoken."

[xliii] "…, hoe meer multifunctionele taken of dingen we hieraan plakken, hoe erger ik het eigenlijk vind. En zeker op de manier hoe het bij dit zonnepark is georganiseerd, namelijk dat het zonnepark van de zeven hectare geloof ik vijf hectare bestrijkt en dat die twee hectare die dan multifunctioneel is, die bestaat al uit een hele brede rand om de zon op het zonnepark zeker te stellen en die rand wordt gewoon gemaaid en die wordt wel meegenomen als multifunctioneel …"

[xliv] "…, ik denk dat we die meerwaarde al heel goed zonder de panelen, al hebben eigenlijk, want we hebben verschrikkelijk mooie bossen rondom Zeewolde en we hebben ook dito speelgebieden aan het strand."

[xlv] "Het gebied heeft een goudgroene natuurbestemming, waardoor er op verzoek van provincie en gemeente veel compenserende natuurmaatregelen moeten worden getroffen."

[xlvi] "De initiatiefnemer heeft moeten aantonen, richting provincie en gemeente, hoe de natuur gecompenseerd wordt …"

[xlvii] "Als het gaat om educatie of over wandelstructuren, dat zijn allemaal extraatjes. Die eisen stelde de Provincie niet. De Provincie stelde gewoon dat bepaalde gebieden en bepaalde planten en diersoorten de ruimte moeten krijgen en de initiatiefnemer moet dan aantonen hoe hij dat gaat doen en ook hoe hij dat de komende jaren natuurlijk gaat handhaven."

[xlviii] "…, van de gemeente was gewoon de eis dat de meedenkgroep samen met de initiatiefnemer op zoek ging naar van, oké, wat kan de initiatiefnemer terugdoen voor de omgeving."

[xlix] "Wij hopen gewoon door dit, als we alles hebben uitgewerkt, dat mensen de weg weer vinden naar het natuurgebied, want eigenlijk wordt het maar heel weinig gebruikt, wat een prachtig natuurgebied is."

[l] "Dus in de huidige situatie is het al openbaar toegankelijk en kan je daar al lopen en we hebben eigenlijk gezegd van goh hoe kunnen we nou dat gebied nog, hè, een plus geven. Nou ja, enerzijds dus door die natuurontwikkeling, maar anderzijds door zo'n informatiepunt, dat soort dingen toe te voegen."

[li] "Dus zowel de locatie, hè, vanwege de aansluitingscapaciteit, maar anderzijds ook vanwege die natuurfunctie en dat heeft er eigenlijk voor gezorgd dat er ook ruimte ontstond om die inpassing te doen en eigenlijk ook wel moeten doen, want anders kwamen we er waarschijnlijk niet uit met de provincie."

[lii] "…, we moesten kunnen laten zien aan de provincie dat die functie natuur op die locatie kon blijven. En dat kan je dus eigenlijk alleen doen om te zorgen dat die kwaliteit zeker niet achteruit gaat en het liefst ook nog eigenlijk beter wordt."

[liii] "…, we snappen dat de gemeente het wil, maar we willen er wel wat voor terug. En eigenlijk dat terug willen, dat had iets te maken met inbreng kunnen hebben in het inrichten van het terrein. Dat is een. En aan de andere kant had het iets te maken met, ja, ook een soort compensatie willen hebben voor het verloren gaan van dat wandelgebied."

[liv] "Maar die weerstand richtte zich eigenlijk voor 98% op de windmolens en de zonnepanelen, daar werd nauwelijks over gesproken."

[lv] "Ja, ik denk dat dat echt heel duidelijk is en als je het op een weegschaal legt dat het heel positief uitvalt. Dat heeft er ook veel mee te maken, dat het een gebied is wat op dit moment heel weinig gebruikt. …, en het is niet zo, het is niet iets wat in het oog ligt, het is niet iets waar je uitzicht mee verliest, het is niet iets waar iemand grond door kwijt raakt, dus ja, dat soort bezwaren waren er ook niet, dus dat maakt het wel een stuk eenvoudiger."

[lvi] "Ja, ik denk het wel. Kijk, het is zonnepark, het is het zicht hè. Als je ergens een zonnepark aanlegt van 100 hectare, dat is een grote plaat, dan kan ik me voorstellen dat het zicht, dat dat vervelend is. Maar wij kleden het zodanig aan dat je, het is ook een gebied met veel groen, van buiten het gebied zie je het niet eens liggen, je moet erin wandelen. En er staat uiteraard een hek om heen, deze zullen we met groen beplanten, dus ik denk dat we dat heel mooi in de natuur weten in te passen."

[lvii] "Op dit moment zien we geen mogelijke negatieve effecten. Alle partijen die betrokken zijn en waren bij de ontwikkeling van dit zonnepark zijn tevreden met het ontwikkelde plan."

[lviii] "Nou, ik denk het wel, want zeker vanuit het verhaal van die natuurfunctie, kijk, er komen wel zonnepanelen maar de ruimte tussen die panelen wordt zo groot dat het ook voordelen biedt voor de natuur en zeker als we kunnen zorgen dat, hè, de ondergrond was nu gewoon grotendeels een beetje een droge grasvlakte, als we daar een plus kunnen bieden, dan denk ik dat dat zeker opweegt."

[lix] "Zonder de meerwaarde die ontwikkeld wordt door de aanleg van het zonnepark zou het project door provincie en gemeente niet geaccepteerd worden."

[lx] "Het wordt toegankelijker en wij investeren extra in natuur."

[lxi] "Dus ja, opgeteld denk ik dat we, de natuurwaarde er veel beter op wordt en dat omwonenden daar blij mee zijn."

[lxii] "Dus over onze locatie, ja wordt, laat maar zeggen, een stuk natuurontwikkeling gedaan en dat opgeteld bij elkaar leidde ertoe dat bewoners akkoord waren."

[lxiii] "… het uiteindelijke plan wat er dadelijk komt te liggen inclusief de route, een veel beter plan is, dan dat het ooit eigenlijk was. En dus de natuur wordt er eigenlijk alleen maar beter op. De kwaliteit wordt alleen maar beter dan wat er nu ligt."

[lxiv] "En de grootste zorg was van ja, beschadigt het hele verhaal niet de huidige natuur niet die daar ligt? En dat is absoluut niet het geval, want het hele plan wordt er alleen maar beter van. Dus dat is ook eigenlijk dan waarom iedereen akkoord is gegaan met het plan zowel de Provincie als de meedenkgroep …"

[lxv] "Maar ik denk wel, als je kan laten zien, hè, dat erop zo een plek dus meer dan alleen een zonnepark wordt gerealiseerd... Ik denk dat dat zeker voordelen heeft. … we hebben hier een locatie, dat is al een vuilstort geweest, heeft een natuurbestemming en we proberen er nu gewoon een functie aan toe te voegen, waardoor je toch eigenlijk die combinatie maakt tussen verschillende functies. Dus ik denk dat het wel een plus oplevert, …"

[lxvi] "…, maar los van die multifunctionaliteit speelt ook die locatie gewoon een hele belangrijke rol. Ik denk dat je dit had geprojecteerd op een andere plek, dan was het weer een ander verhaal geweest. Maar omdat we hier op een vuilstort zitten die niet vanuit de omgeving niet heel zichtbaar is, die wel openbaar toegankelijk is, waar een natuurfunctie op zit, waar we proberen die extra natuurkwaliteiten toe te voegen, nou dat heeft er eigenlijk voor gezorgd dat er weinig weerstand was vanuit de omgeving en dat mensen wel bereid waren ook om mee te denken en met name dus op het gebied van de natuur."

[lxvii] "Ja, ik denk dat het meerwaarde biedt. En als je nu ziet, hè, het gebied is in het verleden ook een keer ingericht als wandelgebied en wordt maar heel weinig gebruikt. En ik denk op het moment dat je het wat meer toegankelijk maakt, en zeker ook de jeugd er meer bij betrekt, dan zal dat zeker helpen denk ik. Het neemt niet alleen de weerstand weg, maar ik denk ook inderdaad dat het meer gebruikt gaat worden."

[lxviii] "Het zijn met name de actieve natuurmensen geweest die wat bezwaren hadden …, die zijn echt omgegaan, die zijn echt ook doordat ze de herinrichting van het gebied hebben gezien, die zijn toen echt omgegaan en doordat ze hier ook nog invloed op hadden helemaal."

[lxix] "Ja, dan denk ik dat men eigenlijk blij zal zijn dat die verandering plaats heeft gevonden."