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Mitigating opposition against solar parks

A Q methodological view into perceptions of involved stakeholders

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Colophon

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Preface

This thesis has focused to expose perceptions of people involved in a solar park project in Wanneperveen, Overijssel concerning the methods applicable to mitigate opposition. I have written this thesis with the intention to fulfil to the graduation requirements of the Environmental and Infrastructure Planning master, provided by the Rijksuniversiteit Groningen. I have been the sole writer and researcher in this thesis, which I conducted between November 2020 and July 2021.

During my time in academics, I have had the pleasure come in contact with many sides of the planning discipline. With a background in Civil Engineering as my bachelor, I have conducted a different study on the topic of the realization of a water retention basin near Groningen. It was already in this research that I experienced that the perceptions of people who are affected by the realisation of such a facility can play a big influence on these processes when they oppose the project. With this previous knowledge, I saw opportunities to study this influence on projects which are vital in the goal towards a more renewable society. Reading news reports showed me that this opposition is a significant problem in those projects and it seemed that dealing with this opposition is complex and not straightforward. With this thesis, I have shown the perceptions of involved people in such a renewable energy project, which could help policymakers and project initiators in understanding this process of opposition. This dissertation has therefore been written for those groups, as well as for the academic field of planning where this study adds knowledge about these processes related to theories as well.

I would like to take the opportunity to thank especially dr. Ethemcan Turhan for his guidance and supervision in this study. I also like to thank dr. Ferry van Kann for his guidance in the design of the research topic. I finally would like to thank my friends family who helped me in discussing issues and keeping me motivated.

I hope you enjoy reading this dissertation.

Ewout van der Schee

Abstract

Community resistance to renewable energy projects is a much-encountered problem in planning practice. With the effects of climate change underlining the importance of a fast transition from fossil to renewable resources as a means to generate electricity, opposition against those projects can cause this transition to move too slowly. Cost overruns, project cancellations and time delays are not uncommon effects of resistance against renewable energy projects. Mitigating opposition during the realisation of such a project itself has been found to be an aspect that is difficult to manage. Community Energy and Energy Justice are two well-known concepts utilised to prevent occurrences of opposition against these types of projects altogether. To understand the effects of Community Energy and Energy Justice on the mitigation of opposition, perceptions of people involved in a solar park project in Wanneperveen, the Netherlands, are analysed. Through the application of Q methodological research, viewpoints of people involved in this project with regard to opposition mitigation are exposed. These perceptions show that there exists a hiatus between common knowledge in literature concerning the mitigation of opposition: where academics and policymakers are generally convinced that shared ownership and financial benefits create higher levels of acceptance, this belief is not shared by all people involved in the solar park project. This means that new methods must be explored regarding the way opposition against solar parks, and renewable energy projects in general, is managed.

Keywords – *Solar park, opposition, acceptance, resistance, shared ownership, renewable energy, financial benefits, governmental influence, Q methodology*

Table of content

List of figures and tables

Abbreviations

Abbreviation	Description
CO_2	Carbon Dioxide
EV	Eigenvalue
IPCC	Intergovernmental Panel on Climate Change
KADE-Q	KenQ Analysis Desktop Edition
NIMBY	Not In My Back Yard
Q-SV	Q sort value
RES	Regional Energy Strategy

1. Introduction

"Residents voice opposition to proposed solar farm site" (The Recorder, 2020). This news headline is one of the most common notions heard in contemporary news regarding the realization of renewable energy projects. Not only does this opposition occur in relation to solar parks (or solar farms, PV power stations, solar energy generation facilities, etc.), there is also a wide range of opposition voiced against, for example, wind parks, biomass facilities, etc. Within the larger picture of today's society, this opposition is problematic: not only makes it the process of realizing renewable energy projects, in general, more time-consuming and complicated, but also high levels of opposition are also associated with cost overruns, time delays and project cancellations altogether (Clary, 1997).

To understand these problems within the wider context of our society, we need to take a step back and look at the bigger picture. For centuries, humans have grown used to the usage of fossil fuels as a means to generate electricity. Beginning in the industrial revolution in western society halfway through the 18th century, coal is regarded to be the first fossil fuel resource utilised by humans with the goal to convert this coal to power and electricity (Pirani, 2018). Wood was the main used energy resource used before coal was found to be applicable, however, due to the renewable nature of wood, this is not regarded as a fossil resource. A century after the rise of coal use, especially in the industrial sector, demand grew for different energy sources due to the invention of the internal combustion engine. Oil and gas were found to be suitable for the usage in those engines, and halfway through the 20th century, those resources had taken over coal in demand numbers (Zou et al., 2016). Today, 70% of all energy generated through fossil fuel is coming from oil and gas, with the other 30% being occupied by coal (Smil, 2017). This long period of using fossil resources has led to multiple negative effects. Firstly, the fossil fuel reservoirs are depleting, leading to possible shortages of mainly oil and gas. Since modern society is dependent on the use of these resources, it is likely that this will be rather problematic in the future. Secondly, the use of fossil fuels to generate power or electricity is often accompanied by the burning of those fuels. This exerts various toxic gasses into the atmosphere, such as CO_2, resulting in climate change and global warming. Mitigating the effects of this fossil fuel induced climate change means that alternatives must be found for the generation of energy.

Renewable energy sources are found to provide a (partial) solution for this issue. Modern society is currently undergoing a transition period, where fossil fuel is gradually being replaced by renewable alternatives. The applied renewable energy types differ per country and depend on the geographical characteristics of that country. The Netherlands, for example, uses mainly biomass, solar and wind energy as renewable alternatives to fossil fuel (CBS, 2020). The pace at which the Netherlands is transitioning from fossil to renewable resources is relatively low: less than 9 per cent of all electricity was generated through renewable energy in 2019. This puts the Netherlands at the bottom of the list of European countries with regard to the share of used renewable energy. Despite this, there are strict goals set on both multi-national and national levels in various climate agreements which indicate various targets which in this case the Netherlands must reach (e.g. being climate neutral by the year 2050). With multiple additional intermediate goals set between now and 2050, it is clear that the transition towards renewable energy must be accelerated.

The Netherlands is mostly focused on solar and wind energy to fulfil these goals. The realisation process of both these types of energy generation is complicated: not only are there many rules and regulations in place, but also dealing with people living close to the project site poses multiple challenges. For multiple reasons, these types of projects tend to lie sensitive among surrounding residents, which can result in those residents voicing concerns, disagreement, and opposition against the realization of those projects. Large scale solar park projects are no exception to this occurrence. Dutch national and regional news stations report on a regular basis that issues have been encountered in those projects related to low levels of acceptance (e.g. Dagblad van het Noorden, 2021; Hansen, 2021).

Opposition of citizens is problematic and difficult to manage. This opposition can cause problems with regard to the project process and progress: cost-overruns, time delays and cancellations altogether are not uncommon occurrences (Clary, 1997; Groothuis & Miller, 1994; Zhu, 2018). This opposition is also often stemming from opinions and general perceptions of those residents. It is therefore a significant challenge for policymakers, project initiators and other involved parties to approach these people and attempt to convince them of the necessity of the realization of the solar park.

Opposition against solar parks, and renewable energy projects in general, has been a widely studied topic in contemporary research (Hoppe et al., 2015; Musall & Kuik, 2011; Rasch & Köhne, 2017; Späth, 2018). Especially from 2010 onwards, significant increases are seen with regard to the number of publications on the topic of opposition against renewable energy projects (Scopus, 2021). The vast majority of these publications focuses on approaches that help to prevent or avoid opposition altogether. One prime example of such an approach is the highly influential and highly cited article by Walker & Devine-Wright (2008) on Community Renewable Energy. This framework has been designed to create a bottom-up planning approach for renewable energy projects in which shared ownership has a significant role in the success rate of those projects. These and other concepts are solely focused on preventing opposition. But, what needs to be done in situations where opposition has already occurred, and the application of for example Community Renewable Energy is too late? Herein lies the research gap which I aim to fill in this thesis. Therefore, I answer the following primary research question in this thesis:

"*What do people involved in Dutch solar park projects perceive to be the most beneficial methods to reduce community resistance*?"

By looking at perceptions of people involved in a solar park project in Wanneperveen, The Netherlands, an empirically grounded view is created which explains how concepts designed in the academic field of planning and by policymakers are perceived by the people who are affected by those policies and frameworks. Within the context of this research question, two sub-questions are designed which help to answer the main question: (1) *"Can the concept of Community Energy, with its focus on shared ownership, have any influence on the process of mitigating opposition?"* and (2): *"How does people's perception of equal divisions of costs and benefits affect the process of mitigating opposition?"*. Including the concepts of Community Renewable Energy (sub-question 1) and Energy Justice (sub-question 2), assist me in creating discourses of the current perceptions among residents.

My goal with this thesis is to approach the topic of opposition against renewable energy projects, and specifically solar parks, from a different direction, and by looking at real perceptions of people who are involved in those projects, create a wider understanding of the influence of, for example, shared ownership on involved citizens. By having a wider understanding of these processes, better decisions can be made regarding the mitigation of opposition, which would hopefully lead to faster, better and cheaper implementations of solar parks.

1.1.1. Reading guide

This thesis is built up in the following order: firstly, as an addition to this introduction, I provide background information based on literature, followed by an in-depth description of the various concepts included in this thesis, also based on literature. **Section 3** explains the case on which I based this study, and provides an explanation of the applied method 'Q methodology' and how this method has been shaped to fit the case. In **Section 4** I indicate the results which followed from the application of this method, and **s 5 and 6** include the discussion, conclusion and recommendations for future research. I end this thesis with a reflection on the research process in **Section 7**, followed by the reference list in **Section 8** and the appendices in **Section 9**.

2. Literature review and theoretical framework

Opposition against solar parks, and renewable energy project in general, have many underlying aspects. In this section, I present two distinct parts. Firstly, a literature review is given regarding the research problem and the underlying background explaining why renewable energy is necessary, what the Dutch renewable energy planning policy entails, and what knowledge already exists in academic literature with regard to this opposition (**Sections 2.1 until 2.5.1**). Secondly, the theories that I applied in this research are explained in a theoretical framework in which I indicate in more detail why opposition occurs, and which approaches have been designed in academic planning literature and practice with regard to the prevention of opposition (**Sections 2.6 until 2.6.2**).

2.1 A changing climate

The rapid change of the earth's climate is the main catalyst for a shift towards a renewable energy society. Although multiple definitions exist which explain climate change, a general consensus exists: climate change is regarded as any change in the state of the climate caused by human activity (Pielke, 2005). Contemporary climate change research primarily focuses on the influence of human activity on the changing of the climate rather than on climate change due to natural causes (Ghil, 2002; IPCC, 2018). Research on climate change has grown gradually since the early nineteenth century but really gained attention in the last decade of the twentieth century (Weart, 2008). This is not coincidentally the same moment scientists came to a consensus regarding the human influence on the changing of the climate, which was lacking before (Cook et al., 2016). Lacking availability of resources was the main reason for the stagnant start of this field of research (Le Treut et al., 2007), but increased calls for expansion of the existing base of literature resulted in the foundation of the Intergovernmental Panel on Climate Change (IPCC). This in turn triggered a steep increase in the amount of conducted research towards climate change (Vasileiadou, Heimeriks, & Petersen, 2011). This gave the IPCC the possibility to expand their body of research on climate change drastically, effectuating in increased knowledge about climate change.

2.2 Effects of electricity generation on climate change

One of the primary factors of human action influencing climate change is the consumption and generation of electricity. This also shows from greenhouse gas emission data per sector, where the electricity and heat sector emit almost more than twice as much pollutants as the second biggest polluting sector: agriculture (Our World in Data, 2021a). Electricity is often used interchangeably with energy, but as energy is impossible to generate as it can only be converted from one carrier to another, the generation of electricity, being the carrier, is the correct term in this situation (U.S. Energy Information Administration, 2021). Multiple transitions have transpired with regard to the resources used by humans to generate electricity: (1) the transition from wind to coal and (2) the transition from coal to oil and gas (Zou et al., 2016). The latter occurred around the end of the nineteenth century the invention of the internal combustion engine as one of the roots of this transition. This increased demands for new types of fuel dramatically. Today, almost 70% of the energy generated through fossil fuels is coming from oil and gas, with the remaining 30% being occupied by coal (Smil, 2017). With increased knowledge regarding the effects of the use of these types of resources to generate electricity and the large share these resources take up percentage-wise in the division between energy resources, changes are imminent in order to mitigate the effects of climate change as much as possible. The process of a third transition from oil and gas towards renewable energy is currently at the centre of many debates and researches. I explain this transition in the following section.

2.3 Transitioning from fossil towards renewable resources

The necessity of mitigating the negative effects of climate change through adaptation measures has become increasingly obvious. The IPCC has set a clear goal of maximizing the temperature increase to 1.5 °C. It has been established that limiting the temperature rise to this number, as compared to 2 °C, would have significantly less severe implications for the climate and the liveability of the earth, with higher numbers causing irreversible damage to the climate (IPCC, 2018). To reach this goal, combined with the depletion of fossil fuel reservoirs and with an increased energy demand each year, alternative methods of energy generation are urgent and necessary (IEA, 2019; Solomon & Krishna, 2011). The first initiatives regarding different forms of electricity generation emerged around 1970. These initiatives did however not get much attention, and it took until the early 1990s for the new approach to accelerate (Verbong, Geels, & Raven, 2008). This energy transition, with a transition being a shift from one equilibrium to another (Van Der Brugge, Rotmans, & Loorbach, 2005), moves society from a fossil fuel based society towards a renewable energy based society. In **Figure 2.1**, a visualization of the process of a transition of a system, such as the energy system, is shown.

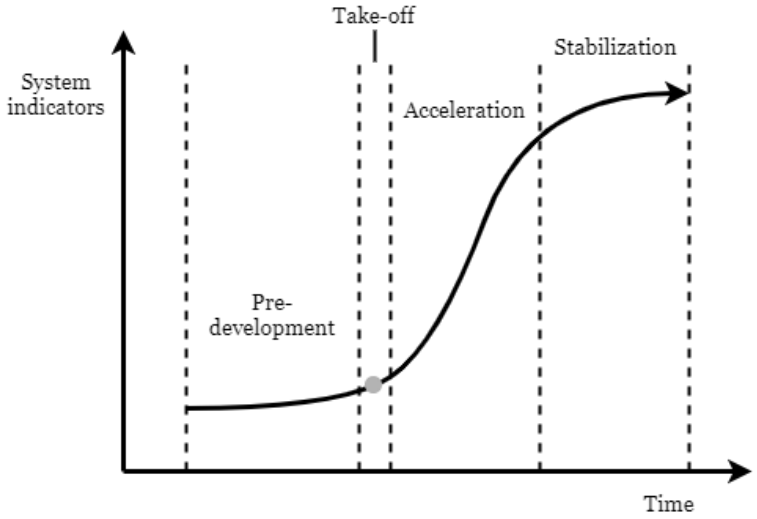

Figure 2.1 – System transition, based on Van der Brugge et al. (2005)

The transition from fossil fuel towards renewable alternatives is observed to be currently in the acceleration phase. Although there is lacking consensus among academics regarding the start of the pre-development phase, this phase included mostly early adopters of renewable energy generating methods. The take-off point lies approximately around the year 2000, some ten years after the foundation of the IPCC. Since 2000, there is a clear stagnation visible in the usage of fossil fuel to generate electricity (Grubler, 2012). Although this take-off moment is already some twenty years ago at the time of this research, the transition is still in the acceleration phase. Solar energy, for example, has seen its main increase in number and percentage of electricity as compared to the total energy used in the Netherlands in only the last four years: wherein 2017 there were less than 50 large-scale solar energy fields, by 2020 there were over 100 facilities operational (Kadaster, 2020). This indicates that not all transitions within the bigger renewable energy transition occur at the same time and experience the same timeline. It does also indicate that realizing solar fields is popular and is done frequently in the past years, and the coming years. The process of realizing those facilities is not without its difficulties and challenges, as I explained in **Section 2.5**.

Solar energy, as I used as an example in the previous section, is not the only renewable energy source. Multiple different types of electricity generation fall under the umbrella of renewable energy sources. Various types of renewable electricity generation (i.e. electricity produced through the use of natural resources that can be naturally restored within a number of years (Lund, 2014)) exist, with solar, wind, biomass and geothermal energy being the most applied types (Alrikabi, 2014).

The advantages of renewable energy over non-renewable energy are numerous (Alrikabi, 2014; Shahzad, 2015). First and foremost: renewable energy damages the climate significantly less than fossil fuels. Secondly, as the name says, renewable energy does not run out as it is renewable, creating a secure energy provision. Thirdly, investment opportunities emerge regarding renewable energy since a new energy business sector has emerged. Fourthly, due to the renewable energy sector being 'young' and novel, possibilities arise for new investments, jobs and an increase in a country's economic strength. Finally, due to its abundance and economies of scale, renewable energy will rapidly have a lower price than fossil fuels.

Although society is currently in the middle of a transition towards the primary use of these renewable resources, it can be stated that society is not transitioning fast enough. By 2018, the share of renewable energy generated in the world was still below 20%, including a significant share of nuclear fuel (Smil, 2017). This means that still more than 80% of all electricity is generated through non-renewable resources (IEA et al., 2019). The fact that the transition does take time is not surprising regarding the speed at which previous transitions happened: the transitions from wood to coal and from coal to oil and gas both took decades to be 'completed'. However, the current state of the climate does not give the freedom for the transition to take equally long: it needs to happen within a much shorter timeframe (Solomon & Krishna, 2011).

Despite the urgency for a fast transition towards a renewable energy society, certain caveats are identified. Emerging opposition against solar and wind parks is, for example, a problem which many such projects experience (Späth, 2018). As the Netherlands continues to proceed towards a society based on renewable energy, the Dutch energy landscape is changing. Comparing the energy landscape from 1990 to the current one, the division between energy sources has changed significantly: where oil and gas accounted for almost 97% of all the electricity generated in the Netherlands in 1990, it dropped to 75% in 2019 (Energie in Nederland, 2019). Renewable energy grew in this same timespan from 1% in 1990 to 19% in 2019 (Energie in Nederland, 2019). Solar-, wind and biomass energy are the primary sources of renewable energy currently utilized in the Netherlands. Of those three sources, solar energy was the last type of energy to be implemented on large scale where the amount of energy generated through solar panels increased by over 13000%, compared to 2010 (CBS, 2021b). Large scale solar parks contribute greatly to this increase, with an accelerated emergence of these parks in the years 2018, 2019 and 2020 (Kadaster, 2020). With the expectation that this amount will grow significantly in the coming years, it is important to realize these facilities in a good and fast manner. Due to the size of these facilities, rural areas often in the north of the Netherlands area chosen as locations for these solar parks (Nieuwsuur, 2019). I explained the spatial impact of these facilities in more detail in **Section 2.6.1**. Because of this, solar parks influence the landscape significantly, which could lead to situations where opposition arises from affected people or organizations. Especially in these remote areas, resistance to those facilities arises. Oft-heard arguments are that people moved to this part of the country for its empty and calm nature and a solar park would disturb this, or that the historic landscape should remain the way it is: high-tech solar energy power stations would not belong there (Nieuwsuur, 2019). The management of the realisation processes for solar parks, and for renewable energy projects in general, is complicated and requires guidance through policies. In the following section, I explain how the Dutch renewable energy policy is shaped by policymakers, and which practised methods exist regarding the realisation process of those projects.

2.4 Renewable energy policy landscape: from international to local scale

Different policy scales have an influence on the way solar- and wind energy projects are realized in the Netherlands. I identified four different levels: (1) international climate policy, (2) national policy, (3) provincial policy and (4) municipal policy. The first level evolves around the climate agreement reached in Paris in 2015. This agreement, signed by close to all countries in the world, is a legally binding contract that includes specific goals, such as the limitation of global warming by a maximum of 2°C, for

the involved countries to mitigate the effects of climate change (United Nations Climate Change, n.d.). Another target from this agreement is the fact that participating countries need to be 'climate neutral' by the year 2050 (United Nations Climate Change, n.d.). In general terms, this agreement lays out the foundation on which countries themselves need to create policies to fulfil these agreements. The Dutch national policy has taken over these internationally agreed-upon goals and created a specified agreement of its own in a national climate agreement (Climate Agreement, 2019). This national climate agreement builds upon multiple pillars regarding governance, monitoring and specific goals, e.g.: 70% of all energy generated in the Netherlands should come from solar- and wind generation. It also states that there is the aim for shared ownership of 50 % local civilian ownership and 50 % ownership by an executive party. The third level is the provincial/regional policy level. These policies indicate on a regional level which locations are suitable to create new solar- and wind generation facilities, and indicate their choices regarding renewable energy in the Regional Energy Strategy (RES) (Nationaal Programma Regionale Energiestrategie, 2019). 30 regions have been created which all need to present their own regional energy strategy program. Finally, there is the municipal level of policy. This is perhaps one of the most interesting policy levels since all the goals set at the higher levels come together on the lowest scale and need to be realized on a local level. The municipalities are asked to actively participate with the regional level in the creation of the regional energy strategy documents in which prerequisites and other guidelines are created which the new to be created solar- and wind parks need to meet (Rijksdienst voor Ondernemend Nederland, 2021a).

2.4.1 Practiced methods for realizing solar energy projects in the Netherlands

The responsibility of reaching the goals set in the national climate agreement lies with the local level governments in the Netherlands. Not only are these local authorities tasked to actively participate in the creation of the RES of the region in which the municipality is located, they also have to create ways in which they will comply with the goals set in that strategy. Possible locations for solar electricity generating projects are, for example, included in these RES agreements. Looking at the realization of solar energy projects, the municipalities need to actively engage stakeholders to create such projects (Rijksdienst voor Ondernemend Nederland, 2021b).

The process of realizing a solar electricity generating facility is dependent on the way local level governments shape the Regional Energy Strategies. Unlike policies for wind energy, no clear guidelines for solar energy have been set by the national government, causing differences in policies between regions. The lack of clear guidelines from the national government can cause unclear processes, which in turn can create opposition against the project from the community.

In the following section, I describe already existing studies on the topic of opposition against renewable energy, followed by an explanation of the conceptual framework in which I explain which research question is central in this study, and how various theories relate to this question.

2.5 Social resistance to renewables

In relation to opposition against renewable energy projects, contemporary research has come up with multiple reasons and underlying factors explaining why opposition emerges. In this section, I aim to give a brief indication of what this current knowledge entails, how this opposition makes practice difficult, after which I provide a theoretical framework in **Section 2.5.1** in which theories and concepts are indicated which could affect the process of opposition mitigation.

First of all, NIMBY-ism is a much-encountered phenomenon in renewable energy projects. As I explain further in **section 2.6.1**, the term NIMBY-ism is used to describe the general attitude of local citizens who express voices of opposition (Cass & Walker, 2009). The underlying layer of expressions of NIMBY-ism are often emotional, related to attached landscape value. People often experience high levels of place attachment: emotional bonds people experience with places, which are exposed in situations

where that place is under 'threat' of change (Devine-Wright, 2009). Positive emotions between people and places have been found to occur when people live in the near vicinity of those places for some time (Hay, 1998). Changes, or attempts to change this landscape can disrupt this bond between person and location, causing those people to express opposition as a result. Devine-Wright (2005) has observed this trend, where he mentions that a change in the landscape can feel for involved people as a threat to their identity, where those people act based on opinions that they are tasked to protect those places from changing (Batel, 2020). These emotions are expressed by citizens in nuanced ways (e.g. through signed petitions and frustration towards government decisions (Jasper, 1998; Lakhanpal, 2019)), but also in more extreme ways (e.g. anger towards renewable energy project initiators, the dumping of waste on the project location (Jasper, 1998)). One extreme example is a situation in the southern UK, where the realization of a wind farm led people to compare the realization of this project to the Nazi invasion in World War II (Cass & Walker, 2009). Albeit that these examples are rather unique, it does show the sensitive nature of the realization of renewable energy projects.

Secondly, people have also been experienced to oppose to renewable energy projects when they perceive the process to be unjust or unfair (Cass & Walker, 2009). This can be both due to the process itself, or to the nature of renewable energy projects in general. The former has relations with the level of participation of local citizens, where feelings or opinions regarding this level may lead to opposing voices. Next to this, benefits may be perceived as being too little, both from a personal view (e.g. financial) and from a general view (e.g. renewable energy is not the solution to solve climate change): the benefits do not way up against the negative effects renewable energy projects have on the community (Cass & Walker, 2009).

In responding to the opposition in practice, considerations must be made regarding the importance of the expressed opposition. It has been an established difficulty to assess the magnitude of that opposition, since the opposition is often expressed by a statistical minority, compared to the group of people who are in favour of renewable energy projects (Walker, 1995). A common response to these notions is the application of community or shared ownership. The Dutch policy landscape regarding renewable energy sees the application of shared ownership as an important tool to increase acceptance for renewable energy projects.

The range of consequences tied to occurrences of opposition and NIMBY-ism is multiple. The management of opposition and NIMBY cost both time and money. This can lead to inefficient allocations of resources since attention, time and money is put into the management of these processes (Groothuis & Miller, 1994). Because of this, more money is required for the entire project, since a significant part of the budget is flowing to managing opposition (Maney & Abraham, 2008). Besides this aspect, managing those voices of opposition costs time. This, in turn, leads to slower processes and thus delays and time overruns (Maney & Abraham, 2008). Due to the importance of a fast transition towards a renewable energy based society, which I explained in **Section 2.3**, any setbacks in these processes can cause this transition to happen too slowly. In the Netherlands, this is also related to bureaucratic decisions regarding permits for renewable energy projects: before municipalities are allowed to allocate those permits to a solar park project, for example, they must be convinced that the acceptance of that project is of a high enough standard. Opposition and NIMBY do not substantiate this requirement. Since the efforts needed to increase acceptance cost time, delays are inevitable (Clary, 1997). In extreme situations, NIMBY and opposition have led to project suspensions and cancellations altogether (Zhu, 2018). Opposition can also lead to problems among local citizens. Disagreement regarding renewable energy projects within communities can cause disruptions in the relation between community members, which could even lead to lower well-being of those members (Schively, 2007).

In this section, I explained a selection of underlying problems related to the realisation of renewable energy projects, based on existing literature on the topic of renewable energy opposition. Next to this,

I gave an indication of the possible effects of opposition regarding the realisation of a renewable energy project. In the next section, I explain which problem is under study in this research, and how concepts related to the aforementioned issues affect the process of mitigating opposition.

2.5.1 Research framework for studying perceptions regarding opposition mitigation

As I mentioned in the previous sections, opposition against renewable energy projects has been a widely studied subject of research in contemporary academical fields, and the Netherlands has multiple policies in place which focus on the management of these processes. However, I have observed that research often focuses primarily on preventing opposition without acknowledging the process needed to mitigate opposition during the process. Additionally, policies that shape the process of this mitigation of opposition also seem to be missing within the whole renewable energy policy landscape. In this study, I focus on the mitigation of opposition, and aim to answer the following research question:

"*What do people involved in Dutch solar park projects perceive to be the most beneficial methods to reduce community resistance*?"

In the academic discipline of planning, multiple concepts have been found to have a significant influence on acceptance of solar parks. The vast majority of those concepts are aimed at preventing opposition from the initial start of the project phase. To analyse whether or not a selection of concepts is applicable in the debate of mitigating opposition, and specifically the way people look at those concepts, I selected two highly influential concepts on the process of opposition against renewable energy: Community Energy and Energy Justice. The choice for these concepts was made due to the established nature of them regarding opposition prevention. Analysing the applicability of them related to mitigating opposition would help increase the understanding of the concepts in the planning discipline. This leads to the following two secondary research questions: (1) *"Can the concept of Community Energy, with its focus on shared ownership, have any influence on the process of mitigating opposition?"* and (2): *"How does people's perception of equal divisions of costs and benefits affect the process of mitigating opposition?"*. **Figure 2.2** shows a conceptual framework in which I presented a visual representation of the connection between the concepts, the main research question and the methods that are applied. I explained these methods in more detail in **Section 3**.

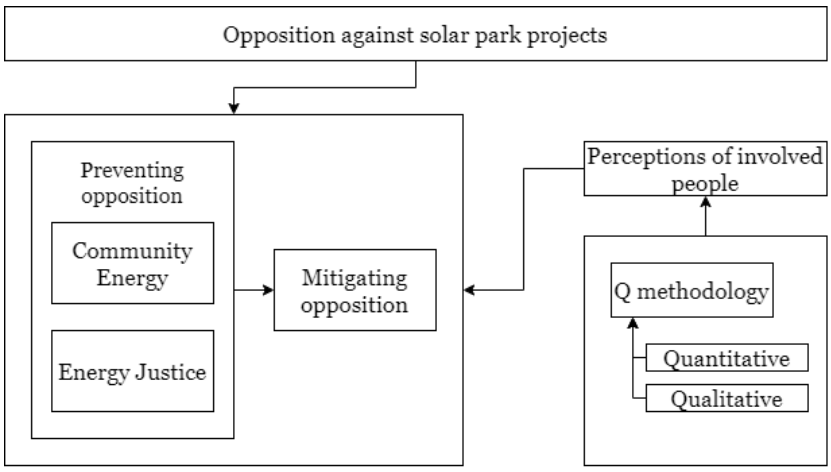

Figure 2.2 – Conceptual framework for analysing perceptions regarding opposition mitigation

In this figure, I show the distinct aspects which play a role in this thesis. Firstly, the overarching topic is indicated, which is opposition against renewable energy projects. Since I selected a project in which the realisation of a solar park is central, this study specifically assesses opposition against solar parks. Secondly, the two concepts related to preventing opposition are indicated, and by the arrow towards

mitigating opposition, I aim to show which relation is under study in this thesis. Thirdly, the methodology is shown on the right side of the figure which shows the perceptions of people involved in the solar park project perceive Community Energy and Energy Justice, and how those people believe those concepts to be influencing processes of mitigating opposition.
In the following section, I provide a theoretical framework in which I explain how opposition emerges, what the effects of opposition are and how theories explains the two concepts as I mentioned above. In **Section 3** I explain both the case study and provide an in-depth explanation of the methodological framework which is characteristic for a Q methodological study.

2.6 Issues faced in implementing solar energy projects

As I showed in **Section 2.5**, multiple problems emerge in the realization of renewable energy projects. In this study, I specifically focused on opposition against large scale solar energy generating facilities (hereafter solar park, solar farm). One of those issues is the emergence of opposition against those projects, with multiple side-effects as a result. Factors which greatly influence the success rate of those projects are multiple. Within the context of this study, two theories are observed: Community Energy (Walker & Devine-Wright, 2008) and Energy Justice (Sovacool & Dworkin, 2015). In this section, I provide a description of those theories and how they relate to opposition against solar energy projects. I further indicate the origins and current methods for preventing opposition, added with practical examples of how projects approach opposition.

2.6.1 Emerging resistance to renewable energy projects

Opposition against solar parks in the Netherlands is common. 'Resistance', or 'opposition', or 'low support', or 'low acceptance' are all described to indicate a lack of community acceptance (i.e. acceptance of siting decisions and renewable energy projects by local stakeholders, (…) residents and local authorities (Wüstenhagen, Wolsink, & Bürer, 2007)). Underlying reasons for this lack of acceptance are numerous. First of all, the scale of solar power plants is rather significant. Due to the extremely high energy density of fossil resources, and the lower energy density of renewable energy resources, a lot of physical space is required in order for renewables to take over completely from fossil fuel (Layton, 2008). The amount of physical space required in the Netherlands to provide all households and industry with electricity coming from solar panels (2,2 billion kWh, (CBS, 2021a) is equal to 14.7 million square meters, equal to more than one-third of the total Dutch land surface area (Zonneplan, n.d.)). With renewable energy needing significantly more surface area to generate a similar amount of electricity as compared to fossil fuel, its spatial impact is undoubtedly larger. With a higher spatial impact, landscapes are affected more severely. This in turn affects people's feelings and emotions which are attached to a specific piece of land, which I briefly mentioned in **Section 2.5**. This relates to the second point: diminishing landscape value. With landscape value being defined as the intangible and difficult to judge value persons attach to their perception of a landscape (Tolli et al., 2016), it makes the spatial impact of renewable energy projects prone to face issues regarding opposition. People who live in remote areas, which are often the locations of solar parks, have grown used to the landscape as it has been for many years. Changes in those landscapes can exert significant emotions among residents, such as anger, frustration and disappointment. Dealing with those values and perceptions is one of the major challenges faced by solar energy projects. Not only do solar parks have a significant spatial impact, but renewable energy projects in general also tend to lie very sensitively among residents. Colliding interests, views and demands often cause a big variety of perceptions within solar park projects. In relation to these values, opposition often occurs when stakeholders feel an unequal distribution of the costs and benefits of the facility. Studies have shown that people living closest to solar parks experience disproportionate amounts of burdens (Rasch & Köhne, 2017). Energy justice, or the study towards the relation between energy production and consumption to social inequalities, relates to this issue. With a focus on an equal distribution of costs and benefits, energy justice is not a static concept but rather a process that focuses on resolving possible inequalities (Rasch & Köhne, 2017).

Thirdly, with values being subjective and intangible, making decisions regarding these values is difficult. Value attached to landscapes is a factor that is not easily changed, if necessary. Making decisions regarding these values is therefore difficult. In the Netherlands, it is currently the task of the municipality to decide whether there is a sufficient amount of support for solar park projects and whether sufficient actions have been taken to divide costs and benefits as good as possible. However, this process does not necessarily lead to high levels of support, as other factors play a role in the emergence of opposition as well. An oft-heard argument of people who oppose solar park projects is: "I am not against solar- or wind parks, I just do not want it in a location where I feel the negative impacts from it". A concept related to this argument is NIMBY-ism (Not In My Back Yard – ism). This concept, or by some scholars labelled as a syndrome (Dear, 1992), is conceptualized as the *"protectionist attitudes of and oppositional tactics adopted by community groups facing an unwelcome development in their neighbourhood"* (Dear, 1992). NIMBY-ism does not only occur with relation to renewable energy: it has been encountered regarding waste disposal facilities, nuclear power plants, roads, railroads, etc. (Wolsink, 2000). NIMBY-ism comes forth from an individual point of view towards, in this case, solar parks, where the common good is disregarded and a stance is taken in which an individual's own opinion is cause for attempts to block the realization of these projects. It is therefore often regarded by the parties involved in the project as 'unfair' and 'selfish' (Schwenkenbecher, 2017).

All in all, dealing with NIMBY-ism is difficult and complex. The fact that opposition can occur based on people's opinion regarding a project in which, technically speaking, those people might not have any say, makes it rather difficult. When analysing the creation of a solar park from a black-and-white point of view, a party who is interested in realizing such a project can buy land, get permits if there is a sufficient level of acceptance, and start building. Occurrences of NIMBY-ism often lie at the foundation of community opposition, which makes the process of realizing such facilities a more challenging and demanding operation.

Different meanings are associated with the concept of NIMBY-ism (Devine-Wright, 2009). Firstly, it is a concept used to label groups of people within the group opposing the specific project. In dealing with opposition, it is important to understand the different points of view. Different groups have different opinions as to why they might oppose solar- or wind energy projects, and dealing with those groups requires an understanding of their thoughts. Secondly, NIMBY is used to explain the spatial proximity in which opposing groups are located. This notion is based on the expectation that people who find themselves disagreeing on the basis of NIMBY-ism often live close to the site where a project is being realised (Devine-Wright, 2009). Grouping people based on this notion, however, should be done with great care, as it is not always the case that the people who live closest by the development exert the highest amount of resistance. This 'inverse NIMBY syndrome' causes people to live closer to the development location to be more invested in the project and are able to see positives through that view (Warren et al., 2005). Thirdly, NIMBY can also be allocated to the opposing attitude of people based on ignorance, irrationality and selfishness, much like Schwenkenbecher (2017) noted.

NIMBY-ism and landscape value are two closely related notions. Research has shown that people who live in or close to an area with high nature values and vegetation are more likely to exert opposition against an intervention being planned to come in their backyard (van der Horst, 2007). With the various types of NIMBY-ism being indicated in the previous paragraph, I aimed at providing a view on the complex nature of both NIMBY-ism and the subjective value of landscapes. In the following section, I explain two concepts related to opposition prevention: Community Energy and Energy Justice

2.6.2 Theoretical approaches to opposition avoidance

The aforementioned division of 'types of NIMBY-ism' can be helpful in understanding why opposition emerges and how this should be approached (Devine-Wright, 2009). Various concepts have been explored in academics that assist in preventing opposition: Community Energy and Energy Justice.

With those concepts being focused on avoiding resistance, rather than mitigating resistance, this section explores those concepts to create a deeper understanding of them, which helps in analysing whether or not those concepts can also play a role in the mitigation of opposition.

Community Energy, explored by Walker & Devine-Wright (2008) is regarded as one of the most influential concepts in realizing renewable energy projects (Creamer et al., 2019). Community Energy can be regarded as a demand-led planning approach, where Huang et al. (2015) framed the concept as a means to generate secondary energy; i.e. energy which is used directly within close proximity of the generation site. With the term Community Energy being labelled as fuzzy (Huang et al., 2015), defining it is inherently complicated and complex (De Roo, 2007). Thus, rather than aiming to provide an exact definition, it is more useful to describe the concept through its practical implications. Community Energy positions the role of local residents central in the realization process: it is based on a bottom-up process in which the initiative is ideally emerging from local residents themselves and where the project is initiated and operated by local people themselves. This causes residents to be better able to see the possible benefits the project brings to the community (Walker & Devine-Wright, 2008). It is a project by the people, for the people.

The success of the application of community energy depends on different viewpoints, and a combination of these viewpoints. The visual representation of this model in **Figure 2.3** indicates three distinct viewpoints (Walker & Devine-Wright, 2008):. Firstly, high levels of local citizen involvement in all phases of the project are indicated by area A. The presence of such involvement is argued to create the path for the successful implementation of renewable energy projects. A second viewpoint revolves around a focus on the process of a project itself, rather than a focus on the outcomes only (area B). This includes an equal and fair division between costs and benefits throughout the project process and of the final product, which in its turn relates to the notion of energy justice, which I elaborate in what follows. Thirdly, a combination of these aforementioned viewpoints exists where the main focus is on the project process rather than the aim to fulfil the different requirements of 'community energy' (area C).

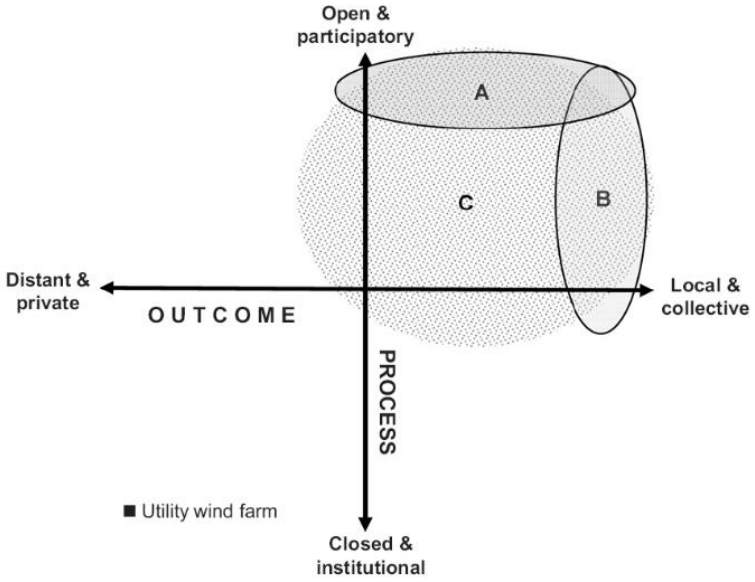

Figure 2.3 – Viewpoints in Community Energy (Walker & Devine-Wright, 2008)

Community Energy focuses on creating a process that ensures the highest amount of acceptance for renewable energy projects from the start. Mobilizing community energy is requires a combination of two types of resources: structural (i.e. the pollical context) and symbolic (i.e. resources to nudge participants) (Bomberg & McEwen, 2012). It has been found that a combination of these two resources is needed in order to engage people in executing community energy projects (Bomberg & McEwen, 2012). When applied in practice, community energy includes local-level stakeholders into both the

process and the outcomes of renewable energy projects with an increased sense of ownership among local citizens as an expected effect (Seyfang, Jin, & Smith, 2013). Shared ownership is believed to be a functional measure within community energy to create acceptance and to provoke less NIMBY-based arguments from local stakeholders. Since it has been pointed out that ignorance is one of the reasons why NIMBY-ism emerges, involving stakeholders arguably decreases the possibility and level of NIMBY-ism occurrence.
In mitigating opposition, however, the role of community energy is unestablished. With a focus on a full process of involvement, its aim is to create a process that comes with the least amount of opposition. Since the concept has such a renowned position within existing academic literature on opposition to renewable energy, it provides opportunities to analyse community energy in the light of opposition mitigation.

Being closely related to Community Energy, Energy Justice plays an important role in whether or not opposition against solar parks emerges. Energy Justice is the study towards the question if costs and benefits of an energy project are equally divided among involved stakeholders. With every energy project being different, with different stakeholders involved, Energy Justice is not a static concept. Rather, it is a process in which the primary focus is on rectifying possible inequalities in this division of costs and benefits (Rasch & Köhne, 2017). Within this debate, it is shown that injustices often occur within projects which cause loss of livelihood, where benefits are allotted to a select group of exclusive stakeholders and where several underrepresented actors are excluded from participating (Ciplet, 2021). Processes in which energy justice elements, i.e. a fair distribution of benefits and costs, an inclusive decision-making process and a recognition of rights of actors and inequalities between those, are present, multiple considerations must be made (Sovacool & Dworkin, 2014). If energy justice is utilised as a decision-making tool, it should include availability of energy, affordability of energy, a just process, equity and good governance (Ciplet, 2021). Jenkins et al. (2016) have identified three distinct questions which are designed to help shape processes where energy justice is utilised as a decision-making tool: (1) where do injustices emerge?; (2) which affected sections of society are ignored?; and (3) how can injustices be revealed and reduced? These elements together are meant to facilitate a process in which a renewable energy project is realized with as little opposition as possible. This does however not mean that injustices are not occurring anymore. Some identified injustices are unequal distribution of costs, unequal distribution of benefits or revenue, and a planning process that excludes various stakeholders (Sovacool & Dworkin, 2014). These imbalances have the possibility of creating perceptions among underrepresented stakeholders, with them feeling not as important as other stakeholders. With this being a subjective problem, the solution to it is not straightforward. Energy justice approaches towards decision-making processes are applied with the intention to create a project situation that is as equally fair as possible (Sovacool & Dworkin, 2015). Energy justice can be seen to be a subset within environmental justice, which focuses on the uneven distribution of costs and benefits of environmental investments on different social groups. Emerging as an interdisciplinary field of study, its focus lies on the unequal impacts of environmental pollution on different classes and ethnic or racial groups of people (Mohai, Pellow, & Roberts, 2009). Within environmental justice, energy justice thus focuses on similar uneven divisions of costs and benefits, with solely its focus on energy related issues, such as renewable energy.

In association with renewable energy, uneven division of costs and benefits are, for example, related to solar parks affecting the lives of people who live close to them for the benefit of people living further away. This inequality between people who only experience the benefits and people who experience costs besides benefits is thought to create opposition against those solar parks. The role of energy justice in mitigating opposition has remained unexplored and poses therefore opportunities to see this concept through the lens of increasing acceptance. In the following section, I explain the method which I used in this study to analyse the perceptions of people involved in a solar park project in Wanneperveen, the Netherlands related to the applicability of the concepts mentioned in this section on mitigating opposition.

3. Methodology

As I showed in the previous sections, multiple theoretical concepts exist regarding opposition to renewable energy projects. Analysing perceptions of involved people regarding the way to mitigate opposition gives a real-life view into the way those concepts are perceived by people. Therefore, a study of subjectivities towards the opinions, feelings and perceptions of people involved in a renewable energy project is conducted through using Q methodology on a case study of a solar park project in Wanneperveen, located in the province of Overijssel, the Netherlands. I have selected a single case study design since contemporary issues such as opposition against solar parks are explicitly suitable to approach through case study research (Yin, 2003). Following from **Section 2.4** in which I explained the current Dutch policy landscape which shapes the process of realizing solar energy facilities in the Netherlands, I provide an explanation of the case solar park 'Zomerdijk' in Wanneperveen. Thereafter, I give a detailed description regarding Q methodology, and the choices and considerations I made in this method in relation to the current study. I end this chapter by providing a rationale explaining why I selected this type of study and this case.

3.1 Solar park 'Zomerdijk': a complex case

The task for municipalities to implement solar parks is a complex one. Many different levels of government and private parties need to work in close collaboration in order to create a workable project environment. The case of solar park Zomerdijk in Wanneperveen is located in the municipality of Steenwijkerland (Overijssel). This municipality is just as any other municipality tasked with reaching goals regarding the generation of electricity as I explained in **Section 2.4**. As I mentioned also in this section, the Regional Energy Strategy agreements per area include possible locations for future renewable energy projects and provide explanations regarding the choices made in that region related to renewable energy generation. The goal-reaching process starts on this level, with the RES West Overijssel consisting of municipalities and water boards from the north-western part of the province of Overijssel (**Figure 3.1**). Still being in the conceptual phase of finalizing the RES, the deadline for completion of the final version of the RES has been set at July 1st, 2021 (RES West-Overijssel, n.d.). The concept RES West-Overijssel has paid specific attention to detailed descriptions of what the role of the community is in realizing solar electricity generation facilities, where shared ownership is regarded as the prime method for creating support for the projects (Holsappel, 2020). Since the RES is still in its concept phase, various aspects should be included in the RES as agreed upon in the Dutch national climate agreement in 2019 (Klimaatakkoord, 2019). An important aspect, and one which is not included in the concept version yet, is the potential location of solar panel parks in the region. This absence regarding the site selection question proves to be a difficult task for the municipality of Steenwijkerland in their role of realizing renewable energy transition.

Figure 3.1: RES area West-Overijssel (Provincie Overijssel, 2021)

The municipality of Steenwijkerland, located in the northwest corner of the West-Overijssel energy region, has created a policy for implementing renewable energy based on the guidelines set in the RES West-Overijssel. This policy, written in 2019, has been created prior to the finalization of the RES, thus without any specific guidelines and search areas for possible projects. Since the transition towards renewable electricity cannot be postponed, projects based on this policy have already been put in motion. More specified goals and targets have been set, which the municipality needs to reach. One of these goals is the realization of 125 hectares of solar panels placed on land (Steenwijkerland, 2019). No deadlines have been specified in this policy. The deadlines, however, are included in the national climate agreement, which aims at a decrease of 50% of the current level of greenhouse gas emissions by 2030 (Klimaatakkoord, 2019). From a very black-and-white perspective, the role of the municipality in this situation is merely to create policies that market parties will execute, and to test whether or not those market parties execute the project within legal boundaries.

In the case of project 'Zonnepark Zomerdijk' in Wanneperveen, a private solar energy company saw an opportunity to create based on the policy of the municipality a solar park. Focused on creating ways to facilitate the climate goals as set by the national government, this company is specialized in the creation of (in some cases temporary) installations of solar panels on empty pieces of land (PowerField, n.d.). With the possibility to create such a facility within the municipality of Steenwijkerland, attempts were made to create a solar park in a location close to the village of Wanneperveen. The initial plans were to create such a park on the property of one farmer. Due to the very close proximity to the village core and a protected Natura 2000 park[1], this location encountered severe opposition from residents in and around the village. This led the farmer who had plans to exploit his property for this project to withdraw his contribution (Heppenhuis, 2020a). Much heard arguments to substantiate this opposition are often in line with the people not being against solar parks in general, just against a solar park in this specific location (i.e. NIMBY-ism).

After engaging in conversations with local people, the solar energy company found a different location for this project. This new location is approximately three times smaller than the initial location would have been and lies further away from the village limits (Heppenhuis, 2020b). **Figure 3.2** shows the location of the project relative to the village of Wanneperveen (based on PowerField (2021)). Although support for this location is significantly higher than for the first location, there are still parties who remain to be against the project. This is problematic since the municipality is only able to provide permits for this project if a declaration of no concerns is established (Ministerie van Infrastructuur en Waterstaat, n.d.). This declaration will only be provided if the municipality feels that the support base for the project is at a sufficiently high level. The local council has given this declaration for this project at the end of April 2021 (Heppenhuis, 2021). Following from this declaration, permits are requested to be able to continue with the project. However, the act of the municipality providing the declaration does not mean that there is no

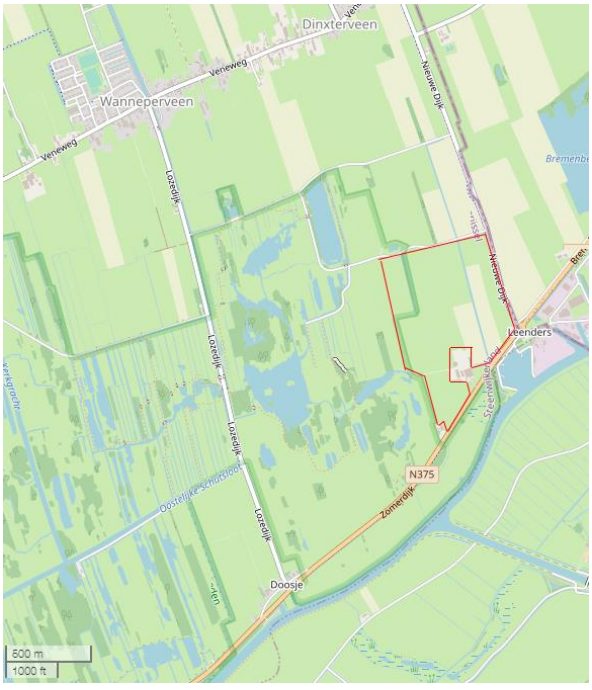

Figure 3.2 – Solar park project location relative to Wanneperveen, based on PowerField (2021)

[1] Natura 2000 is a European network of protected natural areas, where animals, plants, and their habitats are protected to ensure that biodiversity remains high (Natura 2000, n.d.)

opposition left and that this opposition is not problematic anymore. People are still able to file an objection to the project which the authorities need to take seriously. It is therefore important for the project initiators that the opposition remains well-managed throughout the entire project duration.

Since the aforementioned declaration will only be acquired by the municipality when they are convinced that acceptance for the solar park from local people is sufficient, the management of this acceptance is one of the primary priorities for project managers. As the case of solar park Zomerdijk shows a wide variety of perceptions and opinions existing among residents regarding opposition and acceptance, I decided to use this project as a case in this thesis. Q methodological research methods are par excellence fit to analyse perceptions among people involved in projects such as solar park Zomerdijk. In the following section, I explain in detail what this method entails and which steps have been taken to be able to analyse the perceptions well.

3.2 Q-methodology: a study towards subjectivity

To be able to answer the research question "*What do people involved in Dutch solar park projects perceive to be the most beneficial methods to reduce community resistance?*", I have chosen a research strategy that can encompass the opinions and perceptions as I mentioned in this research question. Qualitative research methodologies are the preferred research strategy to answer questions about experience, meaning and perspective (Hammarberg, Kirkman, & Lacey, 2016). Within the realm of qualitative research methods, many different forms exist. Since the nature of the problem under debate is contemporary and behavioural aspects are a significant influencing factor, I have chosen a single case study design. In what follows, I elaborate the steps of this systematic strategy of qualitative research builds upon statements coming from a diverse set of actors.

Q-methodology has been a widely applied social science research method for decades. This method enables researchers to analyse *"different opinions or perspectives on a topic of study by exploring how respondents judge the relative importance to them of different dimensions of a problem or situation"* (Davies, 2017). With Q methodology, a subjective, first-person viewpoint is displayed of people involved in various projects (in this case being the realization of a solar park) (Watts & Stenner, 2012), where it provides a tool to find out what people think about a certain issue or topic. Results from this method reflect the cultural, social and historical context through which people's opinions are shaped regarding a certain research topic (Robbins & Krueger, 2000). It does this through a combination of qualitative and quantitative research methods: qualitative interviews and quantitative data analysis (Ellis, Barry, & Robinson, 2007). The advantages of this combined research approach are significant: because of its quantitative nature, the measurements are replicable and able to be reconstructed, causing the analysis to be less interpretative to the analyst (Ellis et al., 2007). In the following sections, I subsequently explain the concourse, Q sort, data analysis, factor extraction and the number of factors, factor rotation and factor interpretation.

3.2.1 Concourse

Collecting data in a Q methodological study consists of two distinct parts. Firstly, the full data set, called the concourse in a Q study (Watts & Stenner, 2012), forms the foundation of the study. This concourse consists of a large number of statements that display judgements about a research topic, in this study being opposition against solar parks. Common ideas, discussions and extracts from interviews make the foundation of the concourse (Davies, 2017). Since the concourse is meant to be a close representation of reality, statements must be retrieved from sources from as many different backgrounds, viewpoints or perceptions as possible. It is not uncommon for concourses to consist of as many as 100 statements or more.

I created the concourse for this study through the application of two data collection methods. Firstly, I executed desk research on the case itself in order to understand the process that has been gone

through and the current situation of the project. This was done for the purpose of creating an interview guide in which important aspects of the project have been included, combined with concepts from literature. Secondly, I conducted five scoping interviews to serve as a resource for the creation of the concourse (see **Appendix A** for full interview guide, in Dutch). With the aforementioned importance of a diverse set of interviewees, I selected participants based on their role within the case study project. Among the five interviewees, people from the municipality, solar park production company, farmers union and residents were selected to be able to provide a diverse narrative with regard to the project. Thirdly, I conducted more desk research to gather information regarding other actor's positions and opinions regarding solar electricity generating facilities, such as nature conservation organisations. Through interview playbacks, I noted down important statements and comments mentioned by the participants. Since the interviews themselves are not used for the purpose of data analysis itself as is the case in traditional qualitative research, I created no detailed transcriptions. From these three resources, I created a concourse consisting of 149 statements (see **Appendix B** for the full concourse, in Dutch).

3.2.2 Q sort

The second step in the data collection phase in a Q methodological study consists of a more quantitative approach. To be able to see to what extent people involved in the solar park project agree or disagree with the general average perceptions as are included in the concourse, a survey-type data collection strategy is used in Q methodological research. In this phase, a number of statements (Q set) from the concourse which show the strongest viewpoints of participants is selected which can provoke opinions and emotions from other participants. In this study, I selected 25 statements from the concourse through three selection rounds, which portray the widest possible range of perceptions among the participants (see **Appendix C** for the Dutch Q set, and **Appendix D** for the English translation). These statements are then sorted by participants (P set) in a figure in which they indicate to what extent they agree or disagree with a certain statement (**Figure 3.3**).

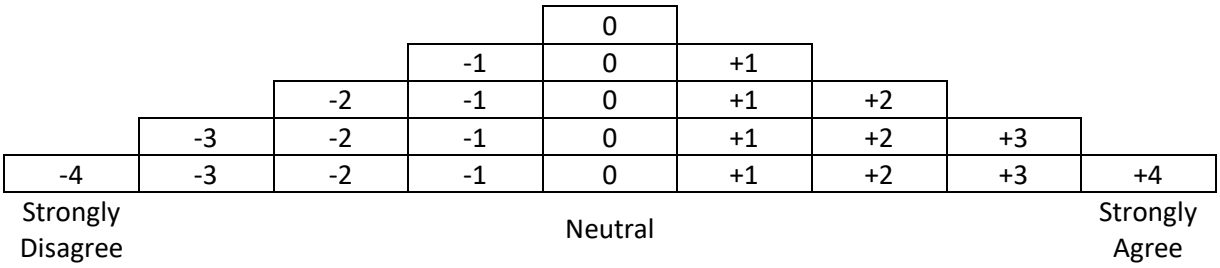

Figure 3.3 – Q sorting grid with representing values, based on Davies (2017)

I choose to apply a forced-choice distribution, which means that participants are instructed to sort the statements from the Q set along an axis with values ranging from -4 to +4, i.e. from 'Strongly Disagree' to 'Strongly Agree'. This forced-choice distribution of statements involves a larger number of positions in the middle of the spectrum and a smaller number of values in the extreme end of the range (**Table 3.1**). Allowing fewer statements to be placed at the peripheries of the figure forces respondents to think critically regarding the way they fill in this figure, and make considerations between statements to decide which fits better at a certain location in the figure.

Forced-choice distribution frequency

Ranking value	-4	-3	-2	-1	0	+1	+2	+3	+4
Number of items	1	2	3	4	5	4	3	2	1

Table 3.1: Forced-choice distribution frequency, based on Watts & Stenner (2012)

Selecting respondents has been done based on initial analysis of the project, combined with spatial proximity of residents. A total of 24 people has been approached with the request to fill in the figure

(**Figure 3.3**). Respondents were also asked to forward the survey to colleagues or other people who had affiliations with project 'zonnepark Zomerdijk'. I used a combination of e-mail, phone calls and physical letters to gather responses, with physical mail being sent to people who live adjacent to the project site and for which other contact information was not available. The full handout Q sorting document as I sent to participants can be found in **Appendix E** (in Dutch). A combined total of 13 responses have been received, of which 11 valid, one incomplete and one incorrectly filled in. **Table 3.2** shows the number of acquired responses per stakeholder.

Stakeholder	Number of responses
Municipality	6
Residents	3
Initiating party	1
Nature conservation party	1

Table 3.2: Responses per stakeholder

3.2.3 Data analysis

Following the two steps of data collection (i.e. interviews and Q sorting), the data analysis phase aims to derive factors from the filled-in matrices to reveal which of those factors represent general viewpoints and shared opinions about the research topic (Robbins & Krueger, 2000). Based on Davies (2017), the data analysis phase consists of two steps: (1) the determination of the amount of factors to be extracted and (2) the rotation of factors, which provide the best representation of the different groups in the sample. I used KADE-Q analysing software the data analysis tool (Banasick, 2019). The detailed raw quantitative q sort data can be found in **Appendix F**.

3.2.4 Factor extraction and the number of factors

From the conducted Q sorts by the participants, factors are extracted by the software which each show one specific part of the variation present in the data. Each following factor shows another part of the variation present. Intercorrelations between each Q sort and every other Q sort are shown in a correlation matrix, consisting of standardized Z-scores for each Q sort. High correlations are indicated with values close to 1, and low correlations with values close to 0 (Watts & Stenner, 2012). Factors are allocated to strong correlations where those factors explain as much about the relationships between Q sorts as possible. On the basis of these scores, KADE-Q analysis software searches patterns of sorting configurations which are the most common throughout the whole dataset. This process is repeated several times, resulting in a certain amount of factors. The total number of factors needed to cover all the different perspectives from the Q sorts depends on the specific research and is therefore not specifically defined (Watts & Stenner, 2012). I determined the number of factors in this study based on three parameters. Firstly, the eigenvalue (EV) indicates a specific factor's statistical strength and explanatory power. Factors with an EV below 1.0 count for less study variance than a single Q sort, therefore serving little purpose (Watts & Stenner, 2012). The EV per factor is shown in **Table 3.3**. This table shows the unrotated factor matrix, which results from the process of factor extraction. Per factor, the factor loading, i.e. the correlation between a specific sort and the strength of that factor, is displayed (Watts & Stenner, 2012). Within this matrix, both positive and negative values are displayed, indicating polarized differentiation of groups regarding certain viewpoints.

Unrotated Factor Matrix

Part. Num.	Participant	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
1	R1	0,808	0,155	0,296	-0,119	-0,019	0,190	0,009	-0,316
2	R2	0,572	0,038	-0,321	0,515	-0,265	-0,029	0,462	-0,058
3	R3	0,586	-0,103	-0,422	-0,477	-0,149	-0,23	-0,145	-0,318
4	R4	0,430	0,282	-0,584	0,261	0,491	0,016	-0,210	0,075
5	R5	-0,109	0,599	0,603	-0,198	0,219	-0,143	0,225	-0,073
6	R6	0,418	-0,688	0,364	0,068	0,064	-0,355	-0,109	0,190
7	R7	0,586	-0,349	0,050	-0,326	0,121	0,573	0,093	0,208
8	R8	0,650	0,422	-0,023	-0,175	0,423	-0,241	0,161	0,170
9	R9	0,575	0,403	0,005	-0,185	-0,571	-0,114	-0,080	0,338
10	R10	0,556	-0,677	0,307	0,245	0,119	-0,089	0,011	-0,092
11	R11	0,422	0,522	0,401	0,462	-0,102	0,139	-0,344	-0,051
	Eigenvalues	3,28	2,14	1,46	1,06	0,93	0,66	0,49	0,44
	% Explained Variance	30	19	13	10	8	6	5	4

Table 3.3: Unrotated Factor Matrix

Secondly, the slope of the scree plot displaying the EV per factor changes at the cut-off point. This scree plot is shown in **Figure 3.4**. Thirdly, it is important that the factors used to show the general perceptions are, apart from their statistical strength, also able to explain a large portion of the data.

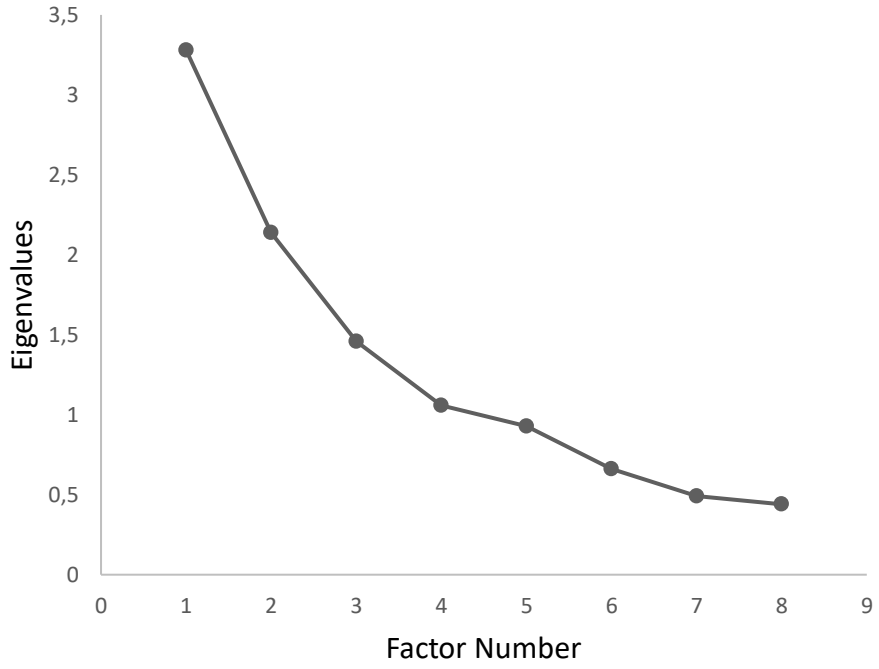

Figure 3.4: Scree plot of Eigenvalue per factor

When observing both **Table 3.3** and **Figure 3.4**, the same conclusion is drawn regarding the number of factors: the EV shown in **Table 3.3** drops below the value of 1.0 after Factor 4, the slope between Factor 4 and Factor 5 changes significantly in the scree plot in **Figure 3.4**, and the explained study variance shown in the unrotated factor matrix indicates that four factors explain 72 % of the data, which is a large portion of the perceptions included in the dataset. Based on these three aspects I decided to include four factors in this study.

3.2.5 Factor rotation

The extracted factors need to be aligned to the specific clusters of commonalities between Q sorts. This process is done through factor rotation. The aim of this process is to change the factors in such a way that they explain multiple cases through high loadings rather than having a larger amount of factors with moderate loadings (Davies, 2017). Within this study, factor rotation is done automatically by KADE-Q analysis software, where I applied Varimax.

3.2.6 Factor interpretation

Following the factor extraction and rotation, the meanings of the separate factors are assessed.
The identification of the relationship between factors follows from this. This relationship, or criterion sort, is the weighted collection of all the Q sorts which load significantly on the specific factor. With this criterion sort, comparison between groups and analysis of individual groups is possible. Based on the z-scores per factor, calculated by KEN-Q analysis software, a representative S sort of that factor is generated which is used for the result interpretation, called factor array. These arrays give an overview of the general perception regarding the statements when looking at them through the lens of one specific factor. Within these arrays, two significant types of statements are indicated: consensus statements and distinguishing statements. Consensus statements are statements on which general consensus is reached by participants who loaded significantly on that specific factor. Distinguishing statements are statements that are specific for that factor and which set the factor apart from the other factors. These two statement types are used in the process of factor interpretation. In **Section 4.2** I described my interpretations of the factors.

3.3 Rationale methodology

In the previous sections, I gave a description of the case of solar park Zomerdijk and explained what Q methodology entails and how I applied this research method in this study. As mentioned before, in this study I aim to study the way involved people perceive methods that can be used to mitigate opposition. The choice for Q methodology was based on previous applications of this method in similarly designed studies with the same aim to expose perceptions of people involved in a certain project. Since I focus on subjective opinions and viewpoints of people, quantitative research alone is not sufficient. With the combination of quantitative and qualitative research methods in Q methodology, I created an objective view on opposition mitigation in solar park projects without losing the value of a qualitative research method regarding research towards experiences, meanings and perspectives. With regard to the chosen case study design, I choose a single case study since contemporary issues, such as opposition against solar parks, are explicitly suitable to approach through case study research (Yin, 2003). Case study research designs aim to *"illuminate a decision or set of decisions: why they were taken, how they were implemented and with what result"* (Yin, 2003). Events happening within a specific case can be generalized within a specific theoretical proposition with the goal to expand theories (Yin, 2003). The choice I made with regard to the case under study was largely based on the phase this project currently exists in. With the project still being in the preparatory phase, both the management of opposition and the opposition itself happen at the same moment as I conducted this research. Analysing this specific project in this specific phase gives a clear indication of what the perceptions and emotions of people are at the moment opposition mitigation must be applied. I therefore selected this project to use as a case in this study.

In the following section, I explained the results retrieved from the Q methodological process as I explained above.

4. Results

As I mentioned in **Section 3.2.4**, I have subtracted four factors from the data. These four factors are the four most common viewpoints among the Q sorts, and thus explain the general opinions of people involved in solar park project 'Zomerdijk' regarding mitigating opposition. **Table 4.1** shows an overview of the four factors, including a name per factor, EV and explained variance. The four factors combined account for a total of 73 % of the variance of perceptions within the data, hence cover a large portion of the perceptions throughout the whole dataset.

Factor	Name	EV	Explained variance (%)	Cumulative percentage (%)
1	Combining top-down and bottom-up	2.53	23	23
2	Own and pay together	2.31	21	44
3	Aesthetics first	1.65	15	59
4	Communalism: own together	1.54	14	73

Table 4.1 – Factor scores

In this section, I explain characteristics of and correlations between the factors. Thereafter I interpret each of the factors, resulting in a discourse per factor. I end this chapter with an explanation of the statements on which consensus is reached between factors.

4.1 Factor characteristics and correlations

Out of the 11 valid responses, 9 Q sorts loaded significantly on one of the four factors. **Appendix G** shows an overview of the characteristics for each factor, including an explanation of these characteristics. Since the factors in this study are the best possible manifestations of the real viewpoints, overlap between the factors can occur. The degree to which factors are unique or share some characteristics with other factors is shown in **Table 4.2**.

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	1	0,2157	0,4353	0,3799
Factor 2	0,2157	1	0,1297	-0,0353
Factor 3	0,4353	0,1297	1	0,172
Factor 4	0,3799	-0,0353	0,172	1

Table 4.2 – Factor score correlations

These intercorrelations indicate a number of aspects. Firstly, **Table 4.2** shows that factor 2 is the most unique factor, meaning that it has the least overlap with other factors: the preference for the combination between shared ownership and financial incentives to mitigate opposition, which factor 2 characterizes, is not found to occur in the other discourses. Secondly, **Table 4.2** shows a certain degree of overlap between factors 1, 3 and 4. This indicates that on some topics, the perceptions of those factors are similar. This is not problematic, however, since a correlation between factors can be understood to be a different manifestation of a similar viewpoint (Watts & Stenner, 2012). This means that there might be underlying similarities of the general perceptions of people who are associated with these two factors, but they exert their feelings about those viewpoints in a different way, i.e. they use different argumentation for a similar perception. A significant point of overlap between these three factors is the perception regarding the influence of aesthetics in the emergence of opposition against solar parks, where similar statement scores were given (statement 3, factor 1: +4; factor 3: +4; factor 4: +3). In the following section, I explain which discourses are associated with each factor through an interpretation of the factor arrays.

4.2 Factor interpretation

The foundation of the factor interpretation, apart from the factor arrays (**Appendix H, I, J, and K**), is indicated in **Table 4.3**. This table shows the salient statements for all four factors, including a factor score which associates with the position of that statement in the factor arrays.

Salient statements for all four factors		Factors			
Statements		1	2	3	4
1	Engaging in conversation with people who disagree with the solar park project is the most important way to increase support		-1*		
2	The position of local residents is not taken seriously enough by the project initiators		-3		+3**
3	Aesthetic values are the most important reason why local residents oppose to solar parks	+4		+4	+3
4	Shared ownership does not automatically lead to higher levels of acceptance				
5	Including local energy corporations helps with shaping shared ownership and thus increases acceptance		+3		
6	The ground taken up by solar parks is wasteful: it is better to use this ground for agriculture	-4		-4	
7	100% shared ownership for local residents is viable and increases acceptance for solar parks	+1**	-4	-3	+4**
8	Local energy projects must be legally obliged to provide secure and long-lasting employment to local communities in proportion to the size of investment.	-3			
9	Municipalities must actively engage in campaigns to create awareness and increase support for solar parks	+3**			
10	Shared ownership is a good method to increase acceptance	+2*	+4**		
11	Promised advantages for local residents are perceived as inadequate				
12	It is for the project initiators too difficult to include local residents in the project: more guidance is needed from the government		-3		-4
13	More positive stories in the media regarding solar parks and its usefulness and necessity will cause increased support base and acceptance				-3
14	Incentives, like subsidies, are necessary to increase acceptance for solar parks	-3	+1**	-3	-3
15	Financial advantages help increase the support for solar park projects		+2*		
16	The concept 'renewable energy' has lost part of its positive image in the past years			+3*	
17	Next to financial participation and shared ownership, local residents should be given more decision-making power in solar park projects for increased acceptance	+3	-1**		
18	People who do not live directly adjacent to a solar park are not truly involved and thus do not have a say in the project			+2**	
19	Policies regarding the acceptance of solar parks must be more clearly defined and conveyed to residents				
20	Municipalities must choose for area-based approaches where, together with local residents and interest organizations, prerequisites are created for financial participation				
21	To compensate for losses of landscape value, a larger share of benefits from solar parks should be going towards local residents				
22	Promised advantages for local residents are perceived as being too good to be true				
23	Spreading project information among local residents in an early stage of the process creates increased understanding and acceptance		+3**		
24	More efforts should be made to include local residents into the scouting of possible locations for solar parks				
25	Renewable energy projects suffer from a lack of a nation-wide vision for guiding the project process			+3**	

Table 4.3: Salient statements per factor

Table 4.3 also displays various statements which do not have any salient value for any of the four factors. This has two reasons: firstly, there are multiple statements on which consensus is reached, meaning that for all four factors the sort value is approximately the same. These consensus statements are further explained in **Section 4.3**. Secondly, on one statement (11) there is neither consensus reached, nor is there a salient value for any of the four factors. This means that this statement does not play a significant role in the discourse of any of the four factors, but is not agreed upon sufficiently to be observed as a consensus statement.

In the following sections, I interpret the four factors. This results in a narrative per factor, in which I indicate the significant loadings from the distinguishing statements and the salient statements per factor. The discourse is further supplemented with quotes derived from participants who are significantly associated with specific factors. This interpretation is based on the distinguishing statements, consensus statements, salient statements per factor and the factor arrays which can be found in **Appendix H, I, J, and K**.

4.2.1 Factor 1: Combining top-down and bottom-up

Factor 1 has an EV of 2.53 and explains 23 % of the study variance. Four participants are significantly associated with this factor, who are all males from the actor groups 'municipality' and 'residents'. The key emphasis in this factor is the perceived value of a combination of governmental guidance and local, individual ownership in the guidance of opposition mitigation.

Factor 1 distinguishes itself through three different statements (**Table 4.4**).

Statement number	Statement	Sort value and confidence interval
10	Shared ownership is a good method to increase acceptance	+2 (*)
9	Municipalities must actively engage in campaigns to create awareness and increase support for solar parks	+ 3 (**)
7	100% shared ownership for local residents is viable and increases acceptance for solar parks	+ 1 (**)

Table 4.4: Distinguishing statements for Factor 1 (** indicates confidence interval of P < 0,01; * indicates confidence interval of P < 0,05)

The statements indicated in **Table 4.4** clearly underline the choice for the name 'combining top-down and bottom-up' for factor one. It becomes apparent that, although the role of shared ownership is perceived to be rather significant, there is still more guidance required from governments, and specifically municipalities. This role is related to more guidance and influence in raising awareness regarding the importance of solar parks, which is thought to be contributing to higher levels of acceptance (9: +3). The sort value of this statement suggests that a more top-down management approach is required to increase acceptance for solar parks. When analysing the other distinguishing statements, however, it becomes clear that a hybrid between governmental influence and shared ownership is the preferred strategy for this factor. Shared ownership is being perceived as a good method for increases acceptance (10: +2). Even 100% shared ownership, which means limited governmental influence and no or only local market parties owning the facility, is perceived to be (marginally) functional for mitigating opposition against solar parks (7: +1). A middle way between shared ownership and top-down governmental management is preferred for this factor.

Various other statements emerge on which consensus has been reached by participants. For example, it is believed that aesthetic values are the primary source of opposition against solar parks (3: +3). In relation to this statement, one respondent mentioned:

> *"The arrival of a solar park negatively influences the wide-open view residents have become used to. This is therefore one of the primary reasons why people oppose changes in the Netherlands, regardless of the type of change. People have attached great value to their view."* (R1).

Further consensus is reached regarding the need for more inclusion of local residents into the entire project (24: +2). The fact that the landscape will change for the worst, according to the respondents, is difficult to compensate. Engaging in conversation is thought to have a positive impact on this compensation and on opposition mitigation in general (1: +2). One participant mentioned:

> *"Dialogues are always the most important tool for opposing parties to come together and reach consensus. Especially in opposing interest situations, engaging in conversation in a constructive and intensive manner can bring the two sides closer together."* (R3).

Offering larger shares of benefits to local citizens who are affected by the arrival of a solar park is not regarded to be effective (21: -1). Related to this statement is the influence of financial incentives such as subsidies on the increase of acceptance for solar parks. It is namely believed that those incentives

are not necessary to increase acceptance at all (14: -4). Explanations by respondents regarding the functionality of subsidies are the following:

> *"Acceptance is acquired through participation in the development and exploitation phase, not through subsidies."* (R8), and *"Solar parks must be able to operate on its own power, without any interference by the national government. This should be done by municipalities and local citizens through the use of cooperation's."* (R9).

These notions again underline the balance between governmental influence and individual, shared ownership which is characteristic for this factor. Another interesting observation relates to the comment done by respondent 9 (R9) as mentioned above. Although there is a great role for local energy cooperations, it is not regarded to have the greatest impact on increasing acceptance for solar parks, as including those cooperations would only marginally help (5: +1). In conclusion, this factor clearly emphasises the role of shared ownership, but with a certain amount of governmental influence, especially in the process of awareness-raising. Therefore the factor is named 'Combining top-down and bottom-up'.

4.2.2 Factor 2: Own and pay together

Factor 2 has an EV of 2.31 and explains 21 % of the study variance. Three participants are significantly associated with this factor, who are females from the actor group 'municipality'. This factor emphasises the value of shared ownership and the role of financial elements in the mitigation of opposition and disregards the position of governments in this process.

Factor 2 distinguishes itself through six different statements (**Table 4.5**).

Statement number	Statement	Sort value and confidence interval
10	Shared ownership is a good method to increase acceptance	+4 (**)
14	Incentives, like subsidies, are necessary to increase acceptance for solar parks	+1 (**)
17	Next to financial participation and shared ownership, local residents should be given more decision-making power in solar park projects for increased acceptance	-1 (**)
23	Spreading project information among local residents in an early stage of the process creates increased understanding and acceptance	+3 (*)
15	Financial advantages help increase the support for solar park projects	+2 (*)
1	Engaging in conversation with people who disagree with the solar park project is the most important way to increase support	-1 (*)

Table 4.5: Distinguishing statements for Factor 2 (** indicates confidence interval of P < 0,01; * indicates confidence interval of P < 0,05)

Having six distinguishing statements, factor two sets itself apart from the other factors. For this factor, three notions arise from **Table 4.5**. Firstly, shared ownership is perceived to have a great influence on the process of mitigating opposition. It can even be stated that shared ownership is regarded as the ultimate way to improve levels of acceptance (10: +4). An important aspect of shared ownership is the inclusion of local citizens from an early stage, throughout the whole process. This includes a thorough and transparent share of documentation to affected people, for the purpose of them having the best opportunity to know the project in detail and to be convinced that the realization of the solar park is necessary and important (23: +3). Rather contradictory, the importance of this inclusion, engaging in conversation with opposing people to create acceptance is not thought to be functional (1: -1). Secondly, however, even though inclusion and participation are important, decision-making power should not be allocated to residents as it is perceived that this would not improve levels of acceptance for solar parks (17: -1). Financial elements are also important in raising acceptance, such as financial benefits. Those advantages can be discounts on energy rates, free solar panels for resident's own roofs, etc. (15: +2). Compared to those advantages, the use of subsidies for increased levels of acceptance is not as significantly functional, as this factor remains relatively indecisive about the role of those subsidies (14: +1).

Shared ownership is perceived to have a great influence on the increase of acceptance, as mentioned above. One respondent described:

> *"Shared ownership increases the involvement of individuals into a solar park initiative. This also gives a sensation of ownership and responsibility, both being a good basis for a solid support base."* (R10).

Even though the role of shared ownership is thus important, there is also a notion on a more moderate view on shared ownership: implementing shared ownership does not automatically lead to increased

levels of acceptance (4: +2). Related to this is a clear notion that, although shared ownership can be functional, 100% shared ownership is not a viable goal to set (7: -4). Respondents commented on this statement by mentioning that this goal:

> *"(…) is not realistic"* (R6), and *"not every person will agree with a solar park in their back yard, so 100% shared ownership is unrealistic. There will always be people who keep their standpoint and will never consent with the arrival of a solar park close to their dwelling."* (R10).

It is further interesting that there is no role put away for the government in the process of realising solar parks since there is no need for awareness-raising campaigns led by the municipalities (9: -2), there is no lacking nation nation-wide vision on renewable energy (25: 0), and different approaches by municipalities are also not required (20: 0). There is a significant role put away for the way information is communicated to involved people, and how this process is documented in the media (23: +3). One respondent elaborated by saying:

> *"Media and newspapers are more focused on bad news than on good news, since bad news sells better. Titles of articles often include proverbs like 'mega', 'giga', or 'biggest', which is not meant in a positive manner. (…) Also, more attention is given to people opposing the project, rather than people being in favour of it. And, if 6 people out of 100 oppose, is there a lot of opposition? (…) Media have a large role in acceptance and awareness-raising with regard to solar parks."* (R7).

To summarize, shared ownership, tailored to the specific situation, in combination with financial advantages and clearer communication and documentation of the project towards residents and in media characterize factor two, and thus is named: 'Own and pay together'.

4.2.3 Factor 3: Aesthetics first

Factor 3 has an EV of 1.65 and explains 15 % of the study variance. Two participants are significantly associated with this factor, who are females from the actor groups 'municipality' and 'residents'. The emphasis of this factor regarding opposition mitigation is put on a needed increased role of governments, and on the aesthetical characteristics of solar parks as the main cause of the occurrence of opposition.

Factor 3 distinguishes itself through three different statements (**Table 4.6**).

Statement number	Statement	Sort value and confidence interval
25	Renewable energy projects suffer from a lack of a nation-wide vision for guiding the project process	+3 (**)
18	People who do not live directly adjacent to a solar park are not truly involved and thus do not have a say in the project	+2 (**)
16	The concept 'renewable energy' has lost part of its positive image in the past years	+3 (*)

Table 4.6: Distinguishing statements for Factor 3 (** indicates confidence interval of P < 0,01; * indicates confidence interval of P < 0,05)

From **Table 4.6**, it becomes clear that consensus has been reached on multiple topics. First of all, it is perceived that the national vision on renewable energy projects is lacking and requires a different national approach (25: +3). This would mean that governments, both national and local, will be more involved in the realization process of solar park projects. Secondly, it is perceived that people are seeing renewable energy different than they did some years ago. Where renewable energy used to be a concept that was associated with mostly positive notions such as 'better for the environment, good for future generations' and so on, it has lost this positive image and is now related to difficult project processes, opposition and frustration among residents (16: +3). It is perhaps perceived that more governmental influence in solar park projects would generate a more positive image, and thus would increase acceptance. Thirdly, determining which citizens are truly involved in the project and thus have a say in it is complex, since it is perceived that only people who live directly adjacent to solar park project areas are involved, and people who live further away are not (18: +2). Increased governmental guidance might offer a solution to this difficult notion since the choice regarding which citizens to include in project processes can create frustration and opposition against the project itself.

Even though it is not emerging from the distinguishing statements from **Table 4.6**, aesthetics play a large role in the negative image of solar parks, and the occurrence of opposition against them (3: +4). One participant explained this by saying:

> *"Solar parks are ugly, period. The camouflaging techniques used to hide the facilities from the line of sight, such as vegetation and embankments, do not work good enough. This is especially the case in locations in or close to natural areas."* (R4).

Losses of landscape value are therefore problematic for this factor, and increased benefits of the facility to local citizens would only marginally help to mitigate this loss (21: +1). Incentives such as subsidies are in contrast not seen as functional, as one respondent mentioned:

> *"Subsidies are regarded to be money that belongs to society which only goes to large companies. Increased use of subsidies would only undermine support for solar parks."* (R2, 14: -3).

The role of shared ownership is also not significant, as there is consensus on the notion that shared ownership does not automatically lead to higher levels of acceptance (4: +1). When observing this in light of more governmental influence, it has been indicated that more governmental guidance is required with regard to a clear vision on renewable energy (25: +3). One respondent mentioned:

> *"The national government can take a more firm role in the allocation of areas suitable for energy development, or in the clarification of boundaries and requirements. The national government has currently let its role slip away and has given all the decision-making power to municipalities, who are in most cases unable to make these decisions correctly."* (R2).

In conclusion, the most important notions which characterize factor 3 are: (1) increased governmental and municipal influence, (2) limited roles for shared ownership approaches and (3) undecisive positions regarding financial benefits and incentives. Since the aesthetics of solar parks play such a large role in the whole discussion regarding opposition, this factor is named 'Aesthetics first'.

4.2.4 Factor 4: Communalism: own together

Factor 4 has an EV of 1.54 and explains 14 % of the study variance. Two participants are significantly associated with this factor, who are male and female from the actor groups 'residents' and 'nature preservation organisation'. The key emphasis of this factor regards the role of shared ownership in mitigating opposition, where no significant role is perceived for financial elements.

Factor 4 distinguishes itself through two different statements (**Table 4.7**).

Statement number	Statement	Sort value and confidence interval
7	100% shared ownership for local residents is viable and increases acceptance for solar parks	+4 (**)
2	The position of local residents is not taken seriously enough by the project initiators	+3 (**)

Table 4.7: Distinguishing statements for Factor 3 (** indicates confidence interval of P < 0,01; * indicates confidence interval of P < 0,05)

Table 4.7 shows the importance of shared ownership for factor 4. It is even perceived that aiming for 100% shared ownership is a viable goal and would increase acceptance for solar parks significantly (7: +4). One respondent mentioned that:

> *"Aiming for 100% shared ownership for local citizens would prevent large foreign companies from buying or taking over the park, as has happened in the past in other locations."* (R5).

Another respondent mentioned that it is important that:

> *"People have control over their own surrounding area."* (R11).

This relates to the other statement indicated in **Table 4.7**, mentioning that currently the position of local residents is not taken seriously enough and should thus be approached with more weight (2: +3). There is an apparent perception among stakeholders that more control should be taken into their own hands. This includes the allocation of decision-making power to those residents, which is currently not done sufficiently (17: +2). Even though shared ownership does have great potential, and even 100% shared ownership is viable, there are still some thoughts among participants which say that shared ownership is not automatically the correct way to guide processes of solar park project realisations and that implementing shared ownership approaches does not automatically lead to increased levels of acceptance (4: +2). Nor is it seen to be the solution for acquiring higher levels of acceptance (10: -1). With a great focus on shared ownership, financial elements are not a significant contributor to lower levels of opposition, as the perception on this topic is rather indecisive (15: -1). As is the case for financial elements, governmental influence only plays a detrimental role in improving acceptance, as awareness-raising campaigns executed by municipalities are not deemed necessary: only a marginal increase of citizen involvement in the scouting of possible locations for future solar parks would be preferred (9: -2, 24: +1). There is further consensus on various aspects which do not really play a role in increasing acceptance. It is, for example, not needed that more benefits are allocated to local citizens in current plans to compensate for losses of landscape value (21: 0). Also, in government-led projects, more citizen involvement would not influence the project outcomes significantly (20: 0). To conclude, it is eminent that shared ownership, although there is consensus regarding its non-perfect nature, is indeed the preferred approach towards the guidance of solar park projects, as it is believed that this would reduce opposition the most. However, no value is observed in the role of financial elements in creating higher levels of acceptance. Hence, this factor is named 'Communalism: own together'.

4.3 Consensus statements

Apart from the distinguishing statements used to form the narratives in the previous sections, I found that a selection of statements to be loaded in a similar way within all factors. In other terms, these are statements that did not distinguish one factor but are similarly loaded for all factors. These statements are shown in **Table 4.8**. In this table, the Q sort value (Q-SV) per factor for each of the consensus statements is provided which correlates with the value those statements have in the factor arrays.

α	Statement + number	F1 Q-SV	F2 Q-SV	F3 Q-SV	F4 Q-SV
	(3) Aesthetic values are the most important reason why local residents oppose to solar parks	+4	+2	+4	+3
*	(4) Shared ownership does not automatically lead to higher levels of acceptance	0	+2	+1	+2
	(8) Local energy projects must be legally obliged to provide secure and long-lasting employment to local communities in proportion to the size of investment.	-3	-2	-1	-2
*	(19) Policies regarding the acceptance of solar parks must be more clearly defined and conveyed to residents	0	+1	-1	-1
	(20) Municipalities must choose for area-based approaches where, together with local residents and interest organizations, prerequisites are created for financial participation	0	0	+1	0
*	(21) To compensate for losses of landscape value, a larger share of benefits from solar parks should be going towards local residents	-1	-1	+1	0
*	(22) Promised advantages for local residents are perceived as being too good to be true	-1	-1	0	0
	(24) More efforts should be made to include local residents into the scouting of possible locations for solar parks	+2	+1	+1	+1

Table 4.8 – Consensus statements (α: confidence interval: ** indicates confidence interval of P < 0,01; * indicates confidence interval of P < 0,05)

Regardless of the perception or viewpoint participants have in relation to mitigating opposition against solar parks, there are topics on which general consensus is reached between the discourses. In particular, there is a significant emphasis put by all discourses on the role of aesthetical values of solar parks in the emergence of opposition. This relates to another key consensus between the discourses regarding compensation for losses of landscape value: all viewpoints say that there is no need for more benefits going to local residents to compensate for the lost landscape value. Only factor 3 sees a marginal value in the contribution of those increased benefits as a means to generate more acceptance. Another interesting consensus is reached on the functionality of shared ownership: although the narratives I described in the previous section indicate that, for example, factors 1, 2 and 4 see a great value in the application of shared ownership into the increase of acceptance, there is general agreement that this shared ownership is not automatically the perfect method for this purpose. Although shared ownership is thus generally not the perfect method for this purpose, it is perceived that citizens should be more included in the entire process, including the process of location scouting for possible future solar parks. Job opportunities generated through local energy projects are not regarded to be important for the increase of acceptance, followed from a clear consensus reached between factors 1, 2 and 4. Factor 3 is marginally more neutral on this point but still does not see any significant value in relation to mitigating opposition. Furthermore, there is also little influence of a more clear explanation of policies towards residents, as most discourses are neutral on this statement with values ranging between -1 and +1. Another interesting consensus is reached on the specific creation of rules for financial participation. Even though the discourse from factor 2 does value the role of financial incentives in the process of increasing acceptance, there is consensus with the other discourses on the topic of the role of municipalities in creating the shared ownership scheme together with citizens and local organisations, where this municipal influence does not have any effect on the level of acceptance for the solar park. From this, it becomes even more apparent that financial involvement in a solar park has certainly not a direct effect of increased acceptance. Finally, all

discourses are neutral on the promised advantages to local residents where it is not believed that those advantages are unrealistic and too good to be true.

To summarise this section, I can state that (1) little can be done to compensate the perceived losses of landscape value, (2) the role of shared ownership into increasing acceptance for solar parks is, on the one hand, functional, but on the other hand, not necessarily a successful mean to create acceptance, and (3) residents should be included much earlier in the planning process of a solar park, even when the arrival of a solar park is not even decided upon yet. In the following sections, I discuss the findings from this section and draw conclusions from them.

5. Discussion

In this thesis, I have formulated one research question and two sub-research questions. The primary research question "*What do people involved in Dutch solar park projects perceive to be the most beneficial methods to reduce community resistance*?" is assisted by two secondary research questions which help to answer the primary research question. These two questions are (1) *"Can the concept of Community Energy, with its focus on shared ownership, have any influence on the process of mitigating opposition?"* and (2): *"How does people's perception of equal divisions of costs and benefits affect the process of mitigating opposition?"*.

With these questions, I aim to provide insight into the relationship between concepts designed in academics and real-life interpretations and perceptions of those concepts among people who are directly affected by the realization of a solar park. These insights create a better understanding of the effects of those concepts, and what affected people really desire in terms of opposition mitigation.

5.1 Main findings

Q methodological research on the case of solar park 'Zomerdijk' in Wanneperveen, the Netherlands has exposed various perceptions, opinions and feelings of people involved in this project regarding the ways in which acceptance for the solar park can be increased. Based on five scoping interviews, and 13 survey responses out of which 11 valid responses, I have shown four separate discourses of the four most common viewpoints among those participants. Three main findings have emerged from the data analysis, which I explain in this section.

First and foremost, it has emerged that shared ownership is regarded differently by involved people than by policymakers. As I showed in this thesis, policies have been primarily focused on implementing shared ownership as a means to prevent opposition and increase acceptance. This also shows from the notion that the work by Walker & Devine-Wright (2008), which also gives a significant role to shared ownership into their framework of Community Renewable Energy, is regarded to be one of the most influential works on the topic of planning renewable energy projects. Additionally, the Regional Energy Strategy (RES) of the area in which the studied case is located has put specific and significant emphasis on their desire to implement shared ownership in these projects (**Section 2.4**). Regarding the role of shared ownership, the findings in **Section 4** show two perceptions: on the one hand, there is the viewpoint, shared between various discourses, that shared ownership is indeed a good method to increase acceptance during the realization of a solar park. Multiple statements regarding shared ownership have received scores that indicate that shared ownership is indeed functional into opposition mitigation. On the other hand, however, there is consensus between most discourses indicating that implementing shared ownership does not automatically lead to increased acceptance. Interestingly, the discourses which included significant assumed functionality of the application of shared ownership (Factor 1, Factor 2 and Factor 4, respectively), also agreed on the notion which says that it is not a natural effect of shared ownership to lower opposition. Apparently, there exists a hiatus between the perceptions of policymakers and the perceptions of the people who are affected by those policies regarding the role of this shared ownership. Policymakers and academics are mostly convinced of the suitability and functionality of applying shared ownership in projects such as the case studied in this thesis, but people who need to participate in those schemes are not equally convinced. It is very well possible that this hiatus makes the process of managing opposition and creating more acceptance for solar parks vastly more complicated. Policymakers and project initiators who are obliged to comply to those policies do not speak the same language as the people who get affected by those policies, which could lead to a lack of understanding between the two parties. If those initiators are convinced that shared ownership must be applied in order to create acceptance and support for a solar park, but citizens who are affected or involved in the project see this differently, reaching a consensus could be nearly impossible. For solar park project processes, this hiatus must be acknowledged and approached accordingly.

Secondly, I found that the role of financial elements in the mitigation of opposition is not without its caveats. This point does have a relation with the previous argument, since financial elements, or the division of benefits as it is called in Community Energy, are often included in shared ownership schemes (**Section 2.4.3**). Just as was the case for shared ownership, the factor interpretation from **Section 4** indicates two viewpoints with regard to the influence of financial elements on the increase of acceptance for solar parks. One viewpoint clearly sees a significant value in the offering of financial benefits to citizens in order to increase acceptance for the solar park. This viewpoint (Factor 2) has put significant emphasis on the role of subsidies, and financial benefits in general. People associated with this viewpoint are under the perception that acceptance levels would increase if the project executive parties would increase the amount of financial benefits for people who are affected by the solar park. These financial benefits are, for example, revenue from the solar park itself, discounts on energy rates, or free solar panels for their own houses. However, another viewpoint arises also which does not see an equal contribution of those financial elements into the mitigation of opposition. Factors 1, 3 and 4 score significantly lower on the statements about financial elements, thus saying that they are not of any significant influence on creating higher levels of acceptance. The interesting thing about this split in perceptions with regard to this topic is that, as counts for the previous argument regarding shared ownership also, many policies include financial elements in their prescribed processes to manage opposition. Since this application is done often in policies, it is surprising to see that the people who are the target group for these financial elements do not perceive this to necessarily lead to higher levels of acceptance.

The final observation I made based on the data regards a difference in perceptions within certain stakeholder groups. Firstly, different citizens look differently at the entire process of opposition mitigation. Since these citizens all have different backgrounds and can have different opinions on the topic of solar parks, this occurrence is not surprising. What is surprising, however, is that municipality employees who participated in this study all loaded significantly different on multiple topics and were significantly associated with three factors: Factor 1, 2 and 3. As I showed in **section 4.2**, especially Factor 2 encompasses a vastly different viewpoint as compared to the other factors, with the biggest difference between Factor 2 and the other factors being the significance of the role of shared ownership and financial incentives in the process of mitigating opposition. This means that within the municipality, there is little consensus with regard to the preferred methods to approach issues regarding opposition against solar parks. With this lack of consensus, it can be problematic for municipalities to be able to provide clear and functional frameworks for this issue. In the already complex process of convincing opposing people to the functionality and necessity of a solar park, it is important for the message which is communicated to those people to be coherent and clear. When there are different viewpoints within the group of people who play an important role in this communication process it can lead to misunderstanding among citizens who feel this lack of consensus, making it even harder to change their perceptions.

These findings, especially the first two, emerged as two surprising findings. In a policy domain in which such a significant emphasis is put on the use and the success of shared ownership and financial benefits, I expected that citizens who need to participate in these schemes regard them in a similar fashion. Observing this gap between the perceptions of policy makers and project initiators on one side, and citizens and other stakeholders on the other side leads me to the statement that, besides these two concepts, new concepts are necessary for the purpose of mitigating opposition. I explain this statement further in **Section 5.3**.

5.2 Other findings

Besides the three main findings as I explained in the section above, two other interesting findings are noteworthy.

Firstly, an overwhelming consensus between all four factors was reached on the origins of opposition against solar parks, which was found to lie in its aesthetic characteristics. Due to the way solar parks look, or the unattractiveness, they impact landscapes negatively and, according to involved people, lower the landscape value of the area around it. This is also exactly why the process of mitigating opposition is found to be so complicated and has so many different viewpoints: the opinions and feelings of individuals need to be managed in order to create acceptance. And one perception might differ compared to other perceptions. Especially when it comes to lower landscape values, some people attach more value to this than others.

A second interesting notion I took from the results is that early citizen involvement in a solar park project would lower the opposition in an earlier stage. Making this intervention early in the process through the clear and quick provision of information and documents, or the inclusion of citizens into the scouting process of possible locations for solar parks leads to the negative feelings of citizens not being able to grow and become so important that anger and frustration have the leading hand in the conversation of the solar park.

5.3 An answer to the research questions

Relating the findings to the theoretical concepts which I explained in **Section 2.4**, three relations must be explained in this section. These notions relate to the concepts of Community Energy, Energy Justice and NIMBY-ism. After these three notions, I provided an answer to the primary research question as I formulated in **Sections 1 and 2.3.1**.

Firstly, the first main finding is related to Community Energy, as explored by Walker & Devine-Wright (2008). The role of shared ownership in the realization of renewable energy projects is significant within this framework. It is believed that, when citizens are partially or fully the owner of a project, they feel more attachment to it and also feel that they are true participants in that project (**Section 2.4.3**). As I explained earlier, this framework has been designed primarily for avoiding occurrences of opposition altogether, based on intensive participation and ownership from the beginning of renewable energy projects. The first secondary research question, as I formulated in **Section 1**, asks the question if this framework also has its functionality in the process of mitigating opposition. From the findings in **Section 5.1**, I can answer this question with two answers: yes and no. The former relates to the discourse in which part of the participants in this study saw a great value in the application of shared ownership in situations where opposition had already emerged. Shaping the framework of Community Energy according to this different side of opposition is therefore observed to be functional. However, the latter relates to the functionality of shared ownership only to a certain extent. Other discourses have clearly indicated that although shared ownership could be a good method to reduce opposition and increase acceptance, there should be no automatic assumptions that applying shared ownership automatically leads to increased acceptance. Going back to the research question related to this issue, I argue that it is useful to apply an altered version of Community Energy with a focus on shared ownership on situations where opposition has emerged among citizens, but caution must be taken when applying this framework since its functionality depends on the people who need to participate. Therefore, it is important for the project initiators to only work with shared ownership if the people who need to participate in these shared ownership schemes are in favour of the process. If not, different avenues need to be taken in order to convince those people to change their perceptions of the project.

The second main finding, i.e. the role of financial elements, relates to the concept of Energy Justice in process of renewable energy project realization. As explained in **section 2.4.3**, Energy Justice focuses on whether or not costs and benefits are divided equally between all stakeholders involved in a renewable energy project. When I observe the three questions designed by Jenkins et al. (2016) which are designed to apply Energy Justice as a decision-making tool, the third question (i.e. 'how can injustices be revealed and reduced'), the reduction of injustices is often done through the allocation of financial benefits to local citizens. I found that the role of these financial elements is not as successful as is thought by policymakers (**section 5.1**). Financial elements are often used in an attempt to compensate for the burdens citizens experience due to the impact of a renewable energy project, and in this case a solar park. I could derive from the data that these financial elements are not undisputed and that these are not sufficient to create a more equal division of costs and benefits. The costs are experienced with a greater magnitude than the benefits can offer. Thus, an equal division between costs and benefits as included in the Energy Justice debate is difficult to reach, and allocating a larger share of benefits to those people who oppose the project does not necessarily lead to higher levels of acceptance. As counts for the notion of shared ownership which I explained in the previous paragraph, the approach towards people involved in projects such as the solar park project in this study must be customised according to the individual who is involved. If that person is not responding to financial benefits, different alternative methods must be explored.

Thirdly, I can connect one of the secondary findings from **Section 5.2** to the concept of NIMBY-ism as explained in **Section 2.4.3**. In the case of solar park Zomerdijk, overwhelming consensus was reached on the reason why opposition can emerge against solar parks, which was its aesthetical values. NIMBY-ism notions also often relate to this finding since most people are often not against renewable energy, but do not want to see the project realised close to their dwelling, or not near a natural area. I can state that NIMBY-ism is the problem that lies at the foundation of most occurrences of opposition, as was the case in the project of solar park Zomerdijk.

This brings me to provide an answer to the main research question: "*What do people involved in Dutch solar park projects perceive to be the most beneficial methods to reduce community resistance*?" (**Sections 1, 2.3.1**). I answer this question by indicating what the participants in this study do not regard to be good methods to reduce community resistance. In this study, I have shown that known methods for approaching people who are in disagreement with renewable energy projects are not perceived to work as good as the literature suggests. Thus, the answer to the question above is as follows: shared ownership and financial elements do indeed provide opportunities to increase acceptance but are not perceived to be the most beneficial methods to reduce community resistance. Due to the fragmented perceptions among involved people regarding these topics, but also regarding governmental influence, no one method emerged as the most beneficial method to reduce community resistance. This notion is important because it indicates that the contemporary beliefs of policymakers and academics regarding the ways projects must deal with occurrences of opposition must be revisited. New ways of opposition mitigation must be searched which break loose from the current policies. In the next section, I provide recommendations for future research in which this plays a significant role.

5.4 Recommendations for future research

In this study, I have exposed the perceptions of people involved in a solar park project in relation to established frameworks for approaching opposition. **Sections 5.1 through 5.3** showed that these perceptions are not totally aligned with the current consensus between academics. In this section, I indicated what this could mean for future research.

Firstly, more studies such as this study can be executed which analyse different solar park projects in a similar fashion. This creates a wider view of the perceptions of people who are involved in different projects. This could also show possible differences in perceptions between regions and countries.

Secondly, similar methods as I applied in this study could be applied to different types of renewable energy projects (e.g. wind park projects), which could expose whether or not the issues I indicated in this study are only true for solar energy, but also renewable energy sector-wide. Thirdly, research can be conducted related to the notion at the end of the last paragraph of **Section 5.3**, where I argue that different tools besides shared ownership and financial elements must be explored. The exploration of the specific characteristics, and their successfulness in the mitigation of opposition can be subject for future research. This novel tool can be a tool that is already known in relation to preventing opposition (such as Community Energy and Energy Justice were in this study), but can also be a completely newly designed approach.

These three gaps are the most notable possibilities for future research. In the next section, I explain the limitations of the current study.

5.5 Limitations

In the outcomes of this study, I indicated a multitude of elements that have an influence on the opposition against solar parks. Regardless of these findings, I encountered some limitations during the duration of this research. First of all, due to the ongoing Covid-19 pandemic during the full duration of this research, data collection has been challenging. Data collection for a Q methodological research is under normal circumstances done through visiting participants and guiding them in their task of filling in the Q sorting grid (**Figure 2.3**). Even though the explanation can be as thorough as possible, it can still be challenging for some respondents to fill in the figure correctly. Due to the ongoing pandemic, this data collection has been done fully at distance, mostly by email and in some cases by physical letter. On multiple occasions, the initial responses of filled in Q sorts were either incomplete or incorrect. This would probably not have happened if visiting the participants would have been possible. As a result, two responses could not be used in the data analysis since one was missing values, and the other was filled in incorrectly because this person misunderstood the task. Secondly, related to this is the number of responses. Because all contact had been going through online sources, collecting responses has been challenging. After having contacted a significant number of people, some of them two or three times, 13 responses were collected. Q methodological research does not have any hard limits attached to it with regard to the number of responses, however, as counts for most research: the more responses, the better the view is of the perceptions of all stakeholders. Thirdly, the stakeholder group 'municipality' was compared to the other stakeholders overrepresented in terms of the number of responses. This was an unintended consequence of the methods I was forced to apply to contact people, where it worked apparently well for municipality employees to be approached in this fashion. Fourthly, the case I choose is a case that is in the preparation phase of the project. While this provided a clear insight into the perceptions which are at play during a project rather than after the fact, there was some hesitation by the initiating parties with regard to my possible influence on the project process. I was requested by those initiators to not approach one interest organisation in the village of Wanneperveen due to the tense and sensitive past the two parties had experienced. There was extreme caution taken by the project initiators since multiple important conversations were scheduled just shortly after this research. Since the case itself was very suitable, and other involved people were still approachable, the exclusion of this stakeholder has not had a significant influence on this research. It would have been beneficial to include the perceptions of this stakeholder, but the study could still be executed without this input.

6. Conclusion

Opposition against renewable energy projects has been an ongoing problem for policymakers and project initiators for quite some years. Since those occurrences of opposition could hinder and slow down the transition towards a renewable resource-based society, emerging resistance is not desired. Multiple concepts and frameworks have been designed which are meant to avoid occurrences of opposition against those projects altogether. However, with the main focus on preventing opposition, its applicability to mitigating opposition during the project process is not established. In this thesis, therefore, I aim to provide insights into the perceptions of people involved in a solar park project regarding the mitigation of opposition. Hence, the following research question has been central in this study: "*What do people involved in Dutch solar park projects perceive to be the most beneficial methods to reduce community resistance*?". Through the application of Q methodology on a solar park project in Wanneperveen, the Netherlands, the perceptions of various stakeholders have been exposed with regard to the mitigation of opposition. A combination of interviews and Q methodological surveys resulted in the exposure of the four most common viewpoints existing among the people who participated in this study. These viewpoints show that the established frameworks Community Energy and Energy Justice for preventing opposition are not undisputed. Applying shared ownership for the purpose of increasing acceptance is not by all involved people regarded as a necessarily functional way to reach lower levels of opposition. The same is found for the application of financial elements to create more support for solar parks, where offering discounts on energy rates, free solar panels or profit from the solar park itself, for example, are also not perceived to lead automatically to more support for the solar park. Fragmented perceptions also emerged related to the role of governments in the process of mitigating opposition: some discourses did see a great value in increased governmental influence while other discourses perceived the opposite and were more aimed at a bottom-up planning approach with little governmental influence. I found that the answer to the primary research question, thereafter, is not an indication of the most beneficial methods, but explains which methods are not perceived to be as beneficial as policymakers and project initiators perceive they are.

The findings from this study indicate a number of aspects for the discipline of planning practice. Methods currently existing in the planning field for preventing opposition, specifically Community Energy and Energy Justice, are only applicable to a certain degree for mitigating opposition. Therefore, in addition to the two concepts explored in this study, novel frameworks need to be explored which would complement these existing frameworks. Mitigating opposition against solar parks, and renewable energy projects in general is an important process that has a great influence on the success of such a project. Contemporary planning practice in the Netherlands lacks the presence of policies indicating how this process must be approached. There should, therefore, additionally to the exploration of new frameworks, be policies that clearly indicate how these issues need to be approached by project initiators. Creating a coherent and uniform policy on this issue for all renewable energy-related projects leads to a better understanding of these processes in itself, and creates more clarity towards the involved citizens who might oppose such a project. This results in a faster transition towards a renewable energy based society.

7. Reflection

After the finalisation of this thesis, I have reflected upon the process I have gone through. In this section, I indicate what went well, what could have been better and how I experienced this past 9 or 10 months.

At the start of this master thesis process, I was quickly able to come up with a significant topic to explore in this study. During my years of studying, I have found out that issues regarding sustainability and energy often caught my attention. Also following from an essay I wrote for the Course of EIP: Interactive Workshop in period 1A of this master which was also on the topic of solar energy and opposition, the topic for this thesis came to me naturally. I really see opportunities in the management of opposition against renewable energy projects since the reports on these occurrences are encountered so often in the news. I was therefore content with my choice of research topic and it turned out that it was a well comprehensible topic to use for a master thesis. The research process itself has been going pretty well in my opinion. In the first few months, I focused naturally first on the creation of my research proposal, and after that on the literature research and theoretical framework. Since this part of the research is so important for the quality of the study, I put quite some time into this part. The methodology, which I started to work on while I almost finished my theoretical framework, did give me some challenges. Before I started with this research I was not aware of the existence of Q methodology. After conversations with my supervisor, who is highly experienced with this method, I found that it was eminently applicable to the research problem I had framed. After diving into this method, I understood what was needed to apply this method and thus was able to complete my methodology. The data collection phase had things that went well and things that could have gone better. Scheduling interviews with participants did go well as I was able to find plenty of people who were glad to participate in this study. Contact with one person has been challenging, as setting a date for the interview took quite a while. Another challenge was that the project initiating party requested me to not approach one stakeholder in the project which was a village interest group. This group has voiced very strong opposition against the arrival of the solar park near the village of Wanneperveen, and the project initiators were afraid that my research would negatively influence the upcoming conversations between the two parties. This was unfortunate since the perceptions of this group would have been interesting to observe. Since I did not want to cause any form of disturbance in the process I naturally obliged to the request by the project initiator. In general, this part of my research went successful. Collecting data in the form of the Q sort questionnaires, however, went more difficult. Since the task for the participants is not as straightforward as filling in a traditional questionnaire, respondents sometimes did not fully understand the task and thus resulted on a few occasions in incorrectly filled in Q sorts. Most of these could be solved through some follow-up emails and phone calls, but unfortunately, not all incorrect responses could be resolved. As the ongoing Covid-19 pandemic prevented me from visiting the responses in person, it made this process somewhat more difficult than it would usually be. Also, gathering the responses in general took quite some time. In hindsight, I overestimated the ease of this phase as I thought beforehand that it would be pretty easy to gather plenty of responses in two weeks, and for a future research would start earlier with the data collection. After two weeks since I started collecting surveys, I had only received 6 responses. At the time this made me a quite nervous since time was not unlimited until I had to start with the analysis phase. After some more emails, however, I was luckily able to gather some more responses. In the end, 11 responses were found valid and able to include in the data analysis phase. For a Q methodological study, this is plenty to get solid results from the analysis. I did aim to get more responses, but taking the Covid-19 situation into consideration and my own (a little too) optimistic view on this phase, gathering 11 responses has turned out to not pose any problems. Data analysis in itself was straightforward and went well. The results I found in this study have been rather surprising for me. The established hiatus between perceptions of policymakers and other stakeholders is not something I expected to establish. Regardless, the results showed a significant statistical strength, and

I regard them as convincing results from the analysis. Drawing conclusions, therefore, was doable and comprehensible.

All in all, I enjoyed working on this thesis a lot, and I learned much about new research methods, conducting a master thesis in general and on the topic of opposition against renewable energy projects.

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9. Appendices

9.1 Appendix A – Interview guide (in Dutch)

Algemeen

- Q1 – Kunt u iets over uzelf vertellen? Naam, leeftijd, werk
- Q2 – Wat is uw betrokkenheid in het project zonnepark Zomerdijk?
- Q3 – Wat is voor u het belangrijkste aspect van dit project?

Houding met betrekking tot duurzame, en meer specifiek zonne energie

- Q4 – Als u denkt aan duurzame energie, wat is het eerste wat in u opkomt?

- Q5 – Op dit moment zitten we als maatschappij middenin een transitie naar duurzame energie. Wat is uw mening met betrekking tot deze transitie?
    - Vindt u deze transitie belangrijk? Waarom?

- Q6 – Nederland gebruikt verschillende technieken voor het opwekken van duurzame energie. Wat vindt u van deze technieken, en van de manier waarop zulke projecten gerealiseerd worden?

- Q7 – Gedeeld eigenaarschap is een voorkomende strategie met betrekking tot duurzame energie projecten. Wat verstaat u onder gedeeld eigenaarschap?
    - Alleen financieel, of ook op een andere manier?

- Q8 – U bent op een bepaalde manier betrokken in een project voor de realisatie van een zonnepark. Wat is uw mening over energie verkregen uit zonneparken?
    - Is deze manier van energie opwekken belangrijk in de transitie naar een duurzame samenleving?
    - Is een beter gestructureerd beleid vanuit de nationale overheid belangrijk voor de realisatie van zonneparken?

Oppositie tegen duurzame energie projecten

- Q9 – In het nieuws komen vaak berichten langs over oppositie tegen zonne- en windparken. Wat voor gevoel geeft het u als u zulke berichten leest?

- Q10 – Project zonnepark Zomerdijk heeft gedurende het project te maken gehad met oppositie vanuit verschillende hoeken. Wat voor effect heeft dit op het proces?

- Q11 - Wat denkt u dat de belangrijkste reden is voor deze oppositie?

- Q12 – Wat wordt er in deze situatie gedaan sociale acceptatie te verhogen?

- Q13 – Initiatief vanuit de lokale bevolking wordt genoemd als belangrijke factor in het voorkomen van oppositie. In de situatie bij dit zonnepark is het initiatief gekomen vanuit de overheid. Wat voor effect heeft dit gehad met betrekking tot de acceptatie voor dit project?

Oplossingen voor het verminderen van weerstand

- Q14 –Wat is volgens u de beste manier om, in situaties van weerstand, draagvlak te verhogen?

- Q15 – Wat verstaat u onder het begrip ‘energiegemeenschap’?

- Q16 – Vaak wordt dit toegepast om oppositie te voorkomen. Denkt u dat dit concept ook toegepast kan worden als er al een bepaalde mate van oppositie is ontstaan?

- Q17 – Bent u bekend met het begrip ‘milieurechtvaardigheid’?
- Wat verstaat u onder dit begrip?

- Q18 – Hoe wordt er in dit project omgegaan met ongelijkheden in de verdeling van voor- en nadelen?

- Q19 – Is er volgens u voldoende inspanning geweest om draagvlak in dit project te verhogen?

- Q20 – Heeft u nog toevoegingen die nog niet genoemd zijn in dit interview?

9.2 Appendix B – Concourse (in Dutch)

1. Zonneparken zijn nodig voor het behalen van de energiedoelen
2. Zonne- en wind energie zijn de beste methodes voor de winning van duurzame energie
3. De woningmarkt loopt achter op het gebied van energie-neutraal maken van woningen
4. De overheid moet zich meer inzetten voor het verduurzamen van woningen i.p.v. het aanleggen van zonneparken
5. De effecten van windturbines zijn slecht te overzien voor mensen die er niet in thuis zijn (slagschaduw, beweging)
6. Alternatieven voor windturbines moeten meer onderzocht worden
7. Zonne energie op land heeft meer toekomst dan wind energie op land
8. Zonne- en wind energie op land zijn allebei nodig voor een hernieuwbare samenleving
9. Zon op land is essentieel voor de transitie naar een duurzame samenleving
10. Zon op dak moet meer aandacht krijgen
11. Er moet een duidelijker beleid komen vanuit de nationale overheid m.b.t. de aanleg van zonneparken
12. Nederlanders zijn snel in het oordelen/protesteren over/tegen duurzame energie projecten
13. Duurzame energie projecten ondervinden meer weerstand dan bijvoorbeeld infrastructurele projecten
14. De ruimtelijke impact wordt overtrokken door mensen die oppositie uitten
15. Mensen missen het gevoel van urgentie m.b.t. de energietransitie
16. Draagvlak vergroten kost te veel tijd in het proces
17. Bepalen wie écht betrokken is bij een zonneparkproject is ingewikkeld
18. Mensen die niet direct naast een zonnepark wonen zijn niet écht betrokken
19. NIMBY-ism is de belangrijkste reden voor het ontstaan van weerstand
20. Landschapswaardes worden onderschat door mensen die het project vorm geven
21. In gesprek gaan met mensen die het niet eens zijn met het zonnepark is de belangrijkste manier om weerstand te verminderen
22. Financiële voordelen helpen voor het verminderen van weerstand
23. Wantrouwen richting de gemeente/overheid vermoeilijkt het tot stand komen van zonneparken
24. Overheden moeten meer doen om lokale initiatieven uit te lokken
25. Omwonenden vanaf het begin betrekken is belangrijk in het creëren van draagvlak
26. De uitvoerende partijen nemen de positie van omwonenden niet serieus genoeg
27. De ‘machtspositie’ van burgers in het kunnen blokkeren van zonnepark projecten wordt onderschat door de initiatiefnemers
28. Participatie met lokale bevolking moet hoger in het vaandel staan bij initiatiefnemers
29. Gedeeld eigenaarschap is een goede manier voor het verminderen van weerstand
30. Er is genoeg gedaan door initiatiefnemers om draagvlak te vergroten
31. Specifieke programma’s van gemeentes met de focus op duurzaamheid helpen bij het succesvol realiseren van zonneparken
32. Het is goed dat overheden initiatieven voor duurzame energie over laten aan de markt
33. Overheden zijn er alleen om beleid te maken, niet om initiatieven te nemen
34. Een transitie naar duurzame vormen van energieopwekking is essentieel
35. Gedeeld eigenaarschap is een goede manier voor het creëren van draagvlak voor zonneparken
36. Voordat zonneparken gerealiseerd gaan worden moet er meer aandacht gaan naar individuele manieren van energieopwekking, i.e. zon op dak, etc.
37. Stimuli zoals subsidies zijn noodzakelijk om weerstand tegen zonneparken te doorbreken (SDE)
38. Traditionele, grijze energie is te goedkoop in vergelijking tot duurzame energie
39. Lokaal eigenaarschap moet niet alleen voor omwonenden zijn, maar ook voor lokale bedrijven en stichtingen

40. 100% eigenaarschap is realistisch, maar 100% van het plan bekostigd door lokale bewoners en ondernemingen is een utopie
41. Naast financiële voordelen in gedeeld eigenaarschap is het erg belangrijk dat dit gedeelde eigenaarschap bewustwording veroorzaakt
42. Zonneparken moeten zo ingericht worden dat de omgeving ook voordelen krijgt m.b.t. natuur: een park om doorheen te wandelen, meer biodiversiteit, etc.
43. Nieuwe verdienmodellen gebaseerd op circulariteit zijn belangrijk voor toekomstige implementatie van zonneparken
44. Initiatiefnemers moeten zelf omwonenden betrekken zodat plannen binnen de beleidskaders van de gemeente vallen
45. Het is voor bedrijven en initiatiefnemers te moeilijk om zelf omwonenden te betrekken, hierin is meer sturing nodig vanuit de overheid
46. Initiatiefnemers beginnen te laat met het maken van plannen (voor aanvragen subsidie) waardoor participatie soms minder aandacht krijgt dan het had moeten krijgen
47. Het is logisch dat zonneparken minder weerstand ondervinden dan windparken
48. Gemeentes moeten meer macht krijgen om zonnepanelen op daken te kunnen realiseren
49. Voordat zonneparken gerealiseerd worden moet er meer aandacht gaan naar het geschikt maken van het elektriciteitsnet voor de grote hoeveelheden elektriciteit
50. Door meer bereikbare kennis over wind en zonneparken wordt het proces moeilijker met omwonenden (misschien verkeerde bronnen o.i.d.)
51. Klimaatontkenners zijn erg moeilijk te betrekken in projecten
52. Mensen die het oneens zijn met een zonnepark project laten zich veel meer horen dan mensen die het er wel mee eens zijn
53. Het betrekken van lokale energie coöperaties in het project door de initiatiefnemers helpt met het vormgeven van lokaal eigenaarschap
54. Initiatiefnemers moeten in de basis altijd samenwerken met lokale energie coöperaties voor het creëren van draagvlak
55. Gesprek aangaan tussen de botsende partijen is de belangrijkste manier van verhogen van draagvlak
56. Community energy is niet geschikt om toe te passen nadat er al weestand ontstaan is
57. Het is niet mogelijk om echt iedereen op elk moment te betrekken in het proces
58. De voordelen die beloofd worden aan het lokale belang worden gezien als schijntje
59. De nadelen van zonneparken wegen niet op tegen de voordelen
60. Esthetische waardes zijn de belangrijkste redenen die mensen aandragen waarom ze het niet eens zijn met zonneparken
61. Luisteren naar de weerstand door de initiatiefnemers is het allerbelangrijkste in het realiseren van zonneparken
62. Zonneparken verminderen de landschapswaardes (uitzicht)
63. Het is zonde dat zonneparken goede grond bezetten die beter voor andere zaken gebruikt zou kunnen worden (agrarisch)
64. Ondanks de negatieve zaken van zonneparken zijn ze wel noodzakelijk voor een transitie naar een duurzame samenleving
65. Windenergie heeft meer toekomst dan zonne-energie
66. De (financiële) voordelen van een zonnepark worden van tevoren te positief weergegeven
67. Er worden veel dingen beloofd vanuit de initiatiefnemers die te mooi klinken om waar te zijn: eerst zien dan geloven
68. Voordelen die beloofd worden vanuit de initiatiefnemers zijn mooier gemaakt dan ze zijn om draagvlak te creëren. Ik vraag me af of dit in de praktijk echt zo rooskleurig is
69. De onzekerheid m.b.t. de effecten van zonneparken op lange termijn zorgen voor voorzichtigheid over mijn positie t.o.v. zonneparken (2^{e} asbestprobleem)
70. Communicatie vanuit de initiatiefnemers naar omwonenden is goed en zorgvuldig

71. Extreme weerstand tegen zonne- en wind parken slaat door (voorbeeld Groningen windpark asbest)
72. Bewoners voelen alsof ze het afvoerputje van de gemeente zijn
73. Initiatiefnemers doen moeite om (financiële) compensatie te bieden voor de lasten die het zonnepark veroorzaakt
74. Het bieden van financiële compensatie met betrekking tot de lasten van een zonnepark helpen in het verhogen van draagvlak
75. Het aanwijzen van gebieden voor een mogelijk zonnepark zonder consultatie van omwonenden veroorzaakt veel weerstand
76. Gedeeld eigenaarschap is een belangrijke stap naar het verminderen van weerstand
77. De gemeente zou meer betrokken moeten zijn in het gehele proces van de realisatie van een zonnepark
78. Het is moeilijk om de weerstand die in het begin ontstaat ongedaan te maken
79. Locatiescans: een omgekeerde locatiekeuze is een goede manier om een locatie voor een zonnepark te kiezen (eerst initiatief, daarna kijken waar het kan (i.p.v. op de kaart kijken waar wat mag, en daarna initiatief nemen))
80. Door zonneparken op plekken te realiseren waar veel CO2 uitstoot is, worden twee vliegen in 1 klap gevangen: minder uitstoot door agrarisch gebruik en duurzame energie opwekking (grondwater hoeft niet verlaagd te worden, veenoxidatie is ook prima)
81. De grens trekken over wie echt betrokken is bij een zonnepark project is erg ingewikkeld en eigenlijk niet te doen door initiatiefnemers
82. Initiatiefnemers voor een zonnepark realiseren kunnen het niet goed doen: elke vorm van communicatie valt niet goed
83. Er is veel argwaan onder omwonenden m.b.t. de beslissingen in het project
84. Media hebben een negatieve rol in de berichtgeving omtrent zonneparken: alleen de negatieve kant wordt belicht
85. De berichtgeving in de media veroorzaakt meer weerstand tegen zonneparken
86. Informatieavonden moeten alleen maar bezocht kunnen worden door mensen die direct betrokken zijn
87. Het begrip ‘duurzame energie’ is in de laatste jaren een vies/smerig begrip geworden
88. In de laatste jaren verliest duurzame energie in het gevoel van urgentie
89. Door berichtgeving in de media krijgen mensen dat het een optie is om niet te kiezen voor duurzame energie
90. Er moet meer bewustwording komen onder mensen met betrekking tot de belangrijkheid van de transitie naar duurzame energie, ook met het oog op de afhankelijkheid die er nu is op stroom vanuit het buitenland (Rusland)
91. De impact op het land die zonneparken hebben is kleiner dan het lijkt: van bovenaf lijkt het heel groot maar in de praktijk zal niemand op die manier het zonnepark bekijken. Vanaf de grond zijn de panelen maximaal maar 1.80m hoog
92. Er zijn meer haken en ogen aan zon op dak dan dat mensen denken
93. Zon op dak is niet voldoende om aan de doelstellingen te behalen
94. Gedeeld eigenaarschap betekent vanaf het begin af aan mee-investeren in het project
95. Gedeeld eigenaarschap is niet de ultieme oplossing voor het creëren van draagvlak
96. Door het gevoel van risico willen mensen niet vanaf het begin mee-investeren in zonneparken
97. Beleid over zonne-energie moet meer divers zijn
98. Onzekerheid m.b.t. beleid voor zonne-energie maakt de realisatie moeilijk
99. Overheden stellen te strenge eisen aan de dekkingsgraad van zonneparken om de bevolking tevreden te houden. Dit maakt realisatie van zonneparken bijna onmogelijk in sommige gebieden
100. Positieve geluiden over zonneparken moeten meer worden weergegeven door media
101. Weerstand wordt door de media groter gemaakt dan dat het daadwerkelijk is

102. Op een andere manier communiceren met omwonenden, zoals via online meetings en het delen van documenten, zorgt ervoor dat mensen beter begrijpen wat de plannen zijn voordat de plannen gepresenteerd wordt
103. Het argument 'zonneparken kunnen niet naast Natura2000 gebieden gebouwd worden' is een argument dat niet op gaat: juist naast deze gebieden kan een zonnepark voor vermindering van stikstofuitstoot zorgen
104. Mede-eigenaarschap is niet geschikt in elke situatie om draagvlak te verhogen
105. Overheden beschouwen gedeeld eigenaarschap te veel als het ultieme middel om draagvlak te verhogen
106. Ook lokaal initiatief door energie coöperaties leidt niet altijd tot een succesvol project
107. In gesprek gaan is het belangrijkste om draagvlak te verhogen
108. Omgaan met meningen over landschapswaardes is erg moeilijk voor initiatiefnemers en kan niet altijd in acht genomen worden
109. Draagvlak afkopen is niet de manier om draagvlak te verhogen
110. Intensiveringsgebieden kunnen een oplossing zijn voor zonneparken: door grote parken op 1 locatie te realiseren ondervinden minder mensen effect van kleinere zonneparken door het land heen
111. Een flexibele houding van de initiatiefnemer is belangrijk voor het kunnen verhogen van draagvlak
112. Weinig ontwikkeling van het landschap in de laatste 30 jaar zorgt ervoor dat mensen niet meer gewend zijn dat het landschap verandert, en dus meer weerstand bieden tegen projecten zoals zonneparken
113. Ruimte wat nu gebruikt wordt voor zonnevelden kan beter gebruikt worden voor andere doeleinden, zoals land- en akkerbouw
114. Voor zonne-energie moeten eerst daken vol gelegd worden voordat zonneparken worden aangelegd
115. Er moet meer aandacht gaan naar de capaciteit van het bestaande net om toekomstige zonnestroom te kunnen verwerken
116. Beleidskaders m.b.t. draagvlak voor zonneparken moeten duidelijker worden
117. Mensen beseffen meer en beter dat het behalen van de klimaatdoelen noodzakelijk is voor een veilige en gezonde samenleving in de toekomst
118. Staten moeten een deel van hun soevereiniteit inleveren omdat personen, NGOs en andere bedrijven veel macht hebben en plannen bij de rechter kunnen blokkeren
119. Windmolens hebben meer toekomst dan zonneparken
120. Voor agrarische doeleinden zijn windmolens veel geschikter door het lagere gebruik van oppervlakte
121. De grote ruimte die zonneparken innemen is een van de grootste negatieve aspecten
122. Gedeeld eigenaarschap werkt niet goed voor het wegnemen van weerstand
123. Door vaag beleid snappen veel mensen niet meer waarom er bijvoorbeeld geïnvesteerd wordt in hou gestookte energie
124. Mensen die van het gas af willen moeten zich flexibeler opstellen m.b.t. de aanleg van zonneparken
125. Er mist een landelijke visie op het oplossen van energievraagstukken
126. Er moeten strengere richtlijnen voor draagvlak zijn in de gemeenteraad voordat zij kunnen bepalen dat een project door mag/kan gaan
127. Door de schaarste van landbouwgrond is het op dit moment onlogisch om zonneparken aan te leggen
128. Het niet weten wat er met de grond onder zonneparken gebeurt heeft effect op het draagvlak
129. Het betrekken van (lokale) bedrijven in de participatie in zonneparken is positief voor het draagvlak in de omgeving

130. De verdeling van kosten en baten moet niet gelijk zijn: baten moeten meer gaan naar de lokale omwonenden en kosten naar overheden/bedrijven
131. Het is aan individuele landbouwers om zich te laten horen als ze het niet eens zijn met het zonnepark, niet aan de belangenvereniging
132. De aanleg van een zonnepark mag nooit leiden tot ruzies binnen de lokale gemeenschap
133. Grootschalige zonneparken tasten natuurgebieden en waardevolle landschappen aan vanwege hun ongereptheid, cultuurhistorisch karakter of herkenbare natuurlijke elementen
134. Het risico van grootschalige zonneparken heeft betrekking op verlies, verandering en verstoring van leefgebieden van diersoorten
135. Zonneparken kunnen gerealiseerd worden, mits er gekozen wordt voor een zorgvuldige inpassing
136. Zonnepanelen moeten eerst geplaatst worden op daken van woningen en bedrijven voordat er grootschalige zonneparken komen
137. Het is beter om meerdere kleinschalige zonneparken te realiseren dan enkele grote
138. Bij de realisatie van zonneparken moeten er combinaties gezocht worden met andere functies, zoals waterbergingen of infrastructuur
139. Zonneparken moeten, op enkele uitzondering na, gerealiseerd worden op onbruikbare, vervuilde grond
140. Zonneparken moeten alleen in uitzonderingsgevallen gerealiseerd kunnen worden: eerst op daken en in meervoudig ruimtegebruik
141. Zonne-energie binnen de bebouwde kom moet gestimuleerd worden en buiten de bebouwde kom ontmoedigd
142. Zonnepanelen op landbouwgrond is zonde: die grond moet gebruikt worden voor agrarische doeleinden
143. De energietransitie kan alleen slagen met voldoende draagvlak en participatie
144. Het plaatsen van zonnepanelen dient altijd in samenspraak te gaan met betrokkenen
145. Gemeentes moeten kiezen voor een gebiedsproces waarin samen met bevolking en belangenorganisaties voorwaarden worden opgesteld voor financiële participatie, met extra aandacht voor een goede locatiekeuze en de onderliggende reden voor de realisatie van het project
146. Naast financiële participatie en lokaal mede-eigenaarschap is zeggenschap essentieel voor de acceptatie van zonneparken
147. Andere voordelen voor de omgeving, zoals social return waarin arbeiders uit de regio worden aangenomen voor de bouw van het park, moeten meer gebruikt worden in de realisatie van zonneparken
148. Initiatiefnemers moeten aantonen dat hun zonnepark door een grote meerderheid van de omwonenden geaccepteerd wordt
149. Er moet meer aandacht komen om mensen met een kleinere portemonnee ook in staat te stellen deel te nemen in zonnepark-projecten

9.3 Appendix C – Q set (in Dutch)

Statement number	Dutch statement
1	In gesprek gaan met mensen die het niet eens zijn met het zonnepark is de belangrijkste manier om draagvlak te verhogen
2	De uitvoerende partijen nemen de positie van omwonenden niet serieus genoeg
3	Esthetische eigenschappen van zonneparken zijn de belangrijkste bron van oppositie
4	Gedeeld eigenaarschap leidt niet automatisch tot meer draagvlak
5	Betrekken van lokale energiecorporaties helpt om gedeeld eigenaarschap vorm te geven en verhoogt hierdoor draagvlak
6	Het is zonde dat zonneparken goede grond innemen die beter gebruikt kan worden voor de landbouw
7	100% eigenaarschap voor lokale bevolking is haalbaar en verhoogt acceptatie voor zonneparken
8	Lokale energieprojecten moeten wettelijk verplicht worden langdurige werkgelegenheid te creëren voor de lokale gemeenschap, proportioneel met de grootte van de investering
9	Gemeentes moeten zich actief inzetten in campagnes voor het verhogen van bewustzijn en draagvlak voor zonneparken
10	Gedeeld eigenaarschap is een goede methode voor het verhogen van draagvlak
11	Beloofde voordelen voor lokale bevolking worden gezien als ontoereikend
12	Het is voor bedrijven en initiatiefnemers te moeilijk om zelf direct omwonenden te betrekken, hierin is meer sturing nodig vanuit de overheid
13	Meer positieve berichten over zonneparken en de nut en noodzaak ervan in de media zal zorgen voor meer draagvlak en acceptatie
14	Stimuleringsmiddellen zoals subsidies zijn noodzakelijk om draagvlak voor zonneparken te verhogen
15	Financiële voordelen helpen bij het verhogen van draagvlak
16	Het concept ‘duurzame energie’ is in de afgelopen jaren een deel van zijn positieve imago kwijtgeraakt
17	Naast financiële participatie en gedeeld eigenaarschap moet er meer zeggenschap gaan naar de lokale bevolking
18	Personen die niet direct naast een zonnepark wonen zijn niet écht betrokken en hebben dus geen zeggenschap in het project
19	Beleid over acceptatie voor zonneparken moet duidelijker beschreven en overgebracht worden naar de lokale bevolking
20	Gemeentes moeten gebruik maken van gebiedsprocessen waar samen met lokale bevolking en belangenorganisaties voorwaarden worden opgesteld voor financiële participatie
21	Om verlies aan landschapswaardes te compenseren moet een groter deel van de opbrengst van zonneparken naar de lokale bevolking gaan
22	Beloofde voordelen voor lokale bevolking worden opgevat als te goed om waar te zijn
23	In een vroeg stadium informatie verspreiden onder omwonenden zorgt voor verhoogd begrip en draagvlak
24	Lokale bevolking moet meer betrokken worden in het zoeken naar mogelijke locaties voor zonneparken
25	Duurzame energieprojecten lijden onder een gebrek aan een nationale visie op het sturen van zulke projecten

Table C.1 – Q set (Dutch)

9.4 Appendix D – Q set (in English)

Statement number	English statement
1	Engaging in conversation with people who disagree with the solar park project is the most important way to increase support
2	The position of local residents is not taken seriously enough by the project initiators
3	Aesthetic values are the most important reason why local residents oppose to solar parks
4	Shared ownership does not automatically lead to higher levels of acceptance
5	Including local energy corporations helps with shaping shared ownership and thus increases acceptance
6	The ground taken up by solar parks is wasteful: it is better to use this ground for agriculture
7	100% shared ownership for local residents is viable and increases acceptance for solar parks
8	Local energy projects must be legally obliged to provide secure and long-lasting employment to local communities in proportion to the size of investment.
9	Municipalities must actively engage in campaigns to create awareness and increase support for solar parks
10	Shared ownership is a good method to increase acceptance
11	Promised advantages for local residents are perceived as inadequate
12	It is for the project initiators too difficult to include local residents in the project: more guidance is needed from the government
13	More positive stories in the media regarding solar parks and its usefulness and necessity will cause increased support base and acceptance
14	Incentives, like subsidies, are necessary to increase acceptance for solar parks
15	Financial advantages help increase the support for solar park projects
16	The concept 'renewable energy' has lost part of its positive image in the past years
17	Next to financial participation and shared ownership, local residents should be given more decision-making power in solar park projects for increased acceptance
18	People who do not live directly adjacent to a solar park are not truly involved and thus do not have a say in the project
19	Policies regarding the acceptance of solar parks must be more clearly defined and conveyed to residents
20	Municipalities must choose for area-based approaches where, together with local residents and interest organizations, prerequisites are created for financial participation
21	To compensate for losses of landscape value, a larger share of benefits from solar parks should be going towards local residents
22	Promised advantages for local residents are perceived as being too good to be true
23	Spreading project information among local residents in an early stage of the process creates increased understanding and acceptance
24	More efforts should be made to include local residents into the scouting of possible locations for solar parks
25	Renewable energy projects suffer from a lack of a nation-wide vision for guiding the project process

Table D.1 – Q set (English)

9.5 Appendix E – Handout document of Q sorting task

Draagvlak voor zonneparken: een studie naar de percepties van betrokkenen

Ewout van der Schee

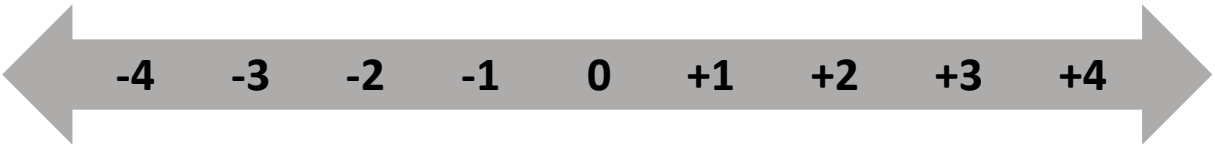
2021

rijksuniversiteit groningen

Hoe het werkt

U wordt vriendelijk verzocht om de nummers die voor de statements staan op pagina 3 in te vullen in het piramide-vormige figuur op pagina 4. Deze nummers kunt u invullen door de 'X' te vervangen met het nummer van het betreffende statement.

De positie van de statements in het figuur laten zien of, en in welke mate u het eens of oneens bent met een statement. De volgende as is zichtbaar op pagina 4:



- Statements waar u het mee **oneens** bent, vult u in boven de waardes -4, -3, -2 of -1: naar mate van hoe sterk u het **oneens** bent met het betreffende statement (-4: sterkst mee oneens, -1: minder sterk mee oneens)

- Statements waar u het mee **eens** bent vult u in boven de waardes +4, +3, +2 of +1: naar mate van hoe sterk u het **eens** bent met het betreffende statement (+4: sterkst mee eens, +1: minder sterk mee eens)

- Statements waarbij u **geen mening** heeft/het u niet uit maakt/geen voorkeur heeft plaatst u in het midden van de piramide, boven het cijfer '0'

De positie van boven naar beneden van de vakken maakt niet uit, alleen de volgorde van links naar rechts.

Het is belangrijk dat ieder statement ingevuld wordt in een vak in het figuur. Na het invullen zullen **alle vakken gevuld zijn, met één statement per vak.** U kunt dus niet meerdere cijfers in hetzelfde vak plaatsen. Wel kunt u tijdens het invullen schuiven met de positie van de al ingevulde nummers. Een voorbeeld van een goed ingevuld figuur is te vinden op pagina 6 (met willekeurig ingevulde cijfers)

Naast het invullen van het figuur wordt u gevraagd om een korte uitleg te geven voor de door u gemaakte keuze bij de waardes -4 en +4 (de statements waarmee u het meeste **oneens** en **eens** bent). Dit kunt u doen op pagina 5. Overige opmerkingen kunt u ook vermelden op pagina 5.

Na afronding kunt u het bestand opslaan en versturen naar: e.van.der.schee@student.rug.nl

Voor vragen kunt u contact opnemen via bovenstaand mailadres of via telefoon:
06-57289527

Uw medewerking wordt zeer op prijs gesteld!

Ewout van der Schee
Rijksuniversiteit Groningen
Master Environmental and Infrastructure Planning

Statements

1. In gesprek gaan met mensen die het niet eens zijn met het zonnepark is de belangrijkste manier om draagvlak te verhogen
2. De uitvoerende partijen nemen de positie van omwonenden niet serieus genoeg
3. Esthetische eigenschappen van zonneparken zijn de belangrijkste bron van oppositie
4. Gedeeld eigenaarschap leidt niet automatisch tot meer draagvlak
5. Betrekken van lokale energiecorporaties helpt om gedeeld eigenaarschap vorm te geven en verhoogt hierdoor draagvlak
6. Het is zonde dat zonneparken goede grond innemen die beter gebruikt kan worden voor de landbouw
7. 100% eigenaarschap voor lokale bevolking is haalbaar en verhoogt acceptatie voor zonneparken
8. Lokale energieprojecten moeten wettelijk verplicht worden langdurige werkgelegenheid te creëren voor de lokale gemeenschap, proportioneel met de grootte van de investering
9. Gemeentes moeten zich actief inzetten in campagnes voor het verhogen van bewustzijn en draagvlak voor zonneparken
10. Gedeeld eigenaarschap is een goede methode voor het verhogen van draagvlak
11. Beloofde voordelen voor lokale bevolking worden gezien als ontoereikend
12. Het is voor bedrijven en initiatiefnemers te moeilijk om zelf direct omwonenden te betrekken, hierin is meer sturing nodig vanuit de overheid
13. Meer positieve berichten over zonneparken en de nut en noodzaak ervan in de media zal zorgen voor meer draagvlak en acceptatie
14. Stimuleringsmiddellen zoals subsidies zijn noodzakelijk om draagvlak voor zonneparken te verhogen
15. Financiële voordelen helpen bij het verhogen van draagvlak
16. Het concept ‘duurzame energie’ is in de afgelopen jaren een deel van zijn positieve imago kwijtgeraakt
17. Naast financiële participatie en gedeeld eigenaarschap moet er meer zeggenschap gaan naar de lokale bevolking
18. Personen die niet direct naast een zonnepark wonen zijn niet écht betrokken en hebben dus geen zeggenschap in het project
19. Beleid over acceptatie voor zonneparken moet duidelijker beschreven en overgebracht worden naar de lokale bevolking
20. Gemeentes moeten gebruik maken van gebiedsprocessen waar samen met lokale bevolking en belangenorganisaties voorwaarden worden opgesteld voor financiële participatie
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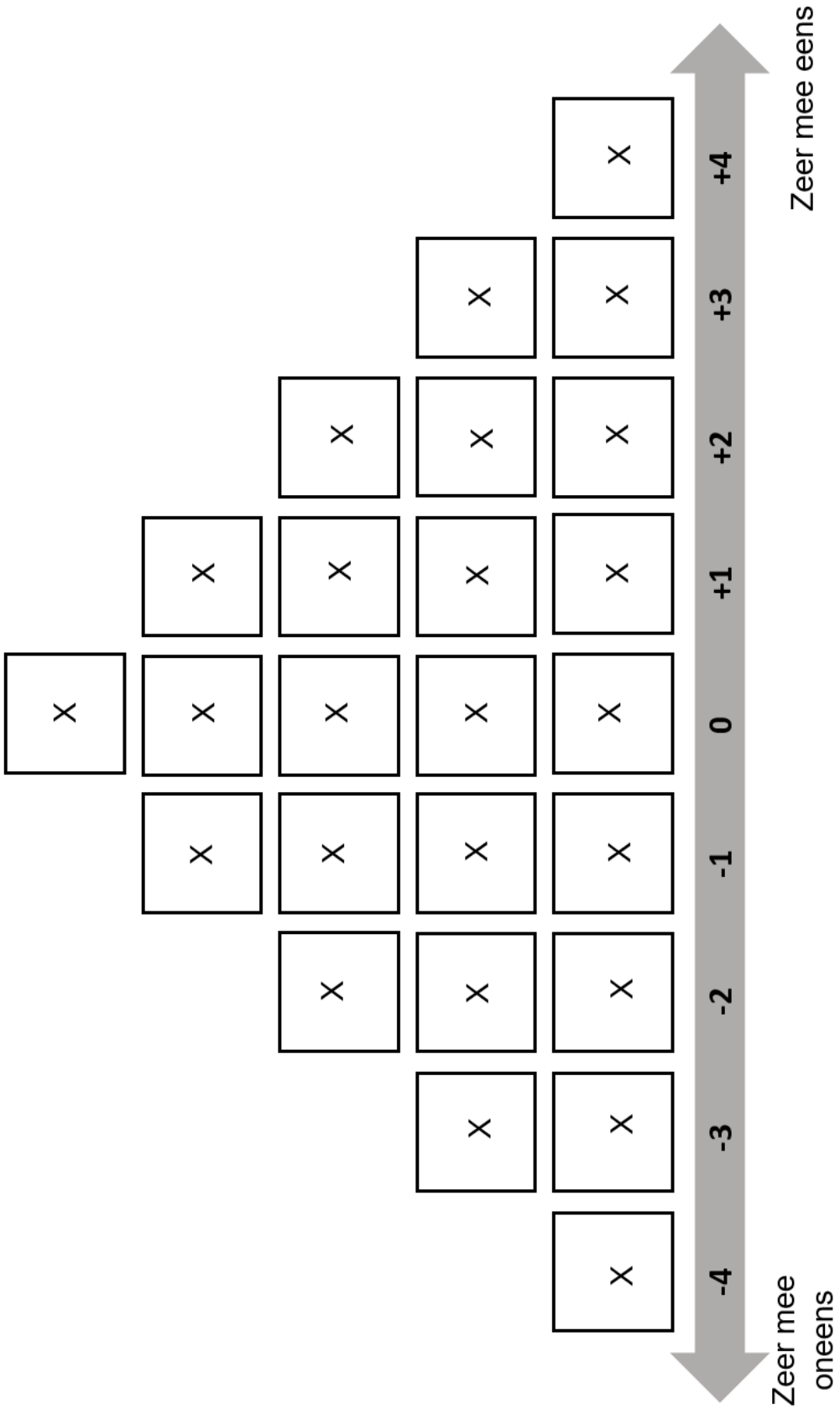
23. In een vroeg stadium informatie verspreiden onder omwonenden zorgt voor verhoogd begrip en draagvlak
24. Lokale bevolking moet meer betrokken worden in het zoeken naar mogelijke locaties voor zonneparken
25. Duurzame energieprojecten lijden onder een gebrek aan een nationale visie op het sturen van zulke projecten

In te vullen figuur



Motivatie keuze statement waarmee u het meest **oneens** bent (waarde -4):

[Typ hier uw tekst, vermeld het nummer van het betreffende statement bij uw opmerking]

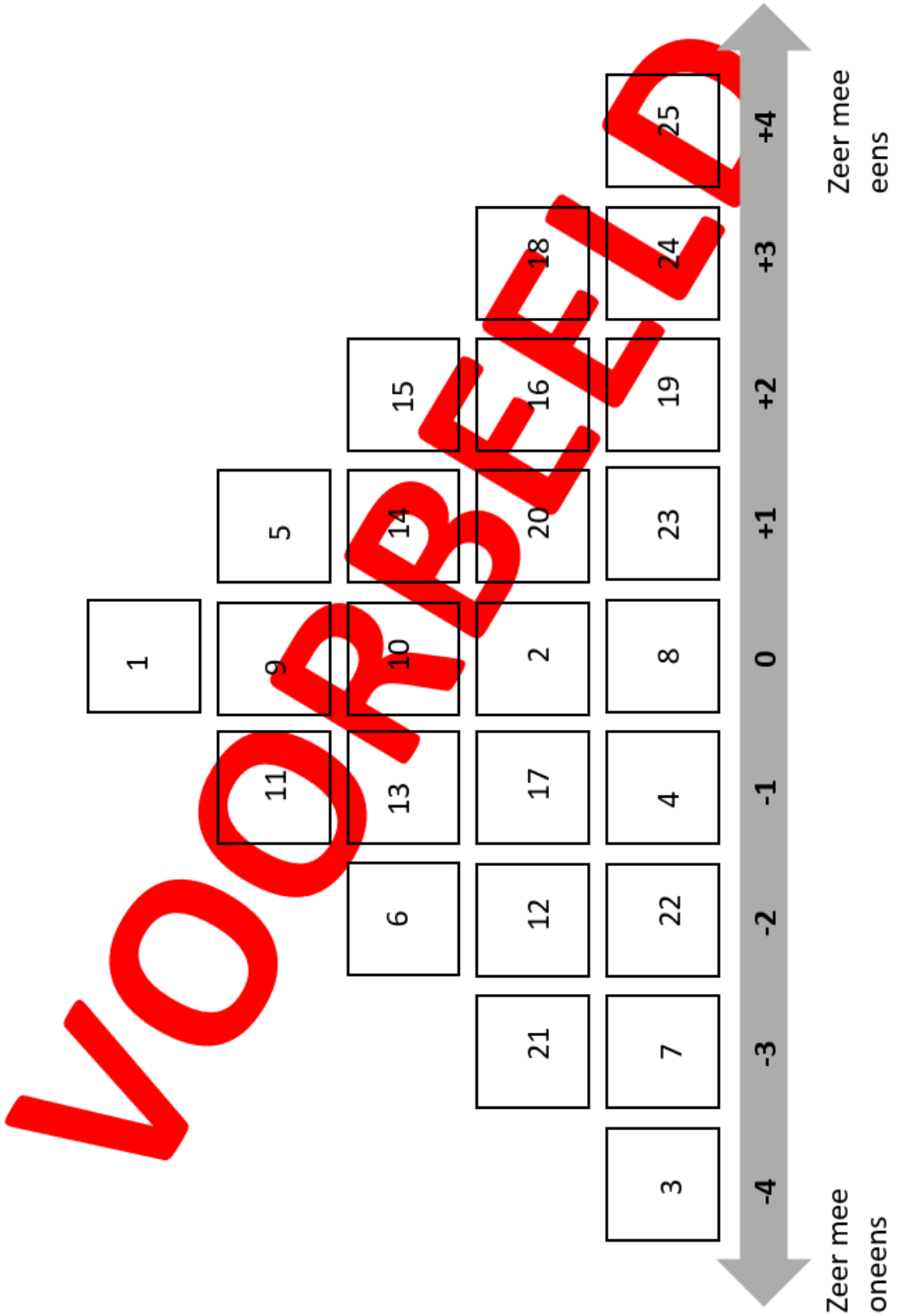
Motivatie keuze statement waarmee u het meeste **eens** bent (waarde +4):

[Typ hier uw tekst, vermeld het nummer van het betreffende statement bij uw opmerking]

Overige opmerkingen (vermeld het nummer van het betreffende statement bij uw opmerking):

[Typ hier uw tekst]

Voorbeeld


Zeer mee oneens
-4
-3
-2
-1
0
+1
+2
+3
+4
Zeer mee eens
3
7
21
6
12
22
13
17
4
10
2
8
14
20
23
15
16
19
18
24
25
1
9
11
5
VOORBEELD

9.6 Appendix F – Raw Q sort data

Participant	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
R1	1	-1	4	2	3	-4	1	-3	3	2	1	-3	0
R2	1	-2	3	0	2	-3	-3	0	-1	0	0	-2	-1
R3	4	-3	3	-2	0	-4	-2	-1	2	0	-1	-1	1
R4	3	1	4	1	-3	-3	-2	-2	-1	-1	-4	2	-1
R5	2	3	0	1	-1	3	4	1	1	-1	-1	-2	0
R6	1	-1	0	2	2	0	-4	-3	-3	3	1	-2	1
R7	1	-4	2	3	1	-1	-1	-2	3	0	-2	-3	4
R8	2	-1	3	1	-1	-2	0	-3	2	1	-3	2	1
R9	2	-2	-1	0	0	-3	3	-2	1	0	0	-3	1
R10	-1	-3	3	2	3	0	-4	-2	-2	4	0	-3	-1
R11	1	2	3	2	2	0	4	-2	-2	-1	0	-4	-3

Table F.1 - Raw Q sort data (part 1/2)

Participant	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25
R1	-2	0	-1	2	-2	0	1	-1	-1	0	0	-2
R2	-4	1	2	2	3	-1	1	0	-1	-2	1	4
R3	2	2	-2	0	3	-1	1	0	0	1	1	-3
R4	-1	-2	3	2	1	0	2	0	1	0	0	0
R5	-3	2	-2	0	-4	0	0	1	-1	-3	2	-2
R6	1	3	0	-2	-2	0	-1	-1	-1	4	2	0
R7	0	1	2	-1	-1	1	0	-2	0	2	-3	0
R8	-4	1	0	4	-2	0	-1	0	-1	0	3	-2
R9	-4	0	-1	2	4	1	1	-1	-2	2	3	-1
R10	1	2	1	-1	-2	1	0	-1	0	2	1	0
R11	-3	-2	1	3	0	-1	0	-1	0	1	1	-1

Table F.2 – Raw Q sort data (part 2/2)

9.7 Appendix G – Factor characteristics

Out of the 11 valid responses, 9 Q sorts loaded significantly on the factors. For factor 1, 4 participants loaded significantly on factor 1, 3 participants on factor 2, 2 participants on factor 3 and 2 participants on factor 4. Table 4.2 shows these defining variables per factor, with additional characteristics also shown.

Factor Characteristics

	Factor 1	Factor 2	Factor 3	Factor 4
No. of Defining Variables	4	3	2	2
Avg. Rel. Coef.	0,8	0,8	0,8	0,8
Composite Reliability	0,941	0,923	0,889	0,889
S.E. of Factor Z-scores	0,243	0,277	0,333	0,333

Table G.1 – Factor characteristics

The more defining variables per factor there are, the more perceptions are included in that discourse and the better that factor can represent a viewpoint. Based on Watts & Stenner (2012), this number should at least be more than 1. Since the factor is a weighted average of the perceptions derived through Q sorts, having at least two defining variables is vital (Watts & Stenner, 2012). Table 4.2 shows that this prerequisite is met for each factor. The average relative coefficient, or the assumed average reliability of each factor, is displayed in the second row. The value of 0,8 is used in the calculation of the composite reliability score, displayed in the third row of the table. This number shows how reliable the factor is compared to the real-life viewpoint. The factors derived out of this study are after all the best possible manifestation of a shared viewpoint. With the composite reliability of all factors being close or over 0.9, they are sufficiently reliable in displaying the viewpoint which that factor indicates (Du Plessis, 2005). Finally, the standard error of the factor scores are presented which say how high the error is with regard to the best possible representation of the shared viewpoint of that factor. This number will increase when more Q sorts are added, since a factor is merely the best possible representation of the viewpoint (Watts & Stenner, 2012). Because of this, some overlap between factors is inevitable and not problematic.

9.8 Appendix H – Factor array for factor 1

				19				
			22	18	23			
		25	16	20	15	10*		
	8	2	11	4	7**	24	9**>	
6	14	12	21	5	13	1	17	3
-4	-3	-2	-1	0	+1	+2	+3	+4
Strongly Disagree				Neutral				Strongly Agree

Table H.1 – Factor array for factor 1

*	Distinguishing statement at P < 0.05
**	Distinguishing statement at P < 0.01
>	z-Score for the statement is higher than in all other factors
<	z-Score for the statement is lower than in all other factors
	Consensus statement

9.9 Appendix I – Factor array for factor 2

				20				
			17**<	13	19			
		8	21	6	16	4		
	12	9	1*<	25	14**>	3	23**>	
7	2	18	22	11	24	15*>	5	10**>
-4	-3	-2	-1	0	+1	+2	+3	+4
Strongly Disagree				Neutral				Strongly Agree

Table I.1 – Factor array for factor 2

*	Distinguishing statement at P < 0.05
**	Distinguishing statement at P < 0.01
>	z-Score for the statement is higher than in all other factors
<	z-Score for the statement is lower than in all other factors
	Consensus statement

9.10 Appendix J – Factor array for factor 3

				10				
			9	15	21			
		11	8	5	4	1		
	14	23	2	12	24	17	25**>	
6	7	13	19	22	20	18**>	16*>	3
-4	-3	-2	-1	0	+1	+2	+3	+4
Strongly Disagree				Neutral				Strongly Agree

Table J.1 – Factor array for factor 3

*	Distinguishing statement at P < 0.05
**	Distinguishing statement at P < 0.01
>	z-Score for the statement is higher than in all other factors
<	z-Score for the statement is lower than in all other factors
	Consensus statement

9.11 Appendix K – Factor array for factor 4

				21				
			18	11	16			
		25	10	22	6	1		
	14	9	15	23	5	4	3	
12	13	8	19	20	24	17	2**>	7**>
-4	-3	-2	-1	0	+1	+2	+3	+4
Strongly Disagree				Neutral				Strongly Agree

Table K.1 – Factor array for factor 4

*	Distinguishing statement at P < 0.05
**	Distinguishing statement at P < 0.01
>	z-Score for the statement is higher than in all other factors
<	z-Score for the statement is lower than in all other factors
	Consensus statement