



The influence of PPP project design on successful outcomes of solar park projects in the Netherlands

A case study of four PPP solar park projects in the Netherlands

Master thesis Environmental and Infrastructure Planning

Name: Alard Bos
Student number: s2987384
Date: 10-07-2020
Supervisors: dr. S. Verweij & R.C. Spijkerboer

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Master thesis:

MSc Environmental and Infrastructure Planning
Faculty of Spatial Sciences
University of Groningen
July 2020

Author:

Alard Bos
s2987384
a.j.bos.6@student.rug.nl

Supervisors:

First: dr. S. (Stefan) Verweij
Second: R.C. (Rozanne) Spijkerboer

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Preface (NL)

Met deze scriptie sluit ik mijn master 'Environment and Infrastructure Planning' af. Hiermee komt mijn studententijd tot een einde en zal een stap volgen richting een professionele carrière binnen dit vakgebied. Ik kijk met een enorm goed gevoel terug op deze tijd waarin ik de kans heb gekregen mij te verdiepen in de wereld van de ruimtelijke planning. In deze jaren is voornamelijk de interesse in de energietransitie, de ruimtelijke duurzame energie ontwikkelingen, gegroeid. Zowel mijn Bachelor scriptie als nu mijn Master scriptie kent een focus richting duurzame energie projecten.

Ten eerste wil ik mijn eerste begeleider Stefan Verweij bedanken voor de goede begeleiding. Tijdens het scriptietraject heeft u mij voorzien van kritische en constructieve feedback maar u gaf mij daarnaast ook het vertrouwen dat ik nodig had om mijzelf te blijven motiveren binnen het proces. Het actief meedenken en het verstrekken van nuttige informatie heeft geleid tot een beter eindresultaat. Ik heb de vergaderingen altijd als zeer prettig en productief ervaren.

Daarnaast wil ik ook graag Rozanne Spijkerboer bedanken als tweede begeleider binnen mijn Master scriptie. U bent mijn eerste begeleider geweest binnen mijn Bachelor scriptie waar ik de samenwerking met u ook als zeer prettig heb ervaren. Dat u nu weer mijn supervisor werd heb ik als zeer positief ervaren. Uw kennis binnen de energietransitie en energiecoöperaties hebben een positieve invloed gehad op het resultaat.

Tot slot wil ik alle geïnterviewden bedanken voor hun tijd, actief meedenken en praktische kennis. Door de huidige Covid-19 pandemie was het niet mogelijk om elkaar fysiek te ontmoeten voor een interview. Hierdoor zijn we samen op zoek gegaan naar andere mogelijkheden, waarbij (video)bellen de voorkeur kreeg. Geïnterviewden hebben de moeite genomen om dia's en ander aanvullend materiaal voor te bereiden om mij zo uitgebreid mogelijk van de nodige informatie te voorzien. Dit is een welkome aanvulling geweest op dit onderzoek.

Alard J. Bos

Groningen, 02-07-2020

Abstract

Since the last decade, energy transition has gained increased attention. The Environmental Policy Plan 2001 marked the start of the Dutch energy transition. Part of this plan includes the implementation of sustainable energy projects, such as solar and wind parks. Due to the delegation of responsibilities to regional authorities in, municipalities and provincial bodies are responsible for a well-managed implementation process in the Netherlands. The regional and local public bodies governing spatial sustainable energy projects depend on collaboration efforts of private parties. This dependency leads to various forms of cooperation between public and private parties, defined as public- private partnership (PPP).

Traditionally, the private party within a PPP is a commercial party, such as a project developer. Since the last decades energy cooperatives developed themselves as serious partners for public parties within the development of energy transition projects. As a result, government bodies can cooperate with both a project developer or an energy cooperative in the development and realisation of sustainable energy projects (Salverda et al., 2012). How PPP projects are successfully implemented is frequently researched in the scientific literature (Al-Saadi & Abdou, 2016; Verweij, 2015). Here, PPP form, PPP management style and the project complexity are presented as important factors towards a successful outcome of the PPP project. However, mainly PPP projects with a PPP composition, with a project developer as a private party, are investigated. This study investigates PPP solar park projects with a PPP compositions, with a project developer or an energy cooperative as private party, towards successful outcome. This research answers the following research question: *'How can a PPP be designed to successfully implement solar parks in the Netherlands?'* To answer this question, four factors of a PPP design were examined: PPP form, PPP management style, PPP complexity and PPP composition. A qualitative method consisting of comparative case studies was performed to gather qualitative data. This included a combination of a document research and semi-structured interviews based on four PPP solar park projects: Solar park Budel, Solar park De Vlaas, Solar park Waalre and Solar park Welschap.

Both document research and semi-structured interviews reveal that all PPP projects investigated used different PPP designs towards a successful implemented PPP solar park project. The results also indicated that both the complexity of the PPP solar park project and the PPP composition of a PPP project affect the used PPP form- PPP management style combination. Cases with a project developer as private party within the PPP focused more on a contract PPP form-PPP management style combination, while cases with an energy cooperative as private party focused more on a PPP partnership- PPP process management combination. Prior literature does not sufficiently addresses the interaction effects between PPP composition on the one hand, and the PPP form and PPP management style on the other hand. By elaborating on this interaction effect on the successful outcome, the present study contributes to PPP design research.

Keywords: Public-private partnership, Project management, Project implementation, Solar park project, Energy cooperative, Energy transition, case study research

Table of Contents

Preface (NL)	3
Abstract	4
List of Figures and Tables	7
1 Introduction	9
1.1 Background information.....	9
1.2 Research aim.....	10
1.3 Research question and sub-questions	11
1.4 Scientific and planning relevance.....	12
1.5 Research design	13
1.6 Reading guide.....	13
2 Theoretical framework	14
2.1 What is PPP?	14
2.2 PPP compositions in energy transition.....	15
2.3 A successful PPP project	16
2.4 A distinction between two PPP forms	17
2.5 Management styles within Public Private Partnerships	20
2.5.1 Project management.....	20
2.5.2 Process management	20
2.6 Complexity.....	22
2.6.1 Project scope and project size.....	22
2.7 Conceptual model.....	23
3 Methodology	25
3.1 Research strategy.....	25
3.2 Case selection.....	25
3.3 Research methods and collection process	26
3.4 Interviews.....	28
3.5 Ethics and limitations.....	29
3.6 Data analysis.....	29
4 Results	30

4.1	<i>Case1: Solar park Budel</i>	30
4.1.1	PPP Form	30
4.1.2	PPP management	32
4.1.3	PPP Complexity.....	33
4.1.4	Outcome of the project.....	34
4.2	<i>Case 2: Solar park De Vlaas</i>	34
4.2.1	PPP Form	35
4.2.2	PPP management style	36
4.2.3	PPP Complexity.....	37
4.2.4	Outcome of the project.....	37
4.3	<i>Case 3: Solar park Waalre</i>	38
4.3.1	PPP Form	38
4.3.2	PPP management style	39
4.3.3	PPP Complexity.....	40
4.3.4	Outcome of the project	41
4.4	<i>Case 4: Solar park Welschap</i>	41
4.4.1	PPP Form	41
4.4.2	PPP management	43
4.4.3	PPP Complexity.....	44
4.4.4	Outcome of the project.....	44
4.5	<i>Different ways to a successful outcome</i>	45
4.5.1	PPP form and PPP management style combinations.....	45
4.5.2	Applying process management in high complex projects	46
4.5.3	The PPP form shifts at higher complexity.....	46
4.5.4	Project developer versus energy cooperative.....	47
5	Conclusion, discussion and reflection	49
5.1	<i>Conclusion</i>	49
5.1.1	Answer to the sub-questions.....	49
5.1.2	Answer to the main question.....	51
5.2	<i>Discussion</i>	52
5.3	<i>Reflection</i>	53
6	References	54
7	Appendices	61
	<i>Appendix A: informed consent</i>	62
	<i>Appendix B1: Interview guide public party within the PPP</i>	63
	<i>Appendix B2: Interview guide private party within the PPP</i>	65
	<i>Appendix C: Coding scheme</i>	67

List of Figures and Tables

FIGURE 1 THEORETICAL EXPECTATIONS.....	24
FIGURE 2 CONCEPTUAL MODEL	24
FIGURE 3 SELECTED CASES.....	26
FIGURE 4 LOCATION SOLAR PARK BUDEL (SWECO, 2018)	30
FIGURE 5 LOCATION SOLAR PARK DE VLAAS (SOLARMAGAZINE, 2018)	34
FIGURE 6 LOCATION SOLAR PARK WAALRE (SOLARMAGAZINE, 2019).....	38
FIGURE 7 LOCATION SOLAR PARK WELSCHAP (ENERGEIA, 2018).....	41
TABLE 1 OVERVIEW OF PPP-FORMS (KLIJN & TWIST, 2007)	19
TABLE 2 OVERVIEW OF PROJECT AND PROCESS MANAGEMENT (EDELLENBOS ET AL., 2007)	21
TABLE 3 COMPLEXITY	23
TABLE 4 SELECTED RESPONDENTS (SEMI-STRUCTURED INTERVIEWS)	27
TABLE 5 SELECTED DOCUMENTS (DOCUMENT RESEARCH).....	28
TABLE 6 PPP COMPOSITION OF SELECTED CASES	30
TABLE 7 PPP FORM SOLAR PARK BUDEL.....	32
TABLE 8 PPP MANAGEMENT STYLE SOLAR PARK BUDEL.....	33
TABLE 9 SUCCESS CRITERIA SOLAR PARK BUDEL.....	34
TABLE 10 PPP FORM SOLAR PARK DE VLAAS.....	35
TABLE 11 PPP MANAGEMENT STYLE SOLAR PARK DE VLAAS	36
TABLE 12 SUCCESS CRITERIA SOLAR PARK DE VLAAS	37
TABLE 13 PPP FORM SOLAR PARK WAALRE.....	39
TABLE 14 PPP MANAGEMENT STYLE SOLAR PARK WAALRE	40
TABLE 15 SUCCESS CRITERIA SOLAR PARK WAALRE	41
TABLE 16 PPP FORM SOLAR PARK WELSCHAP.....	42
TABLE 17 PPP MANAGEMENT STYLE SOLAR PARK WELSCHAP	43
TABLE 18 SUCCESS CRITERIA SOLAR PARK WELSCHAP	44
TABLE 19 OVERVIEW PPP DESIGN CASES.....	45

DBFM.... Design Build Finance Maintain
DBFO..... Design Build Finance Operate
EPP EnergyPort Peelland
MW..... Megawatt
NPM..... New Public Management
PFI..... Private Finance initiative
PPP..... Public-Private Partnership
PV..... Photovoltaic
RVO..... Rijksdienst voor Ondernemend Nederland
SDE+ Stimulering Duurzame Energietransitie

1 Introduction

1.1 Background information

The Environmental Policy Plan 2001 marked the start of the Dutch energy transition. Since the last decade, the energy transition has gained increased attention from a variety of state, market, and society interests both in the domestic and international context (Ros, 2015). An energy transition refers to a structural change in an energy system (Kern & Smith, 2008). The current Dutch energy transition is designed to balance the supply and demand of heat, fuels and electricity, by employing renewable energy sources. This transition builds on the philosophy of transition management as proposed in the Environmental Policy Plan: searching, learning, and experimenting through frontrunners, by means of a combination of bottom-up and top-down control (Loorbach et al., 2008). Part of this plan includes the implementation of renewable energy projects, such as solar and wind parks. Due to the delegation of responsibilities to regional authorities in, municipalities and provincial bodies are responsible for a well-managed implementation process in the Netherlands.

The regional and local public bodies governing spatial sustainable energy projects depend on collaboration efforts of private parties and energy cooperatives (Elzenga & Schwecke, 2015). This dependency leads to various forms of cooperation between public and private parties, defined as Public-Private Partnership (Heuskes et al., 2017; Liu et al., 2015; Sanders, 2014). The term Public-private Partnership is established in the literature and administrative practices in the 1980s. Since then, PPPs have attracted great interest in public administration (Sanders, 2014). The rationale behind PPPs is that public and private parties are able to deliver improved products and policies for complex societal problems, because collaboration brings together different qualities, and leads to the exchange of qualities which can lead to more innovative products (Osborne, 2001).

The general concept of PPP distinguishes itself from similar interactions between public authorities and private parties by three features. First, collaboration between the two parties focuses on the realisation of policy. In the energy sector, this is reflected in climate agreements between governments as a means to control climate change. Second, the public and private parties both actively involve in the collaboration process. Third, the collaboration must be a legally structured partnership (Sanders & Heldeweg, 2012, pp. 40-41). Therefore, a PPP can be defined as: "A legally structured partnership between one or more public authorities and one or more private legal entities that focuses on developing and implementing a joint strategy (or having a joint strategy implemented) for the realisation of a policy." - (Sanders & Heldeweg, 2012, pp. 41-42). Traditionally, the private party within a PPP is a commercial party, such as a project developer (Sanders, 2014). Nowadays, the role of the private party can also be fulfilled by energy cooperatives. As a result, government bodies can cooperate with both a project developer or an energy cooperative in the development and realisation of sustainable energy projects (Salverda et al., 2012).

Energy cooperatives are cooperatives founded based on a community initiative to realize local sustainable energy projects. Most of these initiatives consist of informal associations, and 313 of them have resulted in an energy cooperative (Elzenga & Schwencke, 2015). Energy cooperatives carry out energy saving and renewable energy production projects with residents, local authorities and businesses (Ghaus-Pasha,

2005). The majority of Dutch municipalities contains an association of citizens actively involved in the energy policies in their own neighbourhood, village or city (Elzenga & Schwencke, 2014). Recently, Proka et al (2018) estimated the number of energy cooperatives in the Netherlands at 500, being represented by 50,000 members. With an aggregate production capacity over 250 megawatts generating 140,000 households in 2019 (CBS, 2019), energy cooperatives play a major role in the energy transition process.

Governmental bodies highly value energy cooperatives, as appears from several policy innovations. For example, one of the key priorities mentioned in the Dutch renewable energy agenda is the stimulation of sustainable energy production by local initiatives, such as energy cooperatives (Rijksoverheids, 2016). In addition, diverse government dossiers, such as that of the National Service for Enterprise in the Netherlands, recommend governments to make tendering procedures suitable for energy cooperatives. This offers energy cooperatives an increased chance of winning the tenders, without granting any form of unfair state aid. An example is the inclusion of requirements concerning the involvement of the societal environment (Rijksdienst voor Ondernemend Nederland, 2016).

This thesis investigates how a PPP can be designed to successfully implement solar parks within the Dutch energy transition. This thesis compares two compositions of PPPs: a PPP composition with a project developer as a private party and a PPP composition with an energy cooperative as a private party.

1.2 Research aim

This thesis investigates how a PPP project can be designed to successfully implement solar parks within the Dutch energy transition. It analyses four factors of PPP design: *PPP composition*, *PPP form*, *PPP management style* and *PPP complexity*. Examining these factors allow to identify how PPP compositions can differ in management style and form, when the specific PPP project is established by a project developer or energy cooperative as the private party. It also allows to examine the differences of management style and form, for projects with a high versus low complexity. The success of a project is based on the three traditional performance measurements (time, budget and quality), and the public-private relationship. The current study specifically focuses on the development phase of the projects, since a well-planned project, which is part of this phase, is crucial for the successful outcome of a PPP project (Liyanage & Villalba-Romero, 2015).

The first dimension entails *PPP composition*. This dimension entails a comparison of two PPP composition types with different private parties. The first type contains PPP with a public party and a project developer as private party, the second type contains a PPP with a public party and an energy cooperative as private party.

The second dimension is *PPP form*, which refers to the organisational structure of the collaboration between the public and private party (Hodge & Greve, 2005; Klein & Twist 2007). The present study analyses two PPP forms: the contract form and the partnership form (Sanders & Heldeweg, 2012; Hodge & Greve, 2005). In the case of a PPP contract form, a clear distinction is made between the public party as principal, and the private party as contractor. This PPP form includes clear tendering and contract rules, as well as clearly formulated problem definitions. Tenders relating to DBFM(O) contracts provide a good example of this form. Where the PPP contract form seeks clear divisions and a clear distinction between

the client and the contractor, a partnership PPP is based on joint decision-making. Within this PPP form, a joint process follows towards problem and solution specifications (Sanders & Heldeweg, 2012).

The third dimension is the *PPP management style*. The used PPP management style is crucial for the successful outcome of the project. The literature identifies two management styles: Project management and process management (Edelenbos et al., 2007; Esselbrugge, 2003). Within project management, a project is subdivided into successive phases. Controlling these phases is critical within project management. This management style focuses mainly on internal project management and less on the continuous interaction with external stakeholders. In contrast to project management, process management is based on the assumption of complexity and dynamics in the interests and perspectives of many actors (Edelenbos et al., 2007).

The fourth dimension is *PPP complexity*. Prior literature mentions the match between the management style and the complexity as an important determinant for the successful outcome of a PPP project (Klijn & Twist, 2007a; Sanders & Heldeweg, 2013). In addition, Zhang (2005a) relates complexity with the used PPP form in a project.

The present study focuses specifically on solar park projects, neglecting wind parks. This study differentiates between projects with a high versus a low degree of complexity. Solar parks have on average, a lower degree of complexity than wind parks (RVO, 2015). Therefore, the selected high complex projects will consist mainly of wind energy projects and low complex projects from solar energy projects. In addition, a wind park and a solar park with a comparable annual generating capacity will differ in (visual) nuisance. For example, in addition to visual nuisance, a wind park also causes noise nuisance and the visual nuisance applies to a larger area around the wind park due to the height of wind turbines (Thorne, 2011). Wind parks with a similar delivery capacity to a solar park will experience resistance, from a wider area, from the social and economic environment in which the park is realised. This affects the (organisational) complexity of the project (Krebs et al., 2014). In addition, while solar parks have an average duration period of one or two years (RVO, 2015), wind parks can have a duration period of more than six years (RVO, 2020). A longer duration period influences the degree of complexity of a PPP project, since it increases the amount of uncertainties during the project (Bosch-Rekvelde et al., 2011). As a result, comparing solar parks with wind parks would lead to an unfair comparison in regard of complexity, and a decision between the two has to be made. A main determinant for this decision is the duration period.

1.3 Research question and sub-questions

The aim of the research leads to the following research question:

How can a PPP be designed to successfully implement solar parks in the Netherlands?

Secondary research questions will be answered in order to answer the main research question:

1. How do PPP composition, PPP form and PPP management style influence the successful outcome of a PPP solar park project in the Netherlands?

To examine the influence of PPP design, the study analyses four different factors: PPP composition, PPP form, PPP management style and PPP complexity. The first sub-question investigates how the factors relate with the successful outcome of a PPP solar park project in the Netherlands.

2. How does complexity influence the relationship between the PPP composition, PPP form and the PPP management style towards a the successful outcome of a PPP solar project?

The second sub-question answers if the complexity of the project influences the used PPP form and PPP management style between PPP projects with a PPP composition with a project developer or energy cooperative as private party within the PPP, and how this influences the successful implementation of the solar park.

3. How do the PPP form and the PPP management style interact within the development phase of a PPP solar park project towards a successful outcome?

In order to establish a link between the PPP composition and the success of PPP solar park projects with a high or low complexity, it is necessary to investigate which PPP form-PPP management style combination leads to a successful outcome within a high/low complex PPP solar park project. Sections 4.1, 4.2, 4.3 and 4.4 of Chapter 4 examine the factors, described within the sub-questions, per case. In section 4.5, these PPP designs from the investigated cases are compared and combinations of the examined factors are stated. In this last section of Chapter 4, answers are given to the formulated sub-questions which form a base to draw conclusions on regarding the main question.

1.4 Scientific and planning relevance

The energy transition aims to replace existing (fossil) energy sources and associated technologies with innovative, renewable alternatives (Rotmans, 2011). New techniques for renewable energy are in many cases based on concepts that differ from the old ones, which means that the infrastructure, organisation and institutions around them, in some case their use, has to be adapted. Therefore fundamental changes, not only in the design of (physical) energy supply, but also in usage practices, market structure, legal frameworks and cultural attitudes are required (Akerboom & van der Linden, 2018).

One of these fundamental changes within the Dutch energy transition is the increasingly large number of companies and citizens entering the public domain (Elzenga & Schwecke, 2015). Increasingly, government and parties in society are working together towards sustainable energy goals. Here, the social party often organises itself in the form of an energy cooperative (Hajer, 2011). This means that within PPP projects, in addition to a commercial party, an energy cooperative can also fulfil the private partner role towards implementation of sustainable energy projects. Within the scientific field, this new party within the energy transition has been extensively studied both nationally and internationally (Elzenga & Schwecke, 2015; Debor, 2014). In contemporary literature, energy cooperatives are characterized as a serious cooperative party for governments within the energy transition (Berka & Creamer, 2018).

How PPP projects are successfully implemented is frequently researched in prior literature. Here, primarily PPP projects with a PPP composition, with a project developer as a private party, are investigated (Al-Saadi & Abdou, 2016; Liyanage & Villalba-Romero, 2015; Verweij, 2015). Within these

studies, PPP management style, PPP form and the project complexity are presented as important factors of PPP design towards a successful outcome of a PPP project. What prior literature does not sufficiently address is the interaction effects between the PPP design factors: PPP form, PPP management style and PPP complexity and the PPP compositions, with a project developer or energy cooperative as private party.

The literature emphasises that the focus of energy cooperatives during the development of sustainable energy projects lies in 'community identity', 'participation' and a shared ideal (Berka & Creamer, 2018; Kaphengst & Velten, 2014). Based on this focus on participation and community identity, local stakeholders are offered opportunities to engage in economic development within and for the community (Kaphengst & Velten, 2014). This unambiguous focus is absent from project developers (Berka & Creamer, 2018). Because the main objective of a project developer is not primarily based on a shared ideal but is usually anchored in profit interests, this party mainly focuses on (contractual) certainty and financial gain.

Because project developers and energy cooperatives differ in focus and both add similar but also different qualities to PPP solar energy projects (Kaphengst & Velten, 2014), it is relevant to investigate whether there are demonstrable differences in used PPP form and PPP management style in PPP projects with low or high complexity towards a successful outcome.

1.5 Research design

The primary research strategy is a comparative case strategy. Four PPP solar park projects are selected based on the two investigated PPP compositions, with project developer or energy cooperative as private party, and on high and low complexity. This qualitative research consists of results from semi-structured interviews and document research.

First, primary data is collected through the use of semi-structured interviews. Interviews provide the opportunity to compare detailed descriptions and interpretations of the four PPP projects (Clifford et al., 2010). Second, the present thesis performs a document research of diverse policy documents to compare and support the gathered results. These documents address the design factors of PPP projects, as mentioned in the theoretical framework. To enable a decent research, the results of the semi-structured interviews and the document research are then compared to the theoretical framework.

1.6 Reading guide

The structure of the research will be in line with the research aim and subsequent sub-questions. Based on the research aim, a theoretical framework will be established in which the research will specify its scope. The theoretical framework offers the opportunity to deepen important relevant concepts from the literature obtained. After the theoretical framework the methodology describes which way of collecting data has been conducted. In the subsequent analysis, results from the data collection will be described. A comparison will be made with the theoretical framework. Based on the analysis, the conclusion and recommendations for follow-up research are stated.

2 Theoretical framework

2.1 What is PPP?

In order to achieve the energy transition goals, set out in the Dutch energy agenda, public and private organisations need to cooperate effectively. However, the coordination between these parties is not automatically established, and thus must be organized in collaborative partnerships (Sanders & Hoppe, 2013; Sanders & Heldeweg, 2013).

The interdependence between the public and private domains is seen in the governance sciences as a theme that belongs in the governance debate. One of the most important insights that plays a role in the literature on governance is that the government should not be regarded as the central steering body for social development, but that it shares its functions in this regard with private parties. Particularly when it concerns complex policy challenges (Klijn, 2008; Sanders & Heldeweg, 2012). The institutional design of PPPs is a determining factor in effective cooperation between the public and private domains (Heldeweg & Sanders, 2013).

In the Netherlands, the notion arose that government should involve the private sector in the implementation of governmental policy. This was derived from the Private Finance Initiative (PFI), which originated in England during the ministership of Margaret Thatcher. The reasoning behind this idea is that the private sector could work much more efficiently if different activities are integrated to create economies of scale and increase innovation capabilities. This fits well within the theoretical principles of the New Public Management school. Furthermore, cooperation between public and private parties will be able to deliver better products and/or policies for complex societal problems, to which the sustainability of energy supply can certainly be added. Collaboration and bringing together different qualities combined with the exchange of information can lead to more innovative products. More attention was paid to institutional links in which cooperation between public and private organisations for the realisation of government policy took shape. Such links were referred to as public-private partnerships (PPPs). Since then, PPPs have attracted a great deal of interest in public administration (Osborne, 2001).

There is no clear agreement on the exact definition of the term PPP in the literature (Sanders, 2014). Not every interaction between the government and private parties can be regarded as PPP, because a PPP is a specific form of cooperation. For this study it is therefore important to clarify the concept of PPPs. This can best be done by focusing on the conditions that should be met by a corporation to qualify as a PPP. As opposed to a more uncommitted interactions between the government and private parties (Sanders & Heldeweg, 2014). The three main conditions that should be fulfilled to qualify a corporation as a PPP include:

- Firstly, the cooperation focuses on the realisation of a certain government policy. Regardless of whether the initiative is public or private, PPPs embrace a certain public interest from a political-administrative point of view and consider its promotion to be worth pursuing. In the energy sector, this is reflected in the climate agreements between governments, in which ambitions are formulated to prevent climate change. The following goals are central to the policy: (i) a 20%

share of renewable energy sources by 2020, (ii) an energy saving rate of 2% per year, and (iii) a 30% reduction in greenhouse gas emissions by 2020 compared to 1990 (Sanders & Heldeweg, 2012)

- Secondly, the active involvement of private parties is imperative to realise policies. This involvement in the development or implementation of a policy facilitates the policies' objectives. This of course assumes that both parties need each other. Private parties often provide financial resources, entrepreneurship and technical expertise to the partnership whereas the public party focusses on the alignment with government objectives. Both are required within the partnership to achieve its joint goals. This is therefore a joint and mutually and actively supported strategy which demonstrates a functional commonality of underlying interests (Sanders & Heldeweg, 2012).
- Thirdly, the partnership must be legally structured (Bregman & De Win, 2005). Therefore, the more non-committal, i.e. mutually non-compulsory, interactions between the government and private parties does not qualify as a PPP. A PPP is constructed as a legal structure, which implies a reciprocal obligation, which can - among other things - involve contractual cooperation, participation in a legal entity or participation in an administrative law form of organization (Bregman & De Win, 2005). These relationships are structural because the cooperation occurs as a constructive interaction in function of a common goal. Therefore, a discreet contract for the immediate delivery of goods or provision of services does not meet this requirement (Sanders & Heldeweg, 2012).

It is important that all three conditions are met before a corporation can be qualified as a PPP. Thus, a PPP can be defined as:

"A legally structured partnership between one or more public authorities and one or more private legal entities that focuses on developing and implementing a joint strategy (or having a joint strategy implemented) for the realisation of a policy." - (Sanders & Heldeweg, 2012, pp. 41-42)

This study adheres to this definition and the conditions as described in this section. The analysed cases for this study all meet the above criteria.

2.2 PPP compositions in energy transition

Within the Dutch design of the energy transition, the lower public bodies, such as municipalities and provinces, have the responsibility for the implementation of renewable energy technologies, such as solar and wind parks. These public bodies are dependent on private and social parties to complete these sustainable projects (Elzenga & Schwecke, 2015). Traditionally project developers were involved in these sustainable projects, but in recent years a new party has established itself within society itself; the energy cooperatives (Bokhorst et al., 2015). In a relatively short period of time, these energy cooperatives have established their position as a serious partner for municipalities and provinces to realise the energy transition objectives (Koelemeijer et. al., 2017).

Selecting the right partner is for the government of importance to a successful outcome of the project (Zhang, 2005). A distinction should be made between PPPs involving a project developer and PPPs with

an energy cooperative. Energy cooperatives originate from society and are often founded based on an ideal and aim to involve society in the completion of the sustainable energy project (Kaphengst & Velten, 2014). Compared to project developers, cooperative actions are usually embedded in the local societal environment and do not (only) serve profit interests. Here, energy cooperatives are a platform of organisation and motivation, because the business model is very open and democratic compared to other legal forms such as public limited enterprises or a company. Participation is made possible by the right of the members of the cooperative to vote for positions in the cooperative and decide about the cooperative statement, the associated projects and the distribution and use of profits. People can become members of the cooperative at any time and several activities can be carried out under one roof, as long as they are compatible with the company's mission. A great deal of work is carried out on a voluntary and unpaid basis, including work in the Supervisory Board and the Executive Board (Kaphengst & Velten, 2014).

The literature emphasises that the importance of energy cooperatives during the design and planning of sustainable energy projects lies in 'community identity' and 'participation' (Berka & Creamer, 2018; Kaphengst & Velten, 2014). These are factors that seem to increase self-esteem, energy independence and sustainability. This is what the energy cooperative is trying to achieve. Based on this focus on participation and community identity, energy cooperatives offer local stakeholders opportunities to engage in economic development within and for the community (Kaphengst & Velten, 2014). The postcode rose regulation, a nationwide regulation allowing members of a cooperative to receive an energy tax rebate on locally and sustainably generated energy, is used as the main instrument to financially involve local stakeholders in the development of sustainable solar energy projects of energy cooperatives (Elzenga & Schwecke, 2015). In addition, by involving the community in the planning process, an attempt is made to create support and acceptance among local stakeholders (Berka & Creamer, 2018).

The focus within energy cooperatives is mainly on community identity and participation. This unambiguous focus is absent from project developers (Berka & Creamer, 2018). Because the main objective of a project developer is not primarily based on a shared ideal but is usually anchored in profit interests, this party mainly focuses on (contractual) certainty and financial gain. Within the study it will be researched if due to this difference in focus, the PPP form and the PPP management style used will deviate within a PPP solar park project towards successful implementation of a PPP solar park project.

2.3 A successful PPP project

This study examines in which PPP form public and private parties work together, how these parties manage the PPP project during the development of the projects and what actions lead to satisfactory outcomes.

The success of a project can be described as the extent to which the project result satisfies the parties involved (Van Aken, 2002). To the extent that an involved party (or actor) is dependent on the project result, satisfaction with the successful planning process, and thus a successful result, is of greater importance (Van Aken, 2002). From a project developers perspective, a project is successful or satisfiable, if the project results in profit. This is true because the existence of the project developer is dependent on achieving these profits (Atkinson, 1999). From a client's perspective, the success of a project is expressed in three performance measures. Firstly, the fact that a project is completed on time. Secondly, that it is

completed within the budget. Thirdly, that it meets the predetermined requirement (the Programme of Requirements) (Atkinson, 1999). Based on these three traditional performance measurements, success is measured through: (i) time, (ii) quality (being the extent to which the Programme of Requirements is met) and (iii) costs.

Public-private relationship. Because solar energy projects are implemented within complex social environments, other conditions besides these three traditional measures are required to be taken into account, when deciding if a project is successful (Dimitriou et al., 2013). For example, public values such as accountability or transparency can be compromised during the project, even when the time, quality and cost factors suffice (Reynaers, 2014). Or the interests of external stakeholders, such as businesses and citizens, may be affected during or as a result of the project. These aspects are core responsibilities of the government served by public procurers. In addition, public-private relationships may be strained. Thus, even when these three basic measurements are met, it is not always possible to speak of a successful outcome. The traditional measurement of price, quality and time allow to measure the successfulness of a PPP solar energy project with multiple actors and interests, from an *internal perspective* of the public and private parties involved in the PPP project. While these factors effectively measure the *objective* part of success (Van Aken, 2002), they do not allow for a subjective measurement of success. To enable for a more comprehensive measurement of success, the present thesis also includes a subjective measure: *public-private relationship*. This measure is often used in prior literature (Verweij et al., 2013; 2015, Jeffares et al., 2013). It refers to the extent that the internal PPP parties involved in the project (private and public party), are satisfied with the outcome of the PPP project (Zou et., 2014). The satisfaction of the managers is measured based on their satisfaction with the cooperation and relationship between the public and private party within the PPP project. Since the present thesis measures success only from an internal perspective of the PPP parties, it excludes other success factors such as the interests of external stakeholders, or government responsibilities.

2.4 A distinction between two PPP forms

Forms of PPP have a major influence on the cooperation between parties within the PPP, but can also influence the relationship with external parties (Hodge & Greve, 2005). Using a suitable form of PPP promotes these relationships. In the literature the exact classifications of these PPP forms varies. However, a clear distinction can be made between (A) a PPP based on a concession or contract and (B) a PPP based on a partnership (Hodge & Greve, 2005; Teisman, 1998).

In the first form (A) the contracts are often long-term since they comprises multiple or all phases of an infrastructure project (from development till completion). In this PPP form the government acts as the *principal* and the private individual acts as the *contractor*. The principal is responsible for defining the project. The follow-up phases of the project are described in the tender. This creates a contractually defined implementation relationship. In the literature, various forms of these contracts can be found under names such as DBFM (Design-Build-Finance-Maintain) or DBFO (Operate instead of Maintain). In addition to DBFM(O), the PPP concession or contract form also includes other forms of legal relationships, but there too the parties within the PPP still have separate responsibilities (Wang et al., 2018; Evans & Bowman, 2005).

The benefit of this type of PPP is the lower transaction costs between the project phases (such as design, financing and management) (Klijn & Twist, 2007). Another benefit from integrating these project phases into a contract is that it allows private parties to participate in the tender, which allows for a broader set of solutions from which both parties can benefit. Involving a private party early in the project and creating a legal obligation for the long-term care of the project supports the selection of more sustainable materials. Since sustainable materials probably lead to lower costs (incl. recouping costs) in the long term. Another benefit from early involvement of the private party is they have insights in the financial and technical feasibility of a project early on. The private sector operates from a business case perspective which balances affordability and return on investment (Flyvbjerg et al., 2002; Siemiatycki, 2010). This early information sharing can facilitate the creation of a realistic project scope, also in later stages, and making more informed decisions (Lenferink, 2013). In addition, the private sector can use its conceptual adaptability and creativity to offer a different perspective on problems and therefore provide innovative and "out of the box" solutions (Kelly et al., 2004), such as mixed-use plans (Nijsten et al., 2008).

Alternatively the partnership PPP, form (B), entails the integration of separate activities and subprojects to create added value. Meaning that it brings together various subprojects into an organisational cooperation project. For example, improving the restructuring of the immediate surroundings or other possible separate activities. The added value is created through synergy, which is achieved by linking different projects together and thus achieving interesting substantive results (Klijn & Twist, 2007). Although the partnership PPP is praised in the literature, however it is difficult to apply in for instance infrastructural projects in the Netherlands; particularly on a national level. Public administrators often prefer the contract based PPP since more can be arranged contractually in advance and therefore risks would be better identified and shared between parties in advance. This provides clarity and certainty. (Eversdijk & Korsten, 2015).

In the literature the link is made between partnership PPPs and successful outcome of the implementation of projects, including infrastructure projects (Verweij & Gerrits, 2015; Chan et al., 2003). Primarily caused by the fact that potential possibilities are better utilised in this type of PPP. In a contract based PPP, the coordinating role often shifts towards the private party, after the contracts have been signed. As a result, the public party is less involved in execution of the project which result in loss of potential benefits from collaboration within a PPP, because expertise and skills from the public party are not used optimal (Eversdijk & Korsten, 2015). The public party often has a better relationship with local external stakeholders than the private party. Managing these becomes less effective when the public party is less involved (Verweij, 2015).

These two PPP forms not only differ in terms of organisation (contractual based vs coordination oriented), but also in the way in which co-production is achieved between public and private organisations. In the contractual PPP, co-production is mainly limited to the initial phase in which the tender takes place. After that, the emphasis is on monitoring. In the partnership form of PPP, co-production continues for a longer period. The most important differences between these two PPP forms are set out in the following table (Table 1) (Klijn & Twist, 2007).

TABLE 1 OVERVIEW OF PPP-FORMS (KLIJN & TWIST, 2007)

CHARACTERISTICS	PPP CONTRACT FORM	PARTNERSHIP PPP
TYPE RELATION	Client (public party) and contractor (private party).	Joint decision-making (search for connections).
TYPE OF PROBLEM AND SPECIFICATION OF SOLUTIONS	Public party specifies problem and solution/product.	Public and private party involved in joint process of problem and solution specification.
SCOPE OF PROJECT	Tendency to seek clear separations. Any scope extensions must fall within these defined responsibilities.	Tendency to search for scope expansion and connection elements.
SUCCESS CONDITIONS	Clear contract and tender rules and clearly formulated problem definition/project requirements.	Connecting ambitions and goals, good rules for interaction creating commitment and rewarding cooperation.
MANAGEMENT PRINCIPLES	Strongly based on project management principles (specifying goals, organizing time planning, organizing manpower).	Strongly based on process management principles (target-searching, connecting and linking actors and activities, and linking decisions).
TYPE OF CO-PRODUCTION	Limited and especially prior to the tender. After that, only control, no co-production.	Extensive throughout the process. Initially mainly about the nature of the ambitions and the search for connections, later more co-production if ambitions are jointly realised.

The occurrence of PPP forms in the energy transition differs. The contractual PPP is frequently for the developments of wind and solar parks. These wind and solar parks are then awarded based a tender process which includes both project developers and energy cooperatives. The partnership PPP is mainly used when, of a long period of time, multiple projects are realised in order to achieve sustainability goals in the municipality. Here often energy cooperatives enter into these projects based on PPP partnerships with the municipalities (Elzenga & Schwencke, 2014).

The PPP form can be linked with the PPP management style (section 2.5) and the complexity of a PPP project (section 2.6). This, because an important determinant of the successful outcome of a project is the match between the management style and the complexity of the environment in which the project is executed since complex processes require a different management approach than less complex processes (Klijn & Twist, 2007a; Sanders & Heldeweg, 2013). In their paper, Klijn & Twist (2007a) argue that the contractual based PPP is more based on principles of project management and that the partnership PPP is more based on the principles of process management. Both characteristics fit well with their respective PPP type. The relationship between the management style and environmental complexity is further clarified in the next section.

2.5 Management styles within Public Private Partnerships

Managing a PPP is difficult because the processes are complexified by the numerous actors with potentially diverging interests. A PPP revolves around both the parties within the PPP (the internal stakeholders) as well as parties outside the PPP (external stakeholders). The number of stakeholders and the – often long - duration of a PPP requires good management and thus makes it a crucial factor for a successful outcome. The literature frequently differentiates two perspectives on management styles of PPP projects: project management and process management (Esselbrugge, 2003; Teisman, 2001; Agranov & McGuire, 2001; Gage & Mandell, 1990).

2.5.1 Project management

Project management is strongly focused on controlling the phases based on five aspects, being: quality, time, costs, information and organization. If project management is used, the process is divided into phases that are completed one after the other. (Mantel, 2005). Each transition of phase is marked with a basic document. This contains the results and the progress that has occurred since the previous phase, as well as the demands of the subsequent phase, and the strategy that is to be adopted. Project management is mainly focused on internal project management and less on the continuous interaction with external stakeholders. Within the project approach it is assumed that, within the boundaries of the project, problems and solutions are reasonably stable. This makes it possible to use project management techniques. These include a clear objective, clear preconditions, a timeline and a predefined end-product. The contractual based PPP, as described in the previous chapter, can be characterised as a common PPP form within project management. This however does not exclude other PPP forms when using the project management style (Edelenbos et al., 2007).

2.5.2 Process management

Process management fits more with dynamic activity whereas project management fits with a more static phased step-by-step plan. A dynamic activity is more difficult to handle with a project management approach due to the internal focus and predefined agreements. The dynamic can have both internal and external causes (Edelenbos et al., 2007). A cause is classified as internal when an activity starts as a project, but develops into a process as a result of progressive understanding of the owner that the problem is more complex than initially anticipated. We speak of external dynamics when an activity starts as a project but develops into a process by external parties interfering with the project, bringing in only their own problem definitions and solutions. Process management is based precisely on dynamics and complexity in the interests and perspectives of many actors (Teisman, 2001). Process management is also often preferred when problems are persistent and unstructured as a result of the absence of consensus or insufficient information about the standards to be applied in the case of a problem or solution. It tries to respond to different perceptions of reality on the part of different parties. Process management sees problem solving as a continuous process in which the input of own information and values creates more consensus between the parties. This openness in decision-making creates respect for mutual interests (Edelenbos et al., 2007).

From this perspective, an environment-focused approach is appropriate when allowing all stakeholders to participate in the process in a timely manner on the basis of an open dialogue. Project management can still be useful in a certain stage of the policy process because quality (clear description of the programme of requirements, quality control, etc.), time, costs, information and organisation must be monitored.

Interaction between stakeholders selects and elaborates solutions and, above all, clarifies the problem definition (Edelenbos & Teisman, 2008). These solutions can be different from what the initiator had in mind at the beginning. In process management, indicating a solution to the problem too quickly is not pursued, because it ignores the need to know all interests and, moreover, creates the impression that other interests are not taken seriously (Lui et al., 2018). The following table (Table 2) shows characteristics per management form.

TABLE 2 OVERVIEW OF PROJECT AND PROCESS MANAGEMENT (EDELLENBOS ET AL., 2007)

DIMENSION	PROJECT MANAGEMENT	PROCESS MANAGEMENT
FOCUS	A substantive analysis of the problem. The focus is on a good, substantively substantiated project proposal.	An analysis of the parties involved, their interests, means of power, opinions and interrelationships. The focus is on the most important parties and how to get them together and keep them together.
CORE ELEMENT DESIGN	A substantive solution to the problem.	A description of the process that should lead to the solution of the problem.
ESTABLISH SUPPORT	By content of the initiative: it is so good that it convinces everyone.	Through the process: the (relevant) parties are given influence on the design of the initiative, making it more attractive to them.
DEALING WITH DYNAMICS	By decisiveness: fast and clear decision making, as a result of which changing circumstances no longer have a grip on the initiative.	By keeping options open: the initiative must be and remain attractive to actors.
COMMUNICATION	Is mainly explaining and convincing actors of the plan and follows decision making.	Is a process of consultation and negotiation; decision making is the result.

Project management and process management have clear differences. Applying the right management style within the PPP project is essential for its success (Edelenbos et al., 2007). The choice for the management style mainly depends on the complexity of the project. The literature frequently emphasizes that complex processes in networks can only produce good and satisfactory results if they are intensively supported by process management, based on well-designed organizational guidelines for interactions (Zou et al., 2014; Edelenbos & Teisman, 2008; Edelenbos et al., 2007).

In contrast to project management, process management is based on the assumption of complexity and dynamics in the interests and perspectives of many actors (Edelenbos et al., 2007). Through openness in decision-making based on a continuous process, with contributions from the parties' own values and information, an attempt is made to achieve consensus between parties. When, as in project management, the problem and the solution are identified at the initial stage, the possibility of consensus between conflicting interests of parties is made complicated (Lui et al., 2018).

However, this does not mean that project management has no value in dynamically complex projects. For example, factors of project management, such as the focus on the contract agreements and a substantively substantiated project proposal, are important conditions that determine the progress and success of the project (Edelenbos & Teisman, 2008). The complexity of projects is further clarified in the next section.

2.6 Complexity

Complexity is not an unambiguous concept, but it does play a significant role in this study. Complexity is related to both management styles and PPP forms, and therefore also to the successful outcome of a project. This section clarifies these links with complexity. First, the concept of 'complexity' of projects as used in the research is described. Baccarini (1996) defines the complexity of projects as 'consisting of many different, interconnected components, and to be operationalized in terms of differentiation and interdependency'. In addition, Baccarini (1996) distinguishes two domains in which complexity differs in nature and appearance: technical and organizational complexity. In this respect, both within the technical domain and the organizational domain, complexity increases as the number of interrelated components increases. Williams (1999) argues that an increasing number of related parts within a project leads to a larger project size and more uncertainty and therefore to higher complexity. Shenhar and Dvir (1996) link this uncertainty to the project management style choice. They argue that the management style of the project, in this study the choice between project and process management, could be tailored to project characteristics or attributes. They state that the management of the project should be matched to the technical uncertainty and the environmental uncertainty. Bosch-Rekvelde et al. (2011) state that this environmental uncertainties and technical uncertainties are influenced by the size and the scope of the project. For this reason, it has been decided in this study to base complexity on project size and project scope. The project size can be related to the number of related components and the project scope can be related to the environmental uncertainty. This because a larger project scope affects the number of external stakeholders (Bosch-Rekvelde et al., 2011).

2.6.1 Project scope and project size

Spatial PPP projects are often executed within a complex socio-physical context. Projects have to deal with both internal and external unplanned events (Verweij & Gerrits, 2015). Internal unplanned events originate from the project itself, for example conflicts between public and private parties within a PPP. External unplanned events, referred to by Bosch-Rekvelde et al. (2011) as environmental uncertainties, often originate from the socio-physical context in which the project is situated. Examples include resistance of (local) stakeholders or bad weather conditions. These unplanned events can affect the progress of the project. These events influence the actions of project managers. They will have to react so that these unplanned events do not lead to factors, such as budget overruns or delays, that threaten the satisfactory outcome of the project (Verweij, 2015).

But the more integrated the project, i.e. the more spatial functions are integrated within the project, the more stakeholders are involved in the project. More involved stakeholders in the project means more interpretations and interests and therefore more uncertainty. This indicates a higher complexity and a higher pressure on the success of the project (Bosch-Rekvelde et al., 2011). The integrality of spatial functions within a project depends on the scope of the project (Zhang, 2005a). In this study, it is the scope of the project that is indicated as the first factor related to complexity. The most narrow scope can be

characterized as a single function project. A narrow scope can often be linked to a low form of complexity. This changes when the orientation of the project becomes more external. The focus of PPP projects with an external orientation is on adding multiple spatial functions. This matches the characteristics of the partnership PPP form (Klijn & Twist, 2007).

High complex projects, often with a greater social impact and an external project orientation, fit well with the characteristics of process management (Klijn & Teisman, 2000). In more integral projects, involving many stakeholders, management of these stakeholders will have a higher priority. The management approach here will be more externally oriented. For less integrated projects or single function projects, on the other hand, a more internally oriented approach can be applied. Here, external stakeholders are often less closely involved with the PPP project. Through an internally oriented approach this focus can shift towards, for example, impact minimization for the environment (Verweij, 2015).

This study also links the size of the project to the complexity of a project. Both scope and the size of a project are indicators of the complexity of the project. For example, the size of the project is related to the number of interrelated parts within both the technical and organizational domain. An increase in number of interrelated parts will lead to an increase in project complexity (Baccarini, 1996). Lessard et al. (2014) also claim that the project size is related to the duration of the project. They state that large size projects lead to longer project duration, which increases uncertainties within the project. They state that an increase in uncertainty leads to an increase in project complexity (Lessard et al., 2014). Size of solar parks or often measured in PV (photovoltaic) (Massi et al., 2014; Marinopoulos, 2011). In this research this is translated towards Megawatt, the generated capacity from the solar park. By opting for the measure 'generated capacity' of the solar park projects studied, external spatial developments within the cases are excluded from the measurement. Nevertheless, this measure is chosen because the vast majority of the cases consist primarily of the realisation of solar energy (Massi et al., 2014) and in addition, the second investigated measure 'scope' does take into account these possible external spatial developments within the investigated cases.

TABLE 3 COMPLEXITY

COMPLEXITY	
PROJECT SCOPE	Wide scope: integral projects Narrow scope: single function
PROJECT SIZE	High generated capacity (MW) Low generated capacity (MW)

2.7 Conceptual model

An important determinant of the successful outcome of a project is the match between the PPP management style and the project complexity since complex projects require a different management approach than less complex processes (Klijn & Twist, 2007a; Sanders & Heldeweg, 2013). According to the literature, the complexity of processes stems from different interests and perceptions of problems and solutions of the actors involved. The literature states that stakeholder involvement and horizontal forms of coordination are required within high complex projects caused by an increase in (various) actors (Verweij et al., 2013). Process management is based on the assumption of complexity in the interests and perspectives of many actors (Edelenbos et al., 2007). Through openness in decision-making, with

contributions from the parties' own values and information, an attempt is made to achieve consensus between parties. When, as in project management, the problem and the solution are identified at the initial stage, the possibility of consensus between conflicting interests of parties is made complicated (Lui et al., 2018).

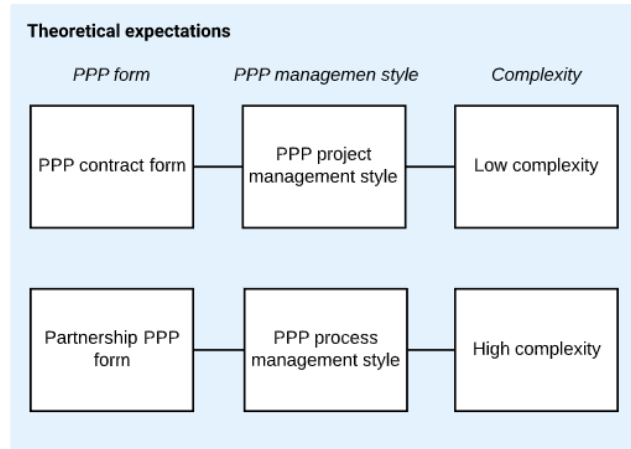


FIGURE 1 THEORETICAL EXPECTATIONS

In contrast to process management, project management is linked to static and less complex projects where the network complexity is low and where stakeholders have little conflicting interests (Edelenbos et al., 2007). Besides connecting the PPP management style to the project complexity, the literature also frequently link the PPP form and PPP management styles. Klijn & Twist (2007) state that the PPP contract form is based onto the principles of project management and that the PPP partnership form is based onto the principles of process management. A illustration of the relationship between de PPP form, PPP management style and complexity is visualized in Figure 1.

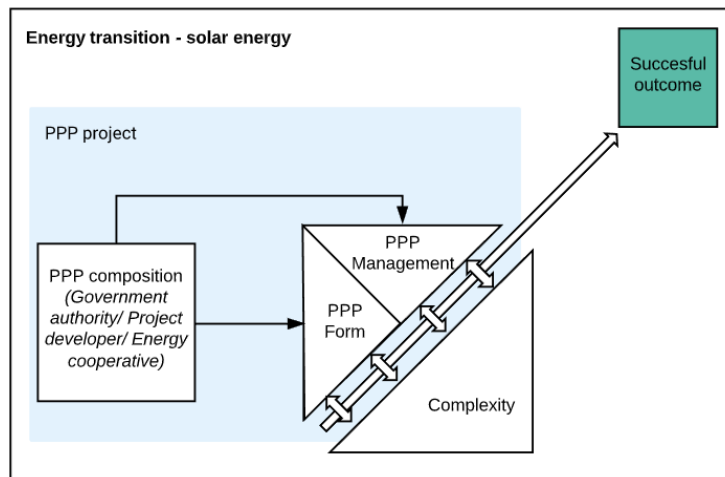


FIGURE 2 CONCEPTUAL MODEL

The conceptual model (Figure 2) shows the relationships between the factors of a PPP project design and the successful outcome. The conceptual model link the variables 'PPP composition' with the 'PPP form' and the 'PPP management style' and it shows the interaction between PPP form- PPP management style combination with the complexity towards a successful outcome.

3 Methodology

In this study, a qualitative research methodology is applied which combines data analysis through policy document research and analysis of semi structured interviews. First, the research strategy will be explained, followed by explanation and justification of the methods of data collection. Then the interviews and their ethics and limitations will be discussed. Finally, the methods of data analysis are presented.

3.1 Research strategy

In order to answer the research question, a qualitative comparative case study was conducted. By applying a case study, detailed descriptions and interpretations can be obtained (Clifford et al., 2010). Gustaffson (2017) states that a case study is a valid way to investigate and subsequently understand settings. According to Hennink et al (2011), a qualitative comparative case study is useful for gaining insight into decision-making processes, including the underlying values that structure these processes. As the aim of this study is to investigate the PPP form, which refers to organisational structure of the collaboration, and the PPP management style, which refers to managing the (decision-making) process, of PPP solar projects with differences in PPP composition and project complexity, a qualitative comparative case study is a suitable research method. By opting for a comparative case study, data can both be extracted per case and this data can be compared between the cases. The comparative case study offers the possibility to compare PPP solar park projects with a successful outcome in a comparable context with different PPP designs. Furthermore, a comparative case study offers the researcher to analyse data both within each situation and across situations (Yin, 1994). The method allows for replication, so cases which confirm relationships can enhance confidence in the validity of the relationships. On the other hand, cases which disconfirm the relationships allow for extending and refining theories (Eisenhardt, 1989). Replication through a comparative case study can provide a more solid basis for possible ties between PPP compositions and PPP form- PPP management style combinations.

3.2 Case selection

Four PPP solar park projects have been selected for the multiple case study. In order to be able to compare the cases studied correctly with each other, they have to meet certain conditions. Firstly, the selected cases must meet the definition and characteristics of a PPP as used in the research (section 2.1). Because the research is framed within Dutch policy and within Dutch sustainable energy development, Dutch PPP projects are investigated. In order to ensure a good comparison between cases, the context of the cases is aligned as much as possible. This is why a selection of cases is made within one province. Because most Dutch solar parks have been realized in the province of Noord-Brabant, this province is selected as research area (Zon op Kaart, 2020). This offers the possibility to make a more extensive choice within one province, with one provincial policy, between the solar parks that have been realised.

Because the main objective of the study is to investigate the relationship between the complexity and the PPP composition of a PPP solar park project a selection of four cases is made. These four cases vary in combination between high and low complexity and PPP composition (with project developer or energy

cooperative as private party within a PPP). Each combination of these factors is therefore examined ones within the multiple case study (Figure 3).

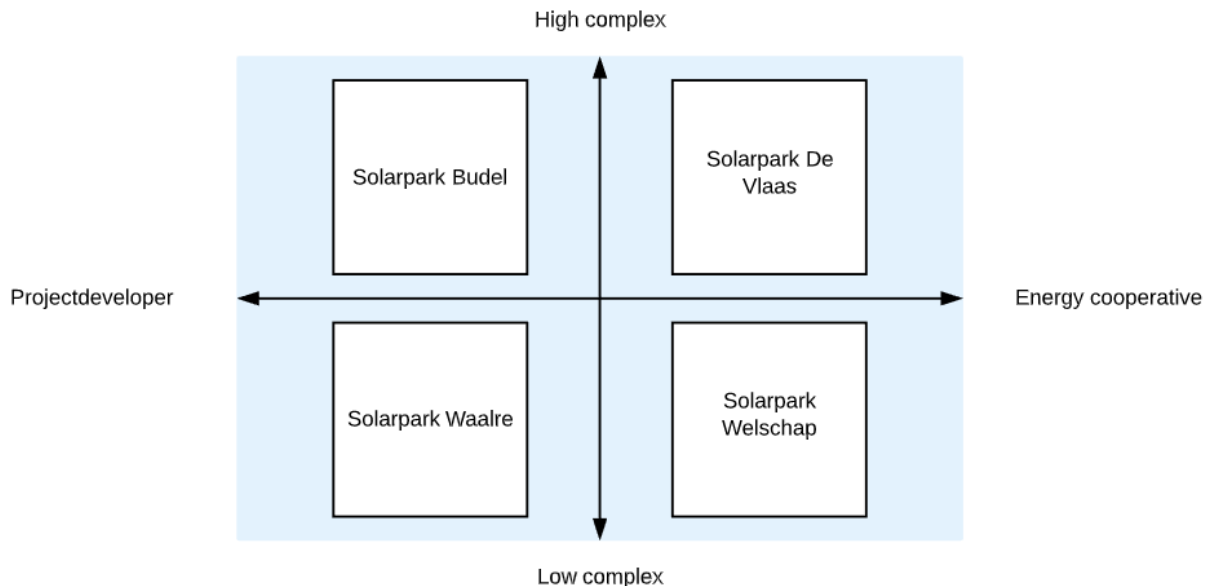


FIGURE 3 SELECTED CASES

The four selected cases are: (1) Solar park Budel, (2) Solar park De Vlaas, (3) Solar park Waalre and (4) Solar park Welschap. These solar parks have been successfully completed and meet the criteria regarding complexity and PPP composition. These PPP solar park projects will be introduced each in Chapter 4.

3.3 Research methods and collection process

Within these case study, multiple research methods were used, combining different approaches and quantitative data. This triangulation can widen the understanding and strengthen the validity of the results (Olsen, 2004). The qualitative data is collected through semi-structured interviews and document research.

First, in order to obtain qualitative data, *semi-structured interviews* were conducted with both the public and private parties involved in the four studied cases. Based on these interviews, qualitative data were collected in order to investigate the links between the factors of the cases selected within this research. By investigating the factors per case a comparison can be made between these factors that are necessary to answer the sub-questions and the main questions within this research concerning the influence of PPP design on successful outcome. Qualitative research is very useful to dive into these complex relationships. In addition, qualitative research helps to emphasize the why and how of processes, and how they relate to their context (Kothari, 2004). A disadvantage of doing qualitative research is that this form is very time-consuming and less suitable to generalize. However, according to Onwuegbuzie & Leech (2010), qualitative data still allow for case to case transfers, which also involves making generalizations from one project to another (similar) project. In this study, cases are chosen within the same province with the same provincial policy to support this generalization. Respondents were selected on the basis of function

and involvement within the cases. Because the research focuses on factors as PPP form and PPP management style, respondents were selected with a management function within the PPP of both the public and private parties of the four cases. Because both, public and private, PPP parties have different perspectives regarding the PPP and were involved within different aspects of the project. Before the interview took place, the respondents were provided with the interview questions (Appendix B1 & B2). These questions were sent to the respondents by e-mail so they could prepare themselves optimally before the start of the interview. Respondents were contacted from March 2020 onwards. An overview of the arranged interviews is given in the following table (Table 4).

TABLE 4 SELECTED RESPONDENTS (SEMI-STRUCTURED INTERVIEWS)

Project	Organization	Role in organization	Public/private (PPP)	Date	Duration	Reference
Solar park Budel	Province Noord Brabant	Project leader/ Licensor Nature protection	Public	14-05-2020	51 min	RES 1
Solar park Budel	Solarcentury B.V.	Lead Engineer	Private	20-05-2020	75min	RES 2
Solar park Budel	Municipality Cranendonck	Project leader/ Policy advisor	Public	24-05-2020	48 min	RES 3
Solar park De Vaas	Municipality Deurne	(ex) Policy advisor Environment and Milieu	Public	19-05-2020	50 min	RES 4
Solar park De Vlaas	Cooperative EnergyPort Peelland	Secretary of the board	Private	18-05-2020	43 min	RES 5
Solar park De Vlaas	Greenspread	Director	Private	15-05-2020	55 min	RES 6
Solar park Waalre	Municipality Waalre	Project leader/ Policy advisor Sustainability and Environment	Public	18-05-2020	53 min	RES 7
Solar park Waalre	Vrijopnaam	Director	Private	12-05-2020	56 min	RES 8
Solar park Welschap	Municipality Eindhoven	Policy advisor Sustainable Energy	Public	20-05-2020	56 min	RES 9
Solar park Welschap	Cooperative Solar park Welschap	Chairman of the board	Private	12-05-2020	42 min	RES 10

Second, a *document research* was also executed as text analysis in this research. Document research focuses on (policy) documents and other non-scientific documents. A document research can be performed based on different goals. Within this study this method was used to obtain specific data form the four selected cases because every selected case has its own context (Corbin & Strauss, 2008).

In this way, the document research supports the results obtained from interviews. These results can be compared with results from the semi-structured interviews in order to conduct a thorough research (Bowen, 2009). The documents were selected per case. In order to guarantee the reliability of the documents, official documents, released by the PPP parties of the four cases, were selected. The documents researched consist of (policy) documents, such as zoning plans and spatial substantiations documents. This resulted in the following document selection. The following table (Table 5) shows the document selection.

TABLE 5 SELECTED DOCUMENTS (DOCUMENT RESEARCH)

Cases	Document	Reference
Solar park Budel	Definitieve beschikking Provincie Noord Brabant	DOC 1
Solar park Budel	Bestemmingsplan Duurzaam Industriepark Cranendonck	DOC 2
Solar park Budel	Visie zonneparken in Cranendonck 2019 -2024	DOC 3
Solar park de Vlaas	Bestemmingsplan de Vlaas, zonnepanelenpark gemeente Deurne	DOC 4
Solar park de Vlaas	Zonnevelden van A tot Z: wat werkt, en wat niet? Gemeentelijk Kennisprogramma Energielandschappen	DOC 5
Solar park de Vlaas	Greenspread opent met zonnepark De Vlaas haar tweede zonnepark	DOC 6
Solar park Waalre	Zonnepark Dreefstraat Waalre Ruimtelijke onderbouwing	DOC 7
Solar park Welschap	Bestemmingsplan Zonnepark Welschap	DOC 8
Solar park Welschap	Brochure Zonnepark welschap	DOC 9

3.4 Interviews

By semi-structured interviews, the relationships between the different factors were explored. In these semi-structured questions the balance between structure and flexibility could be determined. In order to guarantee the structure, the interviews were based on the relevant concepts from the theoretical framework. Per concept questions were formulated. The shift within the questions between the concepts were clearly indicated by the interviewer in order to provide the interviewee with clear guidance during the interview. The informal type of interviewing allowed both the interviewee and interviewer to further touch upon interesting topics or to introduce new ones, to explain unclarities and to explain questions (Longhurst, 2010). Follow-up questions on examples ensured a full understanding of the concepts, such as the PPP management style and PPP form used. The interviewer frequently asked for examples, which provided the interviewee the opportunity to substantiate statements made. All interviews were conducted over the telephone or video calls in Dutch. This due to the current restrictions regarding the Covid-19 pandemic. Preference was given to video calls in order to recognise non-verbal

communication. An informed consent form was used to inform participants about their rights and the use of the data (Appendix A). Recordings ensured that interviews could be transcribed. Two interview guides were drawn up for this study. An interview guide was conducted for the public party within a PPP project, such as municipality and province (Appendix B1) and an interview guide was conducted for the private party within a PPP project, such as project developers and energy cooperatives (Appendix B2).

3.5 Ethics and limitations

During research it was important that ethical aspects were taken into account (Clifford, et al., 2010). Clifford et al. (2010) state that the researcher should be aware that his or her actions may have consequences in their context. During the research, the respondents and their data were treated with respect and consideration. According to Longhurst (2016) there are two important ethical aspects that the researcher should take into account during qualitative research such as interviews: anonymity and confidentiality. This has been taken into account by asking the respondents for permission to record and transcribe the interview, and to use quotes in the final study. The results of the interviews have been transcribed and are available to the respondents. Results of the data were directly implemented in the study without any reformulation of texts.

A possible drawback of applying semi-structured interviews by a phone call, due to pandemic regulation, was the absent of non-verbal communication. Follow-up questions and questions regarding examples of the statements made by the respondents, have been used to overcome this limitation.

3.6 Data analysis

After the data gathering, data has been analysed. In order to provide insight into the qualitative parts of the interview, the interviews were transcribed as quickly as possible. This made it possible for the interviewer to remember specific details better, for example in the respondent's behaviour. During the interviews, notes were made to emphasize important aspects of the interview.

After transcribing the conducted interviews all of the transcriptions and policy documents were coded. Coding is the attribution of certain labels to subjects, words, sentences, opinions and quotes that are relevant for answering the research question (Hennink et al., 2011). Coding can be described as: "A way of organizing and evaluating data in an effort to understand meanings in a text" (Cope, 2010 p.441). Coding makes it possible to identify and analyse categories and patterns within and between transcripts. For coding there is no prescribed method (Bowen, 2009), therefore the used codes are based on the relevant concepts from the conceptual framework. The codes were established for each factor. This, because in Chapter 4 (Results), where the results from the analysis is implemented, the four cases are also addressed per factor. The tables in section 2.4, concerning the distinction between PPP forms (Table 1), and 2.5, concerning the distinction in management styles (Table 2), served as guidance for the coding of these two factors.

4 Results

This chapter describes the results of the interviews. A closer examination of the effect of the (i) PPP Form, (ii) PPP management style and (iii) project complexity on the successful outcome of four selected cases. The final section of this chapter describes how connections between factors and combinations of factors led to a successful outcome of the PPP projects investigated. Table 6 depicts an overview of the cases looked at.

TABLE 6 PPP COMPOSITION OF SELECTED CASES

CASE	PPP COMPOSITION
SOLAR PARK BUDEL	With <u>project developer</u> as private party
SOLAR PARK DE VLAAS	With <u>energy cooperative</u> as private party
SOLAR PARK WAALRE	With <u>project developer</u> as private party
SOLAR PARK WELSCHAP	With <u>energy cooperative</u> as private party

4.1 Case1: Solar park Budel

The first investigated project is Solar park Budel which is part of the Budel-Dorpsplein industrial estate in the municipality of Cranendonck. Nyrstar Budel B.V. intended to realise the Sustainable Industrial Park Cranendonck on these estates (Figure 4). The northern part of the industrial area was set up for businesses and a nature reserve. The western part consists of a nature reserve and a solar park (DOC 1 & 2). The initiative for the solar park came from Nystar Budel B.V. who made their waste storage facility, consisting of *rosite* (a residual production of zinc extraction), available for the project. The day-to-day management of this storage facility was subsequently transferred to the province of Noord-Brabant. With that transfer the province of Noord-Brabant was burdened with the maintenance obligation (Province of Noord-Brabant, 2018). Nystar Budel B.V. has mandated Solarcentury, a solar energy developer, for the development of this solar park. Solarcentury and the province of Noord-Brabant subsequently entered into the Solar park Budel project in cooperation. This resulted in a PPP with Solarcentury as the private party and the Province of Noord-Brabant as the public party.



FIGURE 4 LOCATION SOLAR PARK BUDEL (SWECO, 2018)

4.1.1 PPP Form

The initiative for the development of the Budel solar park originated at Nyrstar Budel B.V. In January 2016, approval was given by the Province of Noord-Brabant to draw up a preliminary project development plan

with the intention of initiating the permit application. This application started in January 2017 and subsequently the province granted a conditional environmental permit. With this permit a grant application could be made after which the plan was finalized (DOC 1, RES 1 & 2).

During the development of the implementation plan, Solarcentury was responsible for the plan design of the solar park and the province took on the role of reviewer (RES 1,2 & 3). This process involved intensive cooperation in which both parties searched for agreement on the plan design (RES 1 & 2). Besides the fact that the province had the role of reviewer, testing for the requirements itself had defined, it also had a facilitating role. For illustration, the province provided the documentation concerning the waste disposal site. In addition, they were also intensively involved in the choice of foundation and tests concerning the foundation. The relationship between the internal parties within the PPP project does not indicate a classic client-contractor relationship, as described in the contractual PPP by Klijn & Twist (2007). Because the province left room within the established requirements to reach joint agreements. The lead engineer of Solarcentury stated:

"I think I was with the province twice a month during that time and each time we tested our ideas with the province to see if we could come to a joint agreement. In doing so, we tried to work within their set frameworks, but they tried to incorporate our plans within their requirements. Thus, it was a joint process."
– Lead Engineer Solarcentury

The project had clearly defined responsibilities within the development phase. The private party was contractually responsible for the realisation and operation of the solar park and the public party took on the role of reviewer (RES 1 & 2). These clearly defined tasks and the related contractual agreements fit within the contractual PPP form. Furthermore, there was a clear framework for the project, which led to a scope with a focus on the project area, again matching the contractual PPP form. The aim of this project was sustainable solar energy in the area (DOC 2, RES 1,2 &3). The characteristics of the PPP form are summarized in Table 7.

TABLE 7 PPP FORM SOLAR PARK BUDEL

**PPP FORM SOLAR PARK
BUDEL**

<i>CHARACTERISTICS</i>	<ul style="list-style-type: none"> ▪ Type relation: The project had a client-contractor relationship but also involved joint decision-making processes (Mixed PPP form). ▪ Type of problem and specification of solution: The public partied specified the problem. After that a joint process of solution specification (Mixed PPP form). ▪ Scope of project: The project used a clear framework for the project, which led to a scope with a focus on the project area (Contract PPP form). ▪ Success condition: The project included integrated phases (Contract PPP form). ▪ Type of co-production: The private party was made contractually responsible for the design, realisation and operation of the solar park (Contract PPP form).
<i>PPP FORM</i>	Mixed PPP form

4.1.2 PPP management

The Budel solar park largely had the character of project management as defined in Edelenbos et al. (2007). Project management focusses on an in-depth analysis of the difficulties, primarily being the project proposal. As described in 4.1.1, the development process mostly occurred internally. In particular, common ground was sought between the province of Noord-Brabant and Solarcentury for the project development plan (RES 1 & 2). With the aim of presenting a project plan; that is of the highest quality and convincing which fits in with project management style. The final project was presented to the external stakeholders, such as the local residents. Within the project, local stakeholders were not actively involved in the plan design (RES 1 & 2). The location was the reason for limited involvement of external stakeholders in the design plan. Regarding which the lead engineer of Solarcentury stated:

"That had everything to do with the location. It's a waste disposal site that does not deserve the award of beauty. It's not precious farmland. The municipality also responded very positively to the project. The land was there anyway." – Lead engineer Solarcentury

This meant that, the zoning plan for this solar park project did not need to be modified. An adaptation of a zoning plan would trigger an objection procedure, which now was not necessary for this project. The characteristics of the PPP management style are summarized in Table 8.

TABLE 8 PPP MANAGEMENT STYLE SOLAR PARK BUDEL

PPP MANAGEMENT STYLE SOLAR PARK BUDEL	
CHARACTERISTICS	<ul style="list-style-type: none"> ▪ Focus: The emphasis within the project was on a substantive analysis of the problems. The focus was on a good, substantiated project proposal (Project management style). ▪ Core element design: The core element of the design was based on a substantive solution to the problem (Project management style) ▪ Establish support: The development process of the plan mainly takes place within the PPP parties (Project management style). ▪ Establish Support: The aim within the development phase was to present the best and most convincing project plan possible to the external stakeholders (Project management style). ▪ Communication: Consensus is actively searched between the PPP parties for the project development plan. Communication to external stakeholders was based on explaining and convincing actors (Project management style).
PPP MANAGEMENTSTYLE	Project Management

4.1.3 PPP Complexity

With 155,000 solar panels on 60 hectares, producing a combined capacity of 43,8 MW (*size*), Solar park Budel was the second largest solar park in the Netherlands when it was opened on June 14th, 2019 (Solarcentury, 2018). In addition, the solar park is located on top of the covering layer of waste disposal site. This top layer consists of a thin plastic top layer topped with a 70-centimetre ground layer (DOC 2, RES 2). This complexified the design of the solar park. Firstly, measuring wells, which were in the top layer, needed to be kept free. In addition, the foundation piles could damage the top layer (RES 1 & 2). Not only did the soil on which the project took place have complexities, this also applied to the environment in which the solar park was built. Furthermore, the adjacent nature reserve Natura 2000 had to be considered during the design and completion of the project. Another complicating factor were the emission requirements (for carbon dioxide and nitrogen) defined by the province of Noord-Brabant requirements (RES 1 & 2). This project had a narrow *scope* with a focus on the production of sustainable energy, but in doing so the environment, like the Natura 2000 area, had to be taken into account (RES 1 & 2).

The adjacent Natura2000 area and the limited thickness of the soil layer have led to a higher technical complexity. The waste storage site increased the technical complexity but also had an impact on the organisational complexity. Firstly, this site is not suitable for high-grade land development, such as agricultural land or housing (RES 1,2 & 3). In addition, both internal and external stakeholders did not

consider this location to be a highly aesthetically pleasing location, which would be detrimental to a solar park at this location. As a result, due to its size and the associated attention, the solar park project had a large number of external stakeholders, including local residents, but they knew little difference in perspective. As a result, the project was more technical than organizational complex (RES 1 & 2). Because the size, producing more than eight times more energy than the second largest investigated case within this study, this case is considered as complex, despite the narrow scope.

4.1.4 Outcome of the project

In Table 9 the performance indicators are listed for success and the respective outcome in this case:

TABLE 9 SUCCESS CRITERIA SOLAR PARK BUDEL

SUCCESS CRITERIA SOLAR PARK BUDEL	
TIME	The project was completed before the set delivery date.
QUALITY	The project met the predetermined quality requirements
BUDGET	The project was realised within the set budget
PUBLIC PRIVATE RELATIONSHIP	The public-private relationship has been considered successful within the project, by both the private and public party

4.2 Case 2: Solar park De Vlaas

Solar Park De Vlaas, located in the town of Deurne, was officially opened on November 16th, 2018. This solar park covers 18,208 panels on a site of more than 11 hectares. A total of 10,113 Panels have been operated on the basis of the SDE+ regulation. The remaining 8,095 panels have been exploited based on the postcode rose regulation (DOC 4). During the opening of the project it was the largest postcode rose project in the Netherlands (DOC 5). The initiative of the solar park project originated at cooperative EnergyPort Peelland (EPP). Together with the municipality of Deurne, it was determined to develop a solar park (RES 4 & 5). In the past, this location was an area for residential development and thus had a residential development zoning. But the houses could never be built due to soil pollution (DOC 4, RES 4). This project was the responsibility of cooperative EPP and the municipality acted as a cooperation partner. Greenspread, a sustainable energy developer, was approached because it was not possible to include the entire power yield of the solar panels in the postcode rose regulation. Greenspread supported the cooperative during the development and realisation and took over 10,113 solar panels from cooperative EPP and operated them on the basis of an SDE+ regulation (DOC 5, RES 4,5 & 6).



FIGURE 5 LOCATION SOLAR PARK DE VLAAS (SOLARMAGAZINE, 2018)

4.2.1 PPP Form

The solar park was a collaboration between the municipality of Deurne (the public party) and cooperative EPP (the private party). The municipality acted as facilitator, project supporter and permit provider (were granted). By this, the municipality supported the cooperative in its choice of location and subsequently provided the land (RES 4 & 5). Furthermore, the municipality supported the cooperative during information sessions for the local residents. A lease agreement on the land was setup between the municipality and the EPP cooperative. This long-lasting agreement stipulated that the energy cooperative was responsible for the design, realisation and operation of the solar farm. It stated that the energy cooperative EPP would be responsible for the management of the solar park for 30 years (DOC 5, RES 4 & 5). The energy cooperative has taken on the role of project developer within this project. During the design phase, prerequisites were been defined by the municipality; most importantly the full support of the local residents during all phases of the process (RES 4 & 5). The preconditions were not set out in a contract but merely served as a framework within which the energy cooperative could develop the project.

No clear client-contractor relationship was present in this project. The energy cooperative served as promoter and initiator, whereas the municipality acted as facilitator and evaluator (RES 4 & 5). Furthermore, there was no tendering procedure used for this project. It originated from a common ambition to develop a local sustainable energy project. No contractual design requirements and predetermined delivery dates were formalized (RES 4,5 & 6). The focus was on the principles of process management as described in the next section. The characteristics of the PPP form are summarized in Table 10.

TABLE 10 PPP FORM SOLAR PARK DE VLAAS

<i>PPP FORM SOLAR PARK DE VLAAS</i>	
<i>CHARACTERISTICS</i>	<ul style="list-style-type: none"> ▪ Type relation: The public and private party based their relation on a joint decision-making process towards the development of the plan. (Partnership PPP form). ▪ Type of problem and specification of solution: The problem and solution specification was based on a joint process (Partnership PPP form). ▪ Scope of project: The solar park project had a broader scope than just generating solar energy (Partnership PPP form). ▪ Success condition: There was no tendering procedure for the project. The project originated from a joint objective (Partnership PPP form). ▪ Type of co-production: Within the project, the energy cooperative served as initiator and promoter and searched for locale stakeholder involvement (Partnership PPP form).
<i>PPP FORM</i>	Partnership PPP

4.2.2 PPP management style

The primary goal for the managers of solar park De Vlaas was to create support among local stakeholders. For one because this was a prerequisite of the municipality but was a focal point for the energy cooperative itself (RES 4 & 5). Local residents have been involved multiple times during the process by presenting the plans and design of the solar park during the development. This method of PPP management clearly fits in with process management (Edelenbos et al., 2007). The administrative secretary of EPP stated:

"We have convened meetings for this purpose. Many people came to these meetings right away. We presented the plans there. We indicated that the plan had not yet been cast in concrete and that we could still make adjustments." – Administrative secretary of EPP

To facilitate further involvement of local stakeholders (based on the post codes regulation) they could participate financially in the project (RES 4,5 & 6). Greenspread financed the share of solar panels that were not sold to local stakeholders. These panels were subsequently operated under an SDE+ regulation (DOC 5, RES 4,5 & 6). Besides that overall process management focus several project management aspects were incorporated. For example, in addition to the focus on the process and analysis of the parties involved, much emphasis was placed on a substantive proposal with the aim of convincing parties. As described in Esselbrugge (2003), these two management styles are not mutually exclusive. The characteristics of the PPP form are summarized in Table 11.

TABEL 11 PPP MANAGEMENT STYLE SOLAR PARK DE VLAAS

PPP MANAGEMENT STYLE SOLAR PARK DE VLAAS	
CHARACTERISTICS	<ul style="list-style-type: none"> ▪ Focus: The goal within the development phase of the project was to create support among local stakeholders by a good, substantive and by actively involving locale stakeholders in the development process (Mixed management style). ▪ Core element design: The core element of the design was based on a substantive solution to the problem and a description of the process that should lead to the solution of the problem (Project management style). ▪ Establish support: Local stakeholders are involved in the development process from the start of the project (Process management style). ▪ Establish support: Local stakeholders were given the opportunity to participate financially by means of a postcode rose regulation (Process management style). ▪ Communication: During the development phase, meetings for local residents were organised several times to present plans and gave local stakeholders the opportunity to suggest adjustments (Process management style)
PPP MANAGEMENTSTYLE	Mixed management style

4.2.3 PPP Complexity

The project is classified both technically and organizationally complex. This project was the largest postcode rose project (*size*) in the Netherlands, producing a combined capacity of 4,9 MW (EnergyPort Peelland, 2018). It also did not solely focus on the development of solar panels, but also contained a wider *scope*; the project had a solar panel surface area of only five hectares, but 11 hectares were included in the project development. These remaining hectares were developed for the benefit of the liveability and nature development of the surrounding area (RES 4,5 & 6). This was created by a natural ice skating area and nature development. For the nature development part cooperation has been established with local beekeepers and local shepherds to decide on the herbal mix and wooded areas. The area also offers recreational opportunities for local residents in the form of walking paths and the natural ice skating rink (RES 4 & 5).

The PPP project involved many internal and external parties. For example, the project included many internal parties due to the later addition of Greenspread during the realisation and the transfer of the operation of the solar park to the De Vlaas cooperative (RES 5 & 6). This led to a complex collaboration between the EPP cooperative and Greenspread. The director of Greenspread clarifies the situation as follows:

"There are two energy connections on the grid. There are three small sub-projects per connection. There are three of ours and three of the cooperative. Then there is the fact that you are jointly responsible for the contact with the installer for the security of the park and the maintenance of the green space. As you can imagine this created a lot of interconnections and dependencies." – Director of Greenspread

In addition, the project had several external stakeholders. Of which the local residents and the beekeeping associations, shepherds and organisations around the ice rink were the most important (RES 5 & 6).

4.2.4 Outcome of the project

In Table 12 the performance indicators are listed for success and the respective outcome in this case:

TABLE 12 SUCCESS CRITERIA SOLAR PARK DE VLAAS

SUCCESS CRITERIA SOLAR PARK DE VLAAS	
TIME	No delivery date has been set within the project. However, the project was completed within the expected timeframe
QUALITY	The project met the predetermined quality requirements
BUDGET	The project was realised within the set budget
PUBLIC PRIVATE RELATIONSHIP	The public-private relationship has been considered successful within the project, by both the private and public party

4.3 Case 3: Solar park Waalre

Solar Park Waalre was awarded based on a tendering procedure set out by the municipality of Waalre. This was a European tender for the realization of a solar park of 1.4 megawatt peak, 4000 solar panels, on a former baseball field location (DOC 7). In June 2019, the developer Vrijopnaam was awarded the project, which offered Vrijopnaam the exclusive right and obligation, for the duration of the agreement, to design, build, operate and manage the solar park at its own expense and risk. The municipality chose to take on a large part of the design to make sure the tendering parties could offer a well-considered concession fee (RES 7 & 8). Initially the tender required that 10% of the generated capacity is placed in a postcode rose regulation through the energy cooperative Waalre Energie Lokaal (WEL). After careful consideration, this was removed from tender. As a result, Vrijopnaam is entirely responsible for the operation of the solar panels developed at the Waalre solar park (RES 7 & 8).

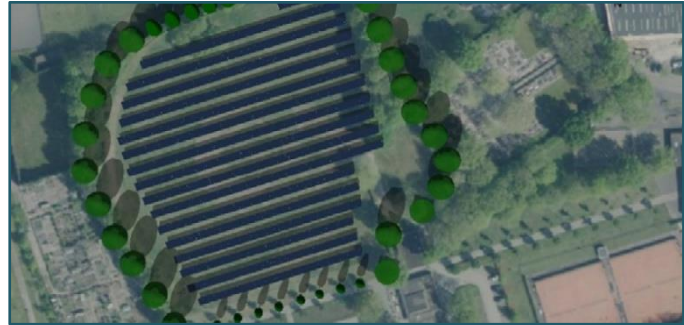


FIGURE 6 LOCATION SOLAR PARK WAALRE (SOLARMAGAZINE, 2019)

4.3.1 PPP Form

This PPP project had a clear client-contractor relationship as defined in Mantel (2005). The municipality of Waalre, the public party, served as the client and Vrijopnaam, as the private party, as the contractor. The municipality of Waalre defined both the problem and the solution/product of the project. This was carried out by the municipality based on a European tender (RES 7 & 8). The municipality selected the location and designed the solar park in detail before the project was put out to tender. It was contractually agreed that Vrijopnaam becomes responsible for the management and operation of the solar park for the coming 25 years. The land on which the solar park has been built remains the property of the municipality of Waalre. Therefore, a long lease contract with building rights was agreed (RES 7 & 8). Thus, the project had clear contract and tender rules as well as formulation. The project had a narrow scope, focussed on the design of solar panels. The director of Vrijopnaam stated the following about this:

"The purpose of the tender was very much to generate sustainable electricity, but not to add any other function. For example, water storage or flora and fauna. What we tried to do was to fit in the solar park as well as possible. ... But the main focus of the park is the production of sustainable energy." – Director Vrijopnaam

Both the described relationship between the public and private parties, the design of the tender, and the narrow scope of the project clearly fit within the PPP contract form described by Klijn & Twist (2007). The characteristics of the PPP form are summarized in Table 13.

TABLE 13 PPP FORM SOLAR PARK WAALRE

**PPP FORM SOLAR PARK
WAALRE**

<i>CHARACTERISTICS</i>	<ul style="list-style-type: none"> ▪ Type relation: The PPP project showed a clear client-contractor relationship (Contract PPP form). ▪ Type of problem and specification of solutions: The public party chose the location and designed the solar park in detail (Contract PPP form). ▪ Scope of project: The project had a narrow scope with clear project boundaries (Contract PPP form). ▪ Success condition: The project followed a European call for tenders. The project contains clear contract and tender rules and a clearly formulated project (Contract PPP form). ▪ Success condition: The private party is made responsible for the operation and management of the solar park for a period of 25 years by contract (Contract PPP form). ▪ Type of co-production: Co-production was limited and especially prior to the tender. After that the public party focused on control (Contract PPP form).
<i>PPP FORM</i>	PPP Contract Form

4.3.2 PPP management style

The management style used within the project fits well with the project management style as defined by Edelenbos et al. (2007). The project focussed on a substantive analysis of the solar park with the aim to establish a substantively substantiated project proposal. This resulted in a highly transparent tender (RES 7). Plans were presented to external stakeholders during town hall meetings. The aim of these town hall meetings was creating support along stakeholders, based on explaining and convincing a substantively strong plan (RES 7 & 8). The PPP management style meets all requirements for PPP project management as set out in Table 14 (Edelenbos et al., 2007).

TABLE 14 PPP MANAGEMENT STYLE SOLAR PARK WAALRE

PPP MANAGEMENT STYLE SOLAR PARK WAALRE	
CHARACTERISTICS	<ul style="list-style-type: none"> ▪ Focus: The focus within the project was on a substantive analysis of the solar park with the aim of setting up a solid, substantively substantiated project proposal (Project management style). ▪ Core element design: The core element design was based on a substantive solution to the problem (Project management style). ▪ Establish support: By means of a substantively strong plan, an attempt was made to create support among local residents (Project management style). ▪ Communication: Plans for the project were presented to local stakeholders during town hall meetings. During these meetings, these local stakeholders were given the opportunity to express their opinions on the plan (Project management style).
PPP MANAGEMENTSTYLE	Project Management

4.3.3 PPP Complexity

This solar park involved a limited number of 4000 panels, producing a combined capacity of 1,4 MW, and can be perceived as a small solar park project (*size*). The location of the solar park was a former baseball field and therefore no longer had a clear function. Before the start of the project, the area was surrounded by wooded areas and was mainly covered with grass (DOC 7, RES 7 & 8). This made it relatively easy to build the solar park. In addition, the project had a narrow *scope* with its main focus on the production of sustainable energy from solar panels. Thus it can be concluded that the project was not complex from a scope and/or size perspective.

Also from an organizational standpoint, the project was not complex. The project had little external stakeholders and resistance to the plan was limited. The location, which previously has a housing purpose, was a key reason. The policy advisor of the municipality of Waalre states the following on this:

"The households adjoining it were rather afraid that new housing would be built. They were actually happy that it was going to be a solar park rather than a residential area because it does not cause any nuisance or negatively impact the scenery given its low structure." – Policy advisor of municipality Waalre

In addition, the project had a clearly set up tender in which the municipality indicated a clear divisions between responsibilities on which Vrijopnaam agreed. These clear agreements and frameworks simplified the organisational complexity (Bosch-Rekvelde et al., 2011). Combining these factors the project is not considered complex.

4.3.4 Outcome of the project

In Table 15 the performance indicators are listed for success and the respective outcome in this case:

TABLE 15 SUCCESS CRITERIA SOLAR PARK WAALRE

SUCCESS CRITERIA SOLAR PARK DE VLAAS	
TIME	The project was realized before the set delivery date.
QUALITY	The project met the predetermined quality requirements
BUDGET	The project was realised within the set budget
PUBLIC PRIVATE RELATIONSHIP	the public-private relationship has been considered successful within the project, by both the private and public party

4.4 Case 4: Solar park Welschap

Solar park Welschap is located at the Eindhoven Air Base and features 11,040 solar panels. The solar park was completed on March 2019 and provides 900 households with sustainable solar energy (DOC 9). Members of the energy cooperative have financed the project. The project originated at the air base, which wanted to compensate for noise nuisance. A joint plan was developed with the municipality for the construction of the solar park. Local residents could financially participate through a post code rose regulation (DOC 9, RES 9 & 10). This post code rose project could only be deployed by an energy cooperative. To realise this, the municipality of Eindhoven has brought together various energy cooperatives and initiatives from the surrounding area. This resulted in the umbrella organisation cooperative Solar Park Welschap U.A. (DOC 9, RES 9 & 10) Within this project cooperative Solar Park Welschap was responsible for the design, realisation and management together with Eindhoven Air Base and the municipality of Eindhoven.



FIGURE 7 LOCATION SOLAR PARK WELSCHAP (ENERGEIA, 2018)

4.4.1 PPP Form

Before this cooperation agreement was setup, a taskforce within the municipality of Eindhoven carried out a feasibility study. The feasibility study mainly examined the possible inconvenience to air traffic and the possibility of grid connection (RES 9).

The municipality was mainly involved in the planning phase of the project. The municipality acted as organiser, mediator and controller. The project involved a joint process between the public party (the municipality of Eindhoven) and the private party (the energy cooperative Solar Park Welschap) (RES 9 & 10). This joint process did not include a clear client-contractor relationship, but was based on joint decisions. The policy advisor of the municipality of Eindhoven stated the following about this:

"We did not give an order, but together we looked for a way to make this a reality. We all had the same goal, a solar park at this location, and we looked at how we could best do it together" – Policy advisor of municipality Eindhoven.

The project did not have a predetermined completion date. For the management of the solar park, a long lease agreement was reached for a period of 15 years dictating the cooperative is responsible for the operation and management of the solar park (RES 9 & 10).

Furthermore, the responsibility for the design and realisation of the project rested with the cooperative. The municipality played a facilitating and organizing role and granted the necessary permits for the project, and assumed a mediating role between the internal and external stakeholders (RES 9 & 10).

The above fits well within the partnership PPP form, as defined by Klijn & Twist (2007). However this project differs from this definition is the scope of the project. Because the project was located at an air base, there was no need to expand the focus of the solar panels towards the improvement of the quality of liveability or nature aspects. Given this narrow scope and clear divisions regarding the project plan were indicated it also fits within the PPP contract form (Lenferink, 2013). The characteristics of the PPP form are summarized in Table 16.

TABLE 16 PPP FORM SOLAR PARK WELSCHAP

PPP FORM SOLAR PARK WELSCHAP	
CHARACTERISTICS	<ul style="list-style-type: none"> ▪ Type relation: The relationship was based on a process of joint decisions (Partnership PPP form). ▪ Type of problem and specification of solution: Public partied specified problem. After that a joint process of solution specification (Mixed PPP form). ▪ Scope of project: The project has a narrow scope with clear project boundaries (Contract PPP form). ▪ Success condition: The energy cooperative is made responsible for the final design and realisation of the project (Contract PPP form). ▪ Success condition: For the management of the solar park, a long lease contract was concluded for a period of 15 years in which the energy cooperative is responsible for the operation and management of the solar park (Contract PPP form). ▪ Type of co-production: The public party functioned mainly as an organiser, mediator and facilitator during the development phase (Partnership PPP form).
PPP FORM	Mixed PPP form

4.4.2 PPP management

The project was based upon a good and substantiated project proposal (RES 9 & 10). External stakeholders, such as local residents, were not actively involved in the project plan. Because the solar park was realised at the air base, on military land, the zoning plan had been changed before the project started. After consultation between the municipality, the air base and the energy cooperative, it was decided not to involve local residents in the design of the solar park. But the air base, an important external stakeholder, was closely involved in the project. This party had a say in the design and realisation of the project (RES 9 & 10). Local residents were informed about the project but had no influence on the design of the initiative by means of a process (RES 9 & 10). This management style used falls within project management as defined by Edelenbos et al. (2007).

A conscious choice was made, since it was a main objective of the municipality and the airbase, to offer local residents the opportunity to participate financially. Setting this up required a targeted search for local energy cooperatives in the surrounding area to act as a cooperation partner (RES 9). By opting for an energy cooperative as a cooperation partner, it became possible to sell the generated energy in the surrounding area through a postcode rose regulation. The active financial involvement of important stakeholders, the local residents, fits within the character of process management (Klijn & Twist, 2007). Because aspects of both management styles have been applied, the management style used within this project is referred to as Mixed Management Style (Table 17).

TABLE 17 PPP MANAGEMENT STYLE SOLAR PARK WELSCHAP

<i>PPP MANAGEMENT STYLE SOLAR PARK WELSCHAP</i>	
<i>CHARACTERISTICS</i>	<ul style="list-style-type: none"> ▪ Focus: The project contained an internal plan decision with a focus on a solid and substantively substantiated project proposal (Project management style). ▪ Core element design: The core element design was based on a substantive solution to the problem (Project management style). ▪ Establish support: External stakeholders, such as local residents, were not actively involved in the project plan. In order to create support, it was decided to present a substantive and convincing plan (Project management style). ▪ Establish support: Local stakeholders were able to participate financially through a postcode rose regulation (Process management style). ▪ Communication: Information evenings were set up for local residents where concrete plans were presented. These evenings were organised to present and convince actors of the plan (Project management style).
<i>PPP MANAGEMENTSTYLE</i>	Mixed Management style

4.4.3 PPP Complexity

The project is a relatively small solar park project, which produces a combined capacity of 2,9 MW (*size*), where the *scope* did not extend beyond the project boundaries of the solar park and was not technical complex. The location of the solar park was easily accessible, consisting of grassland and surrounded by an already present fence (RES 10). Because the solar park was located on an air base, meaning limited visibility for external stakeholders, it encountered little resistance from external stakeholders. Because the project had little external stakeholders, it resulted in a non-organizational complex project. The policy advisor of the municipality of Eindhoven stated the following about this:

"This is not a public space as in nature reserves or agricultural land where you have to take into account the other functions the site has. Now it was a military terrain with no other function. This means that we only had to take into account the requirements of the Ministry of Defence when designing the park." – Policy advisor of municipality Eindhoven

There were also complexifying factors such as an explosive investigation. Since the air base was constructed before the Second World War it was bombed during the war. Since no explosives were found it had no further consequences on the planning process (RES 9 & 10).

4.4.4 Outcome of the project

In Table 18 the performance indicators are listed for success and the respective outcome in this case:

TABLE 18 SUCCESS CRITERIA SOLAR PARK WELSCHAP

SUCCESS CRITERIA SOLAR PARK WELSCHAP	
TIME	No delivery date has been set within the project. However, the project was completed within the expected timeframe.
QUALITY	The project met the predetermined quality requirements
BUDGET	The project was realised within the set budget
PUBLIC PRIVATE RELATIONSHIP	the public-private relationship has been considered successful within the project, by both the private and public party

4.5 Different ways to a successful outcome

All four cases investigated within this research have a successful outcome. However the choices, within the investigated factors, to achieve a successful outcome differ. For example, the cases differ in complexity and PPP composition and have different PPP form and management style combinations. In this section, these combinations of factors are analysed. Table 19 provides an overview of the cases and their variables.

TABLE 19 OVERVIEW PPP DESIGN CASES

<i>CASE</i>	<i>PPP FORM</i>	<i>PPP MANAGEMENTSTYLE</i>	<i>COMPL EXITY</i>	<i>COMPOSITION</i>	<i>SUCCESS</i>
SOLARPARK BUDEL	Mixed	Project Management	Yes	Project developer	1
SOLARPARK DE VLAAS	Partnership	Mixed	Yes	Energy cooperative	1
SOLARPARK WAALRE	Contract	Project Management	No	Project developer	1
SOLARPARK WELSCHAP	Mixed	Mixed	No	Energy cooperative	1

4.5.1 PPP form and PPP management style combinations

Three main patterns regarding PPP form and management style occur across the cases.

Firstly, solar park project Waalre fully complies with the matched PPP form- PPP management style combination described within the literature. The literature frequently states that the PPP contract form is based onto the principles of project management and that the partnership PPP form is more based onto the principles of process management (Edelenbos & Teisman, 2008; Klijn & Twist, 2007). This fits with the observation in the Waalre solar park project where the project management style was used in a contractual PPP. This project was focussed on aspects that characterise this combination, such as target specification, project content, time planning and organisation, which is defined in clear contracts (Edelenbos & Teisman, 2008).

Secondly, the researched cases showed both mixed PPP forms and mixed PPP management styles combined with the matched PPP form - PPP management style combination stated within the literature (Edelenbos & Teisman, 2008; Klijn & Twist, 2007). For example, the solar park De Vlaas project combined a partnership PPP with a mixed management style. However the mixed management style largely tilted to the process management style which combines well with the partnership PPP as stated by Klijn & Twist (2007). What sets this project apart is the combination with the project management style, which creates focus on creating a strong substantive project proposal. Actively involving external stakeholders in the plan design, attempted to convince those involved by this substantiated proposal (RES 7 & 8). A mixed PPP form and management style was used in half of the investigated cases. In these cases, which applied a mixed PPP form, it was considered important to successfully realise the project plan in a joint process, but also to create certainty on the basis of contractual agreements between the PPP parties with defined responsibilities.

Third, the project management style was used in all projects. From this it can be concluded that a well-founded and substantive plan is considered essential for the successful development of solar parks. In

addition, the PPP management styles are not mutually exclusive. Thus, if the focus within the project is on the involvement of relevant parties and joint planning, this process can still started with a substantiated project proposal typical for the project management style. As applied within the project of Solar park De Vlaas (RES 5).

It may be concluded that no unambiguous PPP form- PPP management style combination leads to a more successful outcome, and that several combinations can be used (Table 19). Although it is clear that aspects of project management style combined with a aspects of contractual PPP forms are dominant within the researched cases.

4.5.2 Applying process management in high complex projects

The literature frequently emphasizes that high complex PPP projects can only deliver good and satisfactory results if they are managed in a process management style (Klijn & Twist, 2007a; Sanders & Heldeweg, 2013). Two main patterns regarding PPP management style and complexity occurs across the cases.

Firstly, PPP project Solar park De Vlaas fits with this observation. Within this project, aspects of process management were frequently used during the development phase. In addition, the project also included characteristics of project management. Edelenbos & Teisman (2008) state that factors of project management in dynamically complex projects are important conditions that determine the progress and success of the project. Here, the management style used within PPP project solar park De Vlaas is in correspondence with the literature.

Secondly, for solar park Budel, in contrast with solar park De Vlaas, a project management style was used. This project showed a successful outcome as well. A rationale for choosing this management style is that the complexity was mainly technical in nature. For example, the solar park is completed on a complex location due to its location on a waste disposal site and its location next to a Natura 2000 area (DOC 2, RES 1,2 & 3). The main stakeholders concerning the environment around this location was the province of Noord-Brabant. They are responsible for the management of the waste disposal site and together with the municipality they are responsible for the regulations concerning the Natura 2000 area (DOC 2, RES 1 & 2). Within this PPP project, the province had the role of public party within the PPP project and therefore a lot of influence in the project plan. Because the location of the solar park had the function of a waste disposal site, external stakeholders, such as local residents, knew few differences in perspective (RES 1 & 2). In many ways, the location was visually improved by the realisation of the solar park and had few possibilities for more high-quality functions, such as housing or agriculture. Achieving consensus through transparency and decision making based on a continuous process was therefore not considered necessary within the PPP project (RES 1,2 & 3). It therefore results that the project satisfies the conditions set within this study for a high complex PPP project, partly because this solar park was the second largest in the Netherlands at the time of its opening, but because of the favourable location of the park, the external actors largely shared a similar perspective. As a result, a project management style sufficed the PPP project in order to achieve a successful outcome of the project.

4.5.3 The PPP form shifts at higher complexity

Klijn & Twist (2007a) state that the complexity of the project should be assessed in order to make the right choice of PPP form. They state that a partnership PPP is well suited for dynamic complex projects

and a PPP contract form is well suited for static and less complex projects where the network complexity is low and where stakeholders have few conflicting interests. Two main patterns regarding PPP-form and complexity occur across our cases.

Firstly, the combination between the PPP forms used and the complexity of the cases support the literature (Elzenga & Schwecke, 2014; Klijn & Twist, 2007a). For both low complex projects a PPP contract form was applied, which in turn prefers a project management style. Scoping and distributing responsibilities were important aspects in the low complexity project since they facilitated fast executing and therefore a successful outcome of the project (RES 7 & 10). In addition, for the high complex projects a PPP partnership form was applied. Within both high complex solar projects, the focus was mainly on a process of joint decision-making between the public and private party. This PPP form offered PPP solar project De Vlaas dealing with the high complexity of the project, by searching for consensus through a process in which the (relevant) parties were given influence on the design of the initiative, making it more attractive to them. This PPP form offered the energy cooperative the opportunity to focus on this complex process because no detailed requirements were imposed on the energy cooperative, which made it possible to seek consensus between stakeholders (RES 5,6 & 7).

Secondly, in half of the cases studied a mixed PPP form is applied. Both for a high and low complex solar park project. These projects combined multiple partnership PPP aspects and looked for a clear scope with clear divisions of responsibilities between the PPP parties as well as joint decision making (RES 2 & 10). Based on this observation it can be state that within the investigated cases, a mixed PPP form can lead to a successful outcome in both low and high complex PPP solar projects.

4.5.4 Project developer versus energy cooperative

For both studied PPP compositions, with an energy cooperative or a project developer as a private party, cases of high and low complexity were investigated (Table 19). The PPP form and management style applied in those cases differ. Four main patterns regarding the PPP composition occur across the cases.

Firstly, both solar park projects in which an energy cooperative was involved, a partnership PPP was used. Within the solar park project Welschap this PPP form was combined with some aspects of the PPP contract form. The choice within solar park De Vlaas for a partnership PPP results from the fact that the municipality considered the management of external stakeholders, such as local residents, to be predominant (RES 5 & 6). By deliberately not imposing a contractual deadline on the energy cooperative, and by participating in the decision-making within a joint process, the energy cooperative was able to fully focus on the management of the process (RES 5 & 6). As a result, the energy cooperative was given the opportunity to include local residents in the plan which was a requirement of the municipality. This approach within solar park De Vlaas fits with Berka & Creamer (2018), they argue that energy cooperatives often serve as a means of creating public acceptance through greater local participation. In addition, the literature emphasizes that the importance of energy cooperatives during the design and planning of sustainable energy projects lies with 'community identity' and 'participation' (Berka & Creamer, 2018; Kaphengst & Velten, 2014).

Secondly, both solar park projects with a project developer as a private party opt for a PPP contract form. Within Budel solar park, aspects of a partnership PPP were also taken into account. One explanation for the PPP form used between these two PPP compositions may lie in the fact that the focus differs between

an energy cooperative and a project developer. For example, within an energy cooperative, the focus is on community identity and participation. For project developers the focus is anchored in profit interests (Hajer, 2011). A PPP contract form entails clear contracts with a clearly specified problem and solution, in an attempt to avoid risks and uncertainties (Sanders & Heldeweg 2013; Klijn & Twist, 2007).

Thirdly, within both PPP solar park projects in which an energy cooperative was involved the process management style was applied. As mentioned earlier the literature emphasizes that the importance of energy cooperatives, in the development of projects, lies with community identity and participation (Berka & Creamer, 2018; Kaphengst & Velten, 2014). Process management meets these aspects, because this management style focusses on the most important parties to get and keep them together through a process that should lead to the solution of the problem (Edelenbos et al., 2007).

Lastly, low complex PPP solar park projects tend to use a project management style. The cases support Klijn & Twist (2007a) who match project management with low complex projects. The PPP solar park project Welschap actively searched for the participation of local stakeholders in the form of financial participation. Within this PPP project, an energy cooperative was deliberately engaged as a private party within the PPP to enable financial participation in the form of a post code rose regulation. Despite the financial participation, involvement of local stakeholders was limited during the development phase. For example, plans were presented during information events for local residents, but they were not involved in the planning process (RES 9 & 10). Because the low complexity, resulting from the limited (visual) hindrance from the project, the project management style was chosen. It can be concluded that for the PPP projects with a low complexity, despite the PPP composition with an energy cooperative, the benefits of effectiveness and purposefulness within project management outweigh the benefits of achieving consensus on the project through an open process with external stakeholders.

5 Conclusion, discussion and reflection

The aim of this study is to investigate how the PPP design influences the successful outcome of solar park projects in the Netherlands. To answer this question, it researched how PPP compositions differ in PPP management style and PPP form within the development phase of projects with different degrees of complexity towards a successful outcome. Semi-structured interviews and a document research have been used to answer the main research question: *'How can a PPP be designed to successfully implement solar parks in the Netherlands?'* In this last chapter, the conclusion firstly elaborates on the sub-questions. Secondly, it answers the main question. Finally, based on the findings and limitations, recommendations will be given for practice and academia and a reflection on the process will be discussed.

5.1 Conclusion

5.1.1 Answer to the sub-questions

The first sub-question related to *how do PPP composition, PPP form and PPP management style influence the successful outcome of a PPP solar park project in the Netherlands*. All cases show different combinations of PPP composition, PPP form and PPP management style towards a successful outcome of the studied solar park projects. The PPP form- PPP management combinations differ between the different PPP compositions projects investigated. For both solar park projects, in which an energy cooperative was involved as an internal party within the PPP, a partnership PPP form was used. The low complex solar park project combined the used partnership PPP form with aspects of the PPP contract form. The PPP solar park projects, in which a project developer was involved as an internal party within the PPP, a PPP contract form was used in both cases. The high complex project combined the used PPP contract form with aspects of the partnership PPP form. The use of process management by only the PPP solar projects with a PPP composition with an energy cooperative as private party matches the statement by Berka & Creamer (2018), which state that energy cooperatives serve as a means of creating public acceptance. In addition, the literature emphasizes that the importance of energy cooperatives during the development and planning of sustainable energy projects lies with community identity and participation (Berka & Creamer, 2018; Kaphengst & Velten, 2014). In both solar park projects with a PPP composition with a project developer as a private party, the emphasis is placed on a PPP contract form. One explanation for the PPP form used between these two PPP compositions can be explained by the fact that the focus differs between an energy cooperative and a project developer. The literature emphasises that the focus of energy cooperatives lies in community identity and participation. This unambiguous focus is absent from project developers (Berka & Creamer, 2018). The main objective of a project developer is not primarily based on a shared ideal but is usually anchored in profit interests, this party mainly focuses on financial gain and (contractual) certainty. A PPP contract form is based on clear contracts with a clearly specified problem and solution, to avoid risks and uncertainties (Sanders & Heldeweg 2013; Klijn & Twist, 2007).

The second sub-question dealt with *how does complexity influence the relationship between the PPP composition, PPP form and the PPP management style towards a the successful outcome of a PPP solar project*. Project complexity influences the relations of PPP composition, PPP form and PPP management style towards a successful outcome of the solar park projects.

First, regarding the PPP form- complexity combination the researched cases support the literature (Elzenga & Schwecke, 2014; Klijn & Twist, 2007a). Klijn & Twist (2007a) state that process management is well suited for dynamic complex projects and project management is well suited for static and less complex projects where the network complexity is low and where stakeholders have few conflicting interests. Both low complex cases applied a PPP contract form. In addition, for the high complex projects a PPP partnership form was applied in both cases. Both high complex cases focused mainly on a process of joint decision-making between the public and private party.

Second, regarding the PPP management style- complexity combination the cases mainly support the literature (Zou et al., 2014; Edelenbos & Teisman, 2008; Edelenbos et al., 2007). The complex solar park project, in which an energy cooperative was involved as private parties within a PPP, the PPP management style- complexity combination contrasted with the literature. Edelenbos & Teisman (2008) state that high complex PPP projects can only deliver good and satisfactory results if they are intensively supported by process management, based on well-designed organizational guidelines for interaction. This case used a PPP project management form during the development phase towards a successful outcome. This case could be indicated as highly complex due to the size of the project. But the main focus of the project was on producing electricity considering the adjacent Natura 2000 area and the waste disposal site on which the project was realised. Due to this location, the project was not perceived as environmental degradation by external stakeholders. This resulted in little conflicting perspectives. It can be concluded that the size and scope of a project affects the number of stakeholders involved. Yet, it is the number of different perspectives of these stakeholders that increases the complexity of the project. As a result, the use of a PPP project management style led towards a successful outcome for this specific case

The third sub-question related to *how do the PPP form and the PPP management style interact within the development phase of a PPP solar park project towards a successful outcome*. The PPP form- PPP management style combinations within the studied cases follow the literature statements and also showed mixed forms for both variables. The literature frequently states that the PPP contract form is based onto the principles of project management and that the PPP partnership form is more based onto the principles of process management (Edelenbos & Teisman, 2008; Klijn & Twist, 2007). Where the investigated cases complement the stated combinations between PPP form and PPP management style, the case also show the use of mixed forms of both PPP management styles and PPP forms. Both the Mixed PPP form as the Mixed PPP management style is applied in half of the cases.

For the cases with a mixed PPP form it was considered important, reaching a successful outcome, to realise a project plan in a joint process, a characteristic of a partnership PPP, but also create certainty on the basis of contractual agreements between the PPP parties with defined responsibilities, a characteristic of a PPP contract form (Klijn & Twist, 2007). This offered both PPP parties to share knowledge and experiences, which promotes the search towards effective solutions to complex problems within the project. On the other hand the PPP parties focused on contract agreements and a clear scope, which are important conditions that determine the progress and success of the project (Edelenbos & Teisman, 2008). It can be concluded that the two investigated PPP forms do not exclude each other and can lead to a successful outcome within both low and high complex PPP solar park projects.

Also two researched cases applied a mixed PPP management style. It can be concluded that both investigated management styles do not exclude each other. Aspects of project management can be used

to focus on a substantively substantive project proposal. Here, a substantively substantiated project proposal, designed by the PPP parties, can serve as a starting point for a process in which external relevant parties are involved in the planning process to improve the plan. This mixed management style combines effectiveness by presenting a detailed plan in advance and building consensus by actively involving external parties in the plan design.

5.1.2 Answer to the main question

Now an answer will be given to the main research question: *'How can a PPP be designed to successfully implement solar parks in the Netherlands?'*

As mentioned before, the results indicated that the PPP form- PPP management style combinations of the studied cases mainly align prior literature discussing these combinations. All four solar park projects investigated used project management style. This appeared either through the implementation of certain aspects of project management style, or employing project management style as a whole. All these cases met the requirements of a successfully implemented solar park. From this, two conclusions can be drawn. Firstly, it can be concluded that aspects of PPP project management style can be used in both low and high complex PPP projects. Secondly, PPP project management style predominantly focuses on a well-founded and substantive project plan. Therefore, it can be concluded that the PPP parties involved in the implementation of these solar parks, consider a well-founded and substantive plan as essential for a successful outcome of a PPP project. Yet, the present thesis did not investigate cases which only used process management style. Hence, it cannot be concluded that a well-founded and substantive plan necessarily is required for the successful outcome of a PPP project.

The literature review showed that traditional factors defining a successful outcome include three factors being time, budget and quality. The results indicated that project developers and energy cooperatives focus on different aspects defining a successful outcome. The PPP solar parks investigated that used a process management style did not have a predetermined realisation date. These solar parks prioritised the establishment of a PPP solar park, while simultaneously satisfying the stakeholders involved during the project. For the cases that only used a project management style, it was important to realize the project before the agreed delivery date, to enable a successful outcome. In the two cases that solely used a project management style, the PPP composition consisted of a PPP with a project developer as a private party. Here, the PPP projects with a project developer as private party within the PPP, used a different PPP form- PPP management style combination than a PPP composition with an energy cooperative. Cases with a project developer as private party within the PPP focused more on a contract PPP form- PPP management style combination. This aligns prior literature stating that project developers predominantly focus on making profit based on contractual certainty, as this is crucial for their existence (Kaphengst & Velten, 2014). Cases with an energy cooperative as private party on the other hand, focused more on a PPP partnership- PPP process management combination. Process management emphasizes the participation of external stakeholders within the implementation of PPP projects. From the present study, it appeared that energy cooperatives mainly focus on participation as a manner to realize successful PPP solar projects. These results confirm prior literature stating that the energy cooperatives focus on participation and a shared ideal, to enable the successful outcome of a PPP project.

Concluding, the study of these four PPP solar park projects showed that both the complexity of the PPP solar park project and the composition of the PPP affects the PPP form- PPP management style

combination. Where the PPP form- PPP management style combination mainly follows prior literature, the cases also show the use of mixed forms, both used within the PPP form and the PPP management styles. This shows that both PPP forms and PPP management styles are not mutually exclusive and both mixed styles contribute to the successful outcome of the investigated PPP solar park projects.

5.2 Discussion

The present thesis contributed to the academic literature by comparing PPP compositions, with a project developer as a private party and an energy cooperative as a private party, regarding a successful outcome of PPP solar park projects with high and low complexity in the Netherlands. By researching how these PPP solar park projects with these two different compositions differ in PPP form and PPP management style, it provides novel insights on effective PPP project implementation. The results showed that a distinction can be made between the PPP form and PPP management style combination, between low and high complex PPP solar projects, and PPP solar park projects with different PPP compositions. The studied cases mainly follow the stated PPP form- PPP management style combinations within the literature, but also revealed mixed forms of both factors. These results have several implications for theory and practice:

Private party (energy cooperative/ project developer):

- Focus on a well-founded and substantive plan. This offers the possibility to convince external stakeholders of the plan, but also as a good starting point towards a joint process with external stakeholders in which they are given the opportunity to make adjustments.
- Energy cooperatives often focus mainly on community identity and participation during the development of a solar park project. In low complex projects, a shift of focus from the (participatory) planning process to a (substantively strong) project plan, with clear agreements, can make the project process more efficient, without affecting the success of the project.
- Consider, especially in complex solar park projects, integrating aspects of process management during project development, such as (financial) participation of local residents. Solar parks have increased in size in recent years. Involve main stakeholders early in the process.

Public party (municipalities/provinces):

- Consider involving an energy cooperative in a solar park project. This party can function as a private party within a PPP, but also as an (external) party when a project developer fulfils the role of a private party within the PPP. This offers advantages in terms of financial participation through the possibility of a postcode rose regulation.
- Consider a process of joint decision-making during the development of complex solar park projects, in collaboration with both a project developer and an energy cooperative. The combination of knowledge and experience of both the public and private parties promotes finding solutions to complex problems within the project.

A limitation of the present research is that the analysis is based on a small sample within the province of Noord Brabant. This may limit the generalizability of the results to other provinces. Yet, this small geographic scope was required to enable an in-depth research of specific cases, while simultaneously controlling for external influential factors, such as differences in provincial policies, to enable for a fair

comparison of the cases. Yet, a downside of delineating to this geographic area was that for the PPP projects investigated, there was a limited choice to select PPP solar park projects. This led to a selection of cases with little variety of complexity, which might have biased the influence of PPP design with respect to complexity, on the successful outcome of a project. A study with a larger number of cases with more distinction in complexity can serve as follow-up research. This little variety in complexity can be seen as a limitation of this research.

This research focuses on PPP solar park projects while, within the energy transition, project developers and energy cooperatives are also involved as private parties within a PPP in the development of other sustainable energy projects such as wind parks. The reason for researching PPP solar parks instead of a combination of sustainable energy projects with wind parks is giving within the first chapter of this study (section 1.2). This means that research of wind park implementation is missing from this study and could possibly serve as follow-up research.

5.3 Reflection

In this last part of the thesis, a look back will be taken on the research process from a personal viewpoint. The research process can be defined as educative, which went rather well but also experienced setbacks. The start of the process was difficult through the search of focus of the thesis. In addition, it was chosen to select cases within one province, because, as a result, the provincial policy applied was the same for all cases, as a result of which the choice of cases was limited. As a result, it was important that the selected cases could actually be investigated. A lot of time was spent on arranging the necessary interviews. By focusing on the right respondents, a good balance between private and public parties was interviewed. With hindsight, the variables studied had a large number of connections and relationships. Structuring these relationships within the research was quite a challenge. Because the focus changed during the process, from searching for factors which lead to a successful project to investigating factors which were used within a successful project, sometimes a clear structure of the research faded. This was inevitable as it was a process of doing and learning, which changed insights along the way. A point of reflection is that structure within the process should be given more focus than the generation of (useful) information.

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7 Appendices

Appendix A: informed consent

Toestemming interview

Hartelijk dank dat u mee wilt doen aan een onderzoek PPS (publiek- private samenwerking) zonnepark projecten in het kader van mijn afstudeerscriptie van de master Environmental and Infrastructure Planning (EIP) binnen de Faculteit Ruimtelijke Wetenschappen, aan de Rijksuniversiteit Groningen.

Het is van belang dat u op de hoogte bent van het volgende:

- U kunt ten alle tijden besluiten om te stoppen met het interview, ook nadat het interview heeft plaatsgevonden.
- U kunt ten alle tijden aangeven dat u bepaalde vragen in het interview niet wilt beantwoorden.
- De antwoorden die u geeft zullen alleen worden gebruikt voor dit onderzoek, en niet voor andere doeleinden.
- De geluidsopname zal alleen worden beluisterd door de interviewer, om het interview te kunnen transcriberen en vervolgens de verkregen data te kunnen verwerken. De geluidsopname zal niet aan derden worden verspreid.

Wilt u ook de volgende drie vragen beantwoorden:

- Gaat u akkoord met een geluidsopname van het interview ten behoeve van de latere data-analyse?

JA/NEE

- Mag uw functie binnen uw organisatie/gemeente zichtbaar gebruikt worden in de scriptie?

JA/NEE

- Mag uw naam gebruikt worden in de scriptie, eventueel gekoppeld aan een citaat?

JA/NEE

Ondergetekenden verklaren dit document gelezen en begrepen te hebben.

Handtekening onderzoeker:

Handtekening deelnemer:

Getekend op te

Appendix B1: Interview guide public party within the PPP

Intro

- Geïnterviewde wijzen op opname van het interview
- Geïnterviewde bedanken voor het meewerken en de genomen tijd
- Geïnterviewde wijzen op rechten en anonimiteit
- Interviewer stelt zich voor
- Geïnterviewde aangeven hoe wordt omgegaan met de vergaarde gegevens
- Doel uitleggen van het interview en aangeven hoe die past binnen het onderzoek
- Structuur van het interview voorleggen aan geïnterviewde (Thema's voorleggen)

Algemeen

Kunt u zichzelf introduceren?

- Welke organisatie werkt u en wat is daarbinnen uw functie?
- Hoe bent u betrokken bij het project (Naam project)? In welke rol?

Specifieke vragen

Kunt u iets vertellen over hoe dit project is opgezet? De structuur van het project?

PPS-vorm (PPS-concessie- of contractvorm en de partnerschap-PPS) (Vraag naar voorbeelden)

- Hoe is het initiatief/project ontstaan? En in hoeverre is de gemeente hierbij betrokken?
- Hoe is de samenwerking tussen gemeente en energiecoöperatie/projectontwikkelaar?
 - 1 Is er een visie wat betreft de samenwerking en hoe wordt daarop gestuurd?
- Is de samenwerking ondertekend in de vorm van een contract of overeenstemming?
- Voor welke stadia in het project is de projectontwikkelaar/coöperatie verantwoordelijk (ontwerp, realisatie, financiering, beheer enz.)?
- Bestaat het project alleen uit het ontwikkelen van zonnepanelen of wordt de omgeving ook in het plan meegenomen? (*ook Complexiteit*) (*vraag naar voorbeeld*)

Managementstijl (Project- en Procesmanagement) (Vraag naar voorbeelden)

- Lag tijdens het project de focus vooral op een goed inhoudelijk voorstel of op de analyse van de betrokken partijen? (op de belangrijkste partijen en hoe je hen bij elkaar krijgt en houdt)
- Hoe is geprobeerd draagvlak te creëren voor het project? Lag de focus op een overtuigend plan of door een goed proces? (de (relevante) partijen wordt invloed gegeven op de vormgeving van het initiatief, waardoor het voor hen aantrekkelijker wordt)
- Hoe is er omgegaan met dynamiek en veranderende omstandigheden?

- 1 snelle en duidelijke besluitvorming, waardoor veranderende omstandigheden geen grip meer hebben op het initiatief/ Door het open houden van opties: voor actoren moet het initiatief aantrekkelijk zijn en blijven.
 - 2 Kunt u hiervan een voorbeeld noemen?
- Hoe zijn actoren stakeholders betrokken bij het plan?
 - 1 Aan de hand van duidelijke uitleg en overtuiging van plan en besluiten/ Een proces van overleggen en onderhandelen, waaruit een besluit volgt?

Complexiteit

- Zou u dit project als 'complex' willen beschrijven?
 - 1 Formaat/aantal betrokken partijen/samenwerking/impact op omgeving
- Zal u het project als technisch complex omschrijven?
- Zal u het project als organisatorisch complex omschrijven?
- Heeft het project grote conflicten tussen interne partijen (gemeente/projectontwikkelaar/energiecoöperatie) gekend?
 - 1 Hoe is hiermee omgegaan?
 - 2 Welke factoren hebben hierbij geholpen?

Succesvolle uitkomst

- Zou u achteraf de ontwikkeling/realisatie van het project als succesvol willen beschouwen?
 - 1 Is het project binnen de afgesproken tijd gerealiseerd?
 - 2 Is het project binnen de geraamde kosten gerealiseerd?
 - 3 Is binnen het project voldaan aan de vooraf gestelde eisen
 - Kwaliteit van project/omgang met stakeholders
 - 4 Zal u de samenwerking met de projectontwikkelaar/energiecoöperatie als succesvol willen beschouwen?
 - Kunt u voorbeelden van geven?
 - 5 Denkt u dat de soort private partij (energiecoöperatie/projectontwikkelaar) invloed heeft gehad op het succes van het project?
 - In welke vorm?
 - Management (omgang met stakeholders)
 - Kennis op technisch/organisatorisch gebied
 - Samenwerking/communicatie binnen de PPP

Afsluitend

- Is er u verder nog iets opgevallen of zijn er nog nader te bespreken zaken die u kwijt wilt?
- Vragen naar partijen vanuit de overheidskant om te benaderen

Appendix B2: Interview guide private party within the PPP

Intro

- Geïnterviewde wijzen op opname van het interview
- Geïnterviewde bedanken voor het meewerken en de genomen tijd
- Geïnterviewde wijzen op rechten en anonimiteit
- Interviewer stelt zich voor
- Geïnterviewde aangeven hoe wordt omgegaan met de vergaarde gegevens
- Doel uitleggen van het interview en aangeven hoe die past binnen het onderzoek
- Structuur van het interview voorleggen aan geïnterviewde (Thema's voorleggen)

Algemeen

Kunt u zichzelf introduceren?

- Welke organisatie werkt u en wat is daarbinnen uw functie?
- Hoe bent u betrokken bij het project (Naam project)? In welke rol?

Specifieke vragen

Kunt u iets vertellen over hoe dit project is opgezet? De structuur van het project?

PPS-vorm (PPS-concessie- of contractvorm en de partnerschap-PPS) (Vraag naar voorbeelden)

- Hoe is het initiatief/project ontstaan? En in hoeverre is de coöperatie/projectontwikkelaar hierbij betrokken?
- Hoe is de samenwerking tussen gemeente en energiecoöperatie/projectontwikkelaar?
 - 1 Is er een visie wat betreft de samenwerking en hoe wordt daarop gestuurd?
- Is de samenwerking ondertekend in de vorm van een contract of overeenstemming?
- Voor welke stadia in het project is de projectontwikkelaar/coöperatie verantwoordelijk (ontwerp, realisatie, financiering, beheer enz.)?
- Bestaat het project alleen uit het ontwikkelen van zonnepanelen of wordt de omgeving ook in het plan meegenomen? (*ook Complexiteit*) (*vraag naar voorbeeld*)

Managementstijl (Project- en Procesmanagement) (Vraag naar voorbeelden)

- Lag tijdens het project de focus vooral op een goed inhoudelijk voorstel of op de analyse van de betrokken partijen? (op de belangrijkste partijen en hoe je hen bij elkaar krijgt en houdt)
- Hoe is geprobeerd draagvlak te creëren voor het project? Lag de focus op een overtuigend plan of door een goed proces? (de (relevante) partijen wordt invloed gegeven op de vormgeving van het initiatief, waardoor het voor hen aantrekkelijker wordt)

- Hoe is er omgegaan met dynamiek en veranderende omstandigheden?
 - 1 snelle en duidelijke besluitvorming, waardoor veranderende omstandigheden geen grip meer hebben op het initiatief/ Door het open houden van opties: voor actoren moet het initiatief aantrekkelijk zijn en blijven.
 - 2 Kunt u hiervan een voorbeeld noemen?
- Hoe zijn actoren stakeholders betrokken bij het plan?
 - 1 Aan de hand van duidelijke uitleg en overtuiging van plan en besluiten/ Een proces van overleggen en onderhandelen, waaruit een besluit volgt?

Complexiteit

- Zou u dit project als 'complex' willen beschrijven?
 - 1 Formaat/aantal betrokken partijen/samenwerking/impact op omgeving
- Zal u het project als technisch complex omschrijven?
- Zal u het project als organisatorisch complex omschrijven?
- Heeft het project grote conflicten tussen interne partijen (gemeente/projectontwikkelaar/energiecoöperatie) gekend?
 - 1 Hoe is hiermee omgegaan?
 - 2 Welke factoren hebben hierbij geholpen?

Succesvolle uitkomst

- Zou u achteraf de ontwikkeling/realisatie van het project als succesvol willen beschouwen?
 - 1 Is het project binnen de afgesproken tijd gerealiseerd?
 - 2 Is het project binnen de geraamde kosten gerealiseerd?
 - 3 Is binnen het project voldaan aan de vooraf gestelde eisen
 - Kwaliteit van project/omgang met stakeholders
 - 4 Zal u de samenwerking met de gemeente als succesvol willen beschouwen?
 - Kunt u voorbeelden van geven?
 - 5 Denkt u dat de soort private partij (energiecoöperatie/projectontwikkelaar) invloed heeft gehad op het succes van het project?
 - In welke vorm?
 - Management (omgang met stakeholders)
 - Kennis op technisch/organisatorisch gebied
 - Samenwerking/communicatie binnen de PPP

Afsluitend

- Is er u verder nog iets opgevallen of zijn er nog nader te bespreken zaken die u kwijt wilt?
- Vragen naar partijen vanuit de overheidskant om te benaderen

Appendix C: Coding scheme

CODE CATAGORIES	CODE SUB-CATAGORIES
PPP MANAGEMENTSTYLE	Process Project Focus Intern Extern (involved) parties Connecting Organizing Analysis Together Content Explain Convince Consulate Negotiate
PPP FORM	Contract Term Year Phases Design Exploitation Management Client-contractor relation Joint decision-making Involved Tendency/Tender Expansions Goals Rules Co-production
COMPLEXITY	Complicated Technical Organisational Large Small Size Scope Environment expansions
OUTCOME OF SUCCES	Successful On time requirements Budget Cooperation Satisfied Trust Problems