BUILDING A PLURALISTIC THEORETICAL FRAMEWORK

ANALYSING INTERACTIONS BETWEEN PROJECT GOVERNANCE, INVESTOR CHARACTERISTICS, AND POLICY INSTRUMENTS – THE CASE OF NON-UTILITY INVESTORS IN OFFSHORE WIND FARM PROJECTS

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30 September 2015

ABSTRACT

Offshore wind farm projects require the involvement of an ever-wider, heterogeneous group of investors. Policy makers actively apply various policy instruments to support this. The projects, in turn, are characterised by several governance challenges. The case of offshore wind farms is used to illustrate the added value of building a pluralistic theoretical model to describe interactions between project governance, investor characteristics and policy instruments. The methodology of building such a framework is discussed and motivations for combining specific theories are given. Moreover, the framework and its implications for the case of offshore wind farms are discussed. Three interactions between project governance, investor characteristics, and policy instruments have been identified that could enhance the role of non-utility investors in offshore wind farm projects. Application of a single theory to study OWF investments could not have identified these interactions, as all combine concepts from different theories. Moreover, the framework may be applied in studies of other (similar) sectors, such as (renewable) energy, infrastructure, or other project-based industries.

KEY WORDS: *conceptual framework, combining theories, transaction cost economics, transaction cost regulation, dynamic capabilities, behavioural finance, offshore wind farm investments*

INTRODUCTION

As a result of ambitious green energy goals, the European offshore wind farms (OWF) sector is actively supported by national policy instruments to promote investments. To meet the 2020 targets the required share of offshore wind is estimated at 40 GW and based on several studies this amounts to additional investments of EUR 90 – 120 billion (BCG, 2013; EWEA, 2013; PWC, 2010). However, balance sheet constraints limit the possibilities for utility companies to provide this funding (Green Giraffe, 2013). With the large investment requirements in all of Europe and a limited availability of funds with utility investors, an important role is expected for non-utility investors. It has been advocated that the interactions between the governance of these projects, the characteristics of investors, and the intervention of policy instruments and will be the defining factors in realising such goals.

An integrated framework, with notions from transaction cost economics (TCE), transaction cost regulation (TCR) behavioural finance (BF), and dynamic capabilities (DC) is developed and applied to cover the project governance, investor characteristics, policy instruments and the interactions between those in the European OWF sector. The remainder of this paper will focus on the creation of this conceptual framework. Findings from the European OWF sector will be used to substantiate the applicability of the framework and thereby on the suitability of combining these theories.

The central notion in TCE, the discriminating alignment hypothesis, assumes that governance structures will adapt to the transaction attributes (Williamson, 1985, 1996, 1998). TCE can be used to describe adaption of governance structures to changes in the external environment (Rindfleisch & Heide, 1997). TCR describes investments in the traditional utilities business model (Levy & Spiller, 1994; Spiller, 2013). Looking into private-public interactions, TCR provides an interesting focus on governmental and third party opportunism that may explain reluctance of new investors to invest in heavily regulated sectors. Behavioural finance explains the effects of bounded rationality and information asymmetry in an investor's perspective and also considers traditional aspects of finance (Kahneman & Tversky, 1979; Lokhorst & Youn, 2006). Theory of dynamic capabilities describes investors' unique characteristics that allow them to be successful in markets that undergo constant changes. These capabilities are shaped by investors' processes, positions, and paths (Teece & Pisano, 1994). Teece &

Pisano (1994) argue that the strategic dimensions of the firm are "its managerial and organizational processes, its present position, and the paths available to it".

These theories touch upon interesting elements that seem critical in the interactions between project governance, policy instruments, and investors characteristics but fail to address all the elements individually. What seems to be missing in existing literature is a perspective of these *combined* elements that seem vital in realising offshore wind farm (OWF) investments. Different scholars have addressed governance in utility sectors or other project-based industries (Esty, 2004; Joskow, 1987; Levitt, Henisz, & Settel, 2009; Niesten, 2009; Oxley, 1997; Winch, 1989). Similarly, the policy instruments that are aimed at accelerating renewable energy developments (Abolhosseini & Heshmati, 2014; Butler & Neuhoff, 2008; Couture & Gagnon, 2010; Green & Vasilakos, 2011; Mani & Dhingra, 2013; Prässler & Schaechtele, 2012) and the role of non-utility investors in renewable energy (Darmani, Niesten, & Hekkert, 2014; Mignon & Bergek, 2011; Wüstenhagen & Menichetti, 2012) have both been assessed in many studies . However, never before were these elements combined. Taking a classical economic perspective does not seem appropriate to describe their interactions. The assumed rationality of governments capable of steering investment decisions of investors through a removal of externalities and affecting profitability of projects does not satisfy the real-world difficulty observed with governments to implement optimal policy instruments. Likewise, rational investors with perfect information would find no barriers to invest in OWF projects supported by these policy instruments. However, reluctance of new investors entering the sector is observed. The new institutional economics school seems more fit in explaining the observed issues.

The framework aims to illustrate how project governance, investor characteristics, and policy instruments may constitute and interact in OWFs (figure 1).

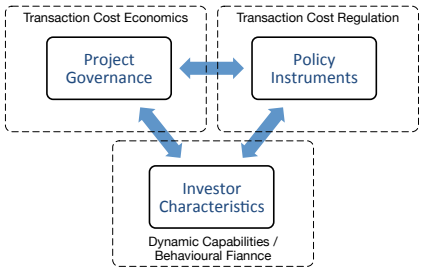

FIGURE 1: FRAMEWORK PURPOSE AND THEORIES

METHODOLOGY

Creating the conceptual framework consisted of five steps.

In a preliminary analysis, theoretical concepts and several studies that have applied those concepts were reviewed in order to find suitable theories that could be used to answer the main research question. Additionally, during this part of the research, an analysis of 155 investments in Europe's 59 currently installed OWFs is performed to get a better understanding of currently active investors and investment strategies in OWFs.

During the conceptualisation, an application of notions from selected theories is chosen and integrated into a single framework.

The operationalisation of the theoretical concepts in an extensive analysis of OWF investments in Europe formed the main analytical part of the research. By looking into the concepts of the individual theories, possible interactions between those concepts are explored when the assumptions of a single theory do not satisfy the real-world observations. Besides the results of the preliminary analysis, several sources are used including sector reports, scientific publications, and news articles. Additionally, to support this part of the research, two expert interviews are conducted to deepen the author's understanding.

Case studies are the source of empirical findings in this study. The case studies are structured to review the possible interactions that are suggested based on the operationalisation of the framework. Three OWFs from different EU countries are selected; these are Belwind (Belgium), Gemini (Netherlands), and Butendiek (Germany). The cases are supported by semi-structured stakeholder interviews with investors from these projects. The comparative case studies are essential in the effort to validate the framework and its interactions.

In the synthesis part the findings from the operationalisation and the empirical case studies are compared to validate these interactions.

MOTIVATIONS FOR COMBINING THEORIES

The motivation for combining the selected theories is based on three aspects. First, the purpose of the framework is to describe multiple aspects (project governance, policy instruments, and investor characteristics) and the selected theories each have their applicability in either one of those aspects. Second, the shared underlying assumptions of the applied theories and their origin in the new institutional school of economics. Third, the limitations of theoretical monism, and the inherent limitations of each of the applied theories in describing the involvement of OWF investments by non-utility investors.

SHARED UNDERLYING ASSUMPTIONS

The applied theories share a similar set of assumptions that form the basis for their compatibility. These similar underlying assumptions originate from the theories' shared foundation in the field of (new) institutional economics. Institutional economics –as an addition to traditional (neo)classical economics- aims to explain economic phenomena by looking at social and legal norms (institutions) in a world of *bounded rationality* and *information asymmetry*.

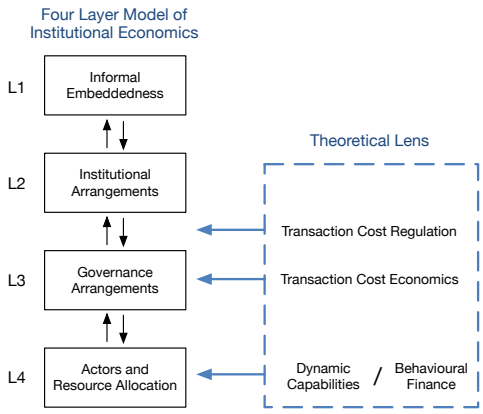

FIGURE 2: THEORY POSITIONS IN 4-LAYER MODEL (ADAPTED FROM: WILLIAMSON, 1998)

Williamson identified four layers of economizing challenges that determine the outcome of economic activity. Changes in one of the layers are likely to have its effects on other layers within the model. The layers differ, however, in level of abstraction and typical frequency at which change occurs (both increasing from the lower levels towards the upper layer) (Künneke, 2007; Williamson, 1998). The theories applied in the proposed integrated framework affect different layers within this model (figure 2). TCE looks into governance issues between private actors, but thereby does not have a direct implication for the institutional arrangements. TCE acknowledges the bounded rationality and opportunism of actors and that the importance of that starting point lies in the fact that 'all complex contracts are unavoidably incomplete' (Williamson, 1998). As an extension of this view, Spiller developed the theory of transaction cost regulation (TCR). TCR specifically targets the governance issues in public-private interactions and introduces the presence of bounded rationality and imperfect information of policy makers. DC and BF discuss the characteristics of individual actors and therefore apply to the fourth layer. DC incorporates information asymmetry by acknowledging the importance of information as a strategic resource. BF revolves around actors' bounded rationale in investment decisions and when assessing risks and returns.

LIMITATIONS OF INDIVIDUAL THEORIES

Groenewegen and Vromen (1996) explain that theoretical *monism* is the doctrine that there exists one and only one true theory for any set of phenomena. Looking at earlier studies into OWF investments, it becomes apparent that such one-sided approach does not capture the complexity of aspects that determine whether or not (non-utility) investors decide to invest in OWFs. Groenewegen and Vromen (1996) propose that theoretical *pluralism* can be an interesting solution to problems where a single theory has limitations to grasp all elements that determine a phenomenon. The limitations in each of the suggested theories are described below.

TCE and TCR do not consider the heterogeneity of non-utility investors that may be active in OWF projects. The discriminating alignment hypothesis leaves out the notion of investor types and assumes homogenous investors that will economize on their transaction costs through alignment of attributes and governance structures. Following merely TCE, an investment decision is thereby independent of investor characteristics. In reality, a broad and diverse group of investors may be active in OWFs and their characteristics are expected to be a in important determinant of how they deal with OWF governance challenges and how they respond to policy. Similarly,

TCR is based on research in the traditional utilities' business model that seems incapable of accounting for the diversity of active investors in Europe's power market.

BF and DC assume passive investment opportunities. These theories assume investors seeking investment opportunities, but in fact there are also opportunities seeking investors as a result of political goals and active government policy intervention. Moreover, the characteristics of OWF projects in terms of size, complexity, and costs require the involvement and governance of several investors per project. The concepts of partnerships, alliances, and consortia are not covered in either behavioural finance or dynamic capabilities, while TCE does look into this.

As all theories have their limitations to cover all aspects that determine the role of non-utility investors in OWFs and seem to be complementary they are combined in a single integrated framework.

THE CONCEPTUAL FRAMEWORK

The developed framework allows for the exploration of interactions between governance challenges in OWFs, the characteristics of different investors, and the effects of policy instruments on these projects. Figure 3 illustrates the framework.

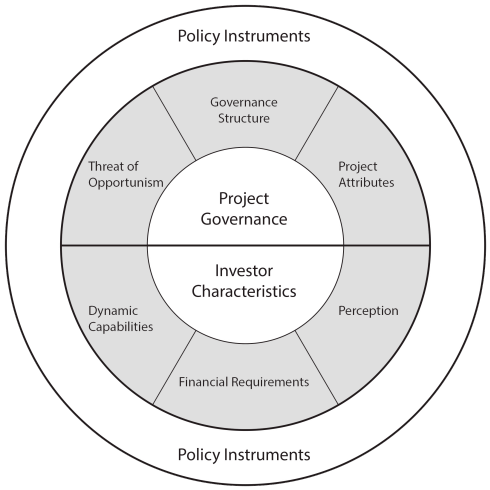

FIGURE 3: CONCEPTUAL FRAMEWORK

PROJECT GOVERNANCE

The upper half of the framework's inner circle illustrates the project governance of OWFs. Following the concepts of TCE, a project may be seen as a bundle of various transactions between investors and other stakeholders. In line with the theory of TCE, the characteristics of the transactions in OWF projects (project attributes) and the governance structures of those transactions should be aligned. In practical terms, this means that suitable structures to govern the shared investments, electricity offtake, and contracting of engineering, procurement, and construction (EPC) companies and original equipment manufacturing (OEM) companies are needed. As OWF projects are characterized by several uncertainties (from counterparties in transactions and environmental uncertainties that stem from markets, technologies, financing, and regulation) and require very specific assets (large physical investments and specific sites), theory of TCE would prescribe vertical integration (hierarchical governance structures). However, in reality, this integration is not observed. Investments in OWFs involving non-utility investors are governed through equity alliances with other investors, because balance sheet investments are too risky and too large given typical project characteristics (size and costs). Notably, there are several variations possible in terms of division of roles and responsibilities within these equity alliances. Moreover, in the absence of a utility investor, offtake of electricity cannot be vertically integrated. Therefore, the offtake of electricity is often governed through either spot markets or long-term power purchase agreements. The governance of contracts with EPC and OEM companies offers some variations with the possibility of wrapping multiple (sub) contracts into one to reduce interface risk for the investors and shared ownership to create commitment. A high degree of mutual trust is required, as all of these transactions require coordination between several parties. Although the characteristics of OWF projects (project attributes) may in many cases be similar, different governance structures are observed. Following only TCE –assuming the governance structure to be a reflection of just the project's attributes- does not explain this difference. Therefore the joint effect of policy instruments and investor characteristics may offer a more satisfying explanation. This would not be to disprove the relation between transaction attributes and governance structures, but rather expand this view with other elements.

INVESTOR CHARACTERISTICS

The lower half of the framework's inner circle defines the investors through their characteristics. Non- utility investors can be independent developers, private equities, corporates, local partners, municipalities, oil & gas companies, OEM and EPC companies, and institutional investors. Each investor may have technical and/or managerial experience; technical, financial or relational resource endowment; and different motives to invest in OWFs. The dynamic capabilities that stem from these characteristics define investors' ability to be successful in OWF investments, but none of the investor types shows all of these characteristics. This suggests that partnerships in project governance would be required to complement their capabilities and would explain the large observed role of equity alliances. Moreover, investors have different financial requirements in terms of risk and return. This could affect their willingness to participate in certain (parts of) a project (each characterised by other risks and returns) and determine their moment of investment or divestment within a project. Finally, perception of a policy regime is an important implication of acknowledging the bounded rationality of investors.

POLICY INSTRUMENTS

The outer ring of the framework illustrates the intended role of policy instruments, bringing together project governance and investor characteristics. Policy makers in Europe apply permitting consent procedures, grid connection policies, up-front and exploitation subsidies to promote OWF investments, but there may be several limitations in how these are designed. Simply creating attractive returns and stimulating certain areas for OWF development (removing the externalities) may not be enough to attract new investors. In fact, a threat of third party and governmental opportunism should be acknowledged as a possible barrier to invest. Retroactive changes in permitting consent procedures (withdrawal of permits) and subsidy regimes (changes in remuneration) are the primary causes of these threats. Moreover, it was found that different policy instruments have trade-off effects on the project's asset specificity and uncertainties (project attributes) of OWFs. This effect was primarily identified in the responsibility of grid connection and in the permitting consent procedure. This suggests that different investors may prefer different policy regimes, which could be explained by their characteristics.

FRAMEWORK INTERACTIONS

THROUGH THREAT OF OPPORTUNISM AND PERCEPTION

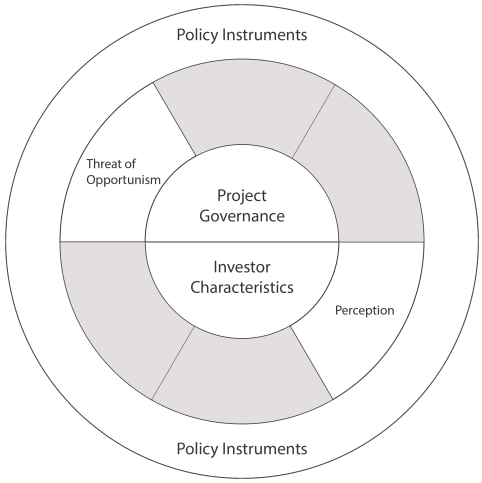

FIGURE 4: INTERACTION 1

Policy instruments should pose a minimal threat of governmental and/or third party opportunism. As mentioned, retroactive changes in permitting consent procedures and subsidy regimes are the primary causes of these threats. This means that stability of policy instruments is preferred to radiate credible commitment to policy goals. Contrary, policy instability could form a barrier to investors. Notably, it is not the actual threat of this opportunism that determines the involvement of investors, but rather their perception of such threats. The three cases displayed no major threats of opportunism or damaged perceptions, which contributed to their success. However, illustrated in the Gemini case, an inevitable withdrawal of several Dutch OWF permits somewhat damaged the investors' perception of the policy regime, but the investors remained confident of the government's support of their project. The perception of investors therefore also strongly depends on their earlier experiences with a policy regime.

THROUGH DYNAMIC CAPABILITIES, PROJECT ATTRIBUTES AND GOVERNANCE STRUCTURE

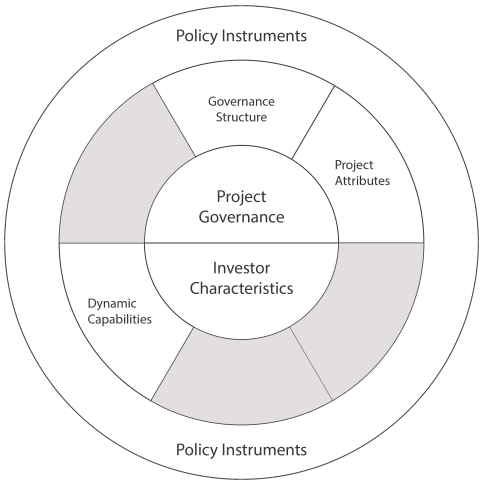

FIGURE 5: INTERACTION 2

Policy makers should consider that investors will structure projects in accordance with their combined dynamic capabilities; policy instruments can then be designed to account for this. The combination of several investors in a project seems logical as their individual experience is generally low and resource endowment and motive will likely substantially differ per investor. The governance structures can be optimized to fit investors' complementary experience, resources, and motives. Expertise in dealing with certain aspects of a project (like the construction) can be exploited by involving the right investors in the right part of a project. In other words, the dynamic capabilities of investors should match the role these investors take within the governance structure (e.g. developer, contractor, strategic or financial investor). In all case studies, this reflection of dynamic capabilities was observed in the division of roles and responsibilities within the governance structure. Moreover, experienced, but asset-light developers formed partnerships with investors that had either complementary financial or relational resources. The ability to deal with certain asset specificities or uncertainties (project attributes) would determine investors' preferences for certain policy instruments with trade- off effect on those project attributes. To illustrate, investors capable of managing the grid connection preferred to be independent of a (semi-)public party to manage the grid connection. Therefore, to avoid the unintended negative effects of policy support, policy makers could either design policy instruments to target the needs of specific investors (e.g. consider their expertise) or consider flexible policy instruments wherein investors can choose the level of governmental involvement (tailored for specific project needs).

THROUGH FINANCIAL REQUIREMENTS, PROJECT ATTRIBUTES AND GOVERNANCE STRUCTURE

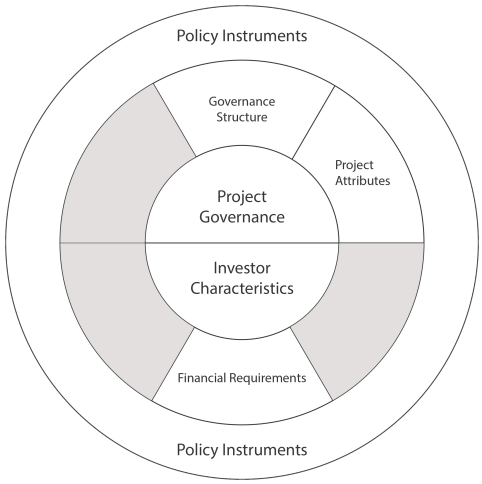

FIGURE 6: INTERACTION 3

Policy makers must consider the differences in financial requirements of investors, because policy instruments (in particular subsidies) are essential in ensuring that OWF projects receive the necessary return to be competitive with other energy investments. However, as observed in all cases, investors that are uncomfortable with specific risks (associated with uncertainties in project phases) can be safeguarded from these by project governance solutions (e.g. EPC wraps that shield them from construction risks) and equity alliance structures that allow changes in ownership. That way, investors that have certain risk or return goals or investors that are bound to an investment horizon (to free up capital) can enter or exit a project to match these requirements. This indicates that the investors can find many solutions to meet their financial requirements on their own through mutual agreements. Policy instruments are then not required to align risks and returns of each project phase with investors' financial requirements, but only have to ensure that OWF projects are competitive over their entire lifecycle.

CONCLUSIONS

PRACTICAL IMPLICATIONS

The last two interactions showed that the alignment of project governance and investor characteristics is critical to successfully involve (more) non-utility investors in OWFs. Unfortunately, the effects of policy instruments on this alignment are limited. However, as concluded from the case studies, investors are capable of forming governance structures to match their characteristics, provided that policy makers create the right regulatory framework. Therefore, as already discussed through the observed interactions, policy makers are recommended to strife for overall stability of policy regime, consider to target the needs of specific investors or apply flexibility in certain instruments, and provide attractive remuneration for projects over their entire lifecycle.

Investors within OWF project are recommended to find governance structures fit for their combined characteristics. Successful projects are built upon strong consortia; therefore investors should actively seek the right partnerships. Given the size and complexity of OWF projects, non-utility investors require partnerships based on dynamic capabilities that are complementary. Moreover, Investors are recommended to consider the financial requirements of themselves and others within a consortium when arranging the project's governance structure.

SCIENTIFIC ADDED VALUE

This research has contributed to existing literature with an integrated perspective of the elements that determine the involvement of non-utility investors in OWFs and by making a strong case for the added value of combining theories (*theoretical pluralism*). The combination of several theories to analyse project governance, investor characteristics, and policy instruments resulted in a more complete view of these elements. Moreover, the interactions *between* these elements were only found once we detached from single theories' assumptions and look into combinations of concepts that transcend a single theory.

TCR acknowledges the threat of opportunism inherent in policy instruments as a result of bounded rationality and imperfect information with governments, but leaves out the differences in cognitive factors of investors. Combining TCR with behavioural finance teaches us that it is not the actual threat of this opportunism that determines the involvement of investors. Rather, the *perception of a threat of opportunism is more important than the actual threat*. This means that different investors could value a policy differently. Whether a threat of opportunism from policy instruments is a barrier to invest will depend on these investors' earlier experiences with a policy regime (*path dependency*).

Following the discriminating alignment hypothesis from TCE, a governance structure is a consequence of the transaction attributes, while *governance is also a reflection of investor characteristics*. To illustrate, although faced with similar attributes, different investors choose different modes of governance. Wpd applied a 'multicontracting' structure to govern all the EPC works in Butendiek. Contrary, both Parkwind and Typhoon Offshore chose a subcontracting structure wherein Van Oord managed the many subcontracts. These differences are better explained by looking into investor characteristics, in particular their dynamic capabilities stemming from experience in managing contract interfaces and the resources to do so. Moreover, governance structures also reflect the financial requirements of investors. Changes in ownership of projects facilitated by the choice of equity alliances allows investors to meet their specific requirements that are often not the same as the expected risks or returns of participation in a project across all of its phases.

Similarly, theory on dynamic capabilities ignores *interdependency in strategic alliances* between investors, assuming that only the competitive advantages of a single firm determine its success in the OWF sector. However, the characteristics of OWF projects in terms of size, complexity, and costs require a combination of dynamic capabilities that none of the individual investor types display. *Consortia based on complementary dynamic capabilities* are of vital importance for success. Combining TCE and dynamic capabilities thus seems logical from this view as well.

FRAMEWORK LIMITATIONS

The simplification of using project attributes in the framework rather than *transaction attributes* has its limitations in understanding a specific transactions. To characterise OWF projects, projects are analysed as a bundle of transactions. This simplification is justified by the fact that the overall *project* governance structure is of more interest than the governance of individual transactions within the project. This approach was useful for the *identification* of project governance

challenges. However, to further *analyse* the governance of a specific transaction (e.g. the grid connection), as a result of a policy instruments and investor characteristics, the exact attributes of that transaction should be further explored. By doing so, looking into a single transaction more closely could contribute to a better understanding of its governance.

Policy instruments are the control variables of policy makers within the framework, but these are in fact *limited by constraints* and bound to *dynamics with policy objectives and targets*. Possibilities of policy makers implementing or changing policy instruments on a national level are in reality often constrained by objectives and targets at an international level. Moreover, the framework ignores the dynamics between policy objectives, policy targets, and policy instruments. Stability of policy instruments is not always within the reach of control of policy makers, as changes in objectives must inevitably be translated into policy instruments. Likewise, policy instruments must be updated based on (possibly disappointing) earlier results if policy makers want to meet earlier stated targets.

SUGGESTIONS FOR FUTURE RESEARCH

The framework provides interesting options for future research as its interactions may all be analysed in further detail. Two options for future research in particular may give interesting findings for OWF investments. Additionally, the applicability of the framework may be tested in the context of other sectors.

From the analysis of the effects of policy instruments it was suggested that different investors could prefer different policy instruments due to the effects of those policy instruments on asset specificity and uncertainties and the characteristics of investors. Therefore flexibility of policy instruments was suggested as a viable option. Flexibility of grid connection policies or permitting consent procedures could be explored as policy options. Experienced investors could for example choose to manage the grid connection themselves (less behavioural uncertainty from TSO) and be remunerated for the extra costs through the exploitation subsidy, while other (less experienced) investors could have the grid connection built by the TSO or another (public) party. Flexibility in permitting consent procedures could for example be incorporated by allowing changes in ownership of permits (to prevent delays in development as observed in the Butendiek case) or give way for flexibility in the technical specifications of an OWF (e.g. number and type of turbines). Methods for exploring the possibilities of such flexible measures could be based on the meta design model by Stikkelman and Herder (2004). Objectives and constraints of a flexible policy regime could be identified through a literature review and stakeholder interviews. A broader set of stakeholders should be involved in creating the objectives and constraints of such flexible policy design to ensure that all interests are represented. Options for flexible policy could thereafter be designed and tested.

The interaction between policy instruments, their inherent threat of opportunism by governments or third parties, and the perception of investors may be subject of further research. Based on the conceptual framework, suggestions from expert interviews and earlier studies, this interaction is expected to play an important role in attracting or keeping non-utility investors from entering the sector. However, unfortunately it has been difficult to validate this interaction from empirical findings based on successfully completed projects. This interaction is most likely better observed in unsuccessful cases. Moreover, the perception of investors is somewhat difficult to 'measure' through an interview. Other qualitative methods to identify barriers to invest are suggested.

The final suggestion for further research is on the applicability of the framework in other contexts. Primarily, other large-scale (renewable) energy projects like concentrated solar power (CSP) and onshore wind may be reviewed based on the same concepts. In terms of scope, the applicability of the framework could also be reviewed in less-developed OWF markets (outside Europe). In general, project-based industries with a large role for government intervention (e.g. real estate, infrastructure, and other utilities) could show similar interactions to those suggested in the framework. The setup of such research could be similar to this research, but with a larger focus on the operationalisation and empirical analysis as the research will thus be based on the conceptual framework suggested in this report.

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