2. Inhoudelijk eindrapport

2.1 Samenvatting (Summary)

The main goal of SP3 was to write an academic PhD thesis on the legal aspects of combining offshore wind energy with interconnectors. For this purpose the research considers in particular a possible UK-Dutch combined grid solution. The PhD thesis consists of four parts. The first part consists of three chapters. Following a general introduction to the thesis, a separate chapter will present the topic of research, i.e. a chapter outlining the electricity chain, the role of (wind) energy production and electricity networks therein and a third chapter explaining about the general legal framework for energy activities offshore. The second part of the thesis involves an analysis of the relevant EU legal framework. After a chapter presenting general EU law and its impact on offshore energy activities, individual chapters will consider in more detail the regulatory framework applying to offshore wind energy production, the development and use of interconnectors and the available EU instruments to promote both activities. In part three the thesis presents the national developments in the Netherlands and the UK. For this purpose the same approach is applied as in the previous parts. This entails that one chapter analyses the national legislation governing the production of offshore wind in the UK and the Netherlands and the legal framework governing the construction of interconnectors in both countries is presented in another chapter. The last part consists of one concluding chapter consisting of the main conclusions and some recommendations.
Below we present the research goals and research questions. Thereafter we shall discuss the research methodology and the choices that were made with regard to the scope of the research. Then we will present in more detail the content and results of the PhD thesis.

2.2. Inleiding (Introduction)

In SP3 the legal aspects of an offshore wind farm interconnector combination between the United Kingdom and the Netherlands where researched. This research involves a legal PhD research and will result in an academic PhD thesis. Although this legal research was conducted separately from the work that was conducted within SP1, the research nevertheless takes into account the different technical configurations developed under SP1 in order to ensure that the research takes into account the most feasible technical feasible wind farm interconnector combinations. This research is therefore not an abstract analysis of the legal consequences of connecting potential offshore wind farms to potential offshore wind farms between yet unknown EU member states, but is taking into account a concrete project. It should nevertheless be noted that the research in SP3 differs from the legal research conducted in SP1 as the research in SP3 provides a theoretical background and substantive analyses of some of the conclusions that have been included in SP1.

2.3. Doelstelling (Research goals)

The aim of this research was to provide answers for the legal questions that would arise when a wind farm interconnector project between the Netherlands and the United Kingdom would be developed. The focus of this research was therefore not on the abstract offshore grid concept as such, but on two specific activities that are relevant for developing such a combined grid solution, i.e. developing an electricity interconnection between two EU member states together with wind energy in the offshore waters of the Netherlands and the United Kingdom.

2.4. Werkwijze: onderzoeksvragen (Research questions)

The PhD research was conducted on the basis of the following research questions:

1) What is the European legal framework and policy with regard to the use of renewable energy sources under Directive 2009/28/EC?
2) What is the European legal framework and policy with regard to the use of interconnectors to integrate the national electricity markets into one European electricity market?
3) Which legal frameworks and policies exist in the Netherlands and the United Kingdom with regard to offshore wind energy?
4) Which legal frameworks and policies exist in the Netherlands and the United Kingdom with regard to cross-border electrical infrastructure?

5) Is it feasible, from a legal perspective, that offshore wind farms are integrated into interconnectors?

2.5. Werkwijze: methodologie (Methodology)

Given the two main elements of such a combined grid solution, the research will focus on both aspects. In addition to the international, European and national regimes for developing interconnectors, it examines in detail the international, European and national regimes for developing offshore wind energy in the Netherlands and the United Kingdom. Given the fact that the German offshore regime has served as an inspiration for the Netherlands and TenneT in both countries is responsible for developing the offshore grid, the research also takes into account the German regime when analyzing the development of offshore wind energy in the Netherlands and the UK. The lessons learned with connecting offshore wind farms in Germany could therefore be relevant for TenneT in the Netherlands. Additionally, it should be noted that Germany faces similar challenges as the United Kingdom and the Netherlands as regards offshore wind energy, and on top of that, the German electricity system strongly resembles the Dutch and British electricity systems. Due to their large dependency on thermal generation, the transmission system operators in these countries are challenged by the increasing shares of new and additional renewable electricity generation. Apart from this, the German electricity system has a high degree of industrial load and is situated in the center of the ENTSO-E Western European synchronized area with a (relatively) high percentage of interconnection.

The method used for the PhD research is the classical legal research method. This method is based on analyzing international, European and national legislation, and the policies that are based on the legislation. Additionally, in-depth interviews with TenneT (NL) and National Grid Ltd. (UK) took place to test the findings of the literature study.

2.6. Resultaten van het project (Structure of the thesis)

The thesis is roughly subdivided into four parts. Each part consists of several chapters, except the last part that provides a conclusion and recommendations

The first part consists of three chapters. Following a general introduction, a separate chapter provides the reader with an introduction to the two topics of the thesis: offshore wind energy and the role of interconnectors in the EU electricity market. The purpose of the first part is to explain which aspects of both activities are relevant from a legal perspective. Subsequently, this part also presents the powers of coastal states to regulate and enforce energy activities and interconnectors offshore. The second part then focusses on the role of the EU law as regards the development of combined grid solutions. In addition to an analysis of general EU law in relation to the internal market for electricity, it will discuss in detail the European legislation on interconnectors and wind energy as well as the regimes in place incentivizing these developments. The third part examines the national regimes on interconnectors and wind energy in the UK and The Netherlands. The fourth part of the thesis mainly consists of a conclusion. It aims at providing answers to the main and sub-research questions and provides some recommendations.

Part I: Technical and Legal Background

Chapter 1: Introduction

This chapter will provide a general introduction, present the research question and the methodology applied.

Chapter 2: The Electricity Chain

This chapter presents an introduction to the electricity chain and focusses in particular on production and transport. The chapter consists of two parts. First, it will discuss the development of (offshore) wind energy. It will show that wind energy as a technique for electricity generation had to overcome numerous technical challenges and that the challenges for offshore wind energy are not merely technical but legal as well. As offshore wind farms are being constructed further away from shore, the costs for the construction of the turbines, substations and the connection to shore have risen. The way

in which coastal states have addressed these issues differ. Thereafter the chapter discusses the concept of the electrical system and its components. It was found that the electrical system consists of a number of different types of electrical infrastructure. There is the 'standard' infrastructure that is part of the electricity chain, and there is additional infrastructure that is designed to meet special circumstances such as closed distribution systems and direct lines. Subsequently the chapter will discuss the concept of interconnectors and provides and overview of the developments regarding interconnectors in Europe.

Chapter 3: Offshore Legal Powers
This chapter examines the rights of coastal states offshore. This is necessary as coastal States have limited legislative and enforcement powers offshore. The relevant body of legislation is the law of the sea. The United Nations Convention on the Law of the Sea (UNCLOS) identifies a number of offshore zones (territorial waters, continental shelf and exclusive economic zones) and governs activities in these zones. Whereas in the territorial waters coastal states have full sovereignty, they have only been granted sovereign rights in the other zones. This chapter explores the rights of coastal states in relation to the production of offshore wind energy, the connection of offshore wind parks to shore and to the connection of two offshore wind farms in two different offshore jurisdictions. Because the offshore wind farms and the interconnector are governed by two separate legal regimes under the law of the sea it is necessary to elaborate on both regimes. The first regime covers the freedom to lay subsea cables that applies to subsea interconnectors. The second regime covers the right of coastal states to regulate the construction of offshore wind farms in the territorial sea and in the exclusive economic zone.

Part II: European Law

Chapter 4: The Development and Scope of the Internal Electricity Market
This chapter will present the role of EU law in relation to the energy sector. It will first discuss the extent to which EU applies to the offshore zones. It will then present the EU market liberalization process that has been developed since the 1990s whilst focusing on the electricity sector. The main issues discussed are the provisions on electricity production and electricity infrastructure. The chapter presents the type of networks that are governed by EU law (such as transmission systems and distribution systems) and the type of regulation that applies to these networks (unbundling, third party access etc.). This includes the need to develop and regulate interconnectors as these are a sine qua non for creating an internal European electricity market. This chapter will also present briefly the main national and European institutions that are involved such as the national regulatory authorities, ENTOS-E and ACER.

Chapter 5: The Development of Offshore Wind Energy
This chapter discusses the relevant European legislation on offshore wind energy. In addition to EU directives on offshore planning, the chapter will analyse the Renewable Energy Directive. Due to the principles of subsidiarity and proportionality, the power to regulate offshore wind energy is in practice attributed to the member states. This chapter therefore aims at providing an overview of the relevant parts of European legislation that have an impact on the ability of member states to regulate offshore wind energy (such as support schemes and priority access) but will also discuss some EU policies on the development of offshore wind energy (such as the political agreement to further the development of offshore wind in the North Sea area).

Chapter 6: The Development of Interconnectors
This chapter will discuss in more detail the European legal framework for interconnectors and, in particular, the regimes that apply when developing new interconnectors. This chapter consists of three parts: (i) the planning of interconnectors, (ii) an analysis of the regular regime applying to interconnectors, and (iii) an analysis of the regime providing for exemptions from the regular regime. As regards the planning of new interconnectors it is noted that constructing new interconnectors is a complex task because it involves the participation of a wide range of parties such as the national transmission system operators and European institutions like ENTSO-E and ACER. Although the

European transmission system operators in Europe expect a substantial growth in the level of interconnection in Europe, there are at the same time numerous reasons for these interconnectors not being built, including regulatory uncertainties. The next part of this chapter will therefore discuss the regular regime applying to interconnectors. Whereas a regime of third party access to interconnector applies, in practice access may be frustrated by a lack of network capacity. An important part of this part of the chapter therefore concentrates on the issue of congestion management. In addition to analyzing the causes of congestion on (subsea) interconnectors, it presents the different methods and criteria for proper congestion management as well as the way in which congestion management is implemented in the European Union and how this affects a wind farm interconnector combination.
The next part of the chapter deals with the exemption regime for new electricity interconnectors. Such exemptions have been made possible as interconnector investments under the regulated regime are not always a feasible option for a transmission system operator. Hence the possibility in EU law to be exempted from the regular regime. The exemption regime is an attempt to balance stability under the regulated regime and attracting investment under a more liberal regime. The exemption provision contains clearly defined benchmark criteria which have to be applied by the national regulatory authorities and the European Commission. However, the European Commission and national regulators are applying the criteria in a stricter manner over the last years without providing reasoning for their policy. It therefore remains to be seen how the exemption regime will contribute to the construction of all of the proposed new interconnectors in the coming decades.

Chapter 7: Instruments to Support Cross-Border Cooperation
This chapter discusses the European instruments that aim to support interconnector development as well as facilitating cross-border cooperation between member states in offshore wind energy. It was found that the European instruments that are codified in the TEN-E Regulation and the Renewable Energy Directive have a limited impact. This is primarily the result of the application of the principles of subsidiarity and proportionality which puts the member states in the driver's seat, and has the European institutions on the back seat with the job of providing non-binding direction instructions.

Part III: National regimes for interconnectors and offshore wind energy

Chapter 8: Developing Offshore Wind Energy in the UK and the Netherlands
This chapter discusses the national regimes on offshore wind energy of the United Kingdom and the Netherlands. Given the earlier mentioned parallels, the thesis also takes into account the German regime and experiences. It was found that the regimes for offshore wind energy are significantly different in the investigated states.
The thesis shows that the United Kingdom has a full-fledged regime for realizing new offshore wind farms but that the current regime is not compatible to allow for a wind farm interconnector combination. In the Netherlands the regime for offshore wind energy has recently been changed as a result of which combined interconnector wind farm solutions have become more feasible. Nevertheless, some barriers still exist and have to be removed. The most important barrier is that interconnection and offshore wind energy are still being treated as totally separate activities, and that synergy solutions are therefore not researched and initiated.
The chapter concludes that national regimes are becoming more accommodating for developing combined offshore wind farm / interconnector synergy solutions, but a number of legal obstacles still remain.

Chapter 9: Developing Electricity Interconnectors in the UK and the Netherlands
This chapter is on the national regimes of the Netherlands and the United Kingdom on interconnectors. We found that in the United Kingdom there is a robust regime to promote interconnector construction. The odd thing in the United Kingdom is that interconnector operations are treated as a commercial activity, comparable to operating an offshore wind farm. There is therefore also an unbundling requirement which prohibits a transmission system operator to be involved in interconnection activities. In the Netherlands and Germany, however, the development of new interconnectors is treated as an activity that is to be undertaken by the transmission system operator. The Netherlands

makes a further distinction as it considers alternating current interconnectors to be part of the national transmission system but direct current interconnectors as separate pieces of infrastructure. These differences in national regimes governing the development of interconnectors are surprising because these national regimes are supposed to be the result of the application of one EU Regulation and not a transposition of an EU Directive in national law.

Chapter 10: Combined grid solutions
Few examples are available on the development of combined grid solutions and so far none can be found between the UK and the Netherlands. However, elsewhere two projects have been developed that apply or intend to apply a combined grid solution. The first project is the Kriegers Flak wind farm combination that combines Danish and German offshore wind farms with an interconnector. The Kriegers Flak is nonetheless not a show case example as the project had painstaking long planning timeline and Sweden, which was an initial project partner, pulled out of the project. The second project is the COBRA project. The project consists of a subsea interconnector between the Netherlands and Denmark that will be made compatible for connecting future German offshore wind farms. However, under the existing legal regime German wind farm developers do not have an incentive to be connected to the interconnector due to the subsidizing regime in Germany and it therefore remains to be seen whether a request to be connected directly to the interconnector will be made in the future. The chapter assesses the lessons to be learned from these projects.

Part IV: Conclusions
Chapter 11: Conclusion and Recommendations
This final chapter aims at linking the outcome of the study to the earlier mentioned research questions. An important finding is that legislation on offshore wind energy and electricity network operation has a high degree of adaptability. The Dutch legislator, for example, was able to amend a legal regime that created an ossified state of perpetual moratoria into a state of the art legal regime that attracts new (foreign) investors in offshore wind energy in the Netherlands. The Dutch legislator thus shown that with the right attitude at the decision making level it is possible to remove legal barriers once the policy goals have been identified and the decision is made to actively realize those goals.
An additional finding is that the ties between the national member states (=decision making level) and industrial parties such as transmission system operators and wind farm developers (= development and execution level) are relatively close. In the triangular constellation of national government/regulator, transmission system operator and wind farm developers the lines of communication are short. However, due to split incentives and long term uncertainties with regard to market conditions/policy changes there is a high degree of evasiveness of risks. There are therefore ongoing discussions on several potential projects, but the parties involved are not willing to commit themselves.
The outcome of the PhD thesis also confirms the outcome of previous academic research that there is a need for more coordination on wind farm zoning at the European level in order to prevent that synergy solutions are lost. This could be achieved by either making the selection of wind farm areas by the member states subject to approval by the European Commission, or to involve the European transmission system operators in the process of site selection through ENTSO-E. The latter option is assumed to be the most viable as it would only require a slight amendment of the procedures of ENTSO-E and the principle of subsidiarity is respected. Also on the national level of both the United Kingdom and the Netherlands there is a need for better cooperation between the governments. Each government is focussing on developing offshore wind energy in their own area of the North Sea without taking the possibility of interconnection into account. More cooperation between the United Kingdom and the Netherlands can be realized within the framework of Political Declaration on energy cooperation between the North Seas Countries, and can be implemented by using already existing instruments provided by European secondary legislation such as joint project and/or joint support schemes.
Last but not least, the PhD research also shows that there is a need to amend EU and national legislation in order to actually allow a national transmission system operator to plan, construct and operate a combined grid solution, i.e. an interconnector wind farm combination. It recommends that parts of the European and national legislation on interconnectors and offshore wind energy have to be

amended to facilitate for the combination of interconnectors and offshore wind energy. Hence, on EU level more certainty has to be created with regard to the application of the European rules on congestion management and the exemption regime. The rules on congestion management aim to optimize the use of interconnectors within the framework of the internal electricity market. However, this regime creates a serious obstacle for offshore wind farm developers who want to connect to a subsea interconnector as they need guaranteed access to the subsea interconnector at any given moment and the rules on congestion management do not allow for such an arrangement. The alternative is to request an exemption from the rules of congestion management. This may proof to be challenging given the trend to limit the number and scope of exemptions by the European Commission. Changes to the national legal regimes need to be made as national legislation in the Netherlands and the United Kingdom solely focus on connecting offshore wind farms to the onshore transmission system in the most cost efficient manner. The possibility of combing offshore wind farms with interconnection is excluded by national legislation. This needs to be facilitated by national law as otherwise such combined grid solutions will hardly be developed.

2.7. Conclusie en aanbevelingen (Results and recommendations)

The PhD-research aimed to investigate the legal aspects of an offshore wind farm interconnector combination between the Netherlands and the United Kingdom. The research nevertheless provides some conclusions that will serve the development of combined wind farm and interconnector solutions in the future. Apart from conclusions with regard to the need for more planning of offshore wind farms and connections to shore and the need for more cooperation between governments, the PhD-research provides some more detailed recommendations with regard to the connection of offshore wind farms to interconnectors. These recommendations particularly deal with the current regime of congestion management and the need to provide some exemptions in order to provide wind farm developers with sufficient guarantees for getting access to the grid. See for more details chapter 11 of the thesis as presented above.