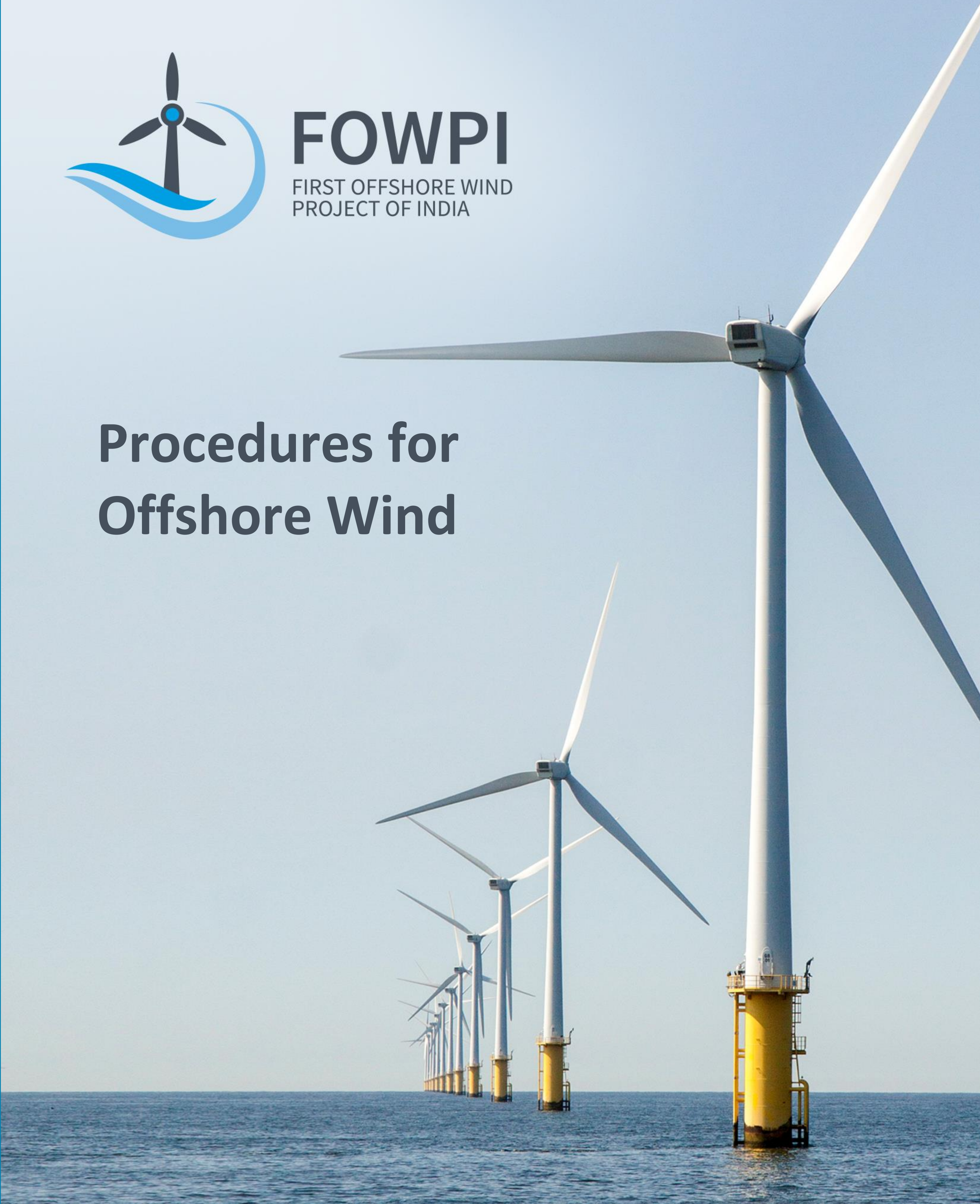

FOWPI

FIRST OFFSHORE WIND PROJECT OF INDIA

Procedures for Offshore Wind

This Project is funded by The European Union

The European Union is a unique economic and political partnership between 28 European countries. In 1957, the signature of the Treaties of Rome marked the will of the six founding countries to create a common economic space. Since then, first the Community and then the European Union has continued to enlarge and welcome new countries as members. The Union has developed into a huge single market with the euro as its common currency.

What began as a purely economic union has evolved into an organisation spanning all areas, from development aid to environmental policy. Thanks to the abolition of border controls between EU countries, it is now possible for people to travel freely within most of the EU. It has also become much easier to live and work in another EU country.

The five main institutions of the European Union are the European Parliament, the Council of Ministers, the European Commission, the Court of Justice and the Court of Auditors. The European Union is a major player in international cooperation and development aid. It is also the world's largest humanitarian aid donor. The primary aim of the EU's own development policy, agreed in November 2000, is the eradication of poverty.

The European Commission is the European Community's executive body. Led by 27 Commissioners, the European Commission initiates proposals of legislation and acts as guardian of the Treaties. The Commission is also a manager and executor of common policies and of international trade relationships. It is responsible for the management of European Union external assistance. The European Commission has its headquarters in Brussels, Belgium, and some services in Luxembourg. The Commission has representations in all EU Member States and 139 Delegations across the globe.

http://europa.eu/

1 About FOWPI

The First Offshore Wind Project of India (FOWPI) is part of the "Clean Energy Cooperation with India (CECI) ", which aims at enhancing India's capacity to deploy low carbon energy production and improve energy efficiency, thereby contributing to the mitigation of global climate change. Project activities will support India's efforts to secure the energy supply security, within a well-established framework for strategic energy cooperation between the EU and India.

FOWPI is planned to achieve the first 200MW sized offshore wind farm near the coast of Gujarat, 25km off Jafarabad. Project will emphasis on bringing the vast experience of offshore wind rich European countries to India which aims to provide technical assistance for setting up the wind-farm and creation of a knowledge centre in the country.

FOWPI will be led by COWI A/S (Denmark) with key support from WindDForce Management Ltd. (India). The project is supported by European Union (EU), Ministry of New and Renewable Energy- India (MNRE) and National Institute of Wind Energy- India (NIWE).

Project is awarded under the Indo-European co-operation on Renewable Energy Program and funded through European Union.

FOWPI will focus on finalisation of design and technical specification of the windfarm including foundation, electrical network, turbines etc.. This will also include undertaking specific technical studies for the selected site (based on the outcome of FOWIND project), including coastal surveys, environmental assessments, cost-benefit analysis, transmission layouts, monitoring systems, safety measures, and other relevant technical studies as identified.

Contract: No 2015/368469 Start 01-2016 Duration: 42 months

2 Disclaimer

The contents of this publication are the sole responsibility of the authors and can in no way be taken to reflect the views of the European Union. The European Union is not responsible for any use that may be made of the information contained herein.

3 Copyright statements

4 Acknowledgements

FOWPI is grateful for the support provided by European Union (EU), Ministry of New and Renewable Energy-India (MNRE), National Institute of Wind Energy- India (NIWE), and the Wind Industry.

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Procedures for Offshore Wind

Version No.	Document Released Date	Edited By	Modified Sections	Reason for Changes
Version 0	15/12/2017	Ecofys and COWI		

CONTENTS

1 Introduction

This document has been prepared with the purpose of providing advisory input on some of the underlining Procedures for implementing Offshore Wind Farms in India. The document consists of three independent Memo's, which cover 1) Permitting Procedures, 2) Certification Requirements and 3) H&S Guidelines. The three topics were shortlisted among a number of other relevant subjects, not included in this document, such as Quality Assurance and Control, Risk Assessment and Control, Permit Management and Contracting Strategy.

The first Memo addresses the Permitting Process, which is a central part of offshore wind project planning. A well-structured process can significantly speed up the project implementation process and reduce risks, ultimately contributing to lower costs of offshore wind energy. The Permitting Process Memo describes how four EU-countries, currently leading the offshore wind development, structure tender preparations. The Netherlands and Denmark, for instance, are shown to reach lower auction prices through higher public preparations and investments before the tender call.

The second Memo, on Certification Requirements, describes how European countries have based their permitting process in line with IEC61400-22. Thus, the Design Basis and Design Evaluation have to be certified by accredited bodies. Manufacturing, transport, installation and commissioning surveillance are quality controlled by internal and/or external bodies e.g. including the Marine Warranty Surveyor representing the insurance company.

By last, the Memo on Health and Safety guidelines is of great importance because human, environmental and material risks can be very high in the offshore environment. In Europe, Health and Safety standards to reduce this risk have been developed by the Marine Oil and Gas industry and adapted to offshore wind conditions. The Health and Safety Memo presents the guidance and numerous procedures used to manage the risk in European Offshore Wind. Links to procedures in UK, Germany, Denmark and the Netherlands are provided, which can form the basis for development of Health and Safety guidelines for Indian offshore wind.

Permitting procedures for offshore wind - MEMO

Confidential

Subject:	Permitting procedures for offshore wind	
Date:	01 December 2017	
Version:	Final version	
To:	Per Vølund	
CC:	Gabriel Zeitouni	
From:	S. Tiedemann	
Reviewed:	A. Ritzen	15.11.2017
Revised:	S. Tiedemann according to comments by Per Vølund	24.11.2017
Revised:	H. van Steen according to request from Per Vølund	01.12.2017
Number of pages:	7	

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1 Introduction

The global offshore industry is maturing and costs decrease. Auctions induce competition between market players, leading to breath-taking results: Successful project developers of the German auction in May 2017 will build offshore wind parks without receiving a subsidy by 2024/25. In December 2017, the Netherlands will invite project developers to submit bids that will not receive any public support but just the construction and production licences on commercial terms.

To benefit from decreasing cost and attract investment, countries that do not yet have experience with offshore wind development need to have reliable, well-structured, risk minimalizing permitting procedures in place. This is particularly true if a country opts for auctions as a mean to select private developers and to set the offtake price for the produced electricity.

In India, offshore wind is still at is infancy, both from a technological point of view and in terms of capacities of relevant stakeholders. This opens the unique opportunity to establish best practice procedures that are investor friendly and at the same time take political preferences into account. This memo therefore introduces the reader to lessons learnt from the European experiences with respect to permitting procedures.

The memo is structured as follows: First, the memo locates the permitting process in the general project planning. Second, it describes the permitting process in greater detail. Third, it outlines roles and responsibilities of three stakeholder groups, the government, the grid operator, and private developers. Fourth, the memo discusses the interaction between permitting and auction design.

2 Permitting as part of the project planning

Permitting often takes its origins in long-term national deployment **targets** for offshore wind. Policy makers translate these targets into short- to medium-term **roadmaps**. Such roadmaps increase certainty for investors and can thus trigger private project planning. To do so, they need to be reliable and in line with other policies such as electrification, decarbonisation, and local industry development. Furthermore, they should be accompanied by adequate financial incentives and a preferential regulatory framework. The more reliable and credible the roadmap, i.e. in form of a binding **national energy strategy**, the higher the likelihood of triggering interest and building a sustainable market.

From a private perspective, the project planning starts with **site development.** It is a costly and lengthy process (up to 10 years) and involves the steps of zone identification, site selection, site investigation, permitting, and construction (see figure 1). The following describes these steps in greater detail.

Zone identification and site selection aims to identify areas to be investigated in greater detail. To do so, enabling parameters as well as major restrictions need to be considered. Enabling parameters are the quality of the wind resource (determining the amount of production), the distance to shore and the accessibility due to weather conditions (determining the cost of construction, operation, and maintenance), the water depth (determining the construction cost). Restrictions exist with respect to usage conflicts e.g. with fishery, shipping routes, military zones, and environmental protection zones but also with respect to e.g. grid connection and ground conditions.

To come up with suitable sites, three approaches exist in Europe, an open-door, a zoning, and a site-specific approach[1]. Under an **open-door approach** the private developer chooses a specific site. Under a **zoning approach** the responsible authority designates a larger area for offshore wind development in which private developers are free to choose a site. Under a **site-specific approach** the government finds and designates a specific area.

The open-door and zoning approach leave more flexibility to the private developer yet they also bear the risk of project failure. Site-specific approaches reduce such risk for private investors but also require sufficient capabilities on the side of the responsible authority. The open-door approach becomes less and less common. A zoning approach is still prevalent in the UK and in countries with immature markets such as China. Germany, Denmark and the Netherlands moved to site-specific schemes[2]. They will be described in greater detail below.

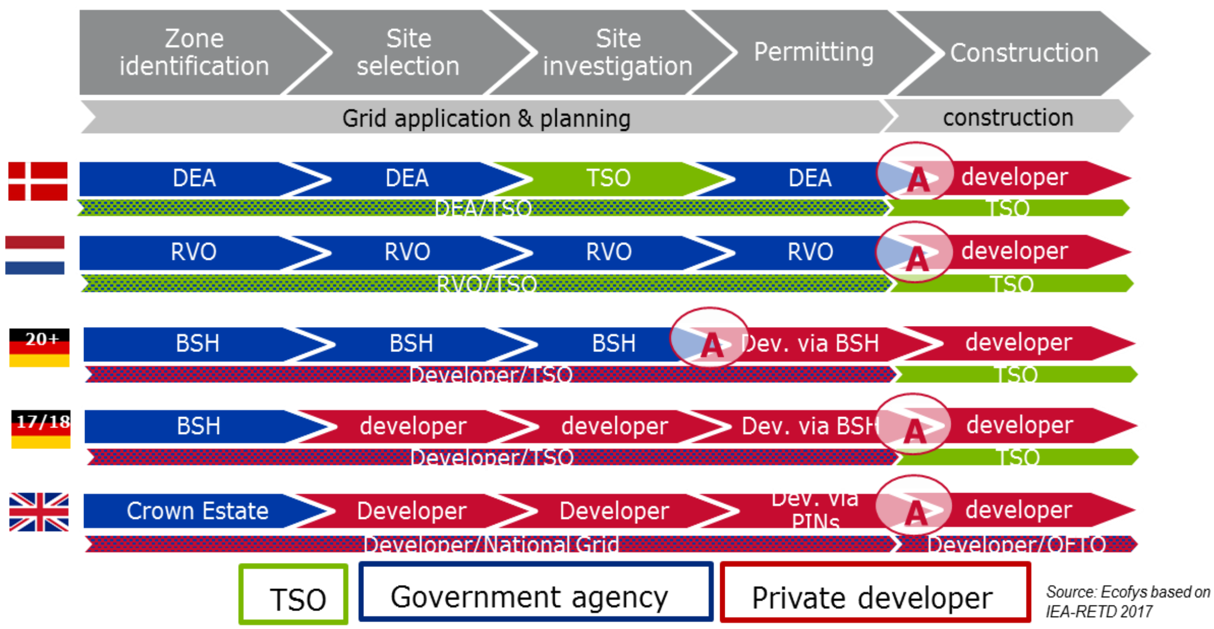

Figure 1: Permitting stages, responsibilities and timing of the auction; abbreviations: Danish Energy Agency (DEA), Transmission System Operator (TSO), Netherlands Enterprise Agency (RVO), Federal Maritime and Hydrographic Agency of Germany (BSH), Offshore Transmission Owner (OFTO), Planning Inspectorate (PINS)

During **site investigation**, the responsible party tries to gather as adequate information as possible. The better the information, the lower the risk and therefore the lower the capital cost. The information can also be used in the **permitting process** which only starts if a site is deemed technically and economically viable. Once the permitting process is finished, the developer can start the **construction** of the offshore

[1] IEA RETD TCP (2017), Comparative Analysis of International Offshore Wind Energy Development (REWind Offshore), IEA Renewable Energy Technology Deployment Technology Collaboration Programme (IEA RETD TCP), Utrecht, 2017, p. 22ff

[2] IEA RETD TCP (2017), Comparative Analysis of International Offshore Wind Energy Development (REWind Offshore), IEA Renewable Energy Technology Deployment Technology Collaboration Programme (IEA RETD TCP), Utrecht, 2017, p. 22ff

wind farm. During the investigation of the site conditions, **grid planning and development** starts simultaneously (see also Figure 1).

The following paragraphs outline the permitting process in greater detail.

3 Permitting process

The permitting procedure takes time, involves many actors, and is (therefore) costly. It starts with the formal opening of the procedure (i.e. by public announcement). The party seeking approval collects preliminary documents and sends the documents to the relevant authorities. It is good practice to display the documents for public consultation, conduct hearings in which potentially conflicting interests are identified, and decide on the required scope and level of depth of the main investigations, particularly of the environmental impact assessment.

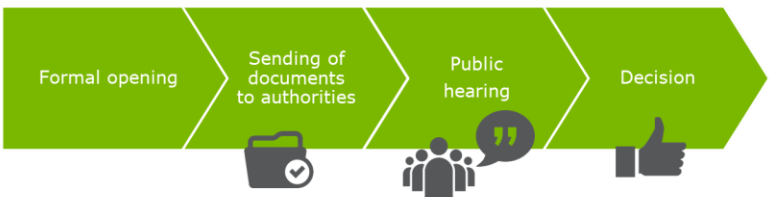

Figure 2: The offshore wind permitting process

The responsible party conducts those studies that are required to comply with the agreed scope. After receiving the results, an additional public hearing can be conducted to allow all involved parties including the public to raise concerns. Depending on the institutional set-up, a public authority may act as mediating partner between conflicting interests. Finally, the responsible authority issues the permit.

A permit indicates at least the design of the wind farm, specific requirements to which the project developer must comply to, a construction schedule, if necessary compensatory measures for nature conservation or compensatory payments to affected stakeholders, security measures, financial securities for decommissioning, and general standards to which the project developer must comply to. When the design changes after the permit has been awarded, the developer may be required to request approval from the responsible authority or – for major changes – may be required to repeat parts of the permitting process.

The permitting authority also follows up on the permit implementation. The authority clears the project before the construction starts. At the clearing, the authority checks if the project developer complies with the permit's requirements. During construction, the project developer may be required to submit construction protocols on a regular basis to prove compliance with standards and requirements of the permit.

In recent years, several countries e.g. Denmark are establishing **one-stop-shops,** i.e. a single point of contact between private developers and public authorities. The one-stop-shop can either only be the central gathering point for all relevant information or be the authority actively supporting or even conducting the permitting. A one-stop-shop helps to speed up the planning process. It thereby reduces cost and overcomes problems of unclear or overlaying responsibilities between public authorities.

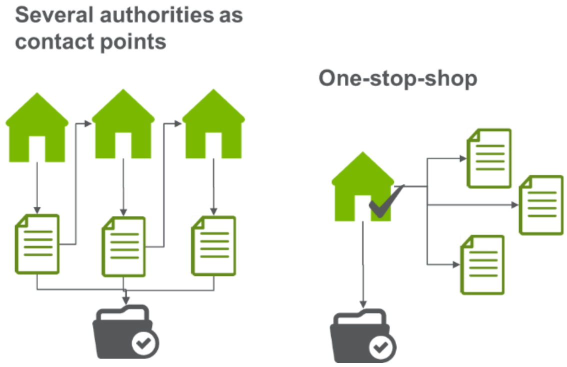

Figure 3 A one-stop-shop for permitting procedures helps to speed up the planning process and reduce costs.

As for the permit itself, the European Union[3] outlines a framework that indicates the permit's elements yet the detailed procedural steps and standards differ between countries, increasing transaction costs and reducing synergies. In general, countries define standards on soil investigations, the construction and commissioning of turbines, eligible materials and best-practices against corrosion (including environmental standards for the use of paints), standards for safety during construction and operation, requirements for labelling, lights, radar and automatic identification systems, compatibility with shipping, noise minimisation during construction and operation.

4 Roles and responsibilities of stakeholders

Policy makers and governmental agencies, grid operators, and the private developers are the three principle stakeholder groups in project development. European member states divided responsibilities between the three main stakeholder groups differently. Three major approaches exist, a so-called central, decentral, and hybrid approach[4].

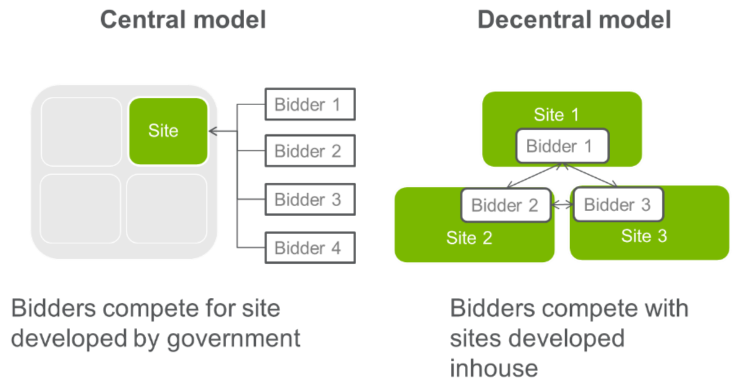

Figure 4 Different approaches to offshore wind permitting

[3] Strategic Environmental Assessment directive 2001/42/EC, the Environmental Impact Assessment directive 2011/92/EU, Habitats Directive 92/43/EEC, Birds Directive 2009/147/EC, Marine Strategy Framework

[4] IEA RETD TCP (2017), Comparative Analysis of International Offshore Wind Energy Development (REWind Offshore), IEA Renewable Energy Technology Deployment Technology Collaboration Programme (IEA RETD TCP), Utrecht, 2017.

4.1 Central model

In the **central model,** the government or a governmental agency is responsible for the first stages of project planning. The government identifies suitable areas for offshore development, selects sites, and conducts preliminary site-investigations. The central authority is in control and can coordinate the initial stages, including finding solutions for conflicting interests. Cost for private offshore development can decrease as the government bears the finical risk from projects failing at an early stage. At the same time, the government needs to have or need to contract the required technical expertise. Furthermore, there is no competition for cost reduction and most promising concepts at the early stages.

In 2013, the Netherlands opted for a central development which is applied since the Borselle auction in July 2016. The government selects sites and obtains the required permits. The grid operator is responsible for grid planning and development. The private developer can acquire the permits and development rights in a competitive auction and is only responsible for the detailed technical planning and project development once all permits and the grid connection is secured.

4.2 Decentral model

In the **decentral model**, the private project developer takes responsibility for most of the planning stages including site selection, investigation, permitting, and – depending on the regulatory framework – sometimes even the grid development. The government is only involved as a counterparty to the private developer, i.e. to negotiate terms for the usage of public land (often the case in maritime environments) or in the permitting process. Private developers can exercise their full technical know-how and experience and thereby benefit from competitive advantages. At the same time, they must bear the risk of failing projects which can increase cost.

The UK have opted for a decentral model. The private developer is responsible for selecting and investigating sites and push the permitting process forward. The UK is also a special case as project developers play an important role in grid development. Until 2009, the offshore grid connections were constructed and owned by offshore project developers and then sold to wind farm operators after construction. Because of unbundling requirements, since 2009, offshore transmission assets are auctioned-off in tendering process and transferred to a third party (so-called Offshore Transmission owners (OFTO)). In the current setting, offshore project developers can decide whether they build the offshore grid connection by themselves or if a OFTO takes over construction. OFTOs receive a transmission tariff that is charged per megawatt hour from the wind farm operators to regain the costs of investment. Hence, in the UK model, the private developer needs to price in the cost for the grid connection. The organisational setting applied in the UK is cost effective on a case-by-case basis but does not support coordination between different projects. Larger offshore wind projects located at increasing distances from shore, may require better coordination in the development of transmission infrastructure. The British regulator Ofgem is working on measures to improve coordination between OFTOs while preserving the competitive character of the offshore transmission regime[5].

4.3 Hybrid model

A **hybrid model** combines the central and decentral model. The government is responsible for some of the early development phases and the grid operator often plans and constructs the grid. The private developer takes over the costly parts of the project planning stages requiring significant technical know-how. The developer also needs to conduct or contract the required detailed investigation during the permitting process. Germany and France apply hybrid schemes. Germany will move to a central model in the early 2020th. Compared to the Danish and Dutch model, developers in Germany will remain responsible for a greater part of the permitting process after being successful in the auction.

5 Interaction between permitting procedures and auctions

As mentioned above, auctions are a mean to select the private parties that are eligible for financial support by the government, or receive a construction and production licence as well as a price for the produced electricity in form of a power purchase agreement (PPA). Auctions and the permitting process interact in two major ways: first with respect to the “timing of the auction”, i.e. at which time during the project planning the auction takes place, and second with respect to the commissioning after the auction.

The **timing of auction** (see (A) in Figure 1) influences the risk allocation between private developer and the public: Before the auction, the project developer invests without knowing if he will be awarded or not. Furthermore, the conditions of the PPA or the level of support are unknown. An auction should therefore take place as early as possible to provide the necessary level of security to justify conducting more costly parts of the site investigation and technical planning.

At the same time, bidders will not be able to submit reasonable bids before conducting investigations in the quality of the site. Particularly, they will not be willing to submit bids if they are not sure if they can secure a permit after winning the auction. Practical experience and theoretical models show that it is in the interest of the private developer to conduct at least the most relevant studies with respect to the economics of the project before the auction. Also, they need to be sure that they can secure a permit.

Furthermore, the earlier the auction, the longer the commissioning period after the auction. If the commissioning period is long, financial close takes place far into the future (>5 years). Hence, private developers face important uncertainty about the development of capital and turbine cost as well as on the development of revenue streams (e.g. the electricity price). This increases the speculative elements of a bid and thereby the risk of a winner’s curse. The winner’s curse is defined as the risk of being awarded, i.e. being the winner, at a price at which it is not possible to realise the project without making

[5] Schittekatte, T. (2016). UK vs DE: two different songs for transporting energy to shore, published at Florence School of Regulation; Pwc (2017). Unlocking Europe’s offshore wind potential

losses. All factors taken together, almost all countries opted for auctions that happen only after significant parts of the permitting procedure took place (see Figure 1).

After the project is awarded in an auction, the project needs to be commissioned in a timely manner. If the permit is not required before the auction, the project often takes longer for being commissioned. Furthermore, the permit or the PPA as such may outline milestones which the successful bidder needs to comply with.

6 Conclusion

The permitting process is a central part of the project planning. If well-structured and reliable, it can significantly speed up the process, reduce risk, and thereby attract private investment at lower cost for the public.

While the required steps are similar, countries opted for different allocation of responsibilities between private developers, the government, and grid operators. Countries with less mature markets often leave technical planning and site investigations to private developers whereas the government provides a clear and reliable framework. Governments can play a central role in de-risking the process by taking over central parts of the planning process. This comes with the caveat of reducing competition for price and innovative solutions yet it can significantly reduce cost as seen in Europe. The introduction of a one-stop-shop as a central focus point for information or for the permitting process can significantly ease the permitting process.

Auctions are increasingly common to select which private developer is eligible for construction and production and under which conditions. They increase the risk of not being awarded and may create a barrier to undertake costly parts of the project planning. Auctions have two major interactions with the permitting process, regarding the timing of the auction and regarding the commissioning after being awarded. As for the timing, all countries opted to have the auction only after significant parts of the permitting are conducted. As for the commissioning, the permitting process may define milestones and deadlines for realisation after the auction.

Project certification requirements for offshore wind - MEMO

Confidential

Subject:	Project certification requirements for offshore wind	
Date:	01 December 2017	
Version:	1.0 final	
To:	Per Vølund	
CC:	Gabriel Zeitouni	
From:	B. Prinsen	
Reviewed:	H. van Steen	01.12.2017
Number of pages:	7	

Table of contents

1 Introduction

A project certification process for Renewable Energy (RE) technology is a good way to provide evidence to stakeholders (financiers, partners, utility companies, insurance companies etc.) that a set of requirements laid down in standards are met during design and construction, and maintained during operation of a RE generation plant.

Project certification becomes increasingly important when the environmental circumstances are challenging. Like offshore on the European North Sea with high wind and waves as in the Indian Gulf of Khambhat, where India's first offshore wind farm is planned, with similar metocean conditions and the additional extreme temperatures and air (e.g. dust) conditions. As in Europe, India will have to incorporate offshore wind project certification requirements into the legal framework to ensure that strict norms and standards are uphold, through independent evaluation, of the wind farm design. This memo therefore introduces the reader to lessons learnt from the European experiences with respect to project certification requirements and process.

The memo is structured as follows: First, the memo highlights the project certification requirements in the Dutch legal framework (like the Danish framework) as a case study. Second, it describes various independent accredited certification bodies and how to best interact with them. Third, it outlines the offshore wind farm design basis, certification statements and applicable norms. Lastly, this memo provides a description of the project certification process and it finishes with a conclusion and recommendation.

2 Legal Framework - the Dutch case

Each country will have its own specific legal framework, which may include project certification requirements. This section highlights the elements from the legal framework in the Netherlands that contain requirements for project certification.

All project certification requirements are contained in the Dutch Water Decree. Appendix I contains a broader overview of the legal framework for offshore wind farm developments in the Netherlands. For further reading on the legal framework we refer to chapter five of the Project and Site Description. Appendix II contains relevant explanatory notes to 6.16d and 6.16g of the Water Decree.

2.1 Requirement prior to construction (Article 6.16d)

The operator announces its intention to set up or change a wind farm at least eight weeks before the start of the construction period to the Minister and provide the following information:… a statement by an independent expert that the design of wind turbines and other wind farm components meet the requirements in article 6.16g §1 of the Water Decree.

2.2 Requirement prior to commissioning (Article 6.16g)

1. Wind farm components are strong enough to withstand the anticipated forces from wind, wave, current and operations.
2. The operator shall provide the Minister with a statement that the design and construction of wind turbines and other wind farm components satisfy the requirements from §1, at least four weeks prior to commissioning of the wind farm.
3. Such a statement has to be provided by an independent expert who will test the design against a set of standards which are in line with best industry practice.
4. Rules may be set by ministerial regulation on the content of such a statement.

3 Accredited Certification Bodies

The certification body for the certification of offshore projects shall be accredited[6] in accordance with ISO/IEC 17065 "Conformity assessment – Requirements for bodies certifying products, processes and services". A certification body can be accredited for specific services according to the applicable standards. For offshore wind projects, the certification body shall be accredited according to IEC 61400-22, "Wind turbines – conformity testing and certification". This IEC 61400-22 standard refers to several other standards including IEC 61400-3 "Wind turbine - Design requirements for offshore wind turbines". 61400-3 is named in 61400-22 to exist both as IEC and as EN document, where IEC is the international standard and EN the European standard.

The list of known accredited companies accredited in accordance with ISO/IEC 17065 for services in accordance with IEC 61400-22 is as follows:

- DNV-GL
- SGS
- TÜV SÛD
- ABS Consulting
- Bureau Veritas

DNV-GL has developed as Service Specification "DNVGL-SE-0073", defining how Project certification of wind farms are conducted according to IEC 61400-22. The other companies normally define the certification process in their offers and tailored to the requirements from the project developer.

3.1 Suggestions on how to interact with your certification body

The certification body is an independent company that needs to be objective and cannot be influenced by incentives or penalties. However, there are certain points of attention that could certainly optimise the cooperation between developer, certifier and contractor:

1. Involve the certifier in an early stage (i.e. at initial design stages);
2. Ensure that the (contractor's) design firm is experienced in offshore wind; and

6 The Dutch Accreditation Council (https://www.rva.nl/en) has been evaluated and authorized by the European Accreditation organisation (EA) as the national accreditation body in the Netherlands.

3. Provide certifier design briefs for review and commenting, to avoid lengthy discussions during detailed design.

4 Design Basis

The design basis for the WTG and its foundation is typically structured as follows:

- Design Basis – Part A: General requirements
  - In this section, the site conditions are documented.
- Design Basis – Part B: Wind turbine specific requirements
  - In this section, the specifications related to foundation design are documented.
- Design Basis – Part C: Structure specific requirements based on part A and part B
  - In this section, the structural requirements are documented.

The certifying body defines the content which is required for each of the design bases, and it is the task of the developer (part A), WTG supplier (part B) and designer (part C) to produce the content. The certification body shall review and give final approval when accepted. There are no known restrictions to who can define and issue the 3 parts of the design basis. In practise, it might be quite difficult for other companies than the wind turbine manufacturer to define Design Basis Part B. It could also create some difficulties with the certification body if Design Basis Part C is not defined and issued by a company which is highly involved in the detailed design of the foundations.

5 Certificates and Conformity Statements

The project developer and certification body agree on a list of documents which the certification body reviews and comments on, which is formalised in a certificate or conformity statement issued by the certification body.

6 Applicable Norm

International Standard IEC 61400-22, which has been prepared by IEC technical committee 88: Wind turbines. It defines rules and procedures for a certification system for wind turbines (WT) that comprises both type certification[7] and certification of wind turbine projects installed on land or off-shore. This system specifies rules for procedures and management for carrying out conformity evaluation of wind turbines and wind farms, with respect to specific standards and other technical requirements, relating to safety, reliability, performance, testing and interaction with electrical power networks. Full access can be purchased in the online IEC store.

7 Project Certification Process

Project certification includes the following steps:

1. Design basis
2. Design evaluation
3. Manufacturing surveillance
4. Transport and Installation surveillance

[7] On national level type certifications are not always a strict requirement from the legal framework. However, as part of best practice, DNVGL-SE-0073 (page 27) states the requirement of a type certificate of the WTG during project certification.

5. Commissioning surveillance
6. Final evaluation

The first two project certification steps are always conducted by one of the accredited certification bodies.

For step 3 most projects use either internal or external resources for welding and coating inspection during manufacturing as an alternative to a certification body. In case the certification body is asked to conduct manufacturing surveillance they mainly focus on certificates, and documentation and only by short visits for spot checks. To ensure quality at all steps of the manufacturing the project owners normally have full time inspectors at most factories to capture and report on any problems.

For step 4 and 5 the project owner will normally contract a Marine Warranty Surveyor representing the insurance company.

8 Conclusion and Recommendation

Based on our knowledge of the Dutch best practice and the interpretation of the legal requirements from the Dutch Water Decree, we conclude that at a minimum the i) Design basis and ii) the Design will have to be certified by an accredited body. However, it remains possible that the manufacturing surveillance (certification step 3) would also have to be evaluated by an accredited body, depending on the local legal framework and interpretation by the competent authority. Therefore, it will always be important to establish a good working relationship and alignment on process, milestones and compliancy requirements between developer and competent authority.

To our knowledge offshore wind projects have so far only been evaluated by an accredited body up to and including the third certification step. The first two steps have been a prerequisite to receive subsidy and a building permit, whereas the third certification step was solely executed to satisfy lenders' and insurers' requirements.

Appendix I: The Dutch legal framework in more detail

Laws and Regulations	Main authorities
The Offshore Wind Energy Act	Ministry of Economic Affairs (EA)
National Water Plan & Water Decree	Ministry of Infrastructure and Environment (I&E) in accordance with the Ministry of EA
Wind Farm Site Decision	Ministry of EA in accordance with the Ministry of I&E
Ministerial Order for Offshore Wind Energy 2015	Ministry of EA in accordance with the Ministry of Finance

The Offshore Wind Energy Act (Wet Windenergie op Zee)

The Offshore Wind Energy Act was established in order to provide a solid legal framework for the development of offshore wind energy and is structure as follows:

- The National Water Plan (Nationaal Waterplan) designates areas for offshore wind energy, the Water Decree regulates certain aspects from the national water plan;
- Wind Farm Site Decisions (Kavelbesluiten) designate where the wind farms will be built and under what conditions they can be constructed and operated; and
- The Ministerial Order for Offshore Wind Energy 2015 sets out the SDE+ tender scheme to provide subsidy and a permit to develop an offshore wind farm.

Nb. The Offshore Wind Energy Act is currently under review to facilitate the changes in future offshore wind tenders.

Water Decree

The Water Decree Art. 6.5 states that no Water Permit is needed for an offshore wind farm where the Offshore Wind Energy Act applies. Instead, the Water Decree has a special section for the operation of wind farms including environmental and safety provisions (art. 6.16a-6.16l Water Decree). Furthermore, Article 6.16g prescribes the details of the project certification requirements.

Wind Farm Site Decision (Kavelbesluit)

The Offshore Wind Energy Act creates the possibility to include exemptions for different environmental laws (Nature Conservation Act and Flora and Fauna Act) in the Wind Farm Site Decision. This means that traditional environmental permits are no longer required, as long as the developer proves that it complies with the Wind Farm Site Decision. The Decisions are very similar and contain among others:

- Location of the wind farms and the offshore grid connection platforms;
- Conditions for the operation of the wind farm; and
- Exemption for the Nature Conservation Act and Flora and Fauna Act.

Ministerial Order for Offshore Wind Energy 2015 (Regeling windenergie op zee 2015)

The SDE+ subsidy tender is mainly regulated by the Ministerial Order for Offshore Wind Energy 2015, which establishes the conditions for handing a subsidy application. Within the subsidy procedure, additional documents containing information about the project site, can be found on a dedicated website provided by the Dutch Enterprise Agency: http://offshorewind.rvo.nl/

Nb. The tender for Sites I and II of the Hollandse Kust (Zuid) Wind Farm Zone is scheduled to open in Q4 2017, initially with a procedure without subsidies.

Appendix II: Explanatory notes to 6.16d and 6.16g of the Dutch Water Decree

Article 6.16d
Pursuant to the first section, paragraph c, the operator will provide a declaration of an independent expert on the design of the wind turbines. This concerns for example a certificate for the design of the wind turbine and transformer station, including mast construction and foundation. The certificate must show that the design of the turbines and the substation meets the requirements laid down in Article 6.16g , first paragraph, on the technical integrity of the wind turbines and other installations.
…

Article 6.16g
A wind turbine must be designed and constructed in such a way that the anticipated forces and tensions during operation are incorporated in the construction design without any objections, in accordance with the locally occurring forces of nature elements.

The technical integrity of the wind farm must be assessed by an independent expert. The operator shall submit a declaration from the expert to the Minister. The statement of the expert will be based on research during the design phase. In the design, the safety-critical elements are determined as the length of the piles as well as the thickness and the quality of the steel used, the location-specific detailed design of the turbine towers. The declaration of the independent expert indicates whether the wind turbines and other installations are built to the previously determined design criteria. The independent expert will base his assessment on prevailing international standards, such as EN 61400-3, and other, normally internally set, quality criteria.

It should be noted that the declaration of the independent expert for the Minister is not binding. The Minister will assess the submitted documents; while the conclusion of the Minister may differ from the opinion of the expert. This can happen on substantive grounds but also in case there are doubts of the actual level of independence and expertise of the person who issued the statement. The operator is responsible to make its own judgement on the independence of the expert. It goes without saying that the expert in question should not be in a dependent relationship with respect to the operator, in order to avoid any doubt on bias or favouritism.

In addition, the independent expert should be able to demonstrate that he has a set of proven industry practice standards, which are incorporated in its quality system. The independent expert will be an international classification body. Several classification bodies have already drawn up their own quality criteria for assessing the technical integrity of wind turbines.

Health and Safety guidelines for offshore wind - MEMO

Confidential

Subject:	Health and Safety guidelines for offshore wind
Date:	01 December 2017
Version:	1.0 – final
To:	Per Vølund
CC:	Gabriel Zeitouni
From:	H. Schult and B. Vree
Reviewed:	H. van Steen 17.11.2017
Revised:	H. van Steen according to comments by Per Vølund 01.12.2017
Number of pages:	12

Table of Contents

1 Introduction

Since the start of offshore wind in Europe, the industry sector had to deal with various health and safety challenges. The supply chain of the offshore wind industry: manufacturing, siting, transport, construction and maintenance is different from those of other industries in each step. Challenges in manufacturing and transport arise from the enormous weight and size of the different components. During siting, transport and construction, the remote location of the sites at open sea with extreme and rapidly changing weather conditions is the main difference to other industries. The enormity of the plants and the unique environmental conditions on the one hand and the recent formation of the offshore wind industry on the other hand are among the reasons for the ongoing development of specific health and safety guidelines for the offshore wind sector.

Offshore wind farm construction and operations pose significant health and safety risks for (contractor) personnel and should always be handled with great care to create a safe working environment. This memo therefore introduces the reader to lessons learnt from the European experiences with respect to offshore wind health and safety risks, national and international guidelines to mitigate such risks and key best practice procedures for a typical offshore wind farm project. The information in this document is intended to provide first guidance. The First Offshore Wind Project of India (FOWPI) initiative should include an experienced health and safety manager/coordinator at an early stage in the tender process to ensure the right level of health and safety requirements for tenderers.

The memo is based on a literature study and practical experience with offshore wind and safety guidelines and structured as follows: First, the memo highlights the most important offshore wind health and safety risks. Second, it describes various (inter)national guidelines. Third, it describes how health and safety guidelines are translated in concrete procedures for risk mitigation in offshore wind projects. Fourth, this memo finishes with a conclusion and recommendation for FOWPI.

2 Health and Safety Risks

To allow for a systematic assessment and handling, dangerous tasks are associated with the potential hazards that might occur during the project work. A hazard is a situation or an activity with the potential to harm people, environment or property. With regard to offshore wind projects, the most relevant hazards are listed in Table 1.

Table 1: Hazards and dangerous activities in offshore wind projects

Hazards	Activities & Operations
Access and egress	Aviation
Confined spaces	Cable laying and entry
Electricity	Lifting
Ergonomics	Marine co-ordination
Fire	Navigation
Geological unknowns	Piling and grouting
Hazardous substances	Ports and mobilisation
Weather and sea-conditions	Remote working
Noise	Subsea operations
Unexploded ordnance	Vessel operations
Vibration	Waste and spillage management
Height	

Risk is the measure for the likelihood of a hazard - an event that might led to harm and loss of people, plant, the environment or the project itself. Risks are typically assessed in two dimensions: first, the probability of occurrence and second the severity of the associated hazard. The severity is a measure for the harm that could be caused by an incident. The probability quantifies the likelihood of an incident of the associated hazard. Risk assessment requires the awareness of all possible events and the detailed knowledge of each step of a task. The result of the risk assessment are usually three risk categories: low, medium and high. A low risk, on the one hand, does not require immediate action. A high risk, on the other hand, should not be accepted by the employer but result in the implementation of an alternative method. As a result, risk assessment is an instrument that helps to identify hazards and indicates how to deal with those. An exemplary Task Risk Assessment Template is attached in Appendix A.

3 Health and Safety Guidelines

Health and safety guidelines help employers to mitigate risks. Those guidelines are usually formulated by national or international institutions or by industry associations and affiliated companies. Some countries provide highly detailed health and safety guidelines, whilst others establish basic standards in legislation leaving the responsibility for their formulation to the industry sector or to single companies. Disregarding differences in national practices, 'no incidents and injuries' has become the rule that overlays each particular guideline in the offshore wind energy sector.

3.1 International guidance

The following table provides an overview of International organisations that provide Health and Safety guidelines for the offshore wind sector. It includes links to the most relevant online resources.

Table 2 Overview of international guidance on Health and Safety in offshore wind

Organisation	Description	Online resources
The Energy Institute	The Energy Institute does not work on health and safety guidelines itself but provides an extensive database of all kinds of resources in the field of health and safety in offshore wind projects. The institute is based in the UK and collaborates with The Crown Estate.	The offshore wind collection provides more than 100 guidance documents.
European Agency for Safety and Health at Work (EU-OSHA)	EU-OSHA is the European Union information agency for occupational safety and health. Our work contributes to the European Commission's Strategic Framework for Safety and Health at work 2014-2020 and other relevant EU strategies and programmes, such as Europe 2020 .	EU-OSHA has published a number of reports including guidelines for the wind sector, including: • E-fact 79: Occupational safety and health in the wind energy sector • Occupational safety and health in the wind energy sector • E-Fact 80: Hazard Identification Checklist: Occupational Safety and Health (OSH) risks in the wind energy sector
Global Offshore Wind Health and Safety Organisation (G+)	(G+) is an international association based in the United Kingdom (UK) with the aim of creating and delivering world class health and safety guidelines for the offshore wind industry. The association has 11 members which are all European utilities. So far, G+ has published two good health and safety guidelines, one for working at height and a second one for the safe management of small service vessels.	The G+ has developed two good practice guidelines, and has published these through the Energy Institute in November 2014. These guidelines provide recommendations for working at height in the offshore wind industry, and the management of small service vessels.
International Finance Corporation (IFC) – part of the World Bank Group	IFC, a member of the World Bank Group, is the largest global development institution focused exclusively on the private sector in developing countries.	The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. This document should be used together with the relevant Wind Industry Sector Guidelines
International Marine Contractors Association (IMCA)	An influential trade association with more than 900 members from the offshore marine construction industry worldwide. The organisation provides one of the most extensive collections of health and safety guidelines for offshore projects in general, including offshore wind but also offshore oil and gas projects.	HSSE Guidance and Technical Reports can be obtained from the IMCA website.

Organisation	Description	Online resources
WindEurope	Formerly known as the European Wind Energy Association), which actively promotes wind power in Europe and worldwide. It has over 450 members, active in over 40 countries.	WindEurope has a Health and Safety Working Group which aims to promote and share H&S activities, best practices and lessons learned. They occasionally publish guidelines e.g. on emergency arrangements including first aid

3.2 National guidance

International harmonisation of guidelines is a relatively recent development. Many developers still consider national guidance to be leading. The following sections provide an overview of guidance from national institutions.

3.2.1 United Kingdom

The most common collection of health and safety guidelines in the UK is conducted by RenewableUK. The renewable energy trade organisation develops health and safety guidelines for the offshore wind energy sector and has currently about 430 members from associated industries, which are onshore wind, offshore wind as well as wave & tidal energy. The objective of RenewableUK's Health & Safety Working Group is a renewables sector free of fatalities, injuries and work-related ill-health. The Health & Safety Strategy 2016-2018 supports an overall improvement in the health and safety performance of the sector and addresses complex or contentious issues that are unique or have a particular sector specific dimension. Guidelines for offshore wind projects provided include: risk management, emergency response & preparedness, work at height, lifting operations, etc.

3.2.2 Germany

In Germany, most of the responsibility for establishing and implementing specific health and safety guidelines is left to companies. The applicable regulatory framework is the Safety and Health at Work Act (Arbeitsschutzgesetz - ArbSchG) which defines basic rules and standards without being particular on offshore wind. The act obliges the employer to organise and implement a functioning safety concept and only provides few and generic health and safety guidelines. The established safety concept must be internally documented, monitored and should lead to an improvement of the health and safety situation. To achieve this, the creation of an occupational safety committee within the company and the provision of personnel and equipment is required. To assure companies' compliance with the legislative requirements, federal state agencies and accident insurer are commissioned for both, external monitoring and advisory services.

Furthermore, the Occupational Physicians, Safety Engineers and Other Occupational Safety Specialists (Arbeitssicherheitsgesetz - ASiG) act, requires the employer to appoint company doctors and occupational safety specialists. These support occupational health, safety and accident prevention and cooperate with health and safety authorities. To improve the internal coordination of occupational health and safety, professional companies with more than 20 employees must form a safety committee, which should meet at least once every three months.

3.2.3 Denmark

In Denmark, an approach similar to the German one is pursued. The Offshore Safety Act provides basic standards and obliges offshore operating companies to implement an own safety concept as well as organizational measures for occupational safety. Other than in Germany, the act is focused on occupational health and safety for offshore operations in specific. This approach allows to be more specific on basic standards and on the requirements to the safety concept. For example, the Danish Offshore Safety Act provides guidelines for risk assessment and mitigation, health and safety activities, emergency response, etc. The elaboration of detailed health and safety guidelines however is left to the companies.

For the internal organization of occupation safety, the Offshore Safety Act obliges companies to form an Accident Investigation Commission, an Emergency Preparedness Committee as well as an Offshore Safety Council, which consist of representatives of the social partners and various authorities. Members of safety committees maintain and improve the health and safety conditions on the installations and need to be trained by the employer.

Compliance with health and safety requirements is monitored by Danish Working Environment Authority (WEA), a government organization under the Danish Ministry of Employment in the field of occupational health. Inspections focus on the companies' own control of the risks through their management systems for health and safety and on the involvement of employees. The WEA participates in the International Regulators Forum (IRF) with regard to occupational health and safety.

3.2.4 The Netherlands

In the Netherlands, a lot of space is left to employers and employees in terms of occupational Health and Safety. Basic standards are described in law as in the German and Danish case. How these standards are compiled into a concrete safety concept is then left to the companies. Measures are typically recorded in a catalogue of labour.

The Netherlands Wind Energy Association (NWEA) provides an internet page for the Wind Energy Companies Health and Safety Catalogue, denoted Arbocatalogus. Therein, arrangements on health and safety guidelines between employees and employers are collected. The NWEA is an organisation for the onshore and offshore wind sector and supports policy change to optimise wind energy deployment. The association has about 300 members representing the entire supply chain of the wind sector.

3.3 Commonly used guidelines

Appendix B contains a list of each countries' health and safety guidelines with links to online resources with detailed information. Here we provide a brief description of the most common health and safety guideline categories:

- **Guidance on the investigation and reporting of incidents,** defines the procedures and formal requirements in a case of an incident. It includes recommendations on interviewing the personnel, inspecting the site and filing and managing the collected information. It also gives examples for an incident classification scheme and insurance reporting.
- **Marine roles for small workboats,** aims to provide guidance for the staff of the offshore wind industry operating on small workboats less than 200 gross tonnes. The guidance considers the special requirements and areas of competence of the operation of those small sized vessels. It needs to be understood as a framework which should be applied with regards to local requirements.
- **Risk assessment,** provides recommendations for the continuous mitigation and controlling of risks in the offshore work environment. It highlights the importance of communicating information about hazards to reduce injuries of workers or damages of the equipment. The assessment can be conducted via a written document or with the help of a toolbox meeting and covers a wide variety of areas within the offshore operation.
- **Safe lifting,** sets the guidelines for lifting jobs in the marine environment. As they are a crucial part of offshore operations the document lays out rules for equipment, maintenance and safe operation. Besides the theoretical background a safe proceeding also requires experience and practice.
- **Toolbox talks,** is a guideline that gives recommendations for the phase right before the actual job at the offshore wind park. A group talking with focus on the tasks of each team member maximizes the effectiveness and reduces the risk of accidents or delays during the operation. They can take place on a regular basis or at shift change at should follow the four basic requirements of timing, attendance, observation and knowledge.
- **Working at height,** is a guideline initially developed for the offshore oil and gas industry to reduce the number of work at height accidents. Besides the discussion of hazards and recommendations for works on a ladder, stinger or near an open hold, the specific aspects of working in the offshore wind industry were added in the guideline of the G+.

4 Health and Safety Procedures

An offshore wind farm developer, owner and/or operator should always implement a Health and Safety policy (or management system), including concrete working procedures to mitigate high risk activities in the field. Health and safety procedures are often the compilation of generic health and safety guidelines into concrete procedures on project level. Those procedures involve training and certification of employees and the establishment of standard operating procedures for the mitigation of identified risks. Factors of success in the evolution and implementation of health and safety procedures are transparency, communication, the involvement of workers and continuous efforts towards improvement.

A Health and Safety policy (or management system) can consist of several components such as requirements, instructions and procedures:

> **Requirements** can apply to certain training requirements of personal, personal protective equipment (PPE), vessels and helicopters. There are three different offshore training standards

originating from the shipping, oil and gas and offshore wind industries. Please refer to the outcomes of a Gap Analysis Offshore Training Standards (Ecofys by order of TenneT), which shows that the Global Wind Organisation (GWO) training is the most extensive in terms of duration, cost and validity. GWO training objectives are specified to the wind turbine environment, so not always applicable to / necessary for work on an offshore platform, where STCW (merchant navy) or OPITO (oil and gas industry) training might also be sufficient.

- **Instructions** can apply to working in certain areas such as the quayside, offshore (wind turbines and substations) or onshore (control buildings, contractor sites).
- **Procedures** help formalise a safety policy (or management system) to manage the significant risks (see Table 7) associated with an offshore wind farm environment. The most important and commonly used procedures for offshore wind farm projects are highlighted in this section.

Table 3: Typical high-risk activities in offshore wind projects that require clear working procedures

High risk activities
Working at height and rope access
Working in confined spaces
Working with electricity (low voltage and high voltage)
Hot work (welding, flame cutting, grinding etc.)
Heavy lifting (>500 KG) and odd size lifting onshore and offshore
People transfer at sea (vessel-to-vessel and vessel-to-structure)
Helicopter transfers and personnel winching operations
Jack up / DP (dynamic position) operations
Diving activities
Working during adverse weather conditions
Last minute changes in working methods

Please Note: *The generalised procedures in the following sections of this document are for information purposes only. Each wind farm owner should appoint a professional Health and Safety manager or coordinator to set-up a project specific Health and Safety policy or management system, including project specific procedures.*

4.1 Work plan

For every work activity in offshore wind farms a work plan, including a Work Method Statement and Task Risk Assessment, is typically required. The person (often a contractor) conducting the work is responsible to setup this document, which could be based on a template provided by the wind farm owner. After review and approval by the wind farm owner (or representative of the owner) a permit to work can be issued. Figure 1 provides an indication of the work planning process.

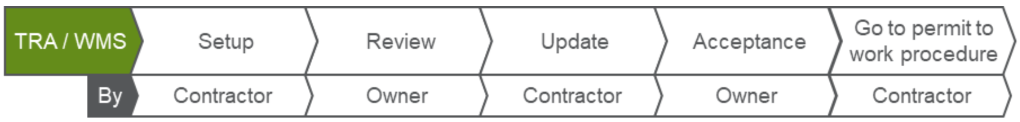

Figure 5: Flowchart of task risk assessment and work method statements

A work plan typically includes a description of the scope, organisation, planning, detailed description of activities and risk mitigation measures, specifically:

- Circumstances;
- Hazards;
- Risk descriptions;
- Pre-control risk assessment (probability, severity & risk);
- Method to mitigate, eliminate or reduce the risk;
- Post control risk assessment and residual risk (probability, severity & risk)

4.2 Permit to Work

A permit to work (and access the wind farm) is issued by the owner of the wind farm to control i) the type of work conducted when and where ii) who enters the wind farm (assets) iii) to inform others (other contractors, authorities etc.). A general procedure is provided in figure 2.

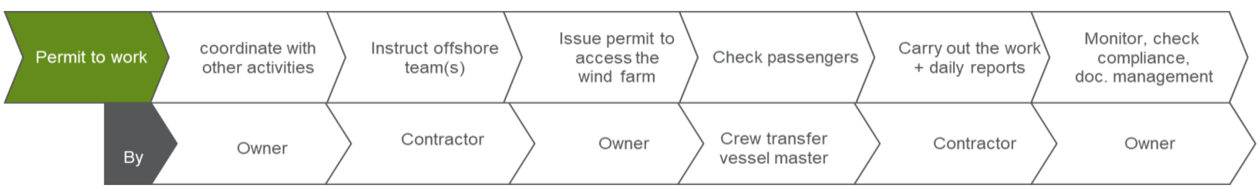

Figure 6: Flowchart of permit to work procedure

4.3 Management of Change

A management of chance (MoC) procedure can help to ensure that associated hazards and risks are properly identified and managed. The procedure should capture appropriate review, approval, implementation and tracking within the offshore wind farm project organisation.

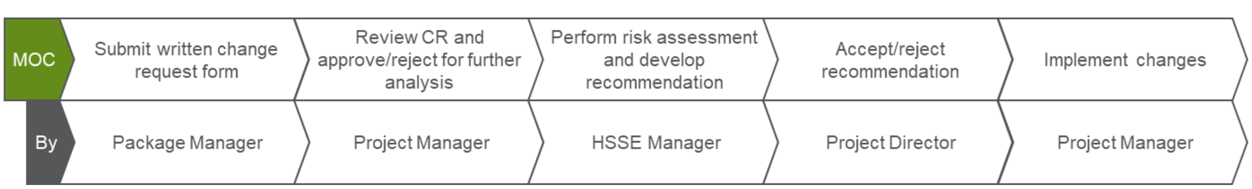

Figure 7: Flowchart of management of change procedure

4.4 Health and Safety reporting and performance improvement

If implemented properly Health and Safety reporting procedures will significantly improve the safety in the work environment. Often it is also a legal requirement, so good record keeping is important to remain compliant with local legislation. A Health and Safety report allows owners and authorities to identify where and how risks arise and whether they need to be investigated. It also allows HSE and local authorities to target their work and provide advice on how to avoid work-related incident and accidents. Information from such reports can be used as an aid to risk assessment, helping to develop solutions to potential risks. Records also help to prevent injuries and ill health, and control costs from accidental loss (www.hse.gov.uk).

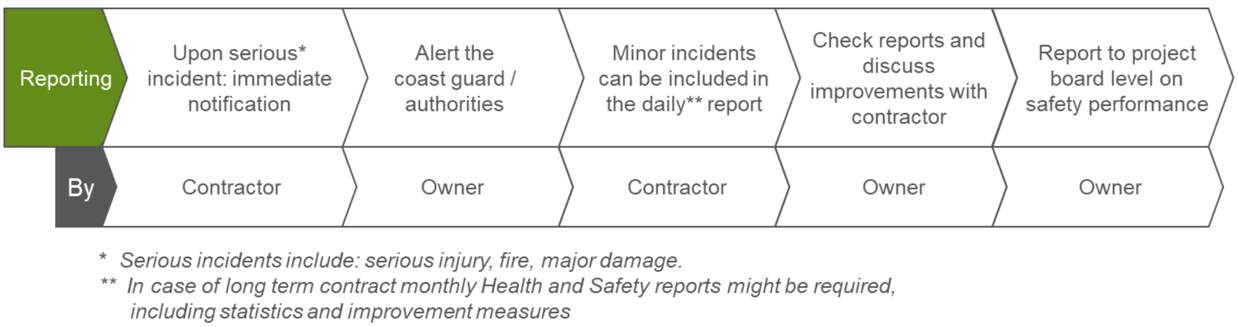

Figure 8 Flowchart of a generalised reporting procedure

4.5 Emergency response

The party conducting work activities, often contractors, should have in place their own emergency response procedure (ERP) to reflect the requirements of their scope of work and in line with their own organisation. However, they should always make sure to align this procedure with the relevant project specific emergency procedures. A general emergency response procedure is depicted in the flowchart in figure 5.

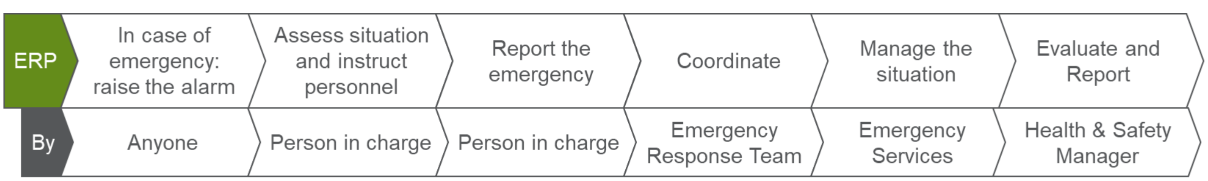

Figure 9 Flowchart of a generalised emergency response procedure

5 Conclusion and Recommendation

Europe is the world leader in offshore wind power, with the first offshore wind farm being installed in Denmark as early as 1991. In the early days, many standards and procedures were adopted from the Oil and Gas industry. For FOWPI this might also be a logical process, considering the highly mature oil and gas industry in the region. However, over the past 25 years the guidelines and procedures for offshore wind in Europe have become more tailor made to the wind industry, incorporating a quarter of a century of experience and lessons learned. It is recommended that these lessons are as much as possible incorporated in the first offshore wind project in India.

The first offshore wind project in India should have a clear Health and Safety policy statement in place. This statement should be drafted by local health and safety experts, with guidance and support from experienced European health and safety expert(s). It is important to incorporate clear health and safety requirements for contractors in the tender documents. Therefore, it is imperative that the right level of health and safety expertise is attracted to the project at an early stage in the tender process.

Appendix A: Example Task Risk Assessment

	PROBABILITY OF OCCURRENCE					
SEVERITY		A	B	C	D	E
	1	LOW	LOW	LOW	LOW	MED
	2	LOW	LOW	LOW	MED	HIGH
	3	LOW	LOW	MED	HIGH	HIGH
	4	LOW	MED	HIGH	HIGH	HIGH
	5	MED	HIGH	HIGH	HIGH	HIGH

PROBABILITY OF OCCURRENCE

A May never occur
B May occur
C Might occur
D May occur infrequently
E Will probably occur

SEVERITY

1 Negligible
2 Moderate
3 Serious
4 Major
5 Catastrophic

RISK

Low = No immediate action required, proceed with care

Medium = Review & implement preventative measures

High = Unacceptable. Find alternative method

SEVERITY	HUMAN	ENVIRONMENT	MATERIALS / EQUIPMENT
NEGLIGIBLE	No or minor injury.	No or insignificant clean up naturally dispersed	No or insignificant damage to equipment or materials
MODERATE	One lost time accident, with no loss of part of the body, or prolonged disability	Clean up requires less than 1day	Damage to equipment or materials with lost time of 1 day production
SERIOUS	Multiple lost time accidents. One injury with loss of part of body, or with permanent disability	Clean up requires approx. 1 week	Significant damage to local area or essential equipment
MAJOR	One fatal injury. Several victims with loss of part of the body, or with permanent disability	Clean up requires approx. 1 month	Significant damage to local area or essential equipment which stops the work until a later date
CATASTROPHIC	Several fatal injuries	Clean up requires more than 1 month	Extensive damage to local area or essential equipment which stops the work totally

Task Risk Assessment Table

ACTIVITY	HAZARD	CONSEQUENCE	INITIAL RISK	RISK CONTROL MEASURE	RESIDUAL RISK

Appendix B: Overview of National Health and Safety Guidelines

Country	Organisation	Health and Safety Guidelines
UK	RenewableUK	The RenewableUK Health & Safety Vision - Mission and Strategy 2016 - 2018 The RenewableUK online guidelines catalogue, including: • Offshore Wind and Marine Energy Health and Safety Guidelines • Good practice guidelines for Integrated Offshore Emergency Response • Wind Turbine Safety Rules • Vessel Safety Guide • Overview of principles and practices in managing confined spaces
DE	German Federal Government	Guidance provided by the German federal government includes: • Safety and Health at Work Act of 7 August 1996 (Federal Law Gazette I p. 1246), as last amended by Article 8 of the Act of 19 October 2013, from the Federal Ministry of Labour and Social Affairs • A German Offshore Wind Energy Security Framework (in German), from the Federal Ministry of Transport and Digital Infrastructure • Minimum requirements for the construction of offshore structures (in German), from the Federal Maritime and Hydrographic Agency of Germany
DK	Danish Working Environment Authority (WEA)	The Danish Offshore Safety Act (2015). Consolidated act no. 831 of 1 July 2015 regarding safety, etc. for offshore installations for exploration, production and transportation of hydrocarbons (The Offshore Safety Act) including: • Risk assessment and risk mitigation (sections 33-37) • Design, construction, layout and equipment (Sections 38-44) • Emergency Response (Sections 45) • Health and safety activities (Sections 46-49) • Training and competence (Section 50) • Working hours, rest and off-duty periods (Section 51) • Registration and notification etc. (Section 52) • Performance of work and medical examinations, etc. (Sections 53-57)
NL	Netherlands Wind Energy Association (NWEA)	The Dutch 'Arbocatalogus' including guidelines on: • Communication in offshore wind (for employee / for organization) • Diving activities (for organization) • Offshore transfer from a vessel from and to a short fixed ladder (for employee / for organization) • Offshore transfer from a vessel / jack-up from and to the platform (for employee / for organization) • Offshore transfer from a vessel from and to a vertically moving platform (for employee / for organization) • Offshore transfer between vessels (for employee / for organization) • Sudden cardiac failure (for employee / for organization) • Organisation in case of impact hazards (for employee / for organization) • Physical (over)burdening due to pushing and pulling (for employee / for organization) • Climbing wind turbine and access to gondola/mast (for employee / for organization) • Exposure to direct sunlight (UV radiation) (for employee / for organization) • Working in enclosed spaces (for employee / for organization)

FOWPI

FIRST OFFSHORE WIND PROJECT OF INDIA