KEMA Limited

Ofgem

Technical Advisors for the OFTO Tender Process:

Offshore Transitional Project Report

WALNEY I

Rev 1.1

3 July 2009

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Revision History

Rev.	Date	Description	Author	Checker	Approver
1.0	10 June 2009	Final Report	DPop	IW	DP
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The Regulatory Asset Values determined will reflect the opinion of KEMA as to the value of the transmission assets if they had been developed in an economic and efficient manner. The primary source in preparing this opinion has been information provided by the offshore wind farm developer during the period from February 2009 up and until 22 May and we have not sought to establish the reliability of the sources by reference or other evidence. We do not accept responsibility for such information, and the report does not incorporate the effects, if any, of events and circumstances that may have occurred or information that may have come to light after said dates. The issues covered in this report, and the emphasis placed on them, may not address the issues relevant to others than our Client, or reflect their specific requirements, objectives, interests or circumstances.

The purpose of this opinion is to facilitate the competitive tender process of our Client for the appointment of offshore transmission licensees only. The opinion will not constitute legal or other professional advice. Although this report was prepared in good faith, KEMA will not accept any responsibility for the accuracy, completeness or otherwise of the information. KEMA (including its Directors and employees) will not accept liability for any loss or damage, howsoever arising, from the use, misuse of or reliance on this information, including but not limited to any errors, omissions or misleading or inaccurate statements. In no event will KEMA be liable for any loss or damage including, without limitation, direct, indirect or consequential loss or damage, or any loss or damages whatsoever arising from use or misuse of the information.

Executive Summary

This report provides an assessment of the Walney I Offshore Wind project being developed by DONG Walney (UK) Ltd, a wholly owned subsidiary of DONG Energy, hereafter referenced as DONG. The report addresses project qualification with respect to Ofgem preconditions, project design and technical compliance with industry requirements, capital costs and equipment volumes. The assessments undertaken have considered the information provided by DONG to Ofgem, up to and including 22 May 2009.

The Walney I windfarm will be located approximately 15km West of Walney Island, Cumbria and will have a total installed generation capacity of 184 MW, with a corresponding Transmission Entry Capacity (TEC) of 178 MW. The transmission assets proposed for transfer comprise one offshore substation platform, one 45.3km 132 kV submarine cable, one 2.9km 132kV underground cable, one 132kV AIS feeder bay providing connection to National Grid and onshore reactive compensation equipment containing a shunt reactor and 132kV gas insulated switchgear with protection and control equipment. The developer's forecast cost for developing and constructing these transmission assets is approximately £89 million. DONG forecast that Walney I will be operational by the end of Quarter 3, 2010 and the TEC has been secured with National Grid from 2 April 2010.

Two offshore transmission ownership boundaries are under consideration by DONG. One boundary option is the 132kV offshore cable terminations in which case the offshore platform would be retained by the developer. The second boundary option is the 33kV terminations at the 33/132kV transformers in which case the offshore platform would transfer to the successful OFTO. DONG has stated that the latter ownership boundary option is conditional upon the establishment of a long term operation and maintenance agreement between the developer and the successful OFTO. The interface point onshore is at the set of 132kV terminations at Heysham substation.

The extent to which DONG, as project developer, has met the qualifying project pre-conditions[1] is summarised below:

C1. **Securing a connection agreement**: DONG has secured a Bilateral Connection Agreement (BCA) with National Grid, dated 11 March 2009, for the full TEC of 178MW.

C2. **Obtaining all necessary property rights and all environmental and planning consents:** DONG has obtained all offshore consents and leases. DONG has submitted a notice to the Crown Estate to exercise their lease. In addition:

- DONG has obtained onshore consents for their northern onshore cable route, except for that with National Grid (see below). However, for reasons of cost, DONG is not currently pursuing this route.

[1] Offshore Electricity Transmission: Updated Proposals for the Competitive Tender Process, Ofgem, 5 March 2009.

- Land agreement negotiations for the preferred southern cable route are ongoing. DONG anticipates agreements in principle being reached by mid-July 2009, with all documentation being complete by the end of 2009.

- DONG has verbal agreement with a local Caravan Park owner for the onshore cable to pass through their property. Compensation and work scheduling are outstanding.

- Lancaster City Council has indicated a backstop date for planning permission of 19 June 2009.

- The land agreement with National Grid is subject to the developers of the Ormonde and Barrow projects establishing a tripartite agreement for subsequent approval by National Grid. DONG estimates that this agreement will be approved by early September 2009.

- Similarly, the land for the onshore reactor station is dependent on the issue of the appropriate land lease by National Grid.

C3. **Entered into all necessary contracts for the construction of the offshore transmission assets:** Outstanding contracts include a Supervisory Control and Data Acquisition (SCADA) contract, the installation contract for the submarine and land cable, and the contract for the onshore reactor substation.

C4. **Secured financing to the satisfaction of the Authority:** A translation of an extract from a supervisory board minute of DONG Energy A/S on 3 December 2007 has been provided indicating the approval to construct Walney 1. However, the level of investment is not specified.

C5. **Provided its financial model and all other necessary financial and other data for the offshore transmission infrastructure:** DONG has provided the relevant transmission infrastructure financial model and other information to assess efficient and economic costs in the form of an asset schedule, cost spreadsheets and subsequent information releases. The financial information provided by the developer has been sufficient in order to carry out the cost assessment process.

It should be noted that some construction contracts and land agreements are currently outstanding with respect to the transitional qualifying project preconditions. It is possible that land agreements will not be in place until mid-September 2009. All construction contracts will not be entered into until October 2009.

The transmission infrastructure specified by DONG has been based on DONG's extensive experience in onshore and offshore transmission both in the UK and in Denmark. Environmental assessments have been undertaken. All relevant offshore equipment is stated to be fit for purpose in a marine environment and the electrical equipment where specified is in accordance with IEC standards. The

Walney I electrical system is designed with limited redundancy. There is only one offshore substation platform with two transformers and single submarine and land cable connection to shore. The loss of a single submarine or land cable will result in an interruption to generation output. The loss of a single offshore transformer will restrict the wind farm capacity to 120MVA. The project is stated to be compliant with current Grid Code reactive power requirements at the onshore connection point. It has not been possible to assess potential non-compliances with the draft change proposals to electricity industry codes under consultation.

Costs and Volumes

The cost assessment process undertaken by KEMA analyses the submitted developer cost information and reports on the extent to which the capital costs are reasonable and therefore could be judged as economic and efficient.

For that purpose capital asset valuations for two boundary options[2] are provided in the table below with explanations of significant variances. For each boundary option, KEMA has derived a normalised version of the developer's valuation, the "Normalised Valuation" and a benchmark valuation based on mean values derived from the transitional projects, the "Comparator Valuation". Both valuation methods are described below:

- **Normalised Valuation**: uses the developer cost information and removes elements relating to contingencies, project financing and project purchases to provide a baseline figure relating to the actual (or forecast) costs associated with establishing the transmission assets. The Normalised Valuation is based upon submitted cost information incorporating contract cost data as provided by the project developer[3]. The Normalised Valuation is used throughout the report as the baseline against which comparisons are made.

- **Comparator Valuation**: KEMA has derived the benchmark Comparator Valuation using a set of cost drivers, calculated from the information provided by the transitional projects. These cost drivers are mean unit cost values that are used to create cost benchmarks that can be compared with the Normalised Valuation. Where disaggregated cost data has not been provided, independent KEMA benchmark costs have been adopted.

DONG's cost information was adjusted to derive the Normalised Valuation as follows:

- - £7.6M, removal of a contingency cost amount; and
- -£0.1M removal of a project purchase cost.

[2] A 33kV ownership boundary at the offshore 33kV/132kV transformers is proposed by DONG. The CUSC boundary is the default commercial ownership boundary contained in the industry framework document, which, for this project, is the transformer side of the 132kV switchgear.

[3] All of the figures are extracted from the asset schedule cost summary sheets and correspondence provided up to 22 May 2009.

These adjustments resulted in a reduction of the Walney 1 stated project costs from £89.4M to £81.7M.

Table 1 Overview of project valuations

Ownership boundary	Developer Valuation	Normalised Valuation	Comparator Valuation
33kV transformer connection	£89.4M	£81.7M	£82.6M
CUSC[4] boundary	£58.1M	£54. 8M	£53.6M

DONG has proposed two boundaries at the 132kV offshore substation;

1. At the 33kV connections of the 33kV/132kV step-up transformers with the platform owned by the OFTO.

2. At the 132kV GIS switchgear with the platform owned by the generator. This reflects the standard boundary described in the CUSC, at the high-voltage side of the step-up transformer.

33kV Transformer connection boundary

[redacted]:

[redacted]

[redacted]

[redacted]

- [redacted].

[redacted]

[redacted]

[redacted]

4 CUSC = Connection and Use of System Code

CUSC Boundary

For a CUSC default boundary at the 132kV transformer connections on the offshore platforms DONG's development costs have been pro-rated in line with the reduction in capital item costs. Thus, £26.9M has been removed from the Normalised Valuation and £29.0M from the Comparator Valuation respectively. This reduction represents the platform and all electrical equipment operating at less than 132kV, inclusive of the transformers. The CUSC default boundary shows a total variance between the Normalised Valuation and the Comparator Valuation of +£1.2M (+2%).

The variance comprises:

[redacted]

The overall normalised cost valuation of the Walney I project is generally consistent with the peer comparator valuation and KEMA regards the normalised valuation as reasonable. However, in the absence of more detailed information, the cost of the offshore substation platform may be high and warrants further investigation.

1. Introduction

Ofgem and the Department for Energy and Climate Change (DECC) have been developing the regulatory arrangements for offshore electricity transmission. These arrangements cover projects that are already built or are expected to be under construction before the new regulatory arrangements reach the 'Go Active' or 'Go Live' dates in June 2009 and June 2010 respectively. Such projects are known as transitional projects and developers have to meet certain pre-conditions in order to be tendered under these arrangements. Projects where the new transmission assets would be designed, financed and constructed by an offshore transmission owner (OFTO) are known as enduring projects.

The offshore electricity transmission licences will be granted by way of a competitive tender process that aims to deliver fit for purpose transmission infrastructure to connect offshore generation economically and efficiently whilst simultaneously attracting new entrants to the sector. The first round of tenders in the transitional arrangements is expected to commence shortly after the Go Active date.

This document provides KEMA's initial review and assessment of the Walney I offshore wind project being developed by DONG Walney (UK) Ltd[5] with respect to meeting Ofgem's transitional project qualification criteria, overall technical and operational compliance, cost rationality and risk profile.

2. Project Assessment Approach

KEMA's approach for assessing each transitional project wishing to enter into the first tender round has been designed to confirm:

- Compliance with the proposed qualifying pre-conditions[6];
- Technical and operational compliance including the project 'fit for purpose' design; and
- Estimates of economic and efficient costs incurred during the development and construction of the transmission assets.

Responses to Ofgem's Developer Information Request (DIR), in conjunction with subsequent correspondence and bilateral meetings with developers have been used as the primary information sources when assessing each project. This assessment includes a review of the specified technical requirements and operational performance criteria as set out in relevant industry codes and standards. During the course of this assessment, no additional modelling, simulation of individual components or physical testing has been undertaken. Areas requiring clarification or further information have been identified and are noted in this report.

5 DONG Walney (UK) Ltd is a wholly owned subsidiary of DONG Energy.

6 Offshore Electricity Transmission: Updated Proposals for the Competitive Tender Process, Ofgem, 5 March 2009.

3. Technical Assessment

3.1 Project Overview

Name	Walney I Offshore Wind Project
Developer	DONG Walney (UK) Ltd
Location	Irish Sea, approximately 15km West of Walney Island, Cumbria
Generating Capacity	184MW (51 x 3.6 MW wind turbine generators) Transmission Entry Capacity (TEC): 178MW
Construction timetable for transmission assets	Offshore and onshore works started and expected to be completed by September 2010.
Commissioning timetable for transmission assets	End of Q3, 2010 TEC secured from 2 April 2010.

In December 2003, DONG was offered the Walney Offshore Windfarm site as part of Round 2 Tender awards. The final investment decision regarding Walney I was made by the DONG Energy Supervisory Board on 3 December 2007.

The project was planned to be constructed in 2009-10 with the first year of commercial operation in 2011. The original contract strategy for construction during years 2009 and 2010 was revised when the project was put on hold in September 2008. A new contract strategy was produced in October 2008 and revised in January 2009 for construction during the years 2009 to 2010. DONG does not expect any deviation from the original project timeline.

A simplified project diagram is shown in Appendix A1.

3.2 Project status in relation to meeting the pre-conditions

The status of DONG in respect of the transitional project pre-conditions is as follows:

C1. Secured a connection agreement with NGET or a connection offer with a DNO for a connection at 132kV or above.

DONG has secured a CUSC Bilateral Connection Agreement (BCA) with National Grid, dated 11 March 2009, for the full TEC of 178MW. This is the variation agreement to the initial BCA agreement of 18 June 2008 that was for the initial TEC of 147MW. The original connection agreement for Walney I was signed in 2003 between Heysham Offshore Wind Ltd and National Grid with subsequent variation and novation agreements being signed in 2008.

C2. Obtained all necessary property rights (e.g. consents and leases) and environmental and planning consents for the offshore project and offshore transmission assets.

DONG has obtained all offshore consents and leases although a number of outstanding issues remain as described below:

- DONG received a Crown Estate Land Lease agreement on 19 June 2008 with the option and right to require the Commissioners to grant a lease. DONG has now submitted a notice to the Crown Estate to exercise this lease. The Crown Estate lease was due to be confirmed by the end of May 2009.

- DONG has obtained all onshore consents for their northern onshore cable route, except for that with National Grid (see below). Due to the costs associated with this route, DONG is currently evaluating an alternative southern route option.

- Land agreement negotiations for a southern cable route with South Lakeland Caravan Park and Lancaster City Council are ongoing. DONG has stated in writing that agreements in principle are anticipated by mid-July, with all documentation being complete by the end of 2009. Should land negotiations for the southern route be unsuccessful, DONG will revert to the northern cable route from 1 October 2009.

- DONG has established verbal agreement with the Caravan Park to confirm that the onshore cable can pass through this property. However, details regarding remuneration and work scheduling remain outstanding. DONG anticipates agreement with the property owner by 16 June 2009. It is estimated that the option agreement and other legal documentation will require three months suggesting final confirmation by mid-September 2009.

- Lancaster City Council has given a backstop date for grant of planning permission of 19 June 2009.

- The land agreement with National Grid requires resolution of engineering issues with the developers of the Ormonde and Barrow projects. A tripartite agreement between the three developers is required and DONG anticipates finalisation by 8 June. Once complete, it will require approval by National Grid and DONG anticipates this will take three months, i.e. by early September 2009. This agreement applies to both the northern and southern cable routes.

- The land for the onshore reactor station is dependent on the issue of the appropriate land lease by National Grid.

KEMA's assessment of environmental and planning consents is included in Appendix A2.

C3. Either completed construction of, or entered into, all necessary contracts for the construction of, the offshore transmission assets.

DONG is pursuing a multi-contracting approach. There are no turnkey contracts. Procurement is split into 19 main contract groups which are further split into associated contracts. The procurement strategy addresses all scopes, tenders, contracts and includes associated guarantees and bonds.

DONG is in the process of finalising a number of construction contracts. Given the time involved in the scheduling of offshore contractors a letter of intent has been issued to secure the required supply and installation vessels. At the time of DONG's DIR submission a number of tenders had still to be issued and contracts secured.
DONG has highlighted the remaining contracts that have yet to be agreed and has subsequently outlined when these are expected to be finalised:

- The SCADA contract will be signed during the week commencing 8 June 2009.
- The contract for the installation of submarine cables is due to be signed on 15 July 2009.
- The contract for the onshore cable installation is expected to be signed on 1 September 2009.
- The contract for the onshore reactor substation is expected to be signed during October 2009.

KEMA's assessment of DONG's procurement approach and contract status is included in Appendix A3.

C4. Secured financing to the satisfaction of the Authority to construct the regulated assets.
A translation of an extract from a supervisory board minute of DONG Energy A/S on 3 December 2007 has been provided indicating the approval to construct Walney 1. However, the level of investment is not specified.

C5. Provided its financial model for the offshore transmission infrastructure and all other necessary financial and other data to Ofgem to enable the assessment of the efficient and economic cost of constructing the offshore transmission assets.
DONG has provided the relevant transmission infrastructure financial model and other information to assess efficient and economic costs in the form of asset schedule, cost spreadsheets and subsequent information releases. The financial information provided by the developer has been sufficient in order to carry out the cost assessment process.

3.3 Proposed Boundary Options

The onshore connection for Walney I windfarm will be at National Grid's 132 kV Heysham substation in Lancashire.

Two offshore transmission ownership boundaries are under consideration by DONG. One boundary option is the 132kV offshore cable terminations in which case the offshore platform would be owned by the generator. The second boundary option is the 33kV terminations at the 33/132kV transformers in which case the offshore platform would transfer to the OFTO. The interface point onshore is at the set of 132kV busbar disconnector terminations at Heysham substation.

DONG has stated that the latter ownership boundary option is conditional upon the establishment of a long term operation and maintenance agreement between the developer and the successful OFTO to be included in the Sale and Purchase Agreement (SPA) for the transmission assets.

The proposed offshore transmission ownership boundaries are illustrated in Appendix A1.

3.4 Design Overview

3.4.1 Offshore design and construction

The Walney I project comprises a single, monopole mounted, substation platform. The substation will be housed within an enclosed steel structure. As the monopile will be subject to horizontal movement during storm conditions, there is a risk of localised fatigue induced failures occurring in the submarine cables. Consequently additional information is required regarding the design of the J-tube bell mouth to ensure this risk is adequately mitigated. This analysis should be undertaken during the detailed design of the offshore substation at the same time as corrosion and scour analyses.

As seabed conditions between Walney and the coast are dynamic in nature, with level changes up to 10m, and that the seabed is also known to contain boulders/stones, it will be important for cable stability analyses to be undertaken. Although the submarine cable route has yet to be finalised, there are a large number of potential physical obstructions to be considered (e.g. a pipeline, wreck and boulders) which could impact on the cable installation programme. Therefore, a degree of flexibility needs to be incorporated within the cable installation plans to minimise/accommodate unforeseen obstacles. In general, more detailed information is required with respect to cable design and installation, particularly with respect to stability analysis.

At the point of landfall an eight metre tide has been noted which has previously moved sand dunes by several metres. Therefore detailed method statements for the cable landfall and cable pull will be required.

Limited information has been made available regarding the maintainability of the offshore assets. Additional information regarding maintenance philosophy and an overall maintenance management system would be useful.

DONG has stated that all relevant offshore equipment will be fit for purpose in a marine environment. Given the long lead times associated with design and supply of offshore substation components, KEMA would comment that the overall project implementation timetable of 14 months appears optimistic. The cable installation timetable appears similarly optimistic given the number of potential obstructions. KEMA's assessment of DONG's offshore design is included in Appendix A4.

3.4.2 Electrical infrastructure design

The Walney I windfarm comprises 51 x 3.6MW wind turbines and one offshore substation platform. 132kV Gas Insulated Switchgear (GIS) is located within the offshore substation platform and is

connected to two 120MVA 132/33kV transformers which then connect to 33kV GIS switchboard. The offshore substation is connected via a single 45.3km 132 kV submarine cable and a single 2.9km land cable to National Grid's 132kV Heysham substation. The Heysham substation provides the onshore point of connection with National Grid at a 132kV AIS feeder bay provided by DONG Energy that will be transferred to OFTO ownership. Onshore, there is also reactive compensation equipment and associated 132kV GIS switchgear to be transferred to the successful OFTO. The 64MVAr shunt reactor and harmonic filters (if required) will be located outdoors and the 132 kV GIS switchgear, protection, control and other auxiliary equipment placed indoors. A simplified project diagram is shown in Appendix A1.

Reactive power capability will be provided by the wind turbine generators. The onshore shunt reactor is planned to only be used to maintain the reactive power balance when the wind turbines are not in operation.

Low voltage supplies are derived from the 33kV switchboard and are backed-up by a local 150kVA diesel generator. There are two auxiliary/earthing transformers which are connected via circuit breakers to the 33kV busbars.

The electrical system offshore is designed to operate in a fully automatic mode with manned input to be required for maintenance purposes only. There are two control systems, a `wind park control system' and a fully integrated Supervisory Control and Data Acquisition (SCADA) system. The two control systems are linked back to the shore offices via a two channel secure internet connection thus allowing a remote control of the offshore substation and the wind park as a whole.

The overall system is designed based on DONG's experience and techno-economic optimisation studies for a lifetime of 25 years taking into account costs of operation, maintenance and equipment failures.

A list of the main onshore and offshore apparatus, proposed ownership and life expectancy is provided in Appendix A5. All equipment has been specified to IEC standards. The design life of the majority of the equipment aligns with the duration of the OFTO revenue stream i.e. 20 years. Any anticipated exceptions, such as small elements of reactive equipment, protection and control systems, batteries etc are noted in Appendix A5.

3.4.3 Redundancy and asset availability

The Walney I electrical system is designed with limited redundancy. There is only one offshore substation platform with two transformers and single submarine and land cable connection to shore. A loss of a single submarine or land cable will result in an interruption to generator output. The loss of a single offshore transformer will restrict the wind farm capacity to 120MVA.

The two 120MVA, 132/33kV transformers located on the offshore substation platform will be interconnected to 33kV switchboards that provide an element of redundancy. It is not clear, however, whether in case of fire this redundancy will withstand such a hazard.

It would appear that the submarine cable size (and cost) has been optimised on 75% current carrying ability with the capability to carry 100% current for 168hours. As there is only one submarine cable, any damage to the cable could have a significant affect on availability (one to two months).

A reliability study of the offshore transmission assets themselves has not been conducted. Based on DONG's extensive experience with onshore and offshore transmission assets in Denmark, DONG assumes the reliability of 100% for the lifetime of the windfarm. The possibility of the cable damage caused by anchors (offshore) or works near the underground cable onshore has however been recognised. Submarine cable damage in particular could lead to the wind farm being shutdown with the relatively long repair time (1-2 month). To minimise this risk, the submarine cable is planned to be buried to a target depth of 2m.

The position regarding strategic spares has not been finalised. DONG's current plan is to procure and share certain strategic spares across its portfolio of wind farms in the UK. The sole and shared spares have been ordered for the submarine and underground cable, optical fibre cables and cable repair joints and terminations. The spare cables are to be delivered in one whole length. A mobilisation contract for vessels to undertake offshore repairs has not been realised; a vessel with a spare submarine cable and repair joints is planned to be mobilised as needed. The spares are not planned to be transferred to the successful OFTO. DONG's proposal is for an operation and maintenance contract to be agreed with the OFTO that would address treatment of the spares.

3.4.4 Compliance with Industry Codes and Standards

The Walney I project is designed to be compliant with current Grid Code reactive power requirements at the onshore connection point. In light of the proposed changes to industry codes relating to introduction of offshore transmission regulatory framework, DONG is indicating that no compliance issues with the draft proposed changes to the industry codes have been identified to date but discussions with National Grid might be needed. DONG is currently awaiting the information on harmonic limits from National Grid in order to progress the harmonic filter design studies.

KEMA's assessment of the project compliance with the industry codes, currently under consultation, is provided in Appendix A6 – A9. As no detailed project design information and system studies had been provided by 22 May 2009, KEMA could not conduct a full assessment of project compliance with the industry codes. Where information was provided, the project was found to be compliant.

3.4.5 Project risk profile

[redacted]:

[redacted]

KEMA's risk assessment for the project is provided in Appendix A10.

4. Cost Assessment

This section provides a cost assessment of the Walney I offshore wind farm transmission assets to connect 184MW of wind generation capacity at a developer estimated cost of approximately £89.4M. Details of the cost assessment methodology applied to the developer sourced cost data are described below. A commentary is also provided regarding the relative magnitude of total project costs and the main disaggregated cost components to highlight any anomalies, inconsistencies, information shortfalls and/or mitigating factors with respect to the Walney I project. The comments provided in this report reflect the information provided to Ofgem by DONG Energy up to and including 22 May 2009. All figures have been extracted from either DONG cost and asset spreadsheet documents submitted to Ofgem or from their clarification documentation. These together provided sufficient information to undertake the cost assessment process.

4.1 Cost Assessment Process and Assumptions

The cost assessment process undertaken by KEMA analyses the submitted developer cost information and reports on the extent to which the capital costs are reasonable and therefore could be judged as economic and efficient.

The overall approach normalises the information provided by developers, allocates it consistently to the main project components[7] of the offshore transmission system and also creates a set of comparator cost drivers that can be used as peer benchmarks. KEMA regards the peer comparators as the most useful indicators of reasonable costs as these relate to projects being developed over a similar timeframe, in the same regulatory and legal framework, with comparable economic drivers and a similar supplier base.

In preparing this cost assessment the following general assumptions have been made:

- For projects yet to complete construction, all costs used are at their contractual values at the time of signing;
- For projects that are commissioned, the comparator costs that are presented (but are not included in the comparator average) are adjusted downwards for copper prices for the cable supply costs and general inflation for the remainder of the project costs to be comparable to developer submitted information;
- All contingency costs have been excluded where these have been explicitly stated;
- All financing costs have been excluded where these have been explicitly stated;
- All project purchase costs have been excluded where these have been stated;

[7] The main components being the offshore substation, supply and installation of the submarine and land cables, onshore reactive power equipment and substation connection and development costs (capitalised operations costs, e.g. project management, overheads, leases and consents etc).

- Maintenance costs have not been included in the capitalised cost valuation;
- It is assumed that each project has procured a similar level of spares as part of the capital cost across the main components of all projects (i.e. no analysis has been completed to normalise for spares costs[8]); and
- Capitalised development costs are presented as a percentage of total Normalised Valuation or percentage of total Comparator Valuation cost basis[9].

Two valuations are created for each offshore OFTO boundary considered, the "Normalised Valuation" and a benchmark valuation the "Comparator Valuation" as described below:

- **Normalised Valuation**: uses the developer cost information and removes elements relating to contingencies, project financing and project purchases to provide a baseline figure relating to the actual (or forecast) costs associated with transmission asset construction. The Normalised Valuation is based upon submitted cost information incorporating contract cost data as provided by the project developer[10].
- **Comparator Valuation**: KEMA derives the benchmark Comparator Valuation using a set of cost drivers, calculated from the information provided by the transitional projects. These cost drivers are mean unit cost values (for example, cable supply cost per kilometre) that are used to create comparative cost benchmarks that are comparable to the Normalised Valuation. Where disaggregated cost data has not been provided, independent KEMA benchmark costs have been adopted[11].

The Normalised Valuation is used throughout the report as the baseline against which comparisons are made.

The following sections describe the cost assessment as applied to the Walney I project.

8 The costs of any spares included have been found to be small and unlikely to make a material difference to the comparator cost estimates.

9 In the Comparator Valuation capitalised development costs are calculated by taking the normalised costs, deducting the capitalised development costs from the total and then calculating the capitalised development costs as a percentage of the remainder, i.e. the percentage is calculated net of the capitalised development costs themselves.

10 All of the figures are extracted from the cost spreadsheet documents submitted by DONG up to 22 May 2009.

11 This captures the majority of the costs for each project. KEMA independent benchmarks are used to form a cost for comparison for elements not covered by the comparator metrics. Where neither is possible, the developer number is used in the comparator cost valuation and a comment will be included to that effect.

4.2 Equipment Costs and Volumes

At 184MW generating capacity (178MW TEC) Walney I is one of the mid-sized transitional offshore developments in terms of electrical capacity and this is reflected in DONG's transmission asset valuation of £89.4M, with the offshore substation owned by the OFTO.

[redacted]

This adjustment resulted in a reduction of the developer's project costs from £89.4M to £81.7M.

As for all the transitional projects, the main offshore transmission costs relate to the offshore substation, the submarine and land cable supply and installation and the onshore reactive substation and connection works. Following disaggregation and peer comparison of the stated costs for each of the considered ownership boundaries, few areas meriting further investigation have become apparent as shown in Table 2.

Table 2 Overview of Developer valuations and comparisons- redacted

4.2.1 Cost assessment comparisons

[redacted]

- [redacted][12].

[redacted]:

Normalised Valuation £M	Comparator Valuation £M	Per MW (Secure) Valuation £M
[redacted]	[redacted]	[redacted]

[redacted]

[12] The MW that are able to be transmitted during the outage of any one transformer on the offshore substation

[redacted]

[redacted]

[redacted]

[redacted]

4.2.2 Impact of different ownership boundary options

DONG has proposed two boundaries at the offshore substation;

A. At the 132kV GIS switchgear with the platform owned by the generator. This reflects the standard boundary described in the CUSC, at the high-voltage side of the step-up transformer.

B. At the 33kV connections of the 33kV/132kV step-up transformers with the platform owned by the OFTO.

Each of these two ownership boundaries has been analysed to establish the capital asset valuation and associated variances as described below.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

4.3 Overall summary

The normalised cost valuation of the Walney I project is generally consistent with the peer comparator valuation and KEMA regards the normalised valuation as reasonable. However, in the absence of more detailed information the cost of the offshore substation platform may be high and warrants further investigation.

Appendix A: Review & Assessment Templates- Redacted