ofgem

Preliminary Information Memorandum

September 2016

Contents

1. Investment Highlights

1.1. Overview

Galloper Offshore Wind Farm (the Project) is situated offshore to the east of the operational Greater Gabbard wind farm circa 27km from the shore of Suffolk. It is composed of 56 Siemens SWT-6.0-154 Wind Turbine Generators (WTGs) providing a total name plate capacity of 336MW.

Project Highlights:

- 6MW Siemens turbines with a maximum blade tip height of 180.5m above Lowest Astronomical Tide (LAT).
- Two buried subsea export cables approximately 45km each.
- 56 buried subsea array cables linking the turbines to the offshore electricity platforms.
- One offshore substation.
- Annual generation equivalent up to 336,000 average UK households.

1.2. Transmission Assets

- Located within the turbine array the Offshore Substation Platform (OSP), including two 132/33/33kV transformers and 132kV switchgear, will transmit the generated power to shore at 132kV.
- Two export cable circuits (with associated fibre optics – 76 fibres per circuit) will connect the OSP to the Onshore Substation. Each circuit will consist of a submarine cable of maximum route length of 45km and an onshore cable of circa 0.85km length. For each circuit the offshore and onshore cables are connected at the Transition Joint Bay (TJB) located behind the sea defences adjacent to Sizewell Beach.

1.3. Highly experienced project developer

Galloper Wind Farm Ltd (GWFL) is owned by Innogy Renewables UK, Siemens Financial Services, UK Green Investment Bank and Macquarie Capital. The Project went through a comprehensive technical and legal due diligence process before Financial Close was reached in late 2015. The financing process has attained a significant amount of recognition on a European and global scale (European Wind Deal of the Year, European Power Deal of the Year, Top Deal of 2015, Best Project Finance Loan 2015).

1.4. Operations and Maintenance

GWFL would be open to offering OFTO bidders different levels of O&M services ranging from a full O&M solution to more selected services that the OFTO may require. GWFL, by virtue of the Management Services Deed (MSD), is able to draw on innogy's proven track record in operating and maintaining generation and distribution assets across Europe which is directly relevant when it comes to operating and maintaining offshore wind farm assets.

1.5. Financial Highlights

The Galloper Transmission Licence (Transmission Licence) that will be granted to the successful bidder for the Galloper Transmission Assets (Transmission Assets) will include the right to a 20-year revenue stream in return for purchasing the Transmission Assets and operating them in accordance with the obligations of the Transmission Licence.

The 20-year revenue stream bid of the successful bidder for the Transmission Assets that will be incorporated into the Transmission Licence will be fixed, subject to agreed adjustment mechanisms.

The revenue stream will be availability-based, with the opportunity to earn additional revenues for better than expected operational performance. The revenue stream will not be subject to periodic review, provided operational performance remains above the relevant minimum standard.

The revenue stream will also not be exposed to any revenue or performance shortfalls from Galloper itself. If Galloper ceases to operate, the NETSO's obligation to pay the revenue stream will continue.

2. Initial Transfer Value

Ofgem will launch tender round five (TR5) to identify a successful bidder to whom an offshore transmission licence should be granted for each of the TR5 qualifying projects.

The Galloper project is one of five projects which have qualified for TR5. It has met the necessary qualifying requirements and tender entry conditions in accordance with the Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015.

This document is a summary of information provided by the Developer and outlines specifically the opportunity for investors to acquire the Transmission Assets and to become the licenced OFTO of Galloper.

It is currently estimated that a Preferred Bidder for Galloper is expected to be appointed in January 2018. This is following first generation from Galloper Wind Farm (Wind Farm), which is scheduled for August 2017.

Construction and commissioning of the Wind Farm is due to be completed by Summer 2018. Once completed, the Transmission Assets will be transferred to the OFTO identified as the successful bidder through the tender process via a transfer agreement. Asset transfer is currently anticipated to be approximately 6 months after appointment of the preferred bidder.

The costs of developing and constructing the Transmission Assets, estimated on the basis of information provided to Ofgem to date by the Developer, are £329.1 million (the Initial Transfer Value). For the purposes of the Enhanced Pre-Qualification (EPQ) stage of the tender process, bidders should assume this value.

Ofgem is in the process of reviewing this information and expects to provide an estimate of the economic and efficient costs incurred in connection with developing and constructing the Transmission Assets at the Invitation to Tender **(**ITT**)** stage (the Indicative Transfer Value).

Ofgem will calculate the economic and efficient costs which have been, or ought to have been, incurred in connection with developing and constructing the Transmission Assets once the assets have been completed. This assessment will be used to determine the Final Transfer Value (FTV).

3. The Investment Opportunity

3.1. Location for the Wind Farm assets

Galloper Offshore Wind Farm is situated offshore to the east of the operational Greater Gabbard wind farm circa 27km from shore as shown in Figure 1 below and further detailed in Appendix 1.

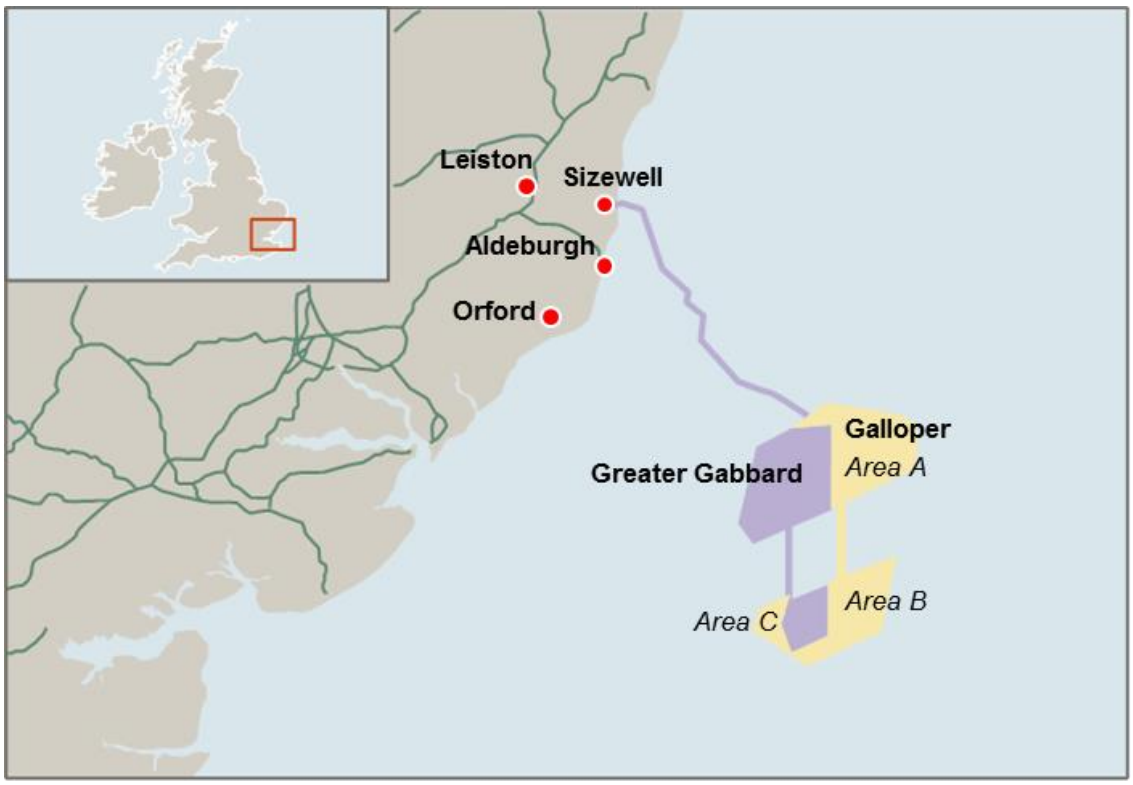


Figure 1: Location of Galloper Wind Farm and assets

The Project comprises 56 Siemens SWT-6.0-154 Wind Turbine Generators (WTGs) providing a total name plate capacity of 336MW. There is a potential to increase this using the Siemens Powerboost feature available on the WTGs. The transmission system is designed to accommodate this increase should it be implemented by the Developer. The WTGs are supported by monopile foundations located in water depths of 27-36 metres.

As shown in Appendix 1, the WTGs are connected by 12 radially branched strings of 33 kV array cables to a 33 kV/132kV Offshore Substation Platform (OSP) which is supported by a jacket foundation.

From the OSP, two 132kV subsea export cables of maximum route length 45km from OSP to shore shall be jointed at the Transition Joint Bay to land cables that continue each circuit approximately 0.85km onshore to a new Onshore Substation adjacent to the existing 132 kV Greater Gabbard substation located at Leiston.

Two underground 132kV cable circuits of circa 0.28km then link the onshore substation and the NGET substation at Leiston allowing the connection of the Project to the national grid transmission system.

The location of the onshore cable routes and onshore substations are further detailed in Appendix 2.

3.2. Ownership and Sponsors

Galloper Wind Farm Limited (GWFL) is owned by Innogy Renewables UK, Siemens Financial Services, UK Green Investment Bank and Macquarie Capital[1] as shown in Figure 2 below. The project construction and operations are managed by innogy through a Management Services Deed (MSD).

In addition to equity funding from the owners, GWFL has also secured project financing from a group of commercial banks and the European Investment Bank. The Project went through a comprehensive technical and legal due diligence process before Financial Close was reached in late 2015. The financing process has attained a significant amount of recognition on a European and global scale (European Wind Deal of the Year, European Power Deal of the Year, Top Deal of 2015, Best Project Finance Loan 2015).

The OFTO process is facilitated under the GWFL loan agreements and the construction of the Transmission Assets is financed largely under a dedicated OFTO loan facility. However, other loan facilities are also used to meet for example, the related working capital and credit support requirements.

* RWE AG is planning an IPO of innogy SE in Q4 2016 however after the IPO RWE AG will retain a majority shareholding in innogy SE.
** As of summer 2016 Sumitomo Corporation became an indirect shareholder after adopting a relationship with project partner Macquarie Capital.

Figure 2. The ownership structure for Galloper.

[1] As of summer 2016 Sumitomo Corporation became an indirect shareholder after adopting a relationship with project partner Macquarie Capital.

3.2.1 Innogy Renewables UK

Innogy Renewables UK is part of innogy SE. For further information about innogy visit www.innogy.com. RWE AG's new subsidiary innogy SE was established as an integrated energy group with three main pillars: The renewables division currently has a portfolio with an electricity generation capacity of more than 3.5 gigawatts and a strong focus on wind power, the grid division operates a 550,000 kilometer-long distribution network and the retail business has over 23 million customers in various European markets. According to the segment reporting in RWE's annual report of 2015 the three existing pillars of renewables, grids and retail business achieved an external revenue of more than €40 billion in 2015 (for details please refer to the annual financial statements of RWE Group). It is currently expected that innogy SE will employ approximately 40,000 of the RWE Group's nearly 60,000 staff members.

3.2.2 Siemens Financial Services (SFS)

The financial services unit of Siemens, SFS, is an international provider of business-to-business financial solutions. Employing more than 3,000 employees worldwide, SFS supports Siemens as well as other companies with their capital needs and acts as an expert manager of financial risks within Siemens. By leveraging its financing expertise and industrial know-how SFS creates value for Siemens' customers and helps them strengthen their competitiveness. Beyond that, financing is key in creating trust for technological solutions – and acts as a key enabler when it comes to the market launch. SFS's total assets amounted to €25 billion as of 30 September 2015.

SFS helps facilitate investments, providing commercial finance, project and structured finance. SFS, through its subsidiary Siemens Project Ventures (SPV), is a highly experienced equity investor in the energy, healthcare, industry and infrastructure markets with a focus on projects which deliver a sound risk-adjusted return profile and in which Siemens plays a key technological role in construction and operations. It has invested equity across a number of technologies having participated and financed the development of over 9,000 MW of power generation capacity to date across coal, gas, onshore wind, offshore wind and solar PV and also brings experience across multiple geographies with investments in fifteen countries currently including the UK, Germany, Spain, Belgium, Morocco, Pakistan and Indonesia among others.

SFS is a strong equity provider for offshore wind projects based on its extensive experience, developed through participation in the following opportunities (amongst others):

- Gemini – 20% stake in a 600 MW offshore wind farm in the Netherlands.
- Butendiek – 22.5% stake in a 288 MW offshore wind farm in Germany.
- Lincs – 25% stake in a 270 MW offshore wind farm in the UK.
- Veja Mate – circa 40% stake in a 400MW offshore wind farm in Germany.
- Galloper – 25% stake.

3.2.3 UK Green Investment Bank plc

UK Green Investment Bank plc (GIB) was launched in November 2012. With initial funding from the UK Government, it is the first bank of its kind in the world. It is a "for profit" bank, whose mission is to accelerate the UK's transition to a greener economy, and to create an enduring institution, operating independently of Government.
The bank became fully operational when it was granted State Aid approval by the European Commission to make investments on commercial terms. This approval applies to a number of green sectors. Offshore wind is one of GIB's priority sectors within its

investment mandate because of the crucial role the sector has to play in de-carbonising UK electricity generation and GIB's role in mobilising the investment necessary to achieve demanding targets for UK power sector emission reductions.
GIB has made three direct equity investments in UK offshore wind projects during the construction phase and has made debt investments in two other UK offshore wind farms. GIB's wholly-owned subsidiary UK Green Investment Bank Financial Services Limited (GIBFS) holds stakes in five UK offshore wind farms.

GIB's equity and debt investments in UK offshore wind include:

- Galloper – 25% stake in a 336 MW offshore wind farm in the UK.
- Rampion – 25% stake in a 400 MW offshore wind farm in the UK.
- Westermost Rough – 25% stake in a 210 MW offshore wind farm in the UK.
- Walney – debt investment in a 367 MW offshore wind farm in the UK.
- London Array – debt investment in a 630 MW offshore wind farm in the UK.

GIBFS's investments in UK offshore wind include:

- Lynn and Inner Dowsing – 60.75% stake in two offshore wind farms totalling 194MW (via GIB FS).
- Gwynt y Môr – 10% stake in a 576 MW offshore wind farm in the UK (via GIB FS).
- Sheringham Shoal – 20% stake in a 317 MW offshore wind farm in the UK (via GIB FS).
- Rhyl Flats – 24.95% stake in a 90 MW offshore wind farm in the UK (via GIB FS).

GIB is wholly owned by HM Government. The Company is not authorised or regulated by the Financial Conduct Authority or the Prudential Regulation Authority. Its wholly-owned subsidiary, UK Green Investment Bank Financial Services Limited, is authorised and regulated by the Financial Conduct Authority.

3.2.4 Macquarie Capital

The Macquarie group, through direct and indirect subsidiaries, is one of the largest infrastructure owners, managers and financiers in the world. Macquarie Group operates in 64 international offices across 28 countries and employs 14,300 employees[2]. Macquarie Capital is the Macquarie group's corporate advisory, capital raising and principal investments arm. Macquarie Capital is a leading equity sponsor and financial advisor in the EMEA energy & infrastructure market, having advised on and completed over £50 billion of European infrastructure transactions since 2010, including numerous notable transactions in sectors spanning OFTOs, European offshore wind, PPP, utilities and alternative sources of renewable energy generation.
Macquarie Capital has been the proud recipient of the "Global Financial Adviser of the Year" and "Most Innovative Investment Bank" on numerous occasions, and has a strong track record in structuring and arranging innovative and market-leading debt capital solutions for infrastructure assets globally.
Selected transaction experience in the renewable energies space comprises amongst others:

- Baltic 2 – Macquarie Capital acted as the exclusive financial adviser and debt arranger to Macquarie and other investors in raising €540m of holdco senior debt financing in relation to the acquisition of 49.89% stake in the 288MW German offshore wind farm from EnBW, a large German utility.
- WoDS Transmission and Blue Transmission – Macquarie Capital was the exclusive financial advisor to both the Blue Transmission and WoDS Transmission consortia; Macquarie Capital structured bid-winning financing solutions and successfully

[2] As of 31 March 2016

delivered them on five OFTO transactions, including Walney 1, Walney 2, Sheringham Shoal, London Array and West of Duddon Sands.

- Dublin WtE Plant – Macquarie Capital acted as the exclusive financial adviser to Covanta on bringing the Dublin waste-to-energy plant to a successful financial close. The WtE plant is the largest greenfield project financing in Ireland since the financial crisis and the largest WtE plant in the country. The project has gross electrical capacity of 68.8MW and will process up to 600,000 tonnes of waste per annum once operational.

3.3. Investment Opportunity Key Strengths

Table 1 The key strengths of the Galloper OFTO opportunity.

General
Experienced, reputable and creditworthy Investors.
Experienced project team (with OFTO sale experience) with dedicated resources to the OFTO transaction, motivated to complete the sale swiftly.
Developer obligations under the SPA to be supported by an appropriate credit support.
A reputable engineering consultancy specialist (Lenders Technical Advisor), who provided technical, contractual and financial review, confirmed that project risks are reduced to a bankable level.
Export cable
Reputable cable manufacturing and installation Engineering, Procurement, Construction and Installation (EPCI) contractor.
Export cables to be tested in line with industry best practices.
Planned full length export cable post lay burial depth survey.
Anticipated 4km of spare export cable to be transferred to the OFTO. Exact length to be confirmed after installation.
An Export Cable Monitoring System (ECMS) in the form of a Distributed Temperature Sensing (DTS) system allowing for a dynamic management of export cable ratings and for quick ease of fault location or fault potential.
Attention to gathering all the required data / installation records for OFTO technical due diligence.
Contracts and other matters
Experienced, reputable and creditworthy contractors.
Majority of OFTO assets are covered by only two EPCI contracts: • Few contracts to transfer. • Interface risk (including in relation to potential claims) mitigated by wrapping the design, fabrication and installation (including vessel supply and port logistics) together.
Robust warranty provisions on a joint and several basis under the respective EPCI contracts, with solid credit support (on demand bonds + PCGs) provided by each joint venture EPCI contractor, as well as the provision of collateral warranties.
The EPCI contractors have liability for all defects under the respective EPCI contracts, whether supply or installation related.
Contractors incentivised to deliver OFTO asset documentation as early as possible, allowing for smooth technical due diligence.
Short onshore export cable route with only three land owners along the route – few property documents to be transferred.
Developer open to offering a range of O&M services to the OFTO.

3.4. Transmission Assets transferring to the OFTO

The Transmission Assets will comprise the following key elements:

- Located within the turbine array the Offshore Substation Platform (OSP) including two 132/33/33kV transformers and 132kV switchgear will transmit the generated power to shore at 132kV.
- Two export cable circuits (with associated fibre optics – 76 fibres per circuit) will connect the OSP to the Onshore Substation. Each circuit will consist of a submarine cable of maximum route length of 45km and an onshore cable of circa 0.85km length. For each circuit the offshore and onshore cables are connected at the Transition Joint Bay (TJB) located behind the sea defences adjacent to Sizewell Beach.
- An Onshore Substation constructed near the existing Greater Gabbard substation in Leiston to connect the Wind Farm to the onshore transmission network at 132kV.
- Two cable circuits, circa 0.28km long, linking the onshore substation to NGET's existing Leiston 132kV substation.
- Two 132kV GIS circuit breakers located within NGET's Leiston substation at the OFTO/NGET Interface Points.

An overview of the assets that the Developer proposes to transfer to the OFTO under a project specific Transfer Agreement and which were used to derive the initial transfer value of the Transmission Assets is set out in Table 2 below.

Table 2. Asset Summary.

Asset	Description
Offshore substation (OSP)	132/33/33kV offshore substation platform Normally Unmanned Installation (excluding 33kV switchgear and auxiliary/control systems of the Generator and any other parties e.g. NGET) housing transformers, switchgear, protection and control equipment and other facilities comprising: • Trussed frame steel topside mounted on a conventional jacket structure which will be secured to the seabed by skirt piles. • A dedicated winching area for heli-hoist operations will be provided on the upper deck of the OSP. This winching area will be utilised for the routine transfer of materials, equipment and personnel for platform operations and to allow emergency helicopter evacuation of personnel. • Davit cranes, GIS switchgear gantry cranes and a main 5t crane. • Temporary refuge as well as separate control rooms and separate auxiliary supplies rooms for OFTO and Generator. • Fire suppression and HVAC facilities. • An oil water system ensuring that a minimum of 110% of the foreseeable potential volume of oily water is safety retained on the platform • HV electrical equipment including the following main plant items: • 2 x 132kV GIS circuit breakers connecting the submarine cable with the main transformers. • 2 x 132/33/33kV 180/90/90MVA three winding transformers

	with on-load tap changers and separate cooler banks. • 2 x earthing transformers. • 2 earthing/auxiliary transformers. • LV electrical power system (including DC systems, switchboards and diesel generator providing for 72 hrs of emergency power). • HV/BoP SCADA system.
Offshore export cables	• Two 132kV 1000mm2 stranded aluminium subsea export cables will link the offshore substation to the onshore transition joint bays near Sizewell. • The maximum route length to shore is 45km.
Onshore substation (OSS)	The onshore substation is located at Leiston, close to the existing 132 kV Greater Gabbard offshore wind farm substation, allowing the connection of the Project to the national grid transmission system. The onshore substation comprises: • A GIS switchgear building (housing the 132kV switchgear, SCADA control and telecom's equipment, messing facilities, OFTO and GWFL control rooms and protection equipment). • Two SVC buildings housing power electronics and auxiliaries for the reactive control system. • The electrical systems in the onshore substation will include the following main plant: • Two independent SVC reactive compensation systems rated to +/-70MVAr and including harmonic filtering, and 132/20kV 85MVA compensator transformer. • Two 132kV 85MVAr shunt reactors. • Two 132kV 40MVAr harmonic filters, each serving one export circuit. • 132kV GIS F35-4 switchgear to connect the export circuits through to NGETs existing substation at Leiston. • DNO LV supply and two auxiliary supply transformers. • Metering equipment, UPS, batteries.
Onshore cables	• Two underground circa 0.85km 132kV cables connecting the onshore transition joint to the 132kV double OSS. • Two underground circa 0.28km 132kV cable circuits linking the OSS and the NGET substation at Leiston.
NGET substation 'Unlicenced works'	• Two 132kV GIS F35-2 circuit breakers and their associated Local Control Cubicles in the NGET substation at Leiston interlocked with the Galloper OSS circuits.
SCADA	• The OFTO assets will be operated from a standalone segregated High Voltage (HV) / Balance of Plant (BoP) SCADA system. • The OFTO and Generator HV/BoP SCADA systems will exchange data as required by the Grid Code. • The OSP and OSS will have separate OFTO and Generator SCADA system equipment rooms. • The functional capabilities of the digital control and communication systems will include:

	• Integrated HV/BoP SCADA system. • Closed Circuit Television (CCTV*) and Security system. • Voice Communication system (IP Telephony) to support the OSP and OSS OFTO areas and control room. • Data Networks and Connectivity to support all digital systems. • Interfaces with other systems. • CCTV*: The system will provide CCTV coverage for the OSP and OSS. The OSS will have sufficient CCTV cameras to cover all building entrances/exits, perimeter fence and gates. The OSP will have sufficient external CCTV cameras to cover all entrances/exits, boat landings, muster stations and Heli hoist area.
Transmission system spares	• Anticipated 4.0km of subsea export cable. Exact length to be confirmed after installation and commissioning A purchase option for other spares to transfer to the OFTO is being developed.

3.5. Operations and Maintenance – Developer O&M Offer

GWFL would be open to offering OFTO bidders different levels of O&M services ranging from a full O&M solution to more selected services that the OFTO may require. GWFL, by virtue of the Management Services Deed (MSD), is able to draw on innogy's proven track record in operating and maintaining generation and distribution assets across Europe which is directly relevant when it comes to operating and maintaining offshore wind farm assets. This is based on drawing on innogy's previous experience including:

- Offshore wind farm construction, commissioning and O&M experience and expertise.
- On and offshore wind farm O&M experience (including logistics);
- Combine cycle gas turbine (CCGT) power station construction engineering and O&M experience.
- European electrical distribution networks.
- Corporate HS&E team with experience of on and offshore operations construction and production.

Further information regarding the potential scope (e.g. access logistics, spares, maintenance and outage strategies etc.) will be included in the data room, as part of the Developer O&M offer, prior to commencement of the ITT stage.

3.6. Ownership Boundaries

3.6.1 Offshore Ownership Boundaries

Post divestment, the OFTO will be responsible for the transmission assets up to the 33kV cable connections on the OSP 33kV switchgear panels. The boundary points and interfaces are shown in the Galloper HV Single Line Diagram in Appendix 3.

The Grid Entry Points offshore as defined in the Grid Code are the boundaries between the Wind Farm Electrical System and the Offshore Transmission System, i.e. they form the Wind Farm's connection points. This boundary will be located such that the entire 33kV switchboards on the OSP will be part of the Wind Farm Electrical System, but the 132/33/33kV transformers and their associated 33kV cables will be part of the Offshore Transmission System i.e. the ownership boundary is at the 33kV switchgear cable terminal boxes.

3.6.2 Onshore Ownership Boundaries

The Interface Points onshore are the boundaries between the Offshore Transmission System and the Onshore Transmission System. The Interface Points will be located at the NGET substation at Leiston, where NGET's 132kV substation will include two 132kV OFTO owned circuit breakers i.e. at the 132kV breaker's busbar disconnectors . These two breakers, and all 'downstream' assets at the onshore substation, will be part of the Offshore Transmission System as shown in the Galloper HV Single Line Diagram in Appendix 3.

3.7. Consents and Property Rights

The following consents, licences and leases have been secured for the onshore substation, the offshore substation and the cable works:

3.7.1 Consents

All material permits and consents have been secured.

The Project has been consented under the Planning Act 2008 with the Galloper Wind Farm Development Consent Order (DCO) (Statutory Instrument 2013 No. 1203), including the Deemed Marine Licence (DML) as amended by the following:

Galloper Wind Farm (Corrections) Order (SI 2013 No. 2086).
Galloper Wind Farm (Amendment) Order 2015 (SI 2015 No. 1460).
Deemed Marine Licence (Variation 1). Deemed licence under the Marine and Coastal Access Act 2009 (the DML).
Deemed Marine Licence (Variation 2). Deemed licence under the Marine and Coastal Access Act 2009 (the DML).
Construction marine licences: Pre-sweeping of sandwaves along offshore export cable corridor; disposal site for materials from pre-sweeping and (if required) drilling arisings from offshore foundation installations; Offshore UXO clearances (cable corridor and array areas); and out of use cables removals (cable corridor and array areas) (licence currently pending).

Collectively, these consents and the supporting authorised consent documentation provide for the project to be constructed and operated subject to the discharge of a series of Requirements and Conditions and compliance with relevant legislation.

3.7.2 Licences and Leases

The Project has five main leases with regards to its physical footprint:

- Crown Estate Lease.
- EDF Lease of land for the onshore substation and initial section of the buried onshore cables, noting that a variation to this lease was completed October 2015.
- Ogilvie Deed of Easement relating to the export middle section of the buried onshore cables routing and temporary construction working areas.
- Ogilvie Transfer of Part Registered Title (TP1) for the transfer of land registry title to Galloper Wind Farm Limited for the 30m x 30m freehold plot purchased for the TJB.
- Suffolk Coastal District Council (SCDC) Deed of Easement relating to the buried cable route on land owned by SCDC at the beach landfall area.

3.7.3 Other Agreements

There are a number of agreements associated with the consents and others in relation to third parties:

- s106 Agreement between GWFL, Glencairn Ogilvie Stuart and SCDC: Agreement to provide contributions to a fund for the Area of Outstanding Natural Beauty – Annual £11,000 payment for 17 years (from 2014) in recognition of the visual impact of the onshore infrastructure.
- Greater Gabbard OFTO Works Agreement between Greater Gabbard OFTO plc and GWFL: Agreement to regulate the interface between the Project's works and the Greater Gabbard OFTO assets requiring progress meetings and approvals of method statements for onshore and offshore works where they are expected to take place within certain distances from the Greater Gabbard OFTO assets.
- Magnox Deed of Covenant between Magnox Limited and GWFL: Agreement to regulate governance arrangements to ensure the Project does not put Magnox Limited in breach of its nuclear site licence.
- Agreement between Interoute Communications Ltd and GWFL for the laying of power cables from the Wind Farm to Sizewell crossing the Concerto N telecommunications cable from Sizewell to Zandvoort and the Concerto S telecommunications cable from Thorpeness to Zeebrugge.
- Agreement for the Wind Farm export cables crossing of Farland North cable between British Telecommunications plc and GWFL.

3.8. Risk Mitigation

The Transmission Assets have been designed according to the planning criteria as defined in the NETS SQSS.

The Wind Farm transmission system is generally symmetrical with two of the following:

- Interface Points to the NGET system.
- Export cables.
- Reactive compensation systems.
- 132kV Harmonic Filters.
- Transformers on the OSP.

Thus the failure of one of the above elements does not lead to a prolonged outage of the complete transmission system and ensures at least 50% of the transmission capacity is available during circuit outages.
The use of a UK standard 132kV transmission voltage means the switchgear and cables used have a proven record of reliability in the UK industry. The onshore electrical system is designed such that maintenance may be carried out on one 132kV export circuit without the need to isolate other parts of the system with separate TJBs for each circuit.

The switchgear will be of double busbar arrangement to comply with the SQSS requirements.

The main oil filled components will have online dissolved gas analysis equipment to enable continuous condition monitoring of these assets.

An Export Cable Monitoring System (ECMS) in the form of a Distributed Temperature Monitoring System (DTS) utilising fibre optic cables within the subsea export cables will provide indication of operating temperatures and forewarn of associated problems.

The Transmission Assets have been designed according to the planning criteria as defined in the NETS SQSS.

The Transmission Assets have been designed to ensure that the capacity of the Wind Farm, excluding cable losses, can be transmitted during an outage of one of the system devices, such as HV switchgear, transformers, or reactive compensation equipment. The onshore transformers have been designed with additional forced air cooling which will allow the full Wind Farm output to be exported via one transformer in the event of an outage, NGET switching, or maintenance requirements.

The offshore export transformers do not have additional cooling and are each rated to export approximately 66% of the Wind Farm's output. Should a fault occur in one of these devices, the Wind Farm will not have to be shut down by default. However, the export capacity may, under certain outage conditions, be constrained. The extent of the power reduction will depend on the prevailing wind speeds and generator availability.

3.8.1 Codes and Standards

The Transmission Assets are compliant with all industry codes and standards.

3.8.2 Performance and Availability

An electrical system availability study concluded that the transmission system availability was above the default target of 98%.

3.9. Project Timeline

Development of the Project started in 2010 and reached Financial Close in October 2015. Project delivery started immediately following the Financial Close with construction works on the Transmission Assets. Delivery of the NGET onshore connection is expected in Q1 2017 following which commissioning of the Transmission Assets is expected during summer 2017. Export of power from the Project is expected to start during the commissioning period. Following commissioning completion the Wind Farm is scheduled to become fully operational during the first half of 2018 as shown in Figure 3 below.

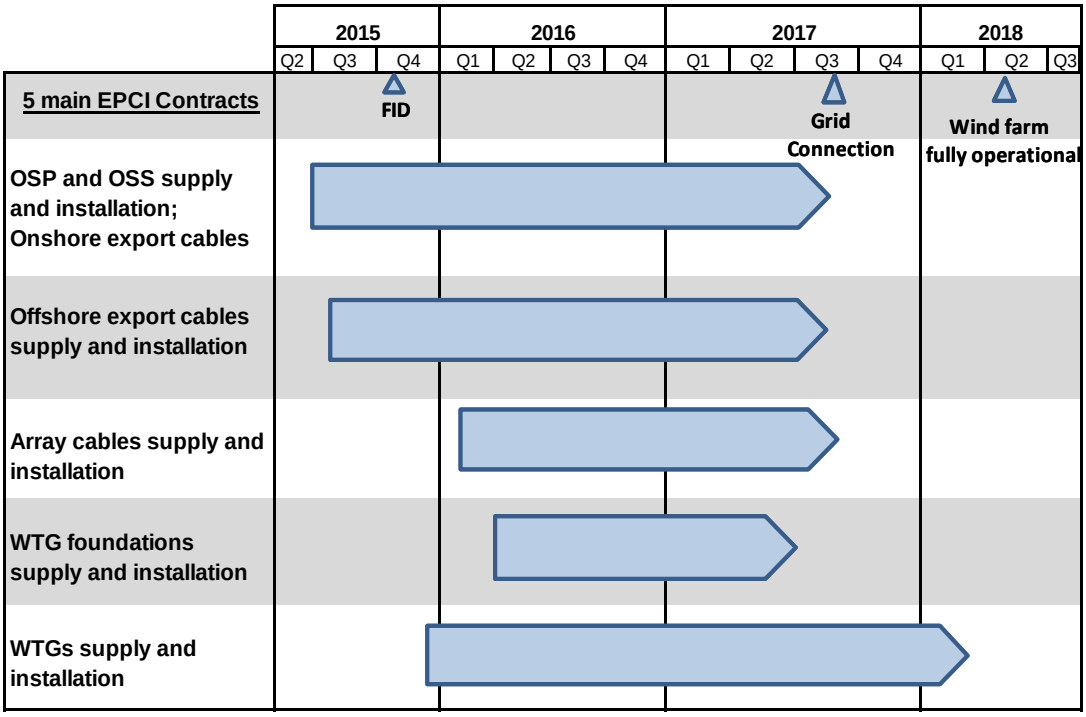


Figure 3. A Gantt chart showing the project highlights.

3.10 Transmission System Design

Table 3. The key transmission network design features of the Transmission Assets.

Key features:	
Expected wind farm design life	23 years.
Composite export circuit capacity	360MVA (180MVA per circuit).
Expected minimum annual availability	The default level is 98% taking into account planned and unplanned maintenance. To be confirmed at ITT.
Technical compliance with industry codes and standards	The overall Electrical System complies with: • The Grid Code. • System Operator - Transmission Owner Code (STC). • National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS or SQSS). • Site Specific Technical Requirements (in accordance with the existing Bilateral Connection Agreement and Construction Agreement). • The Electricity Safety, Quality and Continuity Regulations.

A Connection and Use of System Code (CUSC) Bilateral Connection Agreement has been entered into between the Developer and NGET with Transmission Entry Capacity (TEC) of 340MW at the Transmission Interface Site - NGET's Leiston 132kV substation, and the Connection Entry Capacity (CEC) is 351MW. The TEC will be phased as follows:

- **Stage 1**: 70MW of TEC available from January 2017.
- **Stage 2**: 184MW of TEC (cumulative) in April 2017.
- **Stage 3**: 340MW of TEC (cumulative) in July 2017.

4. Contractual Agreements

The majority of the Transmission Assets will be built under two main EPCI contracts and a third contract for the NGET Unlicenced Works. The strategy to use EPCI contracts mitigates the following risks:

- Interface risk by wrapping the design, fabrication and installation (including vessel supply and port logistics) together.
- Defect liability risk by ensuring that the EPCI contractors have liability for all defects under the respective EPCI contracts, whether supply or installation related.

- Galloper's contracting strategy aims at achieving the optimum balance between limiting the number of contracts and selecting competent contractors working within their knowledge and experience areas. The selected contractors are all market leaders with proven track records in offshore wind and they all have direct experience working with the technology selected for the Project.

- Under the Management Services Deed innogy is responsible for managing quality, programme monitoring and supplier performance on behalf of GWFL.

Table 4 below sets out the main contractors for the delivery of the Project Transmission Assets. The contractor interfaces are shown in Appendix 4.

Contract	Contractor	Services and main equipment
Electrical Systems Works	Alstom Grid UK Limited and Petrofac Facilities Management Limited* (APC Consortium)	Substation design, supply and installation
Offshore Cables	Nkt Cables GmbH & Co KG VBMS (UK) Limited*	Export cables design, supply and installation
Unlicenced Works	National Grid Electricity Transmission Plc	132kV Switchboard extension in Leiston substation

(*) joint and several consortiums.
Note that following Project Financial Close Alstom Grid has been acquired by General Electric Company.

Table 4. Transmission assets construction contracts for the Project

In addition to the main EPCI contracts a limited number of supporting contracts have been agreed in connection with construction aspects of the Project, such as the Enabling Works Agreement for the enabling works to the onshore substation site and the Connection Construction Agreement for the NGET onshore substation, which is standard for this type of project.

5. Disclaimer and Notices

Non-reliance, Accuracy of Information and Exclusion of Liability.

5.1.1 It is the responsibility of each bidder to ensure that it has all of the information it needs to prepare its submissions.

5.1.2 While information provided by Ofgem and/or its advisers in this PIM or otherwise in relation to the Tender Round has been prepared in good faith, neither Ofgem nor any of its advisers make any representation or warranty (express or implied) in relation to the Tender Round or any information provided by developers through data rooms or otherwise. Ofgem and its advisers expressly disclaim any and all liability (other than in respect of fraudulent misrepresentation) based on or relating to any such information or representations or warranties (express or implied) contained in, or errors or omissions from, the PIM or based on or relating to its use by a bidder, a developer and/or any other interested party.

Use of Information.

5.1.3 This PIM is not intended to provide the basis of any investment decision, nor is it intended to be considered as an investment recommendation by Ofgem or by any of its advisers. Each bidder, developer and any other interested party must make its own independent assessment of the qualifying project(s) after making such investigation and taking such professional advice as it deems necessary.

5.1.4 The material in the PIM is not and should not be regarded as legal or professional advice. Bidders, developers and other interested parties should seek their own legal or other professional advice where appropriate.

5.1.5 Nothing in the PIM is intended to, or shall be deemed to establish any partnership or joint venture between Ofgem and any bidder or any developer.

5.1.6 Advisers acting for Ofgem in relation to the Tender Round will not regard any developer or bidder or other interested party as their client or be responsible to anyone other than Ofgem for providing the protections afforded to their clients or for advising any other person on the Tender Round or any matter related to it.

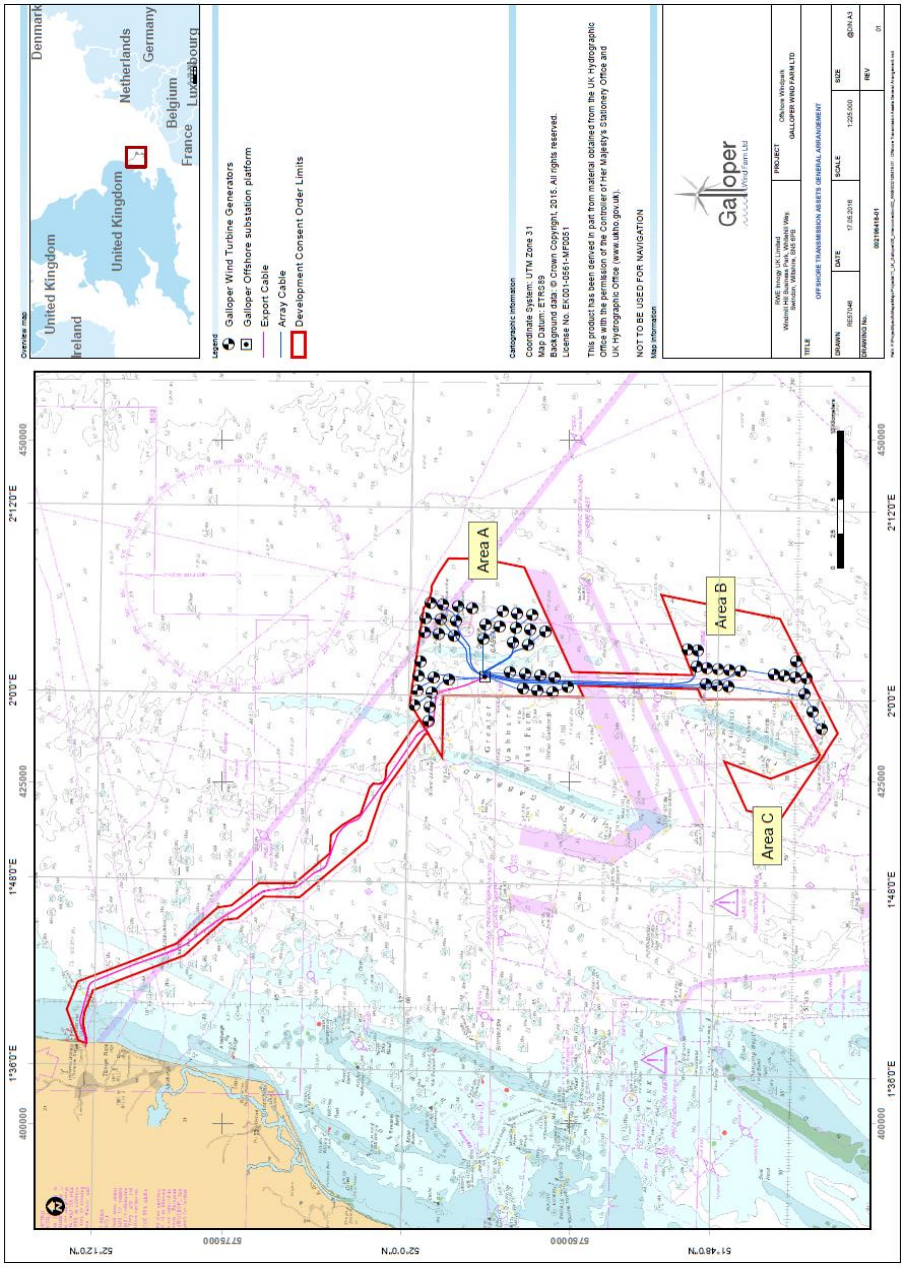
6. Contact Details

The information in this document is provided for information purposes only. It is designed to provide prospective OFTOs, lenders and advisers with certain high-level information related to the Galloper Transmission Assets, to support the launch of the initial, pre-qualification phase of the tender process.

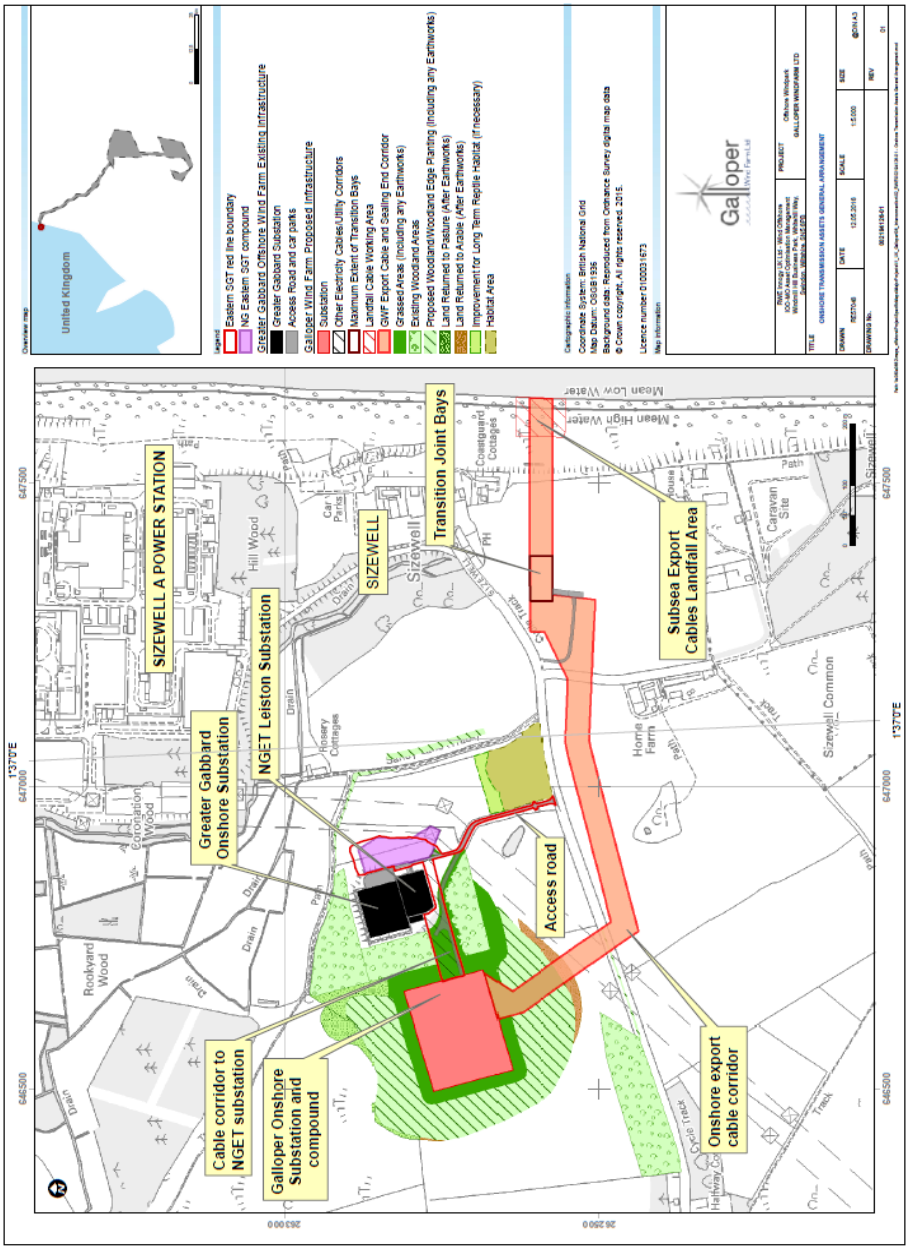
All enquiries or communications, including requests for additional information, should be sent to tendercoordinator@ofgem.gov.uk.

Appendices

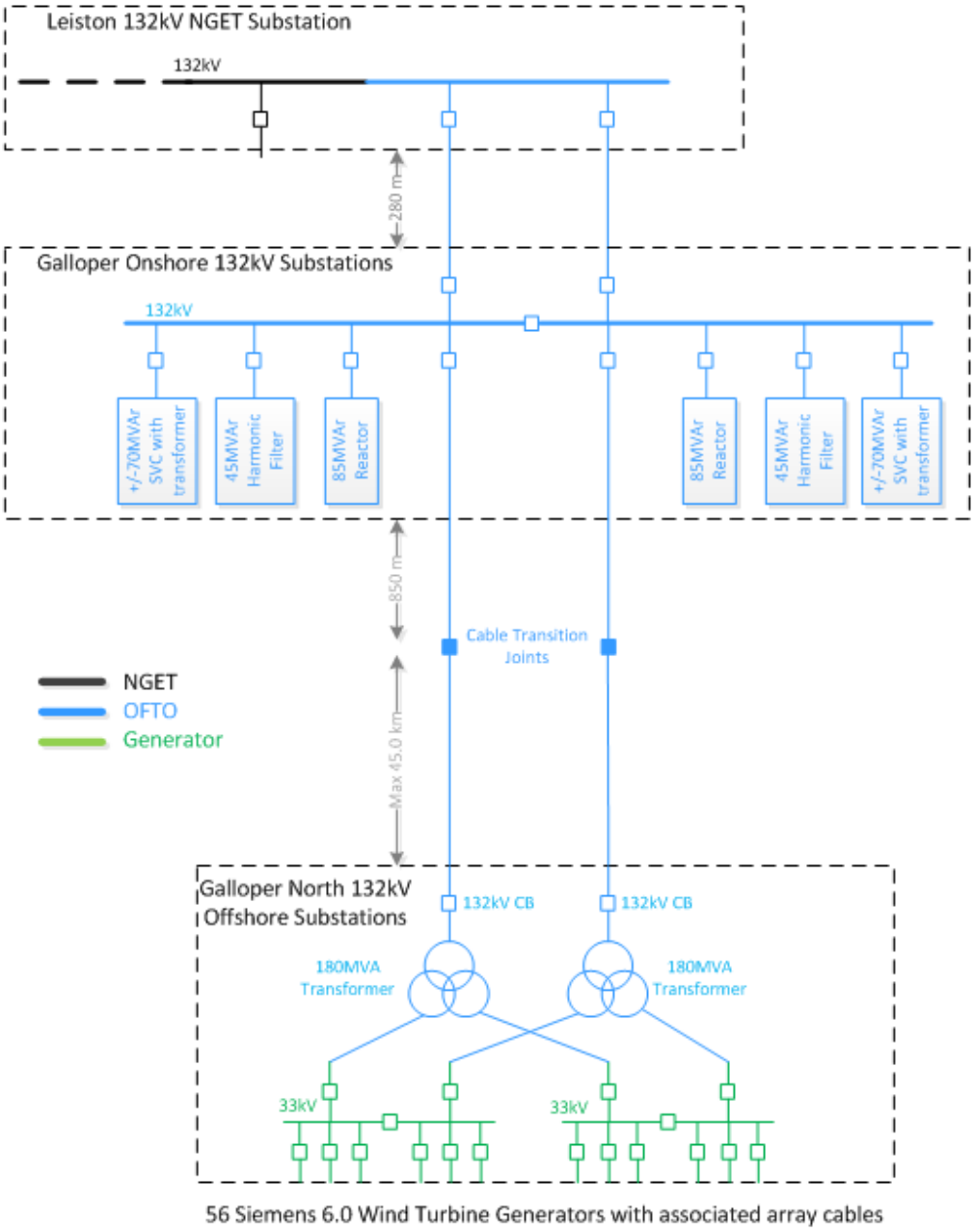
Appendix 1: Offshore Transmission Assets general arrangement



Appendix 2: Location of the onshore substation and cables

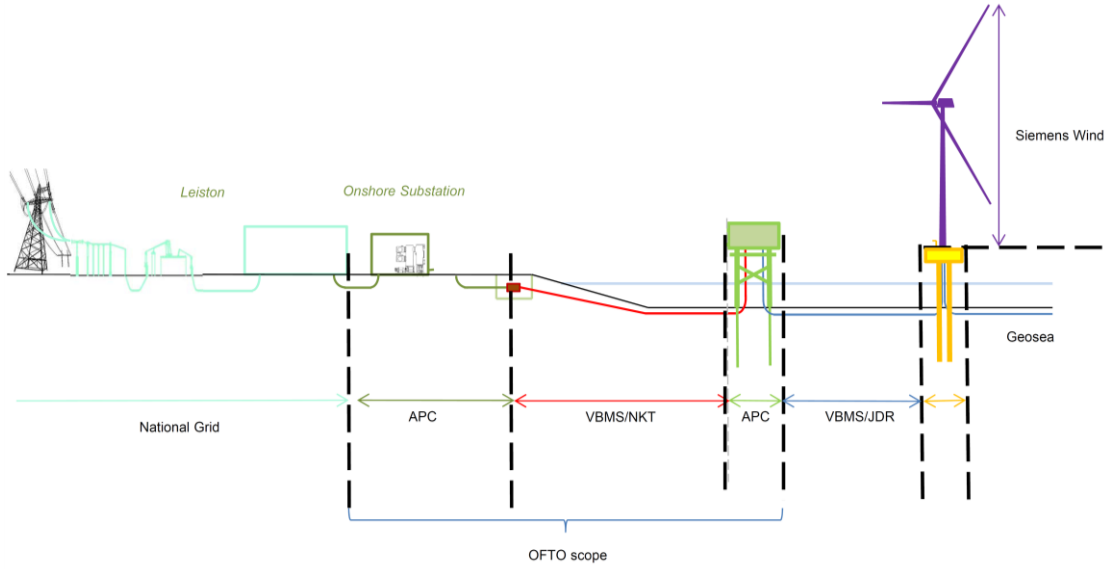


Appendix 3: Galloper HV Single Line Diagram



56 Siemens 6.0 Wind Turbine Generators with associated array cables

Appendix 4: EPCI contractor interfaces



Appendix 5: OSP export cable and array cable layout