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Offshore Transmission Network Review: Decision on asset classification

This letter outlines our decision on the classification of the assets included in National Grid Electricity System Operator's (**NGESO**) first Holistic Network Design (**HND**) into three categories:

- Onshore transmission (reinforcement)
- Radial offshore transmission
- Non-radial offshore transmission

We set out in this letter the regulatory framework, our decision-making process, and resulting classifications and delivery models for this round of HND assets.

Should you have any questions regarding any of the matters raised in this decision, please contact Gareth Gill / Cher-Rae Fairlie at offshore.coordination@ofgem.gov.uk to discuss.

Yours sincerely
Stuart Borland
Deputy Director, Offshore Network Regulation

Background

Offshore Transmission Network Review

The Offshore Transmission Network Review (**OTNR**) was launched by the Department for Business, Energy and Industrial Strategy (**BEIS**) in July 2020 to ensure transmission connections for offshore wind generation are delivered in the optimal way, considering the United Kingdom's increased ambition for offshore wind to achieve net zero whilst balancing environmental, social and economic costs.

The Government's Ten Point Plan for a Green Industrial Revolution, published in November 2020, set an ambitious offshore wind target of 40GW by 2030.[1] In April 2022, the then-Prime Minister announced a new British Energy Security Strategy (**BESS**), which built on previous offshore wind targets to set an ambition of 50GW of offshore wind by 2030.[2]

To achieve the objectives of the OTNR, there are four workstreams operating in parallel, with varying degrees of Ofgem involvement. These are Early Opportunities, Pathway to 2030 (**PT2030**), Multipurpose Interconnectors (**MPIs**) and Future Framework (formerly referred to as the Enduring Regime). This decision on asset classification relates to the HND which forms part of the PT2030 workstream.

Pathway to 2030

PT2030 is the medium-term workstream, covering largely the projects delivered through the Crown Estate (**TCE**) Leasing Round 4 (**LR4**) and Crown Estate Scotland (**CES**) ScotWind leasing rounds, which will make a significant contribution to the government's 50GW ambition for offshore wind by 2030.

One of the objectives of the PT2030 workstream, is to ensure that all network infrastructure (both onshore and offshore) necessary to connect projects in scope, is designed in a coordinated manner with an optimal engineering solution. This must be done at the same time as considering the economic, environmental and community impacts.

[1] The Ten Point Plan for a Green Industrial Revolution (publishing.service.gov.uk)
[2] British energy security strategy - GOV.UK (www.gov.uk)

Holistic Network Design

NGESO published the HND[3] in July 2022 as part of the PT2030 workstream. The HND sets out a single, first-of-its-kind, integrated design for connecting 23GW of offshore wind. It is a first step towards more centralised, strategic network planning and is estimated to lead to overall net consumer savings of approximately £5.5bn. The recommended design leads to an additional £7.6 billion of capital costs due to the additional offshore infrastructure. However, this is outweighed by the £13.1 billion savings in constraint costs that are expected to result from the additional network capacity this infrastructure provides.[4]

The HND includes the National Electricity Transmission System (**NETS**) reinforcements required both offshore and onshore to facilitate the new connections. The inclusion of offshore and onshore infrastructure requires a process of asset classification to determine the purpose for which an asset will be constructed.

We have produced this decision setting out the criteria for asset classification without undue delay in order to allow the relevant parties responsible for the delivery of HND assets sufficient time to progress forward with the Detailed Network Design (**DND**), which will be required for the onshore and offshore assets under consideration.

As set out above, to enable the government's 2030 policy ambition, the first iteration of the HND will drive the coordination of offshore projects progressing through TCE LR4 and CES ScotWind connecting to the transmission system by 2030. The design also includes a small number of projects outside the scope of LR4 and ScotWind.

The HND Follow Up Exercise (**HNDFUE**)[5] includes those ScotWind leaseholders which were not included in the July HND (17.8GW) and 4GW of generation expected to receive seabed leases through The Crown Estate's Celtic Sea floating offshore wind leasing round. In addition to the HND, the DND will be required for each of the onshore and offshore assets under consideration to provide the detailed engineering and routing designs.

Purpose of this letter

In May 2022 we published our minded-to decision and further consultation on Pathway to 2030.[6] In that consultation, we recognised that the HND would include both onshore and

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[3] A Holistic Network Design for Offshore Wind | National Grid ESO
[4] ""ESO Cost savings are calculated over a 40-year asset life period, starting in 2030, using 2021 prices
[5] The ESO is currently developing the HNDFUE, which aims to provide in scope developers with follow up recommendations in Q1 2023.
[6] Minded-to Decision and further consultation on Pathway to 2030 | Ofgem

offshore transmission assets, the ownership of which being either Transmission Owners (**TOs**) or offshore transmission owners (**OFTOs**) respectively. We noted within the May 2022 publication that we would provide further guidance on the delineation between onshore and offshore assets for the purpose of asset classification following completion of the HND and would be based on the purpose for which the asset is constructed, rather than the physical location of the asset itself.

The purpose of this letter is to set out our process and decisions for the classification of assets set out in the July 2022 HND using both technical and legal evaluation against the provisions of the Act as set out in more detail below. We consider that assets will fall within one of the following classifications:

- onshore transmission, where the asset is constructed for the purpose of reinforcement of the existing transmission system
- radial offshore transmission, where the asset is constructed for the purpose of transporting offshore-generated power from a single generating station
- non-radial offshore transmission, where the asset is constructed for the purpose of transporting offshore-generated power from more than one generating station

We have reached the conclusions in this letter based on the assumption that all projects in this HND will be delivered in similar timescales. In certain circumstances we have had to consider the timing of delivery of assets using the best information available to us from, amongst others, developers, TCE and NGESO.

We intend to apply the process detailed in this letter to the HNDFUE. This letter will also provide an overview of the relevant regulatory framework underpinning the decisions made.

We acknowledge that certainty on delivery of assets and associated infrastructure is required. This will be addressed within the DND and Bilateral Connection Agreements (**BCA**).

Asset Classification

Introduction

As set out above, the HND includes the network infrastructure that the ESO considers is optimal to deliver the offshore wind generation required to meet targets. The assets included in the HND will be used for activities which require a licence under current legislation. As sector regulator, and under the Act, Ofgem is responsible for granting licences to companies and ensuring that those companies comply with the requirements and conditions as set out within their licence.

In order for the correct licence to be granted in respect of the relevant asset, we have set out the criteria which should be used to determine the appropriate classification of each asset.

There are different delivery and ownership implications dependent on whether an asset is classified as onshore or offshore. Additionally, the application of codes and standards, as well as connection contracts, may vary depending on the classification of assets. Assets can only be classified as either onshore or offshore, but not both. Once an asset included in the HND has been classified in accordance with the technical and legal criteria, this will not be reopened at a later date or as a result of the HNDFUE.

Onshore Assets

Under the Act onshore transmission is any transmission not falling within the definition of offshore transmission[7] and under the existing regime onshore transmission assets are owned by TOs.

Where the HND projects meet the criteria for onshore transmission, the relevant TOs will be responsible for developing the DND of these projects. Our expectation is that these projects are likely to qualify for consideration under the Large Onshore Transmission Investment (**LOTI**) mechanism under the existing RIIO-2 price control framework. Under the LOTI mechanism, TOs are able to submit funding requests for the delivery of the pre-construction work required to develop the DND of qualifying projects.

We recently published a consultation[8] on proposals to speed up the regulatory process for strategically important LOTI projects that are critical for the delivery of our 2030 offshore wind ambitions, the Accelerated Strategic Transmission Investment (**ASTI**) framework. Given that these projects are at an earlier stage of development than projects proposed to fall within the ASTI framework, we will decide on whether to include these projects within the ASTI framework once the delivery plans for the projects are sufficiently developed.

We intend to publish our decision on the ASTI framework in December. Within this decision, we expect to confirm whether the delivery plans for any of the projects are sufficiently developed and robust enough for us to include them in the ASTI framework. We will also confirm the next steps with regards to pre-construction funding for these projects.

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[7] S4 of EA1989 regarding electricity transmission
[8] Consultation on accelerating onshore electricity transmission investment | Ofgem

Offshore Assets

Offshore transmission is defined in the Act[9], with "relevant offshore lines" being assets which are constructed wholly or mainly for the purpose of transmitting electricity generated in offshore waters. Transmission licences for assets with this classification, are granted following a competitive tender process under the OFTO transmission licensing regime (**the OFTO regime**) in accordance with the Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015.

To date, all offshore transmission assets have been radial offshore transmission assets (as set out below). However, under a coordinated design there will be offshore transmission assets which will not meet the criteria of radial assets and we therefore require a new classification. This classification is non-radial offshore transmission.

The classification of *radial offshore* or *non-radial offshore* is important because it will have an impact on how the assets are designed, built and operated. The distinction between these assets is presented below. We additionally set this out in our minded-to decision and further consultation on PT2030.[10]

Radial offshore transmission

We consider a radial offshore solution to be a transmission system which fulfils both of the following criteria:

- Infrastructure is used for transmission in an area of offshore waters of electricity generated by **a single generating station** in such an area, and
- Infrastructure connecting a single offshore generating station **directly to a point on the transmission system owned by a transmission owner**. This point may be physically located onshore or offshore, and its designation as onshore or offshore will be determined by its **primary electrical function** (primary usage), as opposed to its location.

Non-radial offshore transmission

We consider a non-radial offshore solution to be a transmission system which fulfils both of the following criteria:

[9] S.6C and S.64 of EA1989 regarding offshore transmission
[10] Minded-to Decision and further consultation on Pathway to 2030 | Ofgem

- Infrastructure used for transmission in an area of offshore waters of electricity generated by **two or more generating stations** in such an area, and
- Infrastructure connecting two or more offshore generating stations to a **point on the transmission system owned by a transmission owner**. This point may be physically located onshore or offshore, and its designation as onshore or offshore will be determined by its **primary electrical function** (primary usage), as opposed to its location.

Onshore Reinforcement

The initial stage of the classification process is the identification of assets which will fall within the category of onshore transmission. We consider onshore classifications under this process to be reinforcement of the onshore transmission network. This is because, in the HND, assets with an onshore classification will run electrically parallel to the existing transmission network, as they will transport power from onshore generating stations to another point on the transmission system. In order to ensure the maximum network reinforcement benefit is delivered, we consider it necessary to first ascertain potential reinforcement links before classifying other assets.

Where the primary usage of the asset is found to be onshore, this must constitute complete onshore reinforcement, ie ultimately form part of a wider link which connects two points on the onshore transmission network. In principle, this is similar to the planned Eastern and Western HVDC projects.[11] The value of this type of reinforcement link increases with the number of transmission boundaries crossed.

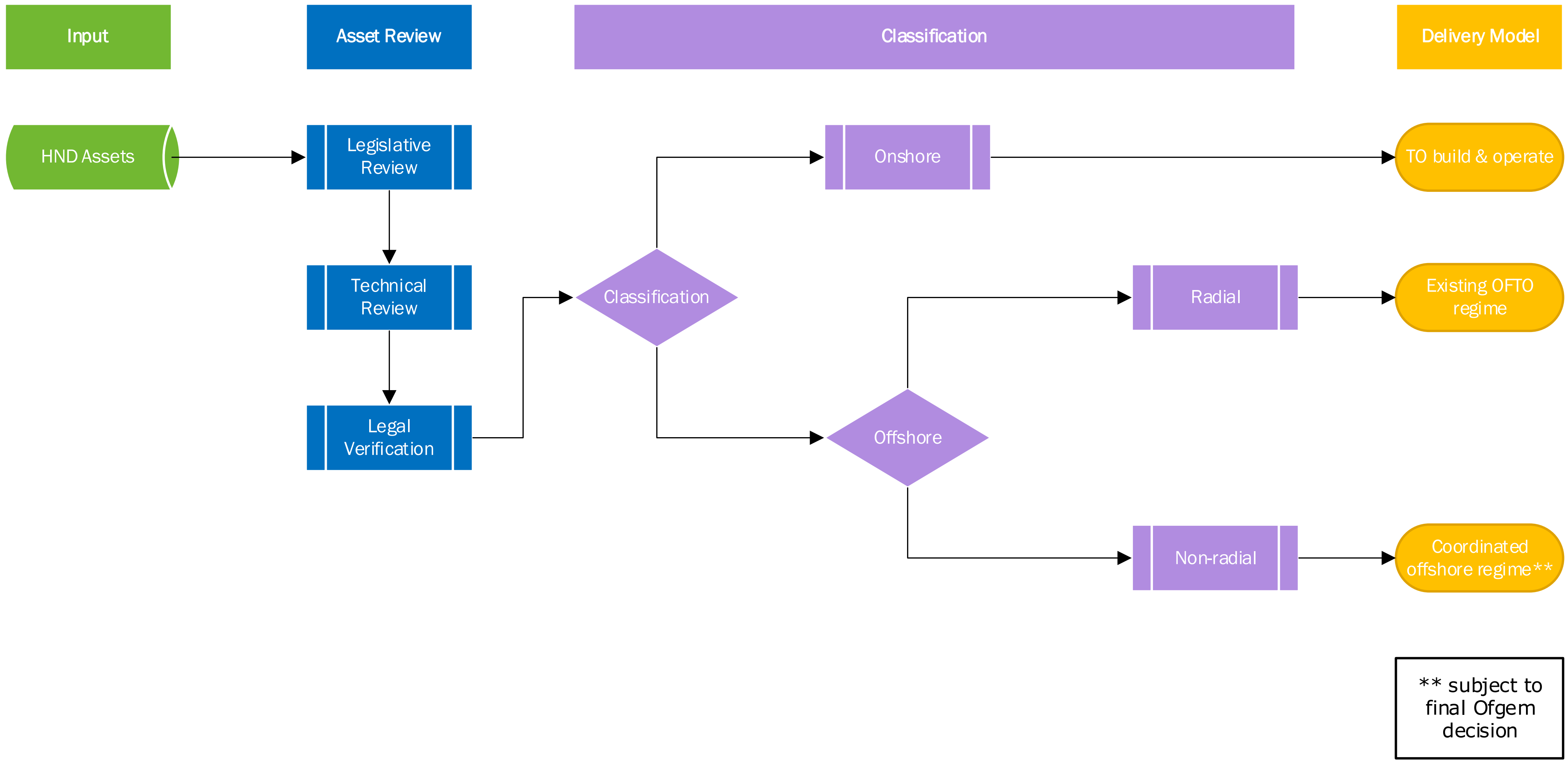
Therefore, should we reach an **onshore** classification, we will seek to ensure that this link provides the maximum reinforcement benefit in line with results from the asset classification process. We outline our decisions on onshore reinforcement assets within **Annex 1.**

Classification Process

The following flowchart in **Figure 1** details the assessment process for reaching asset classifications. The asset classification process is made up of three distinct stages, which allows us to arrive at one of the three classifications as outlined in legislation and policy definitions: onshore, radial offshore, and non-radial offshore. More detail is provided on the function of each stage of the asset review: legislative review, technical review, and legal verification.

[11] Eastern HVDC – Conditional Decision on the projects' Final Needs Case | Ofgem

Figure 1 – Asset Classification Process Flowchart



Legislative Review

The first stage of the process is to consider the nature of the asset in question in accordance with the provisions of the Act. The Act defines transmission and offshore transmission as a sub-set of the activity of transmission.

Offshore transmission involves relevant offshore lines which are high voltage electric lines constructed wholly or mainly for the purpose of conveying electricity generated offshore.[12] On this basis we consider that assets can be classified as either onshore or offshore depending on if the relevant asset's activity is either wholly or mainly onshore or offshore. The primary usage of an asset as either offshore (radial or non-radial) or onshore will be determined following technical analysis.

Technical Review

The purpose of the technical review is to establish the primary usage of assets included within the HND, under one of the three designated classifications: onshore transmission reinforcement, radial offshore transmission, and non-radial offshore transmission.

In order to determine the primary usage of an asset, we consider the following characteristics of each asset in question:

- *Power flows*: are used to establish where power is coming from, and to where it moves across the network.
- *Capacity utilisation*: in this context refers to the usage of the rated capacity (in MW) of cabling, or maximum power which can be transported at one time. This forms the baseline for examining the proportion of power flowing to and from assets and is crucial when examining multiple assets on the network. We examine the extent to which assets make use of surrounding infrastructure, as this illustrates how the assets will be used.
- *Security and Quality of Supply Standard (SQSS),[13]* which we examine with particular regard for compliance with limits to loss of power infeed risks – ie the risk of losing connected generation and the mechanisms in place to avoid losses. This strengthens the rationale for classification of assets under the HND, as the SQSS sets out requirements for network stability.

[12] S.6C and S.64 of EA1989 (Electricity Act 1989 (legislation.gov.uk))
[13] SQSS Code Documents | National Grid ESO

Legal verification stage

At this stage of the asset review process, we confirm our results from the technical review. We assign a final classification on this basis so that Ofgem can determine the appropriate licence and delivery model for the activity being carried out.

If the asset in question is **not** *wholly or mainly* constructed for conveying power generated offshore to any other place, we arrive at the *onshore reinforcement* classification. In the first instance, we use power flows and capacity to determine this. However, when power flow and capacity data is inconclusive we then consider the subsequent parts of the link with the *highest* correlation to onshore (transmission) flows to continue the reinforcement link.

Otherwise, if the asset **is** *wholly or mainly* constructed for transmission of electricity generated offshore a classification of *offshore* transmission is decided, which has two sub-classifications. We then examine whether an asset is used for one or more than one purpose, which leads us to a sub-classification of:

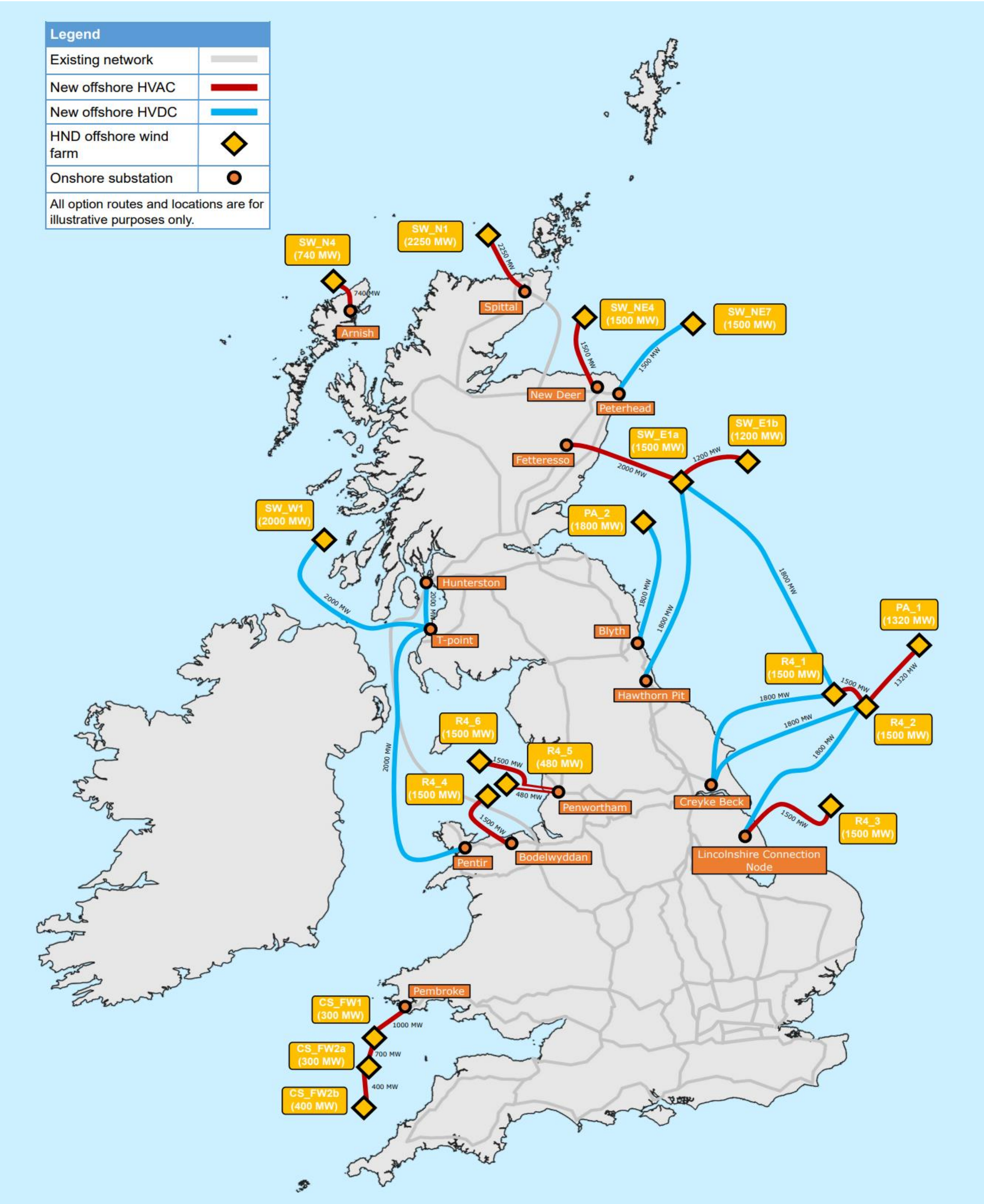
- *Radial offshore*, where an asset is constructed for the purpose of conveying power generated offshore by one generating station
- *Non-radial offshore,* where an asset is constructed for the purpose of conveying power generated offshore by more than one station

Upon classifying into one of the three classifications, this will determine the type of transmission licence which will be required. It is important to note that the classification process will not result in a licence and parties will still be expected to undergo the usual application process. However, once a licence is granted, it will **not be subject to change in future**.

HND Asset Classifications

Figure 2 below sets out National Grid ESO's HND, for proposed assets necessary for delivering 23GW of offshore wind capacity by 2030. We make use of this diagram to illustrate the classification decisions and provide us with information on the structure and detail of connections. The following classifications are supported with detailed information provided by the ESO.

Figure 2 – NGESO HND



Assessment

We have applied the classification process to the HND (as shown in **Figure 2**). The process has identified transmission assets which are onshore, radial offshore and non-radial offshore. We set out classifications in the table below and give further detail on the process as applied to each asset within the following annexes, where **Annex 1** in the first instance sets out onshore reinforcement classifications.

Table 1 – Classification of assets

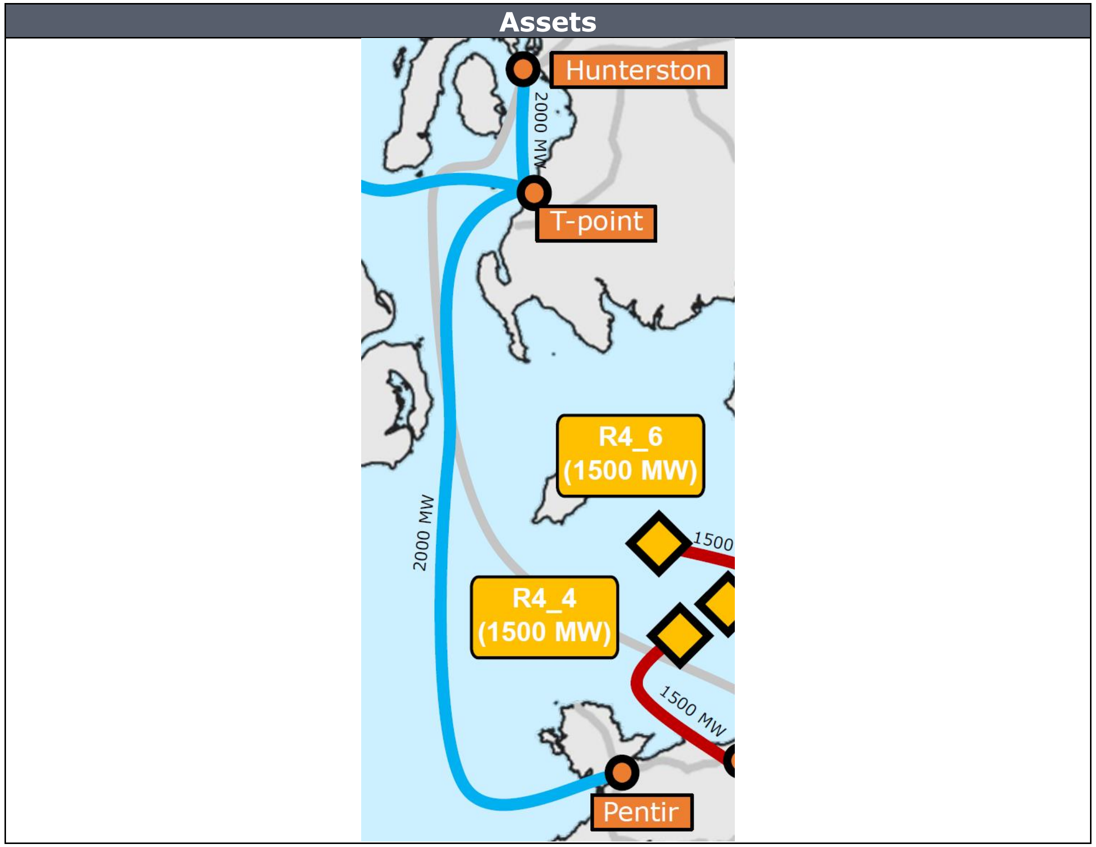
Circuit	Classification
PA_2 - Blyth	Radial Offshore
SW_NE4 - New Deer	Radial Offshore
R4_2 – Creyke Beck	Non-radial Offshore
R4_2 - Lincolnshire	Onshore
R4_1 – Creyke Beck	Non-radial Offshore
R4_1 – R4_2	Onshore
Fetteresso - SW_E1a	Onshore
PA_1 – R4_2	Radial Offshore
SW_E1b - SW_E1a	Radial Offshore
SW_W1 - T-Point	Radial Offshore
SW_NE7 - Peterhead	Radial Offshore
R4_4 - Bodelwyddan	Radial Offshore
R4_5 - Penwortham	Radial Offshore
R4_6 - Penwortham	Radial Offshore
SW_E1a - Hawthorn Pit	Non-radial Offshore
SW_E1a - R4_1	Onshore
SW_N4 - Arnish	Radial Offshore
R4_3 - Lincolnshire	Radial Offshore
Hunterston – T-point	Onshore
Pentir – T-point	Onshore
SW_N1 - Spittal	Radial Offshore

Annex 1. Onshore reinforcement classification

a. West Coast reinforcement

The west coast has a number of onshore reinforcement classifications. Following the asset classification process, there are two links:

- T-point – Hunterston
- T-point – Pentir

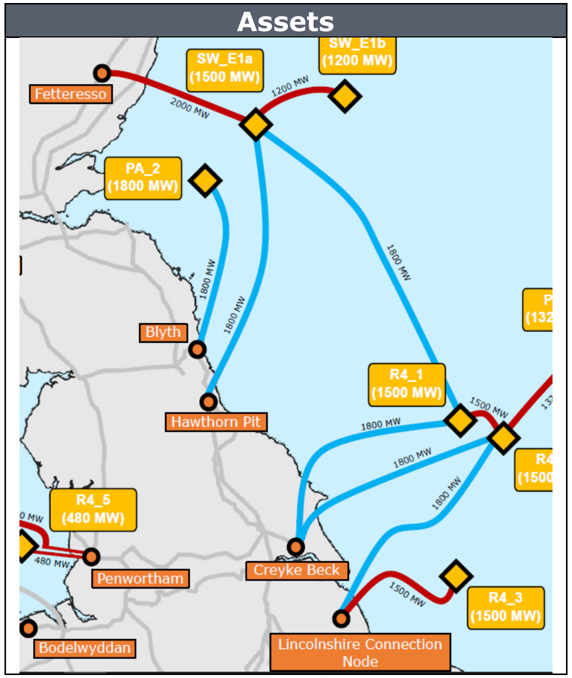


Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
T-point – Hunterston	Infrastructure is used for transmission of electricity between two points onshore.	Predominantly from Hunterston to onshore substation	2,000MW HVDC cable connecting from onshore to onshore substation	Neither wholly nor mainly used to convey electricity generated offshore, therefore onshore	Onshore (reinforcement)	TO build
T-point – Pentir	Infrastructure is used for transmission of electricity between two points onshore.	Predominantly from onshore substation to Pentir	2,000MW HVDC cable connecting from onshore to onshore substation	Neither wholly nor mainly used to convey electricity generated offshore, therefore onshore	Onshore (reinforcement)	TO build

b. East Coast reinforcement

The east coast region of the HND has a number of onshore reinforcement classifications. Through the asset classification process, we have determined that this link constitutes:

- Fetteresso – SW_E1a
- SW_E1a – R4_1
- R4_1 – R4_2
- R4_2 – Lincolnshire Connection Node



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
Fetteresso – SW_E1a	Infrastructure is used for transmission in offshore waters, of electricity generated onshore. Used for conveying electricity generated onshore through transmission system.	Mostly unidirectional (bidirectional possible) flow from Fetteresso to offshore substation	2,000MW HVAC cable connecting to offshore substation	Neither wholly nor mainly used to convey electricity generated offshore, therefore onshore. This is the first point of connection for onshore reinforcement in this cluster.	Onshore (reinforcement)	TO build
SW_E1a – R4_1	Infrastructure is used for transmission in offshore waters, of electricity generated onshore. Used for conveying electricity generated by onshore through transmission system.	Predominantly from SW_E1a substation to R4_1 substation	2,000MW onshore HVAC cable (most), 1,500MW OWF and substation using 1,800MW HVDC cable	Neither wholly nor mainly used to convey electricity generated offshore, therefore onshore. Continuing reinforcement from Fetteresso.	Onshore (reinforcement)	TO build
R4_1 – R4_2	Infrastructure is used for transmission in offshore waters of power generated onshore. Used to convey this power to transmission system (redundancy).	Bidirectional flow between R4_1 and R4_2 substations, but mostly from R4_1 to R4_2.	1,800MW HVDC (main user), 1,500MW OWF and substation using 1,500MW HVAC cable	Neither wholly nor mainly used to convey electricity generated offshore, therefore onshore. Continuing reinforcement from SW_E1a.	Onshore (reinforcement)	TO build
R4_2 - LCN	Infrastructure is used for transmission in offshore waters of power generated onshore. Used to convey this power to transmission system (redundancy).	Unidirectional flow from R4_2 substation to onshore substation.	1320MW OWF, 1500MW OWF, 1500MW onshore reinforcement, using 1800MW HVDC**	Mainly, but not wholly use to convey power generated offshore**. However, this link completes reinforcement from R4_2.	Onshore (reinforcement)	TO build

** while the power flow data here shows a small correlation in favour of amalgamated offshore generation, of the two links (R4_2 – Creyke Beck and R4_2 – Lincolnshire) considered to complete the reinforcement link, R4_2 to Lincolnshire shows the highest correlation to onshore power flow. Therefore, we consider this link to complete the reinforcement south from Fetteresso.

The complete reinforcement link connects the furthest north to furthest south points, crossing the highest number of transmission boundaries on the east coast.

Annex 2. Offshore asset classification

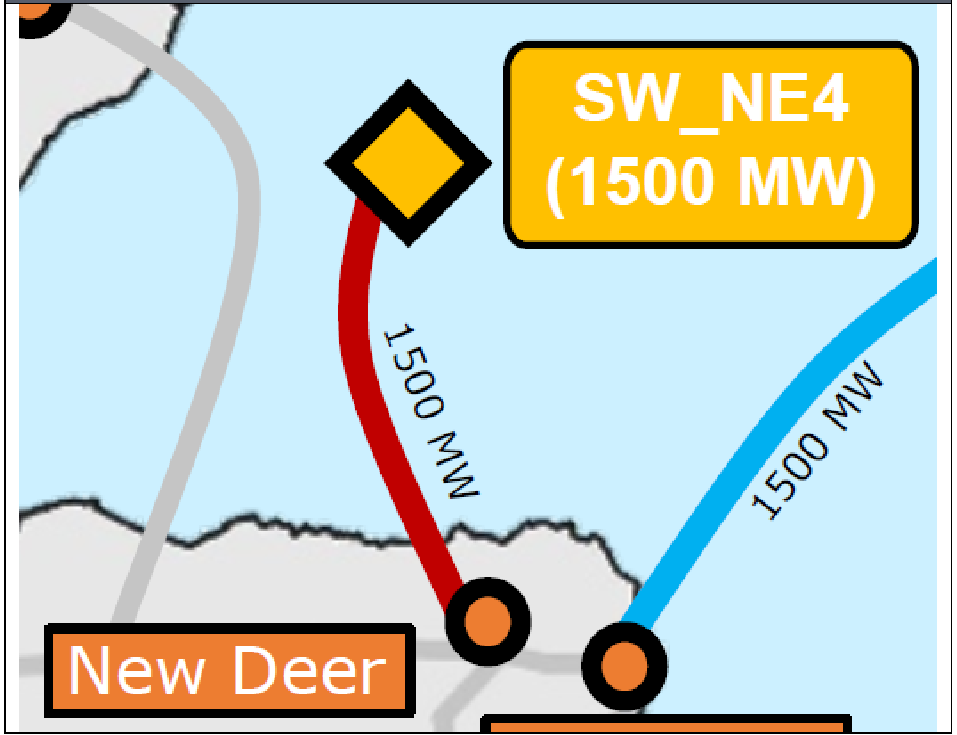
a. PA_2

Asset


Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
PA_2 – Blyth	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from PA_2 substation to onshore substation	1,800MW OWF and substation using 1,800MW HVDC cable	wholly used to convey power generated offshore at PA_2 OWF to onshore substation	Radial Offshore	Existing OFTO regime

b. SW_NE4

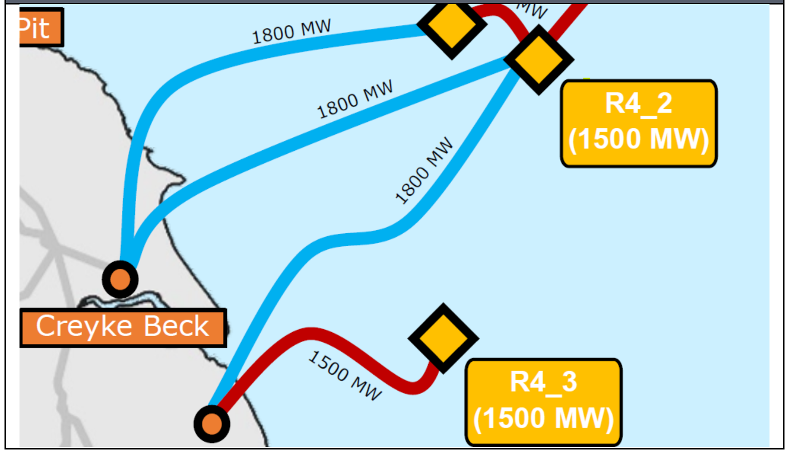
Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
SW_NE4 – New Deer	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from SW_NE4 substation to onshore substation	1,500MW OWF and substation using 1,500MW HVAC cable	Wholly used to convey power generated offshore at SW_NE4 OWF to onshore substation	Radial Offshore	Existing OFTO regime

c. R4_2

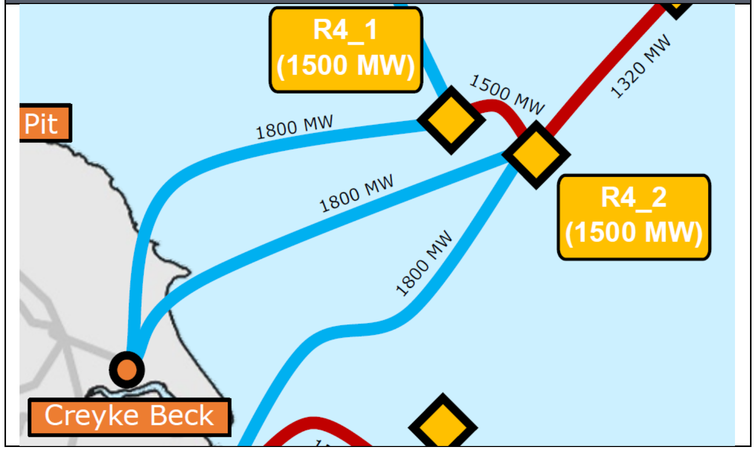
Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
R4_2 – Creyke Beck	Infrastructure is used for transmission in offshore waters, of electricity generated by more than one generating station. Used for conveying electricity generated by OWFs to transmission system.	Predominantly from R4_2 substation to CB onshore substation with some potential flow to R4_1 substation. Some flow expected from PA_1.	1,500MW OWF and substation with using 1,800MW HVDC cable. 1500MW incoming from R4_1 and 1320MW from PA_1	Mainly but not wholly, used to convey power generated offshore at R4_2 OWF to onshore substation. Power also expected from onshore reinforcement, R4_1 and PA_2	Non-radial Offshore	Coordinated offshore regime

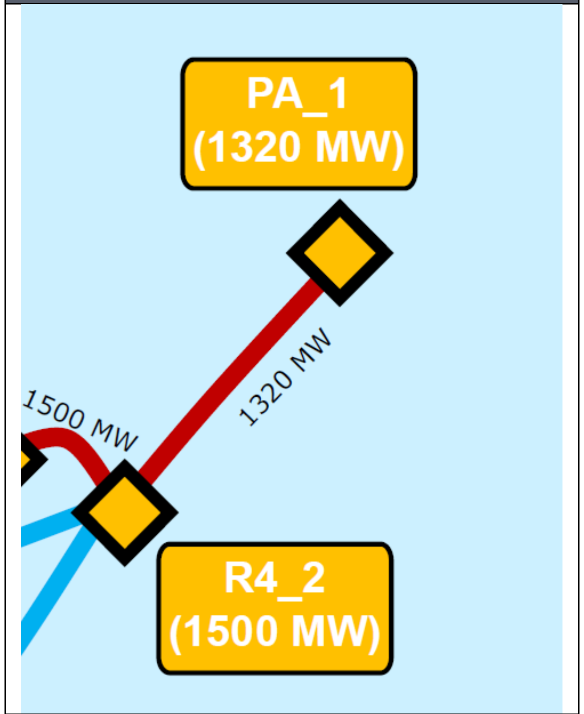
d. R4_1

Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
R4_1 – Creyke Beck	Infrastructure is used for transmission in offshore waters, of electricity generated by more than one generating station. Used for conveying electricity generated offshore to transmission system.	Predominantly from R4_1 to Creyke Beck. Bidirectional possible to R4_2.	1,500MW OWF (main user) and substation using 1,800MW HVDC cable, 1,800MW HVDC cable from north	Mainly, but not wholly, used to convey power generated offshore at R4_1 OWF to onshore substation. Power also coming from onshore reinforcement link.	Non-radial Offshore	Coordinated offshore regime

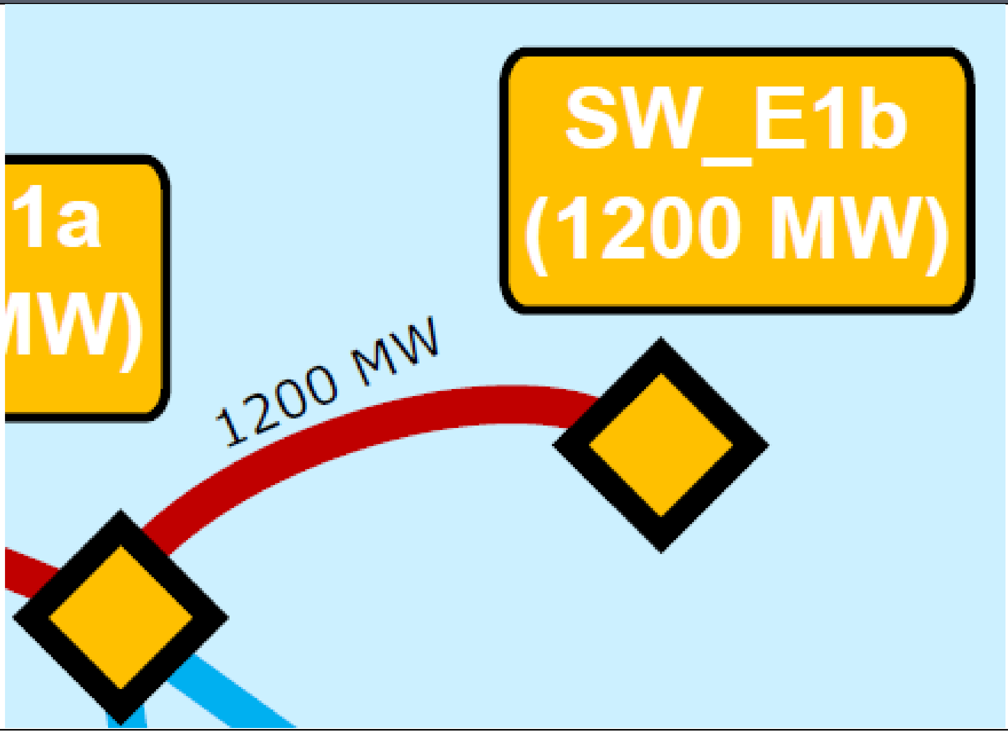
e. PA_1

Asset


Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
PA_1 – R4_2	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to substation.	Unidirectional flow from PA_1 substation to R4_2 substation	1,320MW OWF and substation using 1,320MW HVAC cable	Wholly used to convey power generated offshore at PA_1 OWF to offshore substation	Radial Offshore	Existing OFTO regime

f. SW_E1b

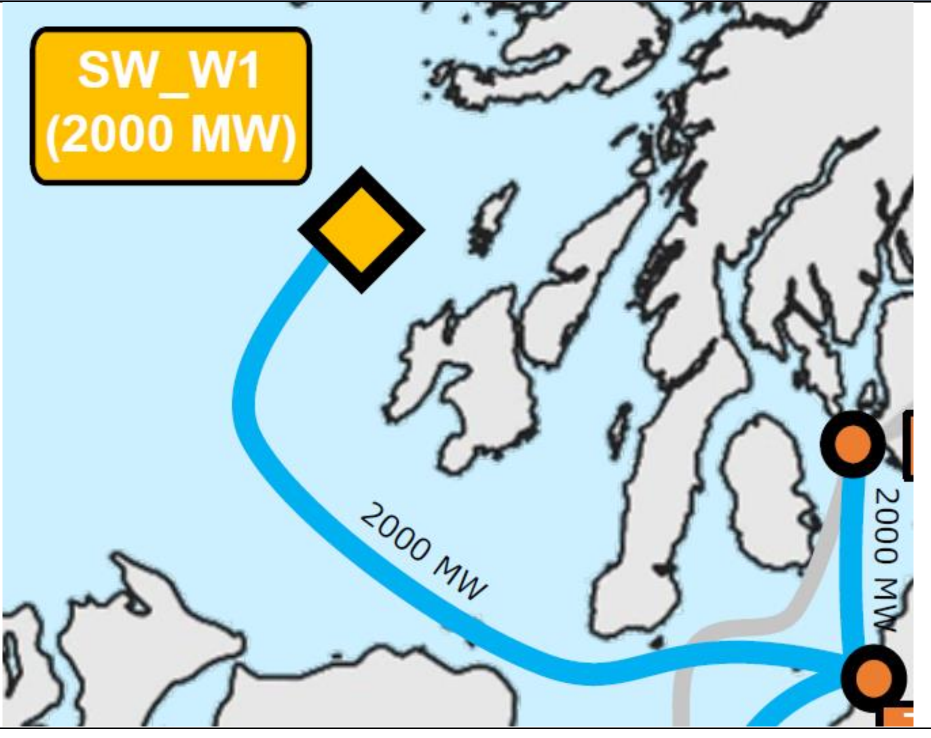
Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
SW_E1b – SW_E1a	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to offshore substation.	Unidirectional flow from SW_E1b substation to offshore substation	1,200MW OWF and substation using 1,200MW HVAC cable	Wholly used to convey power generated offshore at SW_E1b OWF to onshore substation	Radial Offshore	Existing OFTO regime

g. **SW_W1**

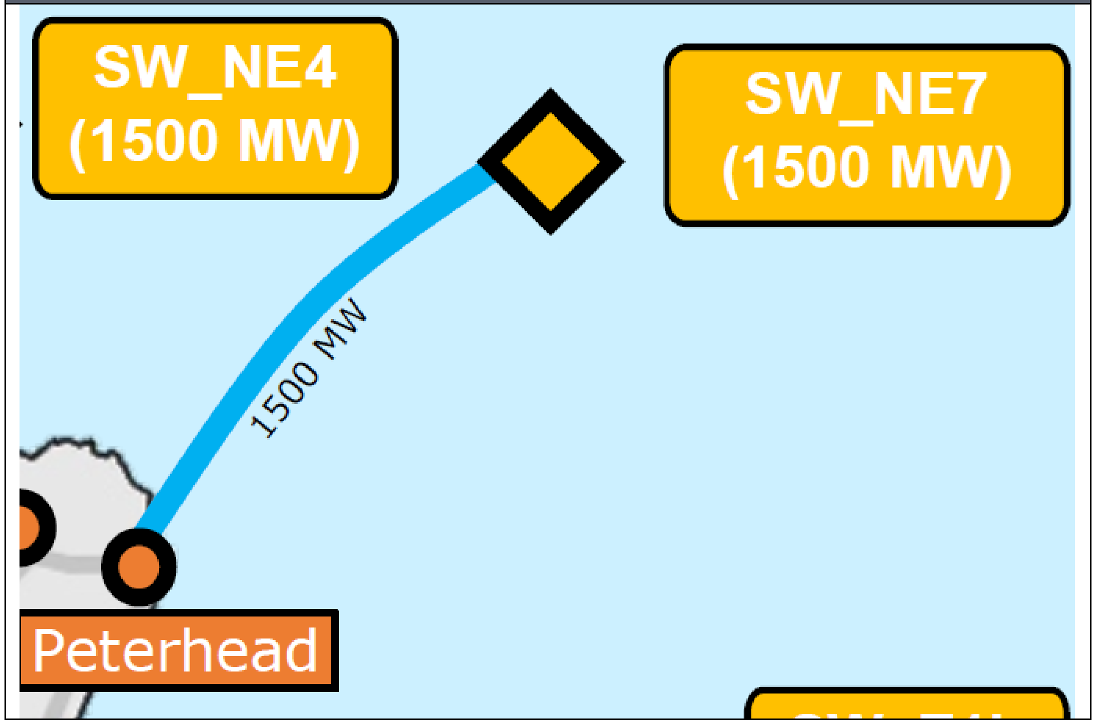
Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
SW_W1 – T-point	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from SW_W1 substation to onshore substation	2,000MW OWF and substation using 2,000MW HVDC cable	Wholly used to convey power generated offshore at SW_W1 OWF to onshore substation	Radial Offshore	Existing OFTO regime

h. SW_NE7

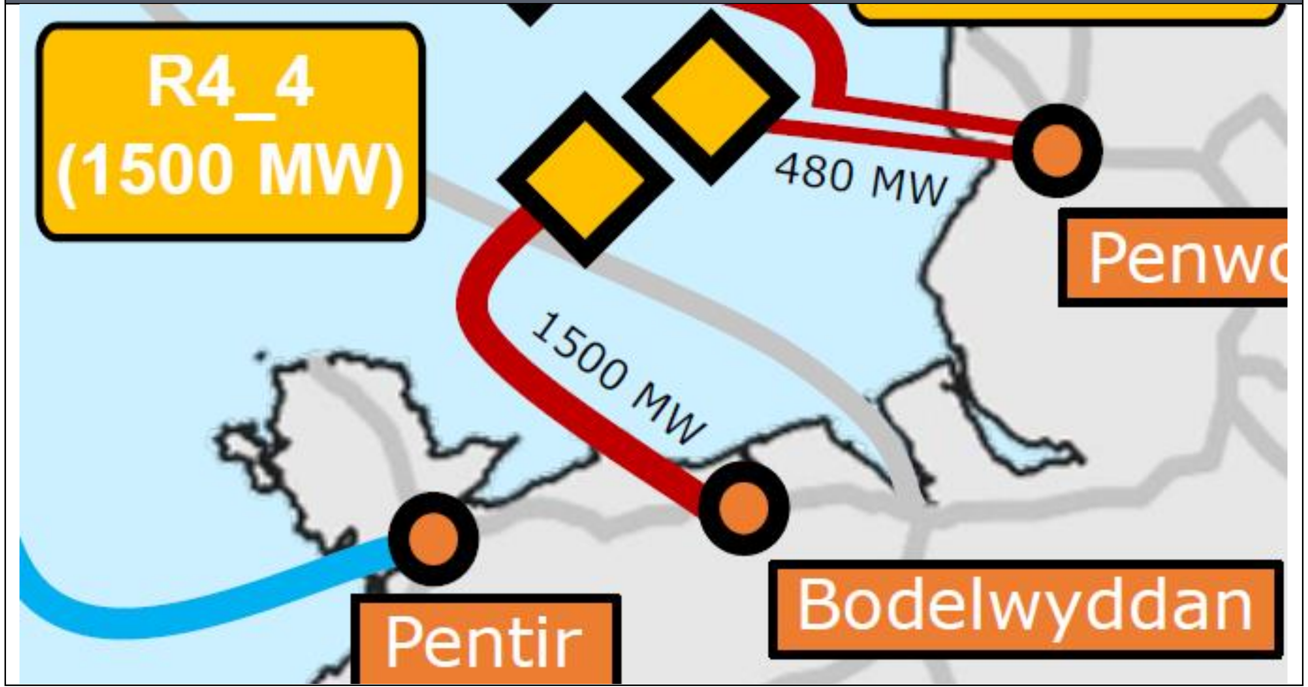
Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
SW_NE7 - Peterhead	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from SW_NE7 substation to onshore substation	1,500MW OWF and substation using 1,500MW HVDC cable	Wholly used to convey power generated offshore at SW_NE7 OWF to onshore substation	Radial Offshore	Existing OFTO regime

i. R4_4

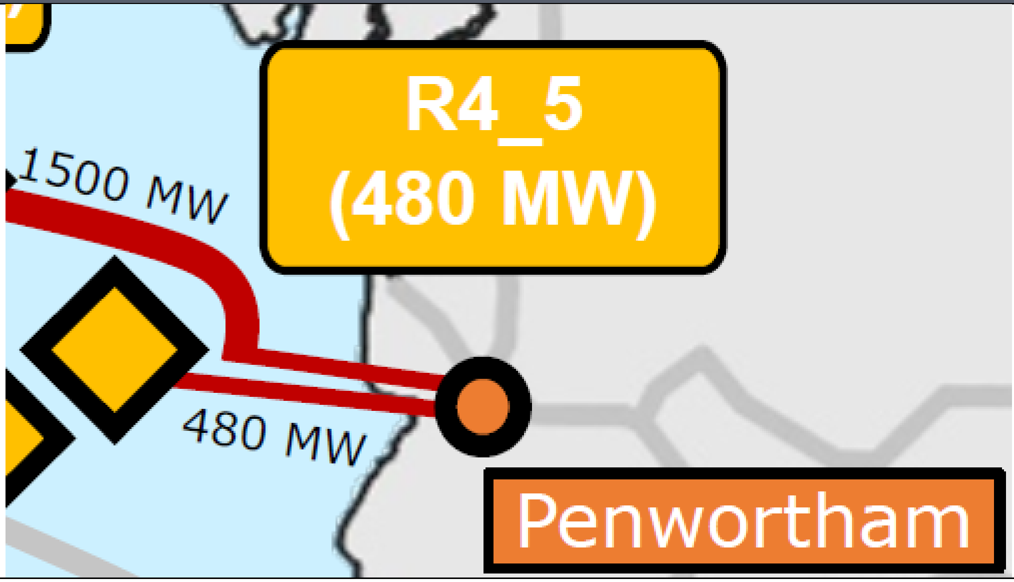
Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
R4_4 - Bodelwyddan	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from R4_4 substation to onshore substation.	1,500MW OWF and substation using 1,500MW HVAC cable	Wholly used to convey power generated offshore at R4_4 OWF to onshore substation	Radial Offshore	OFTO regime

j. R4_5

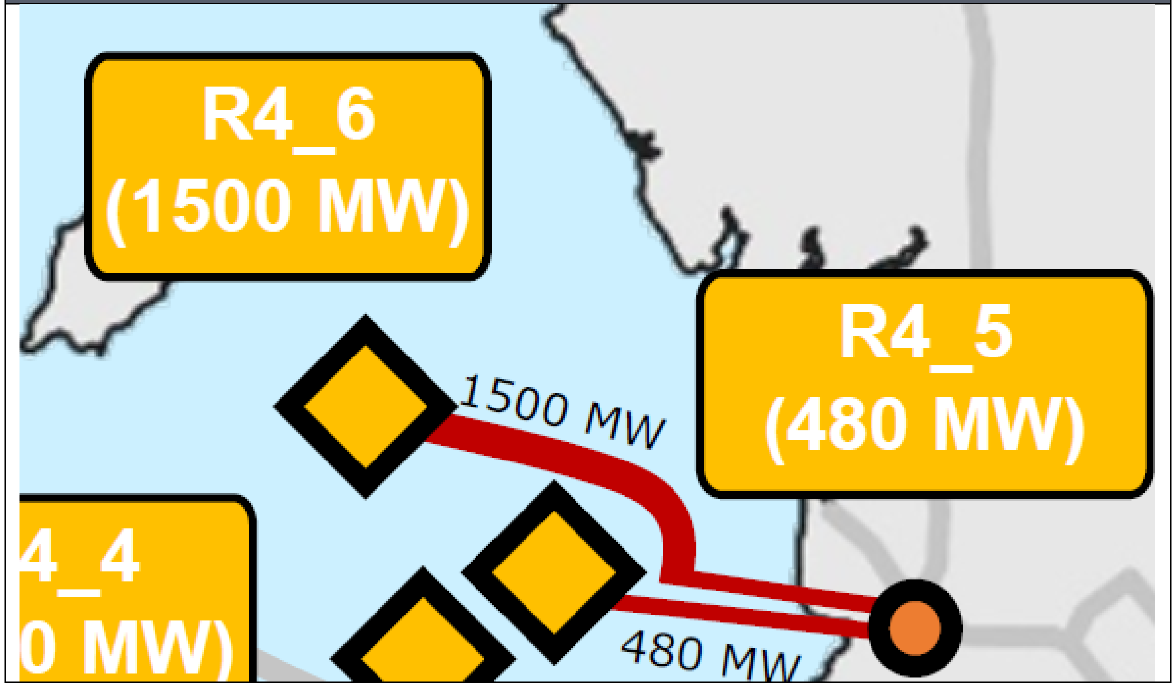
Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
R4_5 - Penwortham	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from R4_5 substation to onshore substation, via shared cable corridor with R4_6.	480MW OWF and substation using 480MW HVAC cable	Wholly used to convey power generated offshore at R4_5 OWF to onshore substation	Radial Offshore	Existing OFTO regime

k. R4_6

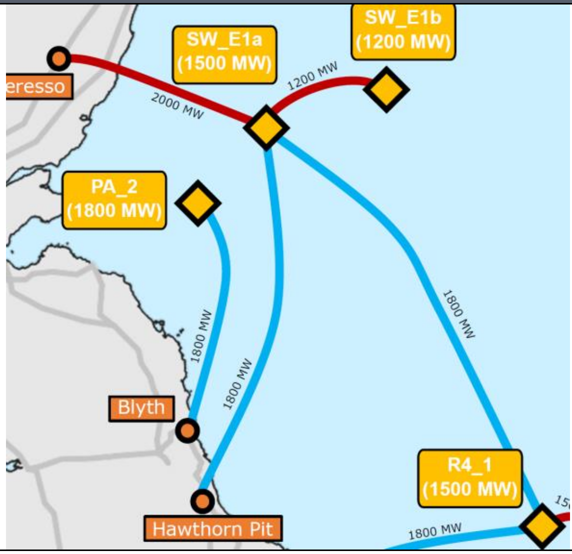
Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
R4_6 - Penwortham	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from R4_6 substation to onshore substation, via shared cable corridor with R4_5.	1,500MW OWF and substation using 1,500MW HVAC cable	Wholly used to convey power generated offshore at R4_6 OWF to onshore substation	Radial Offshore	Existing OFTO regime

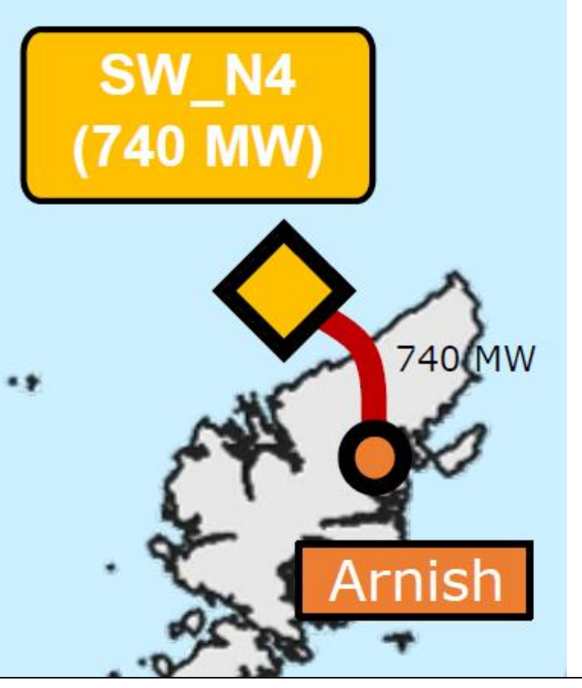
I. SW_E1a

Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
SW_E1a – Hawthorn Pit	Infrastructure is used for transmission in offshore waters, of electricity generated by more than one generating station. Used for conveying electricity generated offshore to transmission system.	Predominantly from SW_E1a substation to onshore substation	1,500MW OWF and substation, with incoming 1,200MW OWF using 1,800MW HVDC cable	Mainly used to convey power generated offshore from SW_E1a to onshore substation. Power expected from SW_E1b and some from Fetteresso.	Non-radial Offshore	Coordinated offshore regime

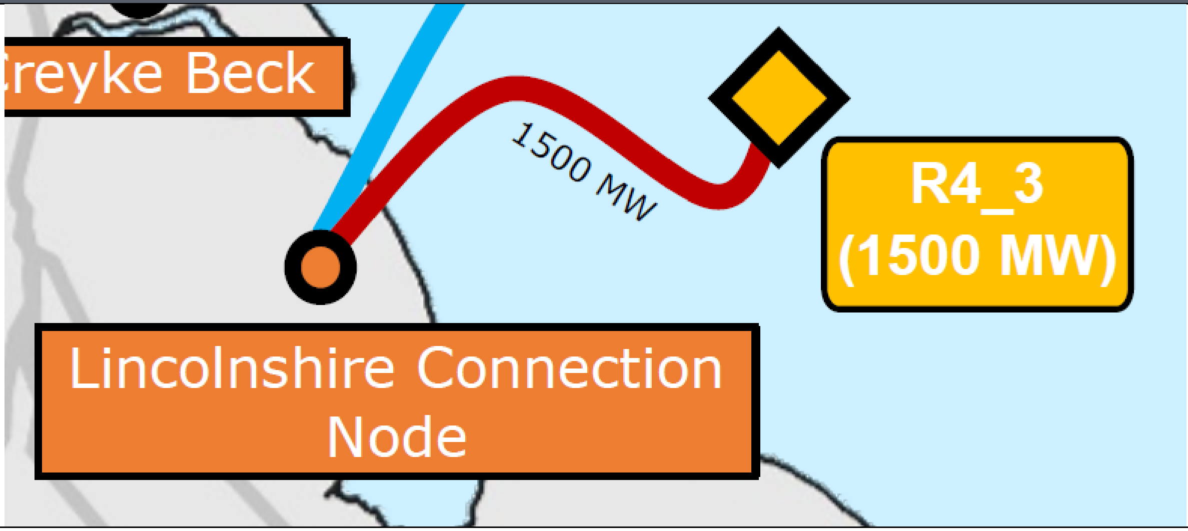
m. SW_N4

Asset


Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
SW_N4 - Arnish	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from SW_N4 substation to onshore substation	740MW OWF and substation using 740MW HVAC cable	Wholly used to convey power generated offshore at SW_N4 OWF to onshore substation	Radial Offshore	Existing OFTO regime

n. R4_3

Asset



Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
R4_3 – Lincolnshire Connection Node	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from R4_3 substation to onshore substation	1,500MW OWF and substation using 1,500MW HVAC cable	Wholly used to convey power generated offshore at R4_3 OWF to onshore substation	Radial Offshore	Existing OFTO regime

o. SW_N1

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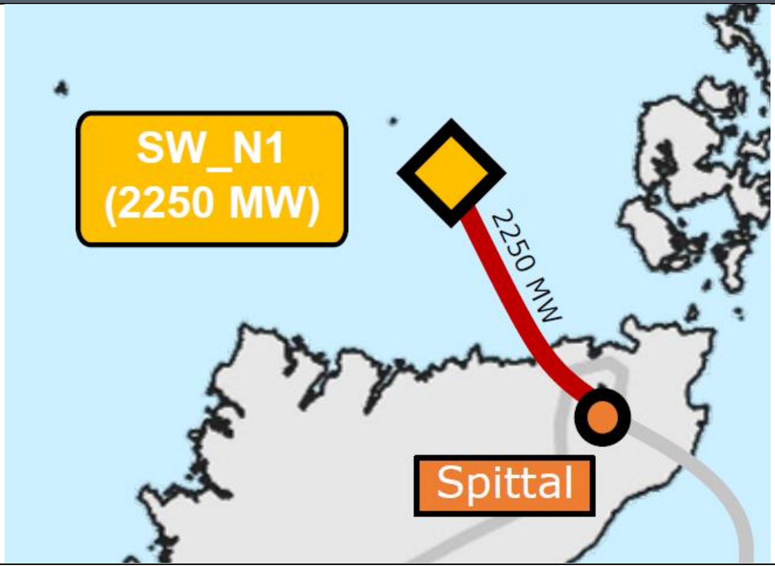

Circuit	Legislative Review	Technical Review		Legal Verification	Classification	Delivery Model
		Power Flow	Capacity Utilisation			
SW_N1 - Spittal	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from SW_N1 substation to onshore substation	2,250MW OWF and substation using 2,250MW HVAC cable	Wholly used to convey power generated offshore at SW_N1 OWF to onshore substation	Radial Offshore	Existing OFTO regime