SONI Response to UREGNI Consultation on

CONNECTION ARRANGEMENTS for OFFSHORE RENEWABLE GENERATION

30 May 2013

1. Introduction

There exist well established practices in N Ireland to connect generators to the transmission and distribution networks and operate the resultant system. The parties involved require to be licensed by the appropriate authority and all licensed parties play a role at every stage of the process from connection through to enduring operation and payment for the electricity produced. The relevant licensed entities involved in the connection of off-shore renewable generation are the Generator, the Transmission Owner, the Transmission System Operator and the Distribution System Operator. All these parties are subject to oversight and regulation by UREGNI (UR). The Generator parties involved have been identified by the Crown Estates processes and it is assumed they will be licensed in due course by the relevant authorities. The other licensed parties involved are NIE, which is both the transmission owner (TO) and Distribution System Operator (DSO), and SONI, the transmission system operator (TSO). These three parties work together via license obligations, statute, contracts, custom & practice, etc.

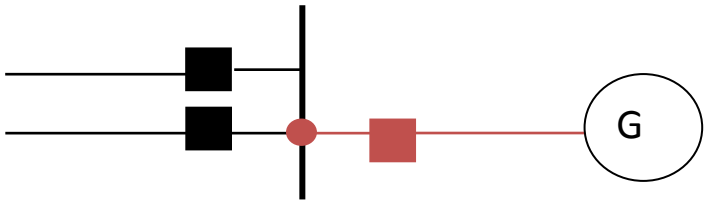
Through this consultation UR appears to be proposing alternative ways of dealing with the connection of potential off-shore generation that do not comply with existing statutes, licenses, Codes, etc and will therefore require changes to those statutes, licenses, etc. The remainder of this response deals with the issues raised by UR from SONIs perspective as the Licensed and certified TSO in N Ireland.

2. Normal Connection Arrangements in N Ireland

The normal arrangement in N Ireland is that the Generator owns and is responsible for certain assets (the generator assets), NIE owns certain transmission assets and SONI operate those transmission assets. The point at which ownership, control and operation of generation assets and transmission assets separate is known as the Connection Point or Point of Connection. For onshore generators in N Ireland connecting to the transmission network this point is well defined and understood, and is described in the Connection Agreement entered into by the relevant parties. The subsequent operation of the systems and the parties respective responsibilities for Safety from the system are defined around a clear understanding of this arrangement.

There must also be an approved device at the Point of Connection that operates (under fault) or can be operated by the relevant parties to electrically separate the generator assets from the transmission assets. The following diagram describes the existing arrangements:

Diagram 1 Connection arrangements in N Ireland



The connection point is where the red line meets the heavy black line. The connection point is usually the asset ownership boundary and the Control Boundary.

Transmission Assets
- Owned by NIE
- Operated by SONI

Generator Assets (including transformation if required)
- Owned by 3rd Party
- Operated by 3rd Party

Connection Point

Point of isolation

In practice, this means that the Connection Point is usually at the bus bar clamps, i.e. located in close physical proximity to the generation unit, on the generator's site.

3. Implications of connection arrangements in N Ireland

3.1 Planning Standards

Both NIE and SONI are subject to License obligations to Plan and Operate the transmission system to certain standards. As is pointed out in the consultation paper SONI and NIE are presently reviewing the relevant transmission standards to determine if they are still appropriate for the all-island transmission system. In reviewing the standards that should apply in N Ireland, other standards in use elsewhere in Europe will be considered. In addition, any review of current standards will need to take into account the ongoing development of grid connection standards at an EU level under the proposed network code on the requirements for the connection of generators. However, while certain common principles may apply to the all-island system the standards that are required will always have to consider the size and nature of the all-island system to ensure that the resultant arrangements continue to provide the security of supply and system stability that customers have become accustomed to.

3.2 Installation of assets

Under current onshore arrangements, the connection point has usually been within a generator's site and there has been no ambiguity regarding asset ownership and therefore all the parties' responsibilities. The present arrangements are that transmission assets owned by NIE are operated

by SONI. This arrangement allows all parties to be clear from the outset about their responsibilities both during and after installation of assets. However, under some of the variations proposed in the consultation paper, where a developer installs assets on the system side of a connection point, SONI could become responsible for operating parts of the system which have not been developed in accordance with relevant standards.

3.3 System Operation

SONI operates transmission assets that are owned by NIE. These arrangements are clearly understood and present practices are backed up by legislation, Safety Rules and Codes. SONI would also note that the use of standard equipment by NIE is very important to SONI's ability to operate transmission assets.

SONI has an obligation to operate the transmission is a safe, secure and economic fashion and the present network design, equipment specifications and operating arrangements have evolved to facilitate achievement of these aims.

3.4 Market Operation

Under current arrangements the location of the point of connection has implications for the commercial settlement of connected generators. A generator with firm access remains available and therefore will receive certain payments from the Market should an outage of a transmission asset (i.e. on the system side of the point of connection) prevent it exporting any of its capacity. The outage of any generator owned assets (i.e. on the generators side of the point of connection) make the generator unavailable and therefore during such an outage no payments will be made to the generator by the Market.

4. Consideration of Options presented by UR

UR and their consultants have presented four options for consideration – three for off-shore wind and one for off-shore tidal. While the consultation paper discusses physical connection arrangements and ownership separately SONI will consider together both the physical connection aspects and the ownership aspects of each option in response. From the outset SONI notes the indication that UR is prepared to consider arrangements for the generator developer to install transmission assets over 3rd party property that could subsequently be transferred to the NIE, as the TO. However, SONI should emphasise, on the basis of the points mentioned above, and regardless of how any transfer of assets takes place SONI would only be in a position to operate assets that came into NIEs ownership should they be constructed to accepted industry standards and configured in such a way that allows SONI to apply normal operational and commercial practices.

SONI notes that none of the first three options define or refer to a Point of Connection. The point of connection is only referred to in Distribution Connection Variation 1 for the off-shore tidal generation. From SONI's perspective the identification of the Point of Connection in each of these options is crucial for any discussion regarding the physical connection arrangement and asset ownership issues.

In the light of these general observations, SONI considers that the transmission solution most in keeping with existing practice and the spirit of the relevant legislation and Codes is that the Point of Connection in the case offshore generation should be consistent with the Point of Connection onshore, and should therefore be established at the off-shore platform. The connection to the generation units from this point would be the responsibility of the generator and the onshore and offshore assets on the system side of this point would be the responsibility of the existing TO / TSO.

Having said that SONI also recognise the associated risks involved in owning and operating off-shore assets and address the variations considered in that light also.

The following analysis adopts the labels used in the consultation paper.

Diagram 2 Variation 1 - Transmission Radial Connection – combined TO / Developer build

4.1 Discussion – Transmission Variation 1

SONI note that the options presented are illustrative but would want to clearly note at the outset that 600MW would be in excess of the largest single in-feed on the existing all-island network and, as such, consideration will have to be given to the system security, reserve capability and economic implications of a single connection arrangement.

SONI would make the following observations:-

a. While there is no Point of Connection defined SONI assume from Table 1 of the consultation paper that UR intends it to be at the New Near Shore S/S. NIE would own the transmission assets marked black and red and SONI would operate those assets. The blue assets would – on this basis – be generation assets rather than transmission assets and the fact that they would be owned by the generator would therefore not be a breach of the IME3 unbundling requirements. It should be noted, however, that this option is inconsistent with the usual approach and that it results in transmission circuits being owned by the developer.

b. The black assets could be modified by NIE as required to meet Security & Planning standards and the red assets would be designed and installed by NIE to meet security & Planning standards.

c. Should the Point of Connection be at the Near Shore S/S the blue assets could be installed by the generator developer and, in keeping with accepted practice, could remain in the ownership of the

generator post energisation. These would become generator assets and would be operated by the generator. The MEC, FAQ, availability, etc of the complete off-shore arrangement would therefore be considered at the point of connection at the Near Shore S/S.

d. SONI believe that work carried out by ENTSOE (NSCOGI) and EirGrid identifies the need for a cost effective off-shore grid to be developed. These off-shore assets should be considered as part of that grid. However, should the blue assets be considered for transfer to the TO or another party then the Point of Connection would also have to be moved to the off-shore platform. To facilitate such a transfer the blue assets up to the point of connection would also have to be designed and installed to meet existing Planning and operation standards.

e. If a transfer to the TO is envisaged and UR considers that the Point of Connection should be at the Off-shore S/S but NIE does not wish to consider adoption of the off-shore assets then SONI would be happy to enter into discussions with the relevant parties to consider the implications and viability of off-shore transmission asset ownership / operation.

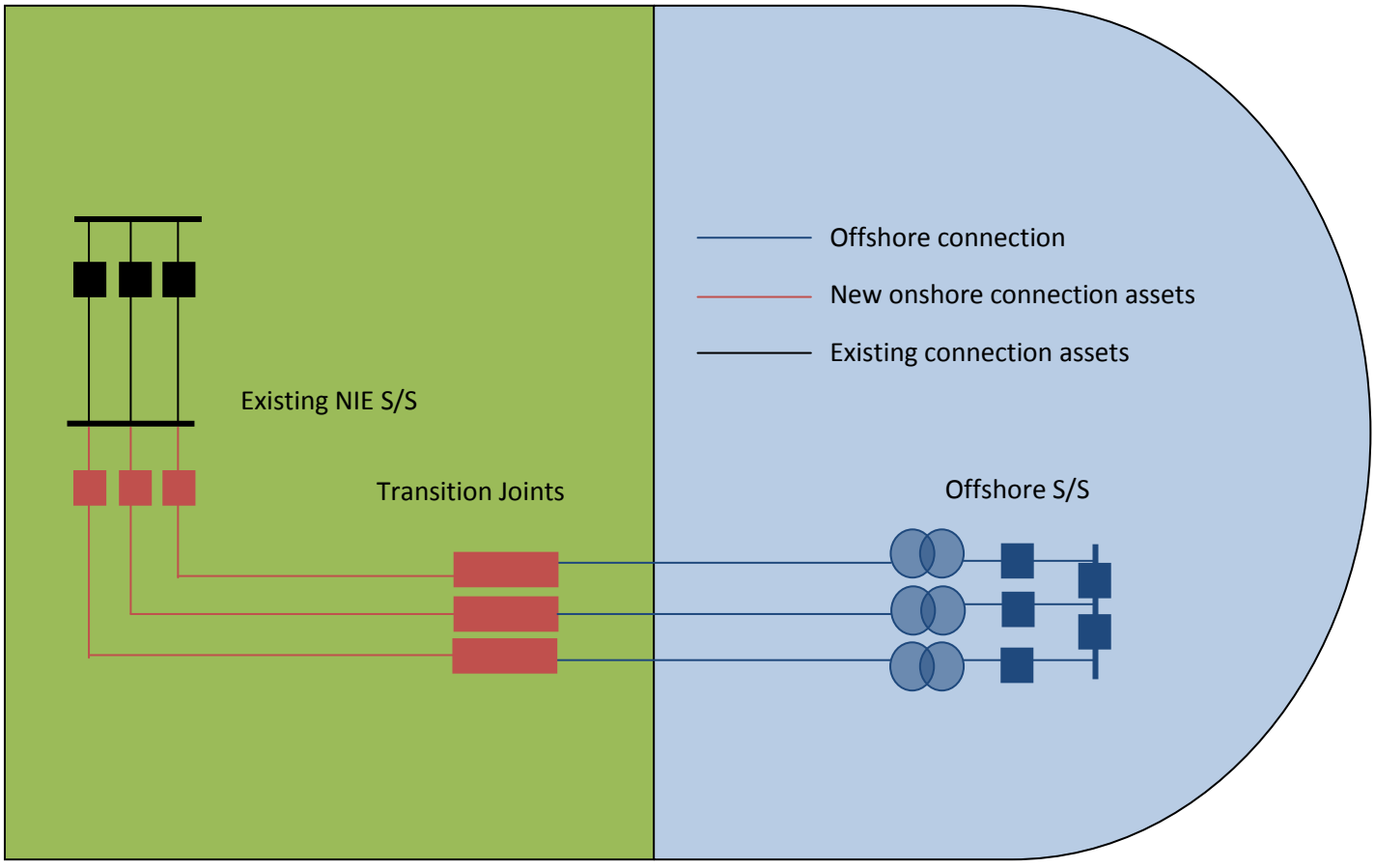


Diagram 3 Variation 2 – Transmission radial connection – TO Build

4.2 Discussion – Transmission Variation 2

a. As SONI explains below, operationally it considers a near shore substation (rather than transition joints) to be essential and therefore this variation is not appropriate.

b. The transition joints are not points of isolation and therefore could not be considered as the Point of Connection. The transition joints are therefore not physical points at which ownership of and responsibility for the assets can change. SONI believes that the approach that is consistent with general principles is for the Point of Connection to be at the Off-shore

substation and therefore NIE would own all black, red and blue transmission assets up to the point of connection and SONI would operate them in accordance with normal practice. This arrangement would therefore be IME3 compliant, because the transmissions assets would be owned and operated under the currently certified arrangements.

c. The black assets would be modified by NIE as required to meet Security & Planning standards. The red and blue assets would be designed and installed by NIE to meet security & Planning standards.

d. Consideration would need to be given to the point of isolation at the high voltage side of the off-shore transformers to establish the off-shore point of Connection. The off-shore substation arrangements should be the same as the on-shore substation arrangement in Variation 1.

e. The additional risks (and potential Market costs) associated with the operation of off-shore assets would have to be considered by SONI prior to them accepting this arrangement.

f. SONI would therefore be concerned that this proposal is less secure than Variation 1 as it leaves the SO (and thereby grid users and consumers) rather than the generator liable for either complete or significant reductions in generation output capability following a fault on off-shore assets. The repair of an undersea cable fault can be a lengthy process and a completed definition of generator availability in this specific case would need to be identified. More generally SONI would need to fully understand all the implications and responsibilities of all parties prior to them accepting these arrangements.

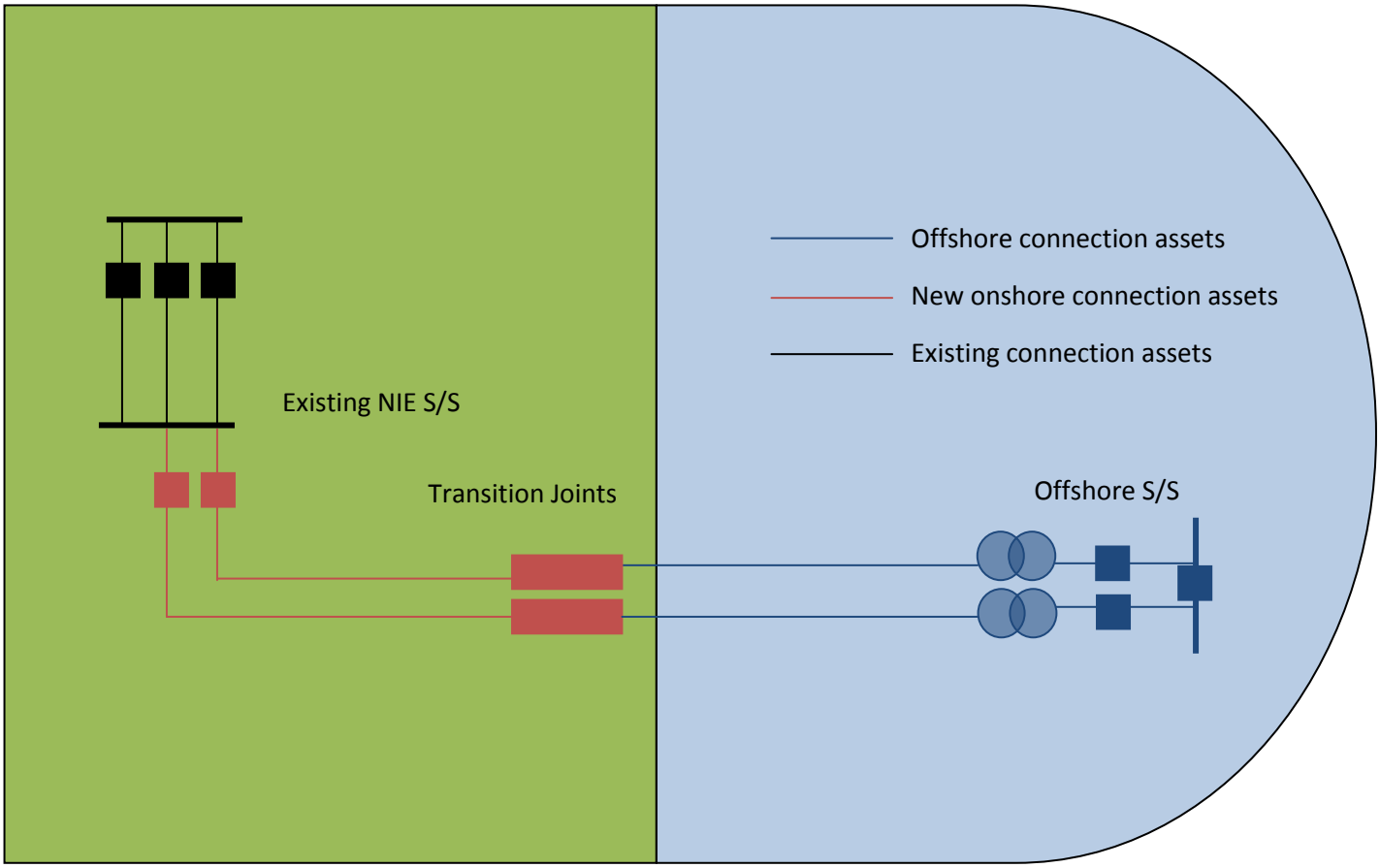


Diagram 4 Variation 3 – Radial Connection – developer build

4.3 Discussion – Transmission Variation 3

a. As SONI explained previously, operationally it considers a near shore substation (rather than transition joints) to be essential and therefore this variation is not appropriate.

b. If, as indicated in Table 3, the connection all the way from the offshore substation to the existing NIE substation were to be developed and owned by the developer, the Point of Connection would have to be at the existing NIE S/S to make the connection a generation asset and therefore IME3 compliant. The generator would therefore be responsible for the complete installation, operation and maintenance of all red and blue assets.

c. SONI is concerned by the reference in the consultation paper to a choice by the developer to design the connection to a manner close to the GB design standards, the National Electricity Transmission System Security and Quality of Supply Standards. SONI does not believe that these standards can be applied in N Ireland and, furthermore, SONI does not believe that the National Grid SSQS are appropriate for application to off-shore generator connections to the all-island system. Similarly SONI do not believe that a developer can choose which standards should apply. SONI would be concerned if a significant amount of potential generation could be connected to the all-island network without complying with the same N Ireland standards as all other generation.

d. SONI would not operate these assets as indicated in Table 3 as they would not be owned by NIE. Similarly any outages on these circuits would be considered as the generator being unavailable rather than the system being unavailable and the generator would not be remunerated in any way via the Market.

5. SONI response to UR questions on transmission connection Variations

SONI consider that the transmission solution most in keeping with existing practice and the spirit of the relevant legislation and Codes is that the Point of Connection should be established at the off-shore platform. The connections to the generators from this point would be the responsibility of the generator and the other onshore and offshore assets would be the responsibility of the existing TO/TSO.

However as part of an efficient long term development of an Irish/UK offshore grid infrastructure a phased development of a more integrated offshore network has been demonstrated as viable and can be expected. In this context co-ordination and application of appropriate design standards for offshore developments to allow for longer term adoption of these transmission assets is appropriate to minimise costs to all users. SONI therefore recommend that any offshore assets should be constructed to an appropriate design and operation standards compatible with existing onshore design and operation standards. As TSO, SONI will need to be involved in the development of these standards to ensure its license obligations can be fulfilled when operating any such assets.

SONI also recognise the associated risks involved in owning and operating off-shore assets and address the variations considered in that light also.

5.1 SONI Answers to Questions to Respondents

With reference to the radial transmission connection variations discussed, UR is interested to receive views on the following issues as well as views on any other aspect of the physical connection arrangements and wider transmission reinforcements required:

- *Preferred transmission connection variation and reasoning.*

Variation 1 with the Point of Connection at the off-shore substation and therefore respecting existing on-shore arrangements would appear to be the most appropriate option for ease of adoption by all parties concerned. The off-shore assets from the off-shore connection point onwards would be installed, owned, operated and maintained by the generators. SONI would make the following additional points:-

- there is merit in having the near shore S/S as it provides a means of operationally separating the onshore from the offshore assets.
- SONI would operate the off-shore assets if NIE became the TO for these assets.
- SONI would consider, subject to the required license changes and regulatory understandings, entering into discussions with UR and the developers regarding ownership and / or operation of the offshore assets should NIE decide that it was inappropriate for them to do so.

SONI believe Variation 2 is legally compliant with current arrangements only if the Point of Connection is at the offshore platform and the asset ownership arrangements are with the TO / TSO. However, SONI believe this arrangement to be inherently less secure and more difficult to operate than Variation 1.

SONI believe all the assets associated with Variation 3 would have to remain in the ownership of the Generator. SONI consider this arrangement to be totally out of line with current legislation and practice.

Should UREGNI consider any of these options or a further variation of these options to be feasible and / or compliant with IME3 SONI would require more discussion and interaction to understand the asset transfer arrangements and the subsequent commercial implications for all parties in both normal operational and market settlement arenas.

- *Potential Offshore substation ownership boundaries;*

The ownership boundary must be at the agreed point of connection. If the Point of connection is off-shore SONI is prepared to consider either the operation of TO owned assets or the ownership and operation of off-shore assets subject to agreement with all parties as to the arrangements for this to work. The arrangements put in place must allow the application of Safety Rules at all times and be compliant with Grid Code.

- *Usage and need for a near shore substation;*

SONI believe that, from an operational perspective, consideration backed up by benefit analysis must be given to establishing the near shore substation. The near-shore S/S separates the on-shore and off-shore assets and allows greater operational flexibility to ensure continuity of generation export under different fault / outage scenarios. Based on international experience SONI is aware that the repair of faulted off-shore assets takes significantly longer than equivalent repairs to on-shore assets. The design and configuration of the connection arrangement must take these risks into account if the generator is to be treated similarly by the Market. The final decision regarding the actual design of the connection arrangement would have to take all risks and liabilities associated with off-shore assets into account. SONI would note that the additional risks associated with off-shore assets have not been factored into our normal business arrangements.

- *Procurement and build of the offshore substation and connection to the onshore network*

The off-shore generation developer is best placed to install the off-shore assets.

6. SONI response to Ownership options presented

The Point of Connection should determine the ownership boundary. In consideration of the options presented by UR for asset ownership SONI believe that the assets up to the Point of Connection must be owned and operated by the TO or TSO to ensure compliance with the certified IME3 arrangements in N Ireland. If it is decided that the Point of Connection is to be at an off-shore platform then the most straightforward option would be to extend onshore ownership arrangements to offshore assets. SONI are prepared to enter into discussions regarding ownership and operation of on-shore or off-shore assets should that become the preferred approach.

6.1 Questions to Respondents

Respondents are asked whether they feel it would be beneficial for the offshore generation transmission connection assets to be owned by the developer or alternatively by the TO, SO, or a third party via a tender process.

The ownership of the off-shore assets dictates the regulatory, market settlement arrangements and ultimately the commercial viability for this form of generation. The asset ownership model adopted also dictates the future usage of these assets for other customers and / or generators. Once a point of connection is agreed, codified and written into Connection and TUoS Agreements the generator assets (i.e. assets on the generations side of the point of Connection) can only be used for transporting energy from the generator to the transmission system. Generator assets are therefore for the sole use of that generator licensee.

If these assets are to be transferred to the present TO or TSO the exact details of the value transaction and ongoing regulatory recovery mechanisms would have to be worked out. Notwithstanding the transfer arrangements they must meet relevant Security and Planning standards. They must also meet certain construction and rating standards if they are to be compatible with existing on-shore practices.

Should the option of transfer on-shore and / or off-shore assets to a 3rd party (TSO?) be considered then all existing arrangements for all parties must be reconsidered. SONI believe this to be the least attractive option.

6.2 Should the present NI onshore transmission owner and license holder (NIE) be permitted to extend the onshore network offshore? This could be based on the present onshore regulatory regime with modifications were deemed necessary. This approach would imply that NIE would take ownership of transmission connection assets built by offshore renewable generation developers from the agreed offshore substation boundary with the generator to the onshore point of connection (POC).

SONI notes that it is unlikely that there will be other such off-shore renewable generation facilities in waters off the coast of N Ireland. SONI is however aware of the ongoing considerations within ENTSOE of off-shore grid development particularly in the North Seas and the implications for such connections. SONI therefore believe that it is most appropriate to extend the grid and associated TO / TSO responsibilities to off-shore generator connections. This would have the additional benefit of ensuring compliance with the IME3 unbundling requirements without the need for further certification decisions.

6.3 Or should the developer have the responsibility to finance the design and build of the connection assets and the cost to maintain the offshore assets as part of the project?

In addition to SONIs comments above and below SONI believe it is inappropriate to handle the connection of one form of generation differently from existing practice without considering the implications for all forms of generation. There are no arrangements in

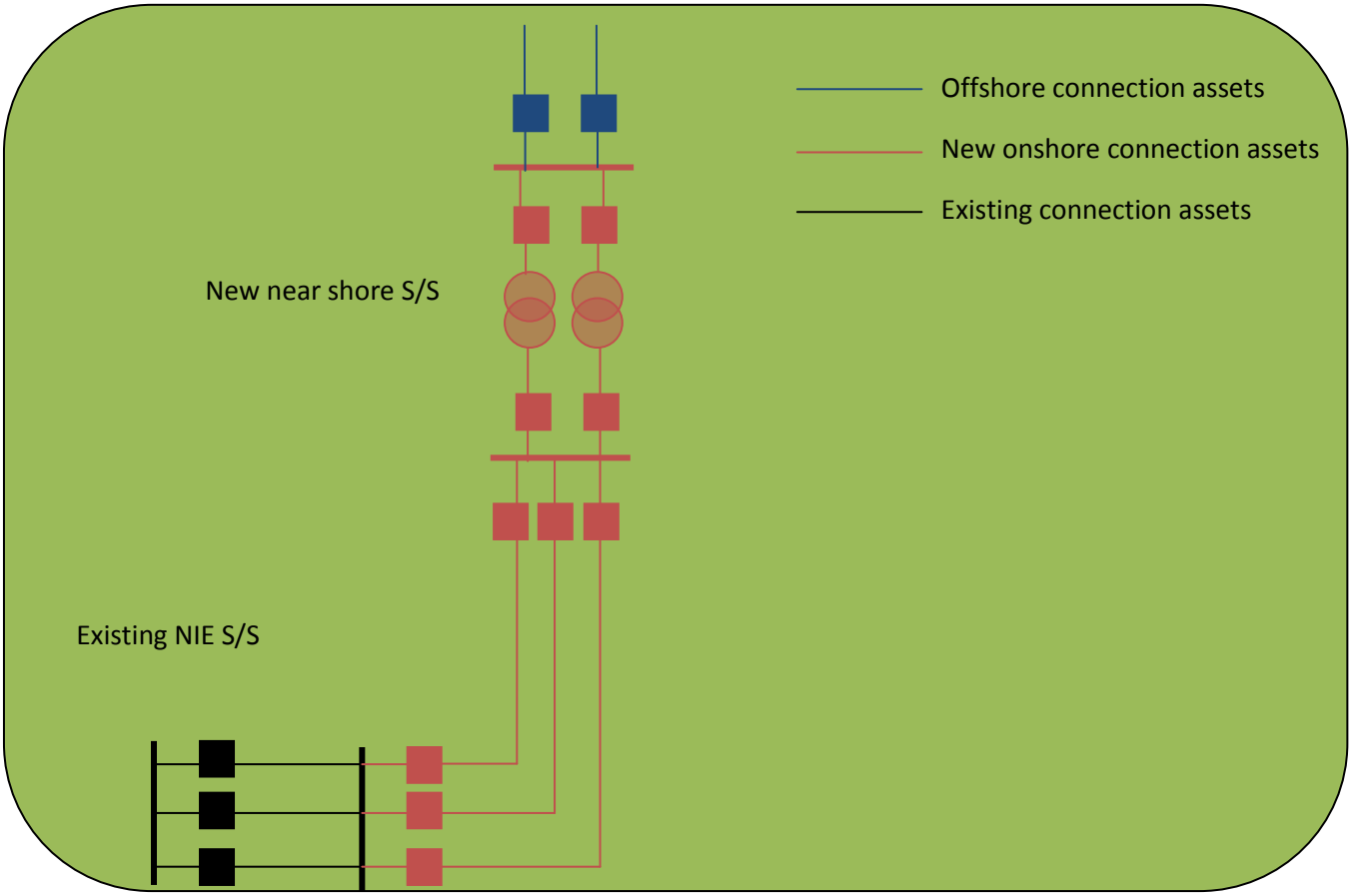
place in N Ireland for contestable construction of transmission assets. SONI is happy to contribute to a much wider debate should UR wish to change the status quo.

SONI believe arrangements will have to be established with all parties, developer, licensed generator, TO and TSO regarding all cost arrangements associated with this project. These arrangements will be much harder and take longer to establish should they differ dramatically from existing established Operational and Market arrangements.

6.4 *UR would welcome comment and views on the ownership and license arrangements relating to offshore connections and are keen to seek alternative options that may be appropriate.*

SONI recognise that the development of an off-shore grid linking the N Ireland, Ireland and Great Britain may be a longer term possibility but SONI also recognise that the process to achieve this aim has to start somewhere. For that reason it may be worth considering an interim arrangement whereby all off-shore equipment to facilitate these connection arrangements is installed to meet all relevant N Ireland Planning, Operational and equipment standards. In the first instance, full responsibility for the ownership, operation and maintenance of the circuitry could be left with the developer / generator. The developer / generator would be suitably licensed (if possible) and the legislation drafted accordingly. Should the use of these transmission assets be required at a later stage to create an off-shore grid, connect other licensed generators or prove the most cost effective way for NIE to provide necessary system reinforcement then consideration could be given to transferring all or some of the assets to the TO / TSO at that time. This way the assets would not be totally lost to more efficient use by N Ireland customers.

7. SONI comments of Distribution Variations 1 & 2



Distribution Connection Variations 1 & 2

7.1 Discussion and SONI response to questions raised:-

a) There is an assumption made in the consultation paper that because, "There is a likely-hood that there will be a need to land power from these schemes at distribution voltage levels …" that the arrangements are considered as distribution connections. The paper continues to argue "In this case the developer would design, build, operate, maintain and finance a distribution connection to an agreed point of connection (POC) on the DNO's network". The variations then show connection arrangements to the existing NIE (transmission) system. SONI do not understand why the Point of Connection is so relevant in this discussion but is not referred to at all in the discussion regarding transmission variations 1, 2, and 3. SONI believe exactly the same principles apply to all connection arrangements in N Ireland that can be considered IME3 compliant.

b) SONI would expect the transmission aspect of any connection arrangement to be designed and installed in keeping with the Security and Planning Standards and will work with NIE to ensure this is the case.

c) In Table 4 it should be noted that where assets at 110kV or above are owned by the TO they should be operated by the TSO.

8. SONI response to other Consultation issues raised

8.1 System Security, LCTA Connection Design, Cost allocation and charging arrangements

Section 7

System Security, Least Cost Technically Acceptable (LCTA) connection design, Cost Allocation and Charging Arrangements touched on in sections 5 and 6 have been reviewed in greater detail. While present LCTA and cost allocation arrangements would remain suitable for offshore renewable generation connections a review of the transmission connection security requirements is currently being undertaken by NIE and SONI.

In terms of charging arrangements the SONI operation and maintenance (O&M) one off upfront charge over the lifetime of a connection, as stated in their Statement of Charges, should be reviewed to accommodate offshore transmission assets where SONI/NIE are to provide offshore connections.

System Security

SONI believe that the transmission network and associated generator connections should be designed, built and operated to an appropriate standard that ensures customers continue to enjoy the same standard and quality of supply as at present. The portfolio of generation plant is changing rapidly and it is timely to review all the relevant transmission Standards applicable in N Ireland. As the all-island system is a relatively small synchronous system the standards applicable will have to be fit for purpose and SONI would caution against straight comparisons with standards that apply for generator connection or network configurations for much larger systems. SONI is fully involved with NIE in reviewing the existing transmission standards and, if necessary, will propose new revised standards that should apply in N Ireland. During this process SONI is happy to consider the Regulators consultants' views as expressed in the paper and all other views as expressed in response to this consultation.

SONI note that, at 600MW, the off-shore wind farm would be in excess of the largest single in-feed to the existing all-island network and, as such, consideration will have to be given to the system security and economic implications of a single connection arrangement.

SONI would also believe that the present or revised standards must be met for all aspects of these proposed off-shore connections that are to be owner / operated by the TO / TSO if they are to be treated the same way as all other generators.

Connection Design, cost allocation and charging arrangements

SONI is prepared to enter into discussions with the Regulators regarding these aspects of policy. SONI believe these policy matters to be applicable to all forms of generator connections.

8.2 Connection Application process and the NI Connection Queue

Section 8 – Application queue

Questions to Respondents

Where a connection to the transmission network is required, should the offshore developers apply for a connection and be added to the ITC analysis list ***once*** *they have received development rights from The Crown Estate?*

UR would like to seek views on this potential approach or any other alternative proposals.

What comparisons could/should be drawn with onshore application process for connections?

Are there areas where the process should be different to accommodate the more complex offshore analysis?

SONI and NIE have recently concluded a consultation on connection processes in N Ireland and the allocation of Firm Access Quantities (FAQ). To date connection processes have only had to cater for onshore renewable (mostly wind farms) generator connections. SONI and NIE are in the process of considering the responses received to that consultation and will be bringing a Consultation Report and recommendation to the Regulators for decision before the end of June.

In general terms SONI do not see the connection process as discrete from ITC analysis and the allocation of FAQ. If a party is eligible to make a connection application then they should be eligible to enter the queue for FAQ allocation and, upon acceptance of terms, be considered in the queue on an ongoing basis until the generation is established and the associated transmission reinforcements have been completed to provide fully firm access. The difficulty arises because the Planning Permission hurdle and connection application date applicable for onshore generators is not easily transferrable to off-shore generators as the consenting processes are entirely different.

SONI would be keen to reach a position where all generating parties can be treated equitably and, through both consultation processes, hope an accommodation can be reached. SONI does not believe the connection processes can be demonstrably different for off-shore but that, in recognising the differences between onshore, offshore and generating technologies, an equivalent or unique position in planning consent processes can be achieved by all generator developers to allow them to make a connection application.

SONI is also mindful that the connection of this renewable wind and tidal generation will require significant transmission network build and reinforcement and believe it is in everyone's interest to resolve this issue and move forward.

8.3 Section 9 – Grid Code

Questions to Respondents

Areas identified in the Grid Code where amendment may be suitable to accommodate the connection of offshore renewable generation are detailed in the following section. UR would welcome views or proposals for amendments to the Grid Code associated with not just the areas identified by UR but any other areas of the Grid Code where development may be required.

The application of the NI Grid Code and the execution of all Users responsibilities requires there to be clear definition and understanding around the Point of Connection and Control boundaries. There must also be understood rules and standards around the ongoing operation and performance of the equipment connected to the transmission system so that there is no detriment to the quality of supply experienced by other users. To properly reflect N Ireland system requirements for off-shore generation SONI will develop an appropriate Minimum Functional Specification (MFS) for off-shore wind and tidal generators. SONI will also consider any other changes that may be required to the Grid Code to ensure off-shore generation is properly covered by the Code. SONI note the reference in the Consultation paper to dynamic VAr Compensation and harmonic filtering and are aware through experience and the evolving DS3 programme how important these factors are in overall system performance. SONI will ensure that these matters are considered fully when reviewing the Grid Code generally and developing the required specifications.

It should be noted that the draft EU Network Code on Requirements for Grid Connection applicable to all generators is due to be adopted through the comitology process later this

year. While it is currently not binding it is likely to be adopted before any connections are made. For information this Code defines both onshore and offshore connection points but tends to favour the grid connection taking place offshore, probably at an offshore platform.

SONI will bring any proposed Grid Code changes to the N Ireland Grid Code Panel for consideration as per normal arrangements prior to submission of agreed changes to UR for approval.