

# Connecting Orkney: Electricity Network Reinforcement Stakeholder Consultation

February 2014



## About us

**Scottish and Southern Energy Power Distribution (SSEPD)**, part of SSE plc, owns and maintains two electricity networks in the north of Scotland:

**Scottish Hydro Electric Transmission plc (SHE Transmission)** owns and maintains the electricity transmission network (132kV and above) in the north of Scotland. The transmission network is used for the transfer of large-scale electricity generation, particularly renewables, to the centres of demand.

**Scottish Hydro Electric Power Distribution (SHEPD)** operates the high and low voltage electricity network that distributes electricity to customers' homes or business premises and facilitates the connection of distributed generation.

SSEPD's first priority is to provide a safe and reliable supply of electricity to our domestic, commercial and industrial customers in the north of Scotland. It is responsible for maintaining, repairing and improving the electricity network.

SSEPD does not sell electricity to customers – that is the role of energy suppliers.

### Licence obligations

Because the distribution and transmission of electricity within a 'licenced' area is considered a monopoly activity, the income earned by both SHE Transmission and SHEPD is closely monitored and controlled by the regulator, Ofgem (Office of gas and electricity markets). The regulator also agrees what levels of investment should be made in electricity networks. The electricity distribution and transmission parts of the industry have eight-yearly price control review periods, when the levels of investment and income are reviewed and agreed.

While both SHE Transmission and SHEPD are part of the same company, they operate separately adhering to different licence obligations.

SHEPD has agreed a common charging methodology for connections with Ofgem. Under its licence obligations it must apply this methodology consistently across its licence area.



# Background

The distribution network in Orkney is supplied from Thurso on the Scottish mainland via two 33 kilovolt (kV) subsea cables. At present there is no transmission infrastructure on Orkney. The current average demand and connected generation capacity is outlined below.

Orkney Demand and Capacity
Average summer demand – 6MVA
Average winter demand – 34MVA
Total connected generation capacity – 74.4MW (excludes 15.5MW of emergency standby diesel generation)

## Orkney electricity network development timeline

1982 A 33kV distribution subsea cable was installed to provide power from the mainland (Thurso – Orkney).

1998 Increased demand, and to reduce the usage of the standby diesel generation, led to a second 33kV distribution subsea cable being installed.

2003 Orkney network reaches capacity for connection of distributed generation. (Development of a third distribution subsea cable at a cost of circa £25 million was considered. However, the proportion of these costs that an applicant would have had to pay under the current regulatory framework meant that it was uneconomic to proceed and an alternative that would allow connection without reinforcement needed to be explored).

Scottish Hydro Electric Power Distribution (SHEPD) is granted regulatory approval to provide connection offers on a non-firm basis which will allow an additional 20MW of capacity to be released.

2004 SHEPD implements inter-tripping solution which allows an additional 20MW of capacity to connect to the network.

2006 SHEPD receives regulatory approval to make Orkney a Registered Power Zone (RPZ) and establish the Active Network Management (ANM) scheme<sup>1</sup>.

2006-9 The concept<sup>2</sup> of the ANM scheme is developed in conjunction with the University of Strathclyde and Smarter Grid Solutions (SGS). The necessary hardware, software and commercial mechanisms are developed to allow ANM to operate in practice

2008 The Crown Estate announces plans to hold a leasing competition in the Pentland Firth and Orkney Waters.

2009 SHEPD installs and commences the use of the ANM system in Orkney.

This allows additional (new) non-firm connection agreements to be made.

2010 March: The Crown Estate announces agreements for lease with developers for 1,050MW of wave and tidal projects in Orkney waters.

April: The UK Government introduces the Feed-in Tariff (FiT) as an incentive to encourage the uptake of renewable electricity generating technologies.

2011 SHEPD connects 77 micro-generator installations in Orkney (Total capacity of 0.7MW) over the 12 month period.

SHE Transmission introduces proposals for a transmission connection between Orkney and Caithness for the sole purposes of exporting capacity generated by two marine developers.

2012 SHEPD receives over 400 micro-generation applications for Orkney in the first 7 months of 2012.

A total of 520 micro-generation installations are connected by SHEPD in Orkney prior to the FiT review date in December – a total of 5MW of capacity.

2012 Orkney network reaches full capacity – SHEPD introduces a moratorium on the connection of renewables to the distribution network in Orkney.

2013 SHEPD connects a large-scale battery at the Orkney energy storage park.

SHEPD completes the replacement of high voltage submarine cables between Eday and Rousay, and Westray and the Orkney Mainland.

Orkney Grid Capacity Steering Committee, of which SSEPD is a member, reports to Fergus Ewing.

<sup>1</sup> To date, SHEPD has invested circa £1 million establishing and implementing the Orkney ANM scheme

<sup>2</sup> A research and development project into the management of multiple network constraints to enable the connection of renewable generation projects.

## The Options

As outlined in the previous section, no further renewable energy projects can be connected to the Orkney electricity network until it is upgraded. There are three possible scenarios to be considered:

1. The development of an AC transmission connection between the Scottish mainland and Orkney

This would involve the development of a new transmission subsea cable between Orkney and the Scottish mainland, new substations and interconnecting circuits to connect developments to the transmission network<sup>3</sup>.

2. The development of a new distribution connection between the Scottish mainland and Orkney

This would involve the development of a new distribution subsea cable between Orkney and the Scottish mainland which would connect into the existing Distribution network<sup>4</sup>.

3. Further consideration is given to how best to use the existing network.



<sup>3</sup> SHE Transmission has developed proposals for a 220kV 180MW subsea cable connection between Dounreay and Bay of Skail, new substations at Bay of Skail, Finstown, Crook and Newark Bay and interconnecting 132kV circuits incorporating a mix of overhead line and underground / subsea cable.

<sup>4</sup> There are currently no plans being developed for a new distribution subsea cable; however it is recognised that this could be a potential solution and needs to be considered as part of this consultation.

## Stakeholder Consultation

This consultation is being undertaken by Scottish and Southern Energy Power Distribution (SSEPD) on behalf of SHEPD and SHE Transmission.

While the issue of network constraint may appear to be one solely for Orkney and its local stakeholders, it is likely that an element of the cost of the proposed transmission solution would ultimately be borne by bill-payers across Great Britain and for a distribution solution, across the north of Scotland. Therefore we are interested to hear the views of a wide range of stakeholders.

The aims of this consultation are:

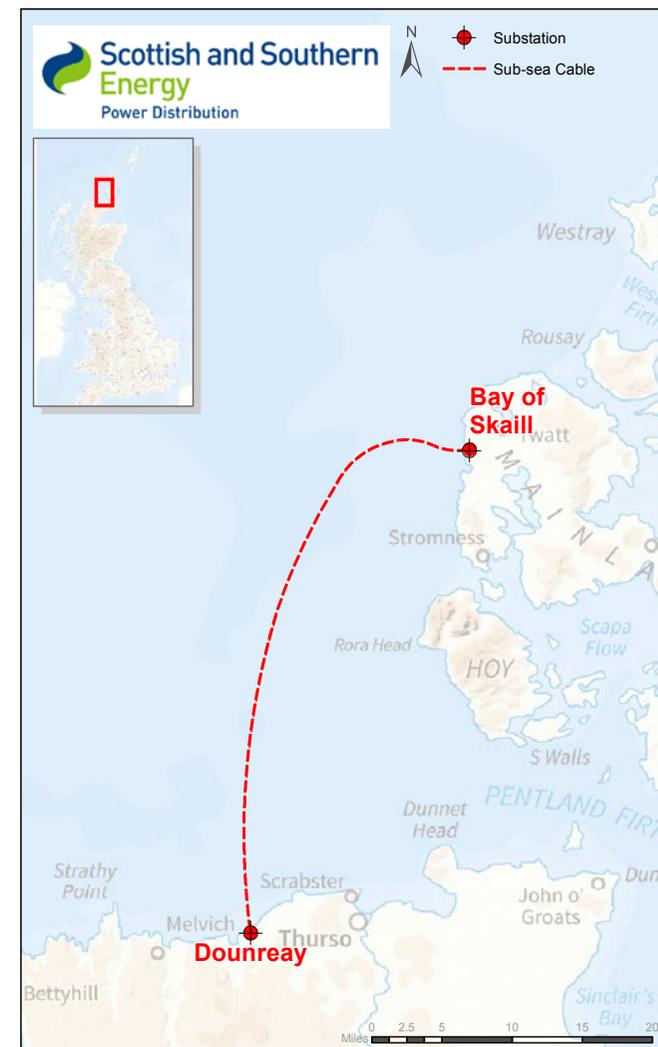
- to update stakeholders on the current status of the proposed Transmission upgrade on Orkney; and
- to listen to the views of a wide range of stakeholders on the optimum reinforcement solution for Orkney.



# Option 1 – Transmission reinforcement

## Issues for consideration

1. The need for a transmission reinforcement is currently driven principally by the developers of marine (wave and tidal) projects.
2. To date there have been no connection requests from more mature technologies, such as onshore wind, large enough to warrant a Transmission upgrade.
3. The proposed 180MW Transmission reinforcement would cost circa £300 million and it is likely that an element of the cost would ultimately be borne by bill-payers across Great Britain.
4. Marine technologies are at differing stages of maturity and there are questions about the timing and requirement of a transmission link.
5. This is referenced in the DECC publication from December 2013, "Given progress of the marine energy sector towards early commercial deployment, we anticipate that projects will be developed during the second Delivery Plan period. We therefore intend to consider again in detail whether Scottish Island-specific measures for marine energy should be put in place, and at what level, as part of the second Delivery Plan period."<sup>5</sup>
6. Therefore securing regulatory approval<sup>6</sup> will be a challenge if the case for investment is predicated solely on marine given the current uncertainties around the date of large scale deployment.
7. It is the view of the wider industry<sup>7</sup>, including SHE Transmission, that the case for investment would be significantly strengthened with the inclusion of applications from more mature technologies such as onshore wind.
8. As noted in the report prepared for the Inter-Island Steering Group, the anticipated generation capacity from marine technologies is not currently at a stage where the need for a transmission reinforcement is imminent.
9. If the generation profile and mix changed, there may be a need to reconsider the current proposal to optimise the final design solution.
10. If it were necessary to redesign the current transmission proposals this would delay the delivery programme.
11. Options<sup>8</sup> exist to allow for the inclusion of more mature technologies and although these pose technical and regulatory challenges SHE Transmission believes they merit further consideration.



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<sup>5</sup> DECC, Scottish Islands Renewables Update Report, 19 December 2013

<sup>6</sup> In accordance with the RIIIO-T1 Strategic Wider Works (SWW) process.

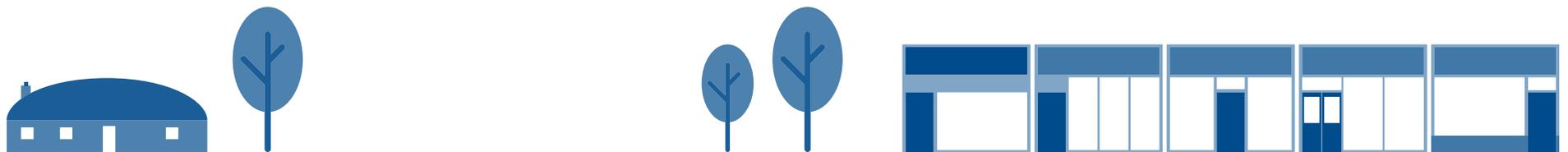
<sup>7</sup> Discussed at recent SR Marine Conference in Inverness on 16<sup>th</sup> September 2013.

<sup>8</sup> Options include the transfer of capacity from marine developers to onshore wind developers and/or developing an element of actively managed access on the transmission network.

## Option 2 – Distribution reinforcement

### Issues for consideration

1. As noted in the timeline, The Orkney distribution network has reached full capacity and to provide additional capacity significant reinforcement would be required.
2. The cost of a new 30MW Distribution link would be circa £30 million.
3. Under the current regulatory framework the majority of the cost of a new distribution subsea cable would be borne by the generators who require it.
4. SHEPD continues to receive applications from developers of small-scale renewables and microgeneration to connect to the Distribution network, however, the level of applications received to date does not justify the need for a new Distribution link.
5. SHEPD has implemented and invested in a number of initiatives<sup>9</sup> to provide developers with access to the Distribution network, facilitating the connection of over 43MW of generation which would not otherwise have been connected.
6. As a reasonable and prudent operator, SHEPD is unable to invest in a new link on a speculative basis i.e. in the hope that there will eventually be a need for it, as the cost for this could be passed on to all bill-payers in its licence area in the north of Scotland.

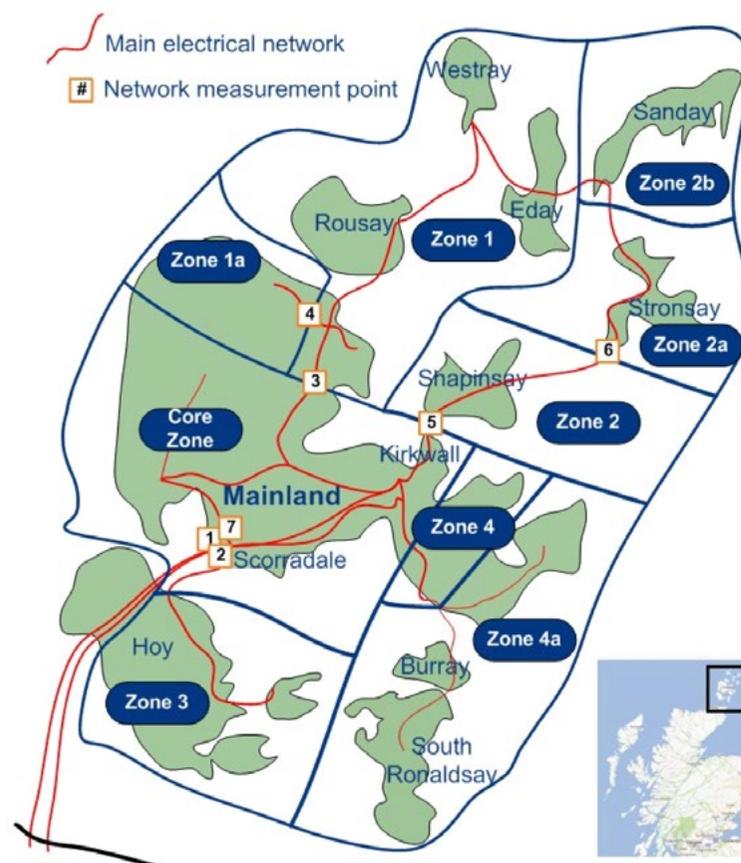


<sup>9</sup> Solutions involving a combination of inter-trip and intelligent management systems (ANM).

## Option 3 – Making best use of the existing network

### Issues for consideration

1. If network reinforcement is not possible at this time, for whatever reason, consideration must be given to how best to use the existing network until developers are ready, able and willing to support additional reinforcements.
2. During the intervening period we need to guard against eroding the established access rights of existing users<sup>10</sup>. To facilitate this, the current moratorium on new connection applications should remain and any proposed inter-Island reinforcement reviewed to eliminate any unintended consequence that any reinforcement of this nature might introduce.
3. Consideration could be given to other initiatives, such as those recently identified by Orkney Renewable Energy Forum (OREF)<sup>11</sup>, however some of those proposed may only benefit a small number of developers and could potentially disadvantage others.
4. Adopting this Status Quo approach would allow time for industry stakeholders and existing users to work together on some of the key economic and contractual challenges that need resolved before a robust economic case for reinforcement can be made.



<sup>10</sup> 74.4MW of connected generation; 30.8MW firm, 20.3MW inter-tripped and 23.3MW actively managed. In addition there is 5.3MW of contracted generation awaiting connection. A combined total of 79.7MW.

<sup>11</sup> Refer to OREF website for further information; <http://www.oref.co.uk/#/grid-work/4571802530>

## Key Questions

<b>Question 1</b>	Has this consultation helped you understand the options for the reinforcement of Orkney's electricity network?
<b>Question 2</b>	Were you aware of the process and requirements for transmission and distribution reinforcement and how they are funded?
<b>Question 3</b>	Do you think a new Distribution link should be developed to facilitate the connection of further renewables? If so, how should this be funded?
<b>Question 4</b>	In light of the stage of development of marine technology, do you think transmission or distribution reinforcement is most appropriate? By which date do you believe there will be enough generation to require reinforcement and how can interested parties work together to achieve this?
<b>Question 5</b>	Organisations which have examined the framework for connecting emerging technologies, such as wave and tidal, to the electricity network have suggested that there may be grounds for adopting a different approach. Do you believe there is a case for this? Would such an approach have implications across Great Britain?
<b>Question 6</b>	Do you believe there are other options for mainland reinforcements that SSEPD has not considered?
<b>Question 7</b>	What are your views on how communities, landowners, developers and local and national government can work together to agree the way forward?



## Stakeholder Contact

It is important that everyone has an appreciation of the wider issues and how they influence the case for investment in both renewable generation and wires infrastructure.

The findings of this consultation will be used to inform the next steps taken by SSEPD.

Your comments would be appreciated. The consultation will close on **Friday 28 March**.

Consultation responses, comments and enquiries should be sent to **[orkney@sse.com](mailto:orkney@sse.com)**

SSEPD intends to hold public information events on Thursday 6 and Friday 7 March in Kirkwall. The events will be open to all interested parties and will give people the opportunity to talk to SSEPD staff about the consultation. SSEPD will advertise the events in the local press and on local radio. Details of the events will also be available at [www.ssepd.co.uk](http://www.ssepd.co.uk) alongside the Consultation Document.

