

# A Whole System Opportunity

## Securing Shetland's Energy Supply

### About SHEPD and our role on Shetland

SSEN, operating under licence as Scottish Hydro Electric Power Distribution (SHEPD), owns and operates the distribution network of overhead lines and underground cables across the north of Scotland. Every year, we invest millions of pounds to maintain and improve the network that serves our customers. Shetland remains unconnected to the main electricity network in Great Britain, and SHEPD acts as the System Operator for the islands, administering electricity generation and network operation. This means that the islands rely entirely on local sources of generation and the supply and demand must be balanced locally; we decide when the island power stations need to run to meet customer demand. The electricity network on Shetland is made up of approximately 1,650km of overhead lines and underground cables operating at distribution voltages (33kV and below). Thirteen subsea cables join the smaller islands to the main island. There are no overhead lines or underground cables operating at transmission voltages (132kV and above).

### Our recommendation

SHEPD has recommended to Ofgem that Shetland's enduring demand needs can be met through sharing use of, and contributing towards the cost of, the proposed Shetland transmission link. Under this Whole System approach, SHEPD's proposed contribution of £251m secures all of the benefits for its Distribution customers which could be provided by the best alternative solutions identified in the market, but at around £140m lower cost.

### Background to our recommendation

Providing a safe, secure and efficient supply across our distribution network is of paramount importance to SHEPD. Shetland has remained unconnected to the mainland GB network and its energy security is provided locally by power from Lerwick Power Station (LPS) with significant support from the output of Sullom Voe Terminal (SVT). LPS, constructed in 1953, together with SVT have provided reliable energy over the last 60 years.



We have facilitated the growth of low carbon generation on the islands. Our NINES<sup>1</sup> project has enabled 12.5MW of renewable generation to connect and bring with it the benefits of reduced emissions and lower diesel costs. With the current islanded generation mix, this is the maximum effective generation that can be connected and still maintain a stable system.

The LPS generation assets have been maintained and managed to maximise their operational life and to minimise the cost to customers. However, we are acutely aware that the life of these energy sources is finite; our current technical and cost recovery arrangements assume replacement with an enduring solution by 2025.

We have been working to identify the future security of supply solution for a decade. The timeline overleaf shows the various steps taken with each iteration seeking to improve the outcome for customers.

**The first recommendation** was a 90MW thermal power station supported by the NINES framework.<sup>2</sup> It was rejected in 2014 on the basis of cost and in favour of a competitive tender process.

**The second recommendation** was the competitively tendered 60MW HVDC distribution link to the GB system supported by thermal backup generation. It was rejected in 2017 following the introduction of new derogations for islanded plant, allowing LPS to run beyond 2021, the government decision to allow remote island wind to compete in the 2019 CfD auction, and significant community, stakeholder and political opposition to its low capacity. This process provided us with the benchmarked benefits and costs against which we have compared the Whole System recommendation.

Further to Ofgem's 2017 determination and identification of the opportunity for "potentially reducing overall costs to consumers through an integrated solution", SHEPD has been developing its whole system recommendation for Shetland.

Over the past decade the design and development of these recommendations has resulted in development spend of over £14m, which has been borne by customers. SSEN and Ofgem share the view that any further development spend must result in an enduring solution.

Fig 1. Timeline of historical processes to secure Shetland's energy needs



## Our Whole System recommendation

In November 2018 we submitted a recommendation for a simple Whole System solution<sup>3</sup> to Ofgem<sup>4</sup>.

Rather than procure a separate solution for Shetland, SHEPD should **contribute a fair share** of the cost of installing a larger transmission link - a contribution of **£251m**.

The **principle** is simple: together SHEPD and generation developers can obtain use of a GB energy link which **meets their needs** (demand security and export) and is, individually and for the GB electricity bill payer, **better value – a saving of at least £140m**. We explain our analysis and conclusion below.

## Benefits of taking a whole system approach

Our recommendation identifies and addresses two concurrent, and complementary, issues.

- Renewable developers on Shetland need a link to the GB system to export power
- SHEPD needs a primary source of power to ensure security of supply across the Shetland islands

Separately, both groups face very high solution costs. Together, developers and the distribution network can share the cost and avoid constructing two solutions when one is clearly more efficient.

We have carefully assessed a range of options available to provide demand security on Shetland, to ensure that the whole system principle is in the interest of customers. This work has been supported by external expert advisors.



### Identify viable options

This stage checked whether any new technology solutions have emerged over the past two years.

### Value options

This stage validated the cost and value of potential solutions, building on the 2016-17 tender process.

### Compare options

This stage developed a method to compare solutions and identify the benchmark cost to GB electricity bill payers of c. £400m.

### Identify 'fair value'

This stage developed a methodology to identify the 'fair value' of a contribution by GB electricity bill payers.

This analytical and evidence-based approach allowed us to identify the following benefits; this is the basis for our recommendation to Ofgem on the enduring demand solution for Shetland.

# Summary of benefits

## A link is the most efficient technical solution

A network link to the mainland, whether distribution or transmission, remains the most efficient solution to secure demand. No other technology, new or established, can currently facilitate renewable generation export, reduce Shetland energy carbon intensity and deliver this at an efficient cost.

## A fair contribution is valued at £251m

'What is access to a larger link worth to SHEPD. Our 'fair value' methodology identifies three areas of value:

- £123m: Peak Demand Support (meeting the Islands' 47MW peak demand)
- £118m: Control Support (carbon reductions from enabling access to the lower carbon electricity)
- £10m: Reduced Losses (the improvement in losses a transmission link brings)

## The next best alternative will cost GB electricity bill payers at least £400m – GB bill payers save a minimum of £140m

Without a transmission link, we must secure an alternative security of supply solution. Our analysis shows the best value alternative is a distribution link, which will cost at least £140m more than the recommended contribution and will not deliver the same level of export potential.

Up to a 'fair value' contribution of £400m, a transmission link represents better value to GB electricity bill payers. Above £400m, we would choose a distribution link solution.

Standby services will also be required, as with any link solution. The cost of these services would be the same to back up supply from either a transmission or distribution link.

## How will this be delivered?

We have recommended that the contribution be made as a one-off payment only on energisation of the transmission link. This provides an incentive to the transmission owner to deliver the security of supply solution and certainty to GB electricity bill payers, generators and other stakeholders that payment of the contribution will result in the desired benefits. The contribution will reduce the value of the regulated asset on which the transmission owner recovers revenue and upon which the Transmission Network Use of System (TNUoS), paid by users of the system, are based. As a distribution network, we would recognise this contribution as a regulated asset, and recover the revenue associated with it as we would any other regulated asset.

## Application to Scotland's other major island groups

Our whole system recommendation is in line with Ofgem's RIIO-2 Framework Decision and its current consultation on network whole system licence conditions. We recognise our Shetland approach is first of a kind, however, we believe that the principle also applies across our network. Where investment by another licenced network enables cost efficiencies, operating benefits or avoidance of duplicate investment for bill payers, then similar contribution proposals are warranted.

We think similar conditions are present on Orkney and the Western Isles. We are developing pan-island proposals to contribute towards each link solution to recognise the benefits that the transmission investment brings to those distribution systems. The distribution network drivers for the Western Isles or Orkney are based on avoiding the replacement of parts of the current network. There is no security of supply driver equivalent to Shetland. Therefore, while the principle is aligned, the potential savings are materially different; we estimate these are lower by a factor of 10. We have followed the same rigorous process undertaken for Shetland, to quantify the need for and value of the transmission links to these islands - more detail on this process is set out overleaf.

## Pan-Island: Orkney and Western Isles

### Identify viable options

We have identified distribution network options which avoid replacement or reduce operation of current assets - back-up generation and / or additional Distribution cables.

### Value options

We have benchmarked the costs of these options against current efficient solutions; e.g. the standby plant costs tendered for Shetland in 2016/17.

### Compare options

We have assessed the security of supply and quality of supply impact for each island. Only solutions which maintain a service at least equivalent to the current standard are considered.

### Identify 'fair value'

We have developed an approach to quantify the 'fair value' of the proposed solutions. This references the cost avoided and future potential additional savings.

## Fair value contribution proposals for Western Isles and Orkney

- Estimated at £20m: Western Isles – reduced reliance on backup generation
- Estimated at £15m: Orkney – avoided replacement of backup generation

We will publish further detail on the pan-island network solutions and potential contribution values shortly. This will be based on Ofgem's feedback on our whole system principle demonstrated through the Shetland recommendation.

## Next steps

We await Ofgem's view of our Shetland recommendation. In its consultation, 'Shetland transmission project: Consultation on Final Needs Case'<sup>5</sup> Ofgem has committed to publish its views of our proposal and to seek wider stakeholder feedback. Ofgem has acknowledged that our proposal will impact the networks charges of transmission-connected generation. We continue to emphasise that clarity for developers and SHEPD is essential ahead of the May 2019 CfD window. In order to provide this clarity, we believe that Ofgem's publication should include:

- Confirmation that Ofgem supports our whole system approach
- Confirmation that, as a beneficiary, a contribution to the cost of the transmission link by SHEPD is justified
- Confirmation of the range of contribution values that are justified based on the extensive evidence already provided by SHEPD

If this recommendation is accepted and developers are successful in winning a CfD award in the 2019 auction, SHEPD will begin the process of tendering for a suitable backup power station.

Conversely, if the fair value contribution is not approved, the costs of the link are not shared, and Shetland developers are not able to submit competitive bids in the CfD auction, it is likely that the transmission solution will not progress and an alternative solution will be required. SHEPD's analysis indicates that the alternative solutions likely to come forward are estimated to cost in the region of £400m+, costing GB electricity bill payers substantially more (£140m) than SHEPD's whole system recommendation. An enduring solution must be ready to enter service prior to the Lerwick Power Station backstop date of 2025.

## Contact Us

If you have any questions about our Whole System Recommendation, please contact us at [Shetland.New.Energy.Solution@sse.com](mailto:Shetland.New.Energy.Solution@sse.com), or write to us at:

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1 More information on the NINES project can be found here: <https://www.ninessmartgrid.co.uk/>

2 Shetland Integrated Plan – Scottish Hydro Electric Power Distribution (SHEPD), July 2013

3 Ofgem has recently published two key documents on the Whole System framework: its Consultation on licence conditions and guidance for network operators to support an efficient, coordinated, and economical Whole System, and chapter 5, 'Enabling whole system solutions', in its RIIO-2 Sector Specific Methodology.

4 Ofgem is currently assessing our proposal and is committed to providing its view.

5 [https://www.ofgem.gov.uk/system/files/docs/2019/03/consultation\\_on\\_the\\_shetland\\_transmission\\_project.pdf](https://www.ofgem.gov.uk/system/files/docs/2019/03/consultation_on_the_shetland_transmission_project.pdf) (see page 9).