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Price Control Operations – Small & Medium Projects Team

SSEN Distribution response: Consultation on Shetland Enduring Solution Draft Determination

SSEN Distribution welcomes the opportunity to respond to Ofgem's Consultation on the Shetland Enduring Solution Draft Determination. SSEN Distribution is the trading name of Scottish Hydro Electrical Power Distribution plc (SHEPD) and Southern Electric Power Distribution plc (SEPD). This response is being submitted on behalf of those licensees. For the avoidance of doubt, this response is non-confidential and may be published on Ofgem's website.

We have a Distribution Network reaching over 3.8 million households and businesses in the North of Scotland and Central Southern England. In Shetland, we serve over 14,000 distribution customers on an islanded electricity network. These customers are currently supplied via a mixture of Lerwick Power Station (LPS) and a Power Purchase Agreement (PPA) with other on-island generation¹. As part of a Whole System Solution² developed with SSEN Transmission, a new 600MW High Voltage Direct Current (HVDC) link was approved in 2019. However, works continue to connect this Transmission link to the distribution system, which is expected to be completed in late 2025. This will connect Shetland's distribution network to the GB mainland grid for the first time.

The new HVDC link is a single circuit. Therefore, in the event of an unplanned outage, a solution is required to ensure security of supply is maintained. As part of the Whole System Solution, SHEPD was required to procure an enduring solution to maintain the security of supply in case of a loss of power from the HVDC link. We were required to do this through a competitive tender process. From a distribution perspective, this will enable LPS to move from full-duty operation to standby mode and will allow SHEPD to reduce consumer costs by terminating the current PPA with the Sullom Voe Terminal.

For the Standby Solution to maintain supplies on Shetland it must provide two elements:

- (i) the ability to ride through any full system Transmission fault; and

¹ This generation is predominantly diesel and gas.

² The 'Whole System Solution' refers to the new HVDC link in single circuit alongside a Standby Solution for Security of Supply.

- (ii) the ability to provide for the demand on Shetland for up to 45 minutes until LPS is fully up and running from cold standby.

Failure to provide both elements would result in a blackout across Shetland with an estimated 3-4 hours full supply restoration time. Our connection agreement with the Transmission Owner suggests that such an outage could be around 19 times over a 10-year period.

Background & Solution

There has been a long history around investment needed to secure supplies on Shetland for the longer term. To provide context for our response, it is important to set out this background so that stakeholders are aware of other options proposed and Ofgem's previous decisions.

In February 2010, Ofgem included an obligation in SHEPD's licence in Charge Restriction Condition 18A³ which "require SHEPD to present an integrated plan to manage supply and demand on Shetland to the Authority". Under this condition, SHEPD submitted the Integrated Plan (IP) and Northern Isles New Energy Solution (NINES) to Ofgem in 2013. This was rejected by Ofgem in April 2014. CRC 18A was subsequently moved to CRC 2Q under the RIIO-ED1 licence from April 2015.

In 2014, SHEPD received a set of additional conditions from Ofgem⁴ which required us to identify a solution for Shetland through a competitive process. We worked with an Independent Auditor to oversee this work. We then received further additional conditions from Ofgem⁵ to complete the open tender process by October 2017. This resulted in the proposal for a distribution link, which was subsequently rejected by Ofgem in favour of a transmission link, with a contribution from SHEPD towards this link⁶. This was designated the Whole System Solution.

Upon approval of the needs case for the Whole System Solution, we have continued to work extensively on developing the Standby Solution since 2019. Ofgem confirmed that they considered the obligation to identify an enduring solution under CRC 2Q to remain unmet until a solution was proposed⁷. Our work on developing the standby solution had been guided by CRC 2Q which was in our ED1 licence, and the additional conditions imposed on us in 2014 and 2016. This therefore sets the regulatory framework under which we were required to develop an enduring solution for Shetland.

In 2020, we first highlighted to Ofgem that a solution with LPS moving to standby and a battery solution with a Fault Ride Through (FRT) was the most optimal⁸. This was validated through an independent review of technologies. In line with Ofgem's requirements from April 2014⁹. We subsequently ran a technology-agnostic tender to invite solutions. All final stage bidders proposed a solution that included an Alternating Current (AC) Chopper and a Grid-Forming (GF) Battery Energy Storage System (BESS) which would provide Distribution FRT and blackout avoidance. In April 2023, we appointed a preferred bidder and engaged with them to further develop the commercial position. The final proposal is for

³ [Electricity Distribution Price Control Review - Statutory Licence Drafting Consultation](#), February 2010, Appendix 1

⁴ These were received in a letter from Ofgem to SHEPD dated 22 April 2014. [ofgem_determination_of_shepd_submission_under_crc18a_0.pdf](#)

⁵ Ofgem issued these in a letter to SHEPD dated 15 April 2016. [additional_conditions_letter_15apr2016.pdf \(ofgem.gov.uk\)](#)

⁶ [Confirmation of approval of SHEPD proposal to contribute to the Shetland electricity transmission project.](#)

⁷ [Notice of decision on allowed costs for Scottish Hydro Electric Power Distribution \(SHEPD\) of Extended Interim Energy Solution for Shetland from 2019/20 to 2022/23](#), June 2018, p.5-7

⁸ As sent to Ofgem in December 2020. Paper titled "Shetland Standby Power: Alternate Generation Technologies" by Mott MacDonald.

⁹ These were received in a letter from Ofgem to SHEPD dated 22 April 2014. [ofgem_determination_of_shepd_submission_under_crc18a_0.pdf](#)

procuring this solution as a service contract to enable trading on the battery, the benefits of which would flow back to consumers.

Given that we were not able to outline final costs of the standby service in our RIIO-ED2 business plan, we requested an uncertainty mechanism reopener in January 2024 to be able to submit final costs. In January 2024, we made a submission to Ofgem under Special Condition 3.2 (Part P) of our licence to add additional allowances in our RIIO-ED2 price control for the Shetland Enduring Solution (SES). The solution in this submission included two main elements: moving Lerwick Power Station (LPS) to standby mode; and our proposed Standby Solution¹⁰. We are awaiting confirmation that Ofgem accepts those costs prior to signing a contract for the service.

Economic Assessment

Our initial options assessment in the submission was based on comparing the proposed service contract against an asset purchase option for the BESS and AC Chopper.¹¹ This was on the basis that other options had either been rejected by Ofgem, such as the rejection of a Dual Fuel 90MW Power Station (2014) and a distribution link between Great Britain and Shetland (2017), did not comply environmental regulations by the Scottish Environmental Protection Agency (SEPA), or did not meet network planning standards. On Ofgem's request, we expanded our economic assessment to include other options, including those previously rejected and tested them across a range of future scenarios.

Our revised analysis provided to Ofgem demonstrated that SHEPD's preferred option had considerable societal benefits over any other option across all scenarios, validating the work undertaken in 2020 prior to starting the tender process.

Ofgem's Draft Determination

We agree with Ofgem's position to approve SHEPD's Shetland Enduring Solution. Having gone through extensive optioneering processes for over a decade, this solution will deliver on three key principles for Shetland as set out by Ofgem – Best value for money for consumers, guarantee secure energy supply, and significantly reduce environmental emissions.

Our Cost-Benefit Analysis (CBA) has shown that this solution, as compared to any solution tested, provides the best value for money to consumers. This analysis has shown that the Whole System Solution, of which this Standby Solution is a part, provides the least cost to consumers under a range of different scenarios.

In engaging with Ofgem over the past year, we have continually showcased that our recommended option for the Standby Solution has been the right way forward. We worked to add more clarity and detail to this. We have concluded that this is the appropriate solution through engaging with independent auditors, extensive market testing and economic appraisals.

¹⁰ The phrase 'Standby Solution' refers to the solution proposed by SHEPD comprising of the AC Chopper and a GF BESS, providing the services of D-FRT and blackout avoidance to consumers in Shetland.

¹¹ The asset purchase option would see SHEPD procure the BESS and AC Chopper. It would either operate these itself under derogation or seek a third party to operate them.

Risk sharing profile

Connecting Shetland to the mainland transmission network involves a complex 260 km subsea HVDC link. Providing backup power to such a remote island poses significant challenges due to its distance from the mainland and the logistical difficulties of transporting equipment and personnel. Preventing blackouts in this remote location requires technological innovation, and Ofgem has recognised that the solution developed for Shetland is the first of its kind within Europe.

In RIIO-ED1, Special Licence Condition 2Q required us to explore innovative options for managing supply and demand on Shetland. Additional condition 3 from Ofgem's 2014 letter to SHEPD mandated that we "will run a competitive process to identify the most efficient solution for Shetland"¹². These requirements set a regulatory precedent that the solution for Shetland should be innovative and procured through an open-market competitive process. We were subject to these requirements for the entirety of RIIO-ED1 during which we were running the procurement process for the Standby Solution.

In our reopener submission, we demonstrated that the contractual terms secured through this competitive procurement were the best available on the market. These terms require us to cover the cost of the service provider's assets if the standby solution fails and cannot be fixed (and are no longer paid for the service). This is partly due to the service provider having to procure the FRT solution (i.e. the AC Chopper and BESS) from two separate parties, with neither willing to take on the integration risk and the fact project financing is being used by our service provider. Given the tight margins of this project, our service provider has indicated that their funders are unable to underwrite these costs.

As a result, we requested in our reopener submission that customers underwrite these costs, based on the fact that we were required by licence to conduct a competitive procurement for an innovative solution and these are the best contractual terms available to comply with those requirements.

In this context, it is important to highlight that it is very unlikely we would secure better commercial terms if we were to run another tender process for the Standby Solution (more likely that costs would go up given supply chain constraints and demand for BESS technologies). A decision to retender would result in around £75m of costs being incurred at LPS due to the additional time needed to run the power station while a new procurement process was run to put a different solution in place. In addition, our CBA illustrates that the preferred solution (service for the BESS and AC Chopper) is substantially more beneficial than alternatives and does not represent an over-investment in the network. In our sensitivity analysis, we demonstrated that consumers are better off under our proposed solution, even in the unlikely event that a maximum debt and equity is triggered and an alternative FRT solution is required when compared to any of the alternative solutions Ofgem asked us to model. Consequently, when faced with a choice of definitely incurring additional costs of £75m (plus any cost increases for the BESS) or low risk of incurring costs of a debt and equity payout, our proposal to Ofgem was that it was in customers' interests to take the low risk of debt of equity payout.

We assess the risk of a failure in the proposed standby solution which cannot be fixed to be very low. The proposed standby solution includes two main components - the FRT, in the form of an AC chopper, and the BESS. The risk of failure for any individual component is considered minimal. However, a primary concern lies in the interoperability of the components, with the majority of the solution's cost

¹² Ofgem Letter to SHEPD dated 22 April 2014. [ofgem_determination_of_shepd_submission_under_crc18a_0.pdf](#). Page 4.

associated with the BESS. In the unlikely event of a failure, the cost of procuring an alternative FRT solution (the AC Chopper and required communications equipment) is low compared to the BESS costs – 15-20% of overall costs.

Extensive desktop studies have been conducted to assess the risks associated with this solution, and we have found that the risk level is very low. It is difficult to envision a scenario where a more feasible fix could not be found before triggering a full debt-equity payout. Natural incentives, including reputational risk, will drive us to ensure the success of this solution. We understand Ofgem's concerns around setting a precedent through permitting customers to take on the risk of asset failure. We would highlight a number of elements which make this a unique case:

- **This is a direct consequence of regulatory requirements:** Due to various historical reasons, Ofgem has chosen to take a highly interventionist approach to the Shetland solution. We are not aware of any other licensee where such an approach has been used to dictate the network development procurement process. We have strictly adhered to both the letter and spirit of CRC 2Q, ensuring the commercial terms are the best available within the prescribed process. By requiring SSEN to assume this risk, in our view, would set a precedent where the risk profile, driven by the prescribed procurement process, is entirely borne by the licensee and not remunerated for it. This would entail SSEN taking a level of risk significantly higher than any other DNO and GEMA acting inconsistently between different DNO licensees.
- **Geography:** Putting solutions in place on Shetland is very different from doing so on mainland Britain. There is high demand across GB and wider Europe for battery-type solutions, meaning that battery providers are picking and choosing projects based on best returns. We have spent considerable time negotiating the best terms we can for the service solution. Our service provider faces far higher risk and costs in terms of transport, accommodation costs for staff than elsewhere.
- **Risk profile:** This is a substantial project at over £100m over a 10-year period and part of the wider Whole System Solution for Shetland which has cost over £600m. While we consider the risk to be low, the impact is high and if it materialised would have a far greater financial impact than any of the RIIO-ED2 incentives are currently forecast to. Our cost of capital does not reflect this type of risk and it was not envisaged at RIIO-ED2 Final Determinations; again in effect this would mean that SSEN was being treated differently than other DNO licensees.

To further protect consumers and ensure a fair allocation of risk, we propose working closely with Ofgem to develop a robust risk-sharing framework, a draft of which we have previously shared with Ofgem. This would establish clear guidelines on how unforeseen technical failures will be managed, ensuring accountability. This will ensure that consumers are protected from undue risk while we remain incentivised to deliver a reliable, innovative solution. We believe this balanced approach will safeguard consumers while promoting the development of forward-thinking energy solutions.

Efficient Costs

We agree with Ofgem's assessment that the Standby Solution as proposed is the most efficient option as shown by our CBA. We believe that this option delivers value for money for consumers.

While we have been able to demonstrate most costs, uncertainty around the benefit from trading on the battery has not been incorporated into our cost-benefit model. We expect that once these are realised; they should flow back to consumers and further help in improving the economic benefits of our solution.

For clarity, all costs being requested in this reopener are for the Standby solution. No costs for LPS have been included in this as this does not form a part of the Shetland Enduring Solution reopener. LPS costs may only be requested under the Shetland Variable Energy Costs to be treated as Pass-through expenditure.


Next steps

We welcome Ofgem's assessment of the needs case we submitted in January 2024. We believe that this solution is the right way forward for Shetland. A seamless and continuous supply of electricity is essential for any local economy to grow. Our Standby Solution offers this through a service agreement with benefits flowing back to our customers.

We look forward to hearing from Ofgem on their final decision on this draft determination. We note that the timeline for this is listed as 'Winter 2024'. We request that further clarity is provided on this since the timeline for the delivery of this solution would rely upon Ofgem making a decision on this at pace.

If you have any questions concerning our response, please do not hesitate to get in touch with me.

Yours sincerely,



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