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Consultation on the cost of the new energy solution for Shetland

Consultation

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Overview:

Shetland's electricity supply is largely generated from Lerwick Power Station, which is approaching the end of its operational life. In April 2014, we directed Scottish and Southern Electricity Networks (SSEN) to run a competitive process to identify the most efficient solution for Shetland's energy future. SSEN has recently announced that a joint bid by NG Shetland Link Ltd (NGSLL)–Aggreko was their preferred bidder.

This consultation sets out details of the successful bid. It seeks your views on our assessment of the proposed costs of the solution. We are consulting separately on the licensing arrangements to operate the solution.

Context

Shetland is not currently connected to the electricity network that serves mainland Great Britain (GB). This means that the islands have to be able to meet all of their own electricity needs. Currently the main source of electricity generation that can respond to customer demand is Lerwick Power Station, which was built in 1953 and is nearing the end of its operational life.

Our principal objective under the Electricity Act 1989 is to protect the interests of existing and future consumers. In doing so we need to ensure both that:

- the people of Shetland continue to have a reliable energy supply after Lerwick Power Station reaches the end of its life; and
- the costs of the energy supply solution for Shetland are efficient. This is important as all GB energy consumers will meet future generation costs on Shetland.

In late 2013, Scottish and Southern Electricity Networks (SSEN) put forward plans for a replacement for Lerwick Power Station. We were not satisfied that the proposed solution adequately incentivised efficient capital and operational costs. For this reason, in April 2014 we directed SSEN to undertake an open, fair and transparent competitive process to identify a new energy solution for Shetland.

SSEN recently announced that a joint bid by NG Shetland Link Ltd–Aggreko won the competitive process. We are required to assess whether the costs presented have been incentivised and obtained fairly and are representative of the solution. This document sets out our consultation on this assessment.

Associated documents

SSEN's consultation documentation
https://www.ssepd.co.uk/shetlandenergy/documents/

Ofgem's determination of Scottish Hydro Electric Power Distribution plc's (SHEPD) submission required under Charge Restriction Condition (CRC) 18A
https://www.ofgem.gov.uk/sites/default/files/docs/2014/04/ofgem_determination_of_SSEN_submission_under_crc18a_0.pdf

Additional conditions on Ofgem's 22/04/14 determination on Scottish Hydro Electric Power Distribution plc's (SHEPD) submission under Charging Restriction (CRC) 2Q (formerly CRC 18A)
https://www.ofgem.gov.uk/system/files/docs/2016/04/additional_conditions_letter_15apr2016.pdf

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Executive Summary

Shetland's electricity supply is largely generated from Lerwick Power Station, which is approaching the end of its operational life. In April 2014, we directed Scottish and Southern Electricity Networks (SSEN)[1] to run a competitive process to identify the most efficient solution for Shetland's energy future.

SSEN recently announced that a joint bid by NG Shetland Link Ltd (NGSLL)[2]–Aggreko won the competitive process. The successful bid involves building a distribution link between Shetland and mainland Great Britain, with back-up diesel generators on Shetland, which will operate only when the distribution link is out of service.

We are required to assess that the costs presented have been incentivised and obtained fairly, transparently and are representative of the solution. We have undertaken a detailed cost assessment, alongside analysis by independent consultants, and consider the costs to be reasonable and efficient. The evidence to support this view is:

- based on SSEN's economic valuation methodology, NGSLL's bid was around £188m cheaper over the lifetime of the contract than the only other technically compliant bid (the 'reserve bid'), which was to build a new full duty diesel power station;
- our bottom-up analysis of the capital costs of the NGSLL-Aggreko solution concurred with the view of independent consultants, and is within a range of overall expected costs for such a technical solution, which we consider reasonable and acceptable; and
- an Independent Auditor (IA) oversaw the competitive process and verified that it was fair, open and transparent.

On this basis, subject to respondents' views, we are minded to approve the total costs of the solution, incentive mechanisms in place and the associated adjustments to SSEN's allowances.

Next steps

We are consulting for six weeks and welcome all respondents' views.

Alongside this, we are also consulting on two other associated areas:

- an informal consultation on the licensing arrangements for NG Shetland Link Ltd; and
- a consultation on SSEN's licence arrangements for Scottish Hydro Electric Power Distribution plc to ensure that SSEN can recover their additional costs associated with the new solution.

[1] Scottish and Southern Electricity Networks (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. We use 'SSEN' throughout the remainder of this document.

[2] NG Shetland Link Ltd (NGSLL) will be the licensed entity that will be responsible for building, owning and operating the link. We use NGSLL throughout the remainder of this document.

We will consult on SSEN's additional costs over the summer/early autumn 2017.

Subject to the responses to these consultations, we plan to take a final decision on the adjustment to SSEN's allowances for the total costs of the solution and the associated licence arrangements by October 2017. If approved, the new solution should be in place by the end of 2020.

1. Background and purpose of this document

Chapter Summary

Explains why a new energy solution is required on Shetland and SSEN's responsibilities as the Distribution Network Operator and System Operator on Shetland. It also sets out the purpose and structure of this document.

Background to this document

Existing supply on Shetland

1.1. Shetland is not connected to the main electricity network in Great Britain (GB). This means that the islands rely entirely on local sources of generation and the supply and demand must be balanced locally. 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).

1.2. The network on Shetland is classified as a distribution network, with no voltages greater than 33kV. It is owned and operated by Scottish and Southern Electricity Networks (SSEN), a Distribution Network Operator (DNO). During the introduction of the British Electricity Trading and Transmission Arrangements (BETTA), it was formally agreed that SSEN would administer electricity generation and network operation on Shetland. This means that it is also the System Operator (SO) on Shetland, and is thereby responsible for balancing the islands' supply and demand.

1.3. Most of Shetland's electricity is currently supplied by two fossil-fuel power stations, with the remainder being supplied by wind generators. In 2016 the main electricity generation sources were:

- **Lerwick Power Station (LPS)** - a 67MW diesel-fired station that provides around 50% of Shetland's electricity on an annual basis. The station was built in 1953 and is owned by SSE Generation and operated by SSEN. The majority of the generators are operating significantly beyond their design life. The station is expensive to operate and maintain. LPS has also been granted temporary derogations to environmental requirements[3] by the Scottish Environmental Protection Agency (SEPA) on condition that adequate emissions controls are introduced through, for example, additional abatement, or the existing station is replaced. These derogations are time-limited and will expire at the end of 2020.

[3] For example, emissions limits under the Medium Combustion Plant Directive.

- **Sullom Voe Terminal (SVT) Power Station** - a 100MW independently owned gas-fired power station, which meets around 40% of Shetland's demand. The station's primary purpose is to supply electricity to the Sullom Voe gas terminal, but it also provides up to 15MW of Shetland's electricity through a third party contract arrangement put in place by SSEN. The future use of SVT is uncertain beyond 2020.
- **Burradale Wind Farm** - a small (3.68MW) independent wind farm, which contributes around 7% of the islands' electricity supply.
- **Northern Isles New Energy Solutions (NINES)**[4] - an innovative trial project developed by SSEN in partnership with third parties and approved by Ofgem in 2011. It aimed to increase renewable generation output, reduce reliance on fossil fuels and cut the cost of electricity by lowering the maximum demand on the island network. The project comprised several generation, storage and demand side managed assets including a number of small-scale, community-based wind generators taking advantage of the above average wind conditions that Shetland experiences.

Why was a change to the current arrangements needed?

1.4. In view of LPS approaching the end of its operational life and the uncertainty about the future of SVT, there has been concern as to how the electricity demand on Shetland would be met in the long term.

1.5. As a result, in our final proposals for the fifth electricity distribution price control review (DPCR5) in December 2009[5], we placed a requirement on SSEN[6] to present to us, by 31 July 2013, an Integrated Plan to manage the supply and demand of electricity on the islands. We said that the plan should:

- examine all available options to find the most efficient solution;
- involve market-based mechanisms, including the possibility to tender the replacement of the power station;
- develop partnerships and work with local communities; and
- identify a solution based on the lowest lifecycle costs that meets environmental obligations.

1.6. In its capacity as the SO on Shetland, SSEN submitted an integrated plan to us in July 2013 for a new full-duty dual-fuel 90MW power station to be owned by SSE Generation and delivered on Shetland in 2017.

[4] Further information on NINES can be found at the following website: http://www.ninessmartgrid.co.uk/our-project/
[5] Electricity Distribution Price Control Review Final Proposals – Decision document https://www.ofgem.gov.uk/ofgem-publications/46746/fp1core-document-ss-final.pdf
[6] Through charge restriction condition (CRC) 18A of the Scottish Hydro Electric Power Distribution (SHEPD) licence.

1.7. We rejected this proposal as we considered that SSEN had not sufficiently tested the market for an efficient and economical solution. Specifically, we were not persuaded that the costs put forward were the most efficient and competitive, as SSEN had not provided sufficient supporting evidence to demonstrate this.

1.8. In April 2014, we wrote to SSEN directing them to competitively tender for a new energy solution on Shetland.[7] The competitive process followed by SSEN is described in Chapter 2. The key requirements set out in the determination letter were for SSEN to:

- **Carry out an open and public consultation and stakeholder engagement exercise**. SSEN were required to ensure this exercise considered all potential solutions and any other relevant considerations, and invited the views of all interested stakeholders. The responses were to be used to develop the scope of the competitive process documents and selection criteria.
- **Run a competitive process** that would be open to all options that a) could meet security of supply and b) were compatible with Shetland's energy needs, with a view to encouraging the smart, flexible, innovative, hybrid and efficient use of current assets. Any viable options also needed to allow for the integration of, and be informed by, the NINES project.
- **Appoint an Independent Auditor (IA)** to oversee, agree and report to Ofgem on the competitive process to ensure the process was fair, open and equitable.

1.9. A range of parties has been involved in the running of the competitive process. These parties are referenced throughout this document and their respective roles are set out in Appendix 1.

Purpose of this document

1.10. SSEN has now completed the competitive process and has informed Ofgem that its preferred bidder is a joint bid by NGSLL and Aggreko, the preferred Shetland New Energy Solution (SNES). The solution involves building a High Voltage Direct Current (HVDC) link between Shetland and mainland GB with a back-up diesel generator on Shetland.

1.11. This document represents our consultation on the adjustment to SSEN's allowances (the 'Relevant Adjustment') associated with the costs of that solution, which will be recovered by SSEN through its Scottish Hydro Electric Power Distribution (SHEPD) licence. We are consulting separately on the proposed modifications to SHEPD's licence to give effect to this. Further information is set out in Chapter 6.

[7] https://www.ofgem.gov.uk/ofgem-publications/87381/ofgemdeterminationofshepdsubmissionundercrc18a.pdf

1.12. For the avoidance of doubt, we are not consulting on the solution itself, which is the product of a detailed competitive process undertaken by SSEN and overseen by an IA.

Structure of this document

1.13. The remainder of this document is structured as follows:

- Chapter 2 provides an overview of the competitive process, including the key stages and the different parties involved in overseeing the process and assessing the technical and commercial aspects of the bids
- Chapter 3 provides an overview of both the preferred SNES and the parties involved
- Chapter 4 sets out our assessment of the costs of the preferred SNES
- Chapter 5 sets out an overview of the incentive arrangements associated with the preferred SNES and our assessment of those arrangements
- Chapter 6 sets out next steps.

1.14. Alongside this document we have published two related documents:

- an informal consultation on NGSLL's application for an Independent Distribution Network Operator (iDNO) licence as NG Shetland Link Ltd (NGSLL); and
- an informal consultation on the proposed modifications to SSEN's licence to enable them to recover the costs of incorporating the new solution.

Responding to this consultation

1.15. We welcome comments on this document by 30 August 2017 to RIIO.ED1@ofgem.gov.uk or in writing to:

Grant McEachran
RIIO - Electricity Distribution
Ofgem
3rd Floor
Cornerstone
West Regent Street
Glasgow
G2 2BA

1.16. Unless clearly marked as confidential, all responses will be published on our website.

2. Overview of the competitive process

Chapter Summary

Description of the process SSEN followed in procuring a new energy solution for Shetland. This section is intended to provide an understanding of the process that had led to the selection of the preferred SNES detailed in Chapter 3.

Stages of the competitive process

2.1. There were five key stages to the competitive process:

- Stage 1 – Initial consultation;
- Stage 2 – Pre-Qualification Questionnaire;
- Stage 3 – Invitation to Tender;
- Stage 4 – Evaluation; and
- Stage 5 – Award Recommendation.

2.2. Following our determination letter to SSEN in April 2014, Fichtner Consulting Engineers, an independent engineering consultancy, was appointed as the IA as of 28 October 2014. The IA oversaw each of the following stages of the process.

Stage 1 - Initial consultation

2.3. In line with Ofgem's 2014 determination, SSEN carried out a public consultation[8] before starting the tender process. The purpose of the consultation was to raise awareness and promote discussion in Shetland and elsewhere about the islands' energy needs and how they could best be met in the future. To inform this process, consultation events were held in Shetland, Glasgow and London.

2.4. The consultation document set out the background to the SNES project and requested stakeholders' views on:

- the requirements for Shetland's future energy needs (both supply and demand side response);
- the competitive tender process for the SNES project;
- the roles and responsibilities of regulated electricity industry participants; and
- the market arrangements that will enable the new energy solution for Shetland to be delivered and operated successfully.

[8] Further information on the project and consultation can be found here: https://www.ssepd.co.uk/ShetlandEnergy/

2.5. There were 302 responses from stakeholders during the consultation process. This comprised 194 written responses and participation of 108 stakeholders at roundtable meetings or drop-in events.[9]

2.6. Responses were received from domestic, public sector and commercial stakeholders on Shetland as well as from organisations with an interest in the future energy system both on Shetland and on mainland GB. SSEN also received responses from potential participants in the competitive process and other electricity licensees.

2.7. The key themes which emerged from the consultation process were:

- **Scope of services required** - There was agreement on the proposed project assessment criteria with a solid emphasis on the importance of security and reliability of the electricity supply to Shetland (prioritised over cost).
- **Services to be procured** - Respondents agreed that tendering for services, as set out in the consultation document, would provide a robust energy solution. They were confident that, by tendering on this basis, the solution would be efficient, flexible and not affect network stability, given the intention to apply non-delivery penalties and incentives on delivery guarantees.
- **Procurement and process** - Respondents agreed that the assessment of bids should take into account the cost of interim solutions that push delivery beyond the original intended SNES start date of 2019[10].
- **Market and balancing on Shetland** - Respondents agreed that the SNES should reliably deliver generating capacity and energy supply and in doing so should be sustainable, economic and efficient.
- **The role of the SO** - There was strong support for the role of the Shetland SO to be clearly defined in licence conditions, with clear documentation setting out how the SO will procure capacity and energy services.
- **Characteristics of the SNES** - Respondents outlined a series of items of key interest in relation to the SNES, which included: (i) security and reliability of energy supply to Shetland; (ii) keeping the cost of the provision of energy to Shetland as low as possible; (iii) reducing the reliance on fossil fuels; and (iv) delivering a solution at the earliest possible date.

Stage 2 - Pre-Qualification Questionnaire (PQQ)

2.8. On 10 April 2015, SSEN commenced the Project Qualification process by placing a call for competition to the EU via an Official Journal of the European Union (OJEU) Notice to the market. The deadline for PQQ responses was 8 May 2015.

[9] The consultation and all non-confidential responses are here: https://www.ssepd.co.uk/ShetlandEnergy/documents/
[10] Ofgem outlined a revised timeline in our determination letter of April 2016: https://www.ofgem.gov.uk/ofgem-publications/100086

2.9. The PQQ required bidders to demonstrate the following:

- an indication of a successful track record for carrying out similar work;
- technical capability;
- resource capability;
- financial standing (e.g. company accounts and evidence of financial status);
- legal standing (e.g. any pending court judgments);
- competence to act within UK CDM Regulations;[11]
- a health and safety track record;
- a quality track record;
- an understanding of the environmental requirements;
- contractual standing in relation to compliance with SSEN's indicative proposed Heads of Terms; and
- the ability to demonstrate competence in the fundamental requirements of their solution.

2.10. The PQQ was divided into "Lots". SSEN chose to use Lots to encourage a range of proposals from different interested parties. Bespoke agreements for each Lot were developed by SSEN, drafted by its legal advisor CMS Cameron McKenna Nabarro Olswang LLP Legal Services (CMS). Ultimately, the intention was to combine a number of Lots offered during the tender to produce an optimised overall solution. SSEN identified 4 Lots for the following types of service:

- **Lot 1: Reliable Provision of Availability and Energy** – sources of energy that can be available all of the time to respond to the needs of customers across the Shetland system as a whole.
- **Lot 2: Intermittent Provision of Energy** – sources of energy that can provide energy some of the time to meet demand on Shetland, but cannot always be relied upon to be available when required by the SO.
- **Lot 3: Reduction of Energy Consumption (demand side services)** – consumers of energy in Shetland could offer either to reduce their demand capacity at peak times to help manage the system, or to reduce their long-term energy consumption.
- **Lot 4: Provision of Additional (ancillary) Services** – a range of requirements to manage the island system, including the ability to respond quickly to changes in demand and restore power in the event of a loss of all generation.

2.11. In total 19 PQQ responses were received by SSEN. A number of respondents submitted bids for more than one Lot (in such cases these are still counted as a single response). Three bids were rejected due to failure to fulfil the prerequisites set out in the PQQ. Following evaluation, one further bid did not pass the 50% pass mark. SSEN and the IA were content with inviting 15 bidders to tender at the Invitation to Tender (ITT) stage. Those bidders offered a range of technologies as summarised in Table 2.1.

[11] The Construction (Design and Management) Regulations 2015

Table 2.1: Summary of bidders who pre-qualified for the ITT stage (by technology)

	Pre-qualified Applicants by Lot			
	Lot 1: Reliable Energy	**Lot 2: Intermittent**	**Lot 3: Demand Reduction**	**Lot 4: Additional Services**
Tenderers' Technology by Lot	A) Diesel Power Station	E) Wind Power	E) Energy Storage	A) Ancillary Services
	B) Diesel Power Station	I) Wind Power	N) Residential Demand Management	B) Ancillary Services
	C) HVDC cable	J) Wind Power	L) Commercial Demand Management	C) Ancillary Services
	D) Diesel Power Station	K) Wind Power		E) Ancillary Services/Energy Storage
	E) Dual-fuel Power Station	L) Wind Power		H) Ancillary Services
	F) Diesel Power Station	M) Tidal Power		I) Ancillary Services
	G) Power Systems Integration			K) Ancillary Services
	H) Dual-fuel Power Station			O) Battery Storage
Total Bids per Lot	8	6	3	8

Note: although 15 different parties, (A) to (O), pre-qualified for the ITT stage, one applicant (G) withdrew before the ITT was issued and so the ITT was issued to 14 parties.

Stage 3 – Invitation to Tender (ITT)

2.12. Only bidders who had prequalified for a specified Lot(s) were allowed to submit an ITT bid for that Lot(s). The ITT documentation was issued to those bidders on 13 May 2016 with a tender return date of 7 October 2016. This date was ultimately extended to 19 December 2016 following multiple requests from bidders.

2.13. An evaluation handbook was produced by Mott MacDonald, a specialist third party general engineering consultant, and was reviewed by the IA. It described, amongst other things, the bid receipt and processing protocol.

2.14. The IA was present at both the bid receipt process and the unsealing and initial processing and confirmed that the bids were handled correctly in accordance with the agreed protocol.

2.15. During the bid period, which included extensive tenderer engagement aimed at understanding the potential bids, for various reasons it became clear that a number of potential tenderers may not be able to find a way to compile a viable tender relative to their technology solution and a number of tenderers withdrew from the process.

2.16. In December 2016, SSEN received the tenders outlined in Table 2.2

Table 2.2: Tenders received at the ITT stage

	Tenders Received by Lot			
	Lot 1: Reliable Energy	**Lot 2: Intermittent**	**Lot 3: Demand Reduction**	**Lot 4: Additional Services**
Tenderers Technology by Lot	A) Diesel Standby Power Station	K) Wind Power	No bids received	A) Ancillary Services
	B) Diesel Power Station	M) Tidal Power		B) Ancillary Services
	C) HVDC cable + Standby Diesel Power Station			C) Ancillary Services
Total Bids per Lot	3	2	0	3

Note: Five different parties - A, B, C, K and M - submitted a tender. Nine parties withdrew between the ITT being issued on 13 May 2016 and the ITT submission deadline of 19 December 2016.

Stage 4 – Evaluation Phase

2.17. The tender evaluation process took place between December 2016 and May 2017 in accordance with the methodology described in the ITT documentation. There were various aspects to the evaluation process, all of which were overseen by the IA. These are described below.

Bid compliance

2.18. The bids were assessed for compliance against set requirements outlined in the ITT documentation. A compliance checklist was included in the evaluation handbook and was used to confirm that these requirements were met.

2.19. Subsequently, a more detailed assessment of compliance was carried out by Mott MacDonald who concluded that all bids were substantially compliant. The IA reviewed and verified all of these processes.

Technical evaluation

2.20. The technical evaluation followed a two-stage process. First, the bids were subjected to a technical compliance check carried out by Mott MacDonald (Stage 1). This was to ensure that the defined technical parameters required for the second stage were present. It also provided a qualitative appraisal of the technical solutions proposed by each of the tenderers. Stage 2 involved security of supply and system modelling which was carried out by WSP, a specialist technical engineering consultancy.

2.21. The assessment of the Lot 1 bids for security of supply was based on WSP's Generation Security Standard (GSS) model, which uses a simplified dispatch model. All three Lot 1 solutions met the Loss of Load Equivalent (LOLE) requirement of <3 hours and the N+2 redundancy requirement.[12] WSP concluded that all of the Lot 1 bids successfully met the security of supply requirements, which were 'pass or fail' requirements.

2.22. For the dynamic system modelling, WSP modelled the response of the system as if it were based solely on each of the Lot 1 bid solutions operating in the following fault conditions:

- loss of largest generator;
- 200ms fault at Lerwick 33kV busbar;
- loss of largest intermittent generator (if applicable); and
- trip of the SVT to the Firth 33kV circuit.

2.23. One issue assessed as part of the technical evaluation was the amount of load shedding required to keep the system operational. Load shedding is the deliberate temporary disconnection of a part or parts of a network, to reduce demand and generally to avoid overloading the generators. It was concluded that the NGSLL link provided a sufficiently fast response that no load shedding occurred in any of the investigated scenarios. The only scenario where load shedding would occur with the NGSLL-Aggreko solution was where the Aggreko standby units were operational instead of the cable link and where a block of six Aggreko units failed. In such a scenario, there would be some load shedding in the event of a 200ms fault at LPS. However, this is a highly unlikely scenario as the Aggreko units can be reconfigured to avoid this. The levels of load shedding were somewhat less than the second most competitive bid (the reserve bidder).

2.24. All of the bids for all Lots, including those for Lot 2 intermittent generation, were deemed technically compliant.

Commercial Evaluation

2.25. The commercial assessment was carried out by Baringa Partners LLP (Baringa) to find the least cost energy solution from the five technically compliant bids. We consider these costs in further detail in Chapter 4.

[12] LOLE represents the number of hours per annum in which, over the long-term, it is statistically expected that supply will not meet demand. The LOLE requirement of <3 hours is in line with Security of Supply standards in GB. In addition, it was agreed that solutions would need to meet N+2 where N is catering for (total capacity minus two largest sources).

Stage 5 - Award recommendation

2.26. The evaluation stage culminated in SSEN's Award Recommendation to Ofgem being submitted on 17 May 2017. This confirmed that the NGSLL-Aggreko submission for Lots 1 and 4 was recommended as the new energy solution for Shetland, with no contracts to be placed for Lot 2 tenderers due to the nature of the successful Lot 1 solution.

IA oversight

2.27. The IA has fully supported SSEN's recommendation to Ofgem and has submitted a report to Ofgem outlining its support.

2.28. The IA had complete oversight of all aspects of procurement design/strategy and technical/commercial tender evaluation. The IA provided both formal and informal updates to Ofgem, which included written monthly reports, meeting attendance and monthly bi-laterals between Ofgem and the IA. The IA was integrally involved in all steps of the procurement process and signed off all key principles, decisions and stages to ensure an open and transparent process, culminating in the most efficient solution being recommended to Ofgem.

3. Description of the solution

Chapter Summary

SSEN has completed the competitive process and has recommended a HVDC subsea cable linking Shetland to the wider GB electricity network and a back-up power station comprising diesel generators on Shetland. We provide a description of the solution in this chapter.

Overview of the solution

3.1. The electricity distribution network on Shetland is not connected to the wider GB system. SSEN has recommended that we should allow it to recover the efficient cost of procuring Availability services from a subsea HVDC cable from NGSLL. This link will be combined with Output services from a back-up generator supplied by Aggreko to ensure security of supply and allow for biennial servicing of the subsea cable link.

HVDC cable

3.2. NGSLL will install a +/- 80kV 250km HVDC cable using voltage source converter (VSC) technology to link Shetland to the wider GB electricity network. The subsea cable will be purchased from Prysmian.

3.3. Once the link is constructed, it will be owned and operated by NGSLL, which has applied for an iDNO licence (see Appendix 2 of this document for more information on the proposed licence arrangements for NGSLL). The cable will have a 60MW import/export capability. The purpose of the competitive process was to secure Shetland's demand, but the cable also has the technical capability to export 60MW.

3.4. The cable in intended to be laid in a trench that will be excavated one year before the cable is installed. NGSLL has noted that its cable installation will meet the protection requirements required for marine licensing purposes e.g. protecting the cable with rock placement.

Route of link and points of connection

3.5. NGSLL intends to build a converter station adjacent to the 132kV Dounreay substation. NGSLL will connect to the transmission system in the north of Scotland owned by Scottish Hydro Electric Transmission (SHE Transmission). The subsea cable is intended to leave the north of Scotland coast near Dounreay, and to follow a route to the west of the Orkney Islands and Fair Isle. It is planned to make landfall on the west coast of Shetland near Scalloway. The final route is subject to further specification and consents.

3.6. NGSLL intends to build a second converter station at Scalloway. This would be connected to the distribution network on Shetland via a new 7.6km 33kV, 60MW capacity cable that would link to the Gremista 33kV substation.

DC converter technology

3.7. NGSLL will procure Module Multimode Converters from NARI for installation at both Dounreay and Scalloway. These converters will use VSC technology.

Back-up generator

3.8. Aggreko will provide the back-up power generation. The availability of back-up is a service within the NGSLL-SSEN contract with the output of the generation subject to a separate contract between SSEN-Aggreko. Both contracts are reflective of the contract which was included in the ITT.

3.9. This is proposed to be sited near Lerwick, with the specific location to be decided at a later date. Aggreko will build a 54.4MW modular generation facility which, taking into account its overload rating, can provide up to 66.2MW. This will comprise 64 0.85MW containerised medium-speed diesel engines. Aggreko will maintain a stockpile of 30 days' of fuel on Shetland to provide sufficient fuel for the generators.

3.10. The generators are scheduled to operate for one week every two years during scheduled maintenance downtime for the HVDC cable. The back-up will also cover unplanned and forced outages. The units will provide the necessary resilience to ensure 54.4MW of on-island back-up generation capability when the HVDC cable is not available.

The bidders

NGSLL

3.11. NGSLL is a wholly owned subsidiary of National Grid plc which, among other things, owns the high-voltage electricity transmission system in England and Wales, is a Transmission Operator and operates the electricity system across Great Britain as the System Operator (SO).

3.12. The National Grid group owns and operates half of two interconnectors:

- BritNed - A 260km bi-pole HVDC electricity interconnector between the Isle of Grain, UK to Maasvlakte, Netherlands. BritNed is a 50:50 joint venture with TenneT, the Dutch electricity Transmission System Operator.

- Interconnexion France-Angleterre (IFA) – A 70km HVDC electricity interconnector between England and France. It is part of a joint agreement with the French Transmission System Operator, RTE.

Further, the National Grid group are currently involved in projects to develop further interconnectors to Belgium (the Nemo Link) and to Norway (the NSL Link).

3.13. For the preferred SNES, NGSLL has appointed two main technology subcontractors:

- NARI – a supplier of electrical power equipment who will work closely with Amey plc, the preferred supplier for civil engineering works. Together they will design, build and commission the converter stations at Scalloway, Shetland and Dounreay.
- Prysmian Group – a manufacturer of electrical power and telecommunications cables who will develop and install the high voltage subsea and underground cables.

Aggreko

3.14. Aggreko plc is a supplier of power generation and temperature control equipment. It operates in over 100 countries worldwide and specialises in the provision of modular, mobile power.

Delivery timetable

3.15. The survey and design phase is planned for completion in Q4 2018, with procurement and manufacture continuing through to Q2 2020. Installation completion is planned for mid-Q3 2020. This means the Shetland link should be available for operation by late 2020, as required by the ITT process.

Impacts of the preferred SNES

3.16. The preferred bidder has identified a number of key impacts of the preferred SNES. These are detailed below.

Security of supply/ reliability

3.17. A key element of the assessment process was each solution's ability to meet Shetland's security of supply requirements. The preferred SNES clearly met these standards. In line with the requirements of Marine Scotland, NGSLL has confirmed that the cable will be protected to ensure it cannot incur accidental damage. Further, the back-up generation on Shetland will be able to meet energy demand during any periods of planned or unplanned outage of the HVDC cable. Overall, it is expected to provide at a minimum, the same reliability as the GB electricity network.

Jobs

3.18. NGSLL's proposal will create a number of long-term high quality jobs on Shetland. These will be based in a new control room intended to be developed at

Scalloway, together with a number of operational jobs at the back-up generation site. SSEN will employ staff to support the continuation of its SO function on Shetland. Finally, a number of temporary jobs will be created during construction.

Emissions

3.19. The solution is likely to provide environmental benefits when compared to a fuel-duty liquid fuel generation solution. This includes reductions in greenhouse gas emissions on Shetland which may contribute to both Scotland's and the UK's wider climate change targets.

Opportunities for renewables

3.20. NGSLL notes that the solution is expected to improve the capability of the Shetland electricity system to accommodate renewable generation. They estimate that the HVDC cable (in its current specification) would allow the development of further renewable generation on Shetland to both meet the needs of the island and the potential for export to mainland Scotland. This creates an opportunity for the development of new projects including, potentially small-scale community-led projects. It would not address the export needs of larger-scale renewable development such as the proposed Viking Wind Farm. In such a case, the needs case for a transmission link would need to be considered. This is discussed further in Chapter 4.

4. Cost assessment of the solution

Chapter Summary

Detail on the total costs of the preferred SNES to 2041, including the commercial assessment of the costs of the SNES service carried out by Baringa on behalf of SSEN and our assessment of the capital costs of the preferred SNES. It also sets out how costs will be recovered and discusses the impact on GB consumers' bills.

Question 1: Do you have any views on the costs of the preferred SNES?

Question 2: Do you have any views on whether the recommended solution represents the optimal level of cost efficiency currently available?

Costs of the preferred SNES

4.1. The evaluation calculated the cost to consumers of the preferred SNES over its 20-year lifecycle. It is estimated at around **£40m per annum** and a Net Present Value (NPV) of the evaluated costs of **£581.7m.** All of the costs of the solution will be recovered through incentivised Output/Utilisation and Availability payments from 2020/21 to 2040/41.

4.2. Additional costs will be incurred by SSEN. In the short-term these will be to continue to run Lerwick Power Station and pay for services from Sullom Voe Terminal Power Station while the link is being built, and in the longer-term to accommodate the new solution on its network. This consultation only considers the NGSLL-Aggreko costs and the costs of paying for the solution over 20 years. We will consult on SSEN's other costs separately over the summer and early autumn 2017.

4.3. Assessments were undertaken to determine if the cost of the preferred SNES is efficient and provides good value for GB consumers. In particular:

- a commercial assessment of the NGSLL-Aggreko bid and the other remaining Lot 1 bid was undertaken by an independent party, Baringa; and
- Ofgem and the IA assessed the capex costs to provide further reassurance on the efficiency of the preferred SNES.

Baringa's commercial assessment

4.4. Baringa carried out the commercial assessment to identify the least cost energy solution from the technically compliant bids. It evaluated the costs of the two remaining Lot 1 bids to determine the lowest Overall Solution Evaluation Costs (OSEC).

4.5. The competition to provide a new energy solution for Shetland was based on providing a certain level of capacity at the most competitive price. It was neutral to whether solutions were largely capex or opex based.

4.6. The assessment looked at the NPV of both of the proposed solutions (using the Availability and Output/Utilisation fees proposed by the bidders) over the life of the contract.

Method

4.7. Baringa used its market despatch model, which uses PLEXOS market simulation software to model the pricing for the services supplied by the tenderers, along with the cost of the electricity imported from the mainland and supplied by intermittent generation on Shetland. This was adapted for Shetland and agreed prior to the issue of the ITT. The IA approved this method.

4.8. It considered the costs in three market scenarios: central, high and low[13], using assumptions from the following:

- fuel and carbon price projections published by the UK Government[14];
- GB demand and supply assumptions from Baringa's standard market report; and
- Shetland-specific assumptions provided by SSEN, such as the pattern of Shetland hourly demand and volume of renewables.

4.9. A further scenario considered was the potential for a future transmission link to Shetland. Proposals have previously been discussed for an onshore 450MW wind farm (the Viking Wind Farm) on Shetland to be linked to the GB mainland via a transmission link proposed by SHE Transmission (the Shetland Transmission Link). While the SNES is driven by the ongoing energy needs of Shetland, the case for the Shetland Transmission Link is primarily based on future large scale export potential. Based on these discussions, Baringa modelled two alternative scenarios:

(i) the Viking project does not proceed and no cable is developed ('without Viking'); and
(ii) the Viking cable is developed in 2023[15] ('with Viking').

[13] The high market scenario assumes higher fuel and carbon costs (i.e. greater economic risk) than the low market scenario.
[14] Updated Energy and Emissions Projections 2015 https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2015
[15] SSEN originally set out a Viking cable commissioning date of 2021. By the time the economic evaluation was undertaken, it was agreed to run the scenario of Viking cable commissioning for 2023 as a more realistic timescale.

4.10. Using the PLEXOS model, Baringa quantified the future costs taking account of each of the market scenarios and Viking futures outlined above. Each fuel price scenario and the Viking future scenarios was given a probability weighting.

4.11. This was used to produce a weighted average cost[16] of the overall solutions, the OSEC value.

Results

4.12. Baringa concluded that the OSEC NPV of the two remaining Lot 1 bids were:

- NGSLL-Aggreko - £581.7m
- Reserve bidder - £769.6m.

4.13. The NGSLL-Aggreko solution was the most efficient option by a considerable margin (approximately £188m).

4.14. The key difference in costs between the two bids was due to the higher fuel (and hence electricity production) costs of the reserve bidder solution compared to the NGSLL-Aggreko solution.

Sensitivities

4.15. Baringa also ran a number of sensitivities including the removal of carbon costs, transport costs and using different fuel cost forecasts. None of these sensitivities significantly changed the results. The only scenario in which the reserve bid was more economic (by approximately £10m) was with an early (2021) introduction of the Shetland Transmission Link. This marginal benefit is dependent on the assumption of the 2021 commissioning date for the Shetland Transmission Link, with any delay resulting in the NGSLL-Aggreko solution being the most economic. However, based on information available at the time, the probability of this was considered to be low.

Ofgem conclusions

4.16. We are satisfied that the cost of the preferred SNES is the most efficient, because:

- the Baringa methodology, approved by the IA, is sound and has produced a fair comparison between each solution;
- the analysis concluded that the NPV costs were approximately £188m lower than the reserve bidder; and
- the sensitivities did not significantly change the results.

[16] The weightings for the various scenarios were agreed prior to the issue of the ITT.

4.17. In addition, crucially we note that the preferred SNES clearly meets the security of supply requirements.

Capex cost assessment

4.18. The preferred SNES is relatively capital intensive. Therefore, we considered that this was the key area in which to carry out our own analysis in order to provide further assurance on the total costs.

4.19. The capital costs of the submission were £303m. This includes the costs of constructing the distribution link (distribution costs) and the back-up power station (generation costs). We requested that the IA undertake a cost assessment of the generation assets and we assessed the costs of the distribution assets.

Distribution assets: method

4.20. Ofgem has developed a benchmarking model for assessing the costs of Offshore Transmission Owner (OFTO) projects. We adapted this model and included additional distribution data to provide the widest possible data set to benchmark the capex costs of the distribution assets. The model is a combination of single variable and multivariable regressions to assess cost categories, using cable length, route length[17] and capacity as the main cost drivers.

4.21. The specific cost categories are:

- Substations: Dounreay (132kV with 1 x 132kV AC cable) and the Gremista Substation at 33kV (with 1 x 33kV AC cable)
- HVDC Converter station: rated power rating 72MVA, power conversion from 85kV AC side to ±88kV DC side
- Subsea cables : 2 x 80kV DC cables 250km each laid in a single trench
- Land cables: AC land cables, 7.64km (33kV) and 375m (132kV)

4.22. Data sources used for benchmarking each category included OFTO and Cap & Floor (C&F) interconnector projects as well as small capacity HVDC project data gathered through research of publically available information.

4.23. We are confident in the statistical robustness of the data samples used to benchmark the assets. In addition to the statistical analysis, we performed a scaling exercise with our engineering experts by using the latest C&F interconnector projects as the basis.

[17] Cable length differs from route length as more than one cable may be laid in the route.

Generation assets: method

4.24. Separately, we requested that the IA conduct a cost assessment of the generation assets. Fichtner undertook a bottom-up exercise, presenting their view of costs for each asset that comprises the generation element of the preferred bid.

Ofgem's results

4.25. As noted above, we undertook a bottom up assessment of capex costs by specific cost categories. However, having consulted the bidders, we consider that the detailed breakdown of capex costs is commercially sensitive information at this time. In reaching this decision, we have balanced the need for transparency with commercial sensitivity. The decision not to publish a capex breakdown at this stage has been informed by our approach to assessing costs for interconnectors through the C&F regime. These final cost assessments normally occur after contracts have been awarded and prices are firm.

4.26. For the NEMO interconnector it was necessary to carry out the cost assessment before contracts were awarded. To ensure that commercially sensitive information was protected, only the headline capex data was used for the NEMO cost assessment. We consider that it is appropriate to use the same approach on this project. To ensure that transparency and commercial sensitivity are balanced, we expect NGSLL to publish a broken down assessment of its capex costs at an appropriate point, after all contracts have been finalised.

4.27. The high-level results derived for our capex cost assessment are outlined in Table 4.1.

Table 4.1: Overall view of capex costs

	Submitted (£m)	**Ofgem View (£m)**	**Difference (%)**	
NGSLL capex costs	278.6			
Aggreko capex costs	24.6			
Total	**303.2**	**282.9 - 310.8**	**7%**	**-3%**

4.28. The NGSLL-Aggreko total capital cost submission of £303m is within a range of 10% of the overall expected cost for such a technical solution. On this basis, we consider that the SNES capital cost aligns within a reasonable range of the overall expected cost for such a technical solution.

How costs will be recovered – impact on GB consumers

4.29. The £581.7m total cost of the preferred SNES is calculated by Baringa on the basis of the OSEC methodology. It represents the evaluation of relevant costs such as the tendered pricing of the services, plus the additional elements including; GB power imports, wind utilisation and losses. These were evaluated on the basis of the modelled dispatch and weighted scenarios. This methodology ensured all bids could be assessed on a comparable basis.

4.30. The actual costs will be recovered by NGSLL-Aggreko over the 20-year lifecycle of the preferred SNES through payments by SSEN for:

- Availability services – to cover the capital costs of the solution as well as the fixed annual maintenance and operating costs; and
- Output/Utilisation services – to cover the energy (MWh) and ancillary services costs.

4.31. Further detail on the components of the Availability and Output/Utilisation payments are set out in Chapter 5.

4.32. Baringa assumed a 3.5% real discount rate and that annual costs and revenues would be incurred at the end of each calendar year. As a result, the total costs per annum over the 20 years would be circa. £40m, which would constitute circa. £39m of Availability payments and circa. £1m of Output/Utilisation payments.

4.33. The actual figures will depend on a range of factors but most notably outage levels, which could affect Output/Utilisation payments if the Aggreko back-up units were required to run more frequently.

Impact on customers' bills

4.34. The isolated nature of its electricity infrastructure means that costs are significantly higher on Shetland than in the rest of northern Scotland. Domestic and non-domestic consumers on Shetland currently benefit from a cross-subsidy arrangement, underpinned by the Common Tariff Obligation, which protects the people of Shetland from paying significantly higher prices than consumers on the mainland pay.

4.35. Given the additional capital costs, the cost of a new energy solution on Shetland was expected to further increase Shetland's electricity costs. There were concerns that the anticipated increased costs of supplying electricity could result in a level of cross-subsidy for Shetland that would place too great a burden if recovered from northern Scotland consumers only.

4.36. As a result, Government proposed that the cross-subsidy be continued for all existing domestic and non-domestic electricity consumers on Shetland.[18] It will also continue for future non-domestic consumers with a maximum demand connection of 2MW. Government subsequently confirmed[19] that these costs would be recovered via

[18] Government response to the consultation on support for non-domestic electricity consumers on Shetland https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415010/Shetland_Cross_Subsidy_-_Government_Response_including_Budget_Reference_-_March_2015_doc.pdf

[19] Hydro Benefit Replacement Scheme & Common Tariff Obligation

the Hydro Benefit Replacement Scheme from all GB electricity consumers as soon as the new solution is implemented. This scheme currently provides an annual cross-subsidy of £58m to consumers in the north of Scotland – worth around £41[20] per household – and is funded by electricity suppliers across GB at a current cost of 80p per household.

4.37. It is for Government to take forward arrangements to deliver this, and it has said that it expects to be able to confirm full details by the time of the next statutory review of the Hydro Benefit Replacement Scheme. Ofgem understands the next review is scheduled to commence in late 2018.

Ofgem's conclusion

4.38. We consider that the total costs identified for the preferred SNES represent the most efficient solution offered under the competitive process and we are minded to approve these costs. Therefore, similarly we are minded-to approve the proposed cost recovery terms and will reflect these for SSEN in the revised licence drafting for SHEPD.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/534154/Government_Response_Hydro_Benefit_4_July.pdf

[20] SHEPD's Common Distribution Charging Methodology Model was used to calculate the average bill reduction of £41. The model was run twice, once with the £58m assistance amount included and once without. The different runs produced different tariffs for domestic consumers. Average bill calculations were calculated for both with and without the assistance amount, with the difference between the bill calculations being £41.

5. Incentive arrangements

Chapter Summary

An overview of the incentive arrangements to which the preferred SNES will be exposed, and our assessment of those arrangements.

Question 3: Do you have any views on whether the proposed incentive arrangements are sufficient to maximise the availability of the service, and to minimise increases in costs to consumers on an ongoing basis?

Incentive Mechanism

5.1. In our determination letter of April 2014, we noted that the new solution should be exposed to incentives. This is important as the solution is paid for over 20 years based on the performance of the services. Therefore, we required that cost efficiency be ensured and encouraged through a competitive tendering process with an appropriate Incentive Mechanism (IM) to induce ongoing reductions in capital and operating costs from the service providers over time.

5.2. In developing the competition framework, SSEN included various incentives in its tender requirements and Lot agreements so the successful solution would deliver value for money, ensure security of supply and would minimise the environmental impact.

5.3. We believe the outcome of the competitive process and resulting recommendation meets the IM requirements set out in the April 2014 determination. We discuss below the various components of the IM, which are:

(i) the cost efficiency of the final solution;
(ii) contractual arrangements between SSEN and NGSLL-Aggreko; and
(iii) incentives SSEN has to minimise their additional integration costs of the new solution.

Cost efficiency of the final solution

5.4. We set out in our April 2014 determination that *'the lowest cost and most efficient solution will be that determined by a competitive market process.'* However, we also specified that any solution must meet the required security of supply standards, providing that *'[t]he technical and commercial requirements of the tender must ensure the widest possible field of bidders, without compromising security of supply'*.

5.5. We believe that the competitive process undertaken by SSEN, in line with the requirements of our April 2014 determination, encouraged a wide and open competitive process as evidenced by the diversity and volume of pre-qualified applicants (as detailed in Chapter 3).

Contractual arrangements between SSEN and NGSLL-Aggreko

5.6. The draft contract in the ITT included a range of provisions aimed at maximising service availability and minimising cost increases to consumers.

5.7. The proposed provisions include the following:

- **Security of supply**: The contract will incentivise the service provider, i.e. NGSLL, to ensure its services, i.e. Availability and Output from the NGSLL link and Aggreko standby generation, are available, as payments reduce or cease if they are not. This places a strong incentive to regularly maintain assets.[21]
- **Price certainty**: As shown in Figure 5.1, the contract has pricing components which fix the price throughout the 20-year operational term from 1 January 2021 to 31 December 2040. Appropriate inflators are applied to those costs that change by inflation, e.g. CPI on fixed and variable operating costs and a diesel price index on fuel. There is no indexation on annual financing costs of the project. Finally, as the service provider cannot control carbon prices on fossil fuels, any carbon costs are directly passed through.

Figure 5.1: Indexation on the five new energy solution payment terms

Availability payments	Output payments
Fixed annual availability fee component (subject to deductions) to cover financing the capital costs*	Output fee (£/ MWh) linked to diesel price index and energy demand
Availability fee component (subject to deductions) to cover fixed annual maintenance and operations costs rising by CPI inflation*	Output fee (£/MWh) for variable operating costs linked to CPI inflation and energy demand
	Output fee (£/MWh) linked to actual carbon cost and energy demand

* The availability fee is subject to deductions if unplanned outages are more than the permitted level per year (nine days).

[21] Apart from planned downtime (of up to seven days every two years), the contract allows up to 180 days (on a cumulative basis) of unplanned outages over the terms of the agreement before availability fee deductions are made. This means that if, in the first three years there are no unplanned outages, then in the fourth year up to 36 days of unplanned outages are allowed.

These detailed pricing components incentivise the service provider to control its costs during construction and operation.

- **Environmental**: The contract structure incentivises power generators to minimise fuel usage, and hence carbon emissions.
- **Availability**: SSEN as Shetland SO will test the power sources on an ongoing basis to ensure the service is available to supply 60MW from the link and 54.4MW from the standby plant, thereby allowing it to confirm the necessary capacity is available at all times.
- **Financial risk**: The contract structure requires the service provider to pay SSEN any incremental costs associated with service failures (liquidated damages before the start date, and direct losses during the term of the contract) up to certain predefined caps. It obligates the service provider to "make SSEN whole" if the contract is terminated because of a major service breach which would also include the costs of replacement services. This ensures that, in the low likelihood scenario where the service is unable to meet demand on the island, SSEN is able to take necessary action to secure alternative sources while minimising the financial impact on SSEN's consumers.
- **Financial robustness**: The ITT stipulated that up to 70% of the project could be financed by debt. Further, the service provider is required to have credit support in place, providing protection that SSEN can call upon to cover unpaid liquidated damages and direct losses in instances where the contract is not terminated. This protects consumers by ensuring the service providers can continue to operate through the life of the contract.

5.8. When the HVDC link is unavailable, the Aggreko stand-by generators (along with other on-island generation) will provide power to the islands, for which it will receive Output/Utilisation payments. However, as noted above, if the cumulative unplanned unavailability is above the permitted outage level, the Availability payment will be reduced. SSEN will be required to provide evidence to Ofgem of the annual Availability and Output/Utilisation fees.

Incentives on SSEN to minimise the costs of integrating the new solution

5.9. SSEN will need to undertake work to accommodate the preferred SNES. This will include ongoing project management, system testing and modelling, physical integration and a year of dual LPS and SNES operation to ensure the new solution is fully embedded. The cost allowances and the incentive mechanisms for each of these activities will be subject to a separate Ofgem assessment and consultation later this summer.

6. Next steps

Chapter Summary

This chapter explains when we plan to publish our decision and additional consultations on the proposed licence arrangements for SSEN and NGSLL.

6.1. If you would like to respond to this consultation, please do so by 30 August 2017. We will consider any representations received and will publish a final decision by October 2017.

6.2. Alongside this consultation, we are also publishing:

- **NGSLL licence**: NGSLL will require a licence to operate the new solution. NGSLL has applied for an Independent Distribution Network Operator (iDNO) licence for National Grid Shetland Link Ltd (NGSLL). Today we have published a four-week informal consultation on their application and have summarised the key principles of this licence in Appendix 2. Following this, we will publish a statutory consultation on proposals to modify the electricity distribution licence so that it contains all of the conditions relevant to NGSLL.
- **SSEN licence changes**: in order to enable SSEN to recover the additional costs associated with the new solution we need to reflect these cost items in their SHEPD licence. Today we have also published an informal four-week consultation on these licence changes.

Both documents are published alongside this document.[22]

6.3. Separately, we will consult on SSEN's additional costs over the summer and early autumn 2017.

6.4. Subject to respondents' views, we hope to publish our final decision by early October 2017. We anticipate that the contract award will take place shortly after this.

[22] https://www.ofgem.gov.uk/publications-and-updates/consultation-cost-new-energy-solution-shetland

Appendices

Index

Appendix 1 – Parties involved in the competitive process and their roles

1.1 This chapter sets out details of the parties involved in running the competitive process for finding the Shetland New Energy Solution (SNES) and their roles in the process.

SSEN

1.2 Scottish and Southern Electricity Networks (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. The company also owns and operates small, embedded distribution systems in other parts of Scotland. SSEN is a member of the SSE plc group.

1.3 In addition to its role as the Distribution Network Operator (DNO), SSEN also undertakes a System Operator (SO) role on Shetland, balancing localised generation output with demand, and ensuring the system is able to provide a stable and secure supply of electricity to its consumers. SSEN conducted the competitive process to determine the SNES solution, as required by Ofgem.

Independent Auditor (IA)

1.4 In our April 2014 determination, we placed a requirement on SSEN to appoint an IA, who is experienced in competitive procurement, including of power generation to oversee, agree and report to us on the competitive process. The IA's role was four-fold:

(i) to work with SSEN to devise the background documents to the tender, including the demand forecast, information on existing generation, and future supply requirements;

(ii) to ensure that the best practice competitive process is open, fair and equitable;

(iii) to be involved in drafting the selection criteria for assessment and selection of bids during the competitive process; and

(iv) to oversee the assessment of the bids during the competitive process.

1.5 Following a competitive process, Fichtner Consulting Engineers Ltd (Fichtner) was appointed as the IA for the process. Fichtner has in-depth knowledge of the assessment of energy projects and in the governance and management of procurement processes.

1.6 The IA had complete oversight of all aspects of procurement design/strategy and technical/commercial tender evaluation. The IA provided both formal and informal updates to us, which included written monthly reports, meeting attendance and monthly bilaterals. The IA was integrally involved in all steps of the procurement process and signed-off all key principles, decisions and stages to ensure an open, transparent process, culminating in the most efficient solution being recommended to us.

1.7 The IA participated in, reviewed and approved all elements of the methodology and process steps as detailed in Chapter 2.

1.8 The IA played a key role in ensuring the correct capacity and energy solution was selected for Shetland. This also included formal documented reporting to us on; the competitive process strategy, competitive process background documentation, pre-qualification for the competitive process, the ITT assessment criteria for the competitive process, the ITT documentation and the assessment carried out during the competitive process.

1.9 The IA has fully supported SSEN's recommendation to us.

Other third parties

Technical Consultant, Mott MacDonald Ltd

1.10 Given the technical complexity of the SNES project, SSEN required specialist third party general engineering and technical assurance support. Mott MacDonald provided this service, which included compiling a tender scope, ITT documentation structure and award criteria for both the pre and post tender stages of the SNES project. The role of Mott MacDonald also covered commercial support in capturing all requirements for the tender process. Mott MacDonald has in-depth knowledge of energy projects and in the governance and management of procurement processes.

1.11 In its capacity as technical/commercial consultant, Mott MacDonald worked with the SSEN project team to draft a scope document which captured SSEN's requirements with:

(i) Reliable Provision of Availability and Energy (Lot 1 ITT requirement)

(ii) Intermittent Provision of Energy (Lot 2 ITT requirement)

(iii) Demand Reduction (Lot 3 ITT requirement)

(iv) Provision of Additional Services (including Ancillary) (Lot 4 ITT requirement)

(v) Network and economic modelling

(vi) Network protection and control

(vii) Network integration / inter-operability arrangements of chosen solution(s)

(viii) Grid and Distribution Codes

(ix) Smart Grid / Active Network Management

(x) GB regulatory and market arrangements

(xi) Shetland-specific regulatory and market arrangements; and

(xii) Operational environmental requirements.

1.12 Mott MacDonald worked with the SSEN project team to create tender evaluation/award criteria relevant to the scope, for inclusion within the ITT.

1.13 On receipt of tenders, Mott MacDonald worked with the SSEN project team and took the lead in assessing tender offers based on the evaluation/award criteria.

System Analysis Consultant, WSP

1.14 SSEN appointed WSP to consider the outcome of the consultation process and balance the cost of capacity and energy provision with security of supply. This included; applying best practice to energy demand forecasting, network system modelling and security of supply analysis. WSP's role included the following elements:

(i) providing a methodology for determining demand and consumption forecasts and scenarios;

(ii) determining the capacity and energy requirements for the Shetland Islands, minimum and maximum requirements for the provision or reduction of energy to maintain system stability;

(iii) completing demand and consumption forecasts for 25 years and sensitivities;

(iv) assessing of impacts of the proposed generation interim contingency and future SNES arrangements on system stability, dynamics, and constraint levels;

(v) recommending capacity to be procured, minimum or maximum levels of generation or reduction that can be accommodated within each of the service categories on a least worst regret basis;

(vi) inputting into the technical assessment criteria - including de-rating, reliability and availability, technology readiness and failure rates; and

(vii) inputting into the scope of the services required (particularly in relation to dynamic performance parameters frequency responsiveness and voltage regulation) based upon the modelling undertaken.

Commercial Evaluation Consultant, Baringa Partners (Baringa)

1.15 To ensure a robust third party assessment of the economics of the tender submissions, SSEN appointed Baringa to analyse the tender pricing submissions with specific focus on the shortlisted tenders. Baringa is an energy sector consultant with experience in modelling the UK electricity market using its short run marginal cost PLEXOS model. Baringa's scope for the SNES project included:

(i) commercial analysis of the Overall Solution Evaluation Cost (OSEC);

(ii) analysis of the Availability fee;

(iii) analysis of the Output/Utilisation fee;

(iv) comparison of the reserve bidder's Output/Utilisation fee and the price of power imports from GB;

(v) comparison of 'with/without' the Viking wind project; and

(vi) sensitivities including variations in the Viking commissioning date.

Legal Advisor, CMS Cameron McKenna Nabarro Olswang LLP Legal Services (CMS)

1.16 Given the complexity of the SNES project, the required formal process from consultation through to competitive tender process, the development of new bespoke and complex legal agreements for the provision of capacity and energy services and ultimately negotiation of these contracts, SSEN retained CMS. CMS have experience and expertise in legal and regulatory matters in the UK electricity industry. CMS continues to provide on-going support to SSEN in relation to the full range of legal and regulatory matters affecting the project, and will continue to support the project through contract negotiations with the preferred bidder/recommended solution.

Appendix 2 – Principles of NGSLL's licence

1.1 NGSLL will require a licence to operate the new HVDC link and it has applied for a "standard" Independent Distribution Network Operator (iDNO) licence. This appendix sets out the broad principles of the iDNO licence they have sought and explains the specifics of NGSLL's application.

Principles of NGSLL's iDNO licence

1.2 A "standard" iDNO licence retains Section A of the Standard Distribution Licence, and turns off Section B of the Licence replacing Section B with three Amended Standard Distribution Licence Conditions, BA2 (Regulation of Charging Arrangements), BA3 (Credit Rating of Licensee) and BA4 (Indebtedness) which are contained in other iDNO licences.[23]

1.3 The two main ways iDNOs are traditionally compensated are by charging grid connections for new consumers onto the network, and through Distribution Use of System (DUoS) charges for every KWh of electricity consumed or generated. However, the SNES is different, given both the cost of buying and laying the sub-sea cable and the numbers of consumers and generators on Shetland. Therefore, to align to the SNES contract NGSLL will recover all of its revenue through Availability and Output/Utilisation payments from SSEN. NGSLL propose to submit a charging methodology, which will ensure that they are only in receipt of either Availability and Output/Utilisation payments from SSEN, or DUoS charges. This is to ensure that NGSLL does not receive both payments. The final arrangements will be subject to licensing arrangements and consultation.

1.4 This will apply for the duration of the 20-year SNES arrangement from commissioning on 1 January 2021 to 31 December 2040. With this amendment, the Availability payments should enable NGSLL to fully pay off the costs of building the sub-sea cable, and through Aggreko provide stand-by capacity when the cable is down.

Treatment after 20 years

1.5 By the end of the contractual 20-year operational term in December 2040 the HVDC link will have been fully paid for. An iDNO licence is not time bound, so from year 21 onwards the connection charging methodology will revert to standard iDNO licence terms with DUoS charges.

[23] The Standard Distribution Licence and the Amended Standard Distribution Licence Conditions are available under the **Licence Conditions** -> **Standard Licence Conditions** -> **Electricity Distribution** dropdown on Ofgem's Electronic Public Register (ePR) accessible at https://epr.ofgem.gov.uk/Document

Our view of NGSLL's proposed approach

1.6 We are supportive of NGSLL's proposal as, by selecting the Availability and Output/Utilisation payments, it ensures that it is not able to recover any additional revenue streams from other parties. It also ensures that when the contract between it and SSEN is no longer in place, it will be able to recover costs as per a standard iDNO.

1.7 Finally, it ensures NGSLL will be incentivised both during and after the 20-year term to maintain a regular maintenance schedule of the assets.

Appendix 3 - Feedback on this consultation

1.1. We want to hear from anyone interested in this document. Send your response to the person or team named at the top of the front page.

1.2. We've asked for your feedback in each of the questions throughout it. Please respond to each one as fully as you can.

1.3. Unless you mark your response confidential, we'll publish it on our website, www.ofgem.gov.uk, and put it in our library. You can ask us to keep your response confidential, and we'll respect this, subject to obligations to disclose information, for example, under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004. If you want us to keep your response confidential, you should clearly mark your response to that effect and include reasons.

1.4. If the information you give in your response contains personal data under the Data Protection Act 1998, the Gas and Electricity Markets Authority will be the data controller. Ofgem uses the information in responses in performing its statutory functions and in accordance with section 105 of the Utilities Act 2000. If you are including any confidential material in your response, please put it in the appendices.

General feedback

1.5. We believe that consultation is at the heart of good policy development. We are keen to hear your comments about how we've conducted this consultation. We'd also like to get your answers to these questions:

1. Do you have any comments about the overall process of this consultation?
2. Do you have any comments about its tone and content?
3. Was it easy to read and understand? Or could it have been better written?
4. Were its conclusions balanced?
5. Did it make reasoned recommendations for improvement?
6. Any further comments?

1.6. Please send your comments to stakeholders@ofgem.gov.uk