

Shetland Northern Isles New Energy Solutions (NINES) Project Consultation

Consultation

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Overview:

In the fifth electricity distribution price control review (DPCR5) Ofgem required the electricity distribution network operator Scottish Hydro Electric Power Distribution (SHEPD) to present, by 31 January 2013, an Integrated Plan to manage supply and demand on Shetland. SHEPD has proposed a trial project as the first part of the Integrated Plan, called the "Northern Isles New Energy Solutions" (NINES) project. This will explore a range of solutions that can be used to inform the second part of the Integrated Plan, including the replacement of the old, diesel fired power station, to ensure the best value solution.

The purpose of this consultation is to seek the views of all interested stakeholders on whether the NINES project should be pursued. We are consulting because the proposal entails additional costs to consumers in the short term (around £15m), with the expectation that these costs will be offset by savings in the second phase of the plan and bring other benefits, particularly allowing more renewable generation to be connected in Shetland. This trial is not explicitly considered in SHEPD's electricity distribution licence.

Context

Scottish Hydro-Electric Power Distribution (SHEPD) owns the electricity distribution network on the Shetland Islands, operates the main power station at Lerwick and acts as the system operator, balancing supply and demand.

In the fifth electricity distribution price control review (DPCR5) Ofgem placed a licence requirement on SHEPD to submit, by 31 January 2013, an Integrated Plan to manage supply and demand on the Shetland Islands. This would involve the replacement of the old diesel powered Lerwick power station. We require SHEPD to demonstrate that it has examined all available options to find the most efficient solution, has involved market-based mechanisms, and that it has developed partnerships and worked with local communities. The plan should identify a solution based on the lowest lifecycle costs and meet environmental obligations.¹

SHEPD has now proposed a pilot project (Northern Isles New Energy Solutions, NINES) as the first part of this Integrated Plan. The NINES project aims to trial a set of alternative solutions (including demand side response and energy storage) that if successful could be implemented to reduce the overall cost of meeting the electricity needs of the Shetland Isles. On completion of NINES, SHEPD will use the learning to inform the main Integrated Plan. In particular, it is expected that the solutions trialled by NINES will allow a significant reduction in the capacity of the replacement of the Lerwick power station and enable the connection of more renewable generators. In this document we are consulting on SHEPD's proposed approach and the options for funding the NINES project.

Associated documents

- Electricity Distribution Price Control Review. Final Proposals - Allowed revenue - Cost assessment (ref. 146/09)
http://www.ofgem.gov.uk/Networks/ElecDist/PriceCtrls/DPCR5/Documents1/FP_3_Cost%20Assessment%20with%20SS%20comments.pdf
- Low Carbon Networks Fund winning projects - Second Tier decision (ref. 147/10)
http://www.ofgem.gov.uk/Networks/ElecDist/lcnf/Documents1/LCNFunddecision_Final.pdf

1

http://www.ofgem.gov.uk/Networks/ElecDist/PriceCtrls/DPCR5/Documents1/FP_3_Cost%20Assessment%20with%20SS%20comments.pdf

Contents

Executive Summary	4
1. Shetland overview	6
Current arrangements	6
How costs are recovered	7
2. The Northern Isles New Energy Solutions (NINES) proposal	10
What is the NINES project?	10
What are the benefits of NINES?	14
What are the costs of NINES?	14
Options	15
Other elements	17
3. Ofgem’s assessment of the proposal	18
Ofgem overview of NINES	18
Mechanism to accept the proposal	20
Ofgem’s views on SHEPD’s proposal on cost recovery	20
Risks	22
Wider benefits	23
Next Steps	23
Appendices	24
Appendix 1 - Consultation Response and Questions	25
Appendix 2 – Impact assessment	27
Summary	27
Key issues and objectives	27
The NINES proposal	28
Options	28
Impacts on consumers	30
Impacts on competition	31
Impacts on sustainable development	31
Impacts on health and safety	32
Risks and unintended consequences	32
Other impacts, costs and benefits	33
Post-implementation review	33
Conclusion	33
Appendix 3 - Glossary	34
Appendix 4 - Feedback Questionnaire	38

Executive Summary

The Shetland Isles (Shetland), some 130 miles north of the UK mainland, are not electrically connected to the GB electricity grid. As a result, Shetland has to produce its own electricity, primarily from fossil-fired generation.

The main source of electricity is the diesel fired Lerwick power station (LPS). This is owned by SSE Generation and operated by Scottish Hydro Electric Power Distribution (SHEPD).² The oldest units in LPS were commissioned in 1953 and the entire station is coming to the end of its life. In particular, it is in breach of the environmental standards set by the Scottish Environment Protection Agency (SEPA). SEPA has granted LPS time-limited derogations on the understanding that the operator introduces adequate emissions controls or replaces the existing station.

As part of the negotiations for its last distribution price control review,³ that took effect in April 2010, Ofgem and SHEPD reached an agreement on the way to address the challenges facing Shetland. We placed a licence obligation on SHEPD to develop an Integrated Plan, by January 2013, for a renewed energy system that would offer the best value for money for consumers, guarantee a secure energy supply and be environmentally sound.

In August 2010, SHEPD sought funding for an innovative project on Shetland under the competitive Second Tier process of our Low Carbon Networks (LCN) Fund. The project was called "Northern Isles New Energy Solutions" (NINES). Its primary aims were to: intelligently manage heat and electricity demand on Shetland so that the replacement for LPS could be reduced in size; and to allow more renewable generation to be connected to the system. Although the NINES project was not awarded funding, the Expert Panel and the Authority recognised the quality of the NINES proposal. As a result, we have been working with SHEPD to consider whether NINES could offer benefits to customers as part of the Integrated Plan.

SHEPD has now put its case to us to pursue NINES as the first phase of the Integrated Plan. It has a number of elements. Firstly, it explores the uses of heat and electricity storage to intelligently manage the demand on the Shetland's generators. This has the potential to allow more renewable generation to be connected, reducing the need for generation at LPS. NINES also introduces new active network management solutions. This ensures that the distribution network operates within its limits and a stable, secure supply is assured. SHEPD believes that

²SHEPD is the Distribution Network Operator (DNO) for Shetland.

³ DNOs can be considered effective monopolies as they are not subject to competitive pressures. As such, Ofgem regulates the charges that DNOs levy and the quality of service they provide by setting a price control every five years. The price control sets the total revenues that each DNO can collect from customers at a level that would allow an efficient business to finance their activities. The current price control is called Distribution Price Control Review 5 (DPCR5) and runs from 1 April 2010 to 31 March 2015. For more information see: http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/DPCR5/Documents1/FP_1_Core%20document%20SS%20FINAL.pdf

NINES has the potential to reduce the required capacity of the replacement for LPS by up to 20MW while also allowing more renewable generation to connect to the network. SHEPD estimates that NINES has the potential to deliver a benefit of up to £9m (in net present cost terms, taking account of NINES) compared with the alternative of replacing LPS with a like-for-like power station.

We have carried out an assessment of SHEPD's proposals. While we consider that certain assumptions made by SHEPD may be slightly optimistic, it seems likely that NINES will deliver benefits to the islanders and SHEPD's other customers. SHEPD estimate that NINES will break even provided that the capacity reduction for the replacement of LPS is at least 15MW.

The purpose of this consultation is to offer all relevant stakeholders the opportunity to comment on SHEPD's NINES project, whether it should be funded as part of the Integrated Plan, and the funding options available to allow it to proceed. As such we have asked specific questions on whether stakeholders agree that NINES can potentially reduce the cost of ensuring a secure, environmentally compliant electricity supply; whether we should change SHEPD's licence to enable the NINES proposal to be submitted; which of the options presented should we use to fund the project; and whether project risks have been adequately mitigated, and are outweighed by the benefits.

Responses to this consultation are required by 5 September 2011. At the conclusion of this consultation we will consider responses and issue our decision. If we decide that it is appropriate to fund the NINES proposal as part of the Integrated Plan, we will issue a statutory consultation on the required licence changes. These changes will apply to SHEPD's licence only.

1. Shetland overview

Chapter Summary

In this chapter we provide an overview of how electricity supply and demand is currently managed on the Shetland Islands (Shetland).

Current arrangements

- 1.1. Shetland is not connected to the main electricity network in Great Britain. This means that the islands rely entirely on local sources of generation, and the supply and demand on the islands must be balanced locally. At any given time there cannot be more generation than demand, or vice versa, meaning that a significant percentage of the generation must have a reliable and controllable output. At present, there is significant interest from wind generators to exploit the excellent wind resource on the islands. However, it is not possible to offer any new connections to these renewable generators as there is insufficient demand to utilise this type of generation.
- 1.2. The network on Shetland is classified as a distribution network, since it does not have voltages greater than 33kV. It is owned and operated by SHEPD, a distribution network operator (DNO). During the introduction of the British Electricity Trading and Transmission Arrangements it was agreed that SHEPD would also administer the electricity supply on the islands - meaning that they are responsible for balancing the islands' demand and supply.
- 1.3. Most of the Shetland's electricity is supplied by two fossil-fuel power stations, with the remainder being supplied by various wind generators. The main electricity generation sources are:
 - **Lerwick Power Station (LPS)**, a 67MW diesel-fired station which provides over 50 per cent of Shetland's electricity. The station provides base load, but its output is also flexed by SHEPD to match the total generation with the demand at any time. The station is owned by Scottish and Southern Energy (SSE) Generation and operated by SHEPD. The oldest LPS generators were first commissioned in 195, and the station is becoming increasingly expensive to operate and maintain.
 - **Sullom Voe Terminal (SVT) Power Station**, a 100MW independently owned gas-fired power station. The station's primary purpose is to supply electricity to the Sullom Voe gas terminal but it also provides around 40 per cent of Shetland's electricity (a maximum of 22MW) through a third party contract arrangement with SHEPD.

- **Burradale Wind Farm**, is a small (3MW) independent wind farm which contributes around seven per cent of the islands' electricity supply. Burradale is one of the most effective wind farms in Europe due to the local climatic conditions.
 - **A number of small-scale, community-based wind generators** taking advantage of the above average wind speeds the Shetland islands experience. In recent years, the introduction of feed in tariffs, in particular, has increased the interest in these types of installations on Shetland.
- 1.4. There is no gas supply on the islands, so the demand for heat is largely met by the use of oil-fired boilers and electric storage heaters. The capital of Shetland, Lerwick, has a district heating scheme operated by Shetland Heat Energy and Power (SHEAP) Ltd. This uses a 'waste to heat' energy plant⁴ to heat the water, which supplies around 1,000 customers.
 - 1.5. The overall electricity demand on the islands that SHEPD is responsible for supplying varies between 11MW and 48MW. LPS is sized to a larger capacity than the peak to ensure that there is a secure source of responsive generation.
 - 1.6. As with other parts of GB, all Shetland electricity customers can choose any electricity supplier they wish.

How costs are recovered

- 1.7. The agreement that SHEPD would administer the electricity supply on the islands was designed so that prices to Shetland's customers would remain in line with those on the mainland. As there are higher costs associated with electricity supply on Shetland, at the time of the fourth distribution price control (DPCR4) it was agreed that the cost differential should be recovered from all SHEPD customers.
- 1.8. The resulting cross subsidy fluctuates from year to year due to the variation in the cost of fuel for generation at Lerwick power station, the cost of the contracted third party generation and the price of electricity on the mainland. The difference between the GB market price and the cost of electricity produced on Shetland sets the level of the cross subsidy met by SHEPD customers. The amount that SHEPD can re-charge for operating and maintaining LPS is set at a fixed allowance in the current price control period (DPCR5).

⁴ This plant burns waste from Shetland and Orkney. There is also a second, oil-fired, boiler for peak load or back up.

- 1.9. The current arrangements to supply electricity on Shetland cost around £29m in 2010-2011. The majority of the costs are from the fuel and operating cost of running Lerwick power station (£16m) and the rest from third party contracts (£13m).
- 1.10. In 2010-11, a third of this £29m was recovered directly from Shetland's customers through their electricity supply bills⁵. The remainder was recovered from customers connected across SHEPD's distribution network.
- 1.11. SHEPD calculates that, in 2010-11, the additional cost of providing a supply on Shetland resulted in an average cost across all their customers of £27 per customer.

Why is a change to the current arrangements needed?

- 1.12. As stated previously, LPS supplies the majority of Shetland's electricity demand. The station consists of two parts, the A station and the B station: the A station was commissioned in 1953 and the B station in 1983. The former is operating significantly beyond its economic life, whilst the latter is now reaching the end of its life. Both are becoming increasingly expensive to maintain and operate due to their age. LPS is also in breach of environmental requirements⁶, and has been granted temporary derogations by the Scottish Environmental Protection Agency (SEPA) on condition that the operator introduces adequate emissions controls or replaces the existing station. We understand that these derogations have been time-limited to coincide with Ofgem's requirement for SHEPD to submit the Integrated Plan in 2013.
- 1.13. There is a significant amount of wind generation which wants to connect to the network. SHEPD is unable to provide connections for this type of generation due its intermittent output and the need to reliably match generation and demand on the islands.⁷

Upcoming developments

- 1.14. There is a proposal currently in place to build an onshore 450MW wind farm on the islands (the Viking wind farm). Clearly this will supply significantly more electricity than the islands' requirements. For this project to proceed, a high voltage, direct current (HVDC) link will have to be built between the islands and the mainland so that the wind farm's output can be exported to the GB grid.

⁵ This does vary year on year depending upon the costs of providing a supply on Shetland vis à vis mainland prices.

⁶ For example, emissions limits under the Large Combustion Plant Directive.

⁷ As electricity cannot be stored, demand for electricity must equal generation at any given moment, the Shetland network must be balanced using only the assets available on the islands. This will change when Shetland is connected to the mainland.

- 1.15. Based on evidence from existing wind farms, SHEPD anticipates that the output of Viking will be less than the demand on Shetland for up to 30 per cent of the year, meaning it could not be used as the sole generation source for the islands.
- 1.16. The HDVC link, if built, will enhance the electricity generation and supply options for the islands. However, whilst the link is expected to be available around 98.5 per cent of the time, Shetland will still need an alternative, constant source of local generation when the cable is unavailable, for example due to repair of faults or routine maintenance operations. SHEPD take the view that the Viking wind farm could not be relied upon to supply the islands during periods when the HVDC link is unavailable.
- 1.17. In general, renewable generation such as wind power is intermittent, and therefore cannot be relied upon to meet customers' requirements at all times. It is therefore not possible to rely exclusively on wind power to completely replace the need for LPS.

Requirement for an Integrated Plan

- 1.18. At the last price control review (DPCR5), Ofgem recognised the situation in Shetland and placed a requirement in SHEPD's licence (charge restriction condition, CRC, 18A) to present an Integrated Plan to manage and supply demand on the islands by 31 January 2013. This Integrated Plan would include the replacement of LPS. Ofgem set out in the DPCR5 Final Proposals that SHEPD must demonstrate in the Integrated Plan that it has examined all available options to find the most efficient solution; has involved market-based mechanisms, including the possibility to tender the replacement of the power station; and that it has developed partnerships and worked with local communities. It should identify a solution based on the lowest lifecycle costs and meet environmental obligations.

2. The Northern Isles New Energy Solutions (NINES) proposal

Chapter Summary

This chapter provides an overview of the NINES proposal and how it will contribute towards the Integrated Plan that SHEPD is required to submit. It also sets out the potential costs and benefits, as provided by SHEPD.

What is the NINES project?

- 2.1. The NINES project is a three year project in which SHEPD will test a number of initiatives aimed, in particular, at reducing the maximum electrical demand on the islands, increasing the amount of wind generation able to connect, and therefore reducing the amount of electricity generated by fossil fuels. This should enable the existing Lerwick power station to be replaced with a smaller and cheaper unit, whilst harnessing the local renewable energy potential and fostering energy efficiency.
- 2.2. Peak demand on the island is currently 48MW. The total capacity of LPS is 67MW providing a margin over maximum demand sufficient to ensure a secure supply taking account of planned and unplanned outages. SHEPD predicts that the NINES trials could deliver solutions that would reduce the capacity required from LPS's replacement by up to 20MW.
- 2.3. Specifically, in the NINES proposal, SHEPD seeks to:
 - understand how best to accommodate Shetland's significant wind and marine potential on a small distribution network and ensure that the islands benefit from it
 - increase understanding of how the existing and known future demand on the island can be best managed, and peak demand reduced, on a constrained, isolated system.
- 2.4. There are seven main elements to the NINES project:
 - modelling to better understand demand and supply on Shetland
 - a 1MW battery for energy storage
 - domestic demand side response
 - additional 'flexible' demand through a 130MWh thermal water store and 4MW electrical boiler forming part of the district heating scheme
 - connection of more renewable generation
 - Active Network Management (ANM) system
 - learning relating to customer behaviour.

2.5. Each of these elements is explained in more detail below.

1) Modelling to better understand demand and supply on Shetland

2.6. One of the key early outputs will be a comprehensive set of integrated models of the Shetland network which will allow SHEPD to model the impact of the NINES initiatives. The models will validate each of the key elements of the project and will then be used to inform the design of the new Lerwick Power Station.

2) A 1MW battery for energy storage

2.7. SHEPD is constructing a 1MW battery located alongside the LPS. This will be the largest battery of its kind on the GB network – and SHEPD aim to use it to demonstrate that storage can be used to allow more intermittent renewable generation to connect onto the network. The battery will also help to optimise and stabilise the management of demand and supply of the existing network by helping to reduce demand peaks. SHEPD believes an additional 400kW of new, small scale renewable generation could be accommodated on the system with this battery. They also believe this figure may prove to be greater once they have gained experience of the battery’s operational performance.

2.8. SHEPD has secured funding for the majority of the battery costs from DECC’s Smart Grid Demonstration Capital Grant (about £1.1m) and from the First Tier of Ofgem’s Low Carbon Network Fund⁸ (a further £1m). However, SHEPD will use funding from the NINES project to integrate the battery onto the Shetland system.

3) Domestic demand side response with frequency response

2.9. SHEPD is working with the Shetland Islands Council and Hjaltland Housing Association to install advanced storage heating and water heating in around 750 homes. Both types of heater will have additional insulation to minimise heat loss and will be fitted with programmable timers to allow better control of temperature and operating times.

2.10. The electrical input to both the hot water heaters and the storage heaters will be controlled by SHEPD, but the customer will control the temperature and operating time. SHEPD will ensure sufficient power enters the equipment to satisfy the customers’ requirements, but will manage the power so that the electricity is used at times that best suit the network. This will involve SHEPD taking into account the predicted demand, weather forecasts, availability of renewable energy and any other network constraints.

⁸ More information on the Low Carbon Networks Fund can be found on the Ofgem website, at <http://www.ofgem.gov.uk/Networks/ElecDist/lcnf/Pages/lcnf.aspx>

- 2.11. This initial roll out will help assess how effective storage and demand side response is at the domestic level. If successful, it is anticipated that this could be voluntarily extended to a further 250 homes across Shetland during the trial and, ultimately, through customer choice, to all electrically heated houses in Shetland. The first 750 homes form part of the NINES project, whilst further expansion would be part of the second phase of the Integrated Plan.
- 2.12. The heaters are being funded by SIC, Hjaltland and the European Regional Development Fund (ERDF).

4) Additional 'flexible' demand through a 130MWh thermal water store and 4MW electrical boiler

- 2.13. The district heating scheme in Lerwick is currently powered by heat generated by the islands' waste to energy plant and a back-up/peak demand oil-fired boiler. SHEAP is proposing to extend the scheme by installing a 4MW electrical boiler which will be linked to a new thermal store capable of storing around 130MWh of hot water. This will reduce the current scheme's reliance on oil and also provide extra capacity to the over-subscribed district heating scheme.
- 2.14. SHEPD is working with SHEAP to enable the new boiler and water store to adjust its demand to help manage demand/supply balancing for the islands. If there is insufficient demand on the system relative to generation, the intention is that SHEPD will be able to ask SHEAP's thermal store to increase demand and use the surplus generation. In the opposite situation, where demand exceeds supply, the intention is for SHEPD to be able to ask SHEAP to withhold demand until a time when the system has more capacity.
- 2.15. SHEPD needs to establish a commercial framework with SHEAP to reflect both the needs of SHEAP's customers and the needs of SHEPD in terms of system balancing. These arrangements will be informed by the early modelling highlighted earlier in this section.
- 2.16. SHEAP is also in discussions with SSE Renewable to create a 6.9MW wind farm on adjacent land with £11.85m of funding provided for this. This would supply power for the boiler and thermal store. The costs of the store and its onsite generation will be funded by the respective partners. This new wind farm will be connected to the boiler via a private electrical network, with any surplus being exported to the grid. This will be a "managed connection" whereby the wind farm will only be able to export if network conditions are suitable. Additionally, the boiler and thermal store will be able to provide a range of ancillary services for the island's system.
- 2.17. SHEPD is requesting funding for this part of the NINES project to understand and test the commercial agreements needed to make this arrangement work permanently. These arrangements will look to develop agreements for managed generation connections, flexible demand connections including ancillary services agreements and payments. If successful, it is hoped that

these agreements will encourage other potential customers to come forward to offer connections on a similar basis which will help inform the second phase of the Integrated Plan.

5) Connection of more renewable generation

- 2.18. Given its geographic characteristics, Shetland has the potential to exploit renewable generation sources, particularly wind. There is interest in connecting this renewable generation to the Shetland distribution system. However, this generation cannot connect to the current system due to the underlying constraints. Connecting more renewable generation, which is intermittent, would exacerbate these problems.
- 2.19. Under the NINES project, SHEPD will establish an active network management capability, which will seek to offer renewable developers an earlier connection date. In return, they will be required to give their agreement to being constrained when the system cannot accommodate their generation. However, potential demand flexibility from other NINES project trails should reduce this constraint by providing demand when there is renewable resource available.

6) Active Network Management (ANM) system

- 2.20. SHEPD has referred to their ANM system as the nerve centre of the NINES project. This ANM system will be designed to monitor the different parameters affecting the network, including embedded constraints, frequency stability and weather to manage an appropriate network response.
- 2.21. A key driver for the trial will be to look to understand how the various elements of the NINES project work and interact. Whilst in theory the trials could offer SHEPD up to 20MW of storage/flexible demand at any one time, the learning from the project will demonstrate to what extent this is actually available in practice.

7) Learning relating to customer behaviour

- 2.22. The NINES project will involve 20 per cent of Shetland's electricity customers. The lessons learnt will help develop a better understanding of customer behaviour and allow the system to be spread to other users.
- 2.23. With a greater ability for customers to control space and water heating, it is expected that peak demands could be reduced by comparison with the current, inflexible system. Customer behaviour will be modelled and factored into demand side management and the promotion of energy efficiency initiatives.

What are the benefits of NINES?

2.24. The primary benefit of NINES is that it has the potential to reduce the peak demand on the islands and therefore reduce the size of the LPS replacement.

2.25. In addition it will:

- enable more renewable generation to connect on the islands, replacing fossil fuel generation
- improve the domestic energy efficiency of the homes in the trial by installing super-efficient heating. This should help the customers lower their energy consumption, and therefore their fuel bills (which would be particularly beneficial to consumers at risk of fuel poverty)
- reduce the reliance on the existing LPS (prior to any replacement), thereby reducing carbon emissions, fuel and operation and maintenance costs.

What are the costs of NINES?

2.26. SHEPD has estimated that NINES will cost £34.5m.⁹ SHEPD has already secured external funding totalling £19.2m, and is therefore requesting that its allowed revenue is increased to fund the additional £15.3m.

2.27. The total project costs will be spread over the three years of the project, as set out in table 2.1 below. It should be noted that the project has already started using the funding from SHEPD and the third parties.

Table 2.1: Timing of total project costs

£m	2010-11	2011-12	2012-13
Total project cost	3.85	19.20	11.90

What options have been considered?

2.28. SHEPD has created six options for the future management of supply and demand on Shetland, in order to illustrate the cost benefit of the NINES proposal. Two of their options set out proposals over and above the replacement of Lerwick. However we consider that the proposal should be considered against the Lerwick replacement – and that any additional benefits gained from third party generators should be considered as a bonus. Hence we have only described the four core options below. SHEPD estimates that the other options result in an increased benefit from NINES.

⁹ All costs are in 2010-11 prices.

Options

Option a) Do nothing

- 2.29. Under this option no new investment would be under taken. However LPS would continue breaching environmental requirements and face potential penalties and action by the SEPA. It would become increasingly expensive to run. The risk of supply interruption would be expected to increase as a result of the ageing plant breaking down. This option is therefore not considered to be a plausible scenario, and has therefore not been designated as the base case.

Option b) Base case - retrofit LPS

- 2.30. Under this option LPS would be retrofitted to extend its life to ensure it can comply with SHEAP's environmental requirements.
- 2.31. Retrofitting LPS is technically challenging as removing equipment and taking plant off line will increase the risk of supply interruptions. The site also has a number of structural problems which means that the continuation of the power station in its current location is not practical.
- 2.32. In spite of the significant practical issues that a retrofit programme would raise, SHEPD has estimated that the cost of this option would be in excess of £50m. The costs of running the retrofitted LPS are assumed to be broadly the same as currently (fuel £9.55m pa, operations and maintenance (O&M) £6.45m pa).

Scenario c) Replace LPS

- 2.33. Lerwick would be replaced by another 67MW diesel power station at an estimated cost of £67m. Given the difficulties refurbishing the existing site, SHEPD consider a new power station would be built on a nearby site. The cost in setting up this new site would be partially off-set by the money received from the sale of the old location. SHEPD estimate that annual fuel costs under this option would be lower (£7.16m) as would O&M (£5.16m).

Scenario d) Use NINES to reduce the size of the LPS replacement

- 2.34. Under this scenario, NINES would be used to inform and manage energy demand on Shetland. This would result in a 48 MW power station being built to replace LPS. The capital cost of this new power station is estimated to be £48m plus £7.6m attributable to the integration of the new station into the network and the related active management system. The annual fuel costs of

the new power station would be lower than all the above scenarios (£5.57m), as would O&M (£3.70m).

Table 2.2: Cost estimates under the different scenarios

Scenario	Power station capacity	Capital Expenditure £m	Fuel Spend £m pa	Operating Spend £m pa
a) Do Nothing	67 MW	0	9.55	6.45
b) Base Case	67MW	50	9.55	6.45
c) Replace LPS	67MW	67	7.16	5.16
d) Replace LPS + NINES	48MW	55.6	5.57	3.70

Cost comparison and cost per SHEPD customer

2.35. Table 2.3 below compares the scenarios over their economic lifetimes. SHEPD calculated the Net Present Cost (NPC)¹⁰ from 2013-14 for a period of 20 years.¹¹ The value of NINES is highlighted by the estimate that it would lead to a £16.67m reduction in costs compared to just replacing Lerwick with a like for like replacement. In term of costs for customers, scenario (d) would cost £29.35 per SHEPD customer compared to £31.97 per customer under the base case (retrofitting LPS).

Table 2.3: Cost comparison of scenarios

Scenario	NPC £m	NINES impact	£/SHEPD customer (2020-2021)
a) Do Nothing	-		£26.89
b) Base Case	440.99		£31.97
c) Replace LPS	408.83		£29.27
d) Replace LPS + NINES	400.90	£7.93m reduction from scenario (c)	£28.13

¹⁰ A present cost is the cost now of a stream of future costs. The value of each cost needs to be adjusted for risk and the time value of money. A net present cost (NPC) includes all cash flows including initial cash flows such as the cost of purchasing an asset, whereas a present value does not.

¹¹ Assuming a rate of return of 4.03 per cent (post tax real). Other assumptions that SHEPD made when estimating their costs under the scenarios was fuel costs remain at 2010-11 prices (a conservative estimate), 20 year depreciation, no load growth and annual unit consumption remaining the same.

- 2.36. Our review has questioned a number of the costs estimated by SHEPD. For example, whether the costs of establishing a new site and de-commissioning the old site have been fully accounted for. We have also questioned the predicted reduction in fuel and O&M costs for the LPS replacement. However, having tested these possible variances, they have not significantly affected our view of the project's impact. We expect to carry out further analysis of SHEPD's economic case for NINES prior to reaching our decision on their proposal.

SHEPD's proposal on cost recovery

- 2.37. SHEPD proposes that the element of costs not funded by third parties (£15.3m) is recovered from their customers (through allowed revenue) in the 2012-13 regulatory year. This would cover all three years of project expenditures.
- 2.38. This proposal would result in an average one-off increase to SHEPD's customers' bills of £20. We estimate that this equates to about £15 per domestic customer.

Other elements

- 2.39. To protect customers from potentially inefficiently incurred costs, SHEPD proposes that Ofgem review actual expenditure relative to what has been allowed in their allowed revenues. This would be carried out as part of an assessment process following the completion of the project. SHEPD propose that costs be assessed against those allowed, and that 50 per cent of the cost or savings of any efficient overspend or underspend be shared with SHEPD customers.

3. Ofgem's assessment of the proposal

Chapter Summary

In this chapter we set out our assessment of SHEPD's NINES proposal, what we would need to do in order to fund it and options for funding.

Question box

Question 1: Do you agree that NINES can potentially reduce the cost of ensuring a secure, environmentally compliant electricity supply compared with the option of replacing LPS with a like-for-like power station?

Question 2: Do you agree with our proposal to change SHEPD's licence to enable the NINES proposal to be submitted as a part of the Integrated Plan?

Question 3: Do you agree with our proposal to finance NINES using a "totex" approach and to classify it as Integrated Plan Costs?

Question 4: Do you agree that the risks to the project have been mitigated, and that the potential benefits from the project outweigh the risks?

Ofgem overview of NINES

- 3.1. SHEPD originally submitted the NINES proposal in the first annual competition of our Low Carbon Networks (LCN) Fund. The independent Expert Panel and the Authority¹² were impressed with the design and potential benefits of the project but did not select it for funding mainly because it had less relevance to GB distributors as a whole compared with other competing projects. The applicability of learning to the whole GB network is one of the six criteria that potential LCN Fund projects are evaluated against. They noted that aspects of the NINES project solution could potentially provide a lower carbon and lower cost approach to meeting the energy needs of Shetland compared to replacing the ageing Lerwick diesel power station with a similarly sized diesel plant. They recognised that during DPCR5 particular attention was paid to these supply and demand arrangements in Shetland because of the need to replace LPS and considered that many of the ideas in the NINES project could inform SHEPD's Integrated Plan.

¹² The decision is available here:

http://www.ofgem.gov.uk/Networks/ElecDist/lcnf/Documents1/LCNFunddecision_Final.pdf

- 3.2. We have summarised SHEPD's revised NINES proposal in the Chapter 2 of this consultation. We have carefully reviewed it and consider that, if successful, it has the following merits:
- it has the potential to reduce the required size of the LPS replacement
 - it delivers a reduction in the Net Present Cost of electricity production over a 20 year period
 - it should enable more renewable generation to connect and reduce the amount of fossil fuels used in generation
 - it encourages energy efficiency
 - it is an innovative project which is working with credible third parties and has significant involvement with the local community.
- 3.3. The project is also consistent with Ofgem's new RIIO framework (which will be introduced in electricity distribution from 2015) which encourages companies to think more broadly about innovative solutions to achieve security of supply in the low carbon future, whilst achieving long term value for money for customers. The NINES project appears to satisfy these objectives.
- 3.4. We recognise that there are potential forthcoming developments such as the Viking wind farm and the electrical link to the mainland, but agree with SHEPD that a thermal power station will still be required on the islands, for times when wind generation and/or the mainland supply are unable to meet the islands' demand. We therefore think that NINES is still justified in this scenario.
- 3.5. We are therefore proposing that the project should be funded through an increase in SHPED's allowed revenues.
- 3.6. We recognise that the short term cost to SHEPD's customers of funding this project is material, but also note that it will provide material reductions in their ongoing costs versus the alternative options. We have set out our view of how the project should be funded below.
- 3.7. An Impact Assessment of this proposal is included as Appendix 2.
- 3.8. We have employed consultants to review the proposal and they have confirmed that the technical aspects of the proposal appear reasonable for a trial, and that the project can provide benefit to both the local consumers on Shetland and to SHEPD's customers on a wider basis. Importantly, they support SHEPD's claim that NINES delivers a reduction in the Net Present Cost of electricity production over a 20 year period even if the actual LPS capacity reduction achieved is 14MW rather than the 20MW targeted by SHEPD.

Do you agree that NINES can potentially reduce the cost of ensuring a secure, environmentally compliant electricity supply compared with the option of replacing LPS with a like-for-like power station?

Mechanism to accept the proposal

- 3.9. There is currently no explicit facility for SHEPD to submit the NINES project for funding. SHEPD's licence (CRC18A) only requires that they submit an Integrated Plan by 2013. However, we consider that the NINES project can be considered as part of the Integrated Plan, since it seeks to identify a solution to the management of supply and demand on Shetland, whilst reducing environmental obligations, involving partnerships with third parties and working with the local community.
- 3.10. We therefore propose to amend CRC18A of SHEPD's licence so that NINES can be considered as part of the Integrated Plan. On formal submission of NINES (by way of a Notice) we will then follow the licence arrangements for the recovery of costs for an Integrated Plan (as set out in CRC18A), which will allow us to adjust SHEPD's allowed revenue to fund the project.
- 3.11. We also propose that a full plan be submitted in 2013, once the full results of the project are known. In order that SHEPD can fully accommodate this learning into the comprehensive Integrated Plan we propose to delay the deadline for the plan submission until 31 June 2013. This would then commence a second re-opener process.

Do you agree with our proposal to change SHEPD's licence to enable the NINES proposal to be submitted as a part of the Integrated Plan?

Ofgem's views on SHEPD's proposal on cost recovery

- 3.12. Ofgem has carefully analysed SHEPD's cost recovery proposal. We consider that to recover the costs in a single year places an unfair burden on SHEPD's customers and does not reflect the fact that some of the project solutions are enduring (ie they will last beyond the replacement of LPS) and should therefore be treated like other expenditures within a price control.

Other funding options considered by Ofgem

- 3.13. We have considered two other ways of funding the project as alternatives to that proposed by SHEPD.
- 3.14. In the DPCR5 Final Proposals¹³ we stated that SHEPD could log-up the cost of developing an Integrated Plan. Logging up is a mechanism used elsewhere in the price control, where the DNO bears the relevant costs itself during the course of the price control period, and then Ofgem reimburses it with an

¹³ The DPCR5 Final Proposals are available here:
http://www.ofgem.gov.uk/Networks/ElecDist/PriceCtrls/DPCR5/Documents1/FP_1_Core%20document%20SS%20FINAL.pdf

efficient level of costs as part of the next price control review. However we recognise that logging-up mechanisms have a standard upper threshold of one per cent of the company’s base revenues – and NINES is significantly above this threshold (at three per cent). We therefore do not think it appropriate to expect SHEPD to bear this cost until the end of the current price control.

- 3.15. It is our preference that the costs in the NINES proposal are treated in the same way as other expenditures in the price control. This would involve the “totex” approach whereby 85 per cent of expenditure is funded as “slow money” through inclusion in the company’s regulated asset value (RAV). The remaining 15 per cent would be funded as “fast money” which is expensed and funded in the year of expenditure. We would set this as an ex ante allowance (ie we would set out up front the amounts that SHEPD can include in their allowed revenues). The annual costs, and cost to consumers are set out in table 3.1 below:¹⁴

Table 3.1: Annual costs of Ofgem proposal

	2012-13	2013-14	2014-15	2015-16	2016-17	etc
Cost (£m)	2.77	1.41	1.38	1.34	1.30
Average cost (£) per SHEPD customer	3.76	1.93	1.87	1.82	1.77	...

- 3.16. This equates to approximately £3 per domestic customer in SHEPD’s area.
- 3.17. Not only does this result in a much small incremental change to SHEPD’s customers’ bills, but we consider that it is justified by the fact that many elements of the NINES trial will form part of the enduring solution once LPS is replaced, and therefore the NINES expenditure should be treated in the same way.
- 3.18. We consider that the cost of NINES could be recovered using the mechanism set out in SHEPD’s licence to fund the Integrated Plan. This allows SHEPD to apply for funding of costs that are incurred, reasonably and efficiently, in the delivery and management of the Integrated Plan and that are not recovered elsewhere. The Authority may then determine the relevant adjustments to a specified term in the licence (UNC_t in CRC4. Restriction of Distribution Charges: calculation of the Allowed Pass-Through Items).

Do you agree with our proposal to finance NINES using a totex approach and to classify it as Integrated Plan Costs?

¹⁴ The costs shown are indicative, since we will need to run the financial model in order to calculate the exact required changes to SHEPD’s allowed revenues. We will do this if we decide, at the conclusion of this consultation, to fund the NINES proposal.

Risks

- 3.19. We recognise that the NINES project is a trial of innovative network and system management solutions, which may not deliver the predicted benefits in full or in part. The main uncertainty with NINES is the degree to which customers' demands for electricity and heat can be intelligently managed to reduce peak demand and whether the innovative solutions being trialled can access this resource. Whilst these technologies in isolation can be considered to be relatively conventional (eg demand control by tele-switching and frequency change), their integration into a centrally controlled management system is new. Similarly, the use of an electrical heater for district heating is not new, but using it as part of a network demand management system is new in GB.
- 3.20. SHEPD has recognised this risk, and has compiled a comprehensive risk assessment. SHEPD will use the initial modelling to validate each element of the trial. If this modelling reveals unforeseen problems the project could be revised, or halted, to reduce as far as possible the amount of customers' money spent.
- 3.21. As stated earlier, SHEPD have estimated that NINES has a positive NPC even if the initiatives trialled by NINES do not deliver the full benefits expected – ie the reduction achieved is 15MW rather than the 20MW targeted.
- 3.22. There is also a risk that SHEPD may not deliver the project to time or within budget. However we consider that this risk is mitigated by the following factors:
- We will set a number of output measures that the project must deliver in order to ensure that SHEPD implement the project as per their proposal.
 - In conjunction with the "totex" funding approach set out above, we propose to apply the IQI¹⁵ efficiency sharing which operates through the RAV rolling incentive. This determines how any overspend or underspend against allowed revenue is shared between the DNO and customers. This will incentivise SHEPD to deliver the project at, or below, budget and with any savings shared with customers.
 - SHEPD will be highly motivated to ensure the project is delivered to time, since they will be required to deliver the whole Integrated Plan by June 2013. If SHEPD does not apply for funding within this window, or if their plan does not include the learning from NINES, the Authority will not consider their application. This means that they will have to apply for financing the LPS replacement in the next price control starting in 2015. Under this scenario the SEPA environmental derogations will expire, and

¹⁵ This has sometimes been called the 'sharing factor' in the past.

SHEPD would have to bear the increased operating costs of LPS in the intervening period.

Do you agree that the risks to the project have been mitigated, and that the potential benefits from the project outweigh the risks?

Wider benefits

3.23. We recognise that the project will produce valuable learning that will be applicable to the other DNOs and to the GB transmission system operator. We will therefore require SHEPD to implement the learning dissemination plans that they set out in the original LCN Fund proposal.

Next Steps

- 3.24. At the conclusion of this consultation we will consider responses and issue our decision. If we decide that it is appropriate to fund the NINES proposal as part of the Integrated Plan, we will issue a statutory consultation on the required licence changes. These changes will apply to SHEPD's licence only.
- 3.25. If there are no objections to our licence modification proposals, the licence will come into force about a month later. This will enable SHEPD to formally submit the NINES proposal, and we will consider it following the process set out in the licence. A direction detailing any changes to SHEPD's allowed revenues will be issued by the end of November, in order that SHEPD can give the required notice of its charge changes, and apply the new charges as of 1 April 2012.
- 3.26. SHEPD will use the learning from the NINES project to inform their preparation of the comprehensive Integrated Plan which they will submit in June 2013.

Appendices

Index

Appendix	Name of Appendix	Page Number
1	Consultation Response and Questions	25
2	Impact assessment	27
3	Glossary	34
4	Feedback Questionnaire	38

Appendix 1 - Consultation Response and Questions

1.1. Ofgem would like to hear the views of interested parties in relation to any of the issues set out in this document.

1.2. We would especially welcome responses to the specific questions which we have set out at the beginning of Chapter Three and which are replicated below.

1.3. Responses should be received by 5 September 2011 and should be sent to:

- Anna Rossington
- Distribution Policy
- 9 Millbank, London, SW1P 3GE
- 020 7901 7401
- anna.rossington@ofgem.gov.uk

1.4. Unless marked confidential, all responses will be published by placing them in Ofgem's library and on its website www.ofgem.gov.uk. Respondents may request that their response is kept confidential. Ofgem shall respect this request, subject to any obligations to disclose information, for example, under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004.

1.5. Respondents who wish to have their responses remain confidential should clearly mark the document/s to that effect and include the reasons for confidentiality. It would be helpful if responses could be submitted both electronically and in writing. Respondents are asked to put any confidential material in the appendices to their responses.

1.6. Next steps: Having considered the responses to this consultation, Ofgem intends to publish a decision in September 2011. Any questions on this document should, in the first instance, be directed to the named contact above.

CHAPTER: Three

Question 1: Do you agree that NINES can potentially reduce the cost of ensuring a secure, environmentally compliant electricity supply compared with the option of replacing LPS with a like-for-like power station?

Question 2: Do you agree with our proposal to change SHEPD's licence to enable the NINES proposal to be submitted as a part of the Integrated Plan?

Question 3: Do you agree with our proposal to finance NINES using a totex approach and to classify it as Integrated Plan Costs?

Question 4: Do you agree that the risks to the project have been mitigated, and that the potential benefits from the project outweigh the risks?

Appendix 2 – Impact assessment

Summary

- 2.1 This impact assessment (IA) sets out the potential impacts, costs and benefits of the NINES project.
- 2.2 The Shetland system currently relies heavily on an diesel fired power station which is reaching the end of its life and is increasingly expensive to maintain and operate. It is also in breach of environmental obligations.
- 2.3 Ofgem has required SHEPD to present by January 2013 an Integrated Plan for a renewed energy system that offers the best value for money to consumers, guarantees a secure energy supply and is environmentally sound. SHEPD has proposed an innovative project – NINES, to inform the development of this Integrated Plan.
- 2.4 The primary objectives of the NINES project are to:
- Understand how best to accommodate Shetland’s significant wind potential on a small distribution network and manage this intermittent generation going forward to ensure that the islands are able to benefit from renewable resources
 - Increase the understanding of how the existing and known future demand on the island can be best managed, and peak demand reduced, on a constrained, isolated system.
- 2.5 In this IA we conclude that the potential value to be derived through the NINES project is likely to exceed its cost.

Key issues and objectives

- 2.6 There are a number of reasons why challenges to the Shetland energy system must be addressed:
- i. the generating plant at Lerwick Power Station (LPS) is coming to the end of its economic life
 - ii. LPS has time limited Derogations for exceeding current levels for emission standards
 - iii. the need for Shetland to be self sufficient: although plans for an electricity connection to the mainland have been developed, this project has not been committed as yet. Even if it is built, Shetland will have to continue to be able to operate as an island system in the event of planned and unplanned outages of the cable link to the mainland

- iv. the network is constrained by its inability to accept any more renewable generation connections.

The NINES proposal

2.7 The seven main elements to the NINES project, as highlighted in Chapter 2 are:

- 1) modelling to better understand demand and supply on Shetland
- 2) a 1MW battery at Lerwick Power Station for energy storage
- 3) domestic demand side response with frequency response
- 4) additional 'flexible' demand through a 130MWh thermal water store and 4MW electrical boiler
- 5) renewable generation
- 6) Active Network Management (ANM) system
- 7) learning relating to customer behaviour.

Options

2.8 SHEPD has assessed the impact of its proposal by using a number of scenarios. We have reviewed these scenarios and sought external advice as appropriate. Based on this review, we have questioned a number of the cost estimates. However, having tested these possible variances, they have not significantly affected our view of the project's impact. We expect to carry out further analysis of SHEPD's economic case for NINES prior to reaching our decision on their proposal.

2.9 These scenarios are discussed in the main consultation document but also summarised here.

Scenario a) Do nothing

2.10 Under this scenario no new investment would be under taken. However LPS would continue breaching environmental requirements and face potential penalties and action by SEPA. There would also be a high risk of supply interruption through the risk of the ageing plant breaking down given it cannot operate indefinitely. This is not considered a plausible scenario for these reasons.

Scenario b) Base case - Retrofit LPS

2.11 Under this scenario, LPS would be retrofitted to extend its life to ensure it can comply with the relevant environmental requirements.

- 2.12 Our understanding is that this is technically challenging as removing equipment and taking plant off line will increase the risk of supply interruptions. SHEPD also say the location and size of the site result in further constraints to the retrofit option. While accepting that this option may not prove practical, almost regardless of cost, the nominal estimate of £50m appears reasonable.
- 2.13 SHEPD say the benefit of this scenario is environmental compliance through lower emissions. They believe that the operating costs would remain as now:
- annual fuel burn costs remain the same (£9.55m)
 - annual operating and management costs remain the same (£6.45m).
- 2.14 This scenario would address challenges (i) and (ii) highlighted in paragraph 2.6. The LPS retrofit would only be expected to have a relatively short life expectancy (<10 years).

Scenario c) Replace LPS

- 2.15 Under this option, LPS would be replaced by another 67MW power station. Given the difficulties of refurbishing the existing site, under this scenario, SHEPD consider a new power station would be built on a nearby site.
- 2.16 SHEPD's £67m capital cost estimate for replacing the power station is considered to be reasonable. The cost in setting up this new site would be partially off-set by the money received from the sale of the old location.
- 2.17 This scenario would address challenges (i), (ii) and (iii) and would provide a new power station with a life expectancy of over 25 years.

Scenario d) Replace LPS plus NINES project

- 2.18 Under this scenario, NINES would be used to inform and manage energy demand on Shetland. This would mean a smaller 48 MW power station is built to replace LPS. The capital cost of this new power station is estimated to be £48m plus £7.6m attributable to the integration of the new station into the network and the related active management system. As with scenario c, the cost in setting up this new site would be partially off-set by the money received from the sale of the old location.
- 2.19 This scenario has the potential to counter all the challenges that Shetland faces and provide a long life expectancy (>25years).

Summary of scenarios: How they meet Shetland's challenges

- 2.20 Table A2.1 below highlights how the various scenarios meet the challenges the Shetland isles face. We can see that only the scenario of replacing LPS +

NINES would meet all the challenges. This suggests that NINES is a project that is likely to benefit SHEPD’s customers.

Cost comparison and cost per SHEPD customer

2.21 To compare the cost of each of the scenarios over the economic lifetime of this investment, to show the least cost, the Net Present Cost (NPC) has been calculated from 2013-14 for a period of 20 years. Table A2.1 below shows SHEPD’s calculated NPCs under each scenario and the revised estimates taking account of the variances we have identified. The value of NINES is highlighted by the estimate that it would lead to a £7.93m reduction in costs compared to just replacing Lerwick with a like for like replacement

Table A2.1: Cost comparison of Scenarios

Scenario	NPC £m	£/SHEPD customer (2020-2021)
a) Do Nothing	-	26.89
b) Base Case	440.99	31.97
c) Replace LPS	408.83	29.27
d) Replace LPS + NINES	400.90	28.13

The NINES project

2.22 The cost comparison above shows that a scenario involving NINES would be most favourable. NINES also covers the challenges facing Shetland. Therefore using NINES to inform the Integrated Plan appears to be a good solution for SHEPD customers as lessons learnt will aid the development of the island’s system before further investment is undertaken.

2.23 The total cost of NINES is £34.5m. SHEPD have already secured £19.2m work of funding from external sources such as DECC. This is of a significant value to the project. SHEPD customers are being asked to contribute the additional £15.3m.

Impacts on consumers

2.24 Under SHEPD’s proposal consumers will face a one-off cost of approximately £20 per SHEPD customer for the NINES project. This equates to approximately £15 per domestic customer. However, Ofgem proposes that this should be funded by customers over an extended period of time – leading to an initial average increase in customers’ bills of £4, decreasing to less than £2 for the subsequent years.

2.25 As highlighted in the cost comparison section; assuming NINES is successful, it is likely to provide consumers long term cost savings due to potential cost

- savings from constructing a smaller LPS replacement and lower costs for balancing the network, which should in turn lead to lower costs for consumer.
- 2.26 Better network modelling, leading to more efficient network operation, and demand side management has the potential to reduce the level of fossil fuel generation capacity needed, resulting in lower fuel costs and reduced operation and maintenance costs at LPS which will benefit customers. By paying for a trial now and learning lessons to feed into an Integrated Plan, consumers benefit by reducing the risk that more investment is made in the LPS replacement than is necessary.
- 2.27 Some 750 consumers will benefit from the installation of new space and water heating in their homes improving energy efficiency and saving costs. The heaters will minimise heat loss and give consumers greater flexibility to control the temperature in their homes and adjust their energy consumption accordingly. If successful this will be rolled out to further households and would improve energy efficiency even further. This will be especially beneficial to the 35 per cent of Shetland households that are in fuel poverty.¹⁶

Impacts on competition

- 2.28 NINES has the potential to increase generation competition by enabling more renewable generation to connect to Shetland's network.

Impacts on sustainable development

- 2.29 The NINES project has a number of benefits with respect to sustainable development.
- 2.30 It will increase system flexibility which will allow more renewable generators to connect to the system. Shetland is recognised for its significant wind generation potential, and at a smaller scale, SHEPD has received significant interest in renewable generation on the islands via the FITs scheme. The demand management being trialled by NINES will reduce the maximum generation capacity requirements on the islands. Both of these elements will reduce the need for generation from the fossil fuelled power station and thereby lower emissions.
- 2.31 The installation of new space and water heating in homes in a trial with Shetland Islands Council and Hjaltland Housing Association will improve energy efficiency. The heaters will incorporate additional insulation to minimise heat loss and will be fitted with programmable timers to allow better control of temperature, thus anticipated to be more efficient. If successful this

¹⁶ Scottish House Condition Survey - Local Authority Analyses 2007-2009
<http://www.scotland.gov.uk/Topics/Statistics/SHCS/LA0709>

will be rolled out to further households and would improve energy efficiency even further.

- 2.32 The installation of a 4MW electrical boiler, which will be linked to a new thermal store capable of storing around 130MWh of hot water, will enable more households to join the district heating scheme and will also substantially reduce the current scheme's reliance on oil. This will also increase flexibility of the system by being able to take up surplus generation, therefore helping to overcome the intermittency problems that renewable generation such as wind face.

Impacts on health and safety

- 2.33 Although NINES does not have any direct impact on health and safety, it will inform the replacement of LPS which does not currently meet environmental emission standards.

Risks and unintended consequences

- 2.34 NINES is an innovative trial and the results are not certain. There is a potential risk that the trials are unsuccessful and, in the worst case, demonstrate that none of the proposed approaches could deliver benefits. If this happens, SHEPD consumers would have paid for the project, but derived no financial benefit.
- 2.35 The main uncertainty with NINES is the degree to which customers' demands for electricity and heat can be intelligently managed to reduce peak demand and whether the innovative solutions being trialled can access this resource. Whilst these technologies in isolation can be considered to be relatively conventional (eg demand control by tele-switching and frequency change), their integration into a centrally controlled management system is new. Similarly, the use of an electrical heater for district heating is not new, but using it as part of a network demand management system is new in GB.
- 3.27. SHEPD has recognised this risk, and has compiled a comprehensive risk assessment. SHEPD will use the initial modelling to validate each element of the trial. If this modelling reveals unforeseen problems the project could be revised, or halted, to reduce as far as possible the amount of customers' money spent.
- 3.28. As stated earlier, SHEPD have estimated that NINES has a positive NPC even if the initiatives trialled by NINES do not deliver the full benefits expected – ie the reduction achieved is 15MW rather than the 20MW targeted.
- 3.29. There is also a risk that SHEPD may not deliver the project to time or within budget. However we consider that this risk is mitigated by the our intent to put in place output measures and the sharing factor on costs, as set out in Chapter 3. We consider that SHEPD will be highly motivated to ensure the

project is delivered to time, since they will be required to deliver the whole Integrated Plan by June 2013. If SHEPD does not apply for funding within this window, or if their plan does not include the learning from NINES, the Authority will not consider their application. This means that they will have to apply for financing the LPS replacement in the next price control starting in 2015. Under this scenario the SEPA environmental derogations will expire, and SHEPD would have to bear the increased operating costs of LPS in the intervening period.

- 2.36 While SHEPD has secured external funding, a large part of this is conditional on the agreement for funding the remainder of the costs in good time. Delays in agreeing the cost recovery of the additional funding could risk this funding. Delays could be caused for example by parties objecting to the required licence changes or concerns by suppliers over changes to use of system charges.

Other impacts, costs and benefits

- 2.37 No other impacts are anticipated.

Post-implementation review

- 2.38 SHEPD will use the NINES project as a trial to inform its Integrated Plan which is required by 2013. As part of this process, SHEPD will need to assess the success of the trial to justify its further roll out. Ofgem will thoroughly scrutinise SHEPD's Integrated Plan to determine SHEPD's allowed revenue in relation to further investment on Shetland.

Conclusion

- 2.39 We conclude that the benefits that will be derived through the NINES project are likely to exceed the costs. Independent advice has supported this view. There is a significant risk of higher future costs and constraints associated with not innovating. NINES enables a pragmatic approach to be taken to trial and learn from innovative solutions before undertaking a significant investment and to adopt an integrated approach to managing supply and demand on Shetland.

Appendix 3 - Glossary

A

Active Network Management (ANM)

Active Network Management (ANM) relates to the use of IT, automation and control to manage network constraints and both the generation and demand.

B

C

D

Distribution Network Operator (DNO)

A DNO is a company which operates an area of the electricity distribution network. The electricity distribution network includes all parts of the network from 132kV down to 230V in England and Wales. In Scotland 132kV is considered to be a part of transmission rather than distribution so their operation is not included in the DNOs' activities.

Distribution Price Control Review 5 (DPCR5)

Distribution price control review 5. This price control is expected to run from 1 April 2010 until 31 March 2015.

Demand side management (DSM)

Demand Side Management (aka Load Management) is any mechanism that allows a customer's demand to be intelligently controlled in response to events on the power system. Such events would include lack of network capacity or insufficient generation.

E

European Regional Development Fund (ERDF)

F

Fast money

Fast money is the revenue that is matched to the year of expenditure.

H

High Voltage (HV)

Includes all voltage levels above 1kV up to and including 20kV.

High Voltage Direct Current (HVDC)

I

Impact Assessment (IA)

Ofgem has a statutory duty to carry out IAs in certain circumstances concerning decisions that it considers to be "important". This is set out in section 5A of the Utilities Act 2000. If we decide that it is not necessary to publish an IA then we must publish a statement explaining the reasons for our decision.

Information Quality Incentive (IQI)

The IQI is a mechanism for setting price control allowances that provides ex ante incentives for DNOs to submit accurate forecasts of their expected expenditure and provides incentives for efficiency improvements once the price control has been set.

K

Kilowatt (KW)

A measure of energy equal to one thousand watts.

L

Lerwick Power Station (LPS)

Low Carbon Networks Fund (LCN Fund)

Funding to encourage the DNOs to innovate to deliver the networks we will need for a low carbon economy.

Low Voltage (LV)

All voltage levels up to and including 1kV.

M

Megawatt (MW)

A measure of energy equal to one thousand Kilowatts.

Microgeneration

Microgeneration is the generation of zero or low-carbon heat and power by individuals, small businesses and communities to meet their own needs.

N

Net Present Cost (NPC)

Net present cost is the discounted sum of future costs.
Northern Isles New Energy Solutions (NINES)

O

P

Q

R

Regulatory asset value (RAV)

The value ascribed by Ofgem to the capital employed in the licensee's regulated distribution or (as the case may be) transmission business (the 'regulated asset base'). The RAV is calculated by summing an estimate of the initial market value of each licensee's regulated asset base at privatisation and all subsequent allowed additions to it at historical cost, and deducting annual depreciation amounts calculated in accordance with established regulatory methods. These vary between classes of licensee. A deduction is also made in certain cases to reflect the value realised from the disposal of assets comprised in the regulatory asset base. The RAV is indexed to RPI in order to allow for the effects of inflation on the licensee's capital stock. The revenues licensees are allowed to earn under their price controls include allowances for the regulatory depreciation and also for the return investors are estimated to require to provide the capital.

S

Scottish Hydro Electric Power Distribution (SHEPD)

Scottish Environment Protection Agency (SEPA)

Shetland Heat Energy and Power (SHEAP)

Slow money

Slow money is where cost costs are added to the RAV and revenues allow recovery of the costs over time (currently 20 years) together with the cost of financing this expenditure in the interim.



Sullom Voe Terminal (SVT)

T

U

V

W

Weighted Average Cost of Capital (WACC)

This is the weighted average of the expected cost of equity and the expected cost of debt.

X

Y

Z

Appendix 4 - Feedback Questionnaire

1.1. Ofgem considers that consultation is at the heart of good policy development. We are keen to consider any comments or complaints about the manner in which this consultation has been conducted. In any case we would be keen to get your answers to the following questions:

1. Do you have any comments about the overall process, which was adopted for this consultation?
2. Do you have any comments about the overall tone and content of the report?
3. Was the report easy to read and understand, could it have been better written?
4. To what extent did the report's conclusions provide a balanced view?
5. To what extent did the report make reasoned recommendations for improvement?
6. Please add any further comments?

1.2. Please send your comments to:

Andrew MacFaul
Consultation Co-ordinator
Ofgem
9 Millbank
London
SW1P 3GE
andrew.macfaul@ofgem.gov.uk