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Network Licensees must publish the required Project Progress information on the Smarter Networks Portal by 31st July 2014 and each year thereafter. The Network Licensee(s) must publish Project Progress information for each NIA Project that has developed new learning in the preceding relevant year.

## NIA Project Close Down Report Document

### Date of Submission

Jun 2021

### Project Reference

NIA\_SSEN\_0039

## Project Progress

### Project Title

An Electric Heat Pathway – Looking Beyond Heat Pumps

### Project Reference

NIA\_SSEN\_0039

### Funding Licensee(s)

SSEN - Scottish Hydro Electric Power Distribution Plc

### Project Start Date

October 2019

### Project Duration

0 years and 7 months

### Nominated Project Contact(s)

Colin Mathieson

## Scope

The scope of the project is to carry out a desktop study which will produce a written report to help network licensees gain a better understanding of the opportunities and benefits of flexible heating demand.

## Objectives

It is anticipated that the report from this project will, among other things:

- Stimulate public debate on storage heating, an important but often overlooked element of energy policy
  - Provide better understanding of the opportunities and benefits of flexible heating demand, and how best to implement them
- Influence internal policy changes in SSEN and use the report to lobby for change at a wider industry level

## Success Criteria

If the project delivers the anticipated learning to GB stakeholders, then it will be deemed successful.

## Performance Compared to the Original Project Aims, Objectives and Success Criteria

In the ongoing debate about future energy policy, it is often assumed that any electrified heat pathway is based around the use of heat pumps. Heat pumps are a popular choice in low carbon technology (LCT) but due to practical constraints around retrofitting existing properties, they have limited suitability for smaller or poorly

insulated homes. A known alternative to heat pumps is smartly controlled electric storage heating.

This project's aims were to explore how smartly controlled electric storage heating could play a role in the electrified heat decarbonisation mix, along with the changing role different parties (Distribution Network Operators, Suppliers, aggregators) may need to adopt to provide flexibility services to ensure value when adopting this type of technology. A report was produced by SSEN and Grid Edge Policy to examine the opportunities presented by the control, operation and use of domestic electric storage heating as a viable alternative to heat pump technology and as a valuable tool to help achieve the UK's carbon target.

This project has been successfully completed and below is a summary of the findings against the stated objectives.

Stimulate public debate on storage heating

Two roundtables were held to gather input from key stakeholders, one was in Edinburgh hosted by Citizens Advice Scotland on 14 February 2020 and the second was in London hosted by National Energy Action on 17 February 2020. Key points gathered from these discussions include:

1. Storage heating is strongly associated with fuel poverty.
2. Consumer experience of current storage heating is acknowledged to be poor. The experience gap is 85% of households with mains gas central heating being fairly or extremely satisfied with their heating system, compared to just 42% for those with electric storage heating.
3. Poor understanding of controls and tariffs.
4. The metering and tariff arrangements for electric storage heating are complex creating added risks.
5. Hot water provision creates further complexity.
6. Direct electric heating in the ascendancy - the number of homes with storage heating has been falling and the number using direct electric heating (e.g. panel heaters, oil-filled radiators) has been rising, which is a risk in the net zero 'no one gets left behind' pathway.

Provide better understanding of the opportunities and benefits of flexible heating demand, and how best to implement them

Homes with storage heaters are considered hard to decarbonise and upgrade with energy efficiency measures or new technology. However, these properties are overwhelmingly lived in by more vulnerable households on lower incomes who can be pushed into fuel poverty by the higher running costs of existing legacy electric heating systems. The final report highlighted that developing a clear vision for these households and the housing stock should be a priority to ensure that 'no-one is left behind' in the move to net zero.

One of the benefits of storage heating is that it could provide value in flexibility as more intermittent generation comes onto the network if the specific metering arrangements and appropriate tariffs were available to enable customers to benefit from the use of electricity at off peak rates (typically overnight).

The report also considers the impacts of the decommissioning of the Radio-Teleswitching Service (RTS) in March 2023 which supports the staggering of schedules to support load shedding and Load Managed Areas which are mainly in our remote network areas in the North of Scotland.

Customers on RTS are typically entitled to a certain number of hours of charging their storage heaters – a main charge overnight but in some cases with a boost in the afternoon. The DNO has the ability, in Load Managed Areas, to update the schedule to help in managing their network. In particular, they can use this to ensure there is a diversity of loads on their networks (whereas conventional Economy 7 would always start charging at midnight for example). The DNO can issue immediate instructions to interrupt the charging in an emergency and therefore provide flexibility to the network. This flexibility is of significant benefit to the DNO and the switching to smart meters and heat pumps will remove this causing further risks particularly in the load managed areas. The report recommended investigating time of use tariffs with suppliers which can provide value to consumers and flexibility to the network.

In summary, the final report recommended that storage heating with smarter controls could offer a suitable solution for many properties where heat pumps are unsuitable due to space, higher upfront costs and home efficiency e.g. a heat pump is less efficient for older 'leaky' homes. The key requirements highlighted are:

For BEIS and Ofgem

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1. Government policy (BEIS, Ofgem) to ensure policies they enact do not inadvertently act as barriers to smart storage heating playing a role.
2. Ofgem and BEIS to ensure a strong focus on the replacement of restricted meters in the smart meter rollout and that customers in homes with electric storage heaters receive the necessary advice and support.

Industry

1. Establish routes to independent customer advice and support to help customers make appropriate choices on low carbon heat

solutions.

2. SSEN to work to develop commercial arrangements to properly reward the provision of flexibility and diversity that is currently provided by storage heating through the RTS arrangements.

The key findings and recommendations were disseminated via two webinars which had 200 delegates registered to attend.

Influence internal policy changes in SSEN and use the report to lobby for change at a wider industry level

This project's insightful findings have been used to shape SSEN's internal policy and procedures as well as investigating alternatives for the RTS decommissioning in March 2023. Discussions are underway with key suppliers to look at alternative arrangements for RTS customers including tariffs and technologies. As a result of this report smart storage heating was also considered in NIA\_NGSO0033 4D Heat as we looked at the impacts of electrifying heating on the Isle of Skye. The report findings have also been shared with multiple parties, via a press release and presentations including to key stakeholders within the Scottish Government Heat Teams. SSEN has highlighted through the newly formed Heat Electrification Partnership with Scottish Government the importance of storage heating arrangements. This report will also be used as a case study as part of SSEN's Heat Strategy which will be published in Spring 2021.

## Required Modifications to the Planned Approach During the Course of the Project

A two-month extension was requested due to the positive interest generated within this project and allowed additional dissemination webinars to be conducted during April 2020.

## Lessons Learnt for Future Projects

The report may have a bearing on the future use of electric storage heating in the UK as the implications of the findings and recommendations have significant influence on the wider industry as we seek a just and fair net zero transition.

Some key features and recommendations from the report for the future vision and use of electric storage heating are:

- Electric storage heating (and even direct-acting electric heating) should be recognised among future policy options for heat decarbonisation, together with whole-house approaches to thermal insulation.
- Investigating time of use tariffs to offer active signalling between the supply chain and the network.
- There should be acknowledgment that future heaters may not look like current storage heaters and the model for their use may require different and more sophisticated demand side functionality more akin to that being considered for smart EV charging to offer the network greater flexibility.
- The role of hot water tanks in all heat electrification scenarios must be considered to understand the disbenefits of removing water tanks as storage resource as it could offer flexibility during intermittent generation.

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In addition, the learnings from this project can be used to build future projects to understand the specific impacts of flexible heating demand and build safeguards for vulnerable customers when alternative technologies are being considered.

The An Electric Heat Pathway – Looking Beyond Heat Pumps report is available to read here:

<https://www.ssen.co.uk/InnovationLibrary/Distribution/>

Note: The following sections are only required for those projects which have been completed since 1st April 2013, or since the previous Project Progress information was reported.

## The Outcomes of the Project

The project findings and recommendations are being considered and disseminated to the wider industry. It is anticipated that a further project will be defined as a result of this work, specifically around understanding the benefits of time of use tariffs and the role of domestic aggregation. This project has also improved our general understanding of the current industry issues associated with electric storage heating achieving the improved TRL on this subject matter from 3 to 5.

As a result of the recommendations from this project, SSEN have purposely included smartly controlled storage heating as part of heat decarbonisation scenarios investigated as part of the NIA\_NGSO0033 4D Heat project, which is a new multi-partner project led by National Grid Electricity System Operator (ESO) and SSEN to explore the potential to use electric heat demand in off-gas areas of Scotland to absorb surplus wind generation, rather than reduce wind farms' output.

This project will also be used as a case study as part of SSEN's Heat Strategy which will be published in spring 2021.

## Data Access

See Network Innovation Competition (NIC) and Network Innovation Allowance (NIA) Data Sharing Procedure at

<https://www.ssen.co.uk/InnovationLibrary/Distribution/>

## Foreground IPR

N/A

## **Planned Implementation**

This project was a desktop study, and it has successfully generated interest in the topic, paving the way for further investigation and discussion within our heat decarbonisation strategy. Further work is needed to investigate the impacts of RTS decommissioning on the network and the alternative arrangements. In addition, SSEN needs to understand the network impacts of time of use tariffs and work with suppliers to introduce these new offerings to consumers.

## **Other Comments**

N/A

## **Standards Documents**

N/A