



NIA ENWL045

THISTLES

Progress Report

July 2026

Version History

Version	Date	Author	Status	Comments
1.1	03/07/2026	Martin Tejada	Final	Comments addressed and wording updated
1.0	15/05/2026	Martin Tejada	Draft	

Review

Name	Role	Signature
A Howard	Innovation Programme Manager	<i>A J Howard</i>
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Approval

Name	Role	Signature & Date
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Table of Contents

Glossary of terms	3
1. Project fundamentals	4
2. Project background	4
3. Project scope	5
4. Objectives	6
5. Success criteria	6
6. Performance compared to the original project aims, objectives and success criteria	6
7. Required modifications to the planned approach during the course of the project	6
8. Lessons learned for future projects	7
9. Data access & quality details	7
10. Foreground IPR	7
11. Standards documents	7

Glossary of terms

Acronym	Description
DNO	Distribution Network Operators
HB	Heat Battery
SP ENW	SP Electricity North West
PNDC	Power Networks Demonstration Centre
BAU	Business as Usual

1. Project fundamentals

Project title	<i>THISTLES - Transforming Heating Into Storage for Local Energy Systems</i>
Project reference	NIA_ENWL_045
Funding licensee(s)	Electricity North West Limited
Project start date	February 2026
Project duration	0 years and 9 months Updated May 2025 to 1 year and 0 months
Nominated project contact(s)	Martin Tejada

2. Project background

Decarbonisation of domestic heat remains one of the key challenges in achieving Net Zero targets within Great Britain. Heating currently accounts for a substantial proportion of residential energy consumption, with a large dependency on natural gas. The widespread electrification of heat, primarily through heat pumps, is expected to play a key role in reducing carbon emissions. However, this transition presents significant challenges for DNOs, particularly in terms of increased peak demand and associated reinforcement requirements, as well as risking leaving behind customers whose homes are not suitable for Heat Pumps or Heat Network.

Project THISTLES has been developed to explore an alternative approach to low-carbon heating using HB technology. These systems store thermal energy during off-peak periods and release it when needed, thereby decoupling electricity demand from heat demand. This characteristic has the potential to reduce peak loads on the network and provide additional flexibility.

The project seeks to understand the technical, commercial, and operational viability of deploying HB at scale within domestic settings. It brings together SP ENW, technology provider Tepeo, and delivery partners including the University of Strathclyde PNDC and LCP Delta. Through a combination of modelling, laboratory testing, and real-world insights, the project aims to quantify the benefits and limitations of HB in comparison to established low-carbon heating solutions.

A key focus of THISTLES is to assess the impact of this technology on low voltage networks, including its potential to alleviate constraints and defer reinforcement. In parallel, the project explores customer suitability, whole-system benefits, and the role of flexibility in integrating

heating technologies into future energy systems. The findings are intended to inform future network planning, support decision-making for DNOs, and contribute to the wider industry understanding of alternative heat electrification pathways.

3. Project scope

Project THISTLES will evaluate the role of HB in decarbonising homes that are currently underserved by mainstream low-carbon heating solutions, such as heat pumps or heat networks. These homes—often flats, terraces, or properties with limited outdoor space—face significant barriers to electrification and risk being left behind in the transition to Net Zero. THISTLES will assess whether heat batteries can provide a viable, flexible, and cost-effective alternative for these households, while also delivering value to the electricity distribution network.

The project will undertake a comprehensive analysis of housing stock within the local authority areas covered by SP ENW to identify properties without a clear route off fossil fuel heating. It will then evaluate the suitability of HB for these homes, model their electricity demand profiles, and simulate their impact on LV networks. The project will also assess the flexibility services potential of HB to understand the extent to which they can support grid services and reduce running costs. By completing this scope, the project will establish a methodology for HB appraisal, network impact modelling, and consumer proposition development, which can be used to inform future roll-out.

The project will deliver benefits to the GB electricity distribution system. Some of these benefits will be quantified during the project lifecycle, while others are expected to be demonstrated qualitatively:

Financial:

- Potential deferral of network reinforcement by shifting heating load away from peak periods through smart thermal storage.
- Reduced operational costs by improving load balancing and avoiding localised overloads.
- Lower customer heating costs through off-peak electricity use and reduced standing charges.

Environmental:

- Significant carbon savings per household by replacing gas boilers with zero-emission heat batteries.
- Supports the decarbonisation of hard-to-electrify homes, accelerating progress toward Net Zero.
- Enables greater use of renewable electricity by aligning heating demand with periods of low-carbon generation.

Operational:

- Improved LV network resilience through demand smoothing and flexibility provision.
- Informs DSO planning processes and RIIO investment strategies with new data on heat battery deployment.
- Leverages existing infrastructure (e.g., smart meters, LV networks) to deliver additional value with minimal disruption.

The project is structured around seven work packages, covering project management, housing stock analysis, heat battery suitability, electricity demand profiling, network readiness,

stakeholder engagement, and trial design. These will culminate in a final report with recommendations for a future demonstrator and integration into BAU planning.

4. Objectives

The project objectives are:

1. Verify the residential decarbonisation gap left by heat pumps & heat networks
2. Assess the extent to which heat batteries can address this gap
3. Evaluate the LV network impact of heat batteries optimised across various tariffs and flexibility signals
4. Complete a technical design for the integration of heat batteries into flexibility markets
5. Develop the customer proposition and technical solution design required for a demonstrator project to prove these findings in practise

5. Success criteria

The project will deliver the following outputs:

- Housing stock heat decarbonisation gap analysis
- Heat Battery suitability evaluation
- Electricity network impact report
- Stakeholder engagement and heat battery literature review
- Demonstration project design including customer proposition development and flexibility market access technical design.

6. Performance compared to the original project aims, objectives and success criteria

Due to delays finalising the necessary innovation contracts, the project has yet to start. These contracts are in the final stages of negotiation, work will commence as soon as they are signed with the original project aims, objectives and success criteria unchanged.

7. Required modifications to the planned approach during the course of the project

Due to delays finalising the necessary innovation contracts commencement is currently anticipated to be Spring/Summer 2026. These changes have been reflected in the PEA and updated in the Smarter Network Portal.

8. Lessons learned for future projects

As the project has not started, there is no Lesson Learned for future projects to report.

9. Data access & quality details

As the project has not started, there is no Data Access and Quality Details to report.

10. Foreground IPR

As the project has not started, there is no Foreground IPR to report.

11. Standards documents

As the project has not started, there is no Standards Documents to report.