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## NIA Project Registration and PEA Document

### Date of Submission

May 2026

### Project Reference Number

ENWL\_NIA\_044

## Project Registration

### Project Title

KeepWarm

### Project Reference Number

ENWL\_NIA\_044

### Project Licensee(s)

Electricity North West

### Project Start

June 2026

### Project Duration

1 year and 6 months

### Nominated Project Contact(s)

InnovationTeam@enwl.co.uk

### Project Budget

£1,151,000.00

## Summary

Decarbonising heat through heat pumps is central to the energy transition but presents significant challenges for vulnerable households. Despite the increasing availability of funding for heat pump installations, the risk of higher heating costs remains a major barrier to acceptance, particularly for disadvantaged and fuel-poor households. KeepWarm will develop an innovative service proposition to help vulnerable households maintain and fund minimum indoor temperatures using smart, automated heat pump controls. This novel approach will deliver consumer health, energy system, and economic benefits while supporting a more cost-effective transition to a decarbonised energy system

## Third Party Collaborators

Passiv UK

## Nominated Contact Email Address(es)

innovation@enwl.co.uk

## Problem Being Solved

Heat pumps operate much more efficiently when running continuously at low flow temperatures. However, disadvantaged households often heat their homes intermittently to manage costs. This not only reduces heat pump efficiency but can also lead to increased dependence on backup electric heating for short-term comfort. Persistently low indoor temperatures present serious health risks, particularly for vulnerable households, and can worsen issues like dampness and mould. In addition, the higher peak electricity demand and excessive demand variance on the DNO network from inefficient and intermittent heating patterns will drive up network infrastructure costs, which are ultimately passed on to consumers, further compounding affordability challenges. While smart controls can improve efficiency and reduce costs, fuel-poor households may face barriers to adoption. Achieving a just transition requires addressing economic and systemic barriers to ensure all households can benefit from the efficiencies that can be achieved through smart controls and digitisation.

## Method(s)

KeepWarm is developing an innovative service model to help vulnerable households maintain minimum indoor temperatures using heat pumps. To achieve this the project will use a combination of technical and commercial methodologies; by enhancing heat pump performance through automated smart controls, KeepWarm aims to benefit multiple stakeholders, including DNOs, consumers, the health service, and social housing providers. The service will optimise heat pump use within a digitally connected energy framework, combining both technical solutions and innovative commercial mechanisms to deliver affordable, reliable warmth.

Advanced controls will automate heat management to ensure efficient operation at low flow temperatures and help households to 'keep warm' above a minimum baseline temperature. The ongoing cost of providing this baseline level of heating will be met through alternative funding sources such as flexibility revenues, social housing contributions, or health programmes, while households will only pay for any additional heating they choose to use.

Measurement Quality Statement: Measurement quality is a key part of this project, particularly regarding the impacts of heat electrification on the LV network and the influence of smart controllers on heat pump behaviour and efficiency. Real-time measurements will be collected at participant dwellings to assess the project, this information will be uploaded to a model, where simulations will be conducted to validate the project assumptions. The simulation methodology and results will be reviewed with direct engagement from SP ENW team, this process will provide assurance and confirm compliance with the data quality objectives.

Data Quality Statement: All data generated and/or processed during this project will be reviewed to provide assurance that output meets the required standards. Data will be managed in line with the RIIO ED2 Data Best Practice Guidance and Data Assurance Guidance. The project partner as part of their research may collect personal data of the participant dwellings, the data collected will be reviewed by the project partner to ensure is both high quality and appropriate for the research, all data collected will be anonymised before sharing with other partners and will comply with GDPR rules.

## Scope

KeepWarm will explore the potential for a new service that uses smart control systems to optimise heat pumps helping disadvantaged households sustain and pay for minimum indoor temperatures. The project will be delivered in 12 Work Packages divided in two stages as outlined below:

### Stage 1

- Work Package 1 - Project Management
- Work Package 2 - Specialist Partner and Pilot Preparation
- Work Package 3 - Techno-Economic Feasibility Modelling
- Work Package 4 - Barriers and Enablers Analysis
- Work Package 5 - Energy System Impact Assessment

After Work Package 5 a Stage Gate will take place, reviewing the project and depending on the outcomes, we will continue to Stage 2.

## Stage 2

- Work Package – 6 Stage 2 Governance
- Work Package - 7 Technical Operations and Support
- Work Package - 8 Consumer Pilot Study
- Work Package - 9 Analysis of Energy System Benefits
- Work Package - 10 Commercial Arrangements and Business Cases
- Work Package - 11 Stakeholder Engagement and Dissemination
- Work Package - 12 Large-Scale Trial Design

## Benefits

KeepWarm aims to provide vulnerable customers an affordable way to warmth their homes by optimising heat pump performance, reducing energy bills whilst maintaining comfort. This could lead to potential enhancement in network efficiency and reduction of energy peak demand as well as opening the possibility for customers to access DSO Services. The monetary benefit to customers will be quantified throughout the project life cycle. These energy system savings and consumer efficiencies are expected to increase through expanded heat pump uptake and the integration of wider flexibility services.

## Objective(s)

The key objectives are to:

- Understand the cost-risk profile for maintaining minimum indoor temperature thresholds
- Design and deliver a pilot study into the technical feasibility
- Evaluate consumer and stakeholder insights
- Assess the impact on the energy system
- Review regulatory considerations
- Define commercial arrangements and business cases

## Consumer Vulnerability Impact Assessment

An assessment of distributional impacts (technical, financial and well-being related) for this project has been carried out using a bespoke assessment tool, which assesses the project as having a positive, negative or neutral effect on consumers in vulnerable situations. To help inform the assessment, this tool considers the categories of consumers identified in the Priority Services Register.

This project has been assessed as having a positive impact on customers in vulnerable situations. The assessment has identified that this project will look to improve the health of customers.

## Success Criteria

The success criteria for the KeepWarm project will be defined by its ability to deliver technical, social, and commercial outcomes that evaluate the service model and enable future scaling.

## Technical

- Demonstrate the ability of smart heat pump controls of maintaining a minimum indoor temperature threshold efficiently at low flow temperatures.
- Creating a framework to roll-out the lessons learned from this project into a DNO flexibility services

#### Social

- Showing the cause/effect relation between thermal comfort, reduced dampness, and positive health indicators
- Validate evidence to confirm if heating costs for vulnerable households can be reduced without compromising warmth.

#### Commercial

- Checking the viability of the framework, this will be assessed through a techno-economic modelling and cost-benefit.

### Project Partners and External Funding

Passiv UK - £94,217

### Potential for New Learning

The KeepWarm project presents a unique opportunity to generate new insights into addressing customer vulnerability and health challenges linked to heat decarbonisation, while also enhancing network reliability, reducing infrastructure upgrade costs for both consumers and operators, and accelerating the transition to net zero.

Key areas of learning will include:

- Analysis of the cost balance between maintaining minimum indoor temperatures and meeting a household's discretionary heating demands.
- Development of new commercial models to address operational affordability challenges of heat pumps
- Evaluation of the system-wide costs and benefits of large-scale, optimised heat pump deployments, including flexibility contributions to the energy network.
- Consumer research and engagement focused on the technical and commercial aspects of the approach.
- Recommendations for GB-wide implementation, covering policy, regulation, and funding considerations.

Project learnings will be shared through multiple channels, including publication on the ENA Smarter Networks Portal, presentations at industry events, and updates via press releases and the SP ENW Innovation website.

### Scale of Project

The project will be delivered in two stages over twelve months. Stage 1 will focus on a high-level, desk-based techno-economic feasibility assessment, while Stage 2 will deliver a consumer pilot study exploring the technical and commercial aspects of the proposed solution. This phased structure is designed to manage investment decision-making around the viability of the approach.

The scale of investment is necessary to develop the project's objectives and outputs to a sufficient level of detail, enabling a robust assessment of the solutions for a potentially larger trial and wider rollout as a business-as-usual proposition.

#### Technology Readiness at Start

TRL3 Proof of Concept

#### Technology Readiness at End

TRL5 Pilot Scale

### Geographical Area

The desk-based studies and delivery of the consumer pilot study will be focused within SP ENW's licence area.

## **Revenue Allowed for the RIIO Settlement**

£0

## **Indicative Total NIA Project Expenditure**

KeepWarm expenditure is estimated to be £1,037,037

# Project Eligibility Assessment Part 1

## Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations

Please answer **at least one** of the following:

### How the Project has the potential to facilitate the energy system transition:

Electrification is widely recognised as the most cost-effective route to decarbonising domestic heating, with heat pumps playing a central role in the energy transition. KeepWarm will develop a new service model that improves heat pump efficiency, reduces grid constraints, and enables vulnerable households to access the benefits of energy flexibility without compromising comfort or health.

### How the Project has potential to benefit consumer in vulnerable situations:

KeepWarm tackles a key barrier to heat decarbonisation for households facing fuel poverty and vulnerable living conditions. Heat pumps operate most efficiently when running continuously at low flow temperatures. However, many disadvantaged households rely on intermittent heating to manage energy costs—an approach that drastically reduces heat pump efficiency. This inefficiency creates a vicious cycle of higher bills, underheating, and increased risks of damp, poor health, and social exclusion.

To break this cycle, KeepWarm will introduce a new service model that leverages advanced, automated heat pump controls to help maintain minimum indoor temperatures. By improving heat pump efficiency and enabling participation in energy flexibility markets, the project aims to unlock system-wide value, reducing network constraints and avoiding costly infrastructure upgrades. The core focus of the project is to ensure that vulnerable, fuel-poor households are not left behind in the transition to net zero.

## Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

### Please provide an estimate of the saving if the Problem is solved

n/a

### Please provide a calculation and/or description of the expected benefits of the solution

This project is categorised as a Research project divided in 2no stages, the first stage with gather evidence required to do a Cost-Benefit Analysis of the proposed solution, as well as identifying barriers and enablers for the strategy.

### Please provide an estimate of how replicable the Method is across GB

This solution is suitable for rollout in properties across GB with suitable heat pumps and sensors.

### Please provide an outline of the costs of rolling out the Method across GB.

The cost for rollout will be covered by social housing providers or customers who install heat pumps, Network Operators will benefit from the flexibility that these devices can provide.

## Requirement 3 / 1

Involve Research, Development or Demonstration

Projects must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify

repeating it as part of a project) equipment (including control and communications system software).

- A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)
- A specific novel operational practice directly related to the operation of the Network Licensees system
- A specific novel commercial arrangement

Involve Research, Development or Demonstration - Please select all that apply

- A specific piece of new equipment (including monitoring, control and communications systems and software)
- A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven
- A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)
- A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology
- A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution
- A specific novel commercial arrangement

## Specific Requirements 4 / 2a

### Please explain how the learning that will be generated could be used by the relevant Network Licensees

The KeepWarm project aims to unlock residential flexibility to support Network Licensees in the transition to NetZero, the project will assess feasibility, pilot deployment, and commercial viability of smart thermostat ensuring comfort for customer and efficient use of Heat Pump, these results will produce replicable methodologies and toolkits, that can be deployed across GB.

The KeepWarm project will generate transferable insights across technical, commercial, and social dimensions, supporting wider adoption by other network licensees. These outputs will be disseminated via SP ENW channels and the ENA Smarter Networks Portal, enabling other DNOs to adapt the project approach to their own contexts.

n/a

### Is the default IPR position being applied?

- Yes

## Project Eligibility Assessment Part 2

### Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed. Networks must explicitly mention similar projects that they have considered and how these differ.

### Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

A review of the Smarter Networks Portal and discussion at the ENA Innovation Steering Group meetings has shown related but not duplicated projects, please see 3.6.2 for details.

Keepwarm will investigate the novel use of advanced control systems to unlock value across the energy system for vulnerable and fuel-poor households offsetting the cost of heating their homes to minimum temperature thresholds. Industry alignment will be achieved by incorporating shared learnings and insights from other electrification of heat projects in collaboration with other DNO's and NESO.

### If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

KeepWarm builds on the foundations set by other projects like Watt Heat, EQUINOX and 4D Heat, but proposes different approach to a problem, by proposing a minimum warmth as a service, using smart controls to maintain healthy indoor temperatures while preserving consumer choice. This disaggregated heating model enables targeted support through mechanisms like Warm Home Prescription and social housing contributions—without locking consumers into specific tariffs or suppliers.

KeepWarm also combines real-world pilot deployment with energy system modelling, health impact evaluation, and commercial strategy development, creating a holistic framework for inclusive flexibility services. Its focus on vulnerable households, alignment with regulatory priorities, and potential to defer costly network reinforcement make it a high-impact, scalable solution.

## **Additional Governance And Document Upload**

### **Please identify why the project is innovative and has not been tried before**

KeepWarm introduces a novel approach to supporting vulnerable households in the energy transition by combining smart heat pump controls with automated flexibility services. Unlike traditional heating interventions, it disaggregates the cost of maintaining a minimum indoor temperature from discretionary heating use, enabling targeted support without restricting consumer choice. It integrates technical innovation with commercial modelling, stakeholder engagement, and health impact evaluation, creating a holistic framework for inclusive energy services.

By leveraging existing infrastructure and aligning with emerging regulatory priorities, KeepWarm offers a scalable, low-cost alternative to network reinforcement. Its unique blend of consumer-centric design, system-level benefits, and cross-sector collaboration makes it a pioneering model for future residential flexibility solutions.

### **Relevant Foreground IPR**

As at the date of this Agreement, ENWL and the Project Collaborator do not expect any Foreground IPR to be created. Regardless of this an IP Register will be created during the set-up phase and will be developed and maintained throughout the project and reported on in the closedown report.

### **Data Access Details**

Data generated can be requested by interested third parties by contacting the innovation team in accordance with our data sharing policy, which is available on our website.

### **Please identify why the Network Licensees will not fund the project as a part of it's business and usual activities**

The project carries technical, economic, and social risks that could impact its success, making it unsuitable for business-as-usual funding given the uncertainty of outcomes

### **Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks (e.g. commercial, technical, operational or regulatory) associated with the project**

There are technical, economic, and social risks regarding the effectiveness of the solution. We will also be exploring the regulatory barriers that may limit or prevent delivery in practice

### **This project has been approved by a senior member of staff**

Yes