

# Innovation Summary Report

31 July 2024





# 1. Foreword

**Welcome to our summary report of Innovation Summary Report for the initial year of RIIO-ED2. In this document we set out all our innovation projects from this regulatory period, along with those ED1 project that were closed down during this time, and share their learning outcomes, benefits and proposed implementation.**

We also draw out those innovation activities from reporting period 1 April 2023 to 31 March 2024 for the Electricity North West license area.

We seek to innovate every day across all our business activities to ensure that we can respond to the evolving needs and expectations of our customers in an increasingly uncertain energy future. Over ED2 we will look to deliver projects that support a just transition to net zero, whilst ensuring that none of our customers get left behind.

## NIA

Our NIA activities are centred around the early-stage technology development, application of research and network demonstration trials. We have received £8.4m to spend across ED2, with a review to be carried out in 2026. This funding is in line with our ED1 funding levels, and lines up with our commitment to continuing innovation.

The ED1 period saw us deliver a portfolio of 32 projects, providing significant learnings and the accelerated benefits to customers with 13 notable projects being deployed rapidly into BAU. We will look to continue this record of success through the ED2 price control.

- Our Sentinel project provided key learnings on improving the safety of our overhead network by providing additional visibility and the ability to remotely detect and locate faults. The deployment of the Sentinel equipment is a key part of our ED2 business plan as the bespoke deliverable, Linesight.
- Another project focused on safety was the Neutral Conductor Integrity project (NCI), which looked to detect early signs of degradation in the LV neutral allowing for early intervention before hazardous situations arose. The solution has been tested on live equipment on a test network and shows great promise. We are looking to follow up on this with a further project in ED2 to
- The Advanced Transformer Monitoring System (ATMS) project expanded our data capture capabilities on our monitoring equipment, providing additional functionality in the form of through fault current (TFC) assessment. Additionally, the analytics carried out on this data were refined and enhanced and the data portal is being integrated into our IT systems to give a near real-time view of asset condition.

- Enhanced LFDD sought to build on the outputs of the ESO's SHEDD project which looked at options to redesign the LFDD scheme to better account for the increase in distributed generation. Building on two of the recommendations that came out of the project Enhanced LFDD demonstrated that existing AVC relays could be upgraded to carry out frequency based tripping at the primary substation level.

We recognise how collaboration can be a key ingredient in successful innovation and we remain committed to continuing and increasing third-party contributions to our Innovation programme. Over the ED1 period we ran eight calls for innovation, either standalone or in conjunction with the ENA, with the last call receiving 27 responses from 15 organisations. We took forward from this several ideas and they formed two new projects in 2022: Hyperspectral Imaging and A Statistical Model for Determining Cut-Out Failures. We have made a commitment in our ED2 business plan to continue this pro-active approach to sourcing ideas and partners.

Across the NIA portfolio our work with third parties is an essential component of innovation at Electricity North West and we consider it central to the successful delivery of our projects. Third parties are actively involved in all our innovation projects, either as a partner or a supplier, and are selected for their expertise or via competitive tender.

In the coming year we look forward to growing our ED2 innovation programme. At the core of our ED2 business plan is our commitment to net zero, innovation and efficiency, and we will focus our innovation ambitions on the key areas of net zero system transition and supporting vulnerable customers. Gathering new ideas, wider collaboration and stakeholder feedback will be crucial to the success in ED2 and we will continue to update on our progress of NIA projects throughout.

## SIF

The start of RIIO-ED2 marked our entry into the SIF process, where we have enjoyed notable success, winning £1.7m of funding across 7 projects delivered during the year alongside collaborating of a further 3. This portfolio of projects has highlighted the flexibility of the SIF process in allowing projects to develop in stages. The benefits of this phased approach can be seen in the outputs of our various projects.

- Across the Discovery and Alpha projects Retrometer created a methodology to quantify the benefits of applying retrofit energy efficiency measures. This will allow for a more accurate assessment of the impact of various measures for both the consumer and the DNO. As this had fully explored the idea a Beta phase project was not deemed appropriate.



- The Rewire project investigated the feasibility of domestic level seasonal storage to increase network resilience and help defer reinforcement needs. Following the Discovery project, it was clear that whilst the idea had merit, the technology was not yet commercially viable, so it was not progressed to an Alpha project.
- Net Zero Terrace looked into ways to decarbonise entire terrace streets using a combination of individual and communal LCTs to tackle the particular challenges associated with these properties. This has drawn widespread interest from various sources, including a number of local authorities. Across the Discovery and Alpha projects significant progress was made on both the technical side and, more critically, the customer engagement side. In order to further refine the methodology prior to a widespread demonstrator we have set up a NIA project to ensure we are best placed for a potential future Beta application.
- The LDES Node project sought to provide a way to optimise the siting of long term energy storage systems on the network. The Discovery project determined the necessary outputs to allow a visual representation of locations that met both local authority and DNO requirements. We have now paused this project to provide time to refine the scope before a potential Alpha submission.
- CoolDown explored the impact on the network of increasing uptake of cooling due to the changing climate. The Discovery project also investigated the use of this demand to provide a new source of flexibility. We have submitted an Alpha application for this project.

A further key impact of the SIF process is that it has broadened the range of partners we have collaborated with. Across the portfolio of projects, to date we have had eighteen project partners of which seventeen were new to ENWL. This has ensured that our SIF innovation has a wider range of ideas and engagement.

## NIC

Alongside our work on NIA and SIF project we also have two ongoing NIC projects in QUEST and BiTraDER. Over the year we have spent over £3m delivering these flagship innovation projects.

The £9m QUEST project builds on our highly successful CLASS and Smart Street projects by looking to create a whole system voltage optimisation system to further drive the efficient running of our network. In addition, the new holistic voltage control methodology will:

- Ensure the network operates as efficiently as possible, optimising the system voltage to connected customers and minimising losses.
- Further boost the benefits available from existing voltage management techniques.
- Facilitate the increased connection and use of LCTs.
- Maximise benefits to all customers through demand reduction at High Voltage (HV) and Low Voltage (LV).
- Explore the potential of reactive power absorb in supporting NG flexible services.

The project is currently about to enter the live trial phase where we will prove the viability of the system on our network. Despite some challenges around the IT design following a change in the cybersecurity environment early in the project we are on track to close down the project by July 2025.

BiTraDER is an £8.4m four year project that is looking to explore the operation and desire for a bilateral trading market through which connected customers can trade their position in the merit order stack. This allows them flexibility in how they meet their curtailment obligations during network constraints, and the additional revenue stream facilitates the connection of flexibility to the network.

Currently, we are developing the components that have been designed be built into a working model to enable customers to trade in BiTraDER. Over the next six to eight months, we will develop:

- The trading platform programmed with the agreed market algorithms.
- Upgrades to the ENWL IT systems to enable interfaces with the BiTraDER platform.
- The scenarios and methodology for carrying out the simulation trials.

We will also continue to conduct further customer engagement and recruitment to ensure we have the right mix of customers for the live network trials. The project remains on track to complete on schedule in 2026.



## 2. Key facts

7

ENWL projects delivered and 3 supported

100%

of awarded funding spent

4

projects in transition to BaU

Over  
£8.4m

NIA funding to invest over the price control

Over  
50

partners and suppliers engaged of which 17 are new to ENWL

£4.6m

spent in FY24 across NIA, NIC and SIF



## 3. Innovation Strategy

**Our Innovation strategy sets out the focus areas for our programme of works across the price control, which reflect the challenges of the industry and the company. It is linked to the ENA national strategy to ensure that we support the GB networks as a whole, but which is also tailored to our unique challenges. Following an update to the ENA document we will be updating our strategy to ensure that we remain aligned to the national priorities.**

Our strategy originally formed part of our ED1 business plan and was a living document throughout the price control, being updated to reflect changes in the national picture along with learnings developed through our projects. This provided a foundation for us to build on in our focus areas for ED2, where we will continue to follow the same philosophy.

Core to the principles of the RIIO framework of electricity regulation, is that network operators must continue to provide and plan for a reliable and efficient network, whilst preparing for the net zero future, keeping costs low and ensuring that all our customers are included and treated fairly and equitably. Successfully delivering against our RIIO objectives presents several challenges right across the organisation, and it's in these areas that we aim to focus our innovation efforts.

For ED2, innovation can be categorised into three areas:




-  Embedded innovation – proven innovation which is considered the default solution to a problem.
-  Business-as-usual innovation – short-term, lower risk innovation funded by our base revenue allowance.

Figure 1: Our challenges



 Ofgem innovation stimulus – innovation funded by our customers under a mechanism agreed by Ofgem, which demonstrates long-term value for customers with a focus on energy system transition and customer vulnerability.

Taking innovation into BAU is considered essential to our undertaking a project. After all, it's only when the innovation has been adopted across our business (i.e., embedded and considered the default solution) that our customers realise the benefits. To ensure a consistent approach and, crucially, a smooth and successful transition to BAU, all innovation projects follow our innovation lifecycle.

### Our innovation lifecycle

Innovative ideas can come from a variety of sources, including diverse stakeholders such as academia, customers, partners, our supply chain, and our people, and are assessed against our strategy and business plan.

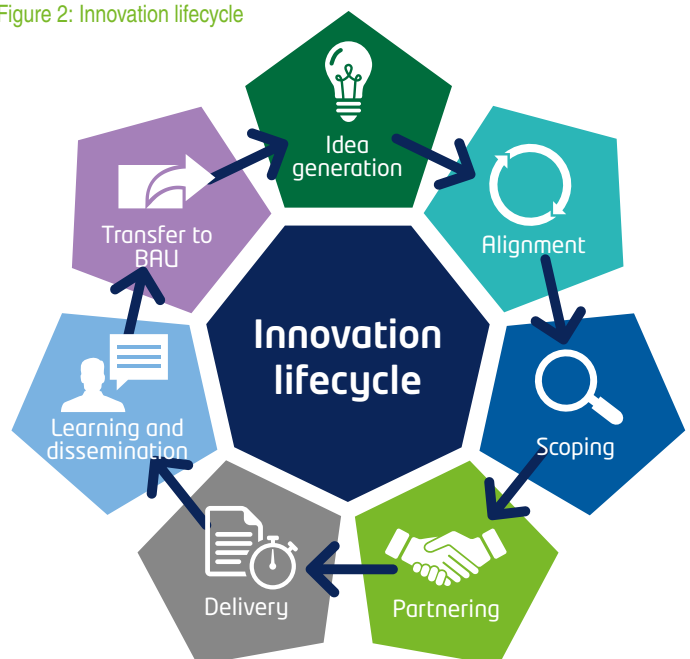
An idea will not be taken forward unless the value for customers is clear and there are appropriate linkages to at least one of our innovation themes.

Ideas are then turned into projects, which describe the aims, objectives and expected outcomes. Once partners are identified, together we will discuss the project scope to understand the value and cost.

During project delivery, we rely on our proven project management skills to ensure projects are delivered on time and to cost. We also engage with the wider business to ensure that the scope includes all elements required to support the transfer to BAU.

Once the project is complete, we share learning. This is essential to avoid duplication and extend the benefits from our work to others, before the transfer to BAU.

Figure 2: Innovation lifecycle


















## 4. NIC Project highlights

### QUEST

Using a novel application of proven technology combined with innovative software, QUEST will build an overarching system which operates a holistic voltage control methodology to co-ordinate existing and future voltage management techniques, establishing efficient network operation, promoting low-cost connection and use of LCTs.














|   |  |   |   |  |
|---|--|---|---|--|
| <br>Consumer vulnerability                 | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: JANUARY 2021   |  |
| <br>Optimise system voltage                 |                                      |   |   |  |
| <br>Facilitate LCT uptake                 |  |   |   |  |
| <br>Maximise use of low carbon generation | <br><b>What next</b>                  | We are in position to begin the live trials of the system to prove the operation of the QUEST software.             |   |  |
| <br>Boost benefits of existing techniques |  |   |   |  |
| <br>Easily adopted by other DNOs          |  |   |   |  |
| <a href="http://www.enwl.co.uk/quest">http://www.enwl.co.uk/quest</a>   |  |   |   |  |



# 4. NIC Project highlights

## BiTraDER

Using extensive engagement with connected resources, culminating in their participation in a real-life trial, BiTraDER will demonstrate how access to a neutral market allows connected resources to trade their curtailment obligations bilaterally, encouraging more of them to participate in flexibility markets.














|   |  |   |   |  |  |
|---|--|---|---|--|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution | <br>Whole energy system   |  |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: MAY 2022<br>                     |  |  |
|                             | Increase availability of flexibility   |   | <br><b>What next</b>                     | We have developed and published the market trading rules and we are working on the detailed design for the end to end system. We are continuing to sign up some customers to assist the market design and take part in the trials which are due to start in August 2024. |  |
|                            | Reduce barriers for low carbon generation  |   |   |  |  |
|                           | Offers more choice and reduces risk to flexible connection customers   |   |   |  |  |
|                           | Increases competition through a transparent neutral market   |   |   |  |  |
|                           | More effective network management  |   |   |  |  |
| <a href="http://www.enwl.co.uk/bitrader">http://www.enwl.co.uk/bitrader</a>                                 |  |   |   |  |  |



# 5. SIF Project highlights

## REsidential whole system integrated REsilience (REWIRE)














The REWIRE discovery phase began investigations into whether networks could use domestic level solutions to improve wider network resilience.

|   |  |   |  |  |
|---|--|---|--|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution  | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: MARCH 2023  |  |
|                            | Improve network resilience   |   |    |  |
|                            | Provide greater flexibility  |   |  |  |
|                           | Lower bills for customers  | <br><b>What next</b>             | This discovery phase of this project is now complete, and all learning is published on our website and the Smarter Networks Portal. The project was not progressed to Alpha phase. |  |
|                          | Releases network capacity  |   |  |  |
|                           | Reinforcement deferral   |   |  |  |
| <a href="http://www.enwl.co.uk/sif">http://www.enwl.co.uk/sif</a>   |  |   |  |  |

# 5. SIF Project highlights

## RetroMeter

RetroMeter will provide and demonstrate a consistent methodology to accurately meter the energy and cost savings benefits of retrofit energy efficiency measures unlocking pay-for-performance financing, increasing uptake and leading to reduced costs for consumers and additional flexible services for the DNO.














|   |  |   |  |  |
|---|--|---|--|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution  | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: MARCH 2023  |  |
|                            | Improve access to retrofit energy efficiency measures  |   |    |  |
|                           | Reduce energy consumption  |   |  |  |
|                           | Lower bills for customers  | <br><b>What next</b>             | We have completed the Discovery and Alpha phase of this project. The project devised the new Metered Energy Savings methodology, explored and quantified the value stack and broadened stakeholder engagement and participation. |  |
|                           | Increase availability of flexibility   |   |  |  |
|                           | New consistent methodology   |   |  |  |
| <a href="http://www.enwl.co.uk/sif">http://www.enwl.co.uk/sif</a>   |  |   |  |  |



# 5. SIF Project highlights

## Net Zero Terrace














Net Zero Terrace will demonstrate how to decarbonise an entire terraced street using a smart local energy system that is integrated with the network but is also optimised, affordable to consumers and easily replicable across Great Britain.

|   |  |   |  |  |
|---|--|---|--|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution  | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: MARCH 2023  |  |
|                             | Improve access to LCTs for terraced streets  |   |    |  |
|                           | Reduce carbon emissions  |   |  |  |
|                           | Support a just energy transition   | <br><b>What next</b>             | We have now completed Discovery and Alpha, which demonstrated that integration of a SLES into our network is possible. Looked at how best to accommodate the solution, conducted further investigation into maximising the benefits of flexibility for customers, and undertook community engagement through the Fairer Warmth app. We plan to develop this further under an NIA project before looking at a Beta application. |  |
|                           | Opportunity for active participation in local energy market by customers   |   |  |  |
|                           | Replicable across GB network   |   |  |  |
| <a href="http://www.enwl.co.uk/sif">http://www.enwl.co.uk/sif</a>   |  |   |  |  |

# 5. SIF Project highlights

## LDES Node

Long Term Duration Energy Storage (LDES) Node investigates the optimal locations to deploy LDES technology to reduce network constraints and maximise output from renewable generation along with providing flexible services.














|   |  |   |   |  |
|---|--|---|---|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution   | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: MARCH 2023   |  |
|                             | Highlights optimal locations for LDES technology deployment  |   |   |  |
|                           | Assists with alleviating local network constraints   |   |   |  |
|                           | Reduces CO <sub>2</sub> emissions by maximising the output of renewable generation                                       | <br><b>What next</b>             | We have now completed Discovery, which highlighted the visual outputs to optimally situate LDES technologies to meet Local Authority and network requirements. All learning is published on our website and the Smarter Networks Portal. We have paused here to review the project prior to a potential Alpha submission. |  |
|                           | Provides cost savings for users of network services  |   |   |  |
|                           | Feeds into Local Area Energy Plans   |   |   |  |
| <a href="http://www.enwl.co.uk/sif">http://www.enwl.co.uk/sif</a>   |  |   |   |  |



# 5. SIF Project highlights

## CoolDown














CoolDown explored the impact of cooling on network capacity by producing improved cooling uptake and demand projections. We then developed novel commercial models to incentivise and unlock flexibility from space cooling, reduced required network reinforcement and optimising value for consumers.

|   |  |   |   |  |
|---|--|---|---|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: MARCH 2024   |  |
|                            | Better understanding of network impact   |   | <br><b>PROJECT COMPLETE</b>             |  |
|                            | Provide network flexibility  | <br><b>What next</b>             |   |  |
|                           | Lower bills for customers  |   |   |  |
|                          | Releases network capacity  |   |   |  |
|                           | Reinforcement deferral   |   |   |  |
| <a href="http://www.enwl.co.uk/sif">http://www.enwl.co.uk/sif</a>   |  |   |   |  |

# 6. NIA Project highlights

## ENWL006: Sentinel

The project will trial new fault location techniques on overhead networks. By developing novel fault location sensors which enable earlier detection and response to broken or damaged conductors, Sentinel will improve the quality of supply for customers and improve safety on the network.













|  |  |   |   |  |
|--|--|---|---|--|
| <br>Consumer vulnerability          | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution | <br>Whole energy system |
| <b>Benefits</b>  |  | <br><b>Timescales</b>              | <b>START: MARCH 2023</b>  |  |
| <br>More precise fault location      | <br>Detects emerging faults            |   | <br><b>BUSINESS AS USUAL</b>            |  |
| <br>Detects high impedance faults | <br>Reduction in CMLs                  | <br><b>What next</b>             |   |  |
| <br>Real time condition monitoring |  |   |   |  |
| <a href="http://www.enwl.co.uk/nia">http://www.enwl.co.uk/nia</a>  |  |   |   |  |



# 6. NIA Project highlights

## ENWL027: Enhanced LFDD














This project will explore the use of SuperTAPP SG relays, currently installed at the majority of ENWL’s primary substations, to provide a more granular LFDD service. In addition, by using the relays in conjunction with measuring equipment the direction if the power flows can be taken into account, allowing net exporters to remain connected.

|   |  |   |  |  |
|---|--|---|--|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution  | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: JUNE 2021   |  |
|                             | Economic solution  |   |    |  |
|                            | Improved usage of existing assets  |   |  |  |
|                           | Allows rapid wide scale deployment   | <br><b>What next</b>             | The project successfully demonstrated that the SuperTAPP SG relay can deliver frequency based tripping, as well as discriminating based on load levels. There is further development required to ensure that it performs in line with OC6 specification. |  |
| £   | Low cost   |   |  |  |
|                           | Better utilises distributed generation   |   |  |  |
| <a href="http://www.enwl.co.uk/nia">http://www.enwl.co.uk/nia</a>   |  |   |  |  |

# 6. NIA Project highlights

## ENWL028: LV Predict














This project will develop a probabilistic framework which predicts the current state of the LV assets across a representative part of the network, most likely as a probability distribution of times to failure, or equivalently the probability of failure in a specific time interval.

|  |  |   |   |  |
|--|--|---|---|--|
| <br>Consumer vulnerability            | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution | <br>Whole energy system |
| <b>Benefits</b>  |  | <br><b>Timescales</b>              | START: JULY 2022  |  |
| <br>Low cost                          |                                      |   |   |  |
| <br>Easily deployable                 |  |   |   | <br><b>What next</b>    |
| <br>New probabilistic framework      |  |   |   |  |
| <br>Better targeted investment       |  |   |   |  |
| <br>Improved cable health prediction | <a href="http://www.enwl.co.uk/nia">http://www.enwl.co.uk/nia</a>  |   |   |  |

# 6. NIA Project highlights

## ENWL031: Automated Transformer Monitoring System (ATMS)

This project will see the upgrade of a number of Totus units and look to integrate the data gathered into ENWL's Chime database, which is used for management of our assets.














|   |  |   |   |  |
|---|--|---|---|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution   | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | <b>START: APRIL 2022</b>  |  |
|                             | Enhancement of existing assets   |   |   |  |
|                            | Targeted data collection   |   |   |  |
|                           | Better visibility of asset condition   | <br><b>What next</b>             | The portal has been made available to the asset management team and is being integrated into our IT systems as part of the BaU transition. We are continuing to monitor the captured data, especially from the TFC units, in order to optimise its use. |  |
|                          | Improved system resilience   |   |   |  |
|                           | Extension of asset life leading to customer savings  |   |   |  |
| <a href="http://www.enwl.co.uk/nia">http://www.enwl.co.uk/nia</a>   |  |   |   |  |



# 6. NIA Project highlights

## ENWL029: Statistical model for cutout failure














This project carried out a combination of literature review and data analysis around modes of cutout failure to generate a condition assessment model which allows targeted replacement of cutouts in a controlled manner.

|   |  |   |   |  |
|---|--|---|---|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution                                   | <br>Whole energy system |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | START: DECEMBER 2021  |  |
|                            | More resilient network   |   |   |  |
|                           | Improved understanding of cutout failure modes   |   |   |  |
|                           | Improved customer service  | <br><b>What next</b>             | <p>Housing stock analysis showed links to cut out types</p> <p>Model built shows usefulness of the approach</p> <p>To be taken to the ENA for next steps.</p> |  |
|                           | Informed asset replacement strategy  |   |   |  |
|                           | Easily transferable to other DNOs  |   |   |  |

# 6. NIA Project highlights

## ENWL032: Needs based segmentation of LIV customers

The RIIO-ED2 challenge group raised a concern that the needs of Low Income and Vulnerable (LIV) customers are not well understood by DNOs. This project will objectively appraise how best to classify LIV customers and identify their energy needs through customer engagement to determine how best to support them in adopting net zero activities.



























|   |  |   |   |   |  |
|---|--|---|---|---|--|
| <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets and practices | <br>Flexibility and commercial evolution | <br>Whole energy system  |  |
| <b>Benefits</b>   |  | <br><b>Timescales</b>              | <b>START: SEPTEMBER 2022</b>  |   |  |
|                             | Improvement understanding of customer needs  |   |   |   |  |
|                           | Consistent definitions of different customer types   |   |   |   |  |
|                           | Support to increase adoption of net zero activities  |   | <br><b>What next</b>                     | <p>This project is newly underway, beginning with development of the research programme. Part 1 of the programme will focus on the development of a common 'lens' or 'lenses' through which DNOs and Ofgem should view the needs of LIV customers, whilst part two will undertake nationally representative customer engagement with LIV customers.</p> |  |
|                           | Expansion of 'living lab' resource   |   |   |   |  |
|                          | More efficient, targeted services enabled consistently across country  |   |   |   |  |
| <a href="http://www.enwl.co.uk/nia">http://www.enwl.co.uk/nia</a>   |  |   |   |   |  |

## 7. Overview

| Project  | Funding | Themes  |  |   |   |  | Status      |
|--|---------|---|--|---|---|--|-------------|
|  |         | <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets & practices | <br>Flexibility & commercial evolution | <br>Whole energy system |             |
| <a href="#">Celsius</a>  | NIC     |   |   |                                  |   |  | COMPLETE    |
| <a href="#">Capacity to Customers</a>  | LCNF 2  |   |   |                                  |                                        |  | BAU         |
| <a href="#">CLASS</a>  | LCNF 2  |   |                                       |                                |                                      |  | BAU         |
| <a href="#">Smart Street</a>   | LCNF 2  |                          |                                       |                                |   |  | BAU         |
| <a href="#">Respond</a>  | LCNF 2  |   |                                       |                                |                                      |  | BAU         |
| <a href="#">Quest</a>  | NIC     |                          |                                       |                                |                                      |  | IN PROGRESS |
| <a href="#">BiTraDER</a>   | NIC     |   |                                       |   |                                      |                       | IN PROGRESS |
| <a href="#">ENWL001: Demand Scenarios with Electric Heat &amp; Commercial Capacity Options</a> | NIA     |                          |                                       |   |                                      |                       | BAU         |
| <a href="#">ENWL002: Distribution Asset Thermal Modelling</a>                                  | NIA     |   |  |                                |   |  | COMPLETE    |

























## 7. Overview

| Project   | Funding | Themes  |  |   |   |  | Status   |
|---|---------|---|--|---|---|--|----------|
|   |         | <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets & practices | <br>Flexibility & commercial evolution | <br>Whole energy system |          |
| <a href="#">ENWL003: P2/6 Rewrite</a>   | NIA     |   |  |                                  |   |  | BAU      |
| <a href="#">ENWL004: Combined Online Transformer Monitoring</a>                         | NIA     |   |   |                                  |   |  | COMPLETE |
| <a href="#">ENWL005: Asset Risk Optimisation</a>  | NIA     |   |                                       |                                |   |  | BAU      |
| <a href="#">ENWL006: Sentinel</a>   | NIA     |                          |  |                                |   |  | BAU      |
| <a href="#">ENWL007: Reliable Low Cost Earth Fault Detection For Radial OHL Systems</a> | NIA     |                          |                                       |                                |   |  | BAU      |
| <a href="#">ENWL008: ATLAS</a>  | NIA     |                          |                                       |   |                                      |                       | BAU      |
| <a href="#">ENWL009: Cable Health Assessment</a>  | NIA     |   |                                       |                                |   |  | COMPLETE |
| <a href="#">ENWL010: Value Of Lost Load (VoLL)</a>                                      | NIA     |                          |  |                                |   |  | COMPLETE |
| <a href="#">ENWL011: Enhanced Voltage Control</a>                                       | NIA     |   |                                       |                                |                                      |  | COMPLETE |

## 7. Overview

| Project   | Funding | Themes  |  |   |   |  | Status   |
|---|---------|---|--|---|---|--|----------|
|   |         | <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets & practices | <br>Flexibility & commercial evolution | <br>Whole energy system |          |
| <a href="#">ENWLO12: Investigation Of Switchgear Ratings</a>            | NIA     |   |  |                                  |   |  | BAU      |
| <a href="#">ENWLO13: Detection of Islands</a>                           | NIA     |   |   |   |                                        |                         | COMPLETE |
| <a href="#">ENWLO14: Optimisation of Oil Regeneration</a>               | NIA     |   |                                       |                                |   |  | COMPLETE |
| <a href="#">ENWLO15: Tapchanger Monitoring</a>                          | NIA     |   |  |                                |   |  | COMPLETE |
| <a href="#">ENWLO16: Future Network Modelling Functions</a>             | NIA     |   |                                       |                                |                                      |  | COMPLETE |
| <a href="#">ENWLO17: Electricity and Heat</a>                           | NIA     |   |                                       |   |                                      |                       | COMPLETE |
| <a href="#">ENWLO18: Avator</a>   | NIA     |                          |  |   |   |  | COMPLETE |
| <a href="#">ENWLO19: Interface</a>                                      | NIA     |   |                                       |                                |   |  | COMPLETE |
| <a href="#">ENWLO20: Artificial Intelligence &amp; Machine Learning</a> | NIA     |                          |                                       |                                |   |  | COMPLETE |

## 7. Overview

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|---|---------|---|--|---|---|--|-------------|
|   |         | <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets & practices | <br>Flexibility & commercial evolution | <br>Whole energy system |             |
| <a href="#">ENWLO21: VoLL 2</a>   | NIA     |                            |   |                                  |   |  | COMPLETE    |
| <a href="#">ENWLO22: Reflect</a>  | NIA     |   |   |                                  |                                        |  | BAU         |
| <a href="#">ENWLO23: Intelligent Network Meshing Switch</a>                   | NIA     |                          |                                       |                                |   |  | BAU         |
| <a href="#">ENWLO24: Smart Heat</a>   | NIA     |                          |                                       |                                |                                      |                       | COMPLETE    |
| <a href="#">ENWLO25: On-Line Assessment Of Neutral Conductor Integrity</a>    | NIA     |   |                                       |                                |                                      |  | IN PROGRESS |
| <a href="#">ENWLO27: Enhanced LFDD</a>  | NIA     |   |  |                                |                                      |  | IN PROGRESS |
| <a href="#">ENWLO28: LV Predict</a>   | NIA     |   |  |                                |   |  | COMPLETE    |
| <a href="#">ENWLO29: A Statistical Model for determining cut out failures</a> | NIA     |   |  |                                |   |  | COMPLETE    |
| <a href="#">ENWLO30: Hyperspectral Imaging</a>                                | NIA     |   |  |                                |   |  | IN PROGRESS |



## 7. Overview

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|--|---------|---|--|---|---|--|----------|
|  |         | <br>Consumer vulnerability | <br>Net zero & energy system transition | <br>Optimised assets & practices | <br>Flexibility & commercial evolution | <br>Whole energy system |          |
| <a href="#">ENWL031: Advanced Transformer Monitoring System</a>                            | NIA     |   |  |                                  |   |  | COMPLETE |
| <a href="#">ENWL032: A needs based segmentation of low income and vulnerable customers</a> | NIA     |                            |   |   |   |  | COMPLETE |
| <a href="#">Net Zero Terrace Discovery</a>   | SIF     |   |  |                                |                                      |                       | COMPLETE |
| <a href="#">Net Zero Terrace Alpha</a>   | SIF     |   |  |                                |                                      |                       | COMPLETE |
| <a href="#">Rewire Discovery</a>   | SIF     |   |                                       |   |                                      |                       | COMPLETE |
| <a href="#">Retrometer Discovery</a>   | SIF     |   |                                       |                                |   |  | COMPLETE |
| <a href="#">Retrometer Alpha</a>   | SIF     |   |                                       |                                |   |  | COMPLETE |
| <a href="#">LDES Node Discovery</a>  | SIF     |   |                                       |                                |                                      |  | COMPLETE |
| <a href="#">CoolDown Discovery</a>   | SIF     |   |                                       |   |                                      |  | COMPLETE |



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