EQUINOX

NIC Project Progress Report

April 2022 – September 2022

Electricity Distribution

nationalgrid

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1. Executive Summary

Equitable Novel Flexibility Exchange (EQUINOX) is funded through the Office of Gas and Electricity Market's (Ofgem)'s Network Innovation Competition (NIC) and has a budget of £7,766,110. The project was awarded funding in December 2022 and will be complete by December 2025.

EQUINOX is the first NIC project dedicated to addressing the challenges Distribution Network Operator's (DNO's) face with the electrification of heat. The project is developing novel commercial arrangements and supporting technologies that will unlock flexibility from residential low carbon heating, while meeting the needs of all consumers, including the fuel poor and vulnerable.

This report details progress of the project, focusing on the last six months, April 2022 – September 2022.

Having been awarded funding in January, the first quarter was spent agreeing the team structure with partners, detailed budgets, gaining agreement on the plans and agreeing contracts. As there are a large number of partners, this took a little longer than planned but the team have remained committed to delivering against the original plan. Official mobilisation occurred with an online kick-off meeting which was attended by all partners.

We have completed and agreed the trials design for the first "test" in Q4 this year, we have customer engagement and recruitment plans in place and have also agreed terms with an additional energy supplier in keeping with the desire of the Expert Panel, who were keen to see an additional supplier to ensure maximum benefit for customers. The additional supplier is Scottish Power Energy Retail who have now joined our monthly all partner face to face meetings. Of course, this could provide some additional opportunities around interoperability as well. In addition to that, the programme has been in contact with the three successful Heat Pump Ready Programmes awarded within the National Grid Electricity Distribution (NGED) license areas and there are some potential additional opportunities to include customers from these projects too. This could allow the EQUINOX consortia some additional value add through added learning to the various trials.

On a technical level we have a broad agreement on the approach to be taken by the various customer facing partners and have started work on the cyber security review to provide all stakeholders the confidence that the proposed technical architecture is secure.

We have also completed a procurement exercise for our Primary Research Partner, and this was awarded to Accent Market Research. They will be undertaking surveys both online and face to face with customers throughout Q3 and Q4. We have also appointed National Energy Action to

support the customer engagement work to help with the messaging to the vulnerable and fuel poor.

Moreover, we have also started work on creating the EQUINOX brand and website to direct customers to a single source of project information, this has not been imperative for this year as the trial is going to leverage existing customers within Octopus and SERO's portfolios.

This report provides more detail on the progress made so far, and we remain broadly on target and aligned for this period which is pleasing given the challenging environment in the energy industry at the moment.

2. Project Manager's Report

2.1. Project Background

The project has five workstreams and in effect three separate phases that take place over the lifecycle of the project. The high level plan submitted within the Full Submission Proforma (FSP) was as follows:

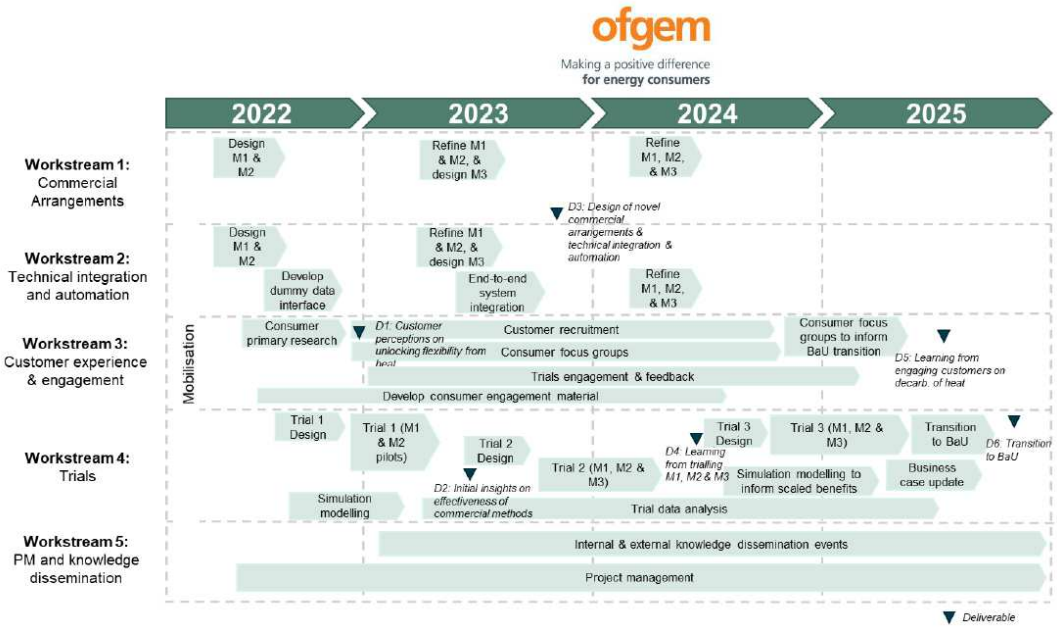


Fig: 1 Original High level project summary plan

The business case , detailed within the report, was and remains clear, heat flexibility is going to be a major part of the future for DNO's and we needed a strong project to investigate this with partners committed to this work. EQUINOX gives us that opportunity to build the evidence needed.

A lot of work during the bid was done in terms of understanding the project and what each partner was seeking to gain and contribute to the project. A key first step in this large innovation project is the mobilisation work between award and project start and a lot of the background work had been done in terms of Initial Planning, Risk Identification, alignment of partners and roles and objectives.

As can be seen by the diagram the plan is to revisit the trials to learn from the feedback from customers so that we gain the most insight from them.

2.2. Project Progress

The project officially started off with an online Kick off meeting, this meeting was to firstly set the scene and introduce the entire team to one another. We agreed some ways of working and set about assigning people to the various workstreams from each of the partner organisations. As the project has a number of project partners, online meetings we feel will not get the best outcome so we are increasingly looking to have more variety in meetings. The project partners at the outset had a chance to review the plan, which was done within each workstream and some work was done on dependency mapping. This enabled the team to verify that the plan was deliverable. A key learning point has been that by ensuring that the first "trial" was not intended to be a full scale trial, but more a test of the end to end system with a more modest customer base, that this de-risked the initial phase.

Because of the continuing effects of the pandemic, we operate in a hybrid manner but during July we were able to have our first face to face meetings in Avonbank, our Bristol office to start to delve into the detail within workstream 1 and also hold an entire project team meeting:

Fig 2: Team arriving for the team meeting

This meeting also gave us an opportunity to run through each of the main four workstreams immediate delivery plans. Feedback from the partners was really positive and we intend to run more face to face meetings in the future. With a project of this scale the benefits of face to face meetings we feel outweigh the risks.

Fig 3: Callum Coghlan, WS1 Lead running through the 6 month plan for his workstream

Below each of the five workstreams provides more of a detailed update but overall the project is starting now to gain the momentum needed. We have made some real progress on the development of the trials design, the technical design and the consumer engagement piece.

2.2.1. Rollout Planning

The Welsh Government and West Midlands Combined Authority are working on their rollout plans with the aim of work starting for the 2023 trials. Both are aiming to meet their targets of 500 and 100-200 respectively by the commencement of Trial 2 at the end of 2023. We will be meeting regularly to progress their plans for rollouts. Scottish Power Energy Retail will also be aiming for 2023 trial involvement as well. In addition Octopus Energy remains on target to recruit its 500 customers. It should be noted that we are not intending to be using the whole portfolio of

customers for the first winter trial, it was planned as an integration test and the volume of customers will be utilised from Trial 2 onwards.

In addition we have opportunities for additional customers with the Heat Pump Ready programme and are in discussions with another supplier as well. Having a diverse range of customer bases from which to draw will give us not only additional learning we think but also ensures that there are a range of customer types involved.

For trial one we are leveraging the current Octopus Energy customer base with communications going to customers in October. We are also targeting some SERO customers who have heat pump installations already- this will ensure that we can test the solution this year without relying on newly rolled out customers.

2.3. Workstream 1- Commercial Design

During the first six months this workstream has been the focus of the bulk of effort and has achieved the following deliverables:

- Defined a comprehensive set of guiding principles for the commercial arrangement design, ranging from customer satisfaction and safety to scalability and stakeholder neutrality

- Evolved the proposed commercial arrangements from the FSP into two different payment arrangements to be trialled this winter, each across two different heat pump set ups

The two payment arrangements are:

- M1: Pay the households an advanced monthly credit to their bill in return for providing flexibility by turning off their heat pump throughout the month at desired times. The payment is fixed regardless of level of household participation throughout the month, so the risk is held more by the DNO/suppliers

- M2: Pay the households credit to their bill after each flexibility event in which they have participated by turning off their heat pump when requested. If they do not participate, they do not get paid. Thus the risk is held more by residential consumers

The two heat pump set ups are:

- Direct Load Control (DLC), where the household's supplier remotely turns off their heat pump through the Home Energy Management system (HEM), though households have the option to override this

- Behavioural Demand Response (BDR), where the household's supplier asks the household to manually turn off their heat pump. The household can respond to this request as it wishes

Finally, we have narrowed down the payment amount we expect customers to receive in the first winter – around £100 per customer, and around £4-5 per heat pump turn off event. This is likely to be a small overpayment vs Business as Usual (BaU), but given that this is the first trial in an innovation project and we are also paying customers for the useful data and learnings that they generate it should strike a good balance to get consumers engaged based on the feedback from the rest of the consortia. We have used this figure based on current flexibility payments in other trials to ensure some consistency.

2.4. Workstream 2- Technical Design

Within this reporting period, this workstream has made good progress towards implementing a technical integration system for trial 1. Two systems are being developed, one to be used by Octopus energy customers, and the other to be used by any SERO customer trial participants. Each partner has designed their system architecture to work with any existing business processes to ensure minimal disruption for customers as well as ensuring a proven system can be in place in time for the first trial.

For each of the two systems, push signals will be sent via an Application Programming Interface (API) from the Flexible Power platform, which aligns with our business as usual flexibility procurement. This will be an aggregated request, which will be broken down into signals for individual homes by Octopus energy and SERO respectively. To facilitate EQUINOX on the Flexible Power platform, we will be creating a new zone for trial partners, but this will be within one of our existing BaU environments.

Each provider is developing a fully automated process, as well as a manual control process. If, for any reason, there is a failure in the end-to-end path for automated heat pump “off” and “on” signalling, we will revert to a manual method.

Figure 3 shows the high level integration architecture being used by Octopus energy during the first trial. This includes the two processes being developed with automation and manual control. All dispatch signals from NGED will be sent via our Flexible Power platform, and via an API these will be taken by Octopus Energy’s Kraken Flex platform in this case.

From here the two processes will differ for automated and manual control:

- For customers under automated control, an API between Kraken Flex and heat pumps has been created, which can remotely switch home heat pumps based on the requirements of the trial. Validation will then be carried out by means of the same API.

- For customers under manual control, email signals will be used to notify customers of an event. The customer will then manually control the heat pump in their home, and smart meter data will be used for validation of the event.

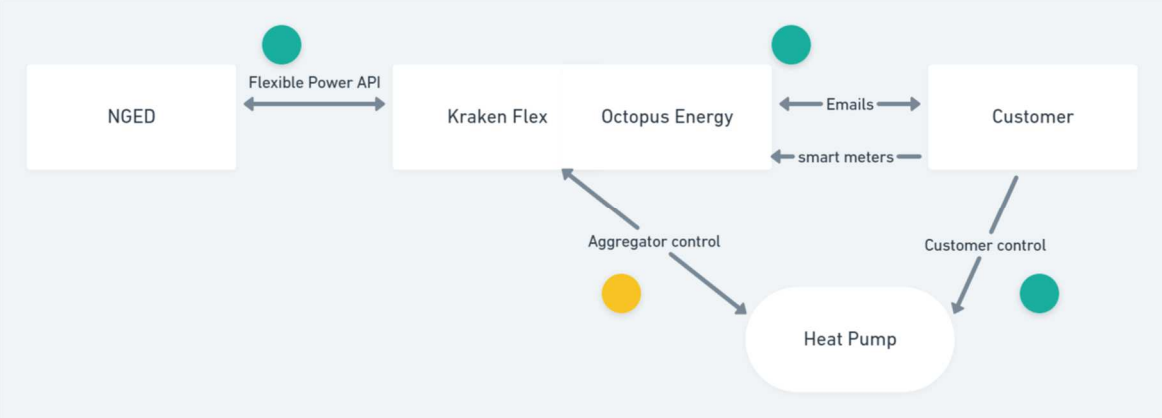


Fig 3: High level integration architecture examples from Octopus Energy

2.4.1. Cyber Security Framework

Within workstream 2 we will be ensuring that good cyber security practices are maintained on the systems used by the project. To ensure this, during this review period we have set out plans to create a clear cyber security governance, actively manage and minimise any cyber security risk, and review the integration designs against any security requirements and gaps.

2.5. Workstream 3- Customer Engagement

Work on Workstream 3 has seen some good progress throughout this period with the level of engagement very high.

In summary, the quantitative GB-wide primary market research has been completed and the team is now moving to qualitative research, which will begin this month. Results from both qualitative and quantitative research will be summarised and shared at the end of this year as part of Deliverable 1 which remains well on track for completion.

The suppliers / service providers have developed communications materials and will shortly begin recruitment activities to gather participants for this winter's first EQUINOX trial. The communications will be partner specific with some EQUINOX boilerplate rather than full EQUINOX branded materials. This is for two reasons: to reduce any confusion with customers and secondly to minimise the impact the rebranding of WPD to National Grid may have led to further confusion.

The team continues to develop materials and tools to use to gather insights on customer perspectives throughout the trial, including surveys, interviews, and focus groups. We will also be detailing how enquiries and complaints will be handled as well.

2.6. Workstream 4- Trials Management

This workstream has been split into the following phases, with regular workshops forming the base for discussion:

- Data Collection
- Data Analysis
- Event Design
- Trial Design & Impact Evaluation Document

A short summary is provided below to detail where each of these phases are at currently:

2.6.1. Data Collection

The initial workshops were focussed on fleshing out all the data points that each partner will be required to collect before, during and after the trial period, leading to the creation and iteration of the Data Collection document. This document outlined the following:

- Data Category
- Data Point
- Importance

2.6.2. Data Privacy

Given the importance of privacy we have detailed the following:

- Who collects it and when
- How each point is collected
- Who uses the data point
- Who the data is shared with and in what format (i.e. aggregated)
- What the data is used for
- The research question it is contributing towards

All partners have aligned on this document, therefore this phase is complete. We are now proceeding to a Partner wide Data Sharing Agreement.

2.6.3. Data Analysis

The Data Collection document as mentioned in 1.6.1 forms the basis for the Data Analysis work has now been scoped. This work has outlined each analysis point, who is responsible for undertaking it, the importance, the reasoning and the research question(s) it is contributing towards. This piece of work was key to outlining the roles and responsibilities for each partner in the trial and in avoiding potential General Data Protection Regulation (GDPR) issues by ensuring that each partner was analysing the data they collected.

As part of the analysis piece, Guidehouse's Central Analytics team in North America were resourced to review the proposed baselining methodology that will be used by the partners for trial 1. Due to the smaller participant pool available for Trial 1 the P376 baselining method will be used (P376 is the industry agreed baselining method for the UK market) as this is the current agreed method between partners and suits smaller trial sizes, and Guidehouse will be reviewing the success of this method by comparing the outputs against their preferred baselining method. The results from this review will inform the choice for trial 2.

2.6.4. Event Design

Because P376 is being used for Trial 1, a similar number of cold event and cold non-event days will be needed to allow for reliable results. This has informed the way in which events will be scheduled over the trial period – a weekly Friday call will be held to evaluate the weather forecast for the week ahead and decide on event days and non-event days. Good progress has been made on the other event related elements, including event timing (eventing peak 5-7pm for trial 1) and event numbers (links to WS1 payment amounts). Inclusion of weather information was considered an important aspect of the Ofgem Expert Panel and we will update regularly on this as part of ongoing reporting.

2.6.5. Trial Design & Impact Evaluation Document

An overarching trial design document is in progress, containing detailed summaries of each partners' approach to experimental design, baseline and Demand Side Response (DSR) calculations and an overview of the decision making process associated with event scheduling.

The NGED process will follow the normal process for flexibility procurement albeit refined to cater for the fact that this is a trial.

2.7. Workstream 5- Knowledge Capture and Project Communications

The knowledge capture and dissemination workstream continues to make progress on the method of recording and disseminating the learning that we are looking to obtain and capture along the way. It has also been working with the partners and wider National Grid teams to create the branding and website for EQUINOX. This is expected to be launched during the next reporting period.

In addition, we have an agreed communications plan and strategy which will ensure that the team communicates both internally and externally in a way that is consistent and approved by all partners.

3. Business Case Update

3.1. Summary of EQUINOX benefits

This section covers the basis of the business case within the FSP and then provides an update to it as appropriate. There is no update to this business case as it stands but during each subsequent report we will update the business case in line with the ongoing assessment carried out during the project and any assumptions and changes to it accordingly.

In its Ten Point Plan for a Green Industrial Revolution, the UK Government announced that it will "aim for 600,000 heat pump installations per year by 2028, creating a market led incentive framework to drive growth, and will bring forward regulations to support this especially in off gas grid properties". This heat pump (HP) installation target represents a significant departure from the current HP installation rate (~30,000 per year). However, it falls short of the deployment levels (900,000 per year) recently suggested by the CCC1. The CCC also stated that "We should not delay on HPs or low carbon heat networks as viable solutions for most of the country". In addition, buildings is the second largest emitting subsector in the UK, accounting for 18% of UK emissions in 2019.

EQUINOX is the first NIC project dedicated to addressing the challenges DNOs face with the electrification of heat. The project is developing commercial arrangements, processes, and supporting technologies that unlock flexibility from residential low carbon heating, while meeting the needs of all consumers, including the fuel poor and vulnerable.

The Carbon Trust and ICL has reported that customers could save approx. £4.5bn/yr by 2050 through the successful use of demand side response (both domestic & non-domestic). Furthermore, the report highlights that flexibility reduces peak demand on distribution networks by 61GW (c.25%) by 2050. Domestic demand side response through EQUINOX will enable the network to accommodate the expected increase in peak demand from the electrification of heat at the lowest cost to customers. Once implemented, the EQUINOX solution will if proven to be successful result in:

- Significant financial, capacity, and carbon benefits associated with a) deferral of network reinforcement (at primary and secondary substations) required to address the increase in peak demand due to the addition of HPs to our network, and b) improved liquidity in flexibility markets and corresponding reduction in pricing. These financial, capacity, and carbon benefits have been quantified through business case modelling, as described below:

[1] https://www.theccc.org.uk/wp-content/uploads/2021/06/Progress-in-reducing-emissions-2021-Report-to-Parliament.pdf

- £1,107 m in direct financial benefits up to 2050 across GB, which will benefit the customer though network savings resulting in lower customer bills, and through enabling access to DSR markets at a lower cost

- 779 MVA capacity released up to 2050 across GB, in the form of demand reduction.

- 1,900 tCO2e of direct savings up to 2050 across GB.

- Faster adoption of heat pumps - A current barrier to the adoption of HPs is the total cost of ownership. Reducing this total cost of ownership by providing incentives to shift electricity usage will contribute to reducing the financial hurdle associated with the adoption of HPs.

- Increased efficiency in flexibility procurement from leveraging LV connected flexibility over HV connected flexibility - The procurement of LV flexibility to resolve an upstream constraint (or ESO balancing requirement) will frequently have a superior effect than procurement of same quantity of HV or EHV flexibility. As an example, typical line loss factors2 (from NGED's Charging Statements) are in the region of 1.013-1.019 for HV & EHV networks, while range between 1.066-1.075 for LV networks. Therefore, procurement of one unit of LV connected flexibility (demand turn down), would create an additional 4.5% reduction in load flowing through an upstream constraint than the same amount of upstream flexibility. This leverage effect associated with LV flexibility (specifically demand turn down) potentially grants DNO greater efficiency when procuring flexibility. This beneficial effect would also be noticed by the ESO.

- Increased opportunity for value stacking – Because the LV network remains the load centre for network flows, any capability to dispatch flexibility from the LV network is likely to benefit all network constraints up and down the network. In comparison, use of HV or EHV flexibility will only ever benefit constraints that are located upstream. Therefore, LV flexibility is likely to have application across more network constraints than its upstream neighbours. This effect will be experienced

[2] https://www.westernpower.co.uk/our-network/use-of-system-charges/charging-statements

as greater efficiency in DNO flexibility procurement, as the same flexibility would be likely to improve more than one network issue.

- Benefit for the National Grid Electricity System Operator (NGESO) – EQUINOX may contribute to system balancing cost reduction due to improved coordination with NGESO. The domestic flexibility unlocked would help NGESO reduce the procurement of other services (e.g., ancillary service procurement avoidance), and hence address transmission network constraints while having the potential to benefit marginal generation costs too. This benefit will be further discussed with NGESO throughout the project and documented the business case update following trial completion.

3.2. EQUINOX Financial Benefits

According to the recently published Flexibility in Great Britain report, “embedding flexibility in zero carbon heat and transport solutions will help to reduce their system impact and costs making their decarbonisation economically more feasible.” EQUINOX is the first NIC project dedicated to addressing the challenges of heat electrification, delivering significant financial benefits across GB. The EQUINOX financial benefit that has been quantified as part of this business case comprises benefit from network reinforcement deferral and from improved liquidity in DNO flexibility markets.

All figures in this Section are presented in real terms using 2021/22 prices. Fig 1. shows the forecast net financial benefits of EQUINOX at GB scale (cumulative):

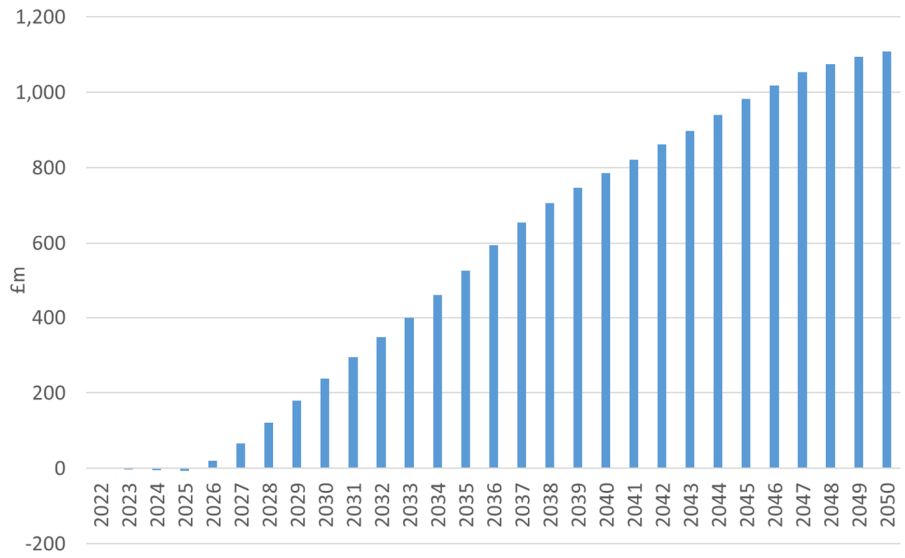


Fig 1. Forecast net financial benefits of EQUINOX at GB scale

This illustrates that there is a significant financial benefit against investment associated with EQUINOX. Comparing the cumulative EQUINOX benefits with the benefits of demand side response reported by industry experts in the Carbon Trust & ICL report, provides confidence that the EQUINOX benefits are likely achievable, and conservative. Table 1 below shows cumulative net financial benefits (in £m) for 2030, 2040, and 2050 across GB:

Table 1. Cumulative Net Financial Benefits of EQUINOX

Licence Area	2030	2040	2050
Licensee Scale			
National Grid Electricity Distribution	£58m	£204m	£290m
All licence areas			
GB	£238m	£786m	£1,107m

3.3. EQUINOX Capacity Benefits

EQUINOX will release capacity headroom through use of heat flexibility, thereby reducing reinforcement needs.

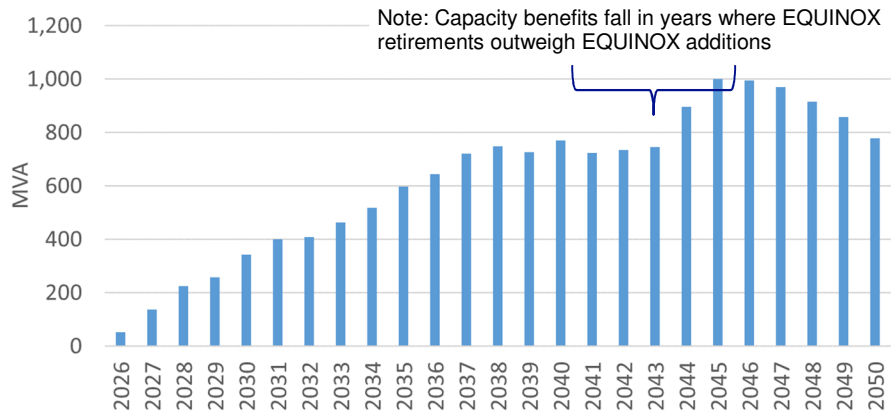


Fig 2. Forecast Capacity Release by EQUINOX across GB

The total High Voltage and Low Voltage capacity released across GB would be 779 MVA by 2050. It should be noted that due to the temporary effect of the flexibility solution (i.e. EQUINOX is used to defer a substation reinforcement for as long as possible until network capacity is overtaken again by load growth, following which the network is reinforced and thus flexibility no longer required), EQUINOX releases capacity temporarily until reinforcement removes the capacity

benefits of EQUINOX at a later date. As a result, the cumulative capacity benefits may fall in some years, as seen in the shape of the graph in Fig 2. This is due to a larger number of substations requiring reinforcement in some years, thus removing the need and capacity benefits from EQUINOX, when compared to the number of new substations at which EQUINOX is deployed and achieving capacity benefits across GB. Conversely to the financial benefits, capacity benefits cannot be capitalised over time.

In context, the Carbon Trust and ICL report estimates that flexibility will achieve a peak demand reduction on distribution networks of 61GW (c. 25% peak demand reduction) by 2050.

3.4. EQUINOX Environmental Benefits: Carbon emission reductions

The capacity benefit described in Section 3.3 can be translated into equivalent environmental benefit from deferral of reinforcement works once EQUINOX has been deployed, offering services to constrained parts of the network. The Capacity to Customers (C2C) project[3] (by Electricity North West) suggested a total saving of 92.7 tCO2e for each new 38 MVA transformer not installed. Using the above assumption, along with the capacity release figures provided in Section 3.3, we determined the environmental benefit of EQUINOX in tCO2e.

This approach understates the total environmental benefit as the support EQUINOX may provide towards the acceleration of HP deployment is not included (beyond the assumed HP load growth scenario). The commercial arrangements (incl. customer incentive payments) may lead to faster adoption of HPs in certain regions, which would in turn result in additional flexibility unlocked. This flexibility would help defer additional network reinforcement (which has not been quantified as part of the business case), hence more financial, capacity, and environmental benefits. The solution would also contribute to the acceleration of heat electrification in GB.

[3] https://www.enwl.co.uk/globalassets/innovation/c2c/c2c-key-documents/carbon-impact-assessment-scenario-results.pdf

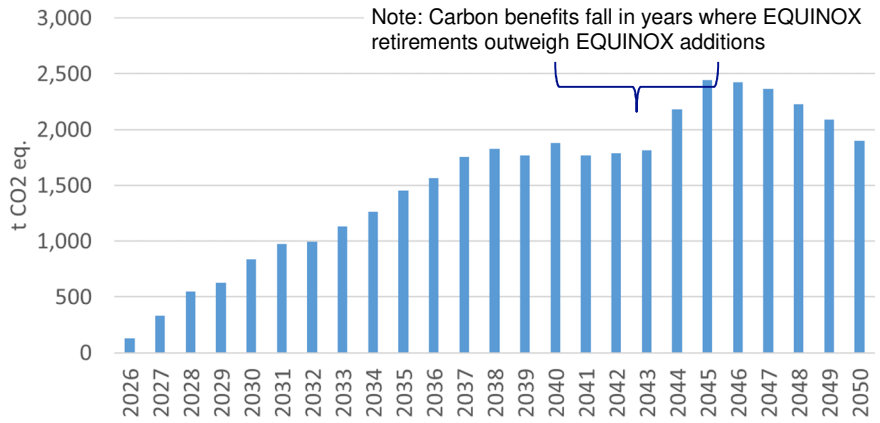


Fig 3. Forecast Carbon Benefit of EQUINOX across GB

A summary of the cumulative benefits across GB is provided in Table 2 below.

Table 2. Financial Benefit, Capacity Released, and potential Carbon Benefit (GB)

Year	Financial Benefit (£m)	Capacity Release (MVA)	Potential Carbon Benefits (t CO_2 eq.)
2030	238	343	836
2040	786	770	1,878
2050	1,107	779	1,900

As EQUINOX is in the first stages of delivery, it is too early to provide a substantive update on the business case. However, the team is conscious that the current cost of living crisis may have a consequential impact on uptake and a further update on the business case will be provided in the next reporting cycle- this is a risk that is recorded in the risk register in that the payments being made may not be sufficient enough to “nudge” behaviour, at the moment we do not though see this a serious risk. Moreover, other competing flexibility projects may also impact on the outcomes and we continue to monitor this.

4. Progress against Budget

Spend is less than expected in most areas but is now starting to ramp up. The Scottish Energy Power Retail costs will be taken from contingency funds.

Table 4: Progress against Budget

Spend Area	Budget(£k)	Expected Spend to Date (£k)	Actual Spend to Date (£k)	Variance to expected (£k)	Variance to expected %
Labour	4412.9	882	161.35	-719	-81.5
Equipment	1212.78	-	-	-	-
Contractors	457.59	53	53	0	0
IT	235.38	-	-	-	-
IPR	-	-	-	-	-
Travel and Expenses	18.09	-	-	-	-
Payments to Users	73.55	-	-	-	-
Contingency	1238.44	-	-	-	-
Decommissioning	-	-	-	-	-
Other	117.38	-	-	-	-
Total	7766.11	935	214.85	-719	-76.9

4.1. Comments around variance

Due to the timing of reporting and contracting delays, spend has started to begin now and will start to increase in line with the budget over the coming quarter.

5. Deliverables

The project has made the following progress towards the Success Criteria and Deliverables within the Project Direction:

Reference	Project Deliverable	Deadline	Evidence	Progress
1	Customer perceptions on unlocking flexibility from heat [WS3]	Dec 2022	A report containing: • Insights from customer surveys and customer focus groups on the barriers and enablers for unlocking flexibility from heat	**Started-**Subject matter experts have been appointed, work has commenced on the surveys with customers. On track for delivery in Dec 22
2	Initial insights on effectiveness of commercial methods [WS1 & WS4]	Jul 2023	A report containing: • An overview of theoretical flexibility simulation modelling based on 'digital twin' housing archetypes • Analysis and learning from early trial data to understand the impact of commercial methods and control on flexibility outcomes	**Not started** but progress on the designs for the trials is on target with designs for the first trial approved.
3	Design of novel commercial methods & technical integration [WS1 & WS2]	Nov 2023	A report containing: • An overview of the novel commercial arrangements (M1, M2, & M3), including: requirements, commercial heads of terms with suppliers and customers • An overview of the technical integration between DNO, suppliers, in-home automation, and customers including: solution requirements (incl. cyber requirements) and specifications (DNO, supplier, & customer) high-level architecture, test plans, and test results. • An overview of learning from designing, developing and testing the novel methods in collaboration with Project Partners and customers.	**Not started** but progress is being made towards the content including design work, test plans, and cyber requirements

Reference	Project Deliverable	Deadline	Evidence	Progress
4	Learning from trialling novel commercial methods [WS4]	Aug 2024	A report containing: • An overview of the commercial terms for DNOs, energy suppliers and customers. • An overview of learning from trialling the range of novel commercial method • An overview of the customer experience during the trials based on customer feedback • An overview of the simulated network impact throughout the trial flexibility events	**Not started**
5	Learning from engaging customers on the barriers & enablers of the electrifications of heat and unlocking domestic flexibility [WS3]	Aug 2025	A report containing: • Lessons learned from engaging with customers on the electrification of heat • Lessons learned on enabling equal opportunities and benefits for fuel poor and vulnerable customers • Recommendations on the role of DNOs in customer engagement	**Not started**
6	Recommended transition of learning to BaU [WS4]	Dec 2025	A report detailing: • Updates to flexibility simulation models using trial data • A description of the recommended commercial arrangements, procurement strategy and technical integration to unlock maximum flexibility from domestic customers • An overview of any regulatory or policy change needed to enable efficient roll out • An update of the project business case that considers project learning	**Not started**

Reference	Project Deliverable	Deadline	Evidence	Progress
N/A	Comply with knowledge transfer requirements of the Governance Document.	End of Project	1. Annual Project Progress Reports which comply with the requirements of the Governance Document. 2. Completed Close Down Report which complies with the requirements of the Governance Document. 3. Evidence of attendance and participation in the Annual Conference as described in the Governance Document.	**Not started**

6. Learning Outcomes

The table below shows some of the learning we have captured so far as part of the Equinox Project. This includes some general practical learning outcomes that we think are useful to other planning projects of a similar scale, as well as specific technical and commercial learning.

Learning Point	Applicable to
We have found that multi party collaboration agreements can take a long time to agree. It may be better in the future to consider individual agreements with links to other partners. This is something we will investigate further with our legal experts.	All DNOs – Project Management
Projects of this scale do benefit from face to face interaction.	All DNOs – Communication
It is important to ensure that all partners understand why the rest of the team are collaborating, "what's in it for me" applies to businesses as well as individuals. It does help set the scene.	All DNOs – Project Management
It is important to stick to the story that you are trying to tell, the search questions that you are trying to answer. With multiple partners, it can be easy to get side tracked by other narratives and agendas.	All DNOs – Communication
Due Diligence on partners may be appropriate where the project is complex, just to reassure the programme management that commitments made can be met.	All DNOs – Project Management
The original planning done with a smaller "test" rather than full trial for Winter 1 was a great way to de-risk the first phase and has enabled the team to ensure deliverability this year.	All DNOs – Project Scoping
GDPR is a key consideration in trials like these and it has been a complex task to unpick all of the relevant data asks for the partners. This takes time and needs to be factored into the planning process as well.	All DNOs – Project Management
To integrate with multiple energy suppliers and home management systems individual approaches need to be taken to integration, but the network interaction being standardised as an API ensures that this has no impact on trial management.	All DNOs – Trial Technical Integration

It cannot be assumed that all trial participants will have a smart meter. Validation of manually controlled heat pumps is more difficult to achieve in these homes and will involve participants needing to submit regular meter readings.	All DNOs – Trial Technical Integration
When planning work for software development teams, contingency needs to be in place for any features expected to be developed for other initiatives as other project/BaU can mean their priorities change.	All DNOs – Technical Integration Project Management
Heat Pump control can be done in two ways, one optimising switching to make heat pumps efficient by selecting appropriate times in their operation cycles, or another where switching is done at exact times required by the flexibility dispatch request.	All DNOs – Trial Technical Integration
When recruiting trial participants, it is important to check if multiple homes share a single heat pump as this has direct implication on the override functionality and customer behaviour.	All DNOs – Trial Technical Integration
Meeting on Technical Integration with multiple suppliers can lead to not getting accurate progress updates due to overlap with other BaU processes or products.	All DNOs – Technical Integration Project Management
Integrating with homes already participating with home management organisations lends itself to carrying out trials of heat pump control.	All DNOs – Trial Technical Integration

7. Intellectual Property Rights

A complete list of all background IPR from all project partners has been compiled. The IPR register is reviewed on a quarterly basis. No new foreground IPR has been generated to date within the EQUINOX project.

8.Risk Management

Our risk management objectives are to:

- Ensure that risk management is clearly and consistently integrated into the project management activities and evidenced through the project documentation;
- Comply with NGEDs risk management processes and any governance requirements as specified by Ofgem; and
- Anticipate and respond to changing project requirements.

These objectives will be achieved by:

- ✓ Defining the roles, responsibilities and reporting lines within the Project Delivery Team for risk management;
- ✓ Including risk management issues when writing reports and considering decisions;
- ✓ Maintaining a risk register;
- ✓ Communicating risks and ensuring suitable training and supervision is provided;
- ✓ Preparing mitigation action plans;
- ✓ Preparing contingency action plans; and
- ✓ Monitoring and updating of risks and the risk controls.

8.1. Current Risks

The EQUINOX risk register is a live document and is updated regularly. There are currently 49 live project related risks. Mitigation action plans are identified when raising a risk and the appropriate steps then taken to ensure risks do not become issues wherever possible. In Table 5, we give details of our top six current risks by category. For each of these risks, a mitigation action plan has been identified and the progress of these are tracked and reported.

Table 5: Top six current risks (by rating)

Details of the Risk	Risk Rating	Mitigation Action Plan	Progress
There is a risk that Optimised Retrofit Programme (ORP) funding will not be directed to the right place(SERO) in order to get customers onboard.	Severe	Utilise existing customer base, leverage other rollouts across NGED areas.	Continue to monitor and discuss with parties to ensure that we can meet the required volume of heat pumps. This is part of the discussions on Heat Pump Rollout for 2023. As the Welsh Gov't develop their plans over the coming period we will have regular dialogue to ensure that their plans meet the projects aspirations and

			commitments. At this stage their rollout plans do not impact on Trial 1.
Level of ambition - risk that EQUINOX may be out paced by the HP roll-out. This is why we need to be aggressive with these targets and make sure Equinox is part of the HP roll-out.	Severe	Continue to monitor externalities and rollout plans.	Monitoring through horizon scanning and dialogue.
There is a risk that one of the partners may not be able to deliver as expected and therefore cause unintended consequences on the overall delivery plan.	Severe	Continued engagement with partners throughout at operational and Snr levels. Explore options externally as well and keep an eye on external events and opportunities.	Ongoing observation and engagement means that this risk is under control, expect to see reduction over coming period.
There is a risk that we will not have enough customers under trial one due to:; a) SERO - unable to provide customers b) technical integration issues for both OE and SERO with "controlled" customers and c) lack of other pools of customers.	Severe	Continued engagement and sharing of plans/updates and information. Pursue alternatives with Passiv.	Ongoing observation and dialogue, increased awareness and visibility of SERO plans and increased confidence of their ability to deliver over the coming months. Weekly dialogue has seen the confidence increase will reduce risk in due course.
There is a risk that SERO integration will not be in place in time for trial 1	Severe	Continued engagement and sharing of plans/updates and information. Pursue alternatives with Passiv.	Ongoing observation and dialogue, increased awareness and visibility of SERO plans and increased confidence of their ability to deliver over the coming months. Weekly dialogue has seen the confidence

			increase will reduce risk in due course.
There is a risk that SERO customers who are recruited for trial 1 will not have an integration method	Severe	Ensure confidence in delivery prior to comms being sent out.	Ongoing observation and engagement means that this risk is under control, expect to see reduction over coming period.

Table 6 provides a snapshot of the risk register, details graphically, to provide an on-going understanding of the projects' risks.

Table 6: Graphical view of risk register

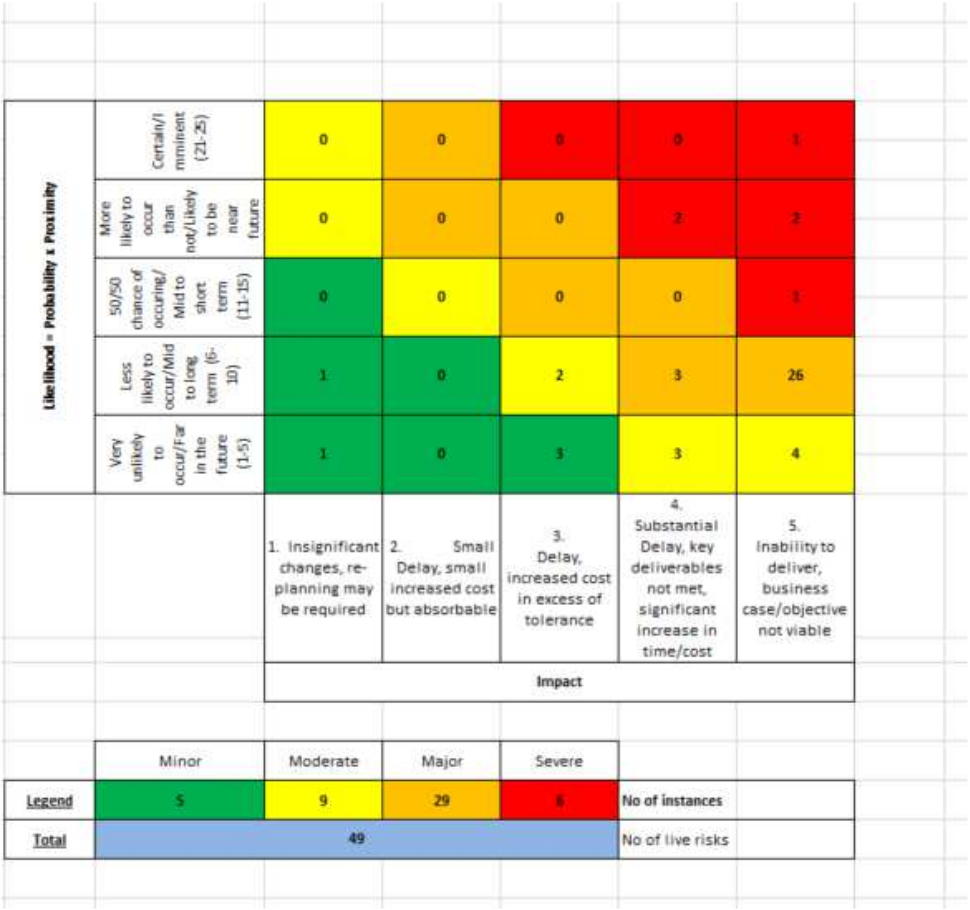
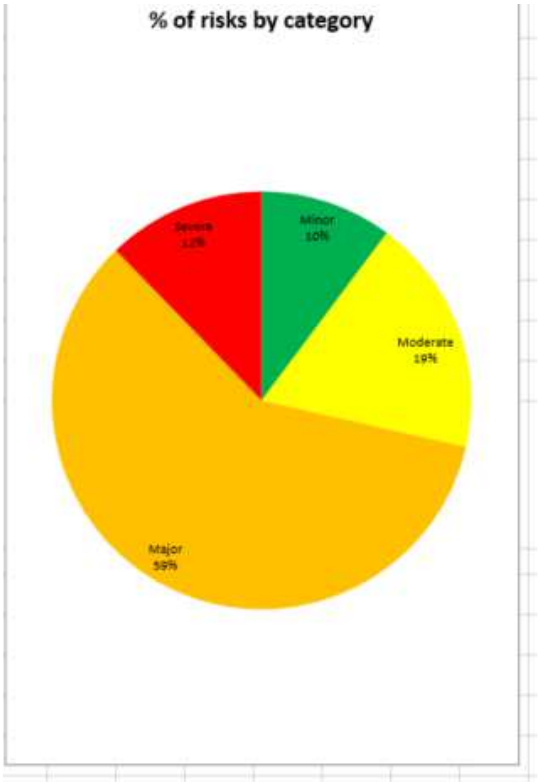


Fig 7 provides an overview of the risks by category, minor, moderate, major and severe. This information is used to understand the complete risk level of the project.

Fig 7. Percentage of risks by category



8.2. Update for risks previously identified

As this is the projects first progress report this is not Applicable for this reporting period

9. Consistency with Project Direction

The scale, cost and timeframe of the project have remained consistent with the project direction, a copy of which can be found here:

Project Direction: EQUINOX- Western Power Distribution | Ofgem

10. Accuracy Assurance Statement

This report has been prepared by the EQUINOX Project Manager (Stuart Fowler), reviewed by WS2 Lead (Ryan Huxtable), and then reviewed and approved by the Innovation Manager (Yiango Mavrocostanti).

All efforts have been made to ensure that the information contained within this report is accurate. NGED confirms that this report has been produced, reviewed and approved following our quality assurance process for external documents and reports.

Glossary

Abbreviation	Term
CCC	Committee on Climate Change
DSR	Demand Side Response
DNO	Distribution Network Operator
EQUINOX	Equitable Novel Flexibility Exchange
HP	Heat Pump
HV	High Voltage
IPR	Intellectual Property Rights
LV	Low Voltage
NGED	National Grid Electricity Distribution
NIC	Network Innovation Competition

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