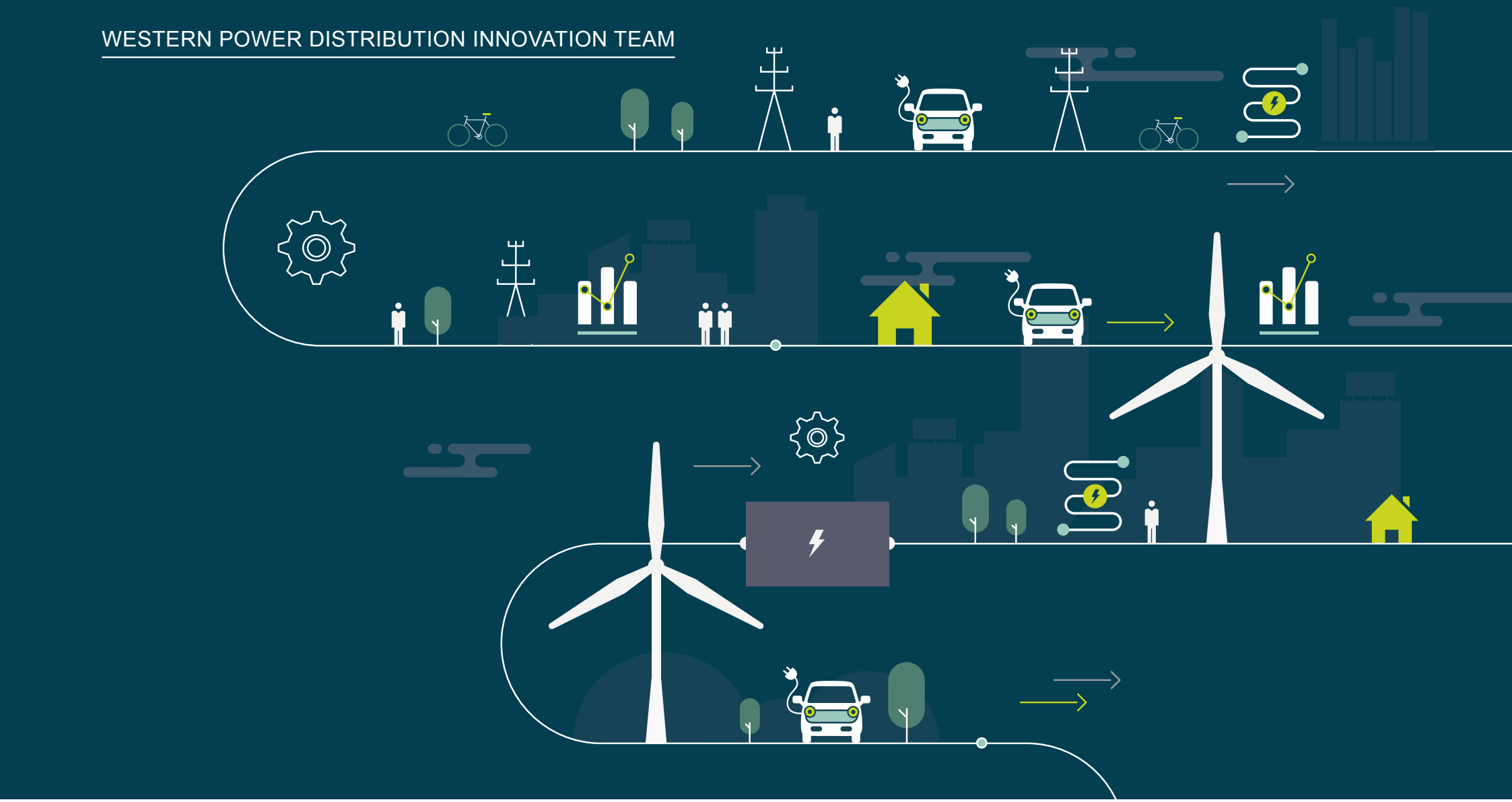
WESTERN POWER DISTRIBUTION INNOVATION TEAM



Innovation Forward Plan

December 2019

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

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This document builds on our Innovation Strategy, where our three key focus and priority areas, Transport, Heat and Data were outlined. We see these as key areas for our innovation programme to develop in order to support Government's net-zero 2050 agreement.

These three priority areas are now described in detail, covering what work we have previously or are currently doing, what Government, industry and wider stakeholders are doing and saying in each area and what specific problems and challenges we would like to use our innovation programme to overcome in the next 12 to 18 months. As well as the three priority areas we also outline an 'Other areas to support our priorities', focussed on technical and commercial solutions, as indicators of the wider range of innovative solutions that will support our innovation portfolio.

We appreciate that a wide range of third parties and stakeholders have skills, technologies, solutions and business capability needed to shape the future of the distribution network and the wider energy landscape and we're committed to pro-actively engaging third parties in the delivery of our innovation programme; principally our Network Innovation Allowance (NIA) and Competition (NIC) projects.

In this document, as well as the detail of the problems and challenges, we've set out our broad timelines for interaction via our NIA and NIC calls, which will focus on the problems and challenges identified in this plan.

To date we have taken forwards a number of projects from our third party calls, nine projects from NIA calls [50% of all projects in the last two years], totalling over £6.8m and five of our last seven NIC bids have originated from these calls. We are dedicated to continuing this with existing and new project partners and collaborators and believe this document should further support this.

Innovation strategy overview

Our Innovation Strategy looks at the long term development of our distribution assets, network operations and customer service required to support the changing system and customer needs. The Strategy looks through to 2035, yet naturally provides more detail on the shorter term priorities, requirements and proposed initiatives.

Innovation is the process of having new ideas, developing them into practical solutions and implementing them into equipment or processes in order to improve network performance or customer service. It will provide more flexible solutions that are better, cheaper or quicker than the current ways of doing things. The RIIO-ED1 Network Innovation Incentives and the Government's net-zero 2050 agreement have and will continue to bring huge change and significant opportunities to innovate.

We rely on innovation to maintain our position as a frontier performer in network performance and customer service. Innovation is targeted at all of the key outputs safety, cost efficiency, customer service, reliability and environment. In the past innovation has proved beneficial by allowing us to continually improve in these areas. Future innovation will allow us to continue these improvements and will also help us to address the challenges brought about by the net-zero challenge.

Our innovation project portfolio has enabled us to deliver significant learning to the wider business as well as other network operators. We have delivered over 100 innovation projects over the previous and current price control period, which has enabled significant changes in how we operate our business providing benefits to customers. Key examples of this is the learning as part of our Low Carbon Networks Hub project that has enabled us to roll out Active Network Management (ANM) across each of our four licence areas, and flexibility services now delivered through the Flexible Power brand, created as part of our Entire NIA project, which developed technical and commercial requirements to utilise flexibility as a service to avoid asset investment requirements.

We continue to innovate and ensure third party access and collaboration on our projects is achieved.

Focus and priority areas

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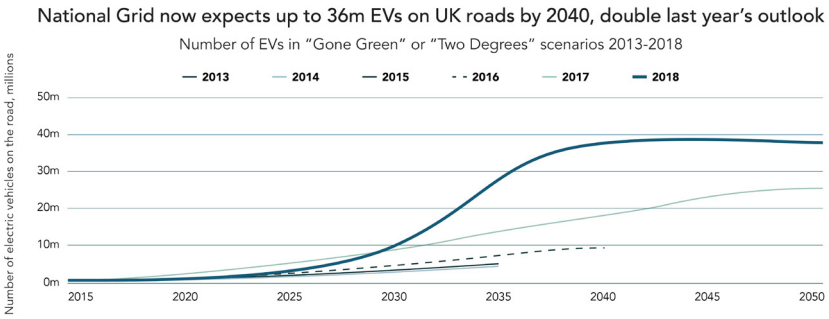
Transport

With the Government announcing the target of net zero by 2050 and banning the sale of fossil fuel vehicles by 2040, we are expecting to see a sharp uptake in the use of electric vehicles (EV), and other zero emission transport. Our most recent forecast for EVs predict there are currently 37,000 EVs across our region, which is set to rise to around 3,000,000 by 2030. We also predict price parity for EV and fossil fuel cars by 2022, which will further cause a step change in EV ownership.

Typically an average EV uses the same amount of power as a household over a year. This would see our distributed energy at least double as EVs replace typical combustion engine vehicles; meaning a huge change to the utilisation of our network and particularly the low voltage (LV) network.

Our network is key to enabling the rollout of EVs and charging networks within our licence area. We are predicting to see 217,000 chargers connected to our network by 2023, and we are committed to ensuring that we are an enabler to this, not a barrier. Therefore, we must understand consumer charging behaviour to ensure that we build new, and manage our existing, assets in a smart and suitable way to ensure everyone gets the charge they need.



Number of EVs on UK roads in National Grid scenarios between 2013 and 2018 – "Gone Green" or "Two Degrees, National Grid's Future Energy Scenarios

Currently we predict that many of our local distribution transformers would support one 35kWh charge every five days for each connected customer, which is around 150 miles range for most EVs. Currently our network is coping well with the uptake, but we will need to evolve both assets and network management as the proliferation of EVs continues.

We have delivered a number of EV projects including LV Connect and Manage and Electric Nation. From these projects we understand the impacts of domestic charging well and are now rolling out business as usual (BaU) solutions using this learning to plan the network and dynamically control charges. Areas we are now keen to understand are based around the public charging infrastructure and the 40% of customers who don't have off-street parking, where the majority of previous learning has centred.

What Government, industry and third parties are saying about this?

The Government's Carbon Plan set out the UK's objectives to reduce carbon emissions, with an 80% reduction achieved by 2050, which has been further built on with the net-zero 2050 agreement. Decarbonisation of transport will play a large part of this plan as transport currently produces a third of the UK's emissions.

The Government set a target in 2015 to "ensure almost every car and van is a zero emission vehicle by 2050", adding in July 2017, "it will end the sale of all new conventional petrol and diesel cars and vans by 2040". These targets have consistently been made more stringent with further announcements in 2018 reducing the previous 2050 aim to be achieved by 2040 and in line with the Road to Zero Strategy an aspiration for "at least 50%, and as many as 70%, of new car sales and up to 40% of new van sales being ultra-low emission by 2030" has also been set. It is clear that the propensity towards EV adoption is to continue and the needs of a suitable electricity network to facilitate this are now, more than ever, paramount.

Focus and priority areas

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Within the Road to Zero Strategy the Government sets out several ambitions for EV charging infrastructure including:

- Launching a £400 million charging infrastructure investment fund to help accelerate charging infrastructure deployment.
  - Taking powers through the Automated and Electric Vehicles Bill to ensure that chargepoints are available at motorway service areas and large fuel retailers;
  - That chargepoints are easily accessed and used across the UK;
  - That chargepoints are smart ready by giving Government powers to set requirements prohibiting the sale or installation of chargepoints unless they meet certain requirements;
- Ensuring homes built in the coming years are EV ready. It is intended that all new homes, where appropriate, should have a chargepoint available;
- Future-proofing our streets, with an ambition for all new street lighting columns to include charging points;
- Investing £4.5 million in the on-street residential chargepoint scheme until 2020;
- Ensuring local planning policies incorporate facilities for charging electric vehicles via the National Planning Policy Framework; and
- Consulting on amending Building Regulations to require relevant charging provision in new non-residential buildings.

We have also been actively involved in the EV energy taskforce which was set up to make suggestions and recommendations to Government and industry to ensure that the GB energy system is ready for and able to facilitate and exploit the mass uptake of EVs.

As well as Government and policy drive for EV adoption consumer influence is now shifting towards EVs with the Kia e-Niro taking 'What Car' of the year award 2019. What Car describe it as the first sensibly priced electric car that can fit into most people's lives. It provides a substantially longer range than almost all rivals without costing substantially more than traditional combustion engine alternatives.

Focus and priority areas

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Projects to date

We have a large portfolio of EV innovation projects and we have been and continue to be proactive in transferring the learning to BaU, supporting our customers in the connection of EVs now and in the future by shaping our EV Strategy. Some of our previous projects include:

Electric Boulevards

Our Electric Boulevard project set out to demonstrate the UK's first ever use of inductive charging infrastructure. It also tackled the issue of charging larger commercial vehicles, in particular buses. Working with Arriva, we converted one of their local bus routes to full electric, which included the use of inductive charging plates.

The project proved that inductive charging is a viable and efficient way to re-charge such vehicles, and proved to be extremely reliable. We also developed solutions to enable large inductive charging units to be connected to the low-voltage network. Previously it would have been considered necessary to have a high-voltage connection. This means that charging infrastructure can be connected cheaper and quicker than previously thought.

EV Emissions Testing (2016)

Our EV Emissions project was established to check the compliance of modern electrical vehicles. Electric passenger vehicles from all manufacturers on the UK market were being tested. The vehicles were cycled through a range of charging and discharging cycles through controlled conditions, with Harmonic and power quality measurements taken. Valuable insight was gained into the performance and compliance of vehicles with mandatory electrical emission standards. These results are informing the refinement of the engineering standards and provided comfort that the automotive sector is producing vehicles with set limits.

LV Connect and Manage

The LV Connect and Manage project has developed a solution to provide an emergency overload protection for the distribution network. This is a form of active network management. The solution will be deployed in areas with a high concentration of EVs, by deploying a domestic load controller box which communicates directly to the charger and substation monitoring.

We expect smart meters, suppliers and aggregators to provide products with time signals which will attract charging away from times of system peak. The LV Connect and Manage system is viewed as a last resort mechanism which would only be implemented when all other options have been exhausted.

Focus and priority areas

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Electric Nation

At its inception the Electric Nation project was Europe's largest domestic EV charging trial with 673 participants. The project will deliver learning on how electric vehicle customers charge their vehicles at home, and better understanding of their acceptance of smart charging. It is also producing a network assessment tool for our planning engineers to assess the most appropriate means of providing capacity.

It will additionally provide a longer term, more strategic view, of the overall implications for electricity network infrastructure of electric vehicles becoming mainstream. These results include knowledge on the frequency of charging events (typically less than twice per week) and the amount of energy consumed each time (approximately 35 kWh). The project has also confirmed a consumer willingness to accept smart charging. Further we have proved that the technology to support such a solution is available and understand the degree to which we can rely upon it for network management purposes. The final phase of the project tested consumer attitudes to time-of-use energy tariffs and the degree to which they can be relied upon to shift peak electricity demands away from the traditional teatime evening peak.

In addition to gaining an improved understanding of the potential for smart charging, the project will also inform our planning standards. In particular future assessment of diversity and maximum demand.

Problem statements and challenges

It is clear that the need for fast and well located EV charging infrastructure is paramount to the continuing take up of EVs and we are committed to ensuring that our network facilitates this and that our innovation programme demonstrates and shapes what is possible in the near future. To that end our current priorities focus on the three challenges below.

On-Street Charging Solutions

As over 40% of people do not have access to off-street parking, such as driveways, in order to facilitate the update of EVs the need to develop suitable solutions to enable large-scale on-street charging is required.

Key for us is how to provide this capacity in often dense urban environments, where space for additional assets is limited and the need for additional assets is often required. We understand that managing charging and commercial efforts will support elements of this, however, we are particularly interested in how to appropriately facilitate additional network capacity for charging and working with others responsible for delivering EV charging infrastructure, particularly local authorities.

EV Filling Stations

Although we expect many electric vehicles to be charged at home and at the workplace, as some 40% of vehicle owners do not have driveway or designated parking, en-route charging will also likely be an important service for owners of EVs. The connection of multiple fast and rapid chargers at a single location can require a substantial capacity to be provided. This can be costly and / or take time to deliver.

Projects in this area should look to explore a number of innovative solutions for the provision of network capacity for electric vehicle charging stations. This will include locations adjacent to major trunk routes as well as locations such as supermarkets and city ring-roads. Options we would expect to be investigated include increasing the voltage level at the point of connection, DC rather than AC connections, inclusion of co-located batteries and poly-phase options.

Electrification of Freight

Key to decarbonising the UK will be the de-carbonisation of freight and Heavy Goods Vehicles (HGV). Whilst other zero emission engines such as hydrogen will have their place in the freight industry, so will electric HGVs. Understanding how these vehicles will charge is key, as it is likely that they will not have enough battery capacity for destination charging alone.This may require investigation in to such systems such as wireless dynamic charging or catenary wire. It should also be considered that ports and shipping will be moving towards electrification, of which we would like to understand the impact better.

More widely we are looking to understand how the electrification of taxis and vehicles as a service, like car clubs, will need to be facilitated and impact and provide value to the network.

Focus and priority areas

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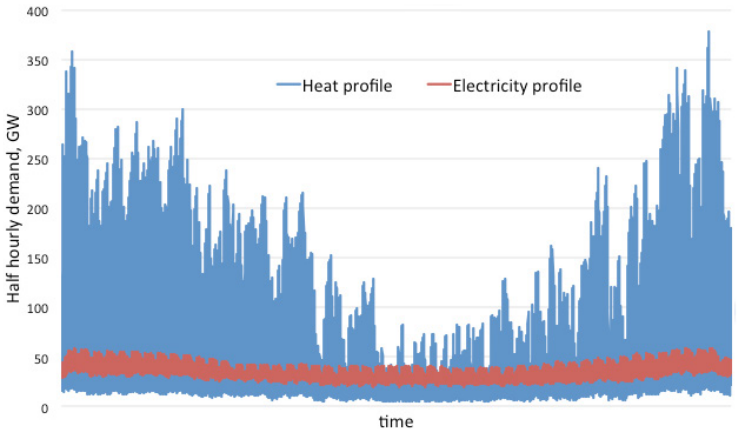
Heat

The energy required in providing heat in the UK is significant and is currently largely provided by gas; however, as we work towards net-zero by 2050 decarbonisation of heat will play an important role. This is likely to mean that a large proportion of heating provided by gas will transition to electricity through the use of ground and air-source heat pumps. The figure below shows the relative scales of gas and electricity demand over the year, predominately driven by heating requirements over the winter period. This highlights the sheer scale of energy required within the UK to provide heat to UK homes and industry and the challenges and opportunities for increasingly providing this heat from electricity.



Half hourly heat and electricity demand profiles over a 12 month period (January to December)

The need to innovate for the inclusion of significant heat demand on the electricity network is required to effectively and accurately understand how the existing system can be utilised as far as is possible and to ensure that reinforcement, where required, is optimised to deliver the projected heat load. Understanding these elements and developing methodologies and solutions now is key to us supporting the decarbonisation of heat.

What Government, industry and third parties are saying about this?

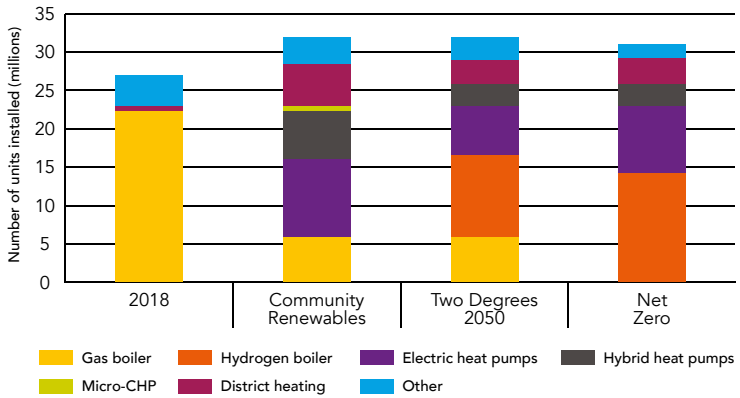
The majority of energy required for heat is currently provided by gas and transported in the relevant gas networks. Around 22 million UK homes are gas heated with average energy demands of 2.8MWh/year for electricity and 14.6MWh/year for gas. The remaining four million homes are not connected to the gas grid and use either oil, liquid petroleum gas (LPG) or electric heating. Of these, 3 million are electrically heated and their average energy demand is approximately 11.8MWh/year. Where homes already use electricity for heating, a large number of these homes are already subject to demand side management via economy 7 tariffs, pushing the electrical load overnight, typically a time of low electricity demand.

With the requirement to decarbonise the UK economy, and progress being seen in electricity generation and transport the question of heat has become a hot topic. This has been sharpened recently with the government's announcement in March 2019 that gas boilers would be banned from new UK homes by 2025 and the further commitment to net zero carbon by 2050.

The challenge of decarbonisation of heat is large due primarily to the sheer volume of energy needed to provide the required heat. Going forward, it is expected that the provision of heat will come via a number of technologies. These include: full electric heat pumps (air source and ground source), hybrid heat pumps, hydrogen heating, combined heat and power, district heating schemes and legacy gas boilers. This will need to be coupled with significant improvements to the thermal efficiency of UK buildings from effective insulation etc.

The expected proportions of each technology differ depending on the scenarios anticipated and are illustrated below from data taken from National Grid's Future Energy Scenario work.

Focus and priority areas



Residential heating technologies in Two Degrees, Community Renewables and Net Zero – National Grid, Future Energy Scenarios, July 2019

In order to achieve the ambitious net zero targets proposed by government, it is anticipated that there will be no homes using gas boilers by 2050 and the more widely the role of hydrogen will have to increase significantly.

The timing of change is dependent on the scenario considered, which in turn is linked to the development of detailed government policy. However, it is generally acknowledged that the decarbonisation of heat will lag that of transport with significant changes seen in the more onerous scenarios in the 2030s.

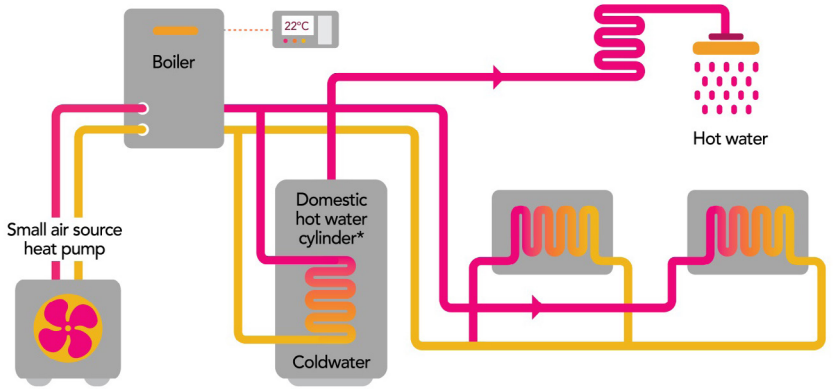
We have conducted a number of investigations into the impact and challenges of the decarbonisation of heat on our network. These include modelling of decarbonisation through our Distribution Future Energy Scenarios and associated Shaping Sub-transmission reports, looking at the geographic distribution of heat pump growth and the resulting impact on our network.

Projects to date

We have undertaken a number of heat projects as part of our innovation programme, which has ensured we understand a broad range of options of how energy will be required to provide heat moving forwards - the projects are briefly described below:

FREEDOM

The need to decarbonise heat means that much of the future heating demand will transfer to the electricity network, potentially creating significant peak demand increases on the system. FREEDOM, in partnership with Wales and West Utilities (WWU) installed 75 hybrid heat pumps within domestic properties in South Wales. The hybrid heat pumps used electricity when there was sufficient capacity on the system to do so and switched to gas at the point the capacity on the electricity system had been reached. This project demonstrated the value of a hybrid solution to avoid the need to reinforce the electricity network whilst supporting a significant decarbonisation.



Hybrid Heating System - FREEDOM project.

Focus and priority areas

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Hydrogen Heat and Fleet

WPD contracted Delta-ee to perform a research study on the feasibility of using hydrogen electrolysers as a controllable load to help with increasing renewable electricity output. The project delivered significant learning, which focussed on the utilisation of the hydrogen having to be significant in order to ensure the investment in an electrolyser is financially viable. The project concluded that the most overall cost effective scenario was to pay for a network upgrade. The most cost effective hydrogen scenario was to use the output to enable a pure hydrogen fuel cell vehicle fleet, due to current fuel costs.

MADE

The Made project is a research study with the objective to better understand the feasibility of managing and aggregating multiple energy assets (EV, hybrid heating system and solar PV) affordably through the use of advanced algorithms to unlock value from energy markets. Through customer research we will also evaluate consumer trust in new technology that is taking greater levels of EV charging, heating system control, and design appropriate user interfaces and information systems to help drive adoption. The partners in this project are PassivSystems, Wales & West Utilities, Everoze, Imperial College and Delta-ee. The work completed so far includes an analysis of what the customers think of the MADE concept which is currently being documented.

Problem statements and challenges

There is still much more work to be done to help us prepare for the decarbonisation of heat. Our primary interest in heat is to understand the impact on our network of the upcoming transition. This should help us accommodate it in an efficient and cost effective manner. This starts with developing a better understanding of usage patterns and profiles for heat pumps of all varieties as well as investigating what flexibility exists or can be added to heating demand. This focuses on how we can deliver the customer requirements for heat and comfort in the lowest cost manner to the GB system and is expected to differ wildly across the range of demographics and housing stock within the UK. Specific areas of heat we would like to understand and innovate around are described below.

Heat Pump Profiles

As heat is increasingly provided through electricity, moving away from gas and oil, the effect on the distribution network, when heat pumps are installed in significant quantities in dense areas is still largely unknown, in terms of diversity and magnitude of usage.

Projects in this area should focus on the development of improved load profiles for all types of heat pumps (air-source, ground-source, hybridisations and others). A wide range of sensitivities will need to be understood to reflect the variability of different and interrelated systems and it is expected that this will involve a large-scale network connected heat pump trial to develop advanced models and scenarios.

Flexibility from Heat

As heat becomes a significant part of the electricity usage on the distribution network we are keen to understand how flexibility of heating load can be successfully achieved as well as the associated benefits to enable load shifting, reducing the impact on the distribution network and the wider system.

It is likely that this project will focus on developing cost effective ways of adding flexibility within heating load. This could be as simple as adding hot water tanks or improving insulation, but should provide effective means of moving demand away from peak times and reducing system costs. Of particular interest is commercial models that enable diversity of heat demand, whist offering a benefit to customers and a ensuring the heat service required by customers is still delivered.

Facilitating Hydrogen

The decarbonisation of the gas network could well mean the use of hydrogen in the existing gas system, where the most sustainable method for producing hydrogen is likely to be through electrolysis.

The use of electrolysis as a mechanism to produce hydrogen requires significant electricity to facilitate. How we effectively and efficiently provide connections and energy to hydrogen production services to support the decarbonisation of the gas network will need to be solved, building on previous work from our Hydrogen Heat and Fleet project and others.

Focus and priority areas

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Data

The provision of accurate and reliable data is paramount to facilitating the operation of a Distribution System Operator (DSO). The increased granularity of data more widely is vital to operating and managing effectively a distribution network, from understanding when and where to invest to determining optimal flexibility services and solutions for customers. As highlighted in the Energy Data Task Force report, companies are to be recognised for innovative mechanisms for using data to provide greater infrastructure visibility and support productive collaboration. This means that the level and depth of data made freely available by all licence network operators will have to significantly increase and we are committed to leading the way in terms of data available for third parties to understand our network and equally utilise advanced analytics to further inform our system knowledge.

What Government, industry and third parties are saying about this?

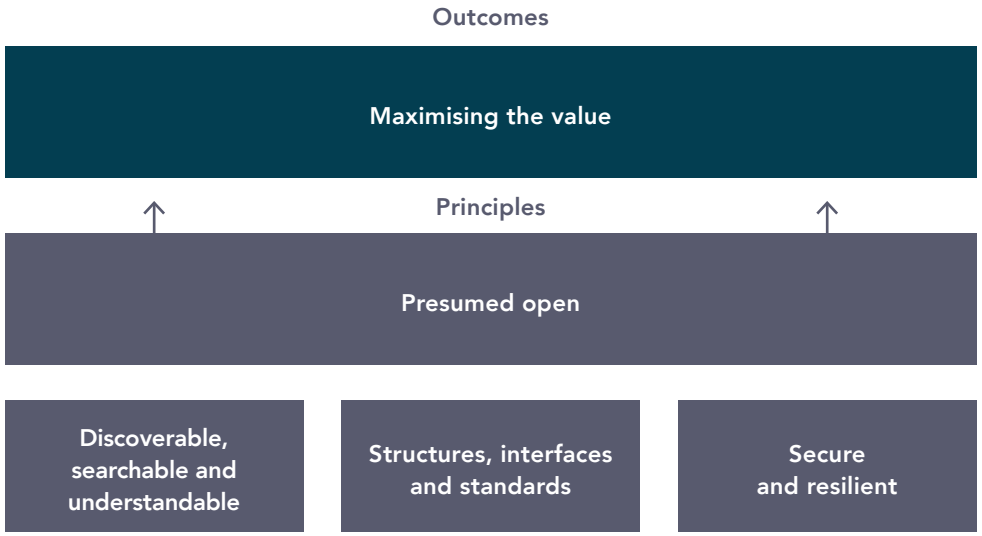
The Energy Data Task Force published A strategy for a Modern Digitalised Energy System in 2019, an independent report sponsored by BEIS, Ofgem, and Innovate UK. The report sets out five recommendations that aim to deliver the most productive, efficient and cost-effective use of assets, enable the creation and deployment of the most innovative services, and support participation of all actors, both large and small, through better understanding and insights into the opportunities and risks of the rapidly decarbonising and decentralising system. These recommendations are:

Recommendation 1 - Digitalisation of the Energy System

Government and Ofgem should direct the sector to adopt the principle of Digitalisation of the Energy System in the consumers' interest, using their range of existing legislative and regulatory measures as appropriate, in line with the supporting principles of 'New Data Needs' 'Continuous Improvement' and 'Digitalisation Strategies'.

Recommendation 2 - Maximising the Value of Data

Government and Ofgem should direct the sector to adopt the principle that Energy System Data should be Presumed Open, using their range of existing legislative and regulatory measures as appropriate, supported by requirements that data is 'Discoverable, Searchable, Understandable', with common 'Structures, Interfaces and Standards' and is 'Secure and Resilient'.



Recommendation 3 - Visibility of Data

A Data Catalogue should be established to provide visibility through standardised metadata of Energy System Datasets across Government, the regulator and industry. Government and Ofgem should mandate industry participation though regulatory and policy frameworks.

Focus and priority areas

Recommendation 4 - Coordination of Asset Registration

An Asset Registration Strategy should be established to coordinate registration of energy assets, simplifying the experience for consumers through a user-friendly interface in order to increase registration compliance, improve the reliability of data and improve the efficiency of data collection.

Recommendation 5 - Visibility of Infrastructure and Assets

A unified Digital System Map of the Energy System should be established to increase visibility of the Energy System infrastructure and assets, enable optimisation of investment and inform the creation of new markets.

Implementing these recommendations will optimise energy system management using artificial intelligence and machine learning to refine prediction and further automation. In turn, this will:

- Reduce System costs by utilising data on asset conditions and their operation to create evidence-based forecasting for future asset behaviour to derive the most economically efficient deployment of smart technologies or acquisition of new assets based on future needs. Additionally, the transparency of system asset and operational data will cause new markets to emerge with new participants, driving better price discovery;
- Improve system stability by increasing the openness of data-flows regarding the actions of existing and new actors, their capabilities and potential risk to system stability. With data transparency and openness, risk can be much better understood and mitigated through coordinated and collaborative actions; and
- Accelerate progress to climate targets by optimising the rate of deployment and extend the energy system can use LCTs.

Projects to date

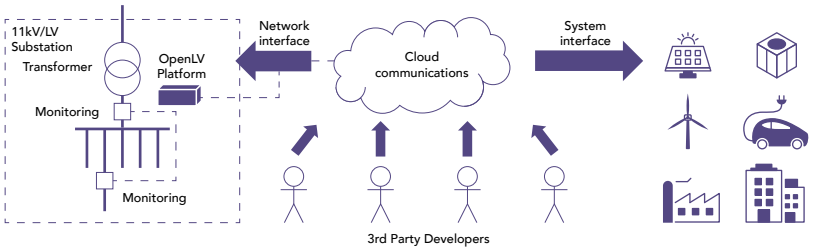
Numerous innovation projects as part of our portfolio have involved the creation of new datasets, such as monitoring to understand the operation of the LV network to a level and granularity not previously possible. Some projects have specifically focused on creating additional value and benefits from data, such as:

Common Information Model

This project aimed to test the benefits of having a network model in Common information Model (CIM) format in terms of software adoption and integration, and if using CIM simplifies the process of adopting a different planning tool, supporting a suite of niche planning tools, or creating interfaces between systems. The Integrated Network Model capability was built and data for a selected WPD operating region was assembled into an actual working model. This model was loaded into third party software and validated and this also showed how data can be exchanged using the CIM format. The decision was made to extend the initial system and model and roll this out into the business.

OpenLV

This project involved developing a common, low-cost platform that can facilitate the deployment of different apps to suit the needs of the network, its customers, and the broader supply chain using monitoring data. The project illustrated the appetite for third parties to develop and realise their own use cases with our data, successfully recruiting over thirty third parties to develop apps and conduct research including seven community groups.



Focus and priority areas

LCT Detection
WPD undertook this project with Electralink and IBM to identify whether it is possible to automatically locate the installation of new electric vehicle charging equipment through the analysis of metering data. Using artificial intelligence techniques our project partners evaluated the potential for such a solution together along with any regulatory and privacy controls which may be necessary. The project showed that interpreting this data effectively can provide us and customers significant benefits.

VM Data
The Virtual Monitoring Data (VM Data) project focuses on the ability to harness structured and unstructured data from ElectraLink, combine it with cognitive analytics, and use this to develop a cost-effective virtual monitoring capability across our network. We will therefore monitor and manage our local electricity networks more effectively and defer conventional reinforcement costs.

Problem statements and challenges

We are committed to facilitating access to existing and future data sets – this will enable greater visibility of our network assets (current and planned operation) as well as engaging with third parties to offer service and solutions based on data, and generating increased data to facilitate the future needs of the network and customers – utilising additional monitoring and analytics to increase network visibility and understanding.

New Data
The amount of and types of data being collected by non-network parties is ever increasing (e.g. demographic, environmental etc.), how this data can be used to support our technical and commercial decisions in the short, medium and long terms is of significant interest.

We are looking for parties to assist us in identifying this data and develop novel ways of using it, alongside our existing datasets, which will drive increased benefit for our network and its customers.

Existing Data
As part of existing operations and specifically innovation trials we have collected vast amounts of disparate operational and project data from previous activities. The autonomous cleaning, tagging, and cataloguing of these datasets that are often in different formats with differing data points could be beneficial to fully realise its potential. Additionally, the large-scale processing of this existing raw data has the potential to facilitate the development of additional products and services beneficial to the network and its customers.

A project, or number of, utilising this data to provide increased network knowledge, such as condition, failure prediction, operation and utilisation information as a service could provide significant network benefit.

Openness
The need to increase the extent to which our existing data is shared, discoverable, searchable, and understandable is critical to ensure that we maximise third party access and development to the benefit of customers and the network alike.

Projects in which we can promote this, be that by cultural change, or novel methods to negate privacy or security issues are of particular interest.

Focus and priority areas

Other areas to support our priorities

As well as the direct innovations to provide solutions in our key focus and priority areas we are of course interested in wider innovations, both technically and commercially focussed to drive innovation in the areas of transport, heat and data to support the low carbon transition. Examples of these innovations and solutions are:

Electrification and decarbonisation of district heating – potentially looking at the use of e-boilers and community level hydrolysis on a wide-scale and how this can positively support the wider distribution network through flexibility and understand the infrastructure requirement to support this uptake.

Storage – whilst we are not able to fund the procurement of storage technologies under the NIA and NIC mechanisms, we are keen to understand how we interact and leverage most value from distribution network connected storage, providing different functions we require now and in the future.

Flexibility and energy markets and services – what near and longer term markets and services are required to drive value from connected assets to specific communities and all customers through network and system benefit.

Transmission and distribution / whole system co-ordination – the need to optimise solutions between the distribution network and transmission services, and wider gas networks, is now paramount to deliver efficient and effective solutions to customers. This covers both technical solutions around optimised investment on the system and commercial solutions around flexibility services.

Third party engagement

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Developing and delivering innovation projects for the future of energy in GB involves a wide range of parties to ensure suitable solutions. We understand that the way we operate the network, engage with customers, use flexibility as a service and work as a business to support the decarbonisation of electricity, and more widely energy, is changing and that third parties, both with a history in the energy industry and not, have a significant role to play in the innovation and transition required.

We have a strong history of pro-actively engaging with third parties, either through third party calls for project ideas or more organically through the co-creation of projects, such as FREEDOM with PassivSystems and Electric Nation with EATL.

Through our third party NIA calls we have or are delivering nine projects with a total value of nearly £6.9m. In 2018/19 alone as part of our NIA programme, where we delivered 21 projects, 96% of the total spend [£4.55m] was with third parties, where an average of third parties involved in each project was over two.

We're committed to increasing the level of third party interaction further, with a particular focus on third party originated projects on our key focus and priority areas, through our individual NIA calls and the NIC electricity and gas collaborative call managed through ENA.

Our approach

We have to date run three NIC calls, two individually and the last collaboratively with all other LNOs through ENA, which has seen five of the seven bid submissions be third party project proposals. These proposals have focussed on our innovation themes of assets, customers and operations as well as the five innovation themes in the ENA Electricity Innovation Strategy.

We are committed to continuing with ENA's collaborative call for NIC proposals as well as co-generating ideas with organisations, principally on our current focus and priority areas.

Our previous NIA calls have either focussed on specific needs from our Innovation Strategy or a wider industry need, however, moving forwards we will use this Forward Plan to outline the key areas for innovation and our current innovation needs, highlighted in the problem statements and challenges section.

The following section will outline the timings for our future calls.

Future Calls

Our future calls will all be made available on ENA's Collaboration Portal, Achilles and our innovation website to ensure as wide an engagement as possible. We are always keen to receive project proposals from third parties and particularly new entrants with disruptive innovations to provide step change solutions to deliver the future outcomes to shape the operation of a DSO and facilitate the low carbon transition.

It is critical that proposals to our calls adhere to the Ofgem NIA and NIC Governance and we'd encourage organisations to review these prior to submitting a proposal, specifically in terms of the criteria to enable funding and the intellectual property conditions to ensure value is delivered to customers.

Third party engagement

NIA 2020

In 2020 we plan to run two NIA calls in January and April.

Jan-2020
This call will focus on the Existing Data challenge as part of the Data priority. We are particularly interested in the use of our existing datasets available through our Energy Data Hub to provide increased network knowledge, potentially as a service, around fault and failure prediction.

The call will be released on 6th January and remain open until 14th February. Further timelines will be advised on release of the call.

April-2020
This call will focus on all the problem statements and challenges outlined in this document, looking for a range of projects from small-scale feasibility studies to large demonstration projects.

NIC 2020

As in 2018 and 2019 the call for NIC project proposals will be managed and coordinated by ENA with the call released in September. Both the gas and electricity industry strategies are currently being updated (for release in March), where there will be greater correlation between gas and electricity themes to further engage and encourage wholes system NIC proposals. Projects that meet one of our key focus and priority areas and have a clear alignment with an ENA innovation strategy theme will be of most interest.

WESTERN POWER DISTRIBUTION INNOVATION TEAM

Find out more about all our projects, request access to project data and view upcoming innovation events at:

www.westernpower.co.uk/innovation

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