The Voice of the Networks

Open Networks Project
2019 in Review

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Foreword

This has been a year of change, delivery, and innovation in the Open Networks Project. Renewed focus on climate change and the new Net Zero targets highlight why it is so important to deliver a smarter, greener energy system for the public, and the successful outputs from the Open Networks Project are a key vehicle in this transition.

David Smith
Chief Executive
Energy Networks Association

Completing its third year, the Open Networks Project has seen major progress in delivering the smart grid including:

- Delivering a commitment to open and expand local markets for flexibility services
- Securing ground-breaking industry agreement on continuing the transition to Distribution System Operation (DSO)
- Increasing the provision and transparency of data through a System Wide Resource Register
- Supporting Net Zero by reforming the connections processes for customers looking to connect clean energy to the distribution network
- Bringing gas and electricity networks closer together for the first time in a whole system approach

This year saw Open Networks reach a major milestone by agreeing a pathway towards smarter grid operation. There was clear consensus across the sector on moving towards a Future World where all operators work closer together – getting the cleanest energy to where it's needed most, more efficiently.

Our work on Flexibility has been a major focus this year, and from the initial commitment made late last year, we now see all network operators going to market for flexibility and providing transparency on future opportunities for customers.

The new flexibility commitment: Our Six Steps for Delivering Flexibility Services outlines how local markets for flexibility will work in practice, ensuring they are open and transparent for all to participate in. Open Networks is already reporting on how these are being implemented by network operators.

2019 also saw Open Networks take an industry-leading look at identifying opportunities for more cost effective network investment and operation between the gas and electricity networks. Open Networks has become a natural home for industry collaboration, working with a wide range of stakeholders.

Making sure that we hear the views from as many stakeholders as possible continues to be at the heart of the Open Networks Project, and this year we grew our reach through the Advisory Group, public consultations, and webinars. We also made a new commitment to community energy groups with the announcement of a dedicated series of Community Energy Forums to be held around the country throughout 2020.

We have made great progress throughout 2019 and plan to keep the momentum going through 2020 and beyond. Next year will see further progress made on harmonising flexibility markets to make it easier than ever for customers to offer services, a DSO implementation plan to set a pathway to get to the Future World of energy, and bringing all stakeholders along with us in our new Community Forums. Working with stakeholders from across the sector will help drive forward the Open Networks Project's relentless focus on innovation to deliver the smarter, Net Zero energy system the country needs.

2019 highlights
Themes and publications

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
Opening Flexibility Markets						Flexibility in GB webpage live Flexibility Commitment Next Steps published
DSO Transition			Future Worlds Impact Assessment Consultation			
Data Transparency				ENA signposting webpage for DER data		System Wide Resource Register proposals agreed
Whole System Efficiencies						Consolidated D-FES schedule online
Stakeholder Engagement		End of Year Report Launch Event	Advisory Group Meeting	Flexibility Workshop	Advisory Group Meeting	
Project Milestones	Launch of Workplan and End of Year Report					First Monitoring Implementation Report'

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	Q1 2020
Flexibility Services Consultation • Flexibility Market Principles • Procurement Processes • Common Contracts				Convergent Branding for four DSO Active Power Service		Good practice guide on managing operational conflicts and co-optimisation of Flexibility published
Published Flexibility Figures						
DSO Transition Path concluded		Unintended consequences & Conflict of interest log published		DSO Innovation Trials Mapping Report Published		
				ENA Data Working Group established		System Wide Resource Register goes live
FES published with regional input				Planning data exchange proposals published	D-FES & FES Building Blocks Whole Energy System Opportunities	Workstream 4 Final Report Regional Development Programmes Report Published
Advisory Group Meeting Community Roundtable	Community Roundtable	Advisory Group Meeting	Low Carbon Networks & Innovations Conference	Advisory Group Meeting		
Interactivity and Queue Management Public Consultation					Monitoring Implementation Update	

2019 highlights
In numbers

98
Total responses from across the industry to our 2019 consultations

3
New Community Energy Forums announced for 2020

21
Wide reaching stakeholder events

95%
Open Networks products concluded in 2019

6
Next steps for flexibility committed to

10
DFESs published

16
Flexibility tenders run by the Distribution Network Operators

947MW
Of flexibly tendered out in 2019 for DSO Services

1333
Innovation opportunities mapped on the Route to DSO

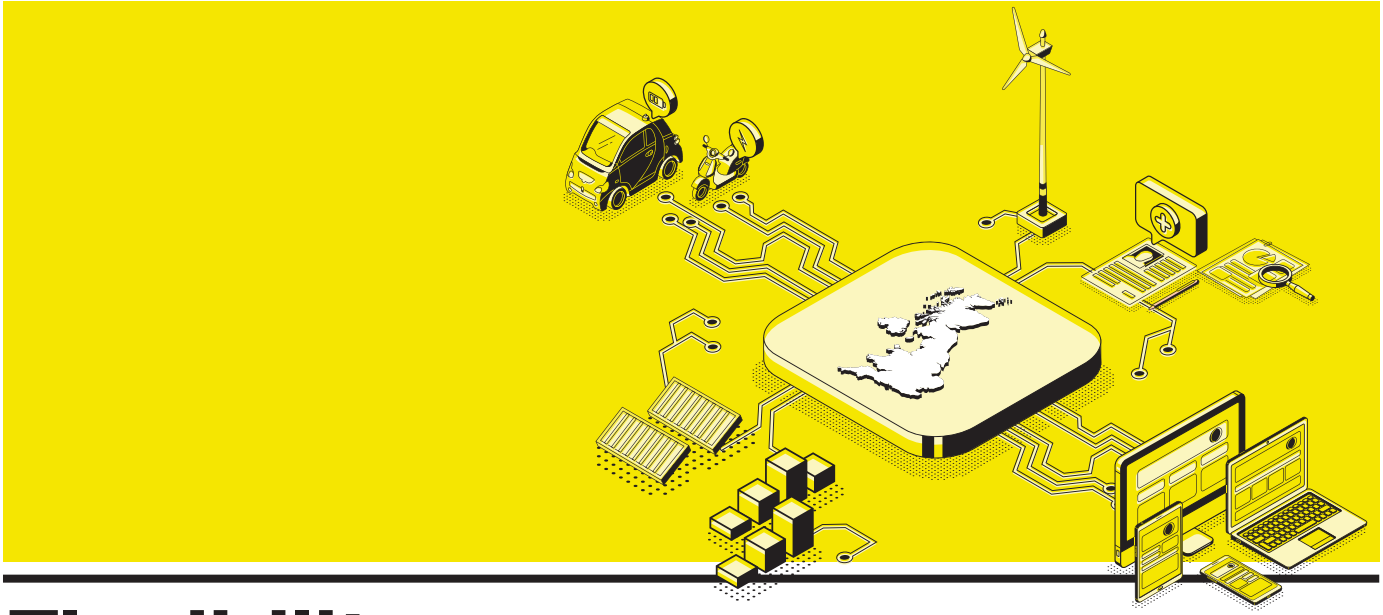
Delivering a commitment to open and expand local markets for flexibility services

Securing ground-breaking industry agreement on continuing the transition to Distribution System Operation

Increasing the provision and transparency of data through a System Wide Resource Register

Supporting Net Zero by reforming the connections processes for customers looking to connect renewable energy

Bringing gas and electricity networks closer together for the first time in a whole system approach



Flexibility
Delivering on our commitment

The networks recognise the importance of flexibility and the benefits to the public that a smart grid can bring. In June 2019, all six of Britain's DNOs, National Grid ESO, National Grid Electricity Transmission, the Transmission Owners and GTC came together and signed up to the ENA Flexibility Commitment: Our Six Steps for Delivering Flexibility Services.[1]

The landmark commitment provides clear market guidelines for customers wishing to take advantage of the opportunities these markets will offer. By providing flexibility services to the networks, customers can help Britain decarbonise its electricity supply by providing clean energy as well as taking advantage of the additional revenue streams.

ENA has provided the first report on how these are being implemented by network operators and we will continue to report on this twice a year to ensure maximum transparency for customers in these markets[2].

A new, specific focus on flexibility

The detail underpinning the delivery of local markets for flexibility services has been driven through a new, dedicated workstream on Flexibility Services in 2019, which seeks to make the experience for customers providing clean energy to the grid as seamless as possible.

Providing a uniform experience for customers is key for easier navigation of the market. This year Open Networks has been standardising the four active power services agreed previously to bring these real benefits to customers.

Responding to our stakeholders, a common contract across all networks for flexibility is being developed with a set of standardised terms and conditions. Rather than relying on good practice as previously planned, the networks have started drafting the legal text which will be shared with industry in January 2020 for use from Q2, making accessing flexibility markets as easy as possible.

Flexibility in GB webpage

Liquidity in these local flexibility markets is critical to getting as many people as possible providing clean energy and earning revenue from these markets. Launched in summer 2019, ENAs new Flexibility in GB webpage is a single access point for customers wishing to enter into Britain's local flexibility services markets. The page provides information on flexible connections, makes updated GB flexibility figures available every six months, and provides a timeline of activity for exactly when services are being procured for each DNO.

Links to reports

1. http://www.energynetworks.org/assets/files/ENA%20Flexibility%20Commitment%20Our%20Six%20Steps%20for%20Delivering%20Flexibility%20Services.pdf
2. http://www.energynetworks.org/assets/files/ON-PRJ-Monitoring%20Implementation%20-%20December%202019-PUBLISHED.pdf

Defining our Future World of Energy

A route to Distribution System Operation

Industry and stakeholders came together and agreed on a shared vision outlined in ENA's Future World Impact Assessment report. Led by independent economic consultants Baringa, the Impact Assessment tested the relative costs and benefits of the Future Worlds, alongside other factors such as degrees of complexity and decarbonisation.

In a milestone decision, stakeholders agreed that closer coordination between Distribution Network Operators (DNO) and the Electricity System Operator (ESO), incorporating price driven flexibility, was the DNO's best place to start the vital transition.

The path chosen offers greatest flexibility and scope for further innovation while allowing new markets to be opened as quickly as possible. Britain's network companies are proven in their ability to successfully deliver risk management, innovation, performance and value for money. By working towards a Future World that has a closer relationship between DNOs and the ESO, networks can be managed in a way that continually brings benefits to consumers.

The networks and the ESO have taken this position and put it at the heart of their strategies, using it as a core assumption for their RIIO-2 business plans for the next five years. The DSO Implementation Plan, due for publication in the summer 2020, will describe how the networks will deliver the eight key DSO functions.

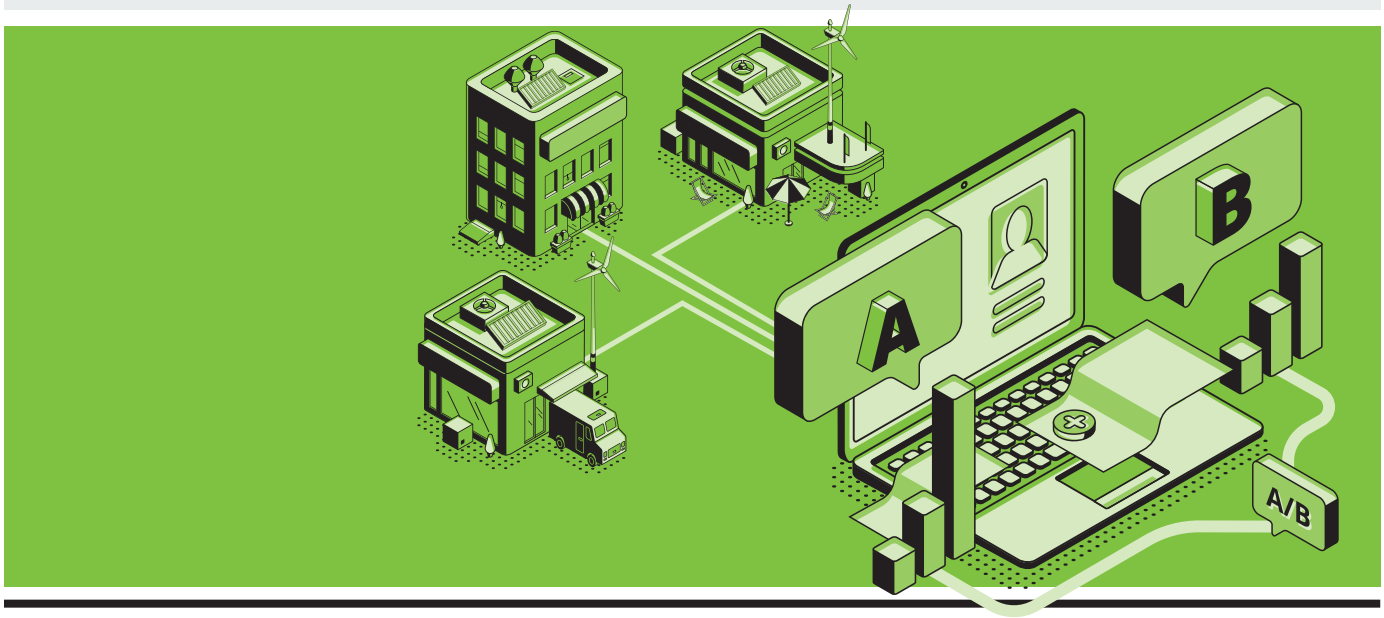
Conflicts of Interest and Unintended Consequences[3]

Building on the work of the Impact Assessment and from industry trials which have been testing these arrangements, Open Networks has been looking to further understand and investigate conflicts of interest and unintended consequences, and identify appropriate mitigation measures.

Working extensively with stakeholders and our Advisory Group, this year a comprehensive risk log was published, and mitigating action is being advanced with appropriate owners, including Ofgem, BEIS, and network companies. Stakeholder input has been incredibly important during the development process of this product, and this live risk register will be updated by the product team on an ongoing basis, and all stakeholders are invited to contribute.

Link to report

3. http://www.energynetworks.org/electricity/futures/open-networks-project/workstream-products/ws3-dso-transition/products.html



Improving distribution connections for customers

Interactivity and Queue Management

Seeking to deliver against a key part of the government's Smart Systems and Flexibility Plan, the Open Networks Project set out a minded to position to make it easier, quicker, and clearer for customers to connect to the grid, including those offering flexibility.

Application Interactivity and Connection Queue Management is a fundamental part of how our future smart grid will operate. Allowing network companies to prioritise flexibility depending on need will alleviate constraints on the network, enable more customers to connect, and secure the energy we rely on every day.

We will develop further detail in Good Practice Guides and an implementation timetable from agreed principles for:

- The Application Interactivity 'conditional' process
- Promoting flexibility in the connection queue where it frees capacity for others (action 1.6 of Smart Systems and Flexibility Plan)
- Queue management, milestones and specific exceptional circumstances where milestones may be relaxed

Improvements to Connections Queue Management

Example of how Flexibility could be promoted in the connections queue, limiting the need for reinforcement.

Order	Project Name	Capacity	Connection	Cumulative Delay	QM Status
NO REINFORCEMENT					
1	A	50	2020	3 Months	Work In Progress
2	B	10	2022	2 Months	Work In Progress
3	C	30	2021	0 Months	Work In Progress
4	D	10	2023	0 Months	Work In Progress
REINFORCEMENT REQUIRED					
5	E	50	2024 (2022)	0 Months	Work In Progress
6	F (Flexibility)	30	2024 (2022)	0 Months	Work In Progress
7	G	30	2024 (2022)	0 Months	Work In Progress

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6	G	30	2022	0 Months	Work In Progress
REINFORCEMENT REQUIRED					
7	E	50	2024 (2022)	0 Months	Work In Progress

Whole Electricity Systems

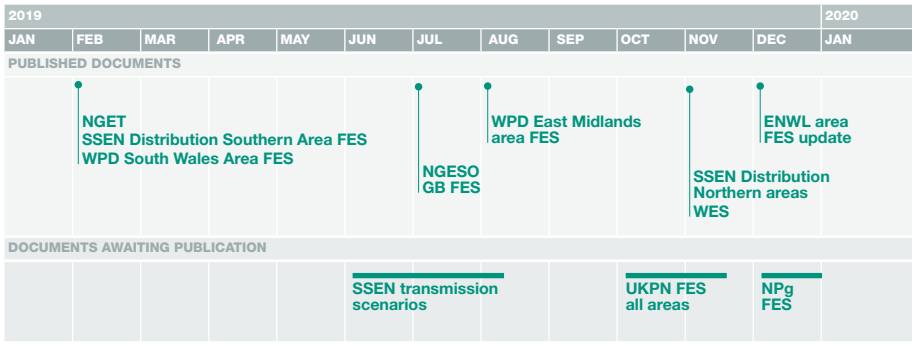
Building Whole Electricity System Future Energy Scenarios

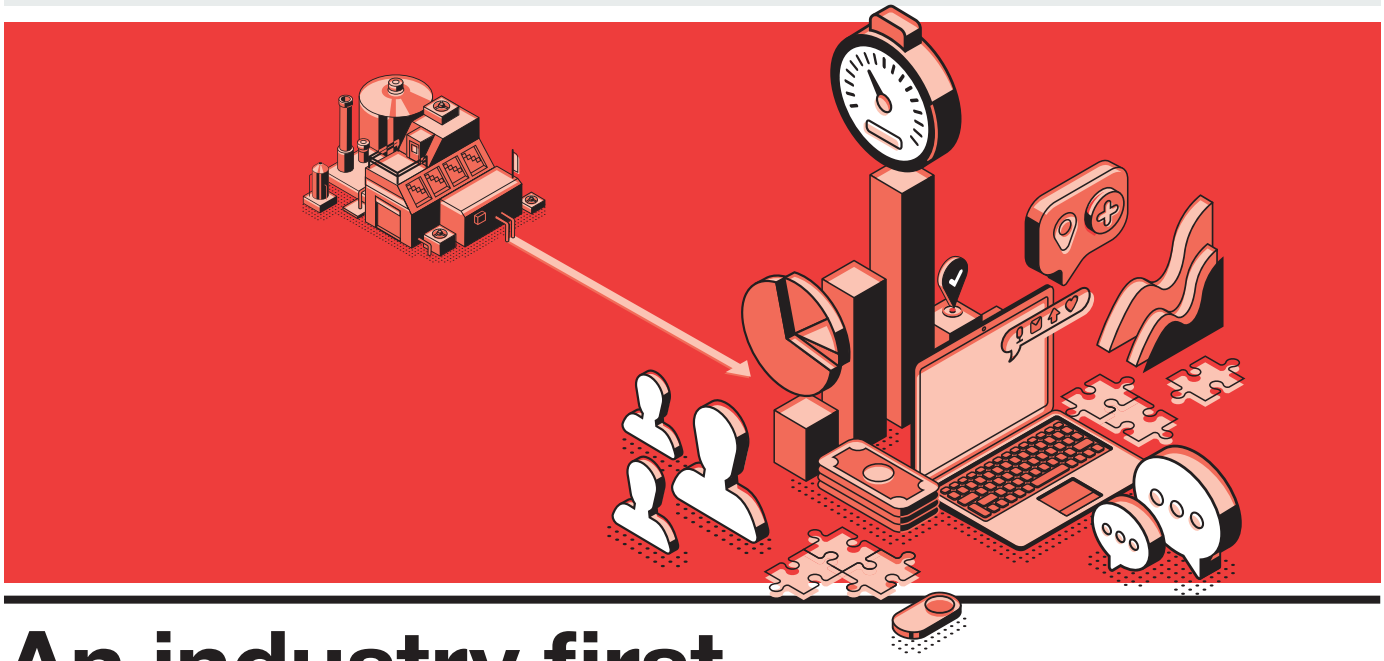
The National Grid ESO's Future Energy Scenarios (FES) describe the potential options and scenarios for energy in Great Britain. Open Networks has delivered common building blocks to ensure consistency across national and regional markets in the ESO FES and DNO Distribution FES publications respectively. This year we improved the FES process, and plan to make further improvements in 2020 by delivering additional regional data inputs for the DNOs.

Change was made to improve the use of regional data in the National Grid ESO's 2019 Network Options Assessment process to consider regional data needs in the investment planning process and further improvements have been identified to add into the 2020 process.

We have proposed an enhanced level of planning data exchange between network companies and are now pressing ahead towards implementation by raising the appropriate Code Modifications into industry governance. As the penetration of DER on DNO and IDNO networks increases it is vital for the efficient and coordinated development of those networks, and that of the transmission system, that the impacts are fully understood under multiple demand scenarios.

2019 Future Energy Scenario Publication Timeline





An industry first
Expanding to Whole Energy Systems

Created in response to stakeholder feedback at the beginning of 2019, the Whole Energy Systems workstream became the first of its kind to consider efficiencies across electricity and gas networks. ENA and The Open Networks Project has become a natural home for network collaboration and working directly with stakeholders in the workstream. Significant progress in building the foundations for whole systems thinking and working in the future has been achieved.

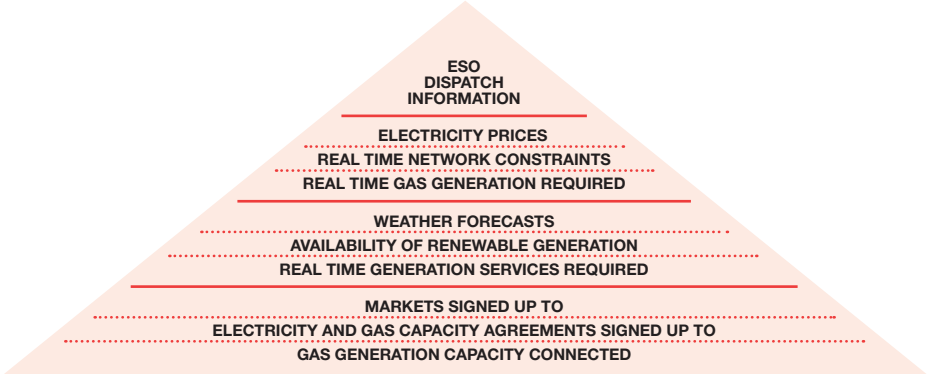
Real Time Operations and Forecasting

The Whole Energy Systems workstream identified a set of prioritised opportunities for sharing data between gas and electricity networks:

- Improved data sharing
- Sharing information on managing network constraints better
- Sharing short term forecasting

Prioritisation Pyramid

The pyramid diagram (below) shows a schematic view of how data sharing should be prioritised. Priority has been determined based on whether the data provides primary information on dispatch plans (higher) or could be used in combination with other data to produce dispatching forecasts (lower).



Investment Planning

The workstream also focussed on medium and longer term investment planning processes, taking existing network or sector specific processes and exploring the value of greater coordination, collaboration, refinements, and evolutions.

The key opportunities for closer collaboration that have been developed through Open Networks' whole energy systems thinking are:

- A single procurement strategy and process
- Development and production of heat maps
- Building a closer relationship between networks and Local Authorities

Launched in late 2019, ENA's Data Working Group is a new forum working with the Open Networks Project and Gas Futures Group, and will be taking forward work on whole energy systems data visibility.

Unlocking the power of data

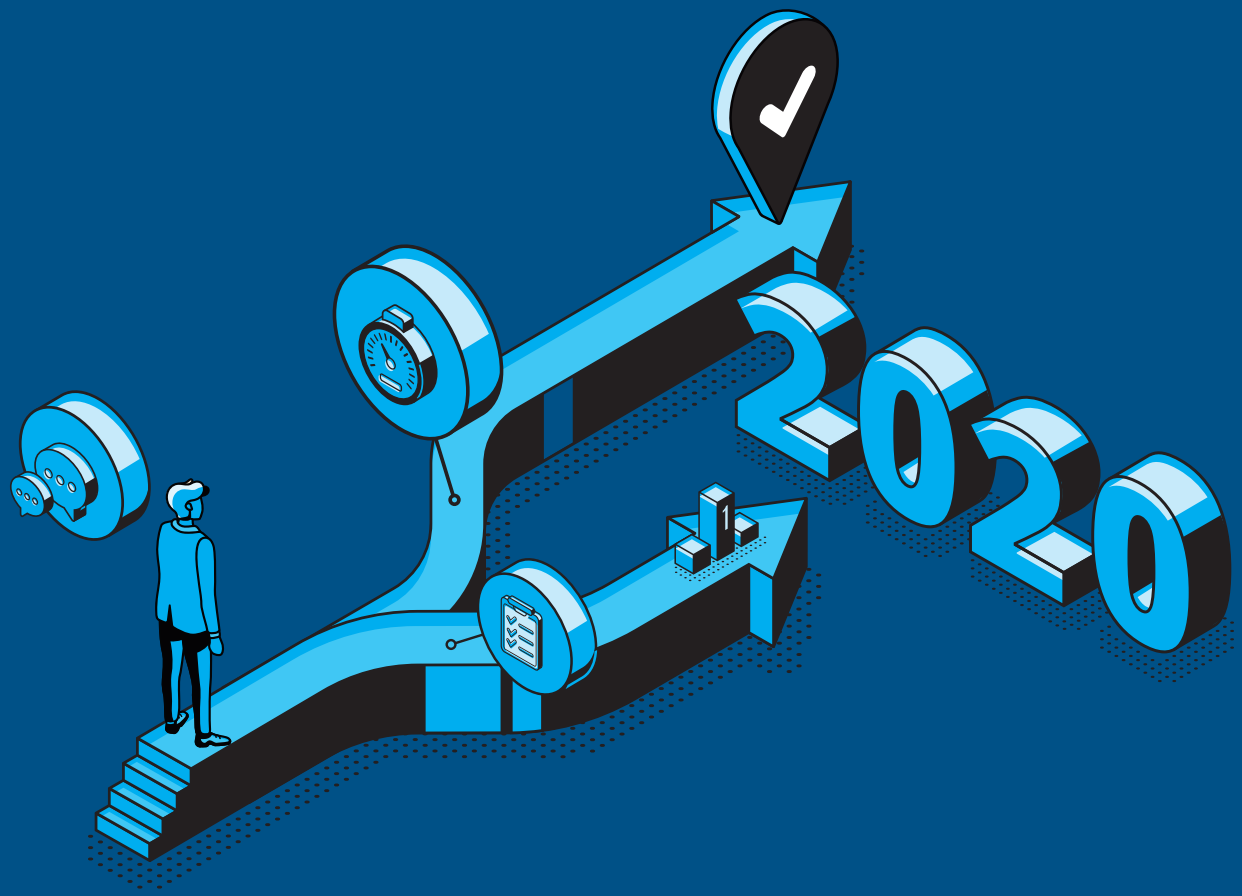
As smarter technologies become more commonplace in homes, businesses and communities, and customers gain more control and visibility of their data, they will be able to make better informed decisions about their energy usage.

Identifying the challenges and opportunities will enable better understanding of how networks are used, such as identifying areas of constraint, which will lead to better, more cost effective investment, shorter and fewer interruptions, and securing the vital energy we rely on every day.

The Open Networks Project has been delivering a System Wide Resource Register of assets: a uniform, standardised register that each electricity network working with National Grid ESO owns and updates of energy resources >1MW that they have connected.

The interim register published in April provides customers wishing to connect to the networks with a single webpage to reference the individual registers that highlight opportunity areas with necessary data. Full, enduring network registers are due to be published in January 2020, with updates forecast for July 2020.

As our energy system goes through a Net Zero revolution, data will be a fundamental part of enabling this. The Open Networks Project and the Gas Futures Group (GFG) agreed in 2019 to establish an ENA Working Group on data. This new forum will be taking forward work in 2020 on a Digital Systems Map, and assist Ofgem and BEIS in the delivery of the other Energy Data Taskforce (EDTF) recommendations, along with other industry stakeholders.

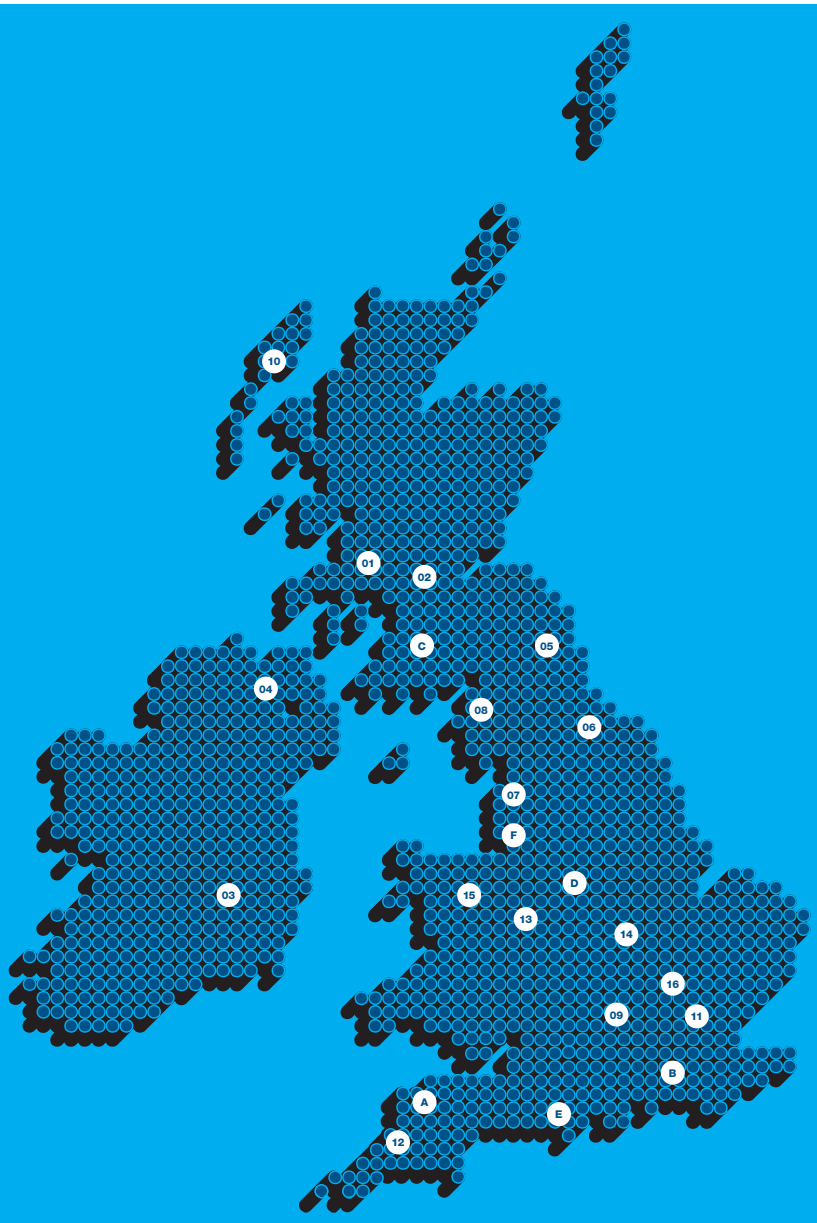


Looking ahead to 2020

The momentum the project has built up over 2019 will be continued throughout 2020 and beyond, and Open Networks' relentless focus on innovation will see a number of significant developments be completed to progress an all-inclusive smart grid.

- Increase liquidity in rapidly emerging local flexibility markets through being open about decision-making, and standardise processes and commercial arrangements across network and system operators for flexibility services
- Plan for the implementation of the Future World of energy and Distribution System Operation through DSO Implementation Plan
- Continue to identify and implement whole energy system efficiencies through our industry leading Whole Energy Systems working group
- Increase the transparency and provision of data of the gas and electricity networks through a new ENA Data Working Group

Case Studies



SP Energy Networks (SPEN)

01 Project FUSION
Creating a smart energy online platform that will allow customers to trade their electricity supply and demand capacity.

02 Active Network Management
Enabling quicker connection in a wide-scale integrated network management zone spanning 11 grid supply points in a single coordinated platform.

03 ESB Networks (Republic of Ireland)
Improving connections for customers and building on Open Networks development for Flexibility services.

Northern Ireland Electricity Networks (NIEN)

04 DNO to DSO Evolution
Taking a customer-centric approach to defining the evolution of the Northern Irish electricity networks.

Northern Powergrid (NPg)

05 Sharing scenarios as open data
Publishing Distribution Future Energy Scenarios (DFES) via the Leeds Open Data Institute.

06 Restore Flexibility e-auction
In UK-first move for a DNO, Northern Powergrid announced in late 2019 its intent to procure local flexibility via an e-auction and Dynamic Purchasing System.

Electricity North West (ENWL)

07 Connecting Community and Local Energy to the system transition with a dedicated community energy manager to work with customers involved in community energy projects.

08 In December 2019 ENWL published the second annual Distribution Future Electricity Scenarios report together with a workbook of detailed regional forecasts.

Scottish & Southern Energy Networks (SSEN)

09 Transition and Project LEO
Replicating and trialling aspects of DSO in Oxfordshire.

10 Resilience as a Service (RaaS) project
Supporting low-carbon solutions for maintaining network resilience.

11 UK Power Networks (UKPN)
Transparency in decision-making of Flexibility procurement.

Western Power Distribution (WPD)

12 Cornwall LEM
Exploring flexible, smart energy solutions for the UK.

13 Flexible Power
Embedding flexibility within a DNO by providing monthly updates on the Flexibility procured for the previous month as well as flexibility requirements for the following month.

National Grid ESO

14 Power Responsive
Bringing together industry and energy users to stimulate increased participation in the different forms of flexible technology such as DSR and storage.

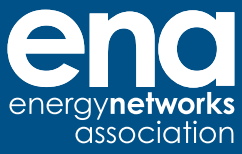
15 Distributed ReStart
Explores how DER in Great Britain can be used to restore power in the highly unlikely event of a total or partial blackout of the National Electricity Transmission System. Working with National Grid ESO, SP Energy Networks, and TNEI.

16 Power Potential
A NIC project working with UKPN, creating a new reactive power market for distributed energy resources (DERs).

Regional Development Projects (RPDs)

A	**South West**	ESO WPD, NGET	Developing the the most cost-effective way of enabling renewable generation to connect to the whole network.
B	**South East**	ESO UKPN NGET	Maximising opportunities for further efficient deployment of distributed resources and reducing overall system costs for energy consumers.
C	**South West Scotland**	ESO SPEN	Developing new ways to use technology and operational methods to provide cost efficient outcomes for the renewable developments.
D	**Connecting Storage**	ESO WPD	Extend the flexibility arrangements given to generation so they apply for storage demand. This will enable storage projects to become part of the solution to network capacity issues rather than capacity planning standards being a potential blocker to them.
E	**South Coast**	ESO SSEN NGET	Developing whole system technical solutions that facilitate efficient transmission and distribution system operation.
F	**Heysham GSP**	ESO ENW NGET	Analyse the Heysham GSP and the distribution network behind it as a 'whole system', in order to deliver the most economic solution for GB consumers.

Open Networks Project partner organisations



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