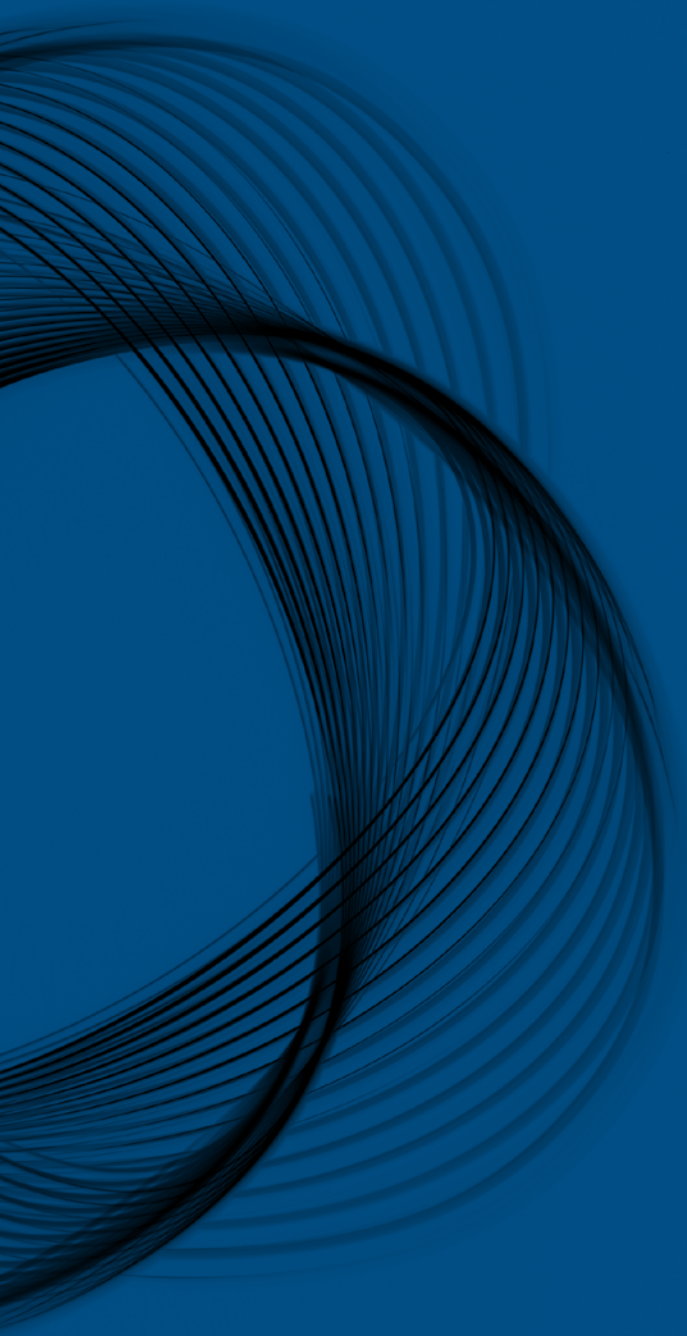
The Voice of the Networks

energynetworks association



Open Networks Project 2018 at a glance

Building a more efficient, smarter, cleaner energy system

Achievements and future direction

Contributing partners

The Open Networks Project brings together Great Britain's (GB) electricity transmission and distribution network companies, including the new National Grid Electricity System Operator (ESO), an independent GB distribution network operator, and distribution operators from Ireland and Northern Ireland.

nationalgridESO

nationalgrid

NORTHERN POWERGRID

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

SP ENERGY NETWORKS

electricity north west
Bringing energy to your door

UK Power Networks
Delivering your electricity

Scottish & Southern Electricity Networks

BUUK infrastructure

ESB NETWORKS

Northern Ireland Electricity Networks

Foreword

Two years ago, we launched the Open Networks Project, an industry-leading initiative that is laying the foundations of the smart grid in GB and informing future developments in Northern Ireland and the Republic of Ireland.

A smart grid – a type of multi-directional electricity supply system underpinned by new digital technologies – is vital for decarbonising and reducing the costs of the UK's energy system, making the Open Networks Project a key industry initiative for delivering Government policy.

It brings together nine GB electricity operators and owners – transmission and distribution – to work closely with distribution operators from: Ireland and Northern Ireland; the Department for Business, Energy and Industrial Strategy (BEIS); the regulator, Ofgem; industry experts; and customer representatives.

Ultimately, with a smarter, more efficient and cleaner energy system, homes and businesses are set to benefit. Research led by the National Infrastructure Commission shows smart technologies which are used to provide services to the electricity grid could save the British public up to £8bn annually by 2030[1].

As the Open Networks Project helps drive us toward this, the public are already gaining better access to secure and affordable low-carbon energy, and more control over how and when they use energy.

Local communities are not only purchasing electric vehicles but are benefitting from sharing or trading their own distributed energy resources, including small-scale solar PV and wind power.

In time, businesses will have access to more consistent, transparent information about local energy markets, making it easier to connect to the grid at a local level and buy, sell or trade electricity.

We continue to collaborate through the Open Networks Project to deliver these short-term improvements, alongside enabling emerging flexibility services markets.

As we look to the future, flexibility services markets are central to facilitating the exchange of technology-based services, such as those provided by battery storage or demand-side response, to keep the costs of the network low for the public, to integrate low-carbon energy and to open up new opportunities for everyone.

Along with our recently announced Flexibility Commitment[2] from GB Distribution Network Operators (DNOs), we have seen flexibility services being connected to the grid and existing flexibility being contracted to support the networks. We can expect a major boost to these emerging markets in 2019.

Through this commitment, the DNOs are openly testing the market to compare relevant reinforcement and market flexibility solutions for all new projects of any significant value.

As this long-term digital transformation takes place, new system roles, responsibilities and market functions are emerging – including the Distribution System Operator (DSO) and Electricity System Operator (ESO) roles. Data is becoming key to unlocking benefits for the public and ENA looks forward to working with the Government's new Energy Data Task Force in realising such benefits.

The Open Networks Project is a key initiative to deliver Government policy set out in BEIS' Industrial Strategy and Clean Growth Strategy Plan, and Ofgem and BEIS' Smart Systems and Flexibility Plan.

Following the Flexibility Commitment made in 2018, we can expect a major boost to flexibility services markets in 2019.

£8bn

National Infrastructure Commission research shows smart technologies providing services to the grid could save the public up to £8bn annually by 2030[1].

[1] https://www.gov.uk/government/news/a-smart-power-revolution-could-save-consumers-8-billion-a-year-adonis
[2] http://www.energynetworks.org/assets/files/ENA%20Flex%20Committment.pdf

The 2018 Future Worlds consultation generated around 50 industry responses to five possible scenarios for the future electricity system, stimulating debate and informing future analysis.

These changes are generating a whole range of different questions about the way our energy system should be run, and it is these questions that the Open Networks Project is answering.

The industry shared its views on these changes through the Future Worlds[3] consultation – a major focus for the project in 2018 – which proposed five possible scenarios for the future electricity system. Taking into account stakeholder feedback, we are progressing an independent impact assessment of the relative costs and benefits of the five scenarios.

The Open Networks Project continues to identify how both our electricity transmission and distribution networks can work most efficiently within the whole electricity system. We will expand upon this in 2019 by looking across the whole energy system: at gas, heat, transport and waste. To-date, we have focused on the electricity system to ensure we have made progress in the highest priority areas.

Widespread stakeholder engagement and input has been key to our work this year – from our industry Advisory Group to public consultations, webinars and events held across GB.

We look forward to continuing to deliver on our vision for a more efficient, cleaner, smarter energy system – for the benefit of everyone.

David Smith
Chief Executive
Energy Networks Association

Peter Emery
Chief Executive Officer
Electricity North West

Paddy Hayes
Managing Director
ESB Networks

Phil Jones
Chief Executive
Northern Powergrid

Clive Linsdell
Chief Executive Officer
BUUK Infrastructure

Frank Mitchell
Chief Executive Officer
Scottish Power Energy Networks

Colin Nicol
Managing Director
Networks Scottish and Southern Electricity Networks

Basil Scarsella
Chief Executive Officer
UK Power Networks

Fintan Slye
Director, UK System Operator
National Grid Electricity System Operator

Paul Stapleton
Managing Director
NIE Networks

Phil Swift
Chief Executive Officer
Western Power Distribution

David Wright
Director, National Grid Electricity Transmission
Group Chief Engineer, National Grid Electricity

[3] http://www.energynetworks.org/electricity/futures/open-networks-project/future-worlds/future-worlds-consultation.html

2018 highlights: in numbers

50

The Advisory Group brings together approximately 50 experts from across the energy industry

05

Advisory Group meetings

100+

Reached 100s of organisations through industry associations

500

The quarterly Open Networks Project newsletter reaches around 500 people

50

Around 50 responses received to the Future Worlds consultation

300

Close to 300 participants in Future Worlds events and webinars across GB

65MW

65 MW flexible generation contracted by GB distribution network operators

7,328MW

7,328 MW of flexibility services used across the GB electricity system for active network management, flexible connections and operational tripping schemes

270MW

270 MW flexible services contracted by GB distribution network operators

The Internet of Energy – transforming the networks

For decades we have invested in our electricity system to serve the public and provide a reliable, secure source of electricity. Now, as the digital transformation of our system takes place – the Internet of Energy – it is enabling us to bring new benefits to the public and businesses. The Open Networks Project is a key initiative in delivering this, through both short-term improvements and longer-term structural changes to the market.

New technologies are becoming central to the way we generate, consume and manage electricity. At home, there is a growing range of new products and services including smart meters, smart thermostats, electric cars and battery storage. In the not-so-distant future, virtual power plants will link homes or businesses together to jointly manage locally-generated energy and artificial intelligence-driven algorithms will improve flows of energy across the system.

This Internet of Energy is not unlike the boom of the Internet in the early 2000s. In the same way, it will change our lives forever – more control and choice, more competitive markets and better deals for the public.

30GW

Since 2007, the local electricity networks have connected 30GW of distributed generation in GB.

Rapid growth of renewable energy

New wind power and solar PV projects have led to record amounts of renewable energy generation being connected at a local electricity network level in GB. In fact, since 2007, the networks have connected 30GW of this distributed generation in GB, with about 85% of it coming from renewable energy. At the same time, the public is adopting new technologies at home, such as electric vehicles.

These two major trends are leading to more intermittent sources of energy on our network. This presents a range of challenges for managing the network, including far less predictable patterns of supply and demand and the need for more frequent and comprehensive data. But as the take-up of these new technologies accelerates, it is also presenting new opportunities for everyone.

The Open Networks Project is finding ways for the electricity networks to work smarter and more efficiently while keeping the lights on.

Our electricity networks are continuing to deliver improvements to the UK's energy system in response to climate change targets and saving the public money. To enable continued investment and innovation in the networks as they evolve and decarbonise, there must be strong alignment between the Government's strategic direction on the energy system and Ofgem's upcoming RIIO-2 price control framework. This applies to both the electricity transmission and distribution networks, starting in 2021 and 2023 respectively, both currently and in the future.

Flexibility services enable networks to avoid building costly new energy infrastructure. For example, using energy from solar panels with battery storage to address local network congestion.

Enabling flexibility services markets

A key aim of the Open Networks Project is to enable the establishment of market places for services provided by new smart energy technologies. This is creating new opportunities for the public and customers to benefit from their connected distributed energy resources (DERs).

Flexibility services markets, as they are known, will increase competition and maximise the Internet of Energy for the benefit of everyone. They will allow supply and demand to be matched at the local level and ensure the most cost-effective investment in the electricity network, such as major upgrades or grid reinforcement.

In a major step forward, the Flexibility Commitment[4] made by GB DNOs in 2018 is helping to establish these markets. For the first time, the electricity distribution network operators are openly testing the market to compare relevant reinforcement and market flexibility solutions for all new projects of significant value.

The GB DNOs have already contracted more than 270 MW in flexibility services, with approximately 65 MW of this flexible generation from DERs, including solar photovoltaic power paired with storage. Across the system, 7,328 MW has been used for active network management, flexible connections and operational tripping schemes. At the same time, network operators have led innovative trials to buy new flexibility services from the market.

The Open Networks Project is also working to ensure that markets – whether for local, regional or national needs – are consistent and compatible, while managing operational requirements across the whole electricity system. Aligning markets at a local and national level is key to promoting maximum value.

The Open Networks Project is providing an evidence base to trial, test and implement what may work in the future, with data being key to operating smarter electricity networks.

Unlocking the potential of data

As the public gains more visibility over their own data and usage patterns, they will be able to make better informed decisions – such as deciding to charge their electric vehicle when prices are lower to reduce their energy bills. Even better, they will be rewarded for returning energy to the grid or reducing their energy consumption.

At the same time, as behaviour becomes much less predictable, data is vital to operating smarter electricity networks. In the future, the networks will need visibility and notification of the location and size of electric vehicle charging points – local and aggregated, real-time and historical data. As smart meter technology continues to gain momentum and provide the data that is needed, this presents exciting opportunities for both the public and the networks.

Business customers will also need more line of sight to network data so that they can better understand where to connect and how to operate to maximise their value; this increased transparency is a key outcome of the Open Networks Project.

Through all of this, the electricity network operators are committed to protecting the privacy and security of public data. The public must benefit from the Internet of Energy, especially those who may be poorer or more vulnerable. In 2018, we started working with a range of experts and organisations, including the Government, to ensure personal data is protected. We are looking forward to working with the Government's Energy Data Task Force[5] in 2019.

2019

We are looking forward to working with the Government's Energy Data Task Force[5] in 2019.

[4] http://www.energynetworks.org/assets/files/ENA%20Flex%20Committment.pdf
[5] https://www.gov.uk/government/groups/energy-data-taskforce

Bringing new benefits

The project is looking at how to make optimal network investment and operational decisions for the whole electricity network, with an increasing focus on how electricity interacts with gas, heat, transport and waste.

In the future, Distribution System Operator (DSO) responsibilities will need to be carried out by a neutral market facilitator – that is, an operator that does not act in a way that could present any conflicts of interest.

The Open Networks Project will need to adapt and evolve in line with wider energy market developments, which includes making major contributions to key initiatives such as Ofgem's Charging Futures Forum[6] and Significant Code Review[7].

To the public

We will continue to deliver secure, reliable electricity to homes and businesses.
Through the Open Networks Project, we will be able to match more varied and less predictable patterns of supply and demand. The latest-generation smart meters are key to providing accurate data so we know what electricity people need, and when they need it. Through all of this, it is critical that the most vulnerable or disadvantaged people are not left behind – they will continue to be supported, as they are today.

A smarter electricity system keeps network costs down for the public.
Through the Open Networks Project, we can replace or supplement more traditional network investment, such as upgrades or reinforcements, with smarter and more cost-efficient ways of investing and operating the grid.

The public is gaining more control and choice over how they use electricity.
Even though much is to be determined about the future electricity system, we know that the public will be more involved than ever. People will be able to generate their own distributed energy, sell to flexibility services markets when it is convenient, or participate in peer-to-peer energy trading within their own community. The Open Networks Project is key to creating these opportunities, including identifying the functions of the emerging DSO role.

To existing and new businesses

It is becoming easier for business customers to connect to the grid.
Through the Open Networks Project, we are simplifying and standardising the connections process and information available to businesses providing distributed energy resources and flexibility services. This includes customers as wide-ranging as local city councils and community energy schemes to industrial and commercial businesses which own solar farms or battery storage facilities.

There will be more competitive market opportunities for businesses.
A growing number of businesses are providing services to the market and together with the right data, these are key to running the network. Whether it be for sustainability reasons, generating a profit or reducing operating costs, these businesses will benefit from new markets and revenue streams. The Open Networks Project is enabling the markets that create these opportunities.

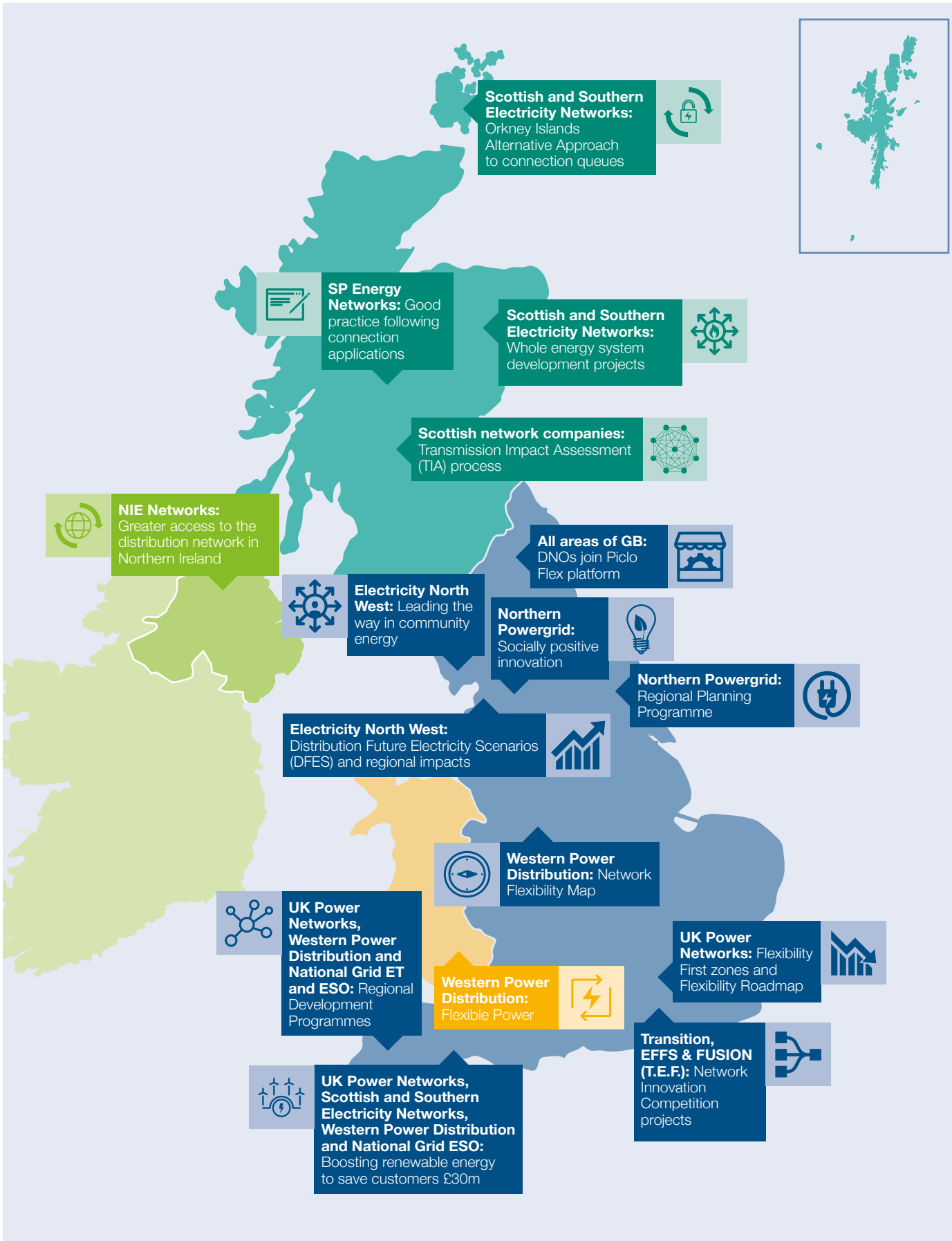
To the UK and globally

We are delivering Government policy to decarbonise the energy system.
While future policy and regulatory decisions about how to structure the electricity system will be made by Ofgem and BEIS, the Open Networks Project is key to bringing the industry together. Through it, we are collaborating and building momentum for short and long-term change which contributes not only to the UK's climate targets, but also to global efforts to transition to a low-carbon economy.

The Open Networks Project continues to be highlighted as a key initiative in BEIS and Ofgem's Smart Systems and Flexibility Plan and its outcomes support BEIS' Industrial Strategy and Clean Growth Strategy.

[6] https://www.ofgem.gov.uk/publications-and-updates/charging-futures-forum
[7] https://www.ofgem.gov.uk/electricity/transmission-networks/charging/targeted-charging-review-significant-code-review

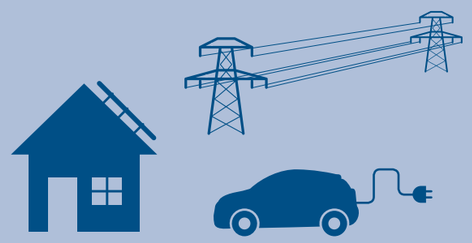
2018 highlights: case studies across GB



2018 highlights: by key themes and publications

Connections and flexibility

- **Key industry learnings** on procuring distributed energy resources services
- **Consultation** on how to treat applications in a queue to be connected to the grid

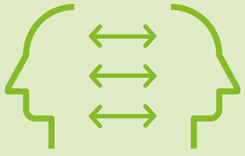


- **Consultation** on establishing good practices for connections interactivity and queue management
- **Guide** outlining processes and products for businesses connecting flexible resources
- **Good practice guide** on curtailment for flexible connections and active network management
- **Good practice guide** for providing information to customers when procuring flexibility services
- **Guidance** for customers on changes to existing grid connections
- End-to-end process **report** for the definition and procurement of DSO services

Future Worlds

- Future Worlds **workshops** with industry stakeholders
- **Outline** of market functions and system requirements for the emerging DSO role
- Key **learnings**, including benefits and drawbacks, of different electricity market models
- **Definition** of the emerging DSO role and its potential responsibilities in the market
- **Consultation** on five possible models – Future Worlds – for the future electricity system, including areas of least regrets for short-term development
- **Publication** of Future Worlds consultation responses

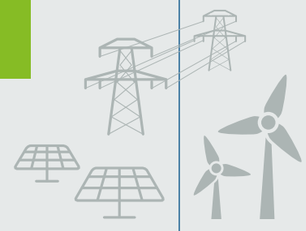
Information and data



- **Review** of industry projects and how data could be exchanged between market participants
- **Terms and definitions** used by the Open Networks Project and the industry
- **Review and recommendations** for a new system-wide register with information for connecting customers
- **Good practice guide** for networks providing information to connecting customers
- **Schedule** of electricity network codes used for running the electricity system
- **Recommendations** for making information available now to distributed energy providers and networks

Whole electricity system

- **Identification** of common security planning standards, and barriers, across the system
- **Review** of the similarities and differences between network forecasting for the future
- Key **industry learnings** for planning investment across the whole electricity system



- **Recommendations** to improve existing network standards and maximise the usage of flexibility
- **Proposed models and processes** for whole electricity system investment planning
- **Report** on current DNO forecasting approaches and the recommended future whole electricity system process
- **Interim report** on operational data exchanges and control architectures for Regional Development Programmes

Apr · May · Jun · Jul · Sep · Nov · Dec

*Please click on the underlined words to be taken to the appropriate website or link.

Energy Networks Association
4 More London Riverside,
London, SE1 2AU

Tel +44 (0)20 7706 5100
www.energynetworks.org
@EnergyNetworks