

# Regional Development Programmes explained



The electricity system is in a period of transition, moving to a lower carbon and more distributed model. There's a shift from energy predominately being supplied by transmission connected generation to a world that includes large volumes of distribution connected generation, flexible demand and storage. This requires a new 'whole system' approach to the commercial and technical operation of transmission and distribution networks.

National Grid ESO and distributed network operators (DNOs) across Great Britain are working together through Regional Development Programmes (RDPs). The aim of these programmes is to maximise the opportunities for more efficient deployment of distributed resources, and reduce overall system costs for energy consumers.

## What is a Regional Development Programme?

A Regional Development Programme is a project or study that looks at the complex interactions between distribution and transmission networks in areas with large amounts of distributed energy resources (DERs).

RDPs are designed to look at the whole electricity system and assess a variety of options to resolve specific network needs. These projects will significantly enhance transmission and distribution systems coordination and control. This will create efficiencies for the whole electricity system and provide new tools and resources to manage system constraints – ultimately reducing costs for customers.

RDPs 'design by doing'. This means they can consider various approaches including:

- traditional asset build solutions
- operational solutions
- the development of coordinated flexibility markets
- distribution system operation (DSO) solutions.

Recognising the increasing maturity of DSO flexibility markets, RDPs are building on the work of the Open Networks project. RDPs make sure standardised approaches are used wherever possible. In turn learnings from RDPs are fed back into the Open Networks project, shaping its work and facilitating wider roll out of best practice.

## Common principles for RDPs

In autumn 2020, UK Power Networks (UKPN), Western Power Distribution (WPD), Scottish Power Energy Networks (SPEN) and National Grid ESO identified eight common principles for RDPs. They are:

1. Create standardised solutions across RDP areas, recognising the need for regional differences.
2. Build on and coordinate with the work of the Open Networks project.
3. Use a coordinated procurement and dispatch method as recommended by the Open Networks project.

4. Make use of market-based solutions where possible but recognising the need for continued system operability.
5. Ensure consistent, sufficient routes are available to cater for different levels of provider participation/activity.
6. Visibility and data exchange need to be delivered in both directions to facilitate efficient service coordination.
7. Recognise Distributed Energy Resource Management System (DERMS) technology can provide access to flexibility services.
8. Make sure learnings are shared between RDPs and the broader Open Networks project.

## What are the challenges?

Current and future transmission and distribution constraints may restrict more DER connections. Options to manage these conditions have been limited and are heavily dependent on transmission reinforcement in the past. There is an opportunity to develop services from distribution connectees but this requires development of commercial arrangements.

Arrangements need to be developed to make it easy for DERs to provide services to the distribution or transmission system operators. Opening markets to new service providers and improving ways of working across transmission and distribution will help us manage constraints more efficiently and enable more DER connections.

## How are we meeting these challenges?

We are managing our operational needs through a co-ordinated market-based approach. This consists of two elements:

### 1. Aligned market solutions

Building on the work of Open Networks project, we are developing flexibility markets to manage distribution and transmission system needs. These will utilise the frameworks developed by the Open Networks project. These markets will be open to existing DERs and new connectees.

We recognise that regular market participation does not work for all customers and will look to develop arrangements that work for a wide range of DER. This will ensure system operability is maintained whilst allowing affected DERs to be appropriately compensated for any impact on their operations.

We intend to consult with stakeholders on our proposals from Spring 2021 on a project by project basis, reflecting the differing system needs and technologies employed.

### 2. System operator co-ordination

Central to design of these markets will be the need to transparently coordinate ESO and DSO needs in procurement and operational timescales. We will also look to develop arrangements that allow parties with flexible connections to provide transmission constraint services for RDP needs.

## What have we achieved so far?

We have developed new network models and improved the level of granularity in data exchanges between the ESO and DNOs. Improved quality and flexibility of power system studies now better informs operability issues and technical risks in the area. These studies revealed the potential for a major increase in the use of available capacity.

We have also established a new connections process, which through a streamlined transmission network assessment, provides DNOs with greater certainty of the transmission network's ability to accommodate DER connections. Developments in this area have formed the foundation of the revised Statement of Works process, which is being progressed through the CUSC modification process.

This streamlined approach uses flexible connection arrangements, including the ability to control the DER output if necessary. This means new connections can proceed without the need for additional network reinforcement. This has the advantage of levelling the playing field for transmission and distribution customers, allowing both to provide transmission constraint management services.

To promote efficient management of DER connections, we are revising the approach to procuring transmission balancing services, so it considers the potential impact on distribution networks. This work will help prospective DER connectees to understand where the opportunities to connect more quickly are and participate in the provision of distribution and transmission services.

The first coordinated visibility and control system (N-3 intertripping) has been delivered between National Grid ESO, National Grid Electricity Transmission (NGET) and UK Power Networks (UKPN) on the south coast of England. Similar schemes will be delivered with Western Power Distribution (WPD) and SSE-N on the south coast in 2021. This will facilitate the connection of additional DERs, much of it zero-carbon, across central and south-western England, whilst ensuring the transmission system remains operable.

## Next steps

We will continue to establish stronger interfaces between our transmission and distribution control centres and DERs. This will provide greater visibility and management of DERs and allow us to develop better ways of understanding the impact of network limitations on services from DERs. An innovative control system is being developed to enable DERs to participate in balancing services markets, which will ensure the system remains operable.

DERs could potentially provide cost-effective solutions to a range of challenging issues facing the transmission and distribution networks. We are developing routes to market, including those for balancing services to support efficient management of network issues. Transparent commercial guidelines will also support DER's business cases and subsequent investment decisions.

Through the new connections process, customers will have information within their connection offer (maximum 90 days) to make an informed decision on their investment. With the development of new control architecture and routes to market, customers at the distribution level will be able to access new revenue streams. At the same time, they will be able to provide the network operators with a wider range of resources and tools to manage the networks. All consumers will benefit from lowest cost solutions across the respective regions.

Detailed discussions of processes and IT solutions needed to deliver co-ordinated markets in SPEN, WPD and UKPN areas are ongoing with engagement with stakeholders from Spring 2021. Delivery works are expected to commence after this.

To ensure standardised, coordinated markets develop across Great Britain, all six DNOs are now invited to regular RDP forums. Discussions are also underway with other network organisations for the development of RDPs in their regional areas.