

JRC Conference Digitalisation and Net-Zero

Developments to address increasingly complex supply and demand across an electricity network and deliver the net zero agenda

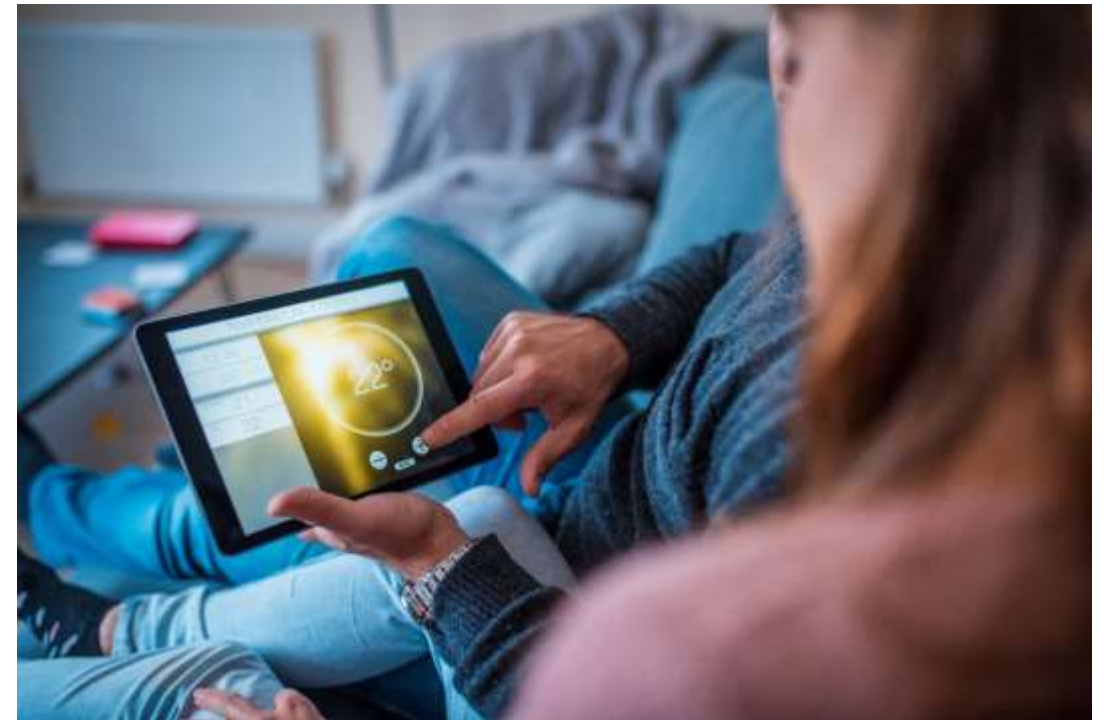
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15th October 2020



westernpower.co.uk

Changing Energy – A Balancing Act

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Introduction

We keep the lights on for 8 million customers in the Midlands, South Wales and South West for only 27p a day on people's bills.

- We serve 7.9m homes and businesses across our regions, and are also part of the communities in which we operate
- Our electricity network is being upgraded from one that was passive to be actively managed
- Control systems are actively managing tens of thousands of end points. Up from a few hundred a decade ago.
- Information and communications technology is a key enabler of delivering net-zero commitments



WPD's network:

- Serves 7.9 million customers
- Covers 55,500 km²
- Employee > 6,500 staff
- Consists of:
 - 92,000km overhead lines
 - 129,000km underground cables
 - 185,000 transformers



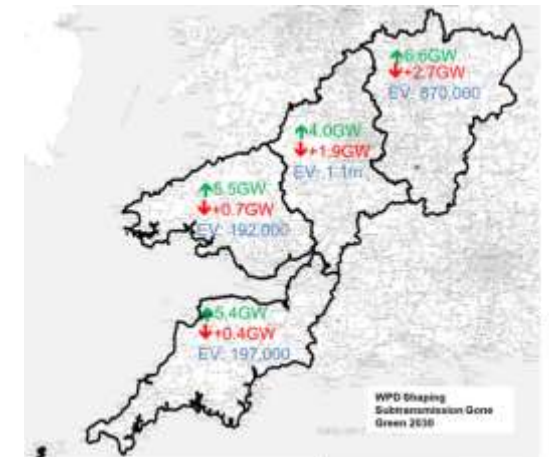
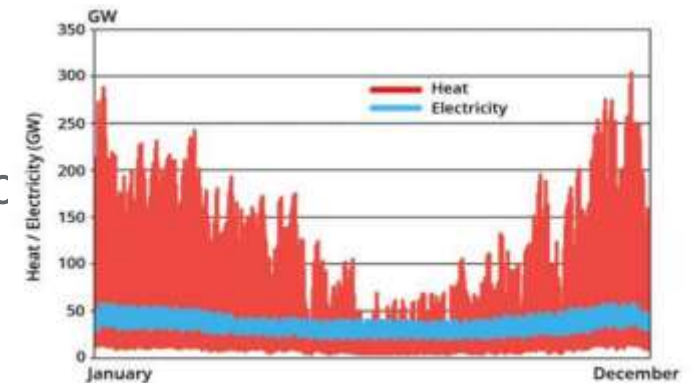
The scale of the Challenge

Decarbonisation of UK energy is an enormous and unprecedented challenge

- Overall electricity consumption is set to double or treble due to electric vehicles and zero carbon electrified heating systems
- An electric car or a heat pump use the same energy as an average home

WPD is providing the low carbon infrastructure essential to electrifying UK transport.

- We've already connected 9.9GW of renewable generation
- Transforming the network from one that was passive and predictable, into one that requires active management and is agile to prevailing weather conditions



Facilitating a transformation

System Access

- Connecting customer low carbon technologies to our network
- Developing “alternative connection” commercial agreements (e.g. Timed and import/export limited)

Innovation

- Demonstration of flexibility solutions
- Enhancements to SCADA / DERMS
- Trialling new plant and equipment
- Development of data and digitalisation techniques
- Working with communities

Leading by example

- DSO functions segregated to avoid any perception of conflict of interest
- Fleet van and car electrification scheme launched
- Tackling building emissions



Data, digitisation and digitalisation

Increasing Importance of Network & Information Systems

- Reliance on **data** driven automation and smarter control systems to run the network efficiently and effectively
- Increasing **digitisation** and automation of the generation, distribution and use of energy (Distributed Energy resource Management – or “DERMS”)
- Greater decision making, openness and exchange of data through **digitalisation**



Digitisation & Network Control Systems

Increasing reliance, interconnection and interoperability

For effective and efficient electricity system operation we will need to obtain and exchange more data from:

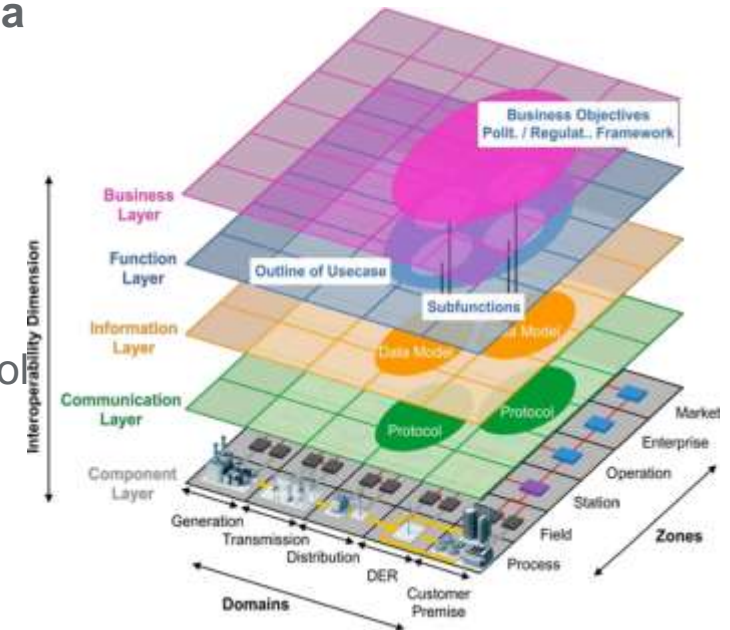
- Other Transmission & Distribution Networks
- Connected Generators and smarter Distributed Energy Resources
- Customers – the human factor
- 3rd party Open Data sources

We will use new and innovative technology to monitor and control our networks

- High resolution electrical network monitoring
- Target ubiquitous secure telecommunications
- Deploy Algorithms and Automation
- Develop Websites, Data Hubs and APIs

The smart grid architecture model (SGAM) provides a framework for interoperability

- Compatibility of Data Models
- Defined Use Cases
- Communication Protocols



Digitalisation - A data centric business

Digitalisation strategy and action plan activity focused on three underpinning elements:



Improved data management

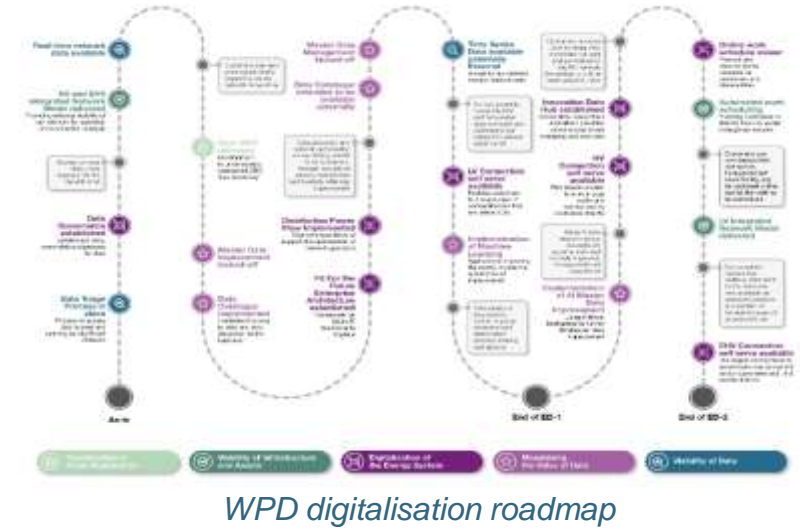


Increased network insight and operation



Presumed open data

- Our digitalisation roadmap is shaped to deliver tangible and impactful change to enable digitalised solutions to benefit customers, network and business operations
- Benefit already being realised through our open access maps and UK DNO first sharing of network data through Common Information Model format
- Ambitious activities underway in the action plan delivering data governance, centralised data access and real-time data to third parties



WPD digitalisation roadmap



Case Study - DSO Flexibility

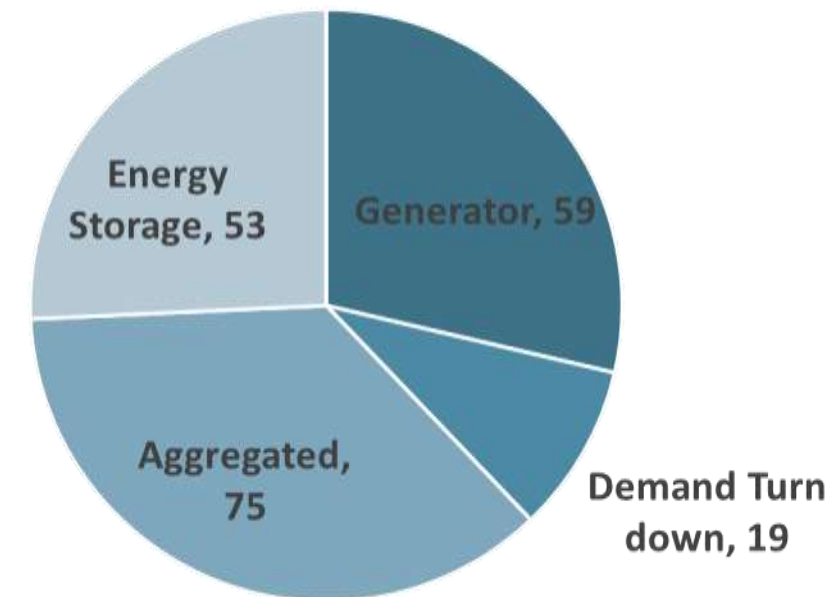
We continue to be leaders in DSO flexibility services, operating the largest DSO flexibility market in the UK.

- Flexibility services became BAU across WPD in 2018.
- 2019 saw us procure for 184MW of services across around 15% of our network.
- In 2020 we have been able to defer £26.4m of conventional asset build across three areas, for an annual operating cost of £550k.
- Our latest tender sought over 300MW of flexibility services and we now operate 220MW of generation turn-up and demand turn-down through commercial contracts.

Technology

- Open APIs to Aggregators with Control System Integration
- Retrospective installation of telemetry to all larger Generation sites

Flexible Power - Number of Assets



Deter, defend, detect and destroy

Cyber Security Considerations

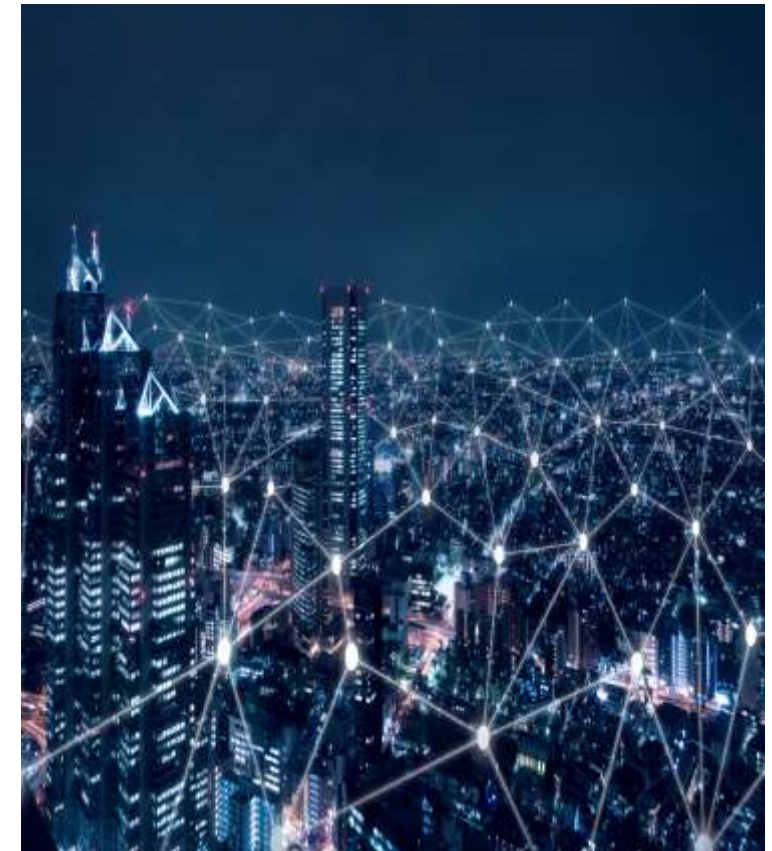
- **A Significantly larger Attack surface**
 - Networks that extend beyond the existing physical electrical boundaries
- **A Mixture of Advanced and Legacy Technologies**
 - Advanced Technology –standardisation delivers more accessibility to users... but also Hackers!
 - Legacy Technology – some Security by Obscurity but difficult to protect
- **Complex Networks, Software and Firmware**
 - Operator and system errors, leaving gaps for attackers?,
 - Complex Software and Firmware – code errors, latent vulnerabilities, new exploits,
 - Firmware Upgrades and Security Patching - how do we patch?



Closing remarks

Our guiding principles of developing an active and automated electricity network

- Accessible – our solutions will be accessible by all customers. We will especially target opportunities where our most vulnerable customers can benefit
- Fair – Including support for Community Energy Groups to deliver zero carbon and lower cost services
- Secure – all systems are fully risk assessed and appropriate mitigating actions will be put in place.
- Dynamic – our solutions will continue to evolve as government policy and customer future needs become clearer
- Sustainable – we will leverage technology in the support of delivering net-zero targets by 2050 or sooner





Serving the Midlands, South West and Wales

Discussion and Debate

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