

**NEXT GENERATION
NETWORKS**

Entire – Latest learning on DNO led DSR

LCNI 2017 Telford Exhibition Centre

17th October 2018

Matt Watson

Innovation & Low Carbon Networks Engineer





Future Networks Programme

Assets

- Management of distribution assets
- Exploitation of asset & network information
- Developing Smart Grid Technology



Customers

- Distributed Generation
- Connecting Electric Vehicles
- Adopting Battery Storage
- Facilitating Flexibility



Operations

- Maintaining Reliability
- Strategic Forecasting
- Transitioning to DSO
- Operational Efficiency



Network and Customer Data

Network Improvements and System Operability

- Improved Statistical Ratings for OHL
- DEDUCE
- Primary Networks Power Quality Analysis
- Stochastic Load Flow
- Visual Data Processing
- Network Islanding
- Common Information Model
- Harmonic Mitigation
- Virtual STATCOM

Transition to a Low Carbon Future

- Virtual Telemetry
- Feeder Fault Level
- Solar Storage
- LV Connect & Manage
- FREEDOM
- Electric Nation (formerly CarConnect)
- Industrial & Commercial Storage
- Hydrogen Heat & Fleet

New technologies and commercial evolution

- MVDC
- 5G Design
- OHL Director
- Entire
- LV Fault Location
- On-street EV Charging

Customer and Stakeholder Focus

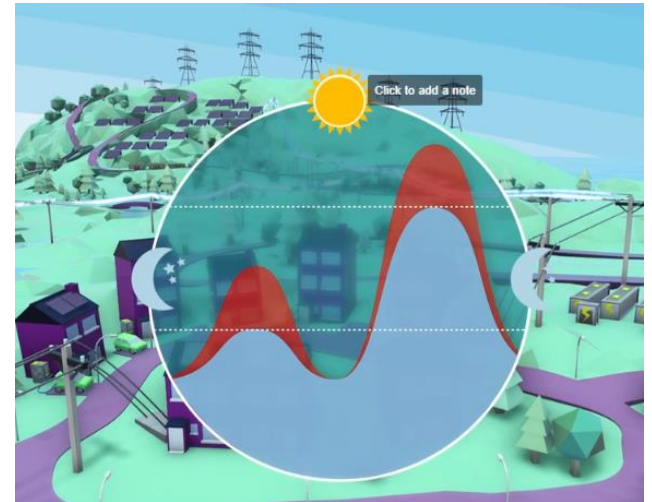
- Power Electronic FLM
- Power Electronic FCL
- Self System Design
- New Build Standards
- LCT Response
- Carbon Portal

Safety, Health and Environment

- Simulated Training
- SF6 Alternatives
- Robot Trades
- LV Sensitive Earth Fault Protection
- Wildlife Protection
- Losses Investigation
- Advanced Vegetation Management
- Airborne: Defect Analysis

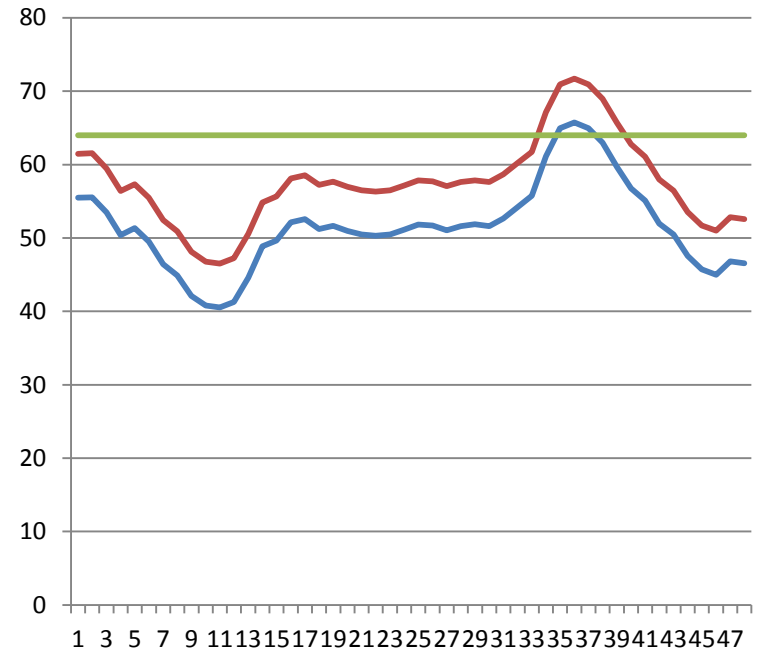
What is Demand Side Response

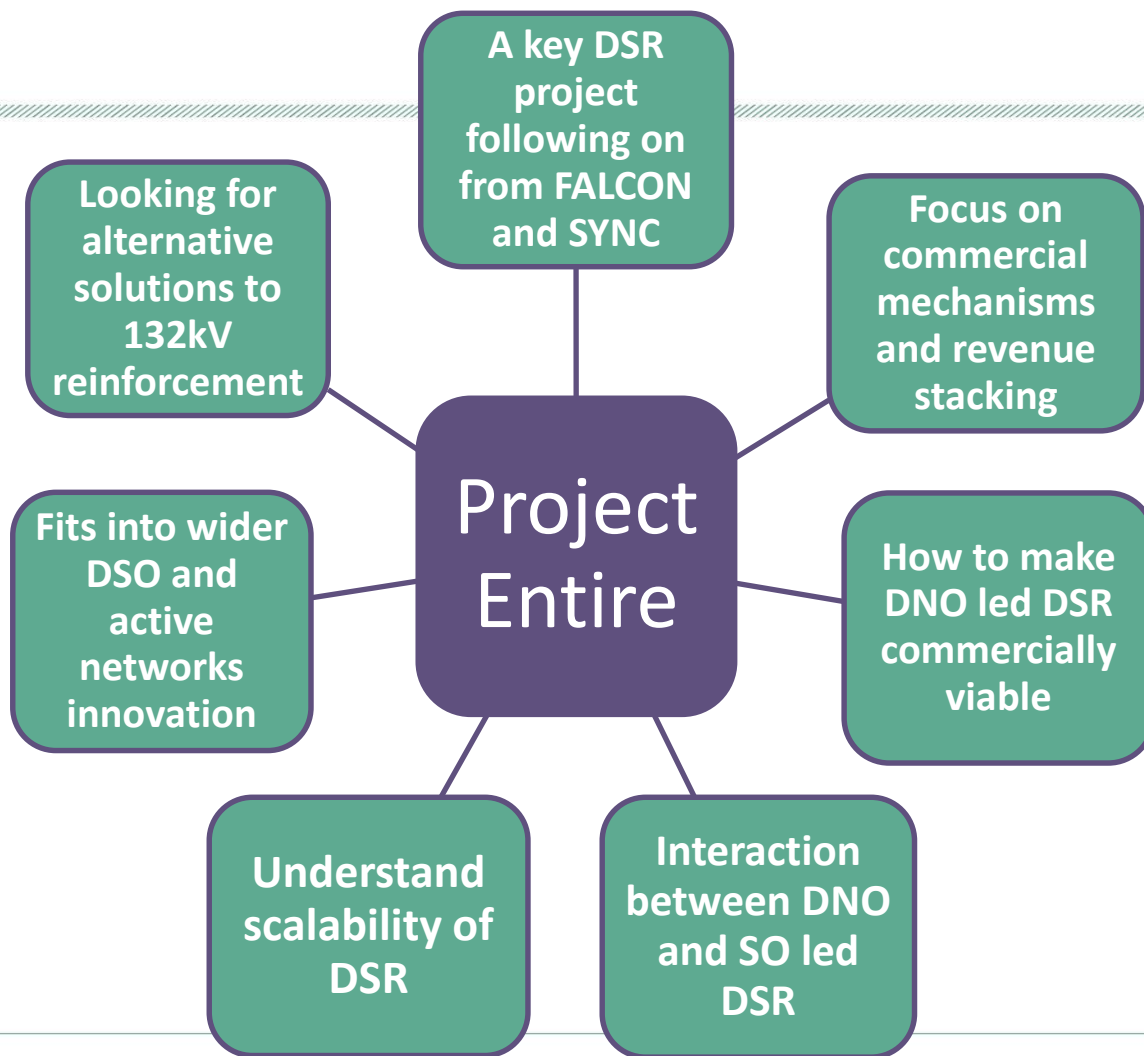
- *‘Demand Side Response is intelligent energy usage. It enables businesses and consumers to save on total energy costs and reduce their carbon footprints by increasing, decreasing or shifting their electricity consumption’ - Power Responsive*
- Utilises customer flexibility to help the network
- Demand Side includes DER (all non-BM)
- Flexibility following a signal
- “can” means both technically but also commercially



Why would a DNO want to use DSR?

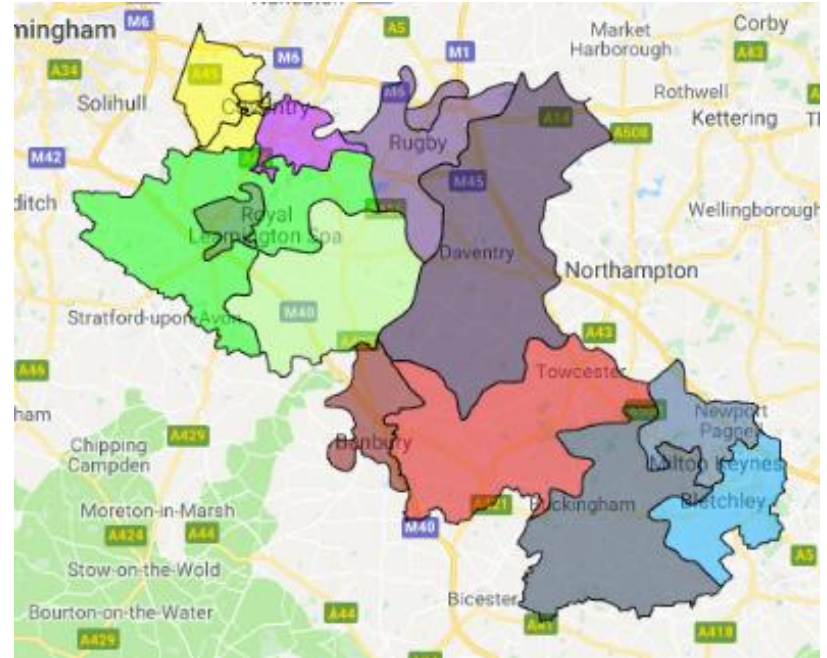
- Avoid or defer reinforcement
- For both winter peak and summer minimum
- Will always compare against traditional reinforcement which has variable costs
- DNO services are:
 - Locational
 - Focussed on higher voltages
 - Limited capacity (pay as you go)
 - Always compared with reinforcement
 - Potentially time bound





Project Entire

- Looked to recruit customers in 14 zones in the East Midlands
- Along the M1-M40 corridor
- Offered under Flexible Power Brand



Three Services

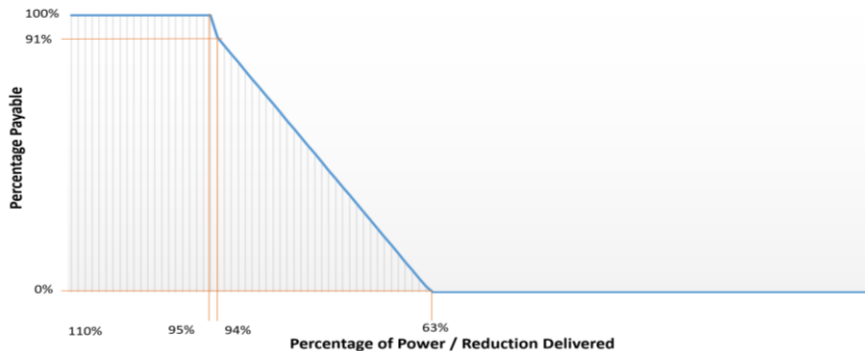
	Secure	Dynamic	Restore
Advance Payment	Arming	Availability	None
Utilisation	Medium	High	Premium
Customer declaration	Week Ahead	Week Ahead	Week Ahead
FP Accept / Reject	Week Ahead	Week Ahead	Automatic Accept
Dispatch Notice	Week Ahead	15 minutes	15 Minutes
Seasonal Requirement	All	Summer	All
Site Type	Half Hourly Metered	Half Hourly Metered	Half Hourly Metered
Generation	✓	✓	✓
Load Reduction	✓	✓	✓

- Secure and Dynamic are main services, Restore is additional
- Based on weekly process to enhance interactions with other services

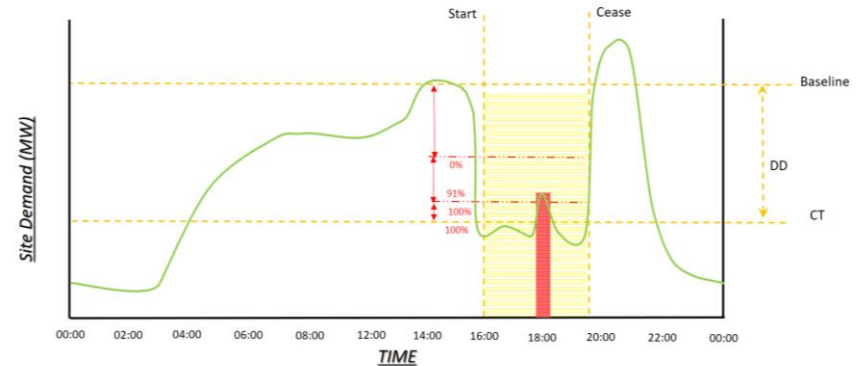
Payment Mechanism

- Arming/Availability fee
- Utilisation fee
- Full delivery incentivised through claw backs (3% per 1% under-delivered)

Utilisation Payments for Secure Service



Utilisation of 'Secure' CMZ – Reduction Site



Systems

- Cloud based system delivered by Kiwi Power
- Customer portal for availability declaration
- Customers enter availability by Wednesday (midnight)
- WPD accept by midday Thursday
- API for monitoring and dispatch
- Self test environment available
- Signals sent 15 mins before event
- Minute by minute metering

Flexible Power Participant API

This API has been developed to interface with participants. Alternatively a physical hardware interface is available. Please be aware that the API is currently in draft and will be subject to minor changes.

[To Participant](#)

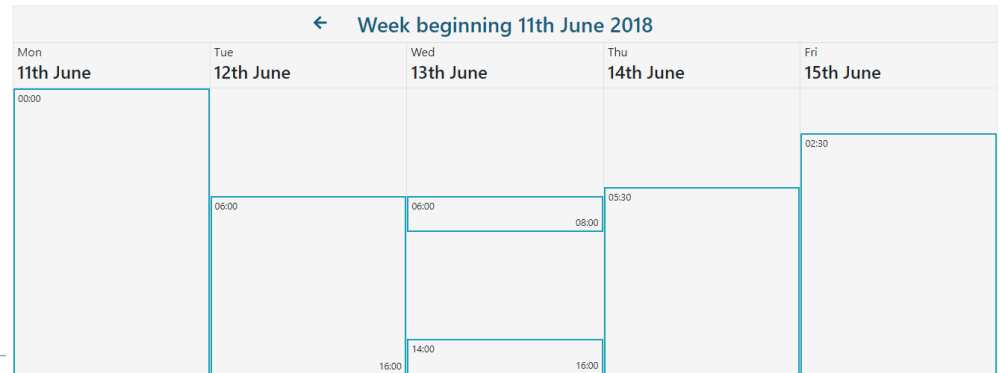
[From Participant](#)

Bletchley

Secure Restore Baseline Not Defined

This week can only be edited until the end of Wednesday 6th June 2018.

Secure Power 1000 kW Min. Event Dur. 30 min Max. Event Dur. 300 min Max. Weekly Dur. 600 min



Recruitment

- Initially ran EoI to assess viability of zones
- Simple process aimed at understanding what was available in zones
- Over 121MW of capacity responded across 69 sites

	Total	Compliant	Potential	Non-Compliant	Out of Zone
Sites	69	34	23	4	8
MW	121.47	41.46	17.95	41.0	21.06

- 12 zones taken forward to full procurement
- Full procurement still underway. Participants in various stages of on boarding

Operations

Systems live
since April

First calls
made
with
successful
delivery

Multiple
sites and
zones live

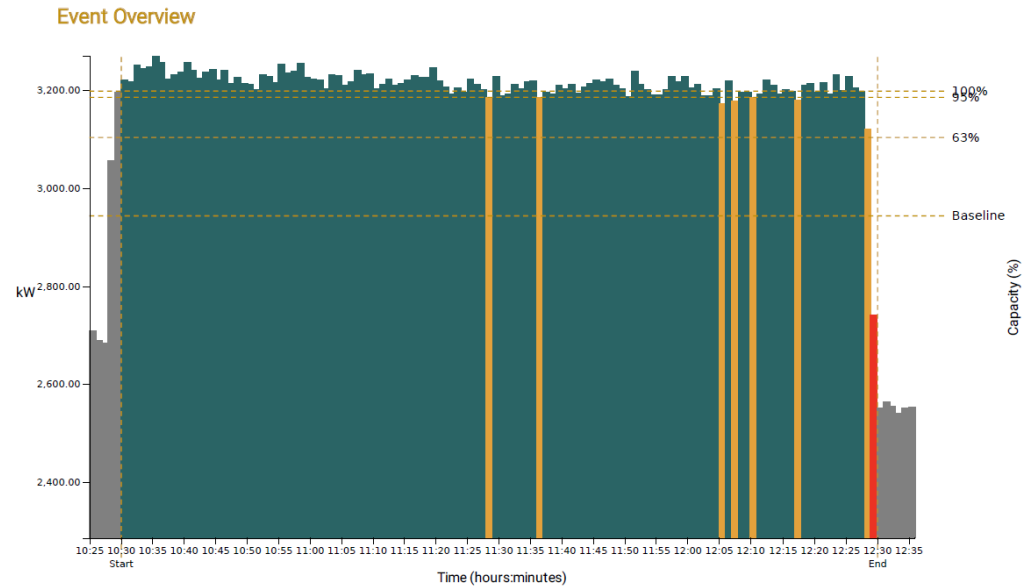
Many
more
sites in
pipeline

Further
testing
planned over
the rest of
the year



Settlement

- Each event has a performance report and earning statement created.
- Performance report: aimed at showing delivery
- Earning statement: highlights impacts on income
- Monthly invoicing



Key Learning to Date

Role of
DNO in
revenue
stacking

Significant
interest in
services,
however sign
ups have taken
longer than
expected

Generally
positive
feedback on
service
structures,
however some
issues with the
freedom given

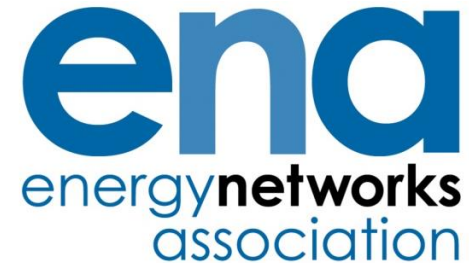
API set up
has been
taken
positively
and is a
simple way
of interfacing

Calls have
been
successful
to date

Internal
processes
and
systems are
simple to
use

Next steps

- Continue Operations till March 2019
- Continue to on-board participants
- Understand participant reliability
- Survey market understanding of the services
- Collect participant feedback on processes
- Log relevant learning
- Close project in April 2019
- Feed into wider DSR roll out plans
- Feed into ENA Open Networks project



Signposting

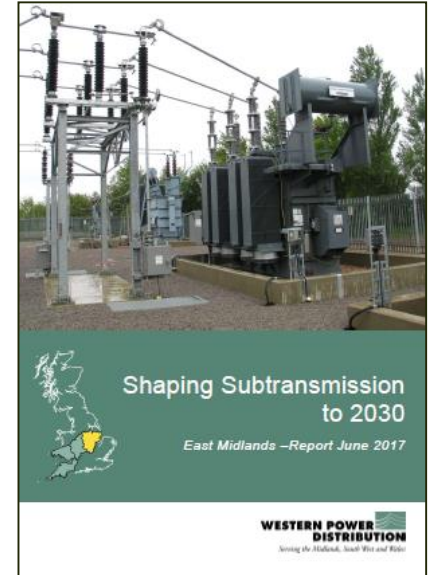
Uses WPD's Shaping Subtransmission Reports to identify future potential network constraints.

Signposting IS:

- A description of the system need to alleviate a potential network constraint.
- A description of the required behaviour of flexibility services in a network area (in a ESA).

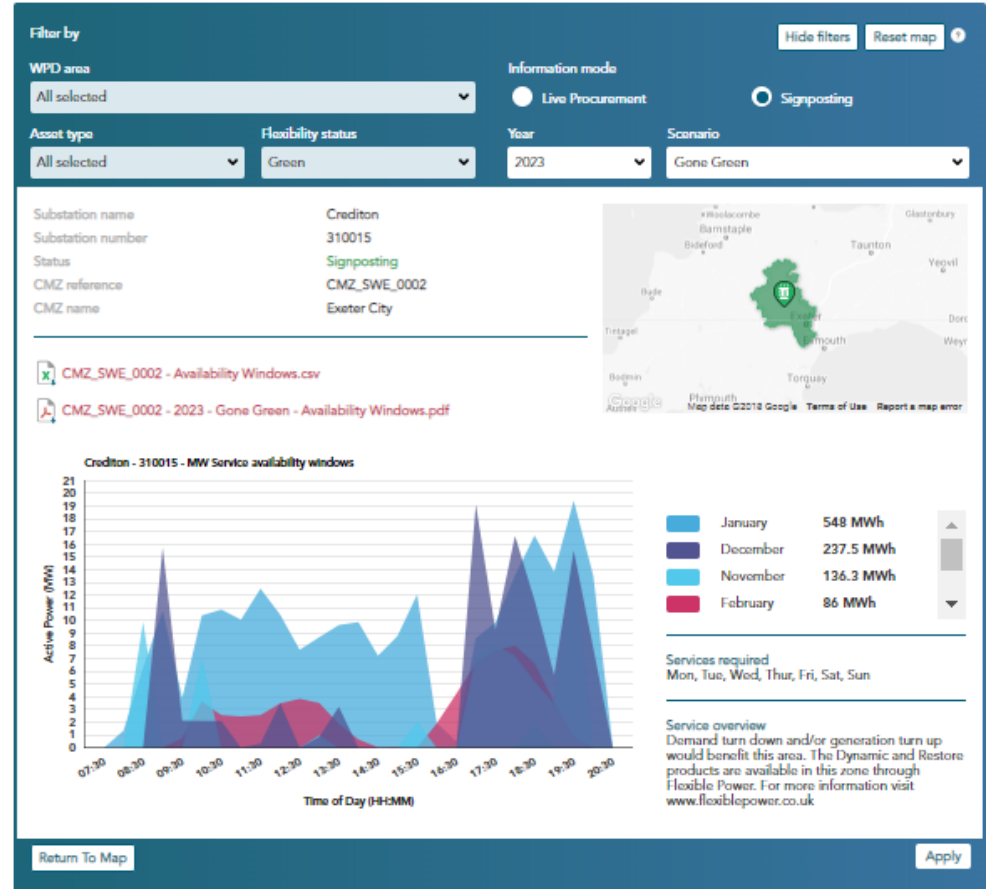
Signposting IS NOT:

- An invitation to tender for the provision of flexibility services to WPD.
- A here and now requirement, or an exact description of system needs.
- The only or best solution to network constraints.



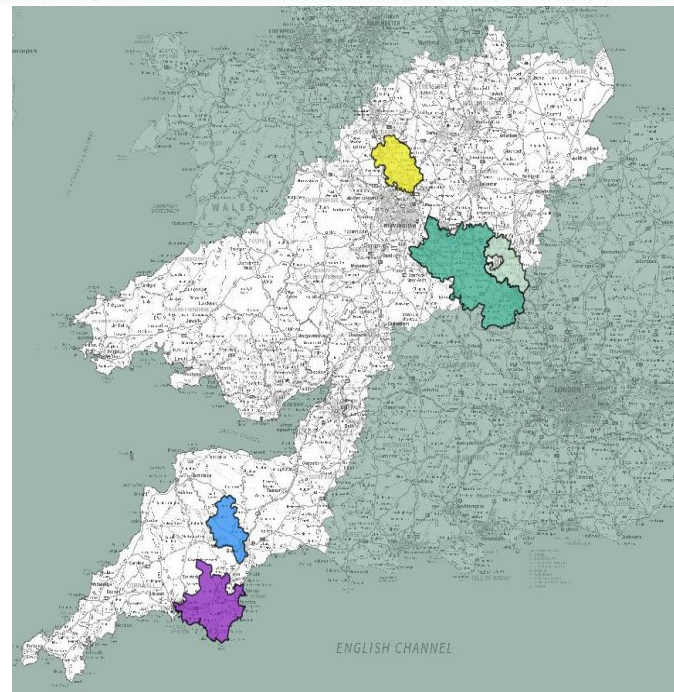
Flexibility map

- Displays our signposting and forecasting information
- Data is downloadable
- www.flexibilitymap.westernpower.co.uk



BaU Flexibility

- Ran EoI in June-July for 18 new zones
- 16 zones taken forward to full procurement
- Full procurement still underway. Procurement ends 19/09/2018
- Feedback on processes and information being sought



	Total	Compliant	Potential	Non-Compliant	Out of Zone
Sites	87	67	6	6	8
MW	261.4	166.9	2.3	5.9	86.3

DSO forward plan

- Published in August
- Highlights latest thinking and way forward through the lens of customers
- Commitment to assess 90% of load related reinforcement spend against flexibility



THANKS FOR LISTENING

WESTERN POWER 
DISTRIBUTION

Serving the Midlands, South West and Wales

Matt Watson

Western Power Distribution

Innovation and Low Carbon Networks Engineer

0117 933 2045/ 0791 245 0780

mwatson@westernpower.co.uk

wpdinnovation@westernpower.co.uk

www.westernpowerinnovation.co.uk