WESTERN POWER DISTRIBUTION

INNOVATION

NEXT GENERATION NETWORKS

Demand Side Response and other customer incentives

1.1 DSR & Customers

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Demand Side Response and other customer incentives

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WESTERN POWER DISTRIBUTION PROTEUS NEW

WESTERN POWER DISTRIBUTION FLEXDGRID

WESTERN POWER DISTRIBUTION PLUGS AND SOCKETS

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WESTERN POWER DISTRIBUTION NETWORK TEMPLATES

WESTERN POWER DISTRIBUTION SMART ENERGY ISLES

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WESTERN POWER DISTRIBUTION FALCON

Future Networks Programme

Assets

- Telemetry
- Decision support
- Improved assets
- New assets
- Flexibility
- Automation
- Incident response

Customers

- New connections
- Upgrades
- Information
- Self Serve
- Products/Service
- Tariffs
- Communities

Operations

- Reliability
- Forecasting
- DSO
- DSR
- GBSO Interface
- Efficiency
- SHE and Security

Network and Customer Data

- Airborne Inspections
- AIRSTART[1]
- Telecoms Templates
- Superconducting Cable
- SF6 Alternatives
- MVDC Test Lab
- Smart Energy Laboratory
- Statistical Ratings
- Primary Network Power Quality Analysis

- Hybrid Heat Pump Demonstration
- Hydrogen Heat & Fleet
- Carbon Tracing
- HV Voltage Control
- Solar Storage
- LV Connect and Manage
- Sunshine Tariff
- CarConnect
- Industrial & Commercial Storage

- DSO/SO Shared Services
- Project Sync
- Project Entire: Flexible Power
- Integrated Network Model
- Smart Meter Exploitation
- Distribution Operability Framework
- Data Analytics
- Voltage Level Assessment
- LV Connectivity
- Smart Systems and Heat[2]

Note: 1 – Funded by Aerospace Technology Institution; Note 2 – Funded by the Energy Systems Catapult

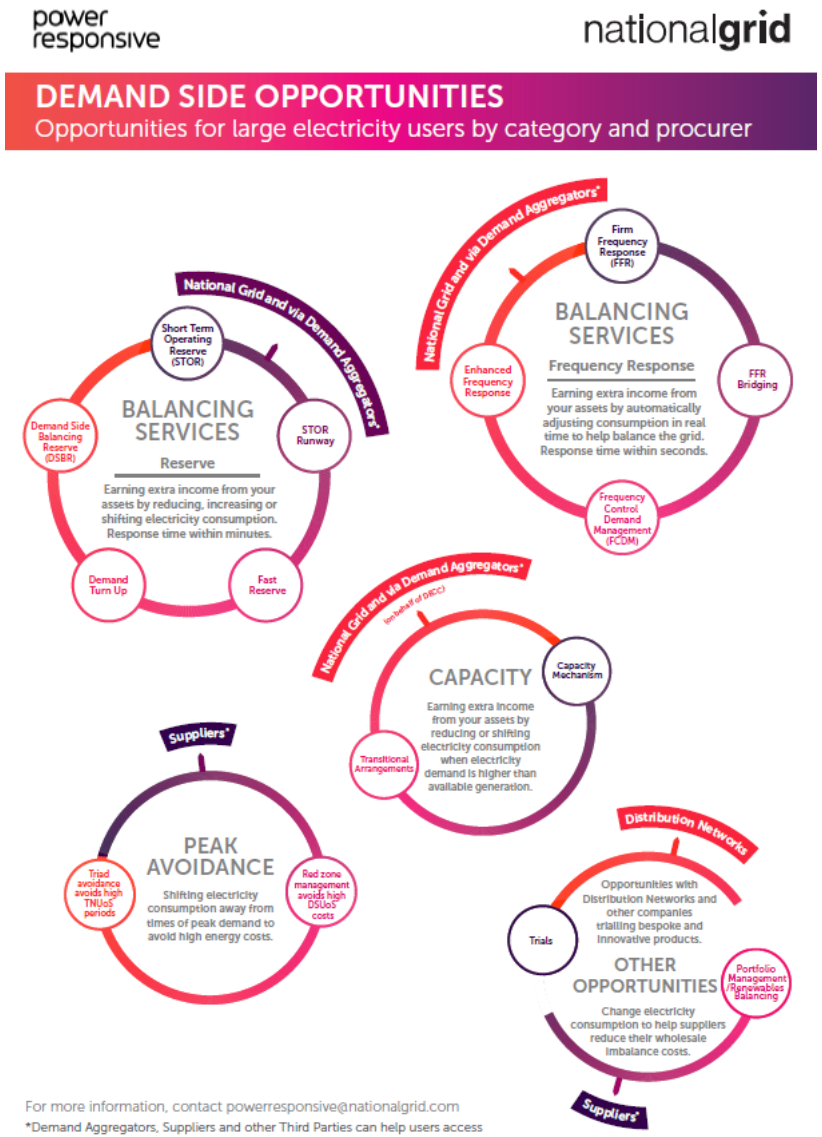
Contents

What is meant by Demand Side Response?

- *Demand side response is intelligent energy usage. By knowing when to increase, decrease or shift their electricity consumption, businesses and consumers will save on total energy costs and reduce their carbon footprint*. Power Responsive
- Utilises flexibility of the demand side to help balance network
- Demand that can change output following a signal
- “can” means both technically but also commercially

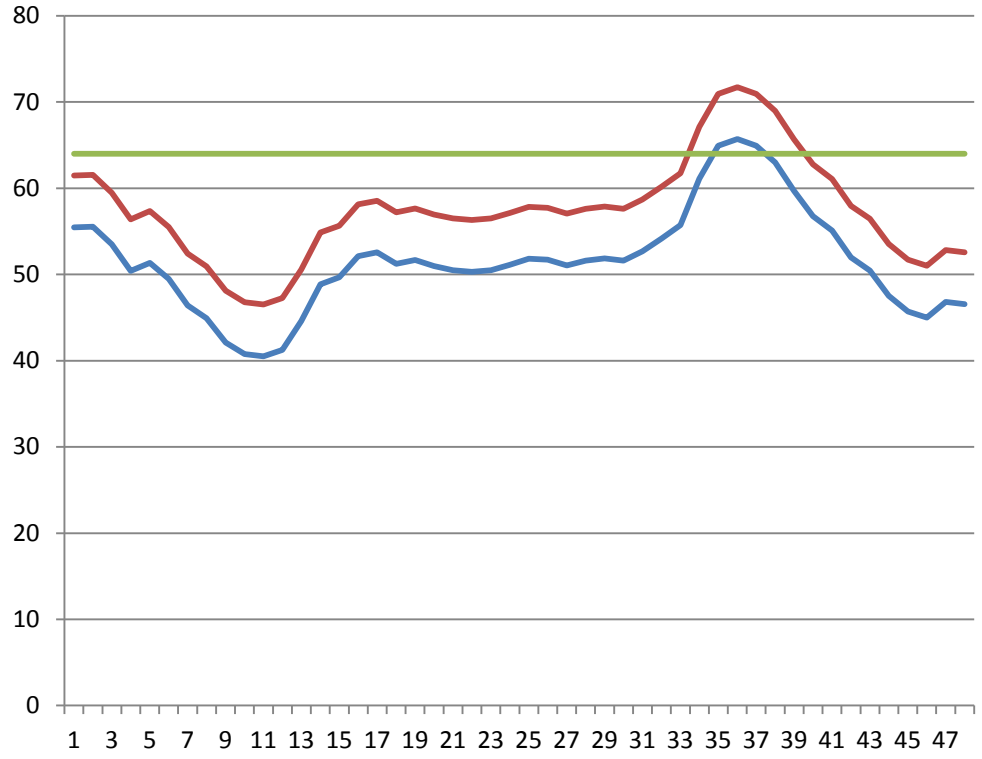
DSR sits in a wider market

- Lots of existing schemes and values for flexibility.
- Need to fit into wider market
- Commercial development of service just as important as the technical side.
- Very different from installing kit on the network



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



Key characteristics

- Locational
- Higher voltages
- Limited capacity (pay as you go)
- Always compared with reinforcement
- Potentially time bound
- For n-1 conditions but called pre fault
- Needs to integrate with ANM
- Needs to be integrated with other DSR schemes

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Domestic Vs Industrial & Commercial DSR

A distinction is often made between Industrial and Domestic flexibility (large and small scale) as they are very different in terms of technical implementation.

- For a DNO both will be competing with each other
- Industrial much more mature
- WPD has experience with both

Falcon

- Large T2 project based around Milton Keynes
- Investigated 6 alternative techniques for avoiding load based reinforcement on 11kV networks, including 2 commercial (DSR) techniques
- Proved technical capability and developed commercial frameworks
- Highlighted issues of conflicts with National Grid services

SYNC

- Trial looking into demand turn up
- Aiming to alleviate issues arising from high levels of generation and low load
- Developed the first collaborative service with National Grid: Demand Turn Up (DTU)
- Customer contracts with National Grid, WPD has a bilateral and can call any contracted customers.

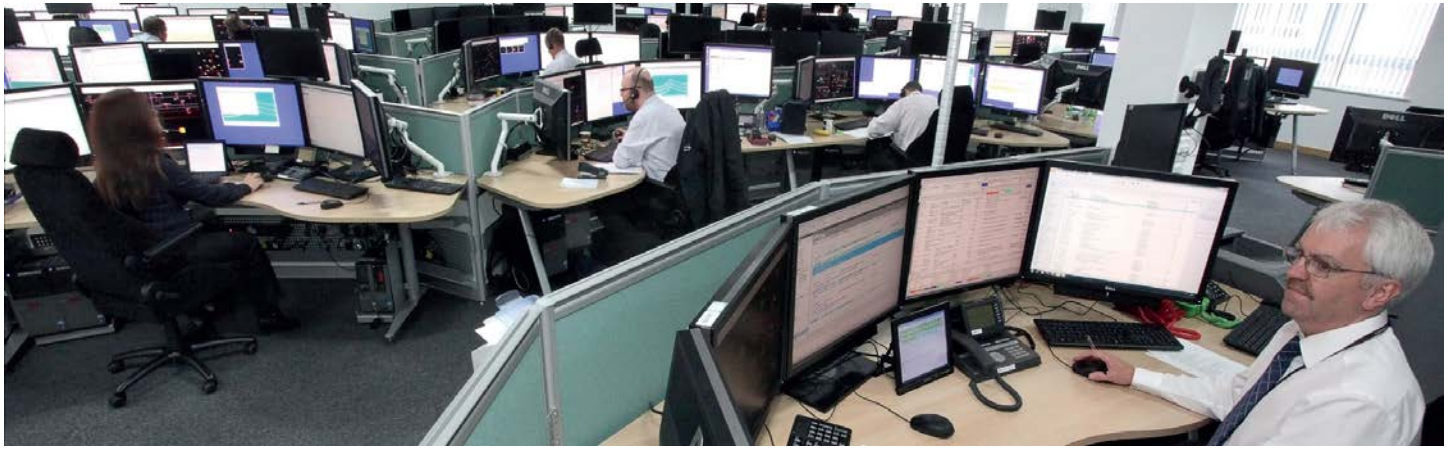
SYNC

SYNC also looking at:

- Effects of cloud cover in PV dominated networks.
- Options for customer led demand turn up
- Potential changes possible through DUoS

Entire

- Part innovation funding, part Business as Usual funding
- Using DSR for a constraint in the East midlands
- Will test using WPD as the customer interface to the wider flexibility markets



Learning to date from industrial flexibility

- Existing market shows that it is technically feasible.
- Key challenges around fitting into an existing marketplace, as shown in FALCON
- The amount of notice is important for reliability
- The value is important for interest
- Most flexibility is around embedded generation rather than actual demand shifting

Domestic DSR

- Very different technical implementation to I&C DSR
- Higher number of participants required
- Lower energy literacy/ awareness
- Much more engagement required

Sunshine tariff

- Offered customers in Wadebridge a ToU tariff with reduced costs from 10am- 4pm from April to August.
- Customer Engagement led by local energy cooperative
- Tariff implemented with Smart meters
- Aimed to investigate the viability of an offset connection agreement

WREN

TEMPUS energy

regensw delivering sustainable energy

Learning from Domestic flexibility

- Significantly more challenging than I&C DSR
- Several key enablers still required.
- Limited existing flexible loads
- DNO not best placed to act as domestic aggregator

Storage

- Technically Storage works well
- Expensive at the moment but prices are falling
- Look for market solutions before DNO led ones
- Will look to fit batteries into other services
- Treated like any other flexible load

Reactive Power Services

- Still to be trialled
- Service could be used to manage voltage.
- Reactive services from Customer-owned power electronic devices (solar PV, wind farms, etc.) instead of traditional devices such as Statcoms, SVCs, etc.;
- Emerging grid code requirements will place requirements on DNOs to actively manage reactive power at the TSO boundary;

DNO requirement to enable connections for market participants

- DNO must facilitate connection to the network to enable own but also wider services
- Include new technology such as storage, electric vehicles…
- Some policies in place, others in pipeline
- Projects investigating technical impacts of new LCTs: hybrid heat pumps, Hydrogen Heat and Fleet, I&C storage, Car connect…

THANKS FOR LISTENING

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

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