

WESTERN POWER 
DISTRIBUTION

Serving the Midlands, South West and Wales

The Changing Electricity Network

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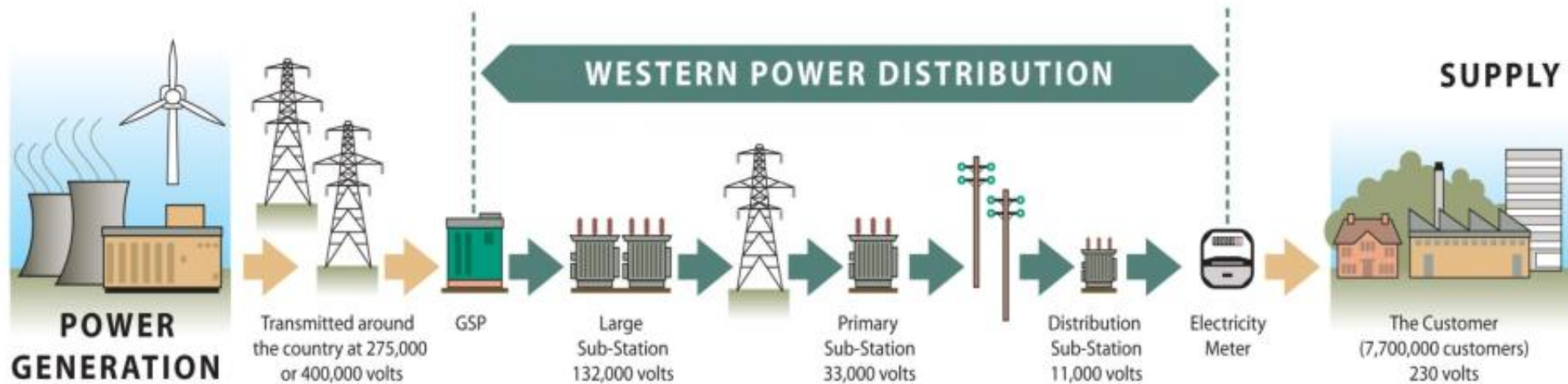
01 June 2017

Our service territory and customer base

- WPD is a Distribution Network Operator (DNO)
- We distribute electricity to 7.8 million customers
- We operate 4 of 14 distribution licence areas in the UK



Traditional Role of the DNO



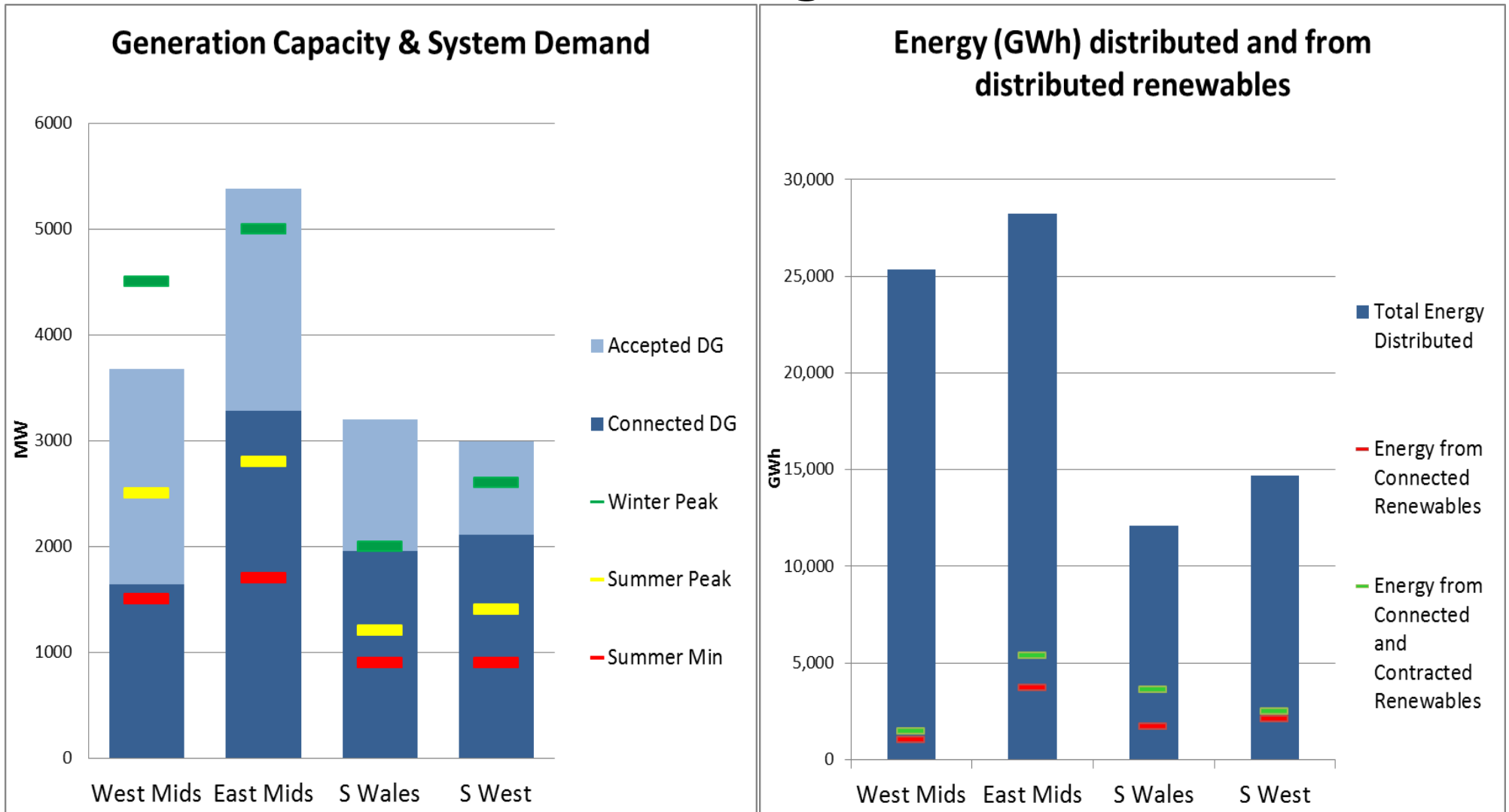
Key Activities

- Maintain the network
- Connect new customers
- Fix the network

Network Changes - Drivers

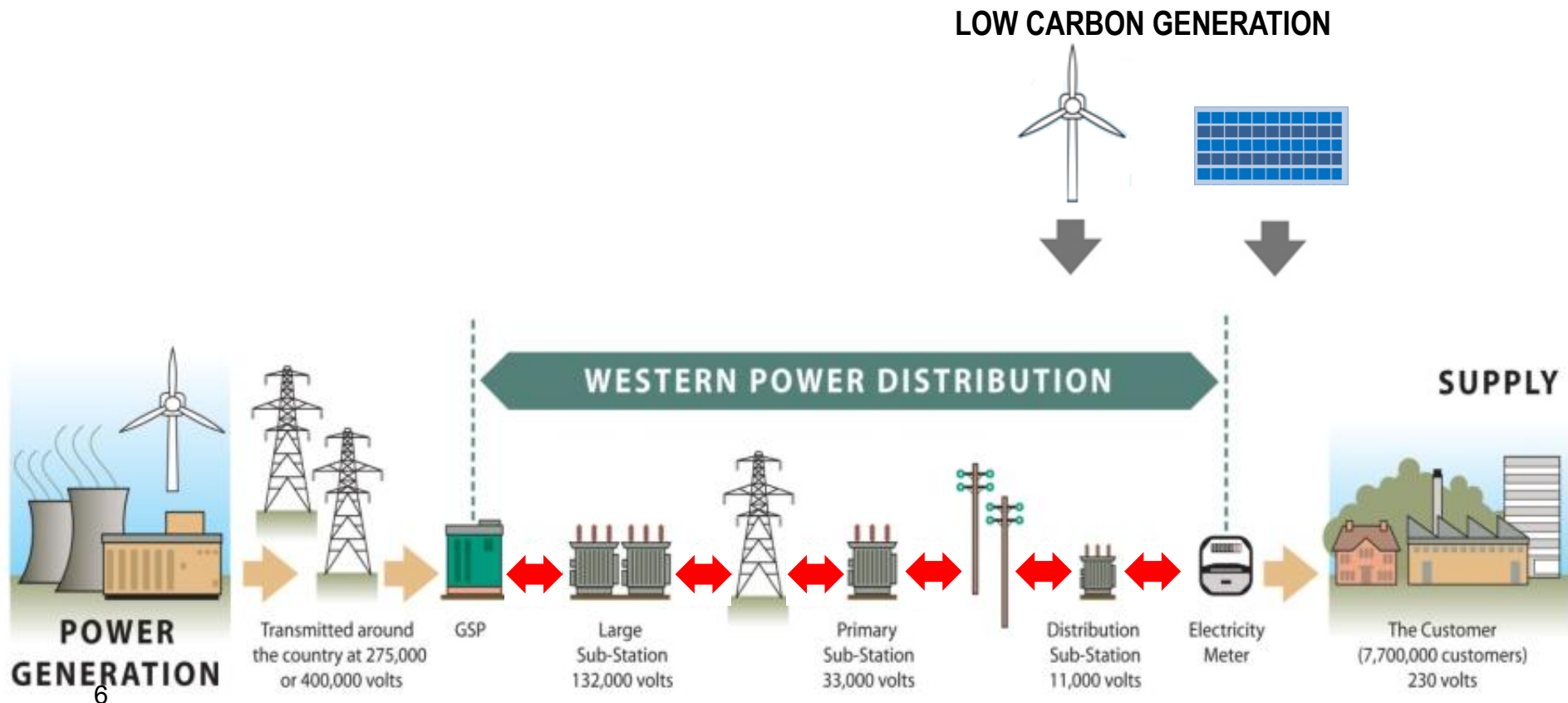
- Climate change and international agreements on reducing carbon emissions
- EU and UK binding targets – delivered through renewable DG, EV, RHI
- Rapid changes in GB generation
 - Much more DG
 - Huge increase in storage applications
 - Volatile market/incentives
 - Increased need for local and coincidental demand
- Consideration of whole system issues
 - Energy
 - Also Gas, Heat and transport fuels
- Significant uncertainty over the pace of change
 - Risk of stranded assets
- Long lead time to build conventional capacity

The impact of distributed generation and storage



The challenge for our network

- Significant volumes of new localised generation cause issues such as reverse power flows, voltage level changes, rapid variations in export/import levels (due to weather i.e. the sun and the wind)



What needs to change?

Moving from operating a passive network to a smart network (known as DSO) is a substantial change, requiring many new capabilities

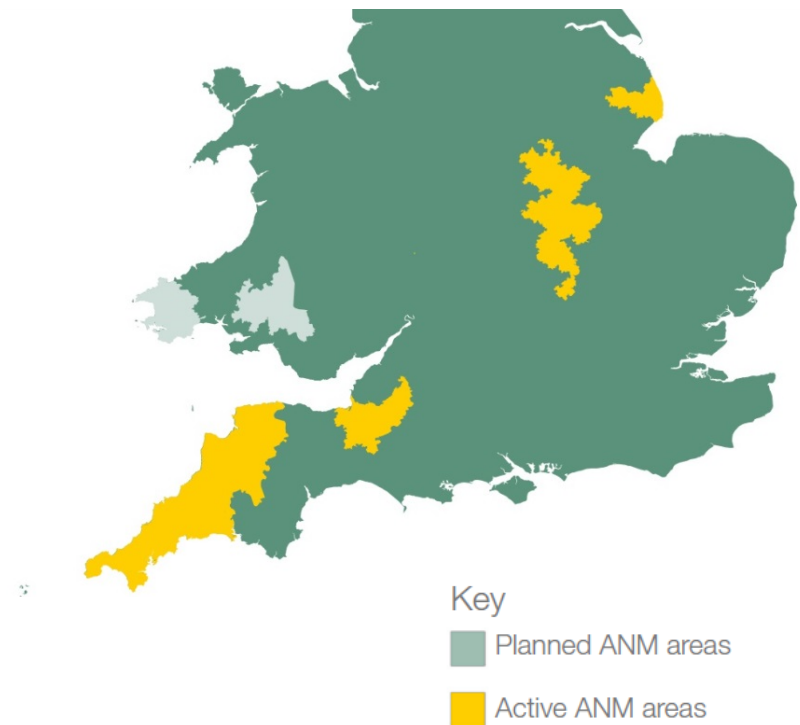
- Historic and real time energy flows
- Forecasting future energy volumes across the network
- Active reconfiguring of the system as needed
- Industry-wide commercial arrangements to contract services such as DG, active demand and storage
- Co-ordination of DSO operational requirements with the National Grid Transmission System Operator (TSO) to reduce conflicts
- Potential for provision of commercial services to Grid
- Simple platform for energy suppliers, generators/storage, local community schemes and other market participants to trade in energy services

What are the building blocks?

Data	Market	IT	Customer	Equipment
Alignment of Data – CIM	WPD regional energy scenarios	Power System Modelling	DSR products by customer segment	Telecommunications readiness
Time Series Data – MWh not MW	WPD Operability Framework	Energy Management and Settlement	DSM tariff structure	Transducers and measurement
Connectivity	DSR Shared Service	Time Series Data Stores	Alternative Connections	Settlement and metering data
	Visibility Platform	LV Connectivity / GIS	Managed Connections	Managed Connection Interface
	Charging Methodology	Settlement and Billing		Active Network Management

WPD Innovation Strategy

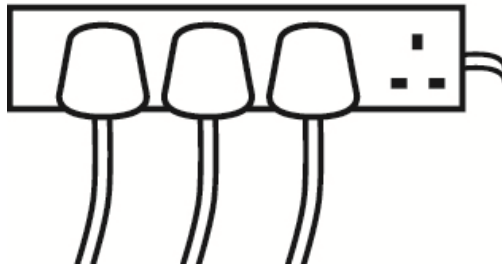
- ANM rollout
 - 4 active zones
 - 9 zones due to roll out
 - More as necessary
- Focus on Demand Side Services
 - A number of demand projects covering domestic and commercial
 - Projects investigating control over electrification heat and transport
- Key focus on integration of systems and data
 - Verification of data and enabling greater use
- Over 25 active projects



Plugs & Sockets/Cornwall Local Energy Market

Platform for trading flexibility services

Customers will alter electricity consumption or generation to benefit a third party.



DNO, SO, TO, Aggregators, Suppliers, Generators connect to the “Socket” via “Plugs”

- Notify flexibility services requirements
- Flexibility service trading
- Notify use of flexibility services
- More information at

<https://www.westernpower.co.uk/Connections/Generation/Community-Energy/Articles-and-case-studies.aspx>

centrica

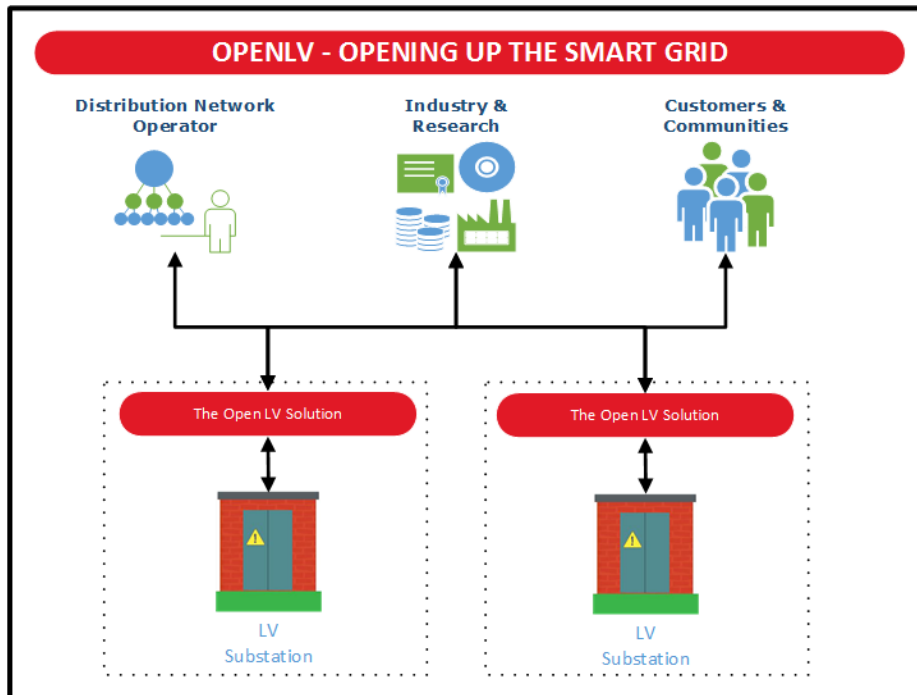
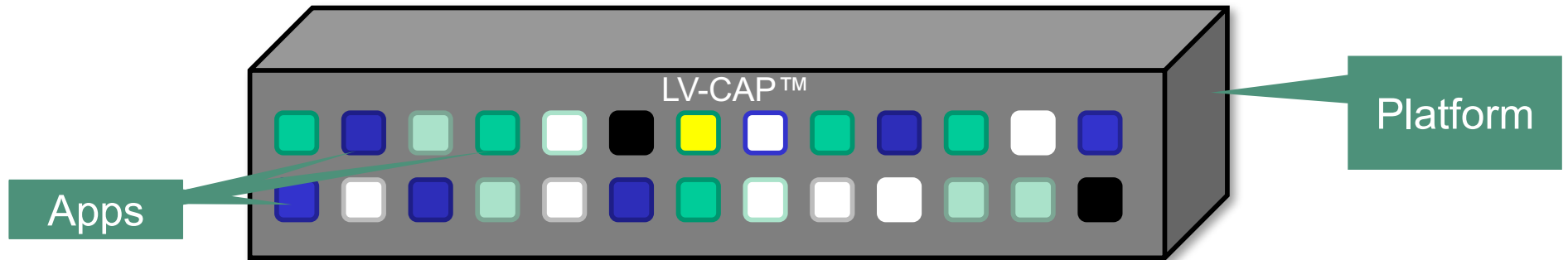
nationalgrid

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EXETER

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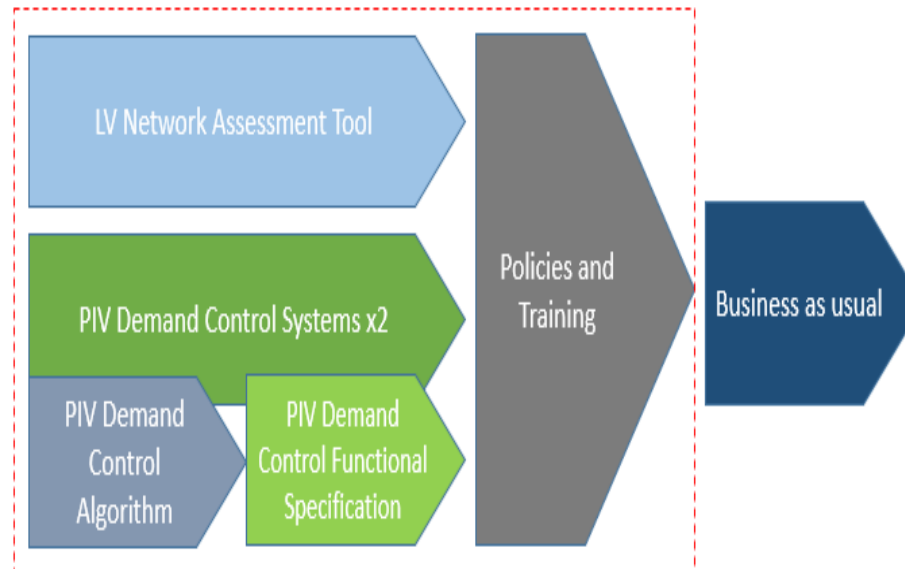
Example – Open LV



- OpenLV will deploy a workable open substation platform for both monitoring and control of the LV network.
- This platform will support the usage of a number of apps.
- Through the apps it will provide community energy groups access to LV network data.
- Stimulate the Market to facilitate a common platform with low cost entry for a range of new App developers.
- More information at <https://www.westernpower.co.uk/Connections/Generation/Community-Energy/Articles-and-case-studies.aspx>

Electric Nation - CarConnect

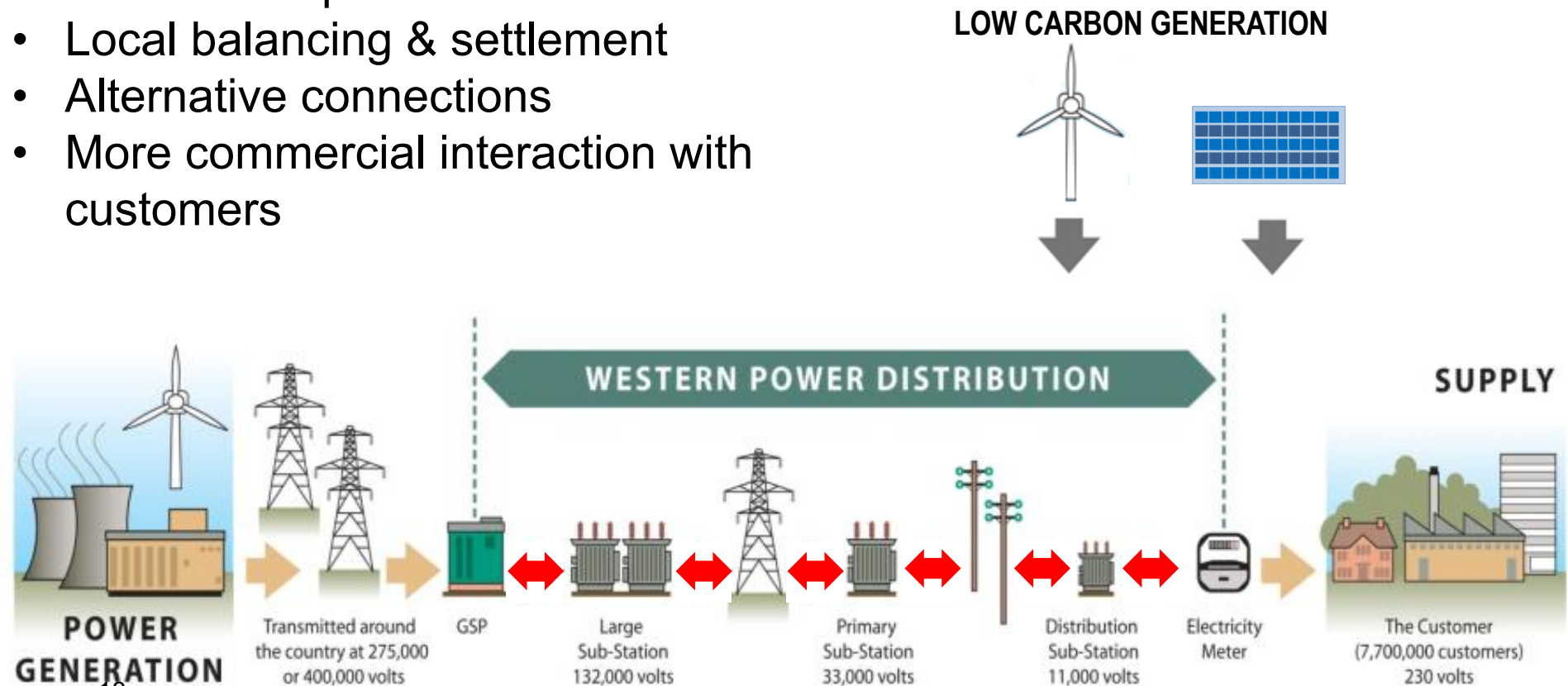
- World's largest Plug-in Vehicle trial consisting of 500-700 vehicles
- Using a wide range of EV models and charging rates of up to 32A
- V2G test bed development
- Developing all the tools required for Distribution Network Operators (DNOs) to manage EV uptake
- Modelling of EV network impacts and constraints
- Monitoring of real-time EV impact to defer reinforcement
- Mitigation of EV impact through Demand Side Response



The future role of the DNO

Key Activities

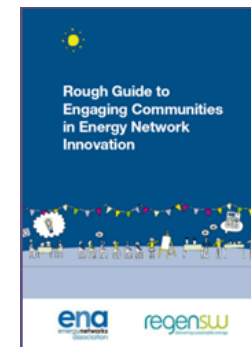
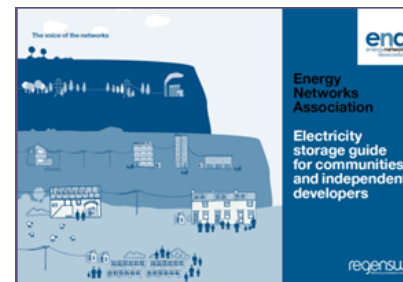
- Managing energy not power
- Demand response contracts
- Local balancing & settlement
- Alternative connections
- More commercial interaction with customers



Support for Community Energy

- Sign up for a connection surgery
- Visit our webpage
<https://www.westernpower.co.uk/Connections/Generation/Community-Energy.aspx>
 - Information and guides
 - Case studies
 - Videos
 - Event details

Connection surgeries



QUESTIONS?