electricity north west

Bringing energy to your door

# Distribution System Operator (DSO) Update

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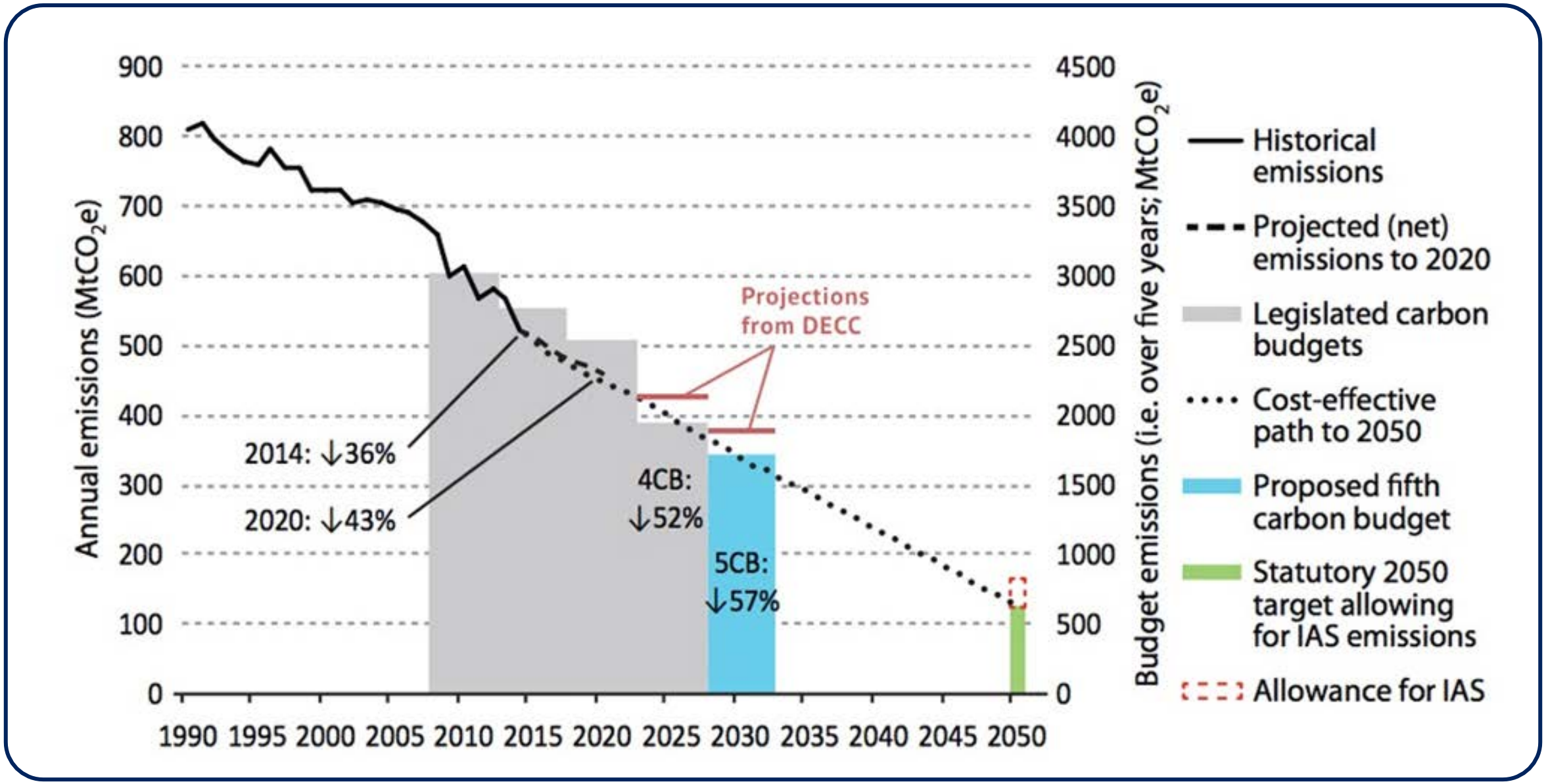
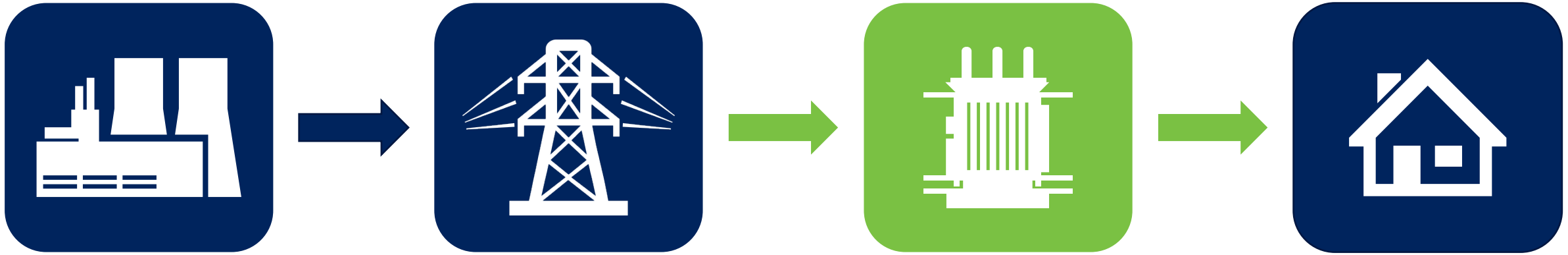
# Key driver - UK climate change targets



# What used to be relatively simple



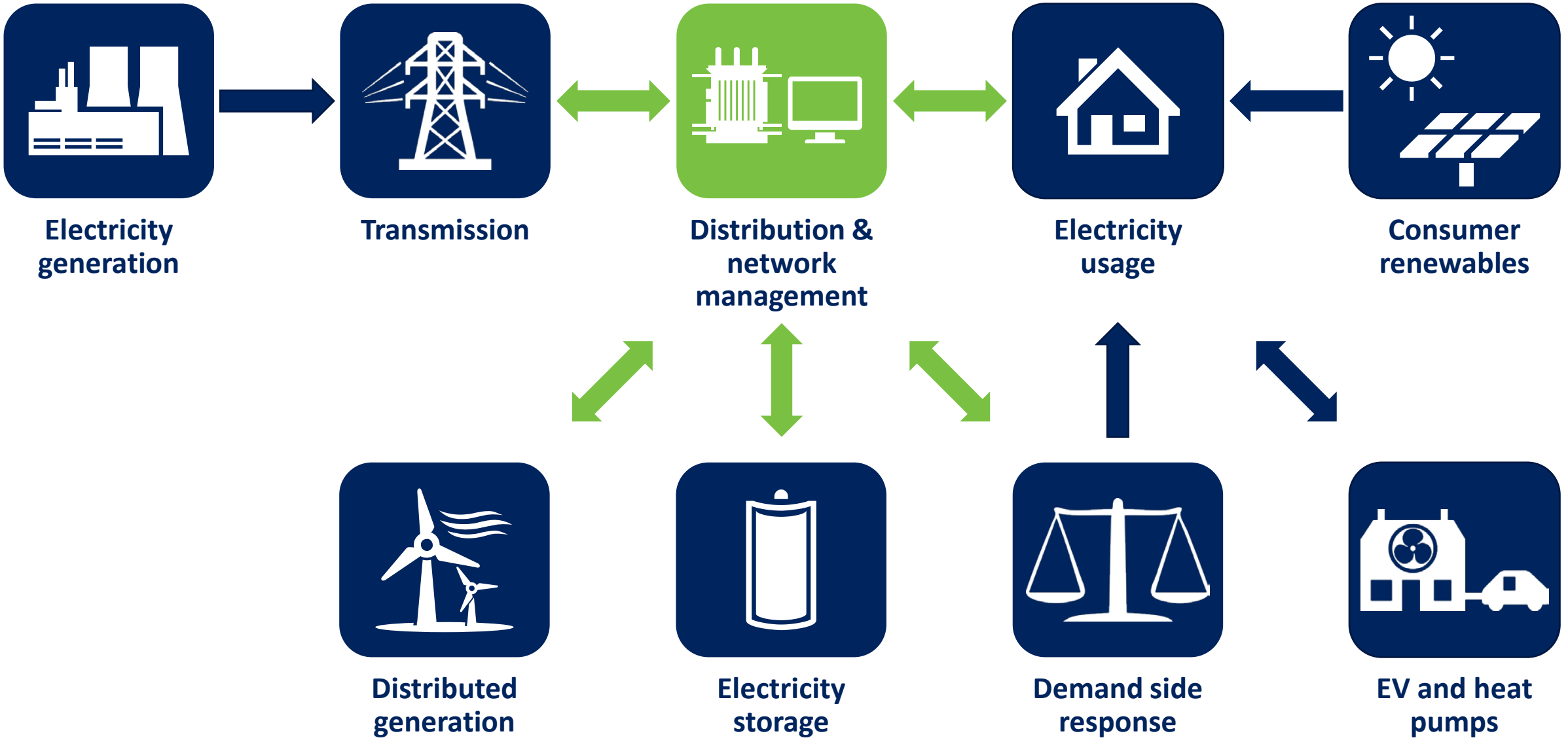
**Electricity generation**

**Transmission**

**Distribution**

**Electricity usage**

# Is now becoming far more complex



# From DNO to DSO

## Old Distribution Network Operator model

Low numbers of connections

Relatively easy to connect more demand

Limited customer engagement

Reactive management

Network sized to cope with peak winter demand

Very little renewable generation

## New Distribution System Operator model

Energy flows in multiple directions

Huge increase in number of renewable connections

Increasingly complex to manage supply and demand

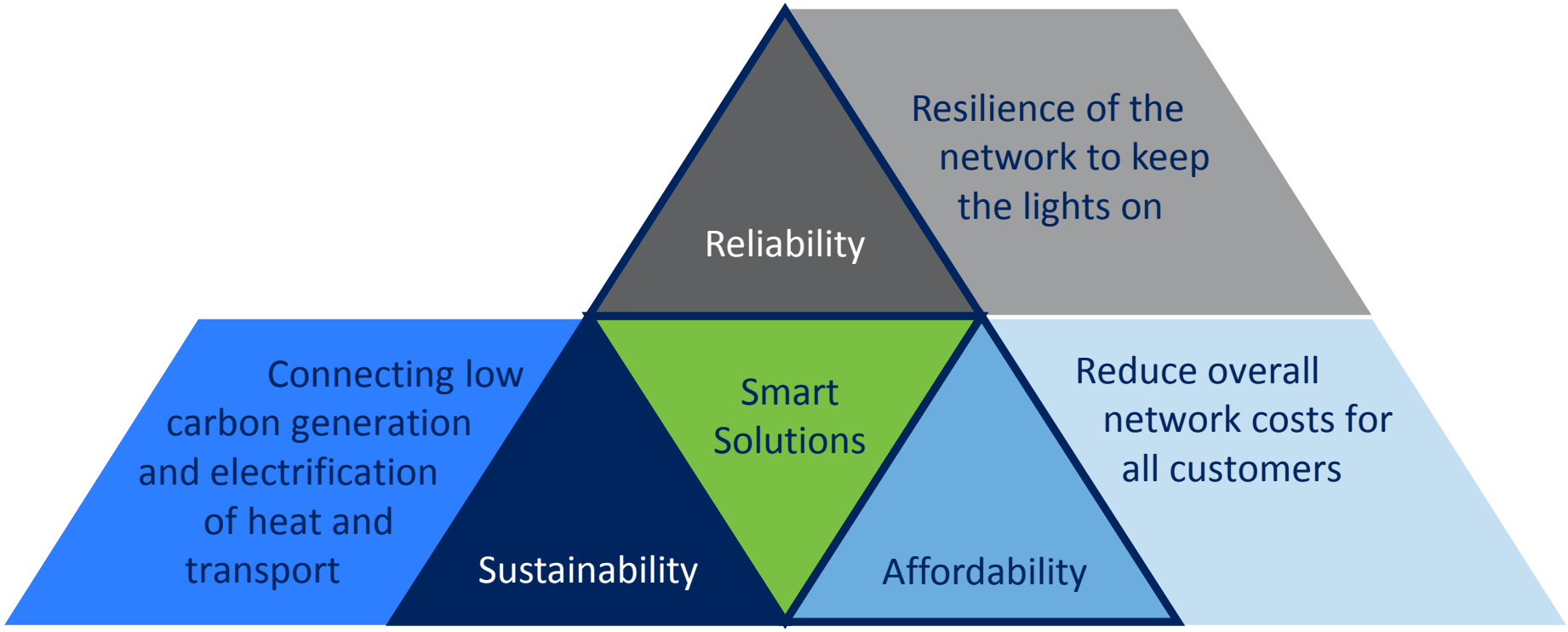
Need to build relationships, and facilitate competition and innovation

Much higher use of electricity for electric vehicles and heat

**Network Operators will need to play a far more sophisticated role in network balancing**

# Network operator challenges

## The network operator ‘Trilemma’




## Customers can help us deliver

# DSO: Definition (Open Networks Project)

"A Distribution System Operator (DSO) securely operates and develops an active distribution system comprising networks, demand, generation and other flexible distributed energy resources (DER). As a neutral facilitator of an open and accessible market it will enable competitive access to markets and the optimal use of DER on distribution networks to deliver security, sustainability and affordability in the support of whole system optimisation. A DSO enables customers to be both producers and consumers, enabling customer access to networks and markets, customer choice and great customer service."

# From DNO to DSO

**Fundamental role remains unchanged: The provision of network capacity**

Key challenge: To provide all network capacity users require, without expensive additional infrastructure

DSOs required to actively balance capacity, on a minute-by-minute basis, using real time data and automated technology

Achieved by establishing local markets where providers of flexibility services can sell this flexibility

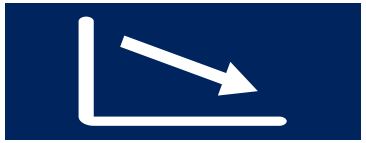
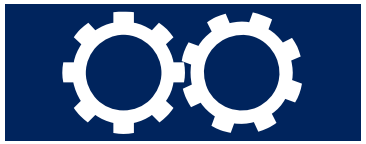
The DSO will create this market and buy flexibility

**To enable this transition DSO must become trusted facilitator and advisor**

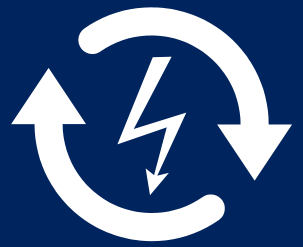
# From DNO to DSO: Our guiding principles

| Neutral, but not silent | Network automation | Collaboration | No regrets | Everyone's included | Affordable and efficient |
|---|---|---|---|---|---|
| We want to be a trusted source of information, helping to demystify the new, complex energy market, while remaining commercially neutral | We will provide sophisticated, automated network services that can meet the needs while keeping costs affordable | We will work with North West stakeholders and collaborate with them to develop local and regional solutions to deliver against devolved and national policy | We will work with stakeholders and customers to plan in a sensible, informed way which will facilitate the development of flexible markets in our region | We are committed to ensuring that the poorest in society are not disadvantaged by energy sector developments and have opportunities to secure benefits | We will continue to focus on value for money and on making efficient investment decisions |

# What we've already delivered

| | | |
|---|---|---|
|  | Improved data quality and network connectivity | Cleansed network data for new Network Management System providing a reliable network model for DSO services |
|  | Better use of network analysis tools | Better understanding of load flow and fault levels and a strategic review of modeling tools and methodology |
|  | Flexible connections | Developers benefit with quick, affordable connections |
|  | Control room data integration with customer service | New interfaces ensures that we're better able to manage impact of network events on customers |
|  | Improved network automation | Automatic Restoration System has significantly improved customer impact of faults on the high voltage network |
| RESPOND | Enabled Respond | Active fault level management that avoids traditional network reinforcement |
|  | Smart meter integration | Will give better visibility of the performance of the whole system and enhance the decision-making capacity of network operators. |

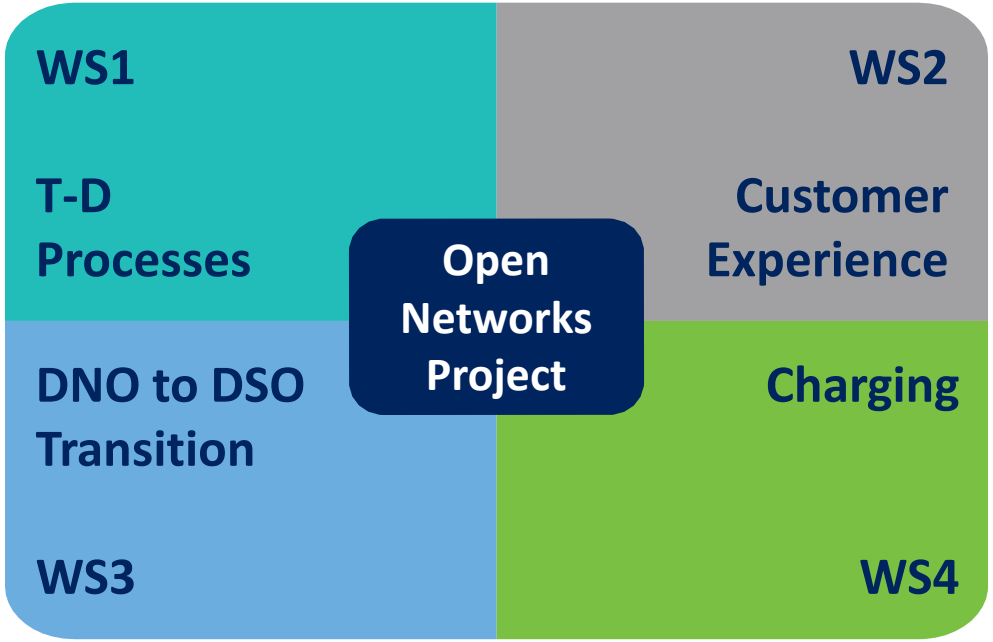
# What we are currently working on

| | | | | |
|---|---|---|---|---|
|  |  |  |  |  |
| Active network management (ANM) | Transmission operator interface balancing | Looking ahead capability | Forecasting | Contract management and curtailment index |
|  |  |  |  |  |
| Distributed energy resource management | Capacity mapping | Industry data flows | Automated point of connection | Legacy Operational Technology |

# The ENA Open Networks Project

Whole system investment and operational planning processes and data flows from years ahead to near real time

DSO transition roadmap, functional requirements and model for DSO, market model options




Customer journey maps for connections and updated connections agreements

Reviewing current charging arrangements, recommend smart tariffs, flexible connections and ancillary service pricing and a longer term whole system pricing review

**Phase 1** — End 2017

Definition of T-D processes, customer experience, DNO to DSO transition and charging

**Phase 2**

Impact assessment of options, trials and preferred designs

**Phase 3**

Regulatory enactment

**Phase 4**

Design, build and test

# DSO Transition Timeline

**Current**

- Flexible Connections
- Flexibility Services EOI
- Tactical ANM Rollout
- Full ANM Design
- Legacy Technology

**2019 – 2020**

- Wider ANM rollout
- TSO-DSO interface
- Regional Requirements
- Capacity / heat maps

**2020 - 2023**

- Further investment in DSO capabilities
- Full ANM & DER services
- Network visibility/ online PoC

**2024 - 2030**

- DSO commercial operations are core business capability
- Full Active System Management

# Summary


Climate change imperative drives increasing urgency to deliver DSO capability

Energy trilemma constrains acceptable solutions

Multi-sector innovation is currently demonstrating what can be done

Ease of deployment and market access must not constrain growth

Further thinking and innovation still needed on the shape and scope of network activities to make this happen

Development of new RIIO outputs needed e.g. capacity incentive?

DNOs to DSOs facilitating wide participation in new markets

DSOs could play increased role in energy efficiency roll-out

# Questions?