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The UK's Smart Systems and Flexibility plan

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Outline

- Ofgem, its role, and current initiatives
- Changes affecting the energy system
- Ofgem's strategy for the energy transition
- The Smart Systems and Flexibility Plan
- The issues we have examined
- Next steps

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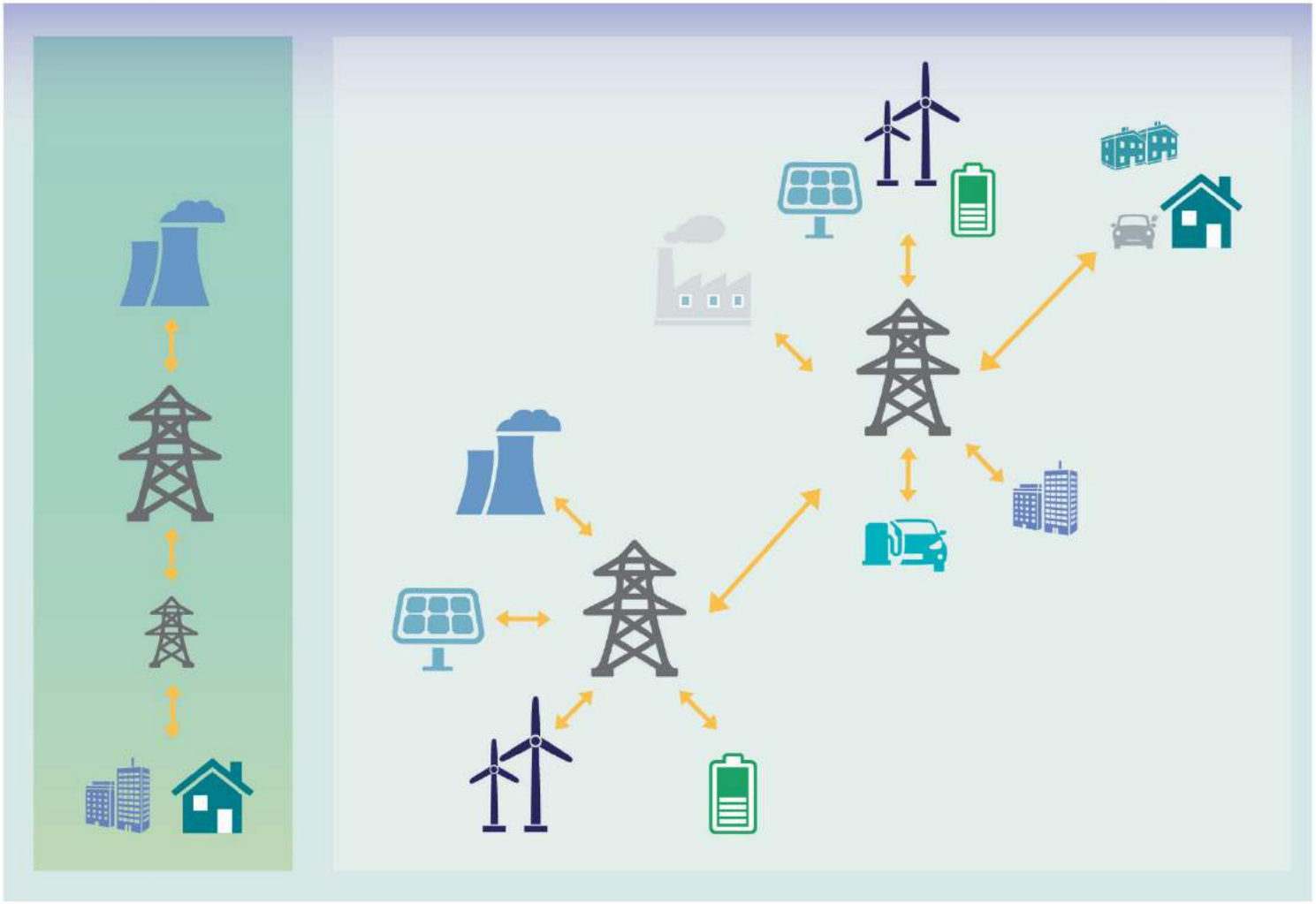
Ofgem's role

- Protecting current and future consumers
- Regulating monopolies
- Access to the system
- Making markets work for consumers
- Overseeing regulatory and commercial arrangements
- Being independent of industry and Ministers – thinking long term, providing stability

Context in the UK

The need for flexibility and smart solutions



Graphic courtesy of National Grid

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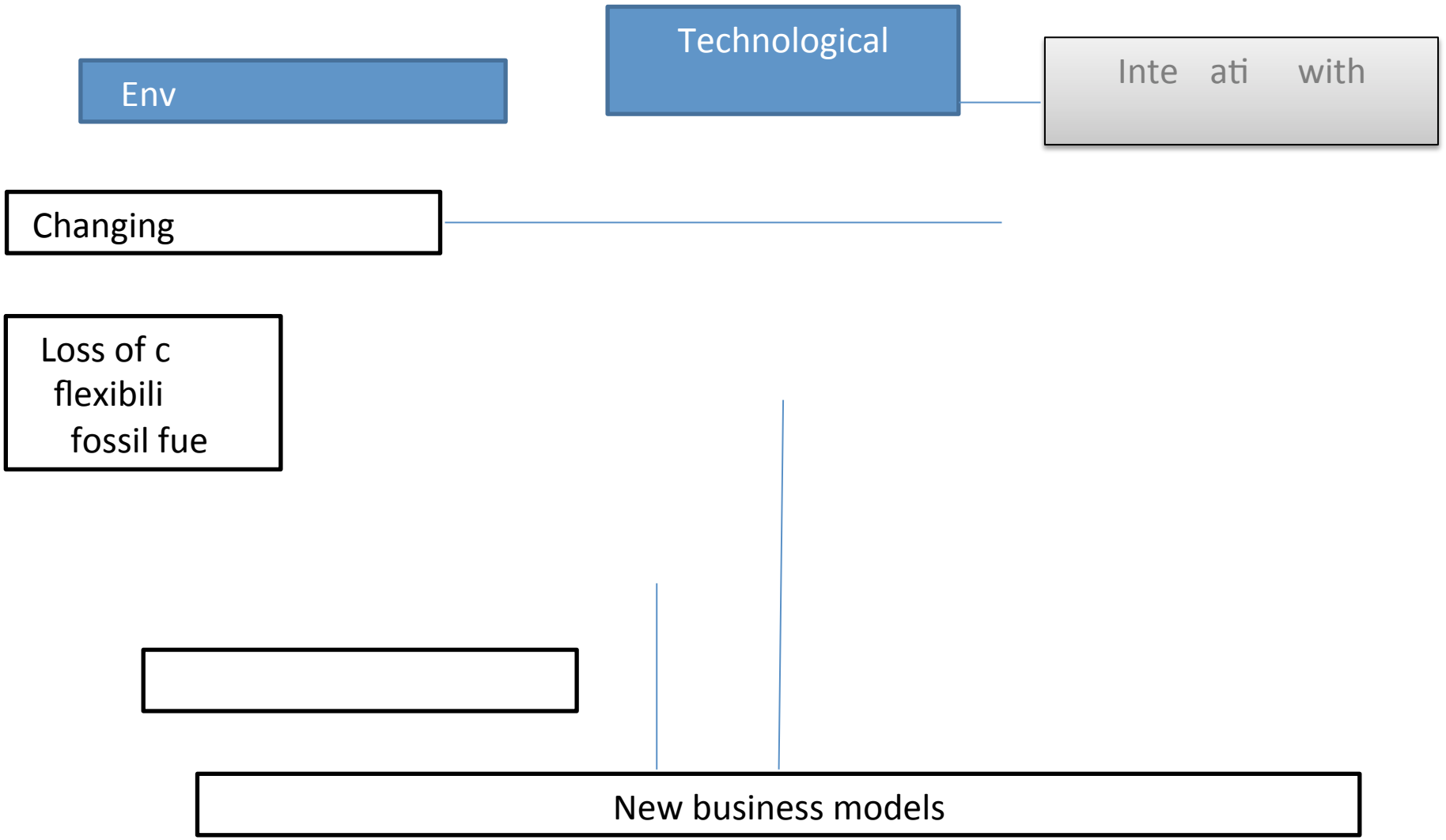
THE CHANGING ENERGY WORLD



Context

Recent growth in **demand for new generation connections at distribution** has **outstripped forecasts..**

..Posing challenges for the DNOs to meet customers' needs

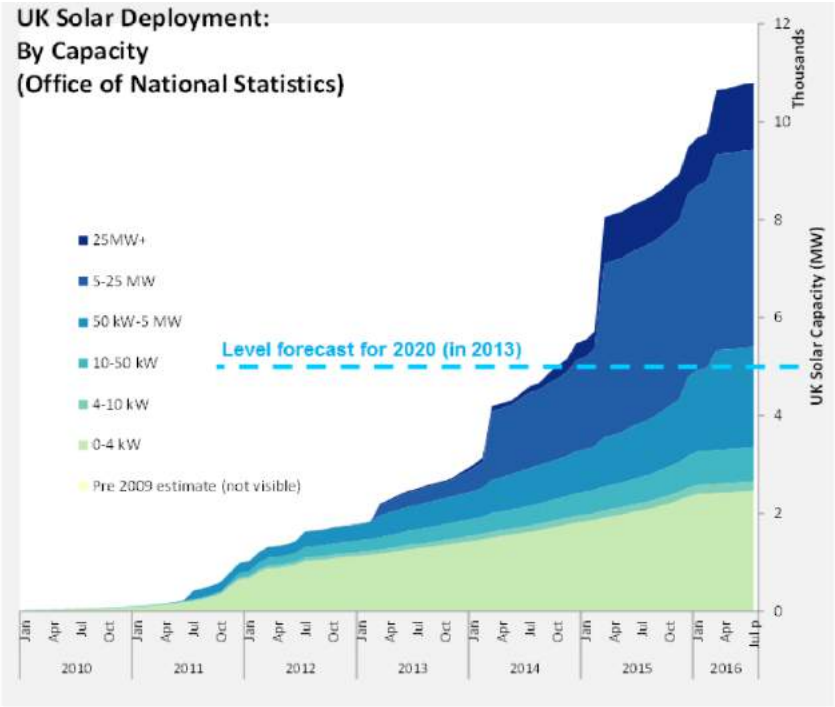
Connection delays in the South West highlighted the level and impacts of constraints, leading to our 'Quicker, More Efficient Connections' (QMEC) work.

We **encouraged DNOs** to:

- Consider **innovative solutions as BaU options**, and
- **Trial new approaches** to bringing forward **new investment (eg consortia).**

Our latest publication:

- **Updates on progress from QMEC** and
- Seeks to build a **picture of the status of constraints** across the network



Solar capacity has exceeded forecast levels

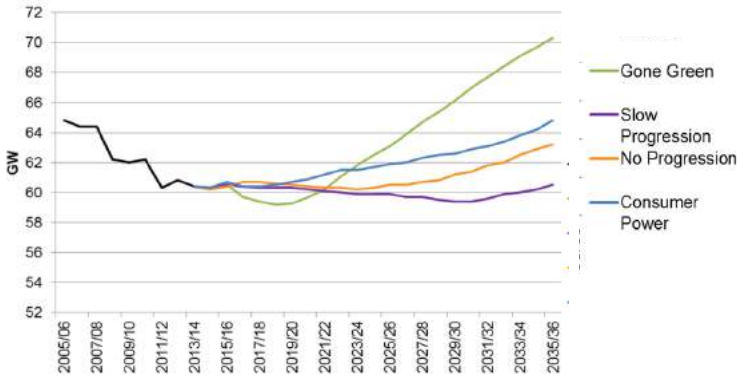
By Dec. 2011, distribution-connected generation accounted for 13% of GB generation capacity, doubling to 26% by the end of 2015 - around 24GW (DUKES).

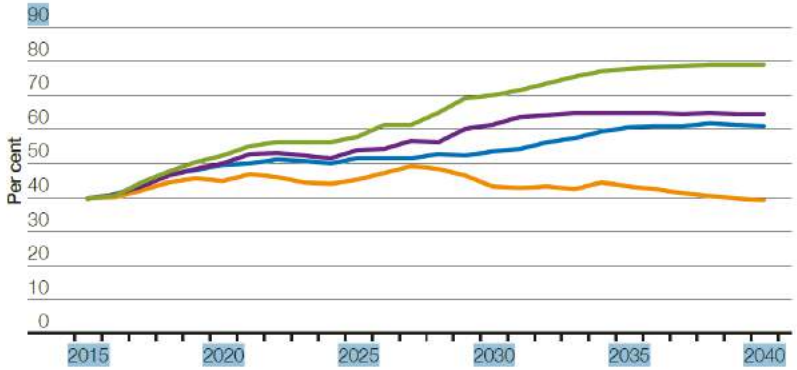
Context

- Increasing intermittency & inflexibility in generation
- Increasing distributed generation
- Changes in consumer behaviour
- Changing demand – Electric Vehicles & heat

A smart energy system, including energy storage and demand flexibility can help address these challenges and deliver secure affordable and clean energy now and in the future.

Most models forecast significant increases in electricity demand and in the proportion of generation from low carbon sources (generally more inflexible or intermittent) (National Grid, Future Energy Scenarios 2016)





Ofgem's future facing work

- RIIO framework for network regulation
- Separation of system operator role
- Non-traditional business models and Innovation link
- Future retail regulation
- Flexibility and the joint Smart Systems and Flexibility Plan with the UK government
- Targeted charging review
- Strategy for energy system transition

Ofgem's regulatory strategy for the energy system transition

Principles

- **Aligning incentives,** so that monopoly network operators and the gas and electricity system operator act in the interests of consumers.
- **Cost reflective** charges for monopoly services that reflect the incremental costs and benefits of how consumers and other parties use the system. This includes minimising harmful distortions arising from the recovery of residual charges for using the networks.
- **A level playing field,** so that all technologies and business models can compete equally, without barriers to entry to the market.
- **Efficient allocation of risk,** so that those best placed to manage the uncertainty inherent in a rapidly changing system shoulder the risks involved.
- **Harnessing markets** and competition where it can bring benefits to consumers.

The right incentives for

- System users
- System operation
- Networks

Our approach to Smart Systems and Flexibility

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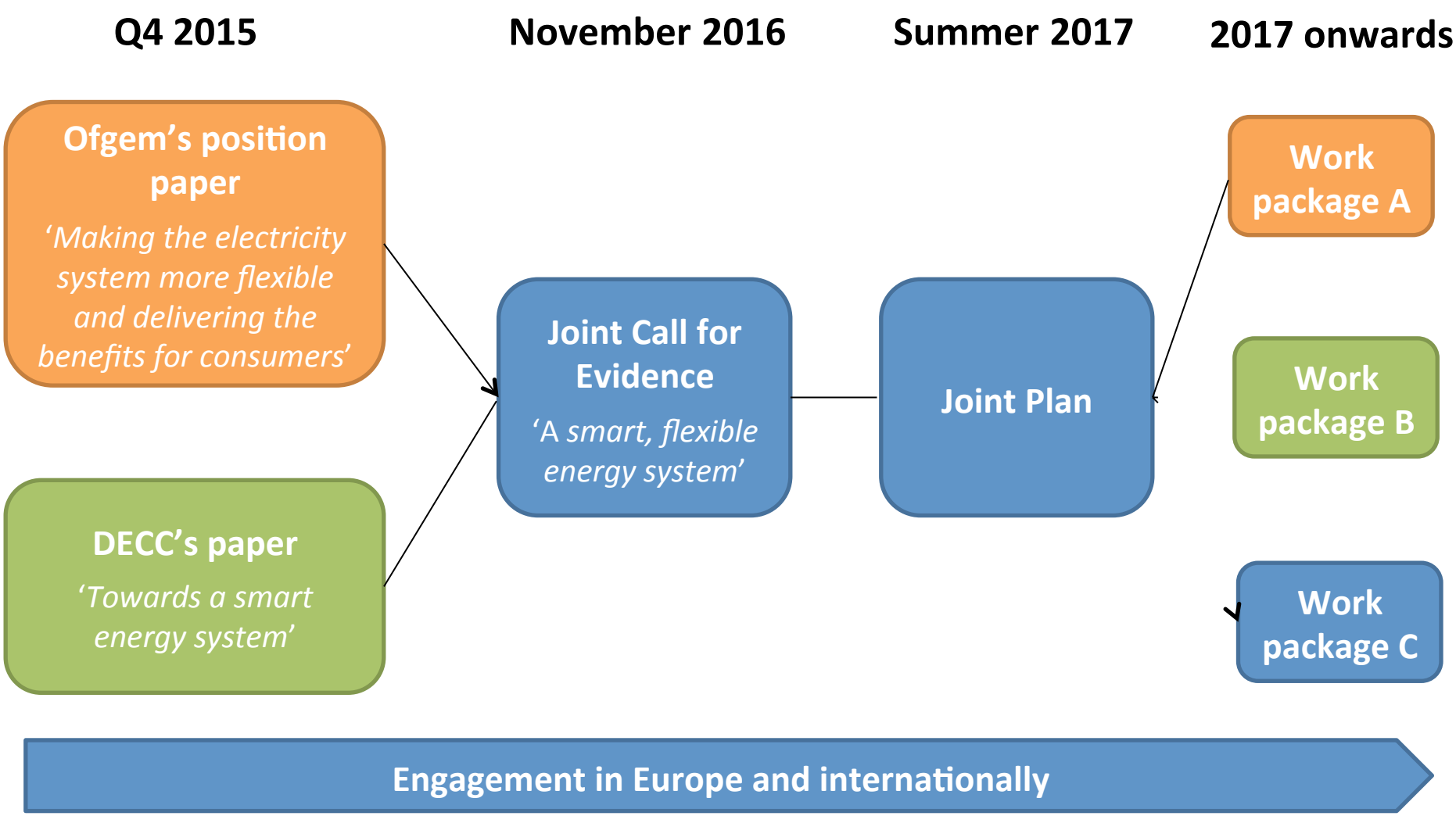
Department for Business, Energy & Industrial Strategy



Smart Systems and Flexibility Plan

- 29 actions in three categories –
  - Removing barriers to smart technologies
  - Smart homes and businesses
  - Markets which work for Flexibility
- Regulator, government and industry responsible for implementing
- Some actions immediate, most by 2019
- Longer term issues being addressed through follow on from regulatory strategy

Joint call for evidence

Contents

- **Removing policy and regulatory barriers**
  - Enabling storage
  - Clarifying the role of aggregators
- **Providing price signals**
  - System value pricing
  - Half hourly settlement
  - Smart tariffs
  - Smart distribution tariffs
  - Other government policies
- **A system for the consumer**
  - Smart appliances
  - Ultra low emission vehicles
  - Consumer engagement with DSR
  - Consumer protection
  - Cyber-security
- **The roles of different parties in system and network operation**
  - The impact of system changes
  - The need for immediate action
  - Further future changes to arrangements
- **Innovation**

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Improving price signals

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Markets that work for flexibility

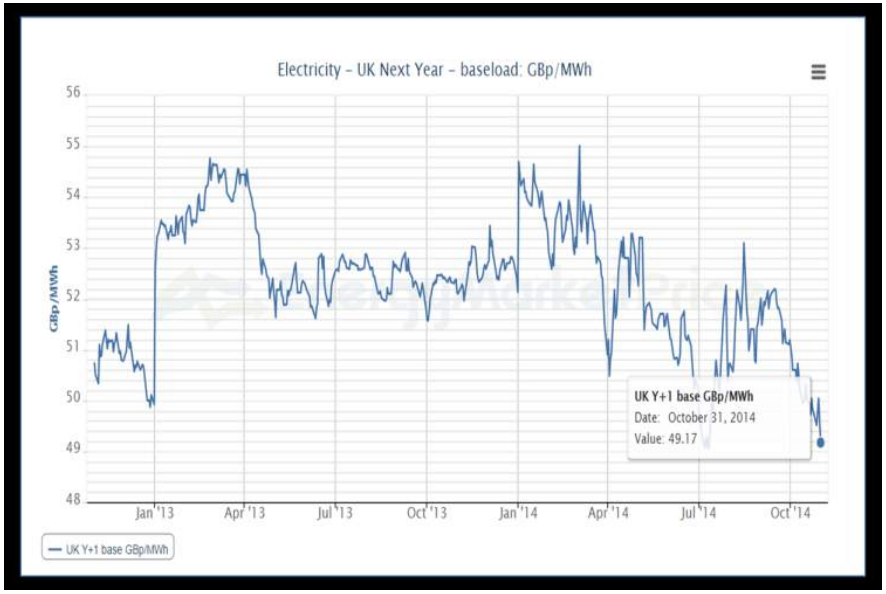
Can flexibility providers **compete fairly in existing markets**?

Are there are **missing markets** for flexibility?

Can flexibility providers **stack value** across these different markets?

Can more be done by markets and through **price signals** without involvement of monopolies?

- Capacity Market
- Wholesale Market
- Balancing Mechanism
- Ancillary Services
- Local network services or other markets?



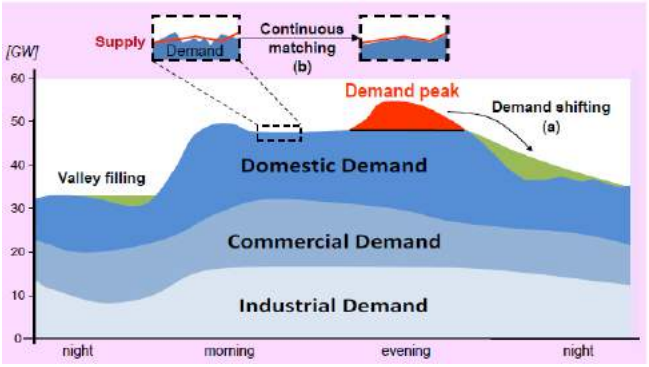
Catalysing innovation

Storage costs

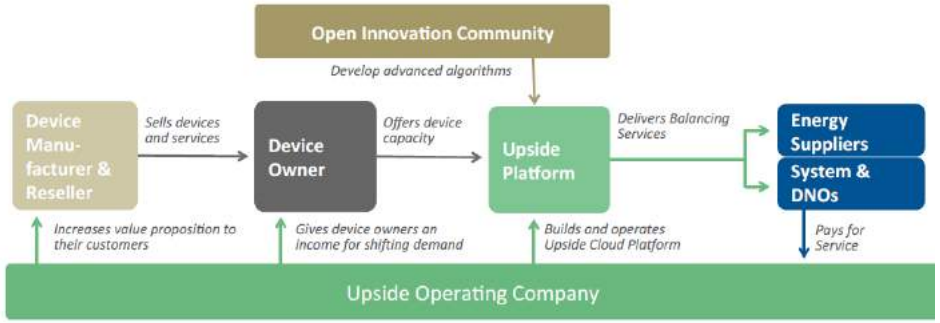
Vehicle to grid pilots

Innovation

Commercial and residential DSR trials



Flexibility platforms



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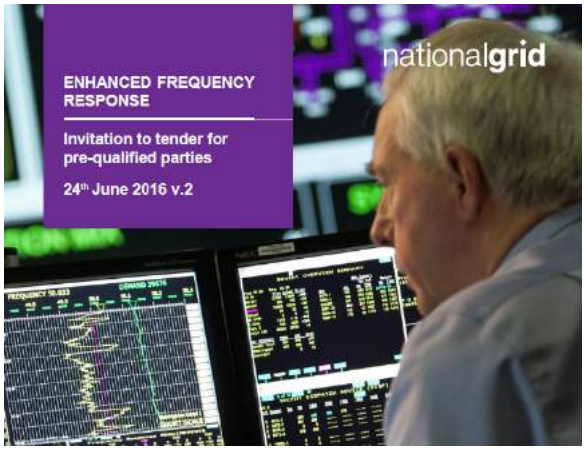
Storage - removing policy & regulatory barriers



Smarter Network Storage facility, Leighton Buzzard

- Regulatory clarity
- Connections
- Network charging
- Ownership
- Final Consumption Levies
- Planning

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Aggregators

Aggregators aggregate flexibility from individual consumers to better meet the needs of those procuring flexibility services. Some traditional electricity retailers also provide this service to their customers and the customers of other retailers.

Aggregators facilitate customers' access to markets, adding value through simplification, scale or portfolio effects.

They assist customers to access revenue from the Balancing Mechanism, Balancing Services, the Capacity and wholesale markets, in exchange for a share of the revenue that they receive.

In our September 2015 Flexibility Position Paper, we committed to clarify the role of independent aggregators and their relationships with other parties and explore the need for policy intervention and regulatory oversight.

Market Access	External Effects	Consumer Protection
Do licensing & regulatory regimes, and market access rules support DSR growth where it is needed? Is System Operator-led procurement of DSR transparent and efficient? Is it facilitating aggregated DSR?	Do the regulatory arrangements ensure independent aggregators interact efficiently with other market participants? Are costs borne in a way that leads to efficient outcomes?	Are consumers being protected sufficiently?

Demand Side Response from consumers

Barriers vary across types of consumer

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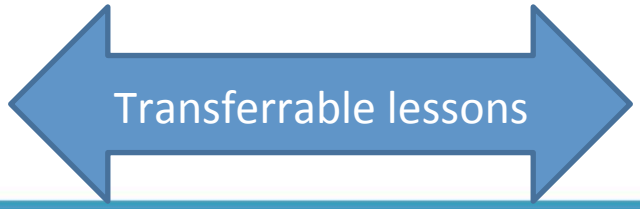
Large I&C

- Many of the enablers in place
- Large users with commercial incentive to participate
- Traditional provision from largest users, typically using on-site generation
- Many do not participate (as much as they could) as unaware of the opportunities or wary of the risks
- Some existing initiatives to address this, e.g. System Operator's Power Responsive initiative

Domestic and smaller non-domestic

- Need for more smart meters, appliances and tariffs
- Current concerns around: scepticism of impact of energy costs; loss of control; lack of info
- Importance of the role of energy service companies; quality of design solutions; development of energy tariffs/services
- Need to engage to raise potential participation esp. vulnerable and those most likely to have difficulty participating



Roles and responsibilities

Areas where most industry progress is necessary

Emerging system requirements

- All parties have appropriate visibility of existing and future network
- Facilitate timely and cost-efficient connections & appropriate signals on where to connect to maximise system efficiency
- Efficient, whole system planning including:
  a) Use of build/non-build solutions
  b) Use of optionality across transmission & distribution
- Efficient use of system resources (including flexible resources and innovative solutions) for local network and system-wide operations*
- Level playing field for new and existing flexible technologies, providers and solutions & access to wide range of revenue streams
- Resilient and secure system with efficient emergency and system recovery procedures
- Responsiveness to and readiness for rapid/unpredictable change
- Market participants have trust and confidence in roles and governance of network companies

Planning

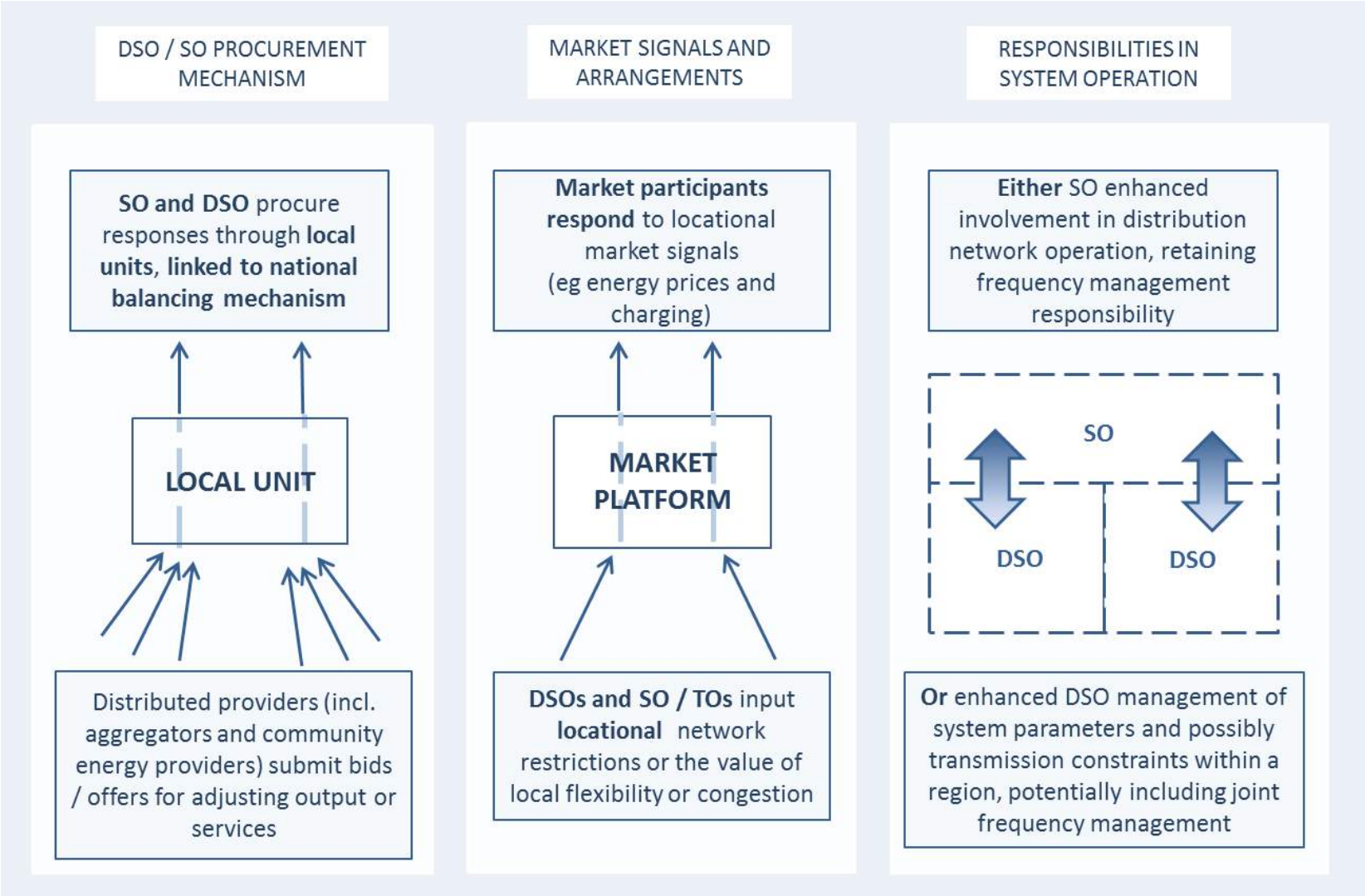
- Formalised planning frameworks
- Clear co-ordination processes and common methodologies
- Role for DSOs in System Operability Framework

Efficient local/system-wide use of resources

- Improved visibility and coordination processes for DSO/SO/TO use of system resources
- Common understanding of cross system impact and processes for delivering best whole system outcome

Further future changes

Efficient resource use – Responsibilities



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What are the benefits of a smart system

Reduce the costs of our future low carbon energy system, while ensuring system is secure and consumers are in control (£17-40bn cumulative savings for GB to 2050*)

Consumers more in control, benefiting from a secure energy system, with lower bills

Defer or avoid network investments	Reduce overall back up capacity required	Reduce system operation costs (e.g. balancing)	Maximise the use of low carbon capacity
Cumulative savings to 2050 are primarily on the distribution network side, with **£4-13bn** in avoided distribution costs and **£0.04-1.5bn** in avoided transmission costs) comparing flexibility option scenarios with a no-flex counterfactual*	Cumulative savings to 2050 from capital costs are **£14-19bn** compared to a no-flexibility counterfactual*, which reflects a reduced need for low carbon capacity (6-9GW) and peaking plants (3-29GW)	Cumulative savings to 2050 from avoided generation costs could be **£13-15bn** compared to a no-flexibility counterfactual* by improving the utilisation of low-carbon (low marginal costs) generation and reducing reliance on peaking fossil fuel plants	Energy consumers engaged through intermediaries or directly. Increased participation in energy markets with competition benefits

Source: DECC (BEIS) Least regret flexibility project (2016)

**Cost savings in DECC (BEIS) Least-regret flexibility project reflects the benefits of all flexibility options, i.e. not just storage and DSR but also interconnection and flexible CCGTs*

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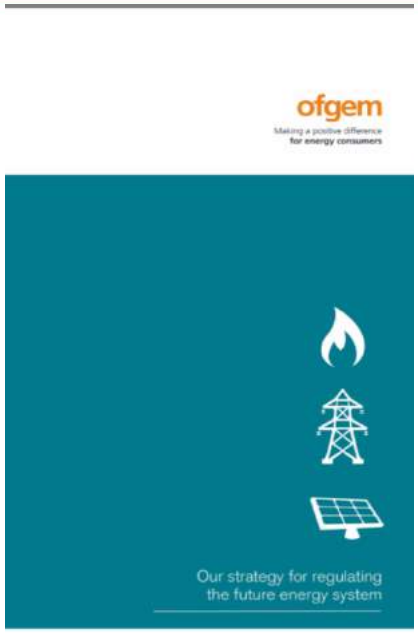
What this means

- Exciting changes
- More difficult decisions
- Allowing for different possibilities and different entities and being alive to change
- Priority remains consumers but with even greater diversity in consumer engagement
- Changing roles especially for system and network companies, but also for retailers / intermediaries
- Keeping industry rules and charging regimes under review

Next steps

- Implementing the actions in the Smart Systems and Flexibility Plan
- Overseeing actions and being alive to change
- Smart Systems Forum
- Continued engagement with others in UK and internationally
- Wider actions from Ofgem's strategy –
  - Longer term, whole system outcomes
  - Access
  - Investment risk

More detail



- https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan
- https://www.ofgem.gov.uk/publications-and-updates/our-strategy-regulating-future-energy-system

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Ofgem is the Office of Gas and Electricity Markets.

Our priority is to protect and to make a positive difference for all energy consumers. We work to promote value for money, security of supply and sustainability for present and future generations. We do this through the supervision and development of markets, regulation and the delivery of government schemes.

We work effectively with, but independently of, government, the energy industry and other stakeholders. We do so within a legal framework determined by the UK government and the European Union.

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