

The UK regulatory model: innovative solutions and practices (e.g. RIIO, sandboxes, digitalisation)

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Agenda

- ▶ Overview
- ▶ Background - why is the UK regulatory model different?
- ▶ Changes in the UK energy market
- ▶ Network regulation
- ▶ Sandboxes
- ▶ Digitalisation
- ▶ Possible future developments

Examples of things old regulators can do to facilitate innovation:

1

Data



Create an industry data index from all network company data; move towards a digital twin of the energy system interoperable with the whole system

3

Network regulation

Culture eats regulatory incentives too - not enough to remove capex bias in incentives - need to find non-wires champions

2

Price



Open up alternative product models (not kWh sales) but think about implications for “left behind” customers first

4

Regulators



Sandbox - yes, but not alone
Not just pilots
Walk a day in innovators' shoes

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About me

- ▶ Started as an economist
- ▶ ~5 years economic consultant at NERA
- ▶ ~5 years at American Electric Power in London
- ▶ ~15 years at Ofgem, including
 - ▶ 5 years running the electricity distribution team
 - ▶ 5 years running the European team (including 3 years as chair of the Elec WG for CEER and ACER)
 - ▶ 5 years on senior leadership team
- ▶ 1.5 years as independent consultant
 - ▶ working for CEER on digitalisation
 - ▶ working for ACER and now ARERA on the Gas Bridge paper
 - ▶ advising ENARGAS (Argentina) on regulatory governance
 - ▶ member customer engagement group for an elec DSO
 - ▶ advising the UK energy data task force
 - ▶ setting up a multi-regulator team in the water sector

What makes the UK regulatory model different?

- ▶ Early mover
- ▶ Strong theoretical start and economist regulators
- ▶ Legislation is enabling not prescriptive
- ▶ Learning from experience
- ▶ Early pro-competition stance led to diffusion of companies
- ▶ Multiple regulators
- ▶ Most of the “innovations” introduced in UK regulation have been a reaction to something else

History

- ▶ 1986: Ofgas created
- ▶ 1989: Offer created
- ▶ 1999-2000: merger Ofgas-Offer creates Ofgem in London
approx. 400 staff
- ▶ 2003: Ofgem board established
approx. 300 staff
- ▶ 2008: approx. 400 staff
- ▶ 2013: approx. 900 staff
- ▶ 2018: approx. 950 staff

Role of the regulator in UK

- ▶ Objective: protect interests of current and future consumers
- ▶ Promote competition - oversee market rules
- ▶ Regulate monopoly networks and system operator (RIIO)
- ▶ Facilitate investment and innovation in consumers' interests (best value for money)
- ▶ Administer some subsidy schemes

- ▶ Not: decide on generation mix, set subsidy policy



Making a positive difference
for energy consumers

Why independent regulation?

Ofgem is an independent regulator, accountable to Parliament, working in the broader context of the energy sector and mostly funded by consumers. We make our decisions working constructively with the government of the day, always bearing in mind that there are longer-term concerns.

There are major benefits for consumers if the regulator is independent from both government and industry:

- Decisions are taken on behalf of consumers at a proper distance from government and other interests.
- Clear decision-making and the open and transparent involvement of all stakeholders.
- Independence creates stability and consistency over time. Businesses know what to expect, and that encourages efficient investment, which will result in lower bills.
- We develop a thorough understanding of how the energy sector works, so we can do a better job for consumers.
- There are clear appeals processes established in law. This means we are held accountable for our decisions, and this increases trust in regulation.

Our ability to make a positive difference for consumers stems from the fact we have powers to regulate independently, and we have the support of society and government to use those powers. This wider public support is important, as we cannot rely solely on our regulatory status in law. Our powers and duties have changed frequently since we were founded in the 1980s, and government has taken increased strategic interest in the future of the sector.

Consumer impact report

Ofgem's budget for the financial year 2017-18 is £90m. Our regulatory activities are expected to deliver quantifiable direct consumer benefits of £7.8bn over 17 years.

This equals a direct benefit to cost ratio of **87**.

In addition, our regulatory activities are also expected to deliver quantifiable indirect consumer benefit of **£8,776m** and additional monetised benefits of **£542m**, as well as other benefits that are difficult to quantify into monetised terms.

Here are some of the decisions we have made over the past year and their expected benefits to consumers:

https://www.ofgem.gov.uk/system/files/docs/2018/07/consumer_impact_report_-_published0307.pdf

2017: 83 consultations, 1278 publications

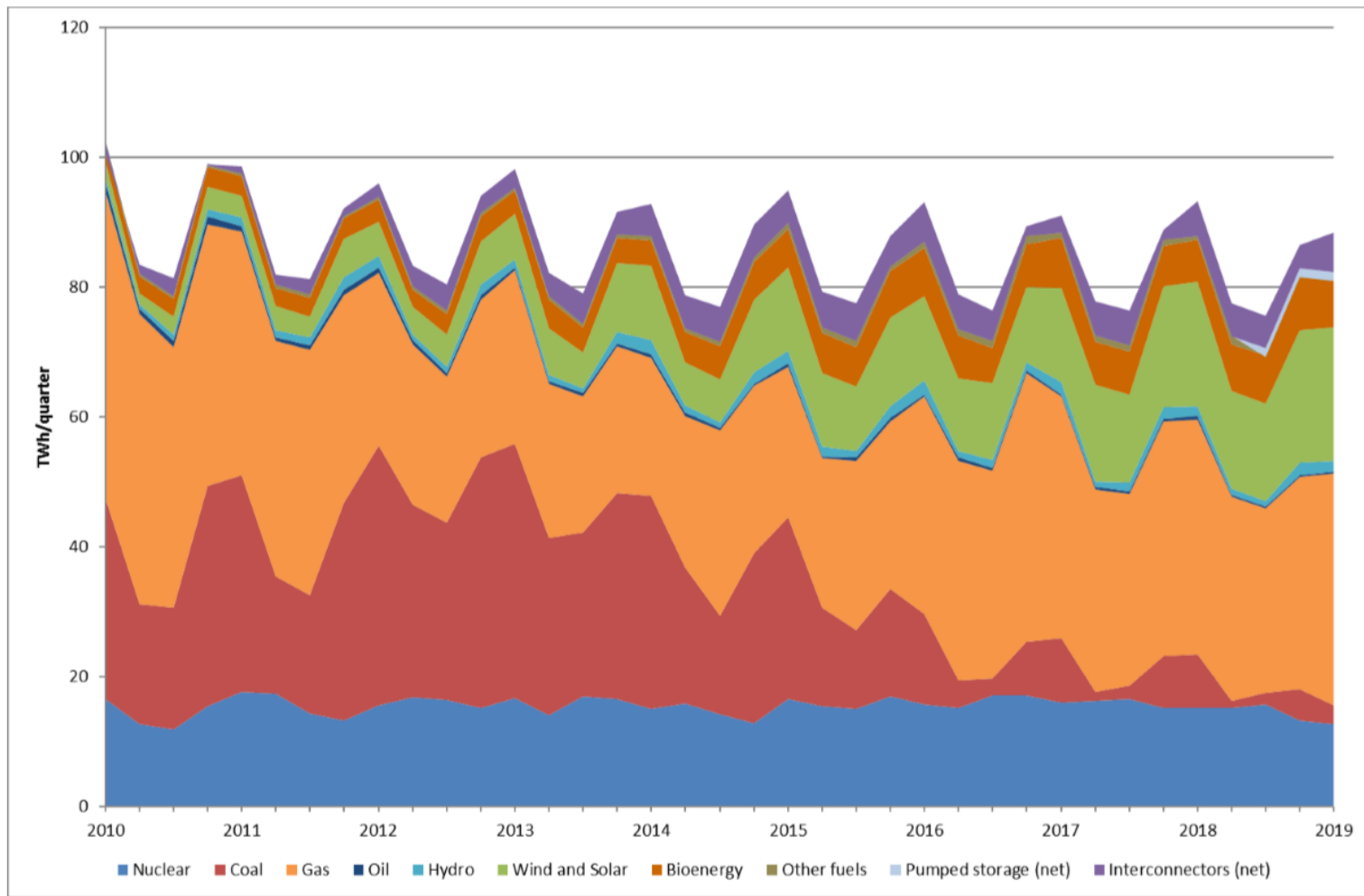
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Changes in the UK energy market

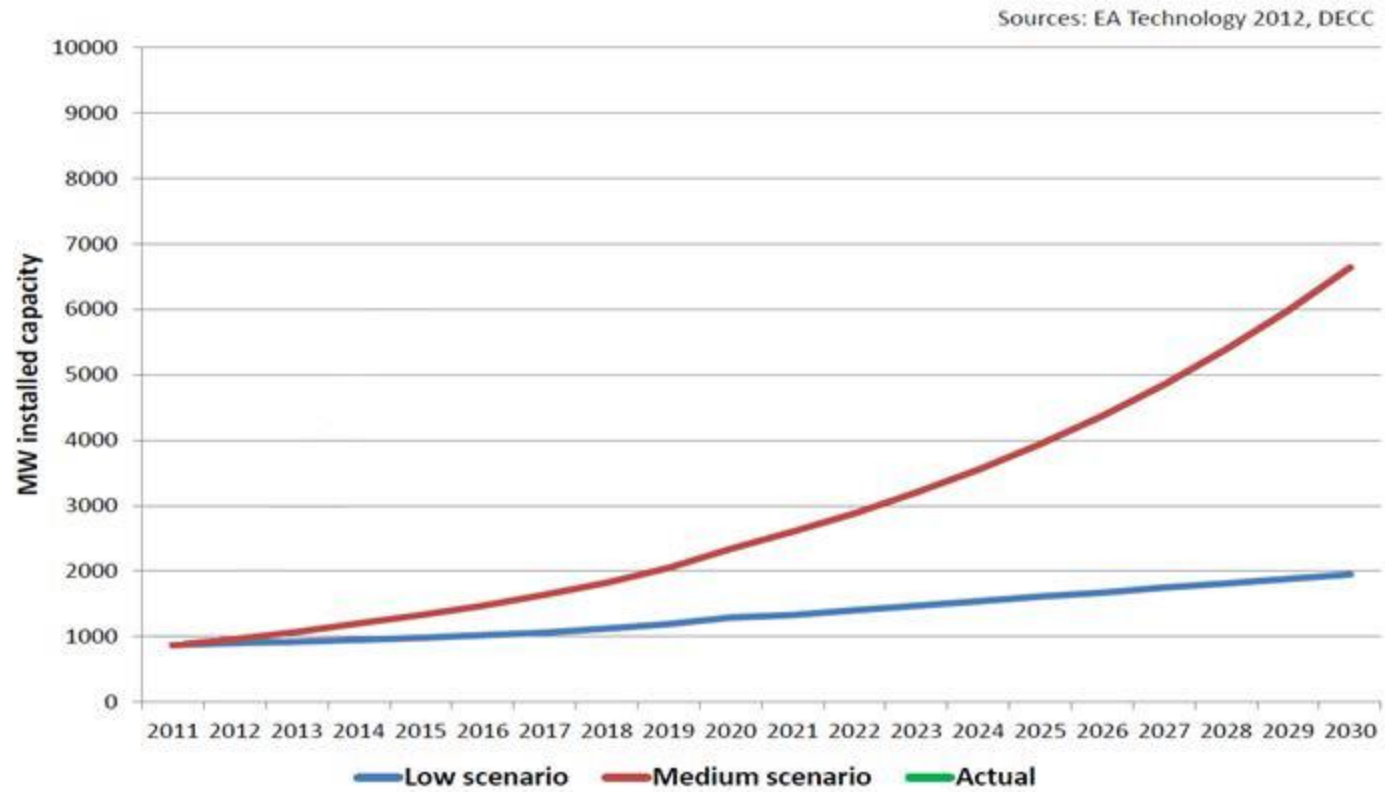
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Figure 6.12: Electricity supply by source (TWh/Quarter)

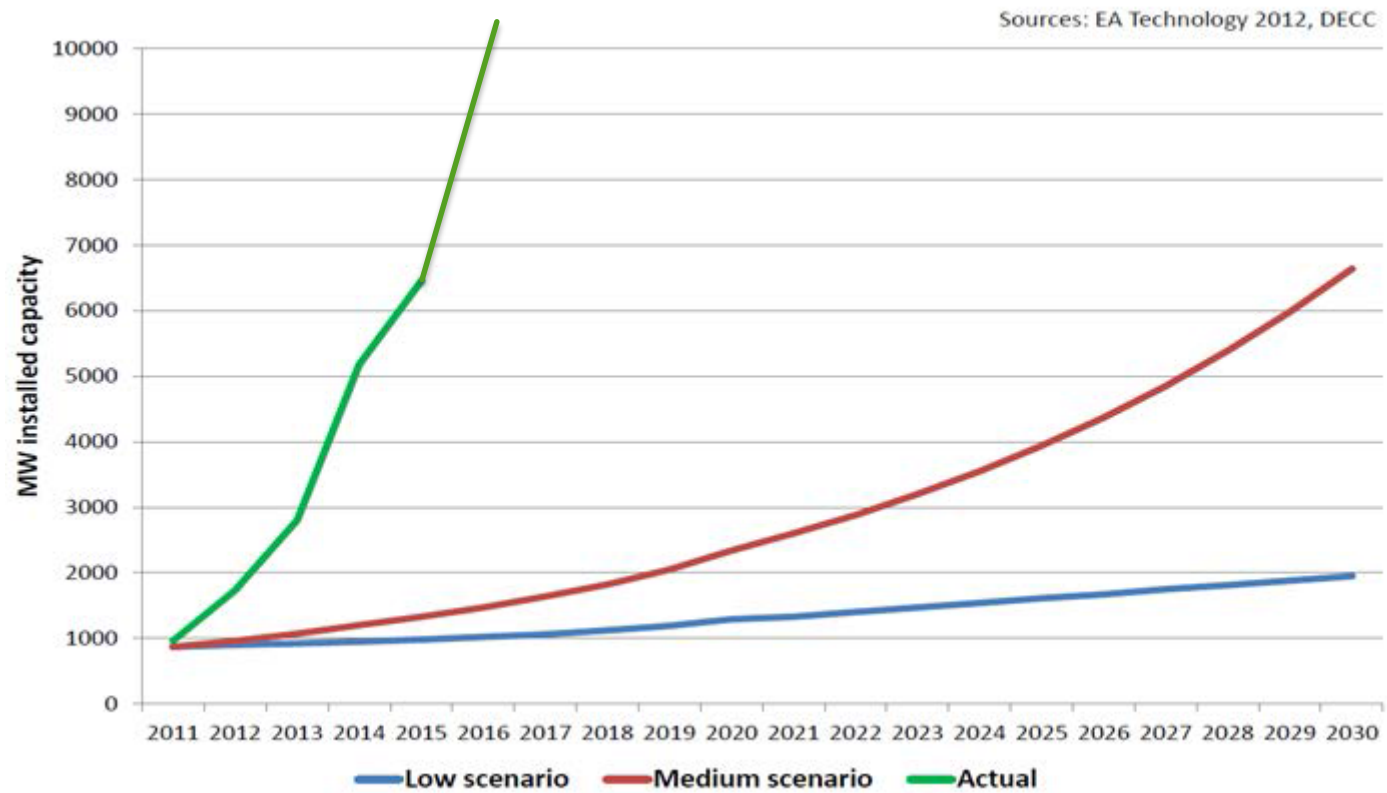


Source: BEIS, Ofgem's calculations.²²⁴

Case study - solar



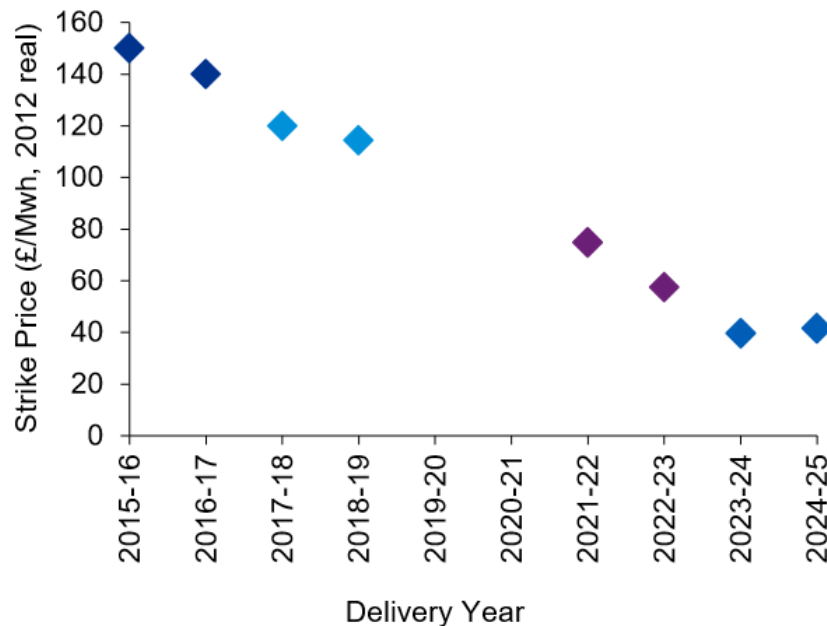
Case study - solar



Case study - offshore wind

- ▶ Currently being built at £140/MWh (administered price)
- ▶ Latest auction result: under £40/MWh for delivery in 2023/24 (all 2012 prices)

Strike prices awarded under the CfD



Source: BEIS

Chart taken from KPMG “Blown away” briefing note, September 2019

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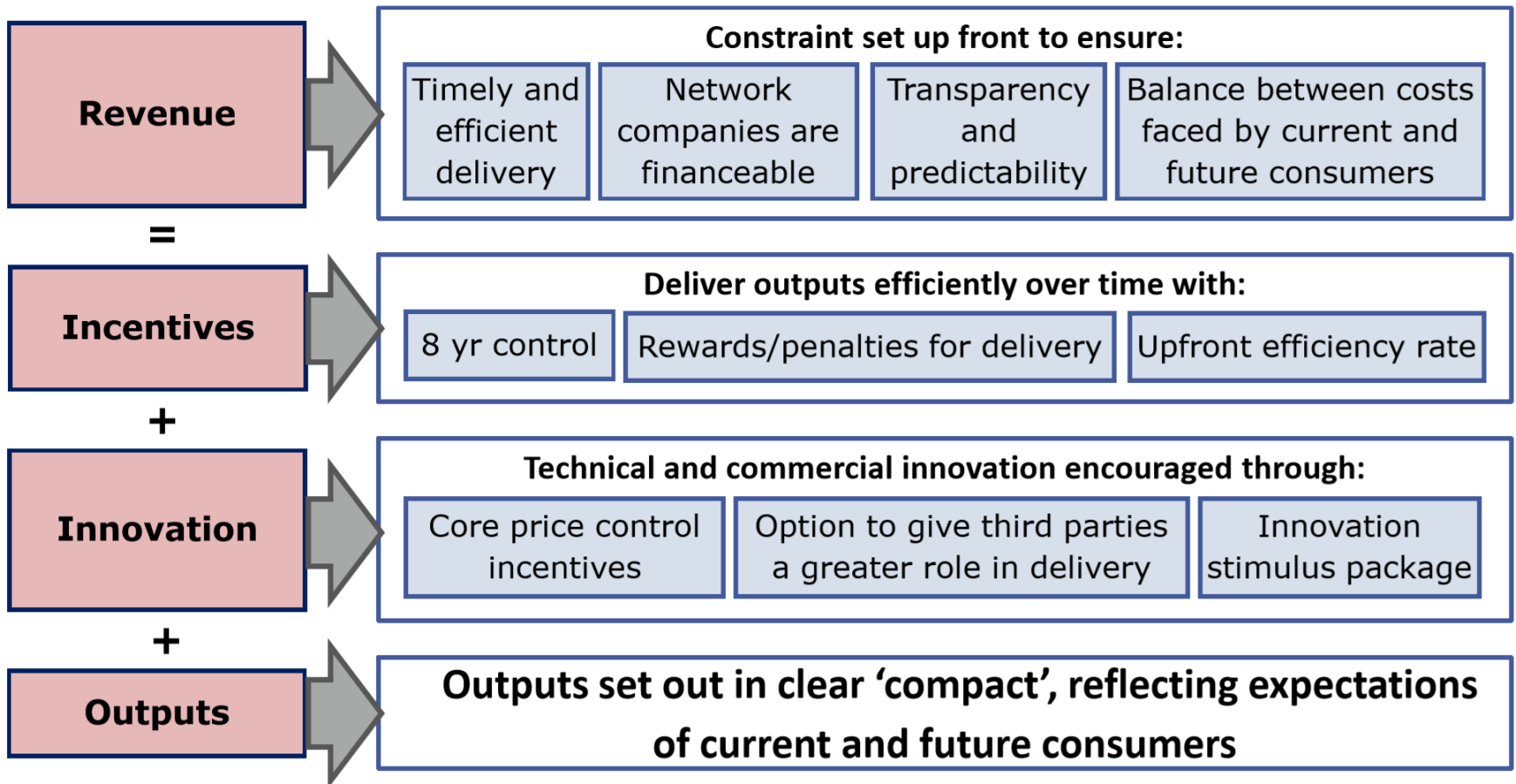
Network regulation

- ▶ Sandboxes
- ▶ Digitalisation
- ▶ Possible future developments

Evolution

- ▶ RPI-X in 1990s led to cost reductions
- ▶ RPI-X in 2000s developed output regulation
 - ▶ (and environmental incentives, innovation funding, totex regulation, menu regulation, discretionary rewards, etc)
- ▶ 2010: RPI-X has worked well, but...
 - ▶ too complicated
 - ▶ network companies too focussed on regulator rather than what their customers/network users want
- ▶ Hence new model: RIIO

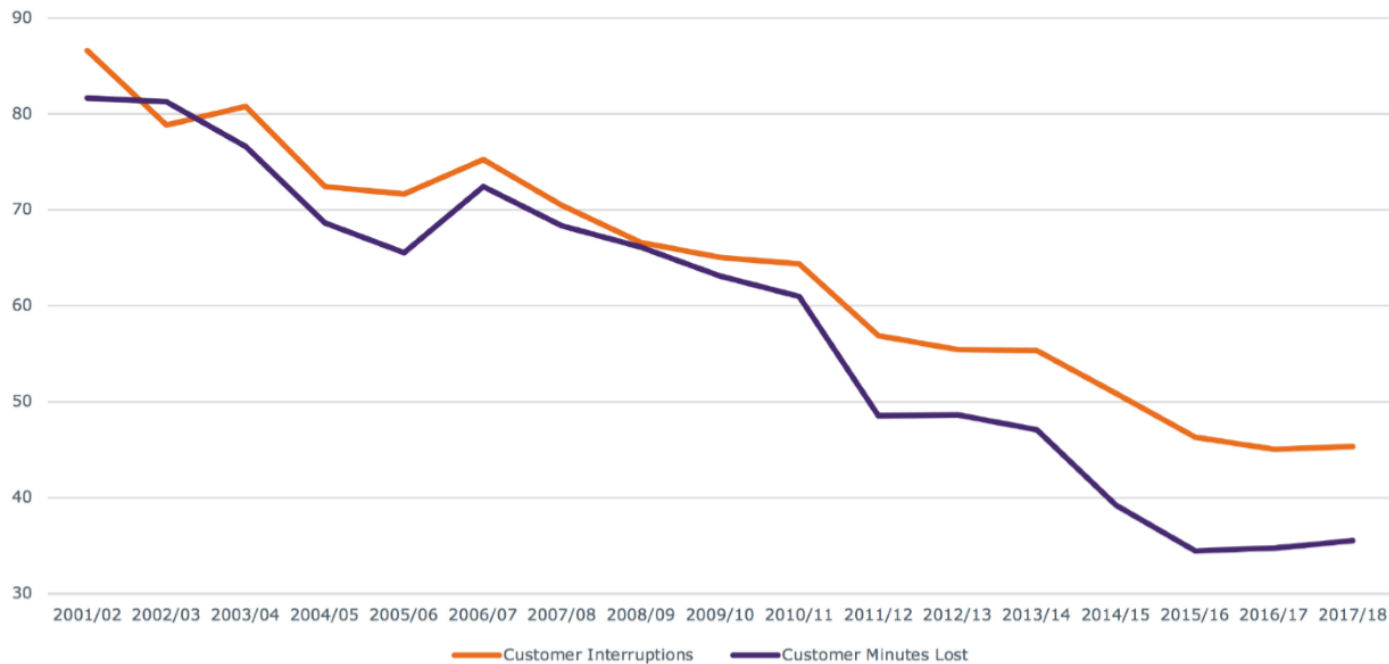
The RIIO Framework



RIIO 1 controls started in 2013 and 2015

Figure 7.2: Reliability improvements in electricity distribution

Number and duration of interruptions on Electricity Distribution networks



Source: 2017-18 RIIO-ED1 Regulatory Reporting Packs and Ofgem historical data.

RIO2

- ▶ RIO-1 has worked well (eg debt indexation), but:
 - ▶ Network companies earned more profit than is justified
 - ▶ Outputs compact not clear
- ▶ Ofgem response: extensive review of all components
 - ▶ Keeping broadly RIO form, back to 5 years, more indexation, more stakeholder engagement, more focus on business plans, probably removing fast-track
- ▶ Also note:
 - ▶ RIO is more complicated than RPI-X+++ (eg review process takes 3.5 years vs 1.5 years)
 - ▶ Arguably even more focussed on the regulator (more/better stakeholder engagement still sought)

More interesting changes to transmission network regulation?

- ▶ Competition to (build,) finance, own and operate new assets
- ▶ Very large construction projects separated from main price control
- ▶ Contestable regime for interconnectors with returns based on out-turn value rather than just cost

- ▶ An aside: what's the difference between leading-edge regulation and eccentric regulation?

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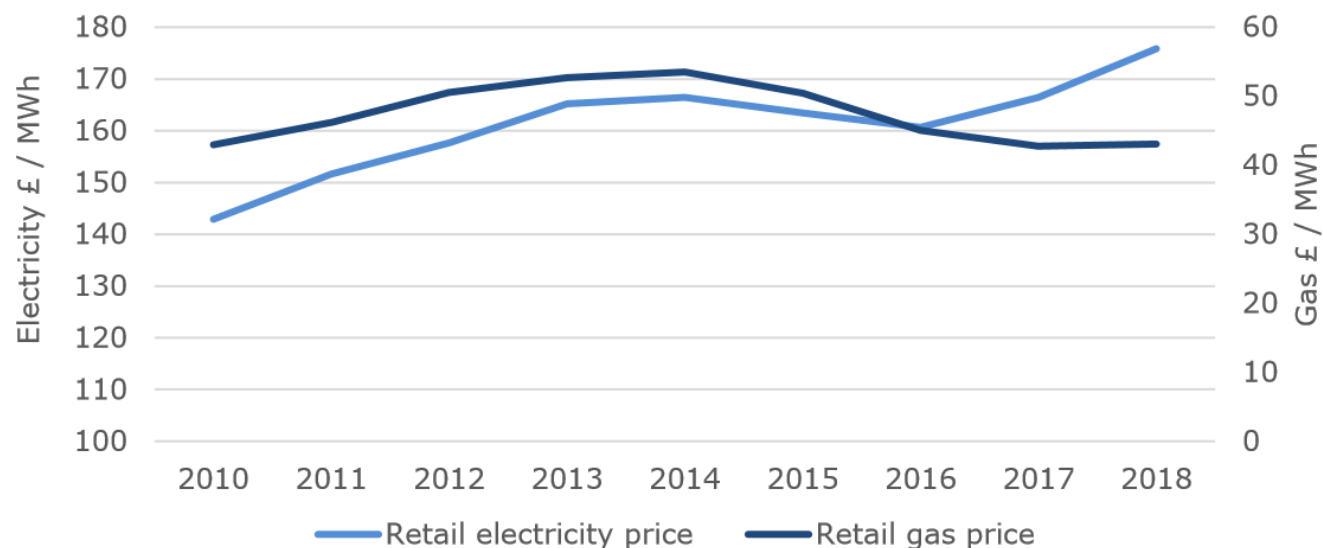
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End-user prices

Figure 2.2: Domestic retail energy prices (£ per MWh, real terms), 2010 to 2018

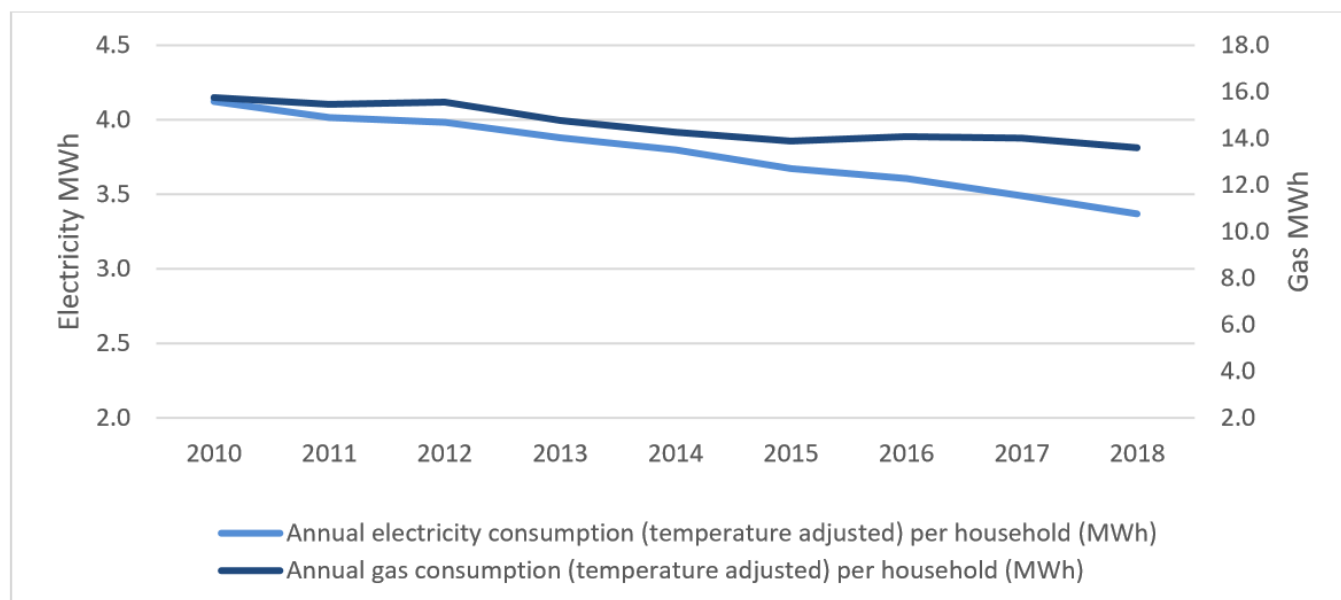


Source: BEIS (2018). Ofgem calculations using annual domestic energy bills data.

Note: Prices deflated to 2018 terms using the GDP (market prices) deflator. Electricity prices per MWh are calculated assuming annual consumption of 3.8MWh, including VAT. Gas prices per MWh are calculated assuming annual consumption of 15MWh, including VAT. Average prices across payment methods are weighted by the number of domestic customers.

Declining demand

Figure 2.3: Average annual household energy consumption (temperature adjusted): 2010 to 2018

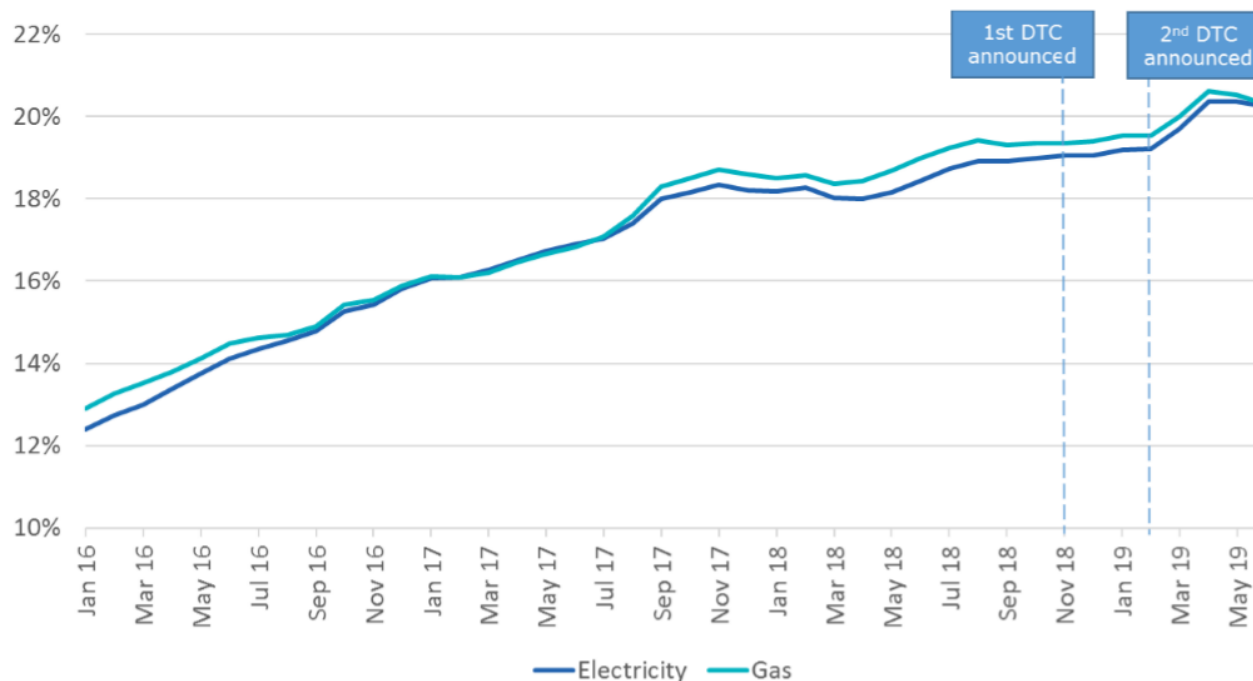


Source: BEIS (2018). Ofgem calculations using Energy Consumption statistics in the UK.

Note: Annual gas consumption has been divided by the estimated number of households that are on gas. Annual electricity consumption has been divided by the number of households on standard electric tariffs.

Retail market

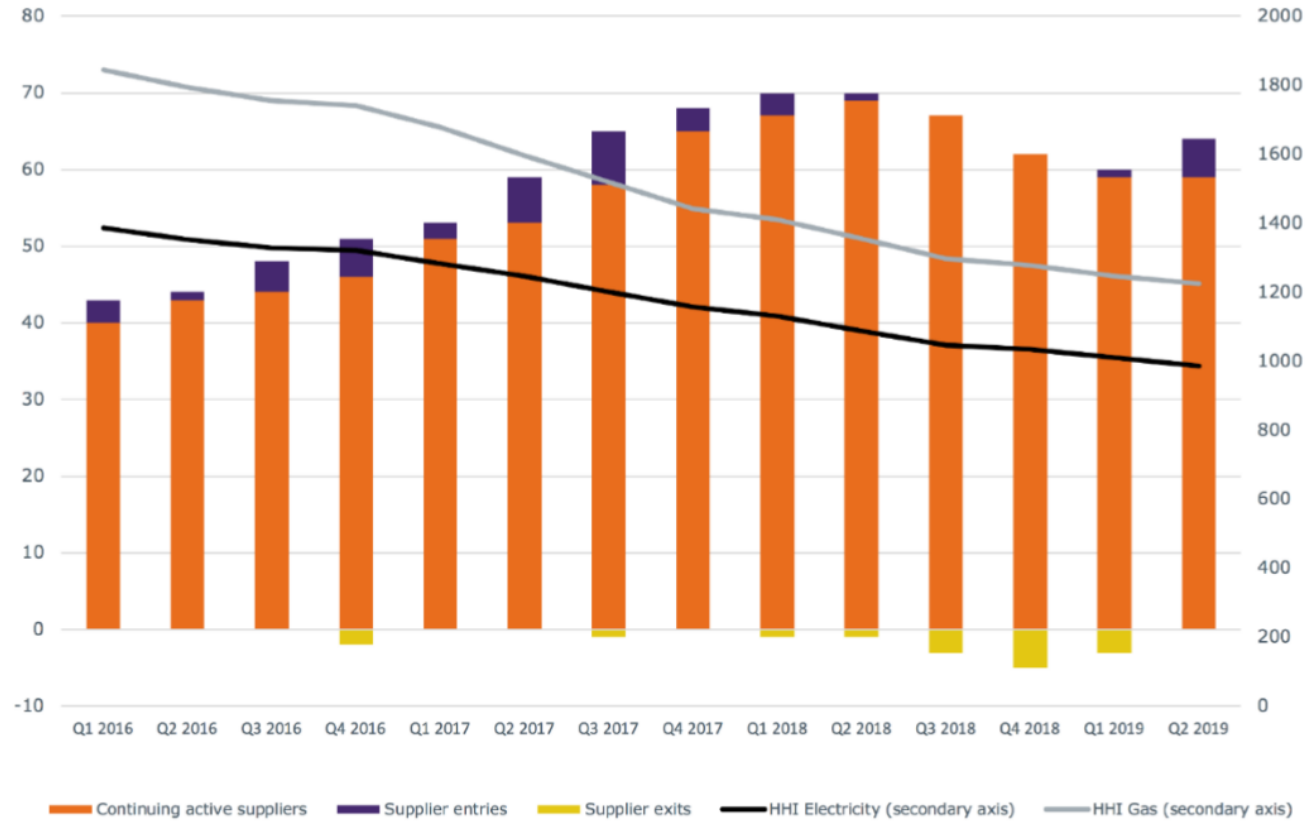
Figure 3.3: Rolling annual switching rates between suppliers



Source: Ofgem's analysis of Distribution Network operator data and Xoserve data.

Note: The switching rates at each date are calculated as the ratio between the total number of switches during the previous twelve months and the average number of meter points during the same period. Taken from Ofgem's State of the Market report, October 2019

Figure 3.1: Market entries, exits and concentration levels



Source: Ofgem’s analysis of Distribution Network Operators and Xoserve data

Note: The chart shows only active licensed suppliers. It does not include white label providers.

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Everyone is talking about...

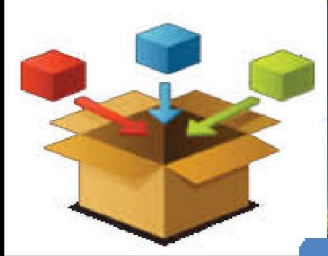
The ...power system will keep changing and evolving throughout the coming decade. Nothing that we know from the past might be taken as granted. Technologies, system and market parties' behaviours and strategies, hence business models will come to change and surprise us

Source: Florence School of Regulation, Policy Brief 2015/04

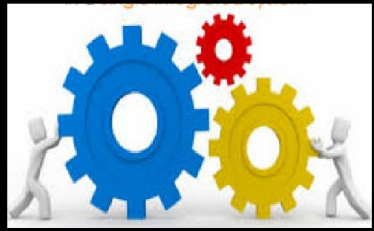
What was recently considered the future (like storage and microgrids), is now considered the past. Things that we thought were 10 years away (like peer-to-peer energy sales and local energy markets) are happening now

Source: Centrica, November 2017

The Players of the Future

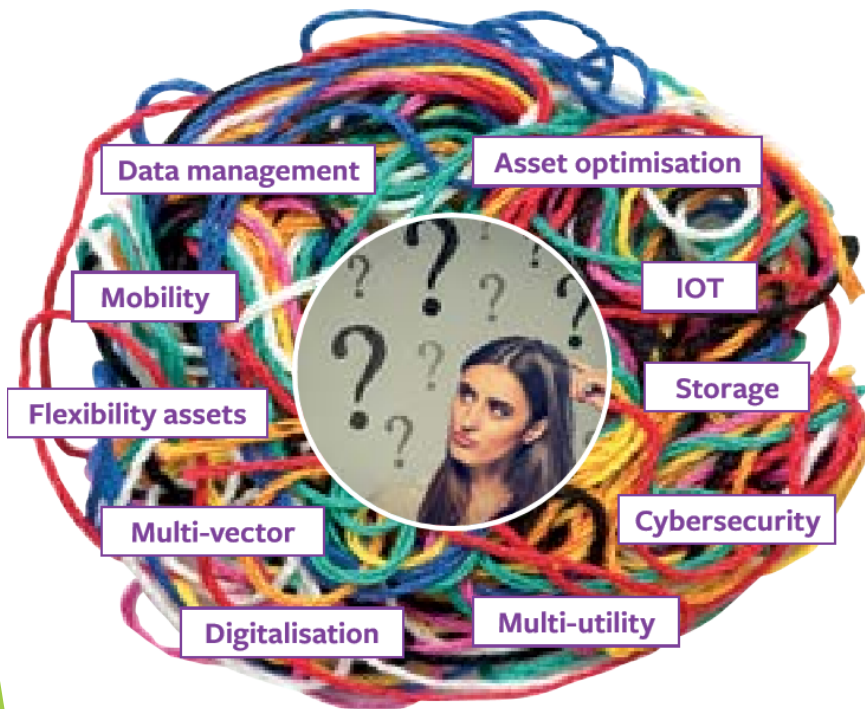


utilization
result solution process
achievement resource
Optimization
system strategy
tool breakeven Bal
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management efficie

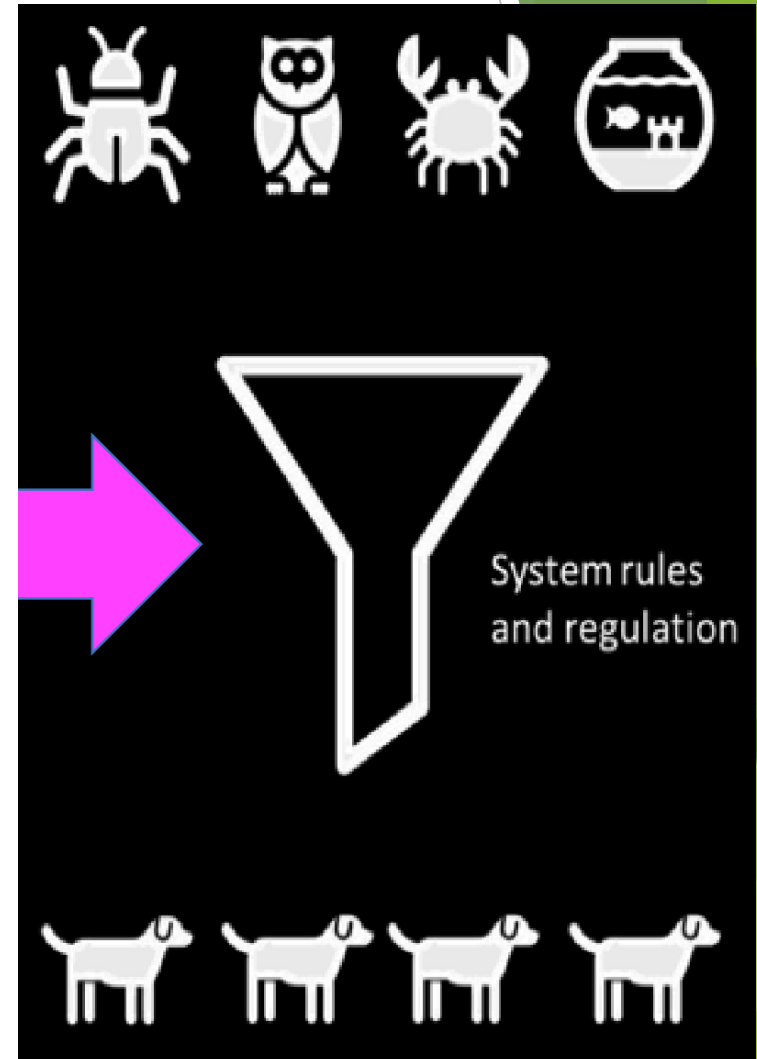


What's the problem?

TOO COMPLEX TO MANAGE



PROCESS REGULATION



Ofgem Innovation Link

What's the Innovation Link?

1. Fast, frank feedback on the regulatory implications of new business propositions

2. A “regulatory sandbox” to enable innovators to trial new products or services without all of the normal regulation

3. Guidance notes on FAQs

What's it achieved?

Approx 200 start-ups helped. Include retail, EV, local energy, personal apps

First round: 30 applications, 3 sandboxes
Second round: 37 applications, up to 9 sandboxes

First published October 2019

Informed Ofgem policy development on future retail market

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Digitalisation involves:

1

Data



Produced by sensors, smart meters & devices in the system

2

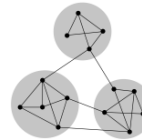
Analytics



Uses data to provide insights & is advancing with machine learning & AI

3

Connectivity



Digital networks provide for connectivity of devices & assets in the system

Digitalisation of the energy system drives change and creates value propositions for consumers...

Changes to the energy system

1

Efficiency



- Improved productivity for networks, generation and gas assets

2

Changes Demand



- Smart buildings
- Mobility as a service
- New retail pricing and products

3

New platforms



- Peer-2-peer trading
- Flexibility market places

Potential Value Propositions

Savings



Convenience



Comfort



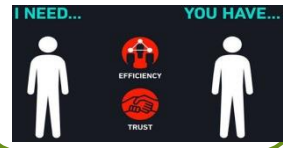
Choice



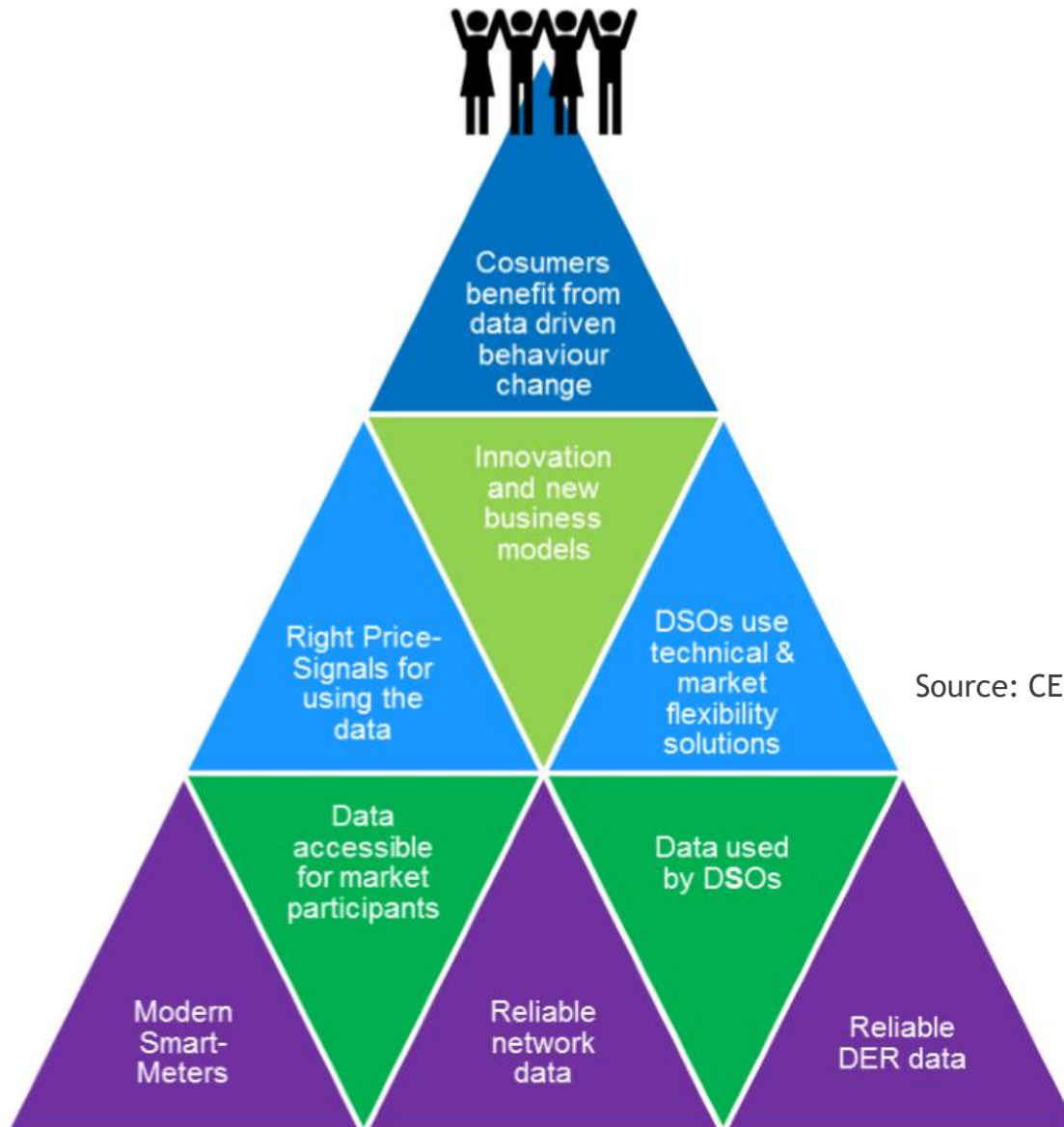
Autonomy



Shared Econ



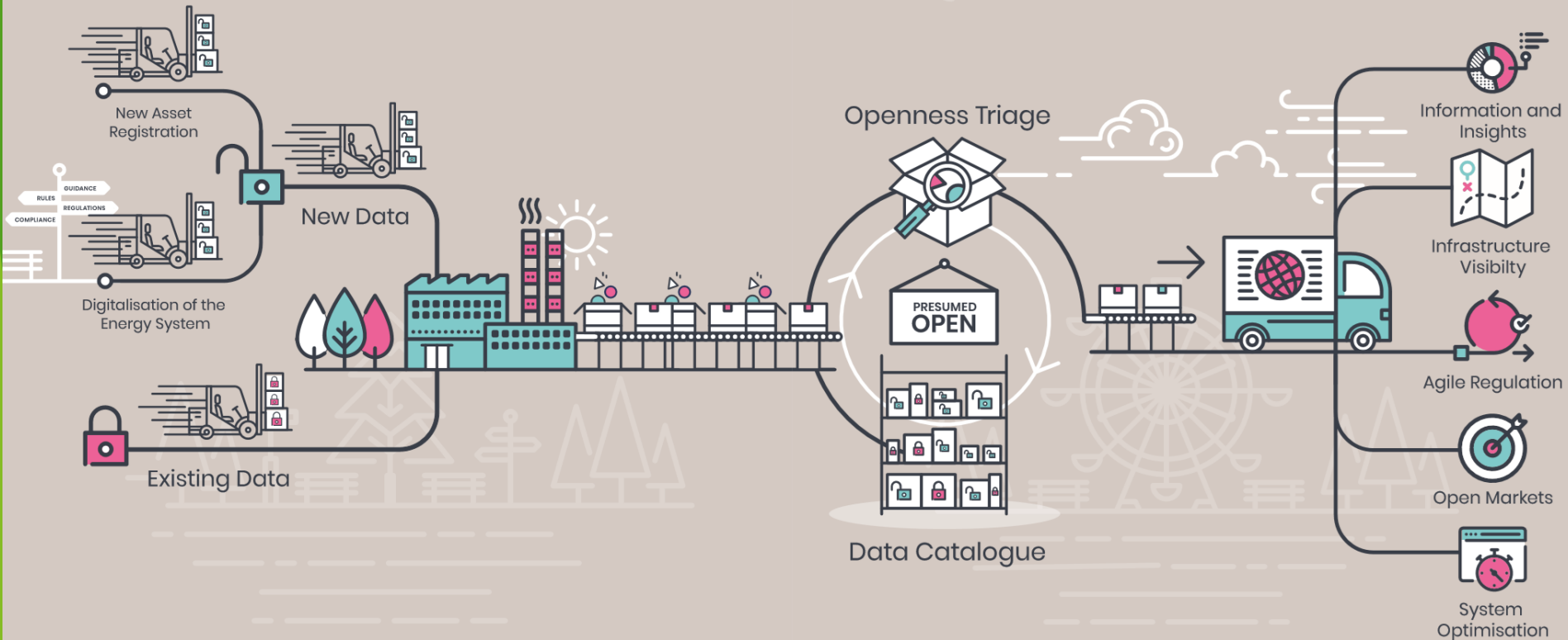
How do we unlock the prize?



Source: CEER, October 2019

A strategy for a Modern Digitalised Energy System

Individually, the taskforce recommendations create positive change but together, they create an environment where data and digitalisation will deliver substantial value for consumers.



Ofgem's role

- ▶ With Government, co-sponsored Energy Data Task Force
- ▶ Established Ofgem data services team
 - ▶ Smarter data handling within Ofgem and with industry
 - ▶ Publishing more Ofgem data
- ▶ Requiring network companies to develop data strategy
- ▶ Co-sponsored £1.9M Modernising Energy Data Access Competition (October 2019)

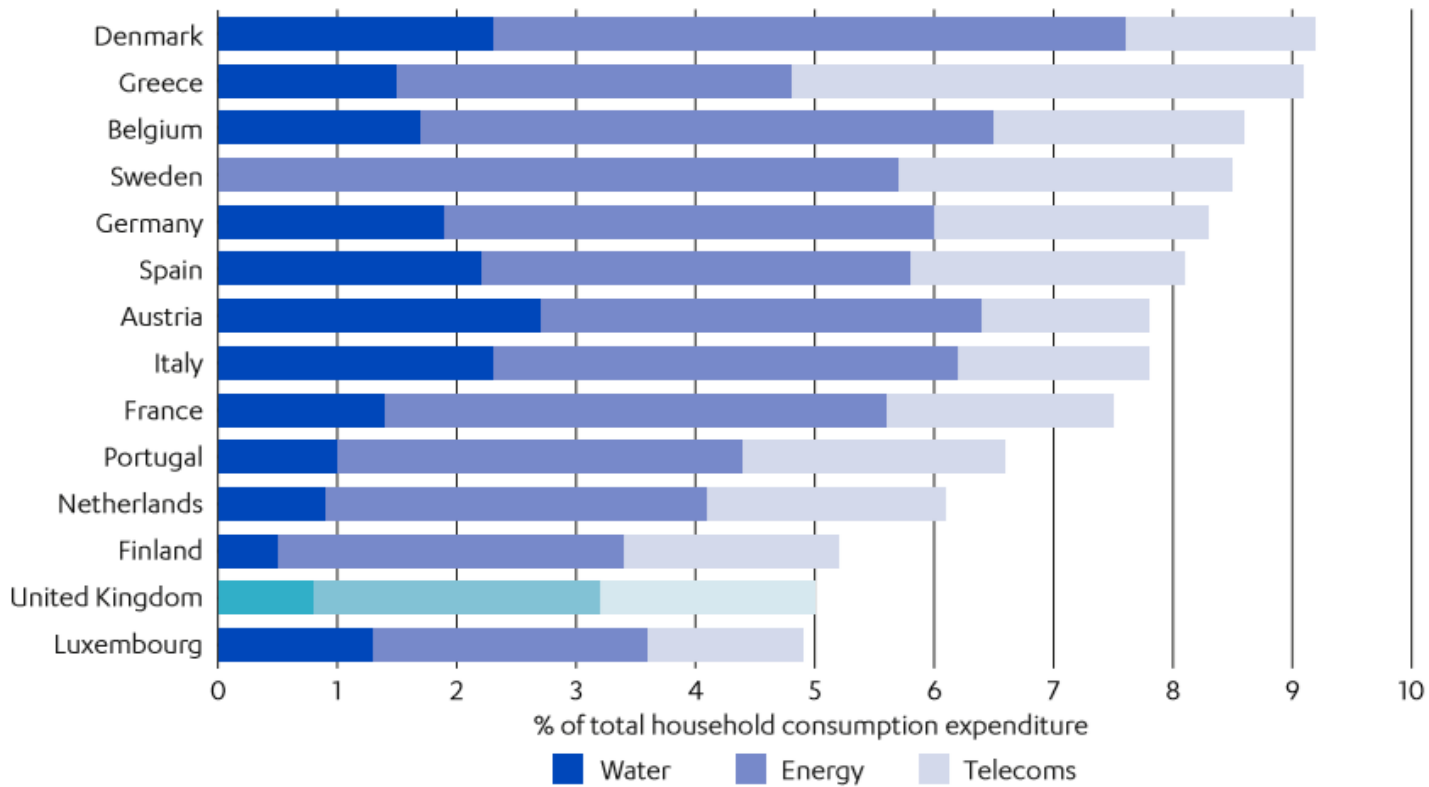
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Possible future developments

Actually, we're doing ok...

Figure 3: per cent of total household consumption expenditure on water, energy and telecoms, UK and EU-15 countries, 2017³⁵



Potential developments

- ▶ Digital Decarbonisation is coming, how about:

Decentralised Democracy?

- ▶ Regional authorities, metropolitan mayors establishing priorities for network companies?

<https://www.nic.org.uk/wp-content/uploads/NIC-Strategic-Investment-Public-Confidence-October-2019.pdf>

- ▶ Social enterprise

- ▶ Whether for-profit or not-for-profit
- ▶ Business for a purpose
- ▶ Because it's the right thing to do (vs because the regulator says)

<https://www.ofwat.gov.uk/wp-content/uploads/2019/10/RF-Beesley-Lecture-16-October-2019.pdf>

Maybe forecasting isn't the hardest part...

“In a keynote speech, Ofgem Chief Executive, ... emphasised that the levels of distributed generation required to meet the Government's targets... would:

- ▶ require fundamental rethinking of the activities of transmission and distribution and of how they interact;
- ▶ alter a number of the existing obligations of [distribution network operators], as distribution networks become an element of the national energy balance;
- ▶ present the new option of encouraging investment in distributed generation rather than choosing to invest in network assets for the provision of capacity; and
- ▶ require a regulatory framework characterised by effectiveness, predictability, simplicity, fairness and consistency.”

Source: Ofgem, 2002