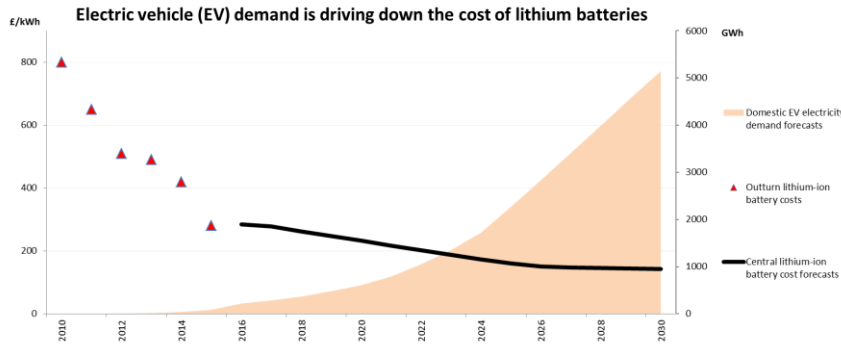


Latest Regulation

The Big Energy Summit 2018 – Making the most of Energy

Chris Brown
Head of Core and Emerging Policy
9 March 2018

ofgem

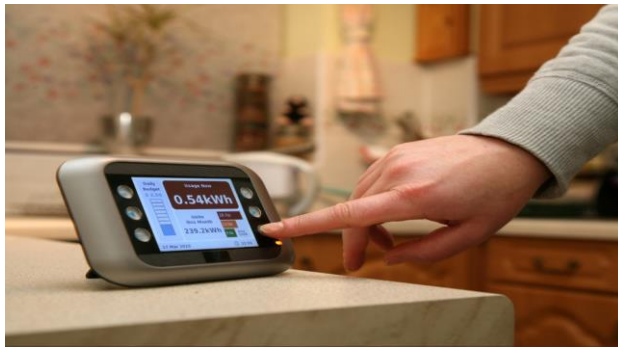


Battery cost data sourced from Aurora (unpublished), includes observed outturn BNEF (unpublished) data
Domestic EV electricity demand based on 2016 EEP returns
It should be noted both battery cost and EV electricity demand forecasts are uncertain

Lithium-ion battery costs plummeting – by more than 50% since 2010 (are we at the threshold of cheap storage)



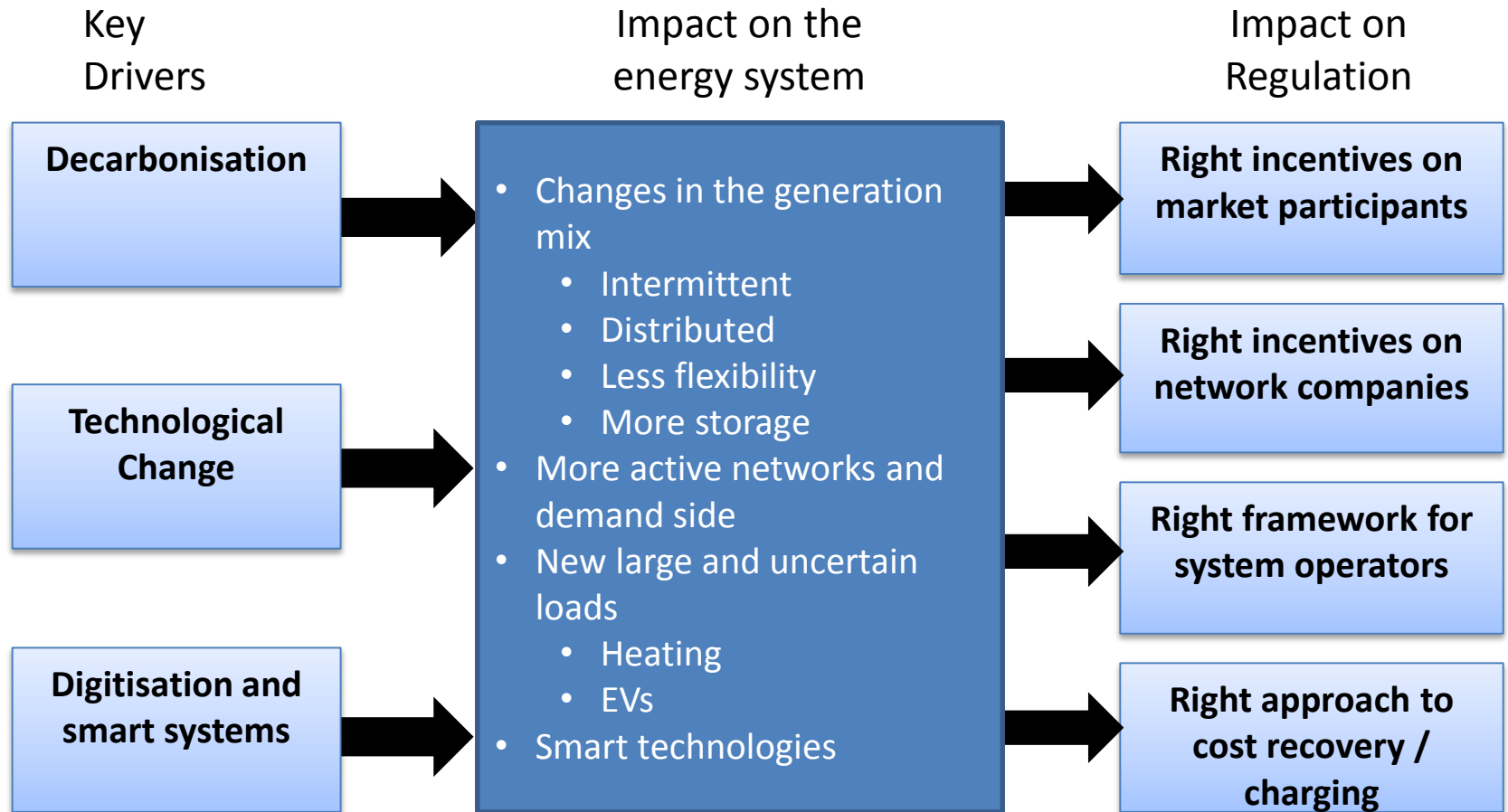
EVs have strong brand recognition; large-scale rollout & charging infrastructure are under development (future possibilities also for V2G)



Smart meter roll out is underway – leading to more consumer choice/control in the home and how we buying energy (rise of the engaged consumer)

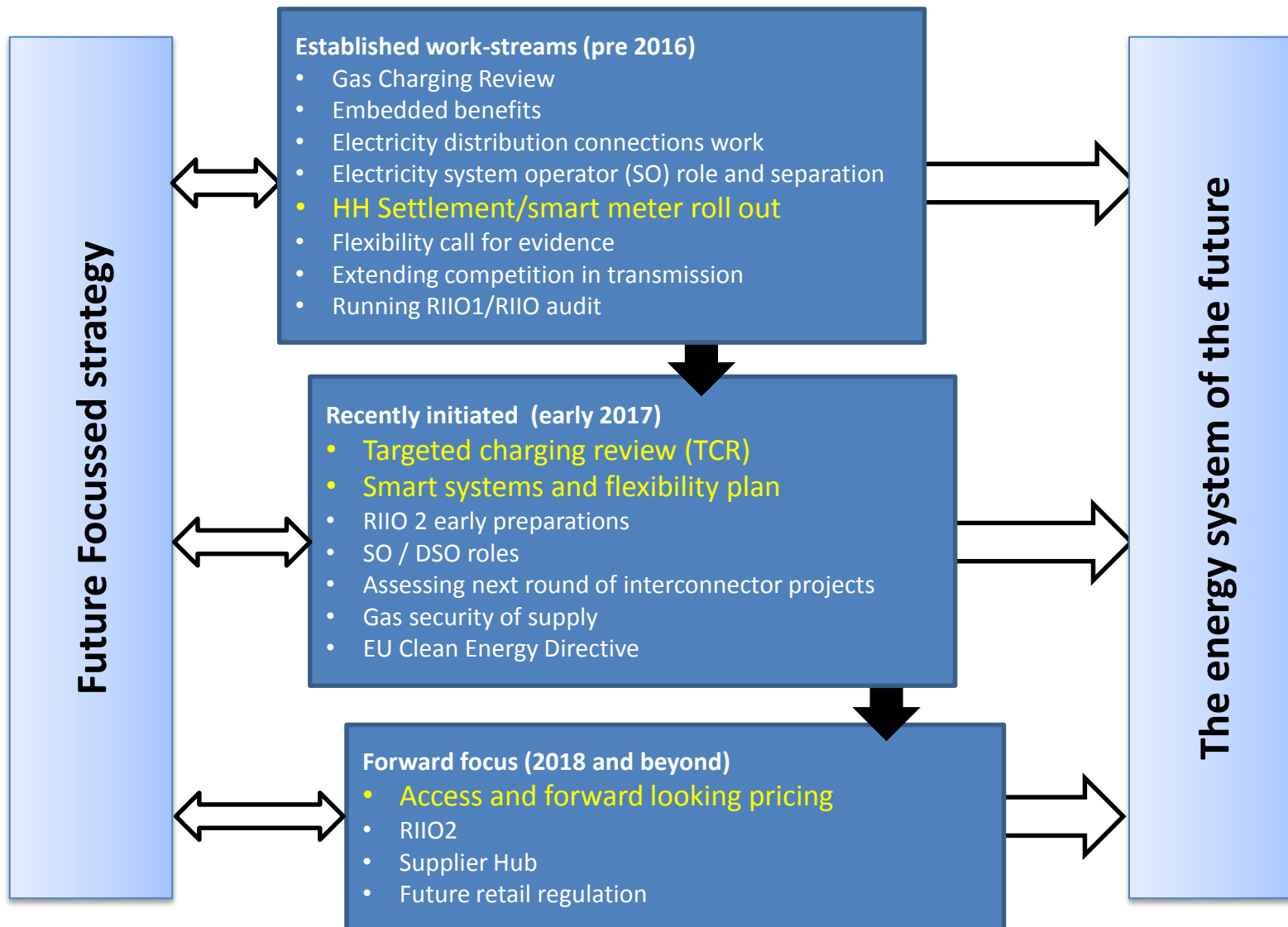


Aggregators working with market leaders to deliver and monetise DSR, helping them to reduce bills (changing role of energy supply company)



Facilitating change in the future energy systems is an important part of our forward work programme

We have a number of initiatives to support and advance the system transformation



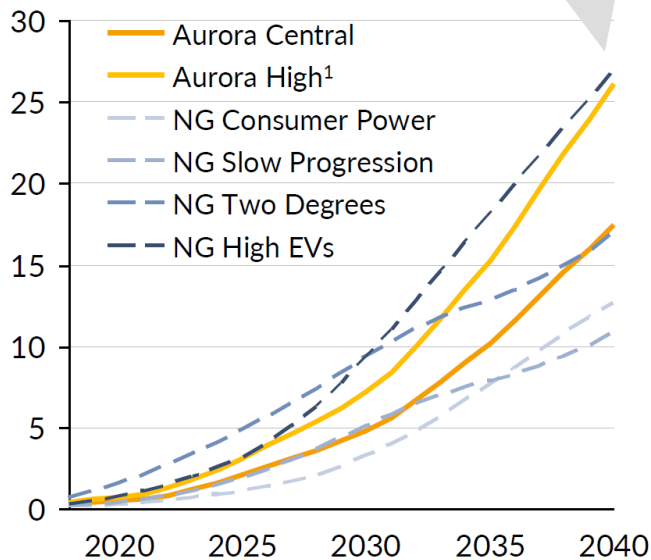
This results in 10 million EVs on the road in GB by 2035, adding 19 TWh to annual power demand



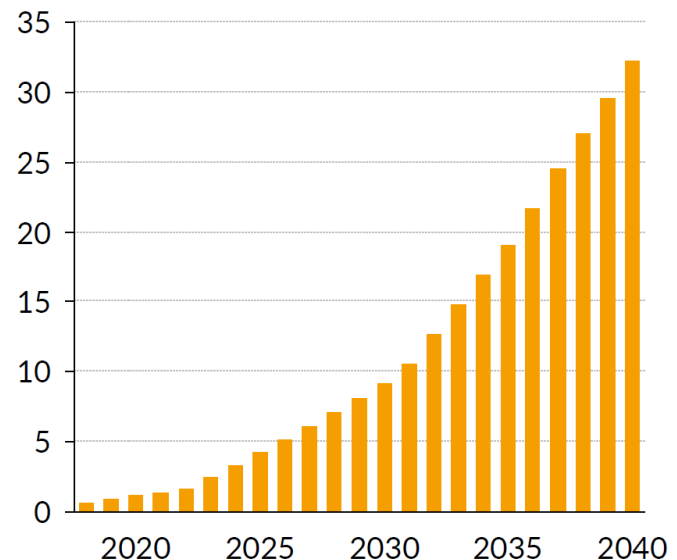
By 2035 we expect 10m EVs on the road in GB, representing 30% of the car fleet...

... adding 19 TWh to power demand in 2035, or 6% of current demand

Total number of EVs in GB
Millions



Power consumption of EVs in Aurora Central,
TWh



Where will they charge: Home, Workplace or Public?



- Slow charging (3/7kW)
- Doesn't all need to be at peak
- Big potential to be smart
- Unpredictable

- Around 72% of charging happens at home

- Fast charging, up to 22kW
- Can charge during afternoon 'off peak', using solar
- Some smart potential
- Fairly predictable

- Around 10% of charging happens at work

- Rapid, 50kW and above
- Large demands from grid, especially peak
- Limited smart potential
- Predictable

- Around 16% of charging uses rapid public network, 3% slow public network

When will they charge: Charging 'smart' has significant benefits

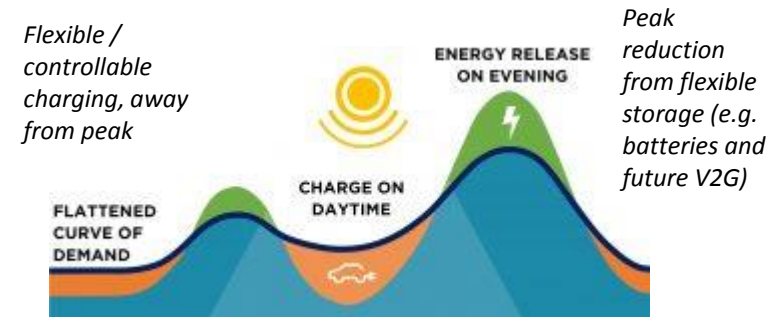
'Dumb' EV charging - at peak



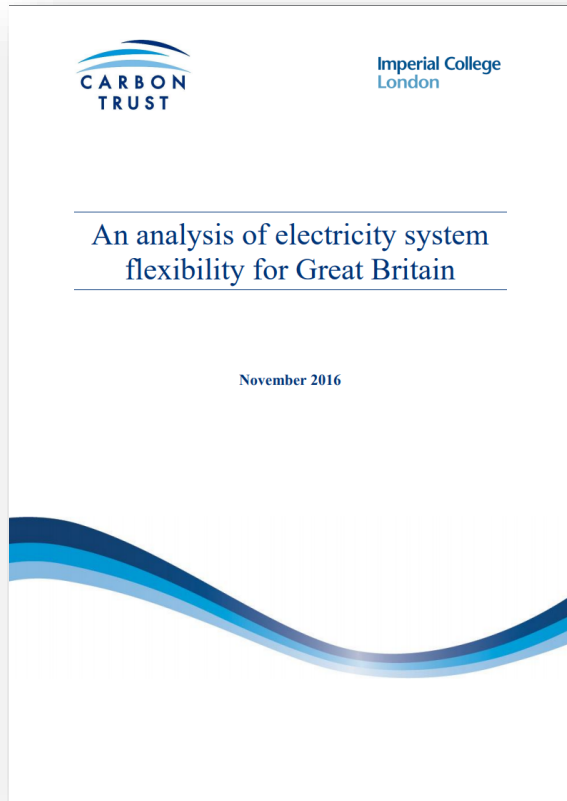
Charging, commences at most convenient time for consumer (worst case arrival at 'home' during evening peak)

- Dumb charging adds to system peak
- Likely to result in extra peak generation, transmission and distribution network reinforcement
- Will **Increase overall system costs** for system balance and reliability
- Rapid charging exacerbates impact on local network (especially when single phase)
- Provides customers with the most **freedom**

'Smart' EV charging - avoids peak



- Smart charging avoids system peak, seeking period of low demand
- Reduces the need for additional new infrastructure and reinforcement
- **Could mitigate and reduce overall** costs to the system, especially if used to provide additional system flexibility
- Slower charging minimises impact on local network (3.5kW to 7kW)
- Requires **customers to engage** and modify behaviour



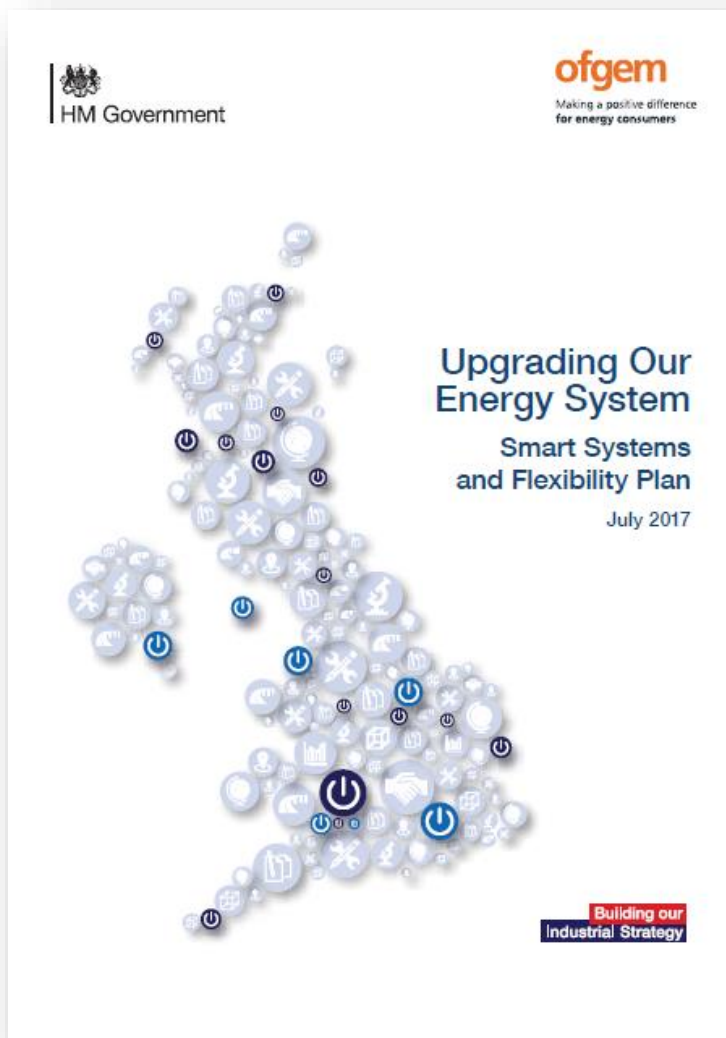
Report investigates a range of future scenarios, with diverse energy needs, together with a range of flexible technologies.

Key flexibility technologies including demand side response (DSR), storage and interconnectors.

Value of flexibility is threefold:

- Reduces the capacity of low carbon generation needed to achieve carbon reduction targets
- Enables system balancing at a lower cost by displacing higher cost alternatives at peak
- Improves the utilisation of existing generation infrastructure and minimises additional investment in transmission and distribution network reinforcement

Research by the Carbon Trust & Imperial College estimates the benefits of a smart, flexible energy system at £17-40bn between now and 2050.



29 point plan with actions for Ofgem, Government and Industry (most of which are due to be in place by 2019)

- Removing Barriers to smart technologies
- Smart Homes and Businesses
- Markets that work for Flexibility

The Smart Systems and Flexibility Plan

Removing barriers to smart technologies

*Regularity clarity and fair
charges*

Define storage in regulation,
planning reform, Health &
Safety standards, **innovation
funding**, deliver a **storage
licence, unbundling rules**,
update network charges,
enable colocation with
renewables.

Smart homes and businesses

*Infrastructure and system
enablers*

Deliver smart meters, **half
hourly settlement**, smart
appliance standards, cyber
security, **EV legislation**,
consumer protections, Crown
Commercial Service support for
DSR, DSR trial funding, Power
Responsive.

Markets that work for flexibility

*Access to markets and
new markets*

DSO/TSO evolution, SO
incentives, Capacity Market
amendments, rule changes;
BM access of aggregators, SO
simplification of Ancillary
Services, **TCR, Access reforms**,
ENA Open Networks project,
network standards, trial
funding

Smart Systems Forum to help implement and steer Plan

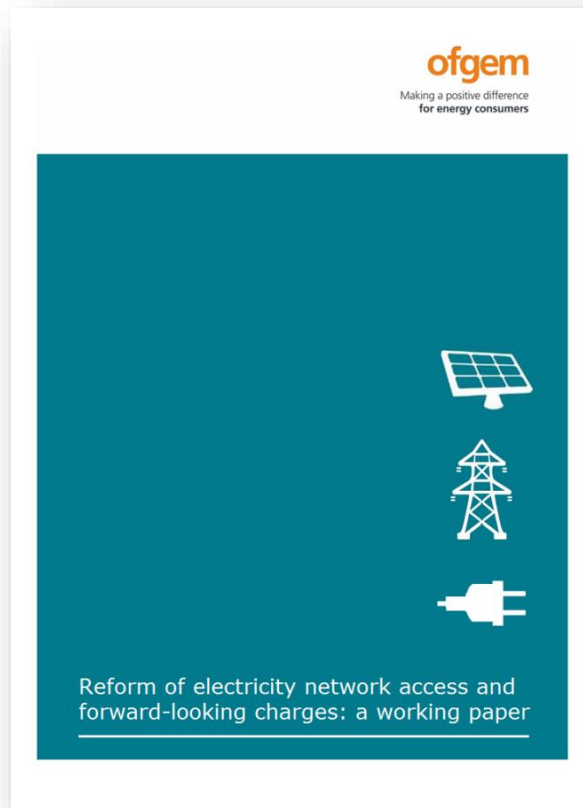
Network Charging



- The current levels of network and system operator (SO) charges are c£10 B per year
- About 50% is connection/forward-looking (designed to send signals to consumers) and 50% is residual/cost recovery charges (to ensure total revenue is recovered)
- We are currently reviewing both forward-looking charges and cost recovery charges



Reform of electricity network access and forward looking charges



Forward looking charges seek to provide signals to users about how their behaviours can increase or reduce future costs on the network. This is closely linked to access arrangements, also under consideration in this review.

Network access arrangements		Forward-looking charges	
Nature of access rights	Time aspects	Structure of charge	Types of costs
	Firmness		Types of charge
	Geographical nature		Basis of charge
	Associated conditions	Timing of payment and degree of user commitment	
Allocation and reallocation	Initial allocation	Level of granularity	Locational granularity
	Reallocation and trading		Types of locational signal
			Temporal granularity

Increase efficiency

- This is about making **better use** of the electricity system in the interests of all consumers
- **Avoiding unnecessary investment** at the expense of consumers in general
- Improving market signals
- And establishing a better basis for **dealing with changes** in the sector – electric vehicles, heat pumps, more devices/dependency on electricity

Why action is needed

- Prospect of increased network **constraints as use of the network changes**
- This could hinder ability for system to accommodate new techs (eg Embedded/Distributed Generation, **Electric Vehicles**, heat pumps) and require **expensive new network capacity** to address, with significant cost to consumers
- **New smart and flexible technologies** offer opportunity to accommodate new usages through making much better use of existing network capacity, alleviating the need for new capacity



Targeted Charging Review: update on approach
to reviewing residual charging arrangements

1

Residual charges are intended to ensure revenue recovery for network companies. They are not designed to incentivise specific actions by network users.

There are 3 separate dimensions which can be considered when designing a residual charge:

- 1) Who should pay – generation or final demand (usually via suppliers), or both;
- 2) What mechanism should be used to collect charges – for example, based on volumes used or another means such as a fixed or capacity charge; and
- 3) How those charges should be implemented – by voltage level or user group, by ability to respond to signals and whether a hybrid (either having different approaches for different users or combined approaches for the same user) approach would help facilitate our principles.

Principles

Reducing harmful
distortions

Fairness

Proportionality and
practical
considerations

Work to date has developed a shortlist for further analysis

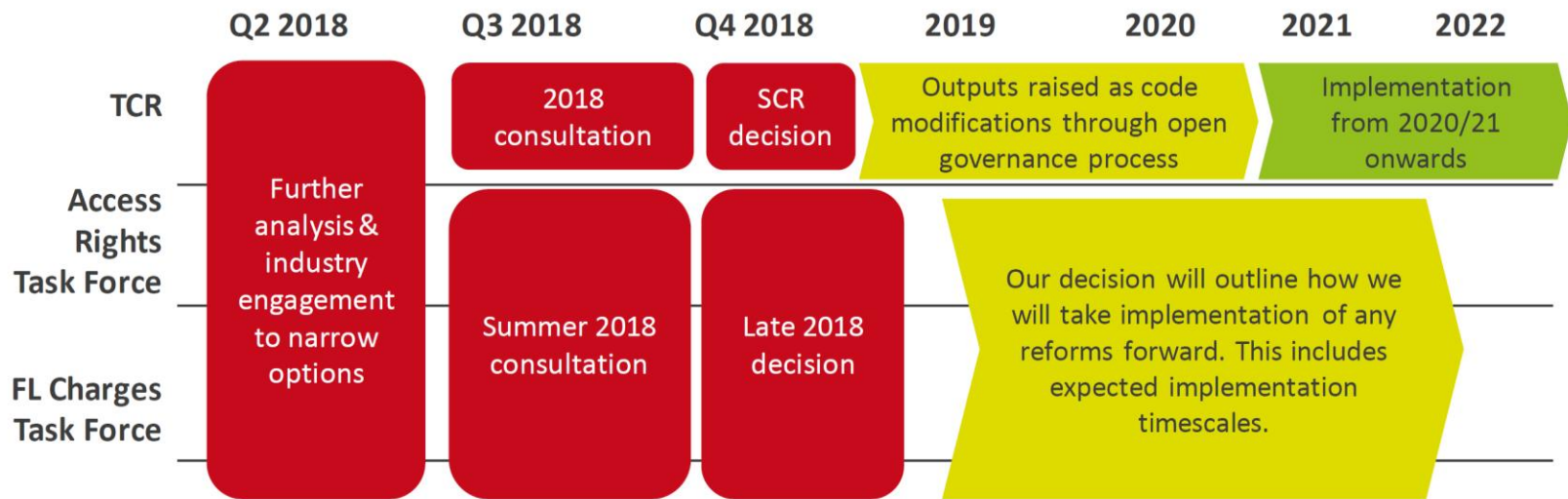


Current work to focus on three levels of analysis:

- What are the residual charges and associated incentives faced by individual users due to the existing arrangements, and how are they affected by a change in the method by which residual charges are collected?
- What aggregate (whole system) changes might be expected from a change to residual charges.
- Costs of change

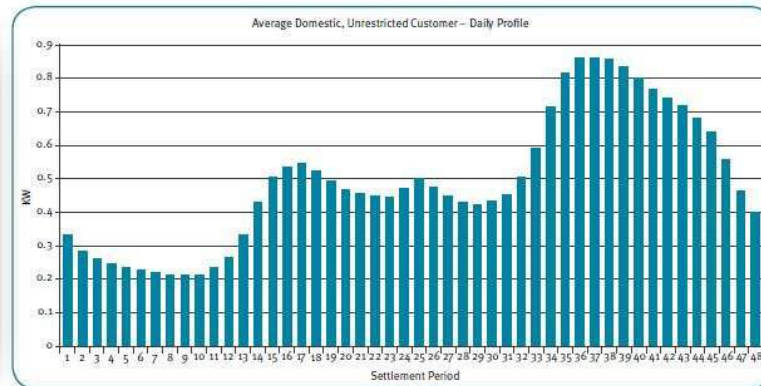
More stakeholder forums in the Spring (dates published on www.chargingfutures.co.uk) ;
Consulting on changes later this year. Questions and comments to TCR@ofgem.gov.uk

TCR and Network Access timelines

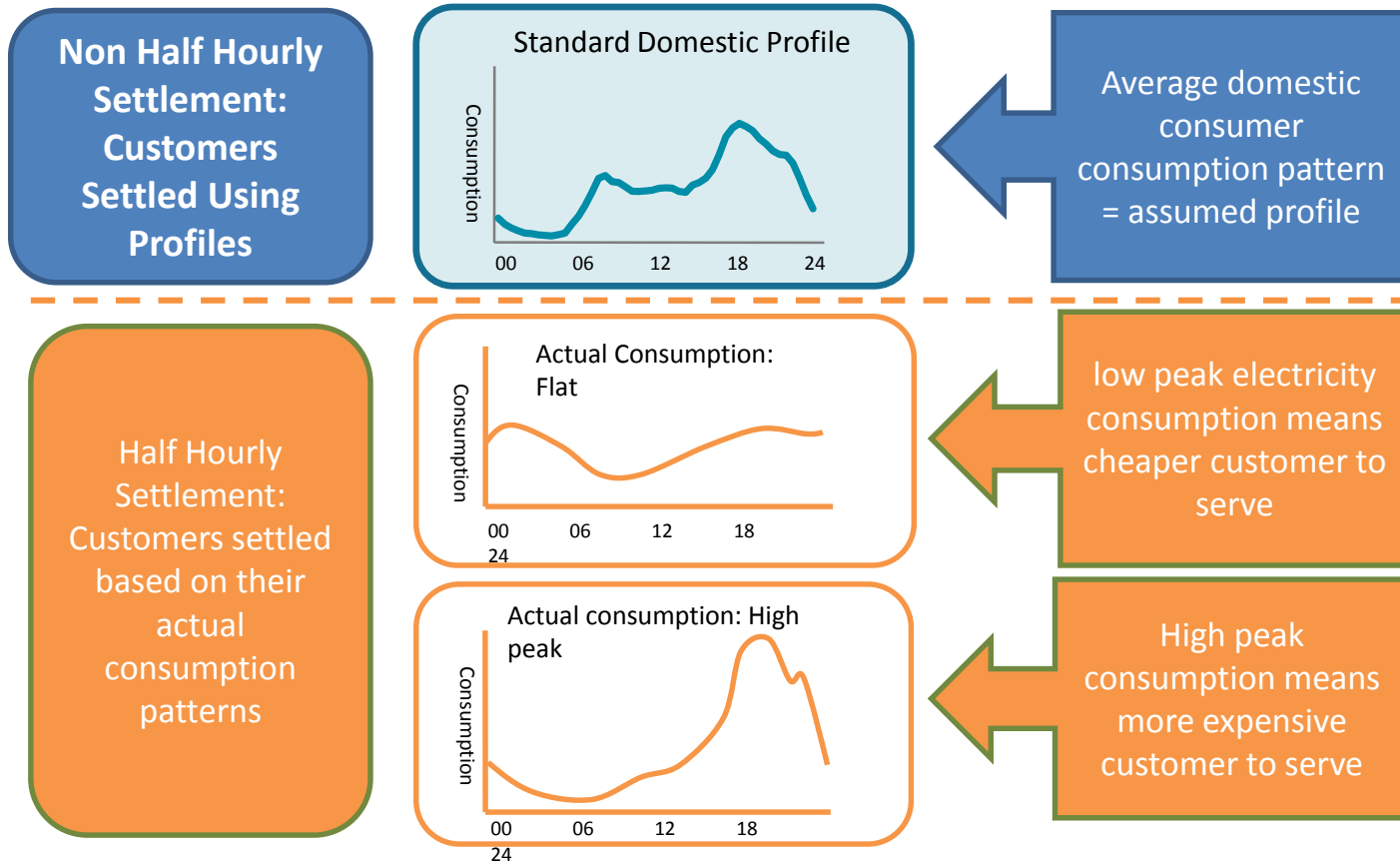


More information available on <http://www.chargingfutures.com/>
Email Chargingfutures@nationalgrid.com to sign up for updates etc

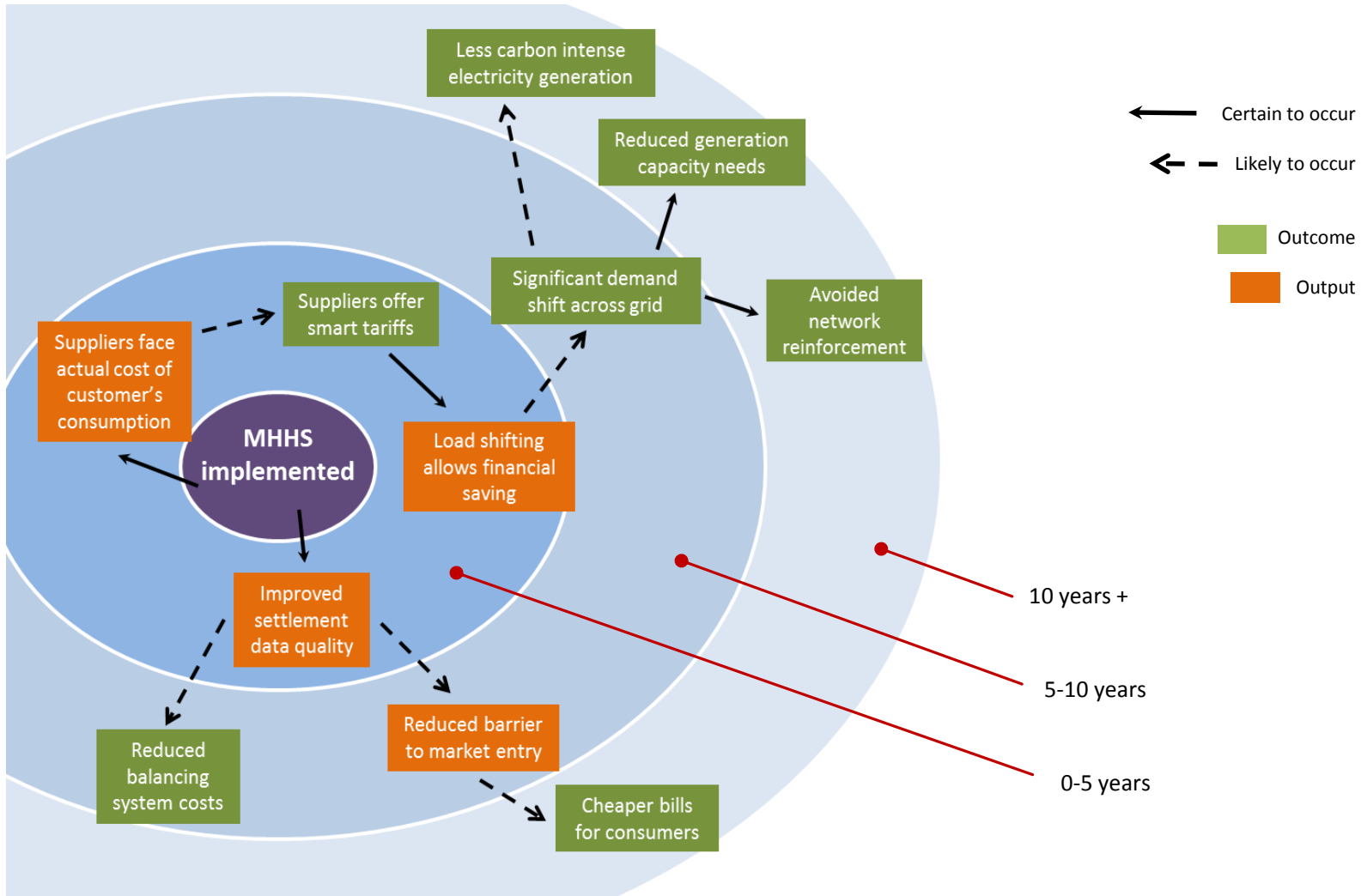
Half hourly settlement



Comparison between NHH settlement and HH settlement



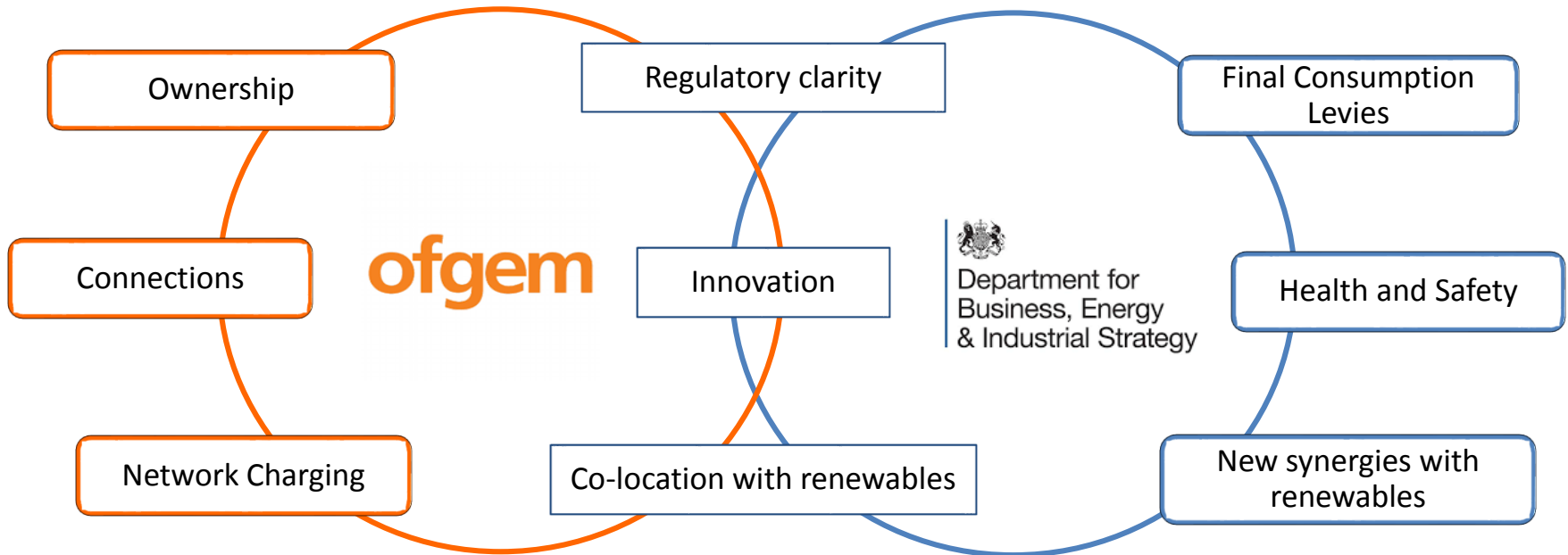
Realising the benefits of mass HHS



Storage



Joint Ofgem and BEIS joint action overview



Our aim is to create a level playing field, so that energy storage can compete fairly with other forms of flexibility and more traditional energy solutions

Enabling the competitive deployment of storage in a flexible energy system: Changes to the electricity distribution licence

Publication date	2nd October 2017
Closing date	27th November 2017
Policy areas	Business consumers Electricity - distribution Electricity - wholesale markets Licences, codes and standards
Status	Closed (awaiting decision)

We are proposing to introduce a new condition in the electricity distribution licence to ensure that distribution network operators cannot operate storage.

Storage can help to integrate intermittent renewable generation, reduce the costs of operating the system, and help avoid or defer costly reinforcements to the network. However, it needs a level playing field to compete in the relevant markets.

Where competitive activities are carried out by monopoly network operators, there is potential for competition to be distorted, for new market entrants to be deterred, and for network operators' incentives to invest efficiently in their networks to be affected.

In the case of networks owning and operating storage, distortions or foreclosure have the potential to affect not just the uptake of storage by third party providers, but also the uptake of other forms of flexibility – such as DSR or other flexible generators – that provide the same or similar services in the same markets. This in turn has the potential to impact on other markets, including that for aggregation.

However, electricity storage can be a valuable source of flexibility for network operators, offering an alternative solution to avoid or defer the need for traditional reinforcement or to support cheaper and faster network connections. We need to make sure that networks have the right regulatory framework to make efficient and effective use of flexibility provided by the market, while acting in an entirely neutral way.

Related links

[Clarifying the regulatory framework for electricity storage: licensing](#)

[Smart, Flexible Energy System – a call for evidence](#)

[Upgrading our Energy System – smart systems and flexibility plan](#)

Our principles

- DNOs need to act in an entirely neutral way
- Monopoly involvement in competitive activities - like operation of storage or commercial aggregation - gives rise to potential conflicts of interest
- We will make sure DNOs have right framework – our view is that DNOs do not need to own or operate storage and we will give effect to this over time

Consultation

- Proposing changes to the DNO licence that will strengthen requirements for DNOs, while leaving possibility for them to own and operate storage where the market has been unable to provide a solution there is a clear case of consumer benefit

We received feedback from 38 stakeholders

Clarifying the regulatory framework for electricity storage: Licensing

Publication date	2nd October 2017
Closing date	27th November 2017
Policy areas	Business consumers Electricity - wholesale markets Licences, codes and standards
Status	Closed (awaiting decision)

We seek to provide regulatory clarity on the treatment of electricity storage within the regulatory framework. To achieve this, we are consulting on changes to the electricity generation licence to make it fit for storage.

The modified licence will provide regulatory certainty to storage facilities, both existing and developing, encourage deployment of this new technology into the system and will ensure that a level playing field exists, so that storage can compete fairly with other sources of flexibility.

The proposed changes will also address in an appropriate manner the issues storage facilities face surrounding final consumption levies (currently some storage could face double charging of final consumption levies at the time of both importing from and exporting electricity to the grid).

We are also consulting on changes to the electricity and gas regulations on the licences applications forms to ensure we have all and only the necessary information to assess eligibility for a licence and have added specific questions for electricity storage providers in the electricity licence application form.

The consultation date will close on 27 November 2017.

Related links

[Enabling the competitive deployment of storage in a flexible energy system: changes to the electricity distribution licence](#)

[Smart, Flexible Energy System – a call for evidence](#)

[Upgrading our Energy System – smart systems and flexibility plan](#)

We received feedback from 38 stakeholders:

- 10 Storage operators
- 10 Suppliers
- 2 Network companies
- 7 Industry organisations
- 9 Others (Consultancies/ Research Centres / Generators / Other industry parties)

High level comments:

- Broadly supportive of the approach and saw this as a positive progress.
- Future work to clarify storage in primary legislation was also flagged.
- Acknowledgment that proposal addresses most of the issues faced by grid-scale storage.
- Need for more clarification on key terms used to avoid misunderstanding/confusion.
- Work still needed to remove barriers for smaller/ behind-the-meter storage too.

Guidance for generators: Co-location of electricity storage facilities with renewable generation supported under the Renewables Obligation or Feed-in Tariff schemes

Publication date	14th December 2017
Information types	Guidance Open letters and correspondence
Policy areas	Environmental programmes FIT RO

We have published draft guidance for participants of the Renewables Obligation (RO) and Feed-in Tariffs (FIT) schemes who are considering co-locating electricity storage facilities with their accredited RO generating station or FIT installation. We have developed this guidance to provide clarity to participants about the treatment of storage facilities within the framework of the schemes in anticipation of increased uptake of co-located storage.

[Renewables Obligation \(RO\)](#)

[Feed-in Tariffs \(FIT\)](#)

We invite stakeholders to provide feedback on the draft guidance. The closing date for providing comment is 8 February 2018.

The cover letter outlines our reasons for developing the guidance and the information we are seeking from stakeholders. Annex 1 provides a copy of the draft guidance.

- Draft guidance published in December 2017 provides clarity about how co-located storage will be treated within the framework of the RO and FIT schemes
- We consider that where the requirements of the RO and FIT schemes continue to be met, storage can be co-located and the generators' accreditation can remain valid.
- The guidance is limited to the requirements and our administration of the RO and FIT schemes, it does not cover issues relating to co-located storage beyond this and should not be used in other contexts.
- We have published this to gather feedback.

Questions?

Contract details:

Chris Brown

Head of Core and Emerging Policy

Chris.Brown@ofgem.gov.uk



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.