



Department
of Energy &
Climate Change

The participation of non-generation activities in the GB Capacity Market

Department for Energy & Climate Change

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Presentation today

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- Environmental & Energy Aid Guidelines and non-generation activities

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- GB Capacity Market - DSR in Capacity Market compatibility with Environmental & Energy Aid Guidelines

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- EDR in a Capacity Market



1. Environmental & Energy Aid Guidelines and non- generation activities



EEAG & aid for non-generation activities (1)

- EEAG (220) “consider alternative ways of achieving adequacy which do not have a negative impact on the objective of phasing out environmentally or economically harmful subsidies, such as facilitating demand side management.”
- EEAG (224b) The Commission will take account of an “assessment of the impact of demand-side participation, including a description of measures to encourage demand side management.”
- EEAG (226) “open and provide adequate incentives to... operators using substitutable technologies, such as demand-side response or storage solutions.”
- Allow for potentially different lead times.

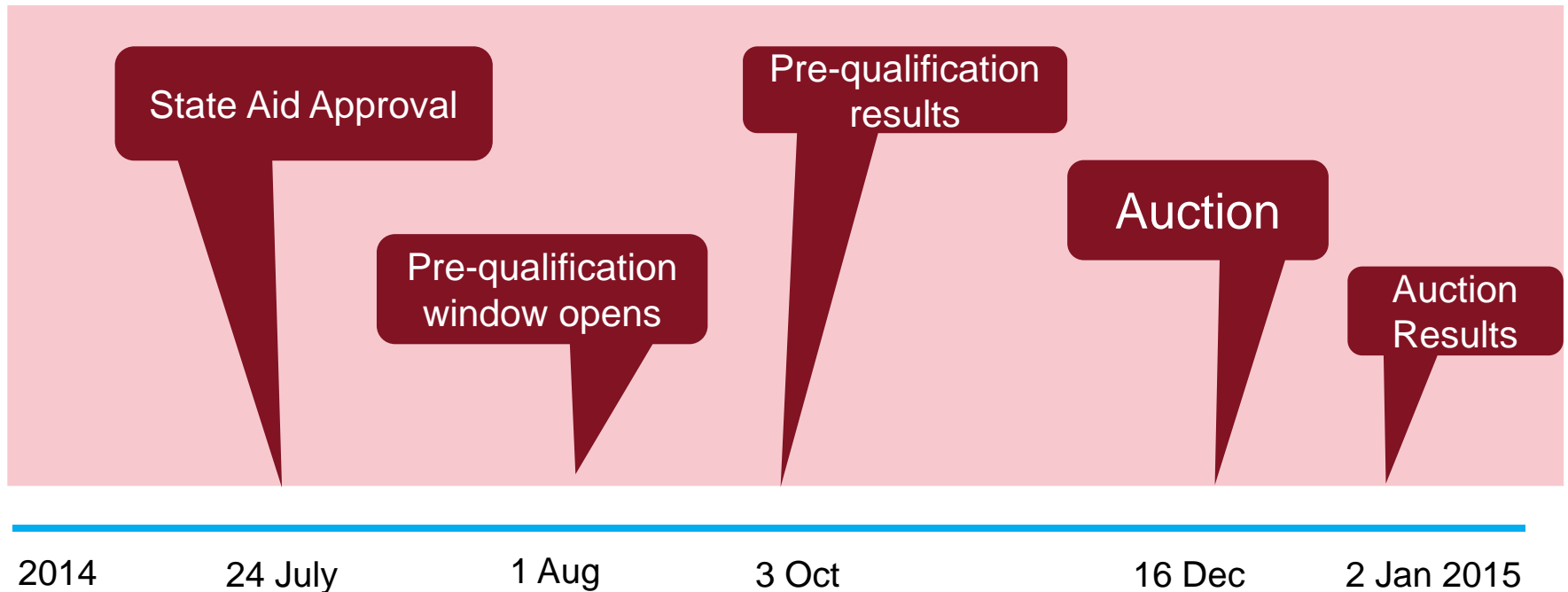


EEAG & aid for non-generation activities (2)

- EEAG (229) “a competitive bidding process on the basis of clear, transparent and non-discriminatory criteria, effectively targeting defined objective.”
- EEAG (232a) Require mechanisms to be open to aggregation to ensure opportunity for small providers to participate.
- EU Energy Efficiency Directive 2012/27/EU “equal market entry opportunities for demand-side resources alongside generation should be pursued.”



2014 Capacity Auction



- 65GW participated in auction
- 49.3GW of capacity secured for 2018/2019 – 76% of volume participating
- Capacity Price of £19.40 per kW p. a.



2. GB Capacity Market – DSR compatibility with Environmental & Energy Aid Guidelines

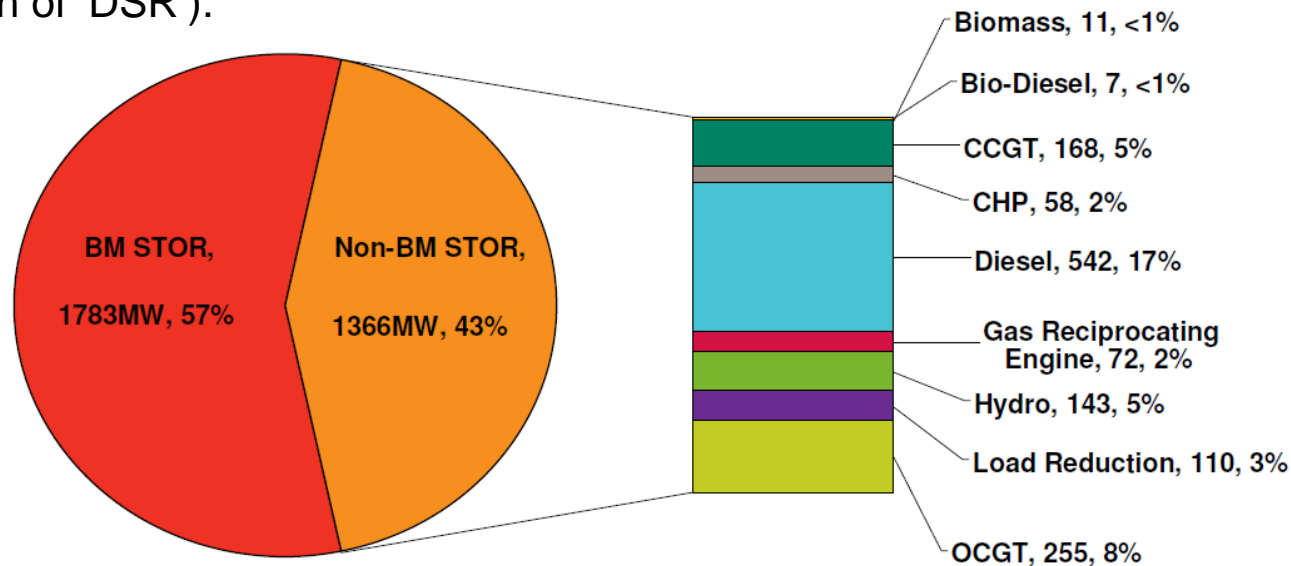


Demand Side Response in GB

Demand side response (DSR) in GB's Electricity Market: temporary reduction in demand on the transmission system and can be provided by generation or load reduction services.

Demand side response in GB's Capacity Market: temporary reduction of imported electricity below a baseline and includes permitted on site generation (self supply).

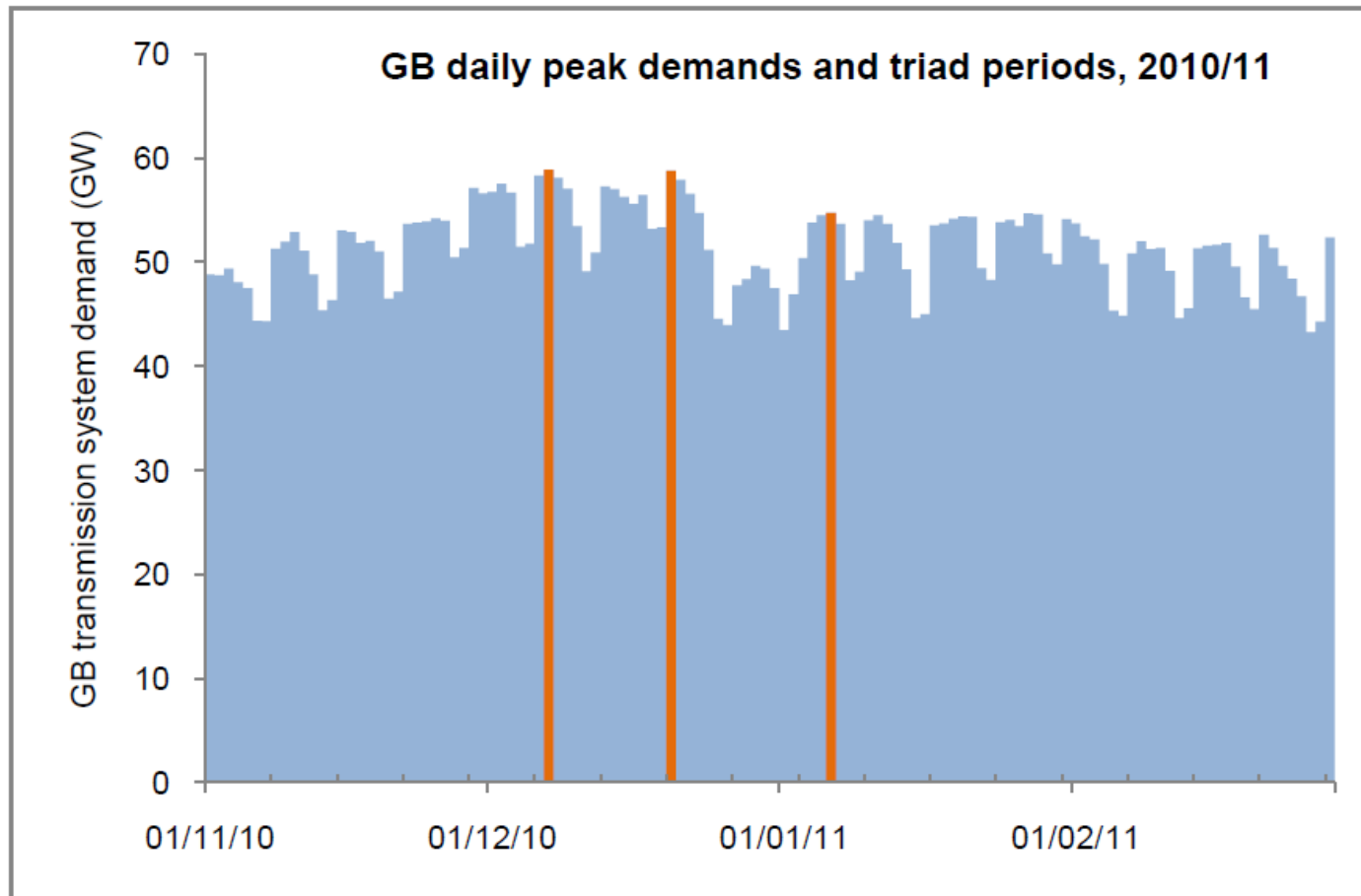
Fuel Type Composition of Non-BM STOR providers (broadly equated with definition of 'DSR').





Triad Peaks

DSR providers monitor demand on the grid and forecast potential triad events. They work with their clients (generally large electricity users) to alert them to triad events so that they have time to reduce or shift demand to some other period, or prepare for use of standby generators. By avoiding using electricity at these three peak times, DSR can help to avoid high transmission network use of system charges.





Why include DSR in the CM

- Increased levels of DSR will allow more **responsive energy prices**, which would then rise to the level at which customers are willing to turn down their demand, rather than the value of lost load.
- By supporting new entry to the market, including DSR, the Capacity Market will **strengthen competition** in the electricity market and help deliver security of supply at minimum cost.
- Demand side response **reduces total demand quickly at a given time**, so that you don't need so much reserve generating capacity. This is particularly valuable as higher levels of intermittent renewables necessitate higher levels of reserve generating capacity.
- New demand side response **can be delivered much more quickly** than a new power station can be built.
- Certain types of DSR can **improve the operational efficiency** of transmission and distribution grids, reducing the need for costly reinforcement.
- In the future, more DSR providers will be customers being smarter about when they use electricity to shift activity (in the same way that domestic customers use economy 7 tariffs) and thereby could **reduce bills**.
- DSR at peak times can reduce emissions by reducing the need for peaking plants, it should be noted that DSR measures alone will have **little impact on carbon emissions**.



State Aid Notification and DSR

State Aid Guidelines

Section 3.9.1 #221

Member States should consider alternative ways of achieving generation adequacy which do not have a negative impact on the objective of phasing out environmentally or economically harmful subsidies.

GB demand side policy

Whilst DSR at peak times can reduce emissions by reducing the need for peaking plants, it should be noted that DSR measures alone will have little impact on carbon emissions. This is because approximately 90% of existing DSR around 1.4GW is from small scale fossil fuel generation (for example diesel) which typically has a high carbon cost, particularly compared to gas. However, as DSR is only called upon for short periods, the total increase in carbon emissions is likely to be insignificant compared to total generation emissions.



State Aid Notification and DSR

State Aid Guidelines

Section 3.9.2 # 209

In its assessment, the Commission will take account of the impact of demand-side participation, including a description of measures to encourage demand side management.

GB demand side policy

Directly supporting the development of the demand side through specific design features:

- Low threshold of 2MW
- Ability to aggregate with resources owned by different legal owners
- T-1 auctions with 50% reserve
- Transitional Arrangements
- Baseline takes into account balancing services delivery
- A choice of metering
- Representation on Expert Group panel for policy development.



State Aid Notification and DSR

State Aid Guidelines	GB demand side policy
<p><u>Section 3.9.3 #227</u> The aid should therefore be delivered through a mechanism which allows for potentially different lead times, corresponding to the time needed to realise new investments using different technologies</p>	<ul style="list-style-type: none">• The Capacity Market procures capacity to meet an enduring reliability standard through central auctions run by the System Operator.• The capacity auctions is technology-neutral and open to both existing and new generation, as well as demand side response.• There are four years ahead of delivery auction for DSR that wishes to invest in new technology.• There are one year ahead auctions for each delivery year which was a request from the demand side response sector.



State Aid Notification and DSR

State Aid Guidelines

Section 3.9.6 #233

- The measure should be designed in a way so as to make it possible for any capacity which can effectively contribute to addressing the generation adequacy problem to participate; and
- The participation of generators using different technologies and of operators offering measures with equivalent technical performance, for example demand side management

GB demand side policy

- The Capacity Market is a market-wide mechanism open to participation of all capacity providers (both generators and demand side response).
- All eligible participants can bid in the auction or opt out if they wish, and the auction design ensures that participants have the right incentives to bid at fair value of their capacity.
- Participants will be able to aggregate to provide capacity and the measure will be open to the demand side.



Features to support DSR

- A low de-minimis threshold of 2MW for DSR and smaller embedded generators. This is lower than most National Grid balancing services.
- All resources have the choice to participate in either the four year ahead or one year ahead auction.
- Some capacity will be set aside from the four year ahead auction, with a minimum of 50% 'reserved' for the year ahead auction. This is not ring fenced for DSR – technology neutral auction.
- DSR can participate in the auction as price makers, enabling DSR resources to be free to bid up to the overall auction price cap.
- The choice of three metering options to allow for a wider participation of DSR resources and small scale generators, using existing metering arrangements where possible.
- Transitional arrangements which will run in the years between the first capacity auction (2014) and the first delivery year (2018-19). The auctions are for DSR and small scale generators and will offer different terms than the full Capacity Market to limit risks, encourage enterprise and build confidence in the sector's ability to participate.



Transitional Arrangement Timeline

	2014	2015	2016	2017	2018
Capacity Market	1 st CM T-4 auction (December)	2 nd CM T-4 auction (expected December)	3 rd CM T-4 auction	1 st CM T-1 auction 4 th CM T-4 auction	1 st CM delivery year (18/19)
Transitional Arrangements		1 st TA auction (expected December)	<ul style="list-style-type: none">• 2nd TA auction• 1st TA delivery year (16/17)	2 nd TA delivery year (17/18)	
Demand Side Balancing Reserve (NG)	DSBR delivery (14/15)	DSBR delivery (15/16)			

CMUs will not be able to hold capacity agreements from the 2014 or 2015 T-4 auctions *and* from a transitional arrangements auction.



2014 Auction Results

	Capacity (MW)	Capacity (%)	Number of CMUs	Number of CMUs (%)
Existing Generating CMU	33,566.006	68.14	185	60.46
Refurbishing CMU	7,048.927	14.31	17	5.56
Pre-Refurbishment CMU	5,848.684	11.87	12	3.92
New Build Generating CMU	2,621.151	5.32	77	25.16
Unproven DSR CMU	165.945	0.34	13	4.25
Proven DSR CMU	8.225	0.02	2	0.65

Table 1: Breakdown of Awarded Capacity by CMU Classification



2014 Auction Results

	Capacity (MW)	Capacity (%)	Number of CMUs	Number of CMUs (%)
CCGT	22,258.651	45.19	47	15.36
CHP & autogeneration	4,235.068	8.60	36	11.76
Coal/Biomass	9,232.183	18.74	29	9.48
DSR	174.170	0.35	15	4.90
Hydro	682.162	1.38	29	9.48
Nuclear	7,876.108	15.99	16	5.23
OCGT and Reciprocating Engines	2,101.223	4.27	121	39.54
Storage	2,699.373	5.48	13	4.25

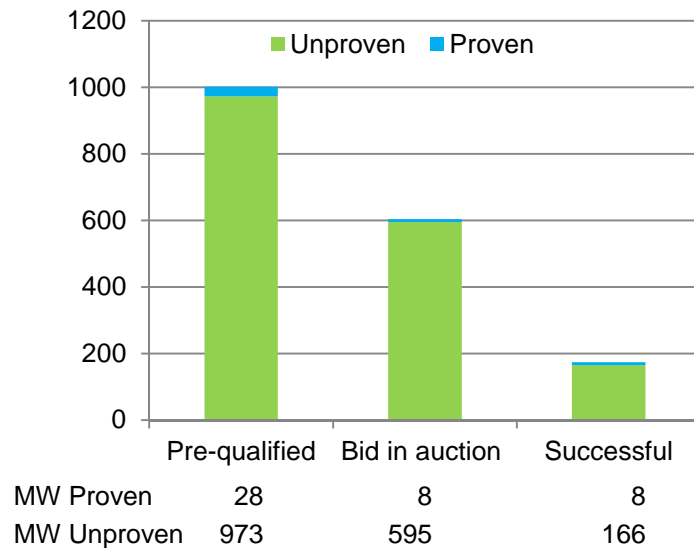
Table 2: Breakdown of Awarded Capacity by CMU Type



Demand Side Reduction

Key Features:

- 1GW DSR pre-qualified – mostly unproven
- 40% of volume dropped out before auction
- DSR successful - 0.174GW gained 1 year agreements



Issues:

Volume:

- We did not expect DSR to play a significant part in the first T-4 auction. The sector have always said that T-1 is a more appropriate auction for them.
- Exit from auction as price fell preserves their option to bid in TA or in the next T-4.
- DSR volumes largely exited at between £35 - £40 and £25 - £30. This represents strategic bidding to preserve the option for future auctions rather than indicating the clearing price was too low for DSR. DSR has participated in Triad Avoidance between £11.05/kW - £30.55/kW.

40% drop out rate in MW between pre-qualification and auction. Due to commercial sensitivities the reasons are unknown.

Other “DSR”

- Note that >1.4GW of small embedded generation (new and existing) was successful and as embedded generation is included within the scope of DSR resources (NG’s balancing services), this figure is representative of the amount of current DSR volumes in GB that participate in STOR.

Policy implications

- Parameters for TA to be set to support the participation of DSR for T-1 auction.



3. EDR in a Capacity Market



UK definition of EDR

Electricity Demand Reduction (EDR) – lasting reduction in electricity demand

Demand Side Response (DSR) – temporary reduction in electricity demand

Why include EDR in the Capacity Market?

Capacity Markets are designed to deliver security of supply. Reducing demand provides security of supply because it increases the margins between electricity supply and demand.



State Aid and EDR

Key State aid considerations

Market failures:

- Positive externalities: EDR measures contribute to security of supply which is a public good that the private sector underinvests in.
- Coordination failures: Tenant landlord split leads to underinvestment in energy efficiency and therefore less security of supply.
- Incomplete information: Undertakings are often unaware of opportunities to reduce their electricity demand. This leads to less security of supply.
- Residual carbon market externalities of fossil fuels: Total environmental impact of carbon not adequately priced into the electricity market.

These market failures have led to approximately 32TWh of cost effective EDR potential in the UK economy.



State Aid and EDR

Have looked at initial State Aid options – some challenges...

- Undertakings will be paid for the electricity reduction they achieve in capacity terms (kW) not energy terms (kWh) – conforms to 3.9.3 (225);
- Our current thinking is that EDR projects would be compensated for the electricity demand they achieve during the winter peak period on the GB Grid.
- Energy efficiency measures are the tool that is used to achieve the security of supply benefit therefore there are wider benefits that cannot be paid for – can only pay for kW savings.



State Aid and EDR

Challenges continued...

How to ensure no overcompensation

- Energy efficiency policy landscape already complicated therefore cumulation is potentially an issue.
- UK is minded to use an auction mechanism which could be distinct to the wider CM auction
- Ensuring effective measurement of EDR actually delivered – this requires a robust measurement and verification regime.

Other issues

- Penalty regime
- Aggregation to ensure relatively small projects can participate.



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Thank you