Department of Energy & Climate Change

The Renewables Obligation for 2016/17

Calculating the Level of the Renewables Obligation for 2016/17

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Calculating the Level of the Renewables Obligation for 2016/17

The Renewables Obligation Order (ROO) 2009 requires the Secretary of State to publish the number of renewables obligation certificates (ROCs) that electricity suppliers are required to produce during an obligation period (the "renewables obligation"). This must be published 6 months before the start of the obligation period, i.e. by 1st October.

The Secretary of State is therefore publishing the renewables obligation for the 2016/17 period today, 30 September 2015. This paper sets out the methodology used in calculating the renewables obligation.

Setting the size of the obligation requires two calculations:

A) For calculation A we are required to estimate the total amount of electricity (MWh) expected to be supplied to customers during the 2016/17 obligation period, for both Great Britain and Northern Ireland. The overall obligation (in ROCs) is then obtained by multiplying these figures by the fixed targets specified in the 2009 Order for the 2016/17 period: 0.154 ROCs per MWh for Great Britain and 0.063 per MWh for Northern Ireland;

B) For Calculation B, the expected number of ROCs issued in 2016/17 is calculated, and then uplifted by 10 per cent (headroom). The projected number of ROCs is then used to calculate the obligation level for calculation B.

The obligation level is set as one of these calculations, determined as:

- Fixed targets: If fixed targets (A) is greater than headroom (B).
- Headroom: If headroom (B) is greater than the fixed target (A).

Calculation A sets the total UK obligation at 45.2 million ROCs using DECC forward electricity demand figures central scenario, compared with Calculation B which sets it at 102.0 million ROCs :- 100.9m ROCs in England, Scotland and Wales and 1.1m in Northern Ireland. Calculation B is the higher of the two and must therefore be used.

To obtain the obligation on individual suppliers (ROCs per MWh), for each of the RO regions, the obligation is divided by the amount of electricity (MWh) expected to be supplied to customers over 2016/17.

This means that the Renewables Obligation, the number of ROCs that electricity suppliers are required to produce during the 2016/17 obligation period will be 0.348 ROCs per MWh in England, Scotland and Wales, and 0.142 ROCs per MWh in Northern Ireland.

Further information is provided in the Annex to this notice.

ANNEX

Calculation A

For 2016/17, DECC central projections[1] are that 298.1 TWh of electricity will be supplied by Licensed Suppliers. At 0.154 ROCs per MWh for England and Wales and Scotland; and 0.063 ROCs per MWh for Northern Ireland, this gives a total of 45.2 million ROCs for Calculation A.

Calculation B

Calculation B estimates the expected amount of ROCs to be issued to stations expected to be operational during 2016/17, carried out for both existing and forthcoming sites.
For each installation, generation is estimated by multiplying the capacity by the number of hours in the year, and the expected load factor. The expected ROCs are then calculated by applying the banding level for that technology to the generation

The list of existing sites is taken from the RO accredited stations list, with just those expected to be operational during 2016/17 included.

The list of potential new build expected to generate in 2016/17 was sourced from the Renewable Energy Planning Database (REPD)[2], the National Grid's Transmission Entry Capacity (TEC) Report[3] and CHP Quality Assurance (CHPQA) programme register. We have also contacted a range of developers to confirm the capacity and timescales for completion of these projects.

DECC's calculations give a total of 92.8[4] million ROCs before headroom. With headroom, this gives a total of 102.0 million ROCs. The split between existing stations and new build stations is as follows:

	ROCs (millions)
Potential ROCs from existing stations (excluding headroom)	71.7
Potential ROCs for new build (excluding headroom)	21.0

[1] Based on latest published DECC electricity consumption predictions (EEP 2014, Published in September 2014). The EEP projects electricity demand (final consumption + energy industry use excluding own use, losses and pumping use). From this measure of demand a deduction is made for the estimated demand met by non - public distribution suppliers. This gives 'electricity sales'.

[2] https://www.gov.uk/government/statistics/renewable-energy-planning-database-monthly-extract

[3] http://www.nationalgrid.com/uk/Electricity/Codes/systemcode/tectrading/

[4] A small difference exists between this figure, and the total number of ROCs in the subsequent table – this is due to rounding.

Total (with 10% headroom)	102.0

Calculation B is therefore higher than Calculation A. In accordance with the Renewables Obligation Order 2009, Calculation B must be used to set the level of the Obligation in 2016/17.

Assumptions used for Calculation B

Load Factors

Load factors are used to calculate generation from the capacity for each technology.

We have considered feedback from stakeholders and have made amendments to our categorisation and methodology for load factors in this year.

Categorisation

For most technologies, we have introduced a load factor for existing stations and one for new build stations to reflect that these may achieve higher load factors. This reflects that new build plants are, in general, likely to be more efficient, reflecting updated technology used in the plants and learning from previous experience.

For onshore and offshore wind we have also introduced further category called 'newer build' which refers to stations having commissioned in the past two years. This category is used to reflect improvements in performance, but where the plant is not anticipated to be as efficient as plants coming forward in 2016/17.

Methodology

In previous years, DECC used load factors derived from actual generation and capacity data, as published in the Digest of UK Energy Statistics (DUKES)[5]. Where historic load factors showed a clear trend, this trend was continued for the respective obligation year. Where there was no clear trend, observed load factors averaged over a number of years were used to give a final load factor. For both approaches, a single load factor was used for each technology.

To derive the new load factors for existing sites, DECC has used monthly generation and capacity data, based on Renewable Obligation Certificates (ROC) issued,[6] for up to the past five years to 31 March 2015. This is deemed more reflective of actual performance than the calendar years previously used.

To inform new build sites, data extrapolation techniques have been used, supplemented by benchmarks, including DECC internal databases and industry intelligence.

For biomass conversions, given the small numbers of projects involved, DECC has used plant specific load factors based on actual generation data and discussion with industry experts.

[5] Table 6.5 DUKES, https://www.gov.uk/government/publications/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes

[6] https://www.renewablesandchp.ofgem.gov.uk/

Technology	Category	Load Factor			Source[7]
		Existing	Newer Build	New Build	
Onshore wind	England and Wales	25.9%	27.6%	29.9%	Actual generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing and newer build category. For new build, data extrapolation techniques have been used, supplemented by industry benchmarks and internal evidence. The differences between cohorts can be explained by technological changes and improved siting.
	Scotland	27.0%	28.6%	32.8%	
	Northern Ireland	28.3%	30.4%	32.2%	
Offshore wind		37.4%	40% (<6MW turbines)	47.7% (>6MW turbines)	Actual generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing and newer build category. For new build, data extrapolation techniques have been used, supplemented by industry benchmarks. The differences between cohorts can be explained by technological changes and improved siting.
Hydro		34.5%		34.5%	Actual generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. Data extrapolation techniques have been used, supplemented by industry benchmarks and internal evidence to inform the new build category. However, the evidence does not point to differences between age cohorts.
Landfill Gas		55.3%		55.3%	Actual generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. The data shows a clear downward trend due to depletion. Data extrapolation techniques have been used, supplemented by industry benchmarks and internal evidence to inform the new build category. However, the evidence does not point to

[7] Load factors are derived from the Renewable Obligation Certificates data and are calculated an unchanged configuration basis. Unchanged configuration load factors express average hourly quantity of electricity generated by plants operational the entire year (in the same configuration), as a percentage of capacity operational the entire year (from the same plants). As such, it removes bias from changes in capacity during the year (e.g. because of sites beginning operation at the beginning or end of the year).

					differences between age cohorts.
Sewage Gas		51.0%		51.0%	Actual generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. Data extrapolation techniques have been used, supplemented by industry benchmarks and internal evidence to inform the new build category. However, the evidence does not point to differences between age cohorts.
Advanced Conversion Technologies		34.9%		34.9%	Given the small number of stations data for Energy from Waste (EfW) stations has been used as the most appropriate approximation. Compared with EfW, this load factor is lower as it is adjusted for the renewable feedstock content.
Anaerobic Digestion		55.9%		87.4%	Actual generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. Data extrapolation techniques have been used, supplemented by industry benchmarks to inform the new build category. New build is expected to benefit from technological improvements, which is consistent with reports from Parsons Brinkerhoff[8] and the Green Investment Bank[9].
Energy from Waste CHP		37.5%		53.0%	Actual generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. Data extrapolation techniques have been used, supplemented by industry benchmarks, such as the Combined Heat and Power Quality Assurance Programme, to inform the new build category. New build is expected to benefit from technological improvements.
Dedicated Biomass		54.0%		68.7%	Generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. Data extrapolation techniques have been

[8] https://www.gov.uk/government/consultations/consultation-on-a-review-of-the-feed-in-tariff-scheme

[9] http://www.greeninvestmentbank.com/media/44758/gib-anaerobic-digestion-report-march-2015-final.pdf

					used, supplemented by industry benchmarks to inform the new build category. New build is expected to benefit from technological improvements.
Biomass CHP		64.5%		71.0%	Generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. Data extrapolation techniques have been used, supplemented by industry benchmarks, such as the Combined Power and Heat Quality Assurance Programme to inform the new build category. New build is expected to benefit from technological improvements.
Photovoltaics (Solar PV)		11.1%		11.1%	Generation data over past three years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. Data extrapolation techniques have been used, supplemented by industry benchmarks to inform the new build category. However, the evidence does not point to differences between age cohorts.
Wave		2.9%		2.9%	Generation over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. However, for 2014/15 no sites have been generating consistently. Data extrapolation techniques have been used, supplemented by industry benchmarks to inform the new build category. However, the evidence does not point to differences between age cohorts.
Tidal		26.6%		3.2%	Generation data over past five years to 31 March 2015, on an unchanged configuration basis, has been used to inform the existing build category. Data extrapolation techniques have been used, supplemented by industry benchmarks to inform the new build category. For existing stations, the evidence suggests a high load factor once 'teething' issues have been overcome. For new build, generally demonstration sites, a much lower assumption is used, reflecting these 'teething' issues.

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