

Analysis of the e-POWER July 2018 auction

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1 e-POWER Auction Analysis

1.1 Headlines

This e-POWER auction took place across two days on 10 and 11 July. The auction sold PPAs for 56 projects totalling 126MW. By number, it was the second largest auction to date with only the January 2018 auction seeing more sites at 65. The majority of contracts sold in the auction were for power from 1 October 2018 for either six or 12 months; however, some contracts had alternative start dates and contract lengths with two PPAs commencing 1 April 2019.

Headlines from the latest auction are:

- The auction also saw a large increase in the absolute value of projects on a £/MWh basis following a significant rise in wholesale power prices and an increase in the traded value of Rocs
- The auction saw a new record high for value retention compared to previous auctions. The average value share retained by generators was 103.8% against assessed post-auction maximum energy benchmark values¹. This compares to 102.1% in the January 2018 auction
 - Nearly half of the sites (48%) achieved values in excess of 105% of the relevant benchmark
- Likely reasons for increased value retention, as well as the 100% benchmark being breached again, include:
 - Competition between offtakers, with a rising number of offtakers in the short-term PPA market now assessed as being above 40 delivering high levels of competition. The auction saw an average of 21 bids per site, with a couple of sites receiving over 40 bids
 - Forecasts of a short Roc market for 2018-19 and 2019-20 boosting expected recycle values, with the traded value of Rocs in monthly e-ROC auctions at their highest since July 2009. Post auction maximum benchmark values are calculated using the buy-out price only, so any recycle values priced into bids acts to push value retention above 100%
 - Suppliers bidding in the auction continue to place a higher premium on controllable baseload technologies (landfill gas, biomass, anaerobic digestion (AD) and municipal waste (MIW)). These sites are also able to earn more lucrative embedded benefits revenues from TRIAD and GDUoS red rates which suppliers will likely have priced into bids
- 21 FiT sites were included in the auction, significantly higher than the 11 sites in the January 2018 auction, with average value retention of 103.0% (or £69.0/MWh). The increased number of FiT sites seeking PPAs is reflective of higher wholesale power prices relative to the administered export rate (£52.40/MWh) – all FiT sites in the auction achieved values above the export tariff
- 32 Roc sites took part in the auction, 26 of which sold both power and Rocs, while six sold power only. Sites which sold Rocs continued to see higher average value retention (at 105.3%²) compared to FiT sites. This is likely forecasts of higher recycle values in the market, with values on the monthly e-ROC auction currently at their highest since July 2009

¹ The post auction maximum benchmark value for a project is calculated as the sum of the current wholesale power price, the site specific embedded benefit values and the value of the Roc.

² Please note that for the purpose of the analysis, post-auction maximum benchmark values uses the buy-out price only. Any recycle value factored into bids therefore pushes values further above 100%.

1.2 Commentary on Implications

The July 2018 e-POWER auction saw a large rise in the contracted £/MWh value of projects, as well as set new record highs for value retention, with the short-term PPA market remaining very liquid amid strong competition between offtakers.

A significant uplift in wholesale power prices was a key driver behind increased values seen in the auction, with the annual baseload contract up more than 20% (£10/MWh) in last six months. This led to generators in the auction receiving a much greater return on their exported electricity than in the January 2018 auction.

Cornwall Insight now estimates there are more than 40 offtakers active in the short-term renewables PPA market. This has underpinned competition and also been a key driver of increasing values for green generators, with new and existing market participants having to bid more aggressively to either maintain or gain market share. This was exemplified by the fact that two sites received in excess of 40 bids, one of which had almost 60 bids.

The high number of generators participating in the auction – being the second most to date at 56 sites – has continued due to the large number of sites on short-term deals (<1 year) sustaining churn rates, but also due to a notable rise in wholesale power prices giving an incentive for generators to lock in at higher prices. Generators have continued to opt for shorter-term deals in light of backwardation³ in the power market.

We believe one of the highlights from the auction came from FiT projects, with all sites achieving values in excess of the administered export tariff⁴, a refreshing change from previous years which has seen the majority of FiT generators inactive in the PPA market. This trend is largely attributed to higher wholesale prices. While FiT sites in the auction was a story of success, it should be noted that the stream of new FiT projects is set to slow considerably with government recently confirming the scheme's closure from 1 April 2019.

Roc sites continued to auction at a premium to other projects, with offtakers pricing in expected recycle values on top of the buy-out price. Cornwall Insight's own forecast expects the 2018-19 Roc market to outturn 10-15% undersupplied owing to an ambitious RO target set by BEIS. Consequently, the increased demand for Rocs has bolstered offtakers' appetite to contract with Roc sites. Suppliers are due to present Rocs by 1 September or pay the buy-out price by 31 August for 2017-18 compliance, where outturn recycle values will become more clear, as well as any knock on effects for 2018-19 from banking.

The final trend to highlight, but one that has been prevalent in the market for some time, is suppliers placing a higher premium on controllable technologies able to generate to baseload output profiles. These technologies generally include landfill gas, biomass, AD, and MIW. Baseload generation is more predictable and acts to reduce the cost of imbalance. Higher values also stem from greater embedded benefit values, capturing the TRIAD and GDUoS red rates.

Overall, liquidity in the renewables PPA market is one of relative health, and the e-POWER auction continues to provide generators access to the supply community, whilst providing suppliers with an easy and convenient route to purchase green electricity. It has remained a 'sellers' market, with demand from suppliers and offtakers generally exceeding the number of projects available. However, a question remains over how long these high prices and retention rates can be sustained. With regard to the wholesale price, forward trades suggest a dampening of prices. As for retention, offtaker margins in the wider renewables PPA market are reported as being "squeezed".

³ Backwardation for wholesale power contracts is a market phenomenon when contracts further in the future are priced lower than those closer to delivery.

⁴ The 2018-19 higher FiT export rate is £52.4/MWh and the lower rate is £37.2/MWh. Whether a site receives the higher or lower rate depends on a projects scheme accreditation date, with sites after 2012 generally receiving the higher rate.



2 Methodology

This report analyses the results for contracts awarded in the July 2018 e-POWER auction across two days on 10 and 11 July 2018. It compares the actual value that sites achieved in the auction against a maximum energy market benchmark value that sites can potentially achieve. Project values and maximum benchmark values are presented as a £/MWh figure based on different potential sources of value. These are assessed post-auction, where sources of value include:

- Wholesale power price
 - For the purposes of the benchmark prices, the winter 18 baseload power price has been taken for six-month contracts from October 2018 at £62.36/MWh, and the annual October 18 baseload price for 12-month contracts from October 2018 at £57.00/MWh. The majority of contracts sold in the auction were for PPAs commencing from 1 October 2018 for either 6 months or 12 months; however, some contracts had alternative start dates and lengths for which an alternative baseload price was used of between £56.26/MWh (12 months from 1 December 2018) and £60.29/MWh (three months from 1 September 2018).
- Green certificates
 - Renewables Obligation Certificates (Rocs). The confirmed buy-out price for 2018-19 has been taken as the benchmark price for Rocs at £47.22. However, the rate of award of these certificates varies depending on the technology used for generation (i.e. Roc banding)
- Generation Distribution Use of System charges (GDUoS)
 - These are paid by distribution network operators for localised generation and vary depending on time of day. GDUoS is the most variable of the potential benefits, as it differs by region, connection voltage, intermittency of technology. GDUoS is always built into the contract price, whether it is a cost or a benefit.
- Balancing Service Use of System charges (BSUoS) and transmission losses
 - As BSUoS and transmission losses are paid on volumes on the transmission system, distribution connected generators can avoid these charges and offer them as a benefit to suppliers.

Triad benefits are not included in this analysis as they are paid separately in the e-POWER contract.

Typical maximum benchmark values of the above elements for the period 1 October 2018 to 31 March 2019 (winter 18) are summarised in Figure 1 and are compared with typical maximum values for front season contracts on the days of recent auctions.

Figure 1: Typical Maximum Benchmark Values (£/MWh) of e-Power Auction Elements (six-month season-ahead prices)

Auction date	Front Season Wholesale Baseload Power	Annual Wholesale Baseload Power	Rocs	Embedded Benefits
Jul-18	£62.36	£57.00	£47.22	£0 to £14.1
Jan-18	£43.63	£46.85	£47.22	£0.4 to £13.9
Jul-17	£46.10	£42.76	£45.00	-£2.0 to +£7.4
Jan-17	£46.10	£47.67	£45.00	-£0.6 to +£7.4
Jul-16	£46.60	£43.42	£45.00	-£0.6 to +£7.0
Jan-16	£31.60	£33.90	£45.00	£0 to £10.6
Jan-15	£41.60	N/A	£44.00	-£1.4 to +£7.3

Source: e-Power



3 July 2018 analysis

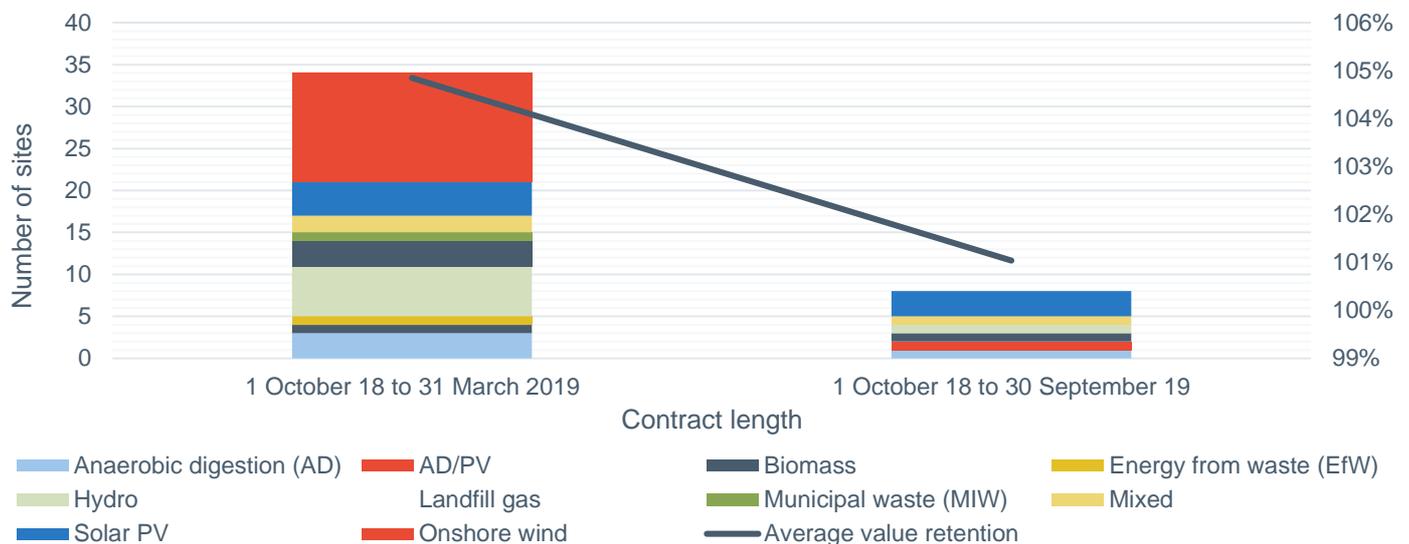
3.1 Auction Summary

The July 2018 e-POWER auction sold PPAs for 56 projects totalling 126MW. By number, it was the second largest auction to date with only the January 2018 auction seeing more sites at 65.

Higher prices were achieved compared to the previous auction with value retention for projects reaching a new record high. Increased values were reflective of a notable rise in wholesale power prices, forecasts of a short Roc market for 2018-19 and strong competition between offtakers – the auction saw an average of 21 per site, with a couple of sites receiving over 40 bids.

The majority of contracts sold in the auction were for power from 1 October 2018 for either six or 12 months; however, some contracts had alternative start dates and contract lengths with two PPAs commencing 1 April 2019. Figure 2 below details average value retention for contracts auction from October 2018 for six or 12 months.

Figure 2: Contract length by technology and average value retention



3.2 Broken Down by Technology

Of the 56 sites awarded contracts in the auction, onshore wind once again had the largest presence by number with 18 projects. However, this was down from 22 onshore wind sites in the January 2018 auction. Hydro had the second largest presence in the auction by number with 11 sites, followed by solar PV and AD both with eight sites.

Baseload technologies continued to sell at a premium to intermittent sites, with value retention averaging highest for landfill gas while solar PV experienced the lowest value retention. Overall, values in this auction were high for all technologies, with the exception of solar PV and biomass with averages brought down by individual sites for special circumstances.

Highlights for each technology are below, and comparisons with the previous auction made where possible⁵.

⁵ Direct £/MWh comparisons between contracts sold in this auction and contracts sold in previous auctions can be difficult, particularly for RO sites receiving different Roc awards. Therefore, where possible we have chosen to compare 12 month contracts for the sale of power only (i.e. including wholesale power and embedded benefits but excluding Rocs). While these sites will have different contract start dates, and therefore different benchmark wholesale power values and site specific embedded benefits, it allows for the best comparison

- **Onshore wind** had the highest presence in the auction with 18 sites awarded contracts. However, of all the technologies included it had one of the lowest levels of average value retention at 103.8%. This reflects the additional discount that offtakers price in for intermittent technologies to account for higher imbalance risks and price cannibalisation – the depressive influence on the electricity price at times of high output from intermittent generation. Despite this, the absolute value achieved by onshore wind projects on a £/MWh basis was up considerably. The value of power for export only (i.e. without Rocs) for onshore wind sites on 12 month PPAs averaged £69.9/MWh, up 33.9% from the January auction.
- **Solar PV** had the third highest presence in the auction with eight sites awarded contracts, down from 14 in the January 2018 auction. Like wind, solar PV sites saw a notable rise in the absolute value achieved on a £/MWh basis – the value of power for export only on 12 month PPAs averaged £59.5/MWh, up 23.8% from the January auction. However, solar PV saw the lowest average value retention at 97.2%, reflective of the additional discount offtakers price in for intermittent technologies as stated for wind. Lower average value retention is also reflective of higher proportion of FiT sites for solar, where the two sites selling Rocs both achieved value retention of >100%. In addition, one small (50kW) solar project brought the average down achieving only 84.6% due to a low number of bids for the site.
- **Hydro** had the second highest presence in the auction with 11 sites. It also had the second highest average value retention at 106.8%, with one FiT site achieving 115.1%. This is likely due to the premium that offtakers place on more predictable technologies, but could also be due to offtakers placing a premium on more green technologies, with offtakers often seeking electricity from wind, solar and PV technologies over biomass, landfill gas and waste technologies. One hydro site in particular received 45 bids. In terms of absolute value achieved, hydro power for export only on 12 month PPAs averaged £73.9/MWh.
- **Landfill gas** saw three sites participate in the auction and achieved the highest average value retention at 108.4%. This is likely due to the premium that offtakers place on baseload technologies and that all the sites were for power and Rocs. In terms of absolute value achieved, landfill gas sites selling power and Rocs (1Roc/MWh) achieved £125.8/MWh on average, and although there were no directly comparable contracts sold in the previous auction values were up considerably in line with other technologies.
- **AD**, as a baseload technology, also experienced relatively high average value retention at 105.2% across eight sites. This is up from 104.2% in the January 2018 auction. Power from AD for export only on 12 month PPAs averaged £69.2/MWh, up 28.3% from equivalent contracts in the previous auctions.
- **Biomass** saw two sites in the auction with an average value retention of 97.2%. While one site achieved 108.4% for the sale of both power and Rocs, the other achieved just 86.1% for the sale of power only. It should be noted that the latter site has had no export to date due to it being in its commissioning period.
- **Waste technologies**, including one EfW and one MIW site, achieved average value retention of 105.6%. Both contracts were for the sale of power only from 1 October 2018 for six months, and achieved an average value of £66.9/MWh. Waste technologies in the previous auction achieved an average value of £49.6/MWh, although there were no directly comparable contract types.
- **Other sites** in the auction included an AD/PV combined site, and three mixed technology sites, all seeing value retention of above 103%.

Figure 3 shows the range of values achieved by different technologies against typical maximum benchmark values. The table highlights the general trend of baseload sites achieving higher values in the auction.

Figure 4 and Figure 5 detail the performance by technology against market benchmark prices.

Figure 3: Number of sites achieving proportion of typical maximum benchmark value

Technology	<90%	90%-95%	95%-100%	100%-105%	>105%	Total
Anaerobic digestion (AD)	0	0	0	3	5	8
AD/PV	0	0	0	0	1	1
Biomass	1*	0	0	0	1	2
Energy from waste (EfW)	0	0	0	0	1	1
Hydro	0	0	0	3	8	11
Landfill gas	0	0	0	0	3	3
Municipal waste (MIW)	0	0	0	0	1	1
Mixed	0	0	0	2	1	3
Solar PV	1**	1	3	3	0	8
Onshore wind	0	0	1	11	6	18
Total	2	1	4	22	27	56
Percent	4%	2%	7%	39%	48%	100%

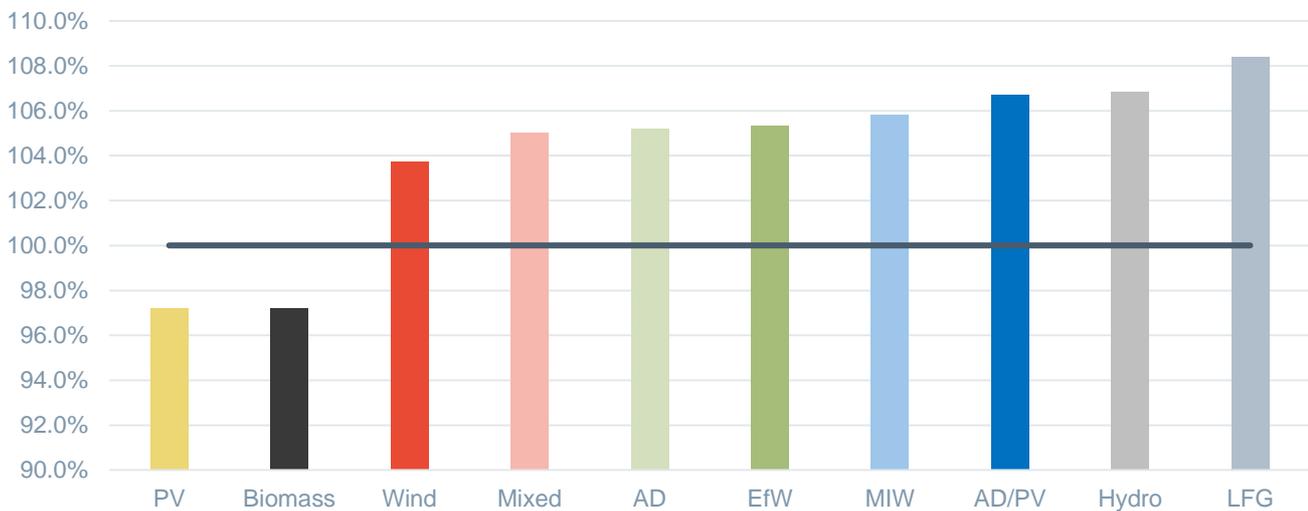
* This site has had no export to date due to it being in its commissioning period and only received one bid

** This achieved only achieved 84.6% retention due to a low number of bids for the site and it very small size (50kW)

Figure 4: Average, minimum and maximum value retention by technology

Value retention	AD	AD/PV	Biomass	EfW	Hydro	LFG	MIW	Mixed	PV	Wind
Average	105.2%	106.7%	97.2%	105.3%	106.8%	108.4%	105.8%	105.0%	97.2%	103.8%
Maximum	108.9%	106.7%	108.4%	105.3%	115.1%	111.5%	105.8%	109.0%	104.9%	106.9%
Minimum	101.8%	106.7%	86.1%	105.3%	102.2%	106.9%	105.8%	103.0%	84.6%	97.3%

Figure 5: Average value retention by technology



3.3 Summary by Support Scheme

Value retention for sites varies by support scheme as well as technology. While Roc sites have continued to see higher value retention, FiT sites have seen a notable increase in activity.

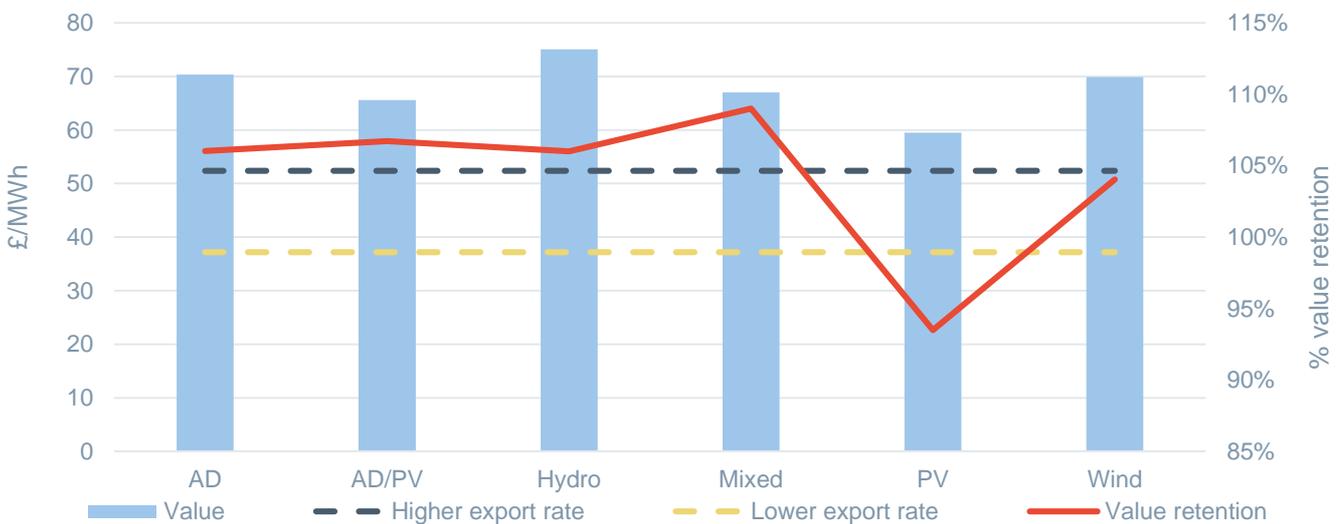
3.3.1 FiT Sites

21 FiT sites were included in the auction, significantly higher than the 11 sites in the January 2018 auction. The increased number of FiT sites seeking PPAs is reflective of higher wholesale power prices relative to the administered export rate – the annual October 18 wholesale price used for this auction assessment is £57.0/MWh, versus the 2018-19 higher export rate of £52.4/MWh and lower rate of £37.2/MWh. FiT generators have an annual choice to either take a PPA or the export tariff. For many years prior to 2018 this has seen the majority of FiT sites choose the export tariff amid low wholesale power prices. However, this trend represents a notable shift in the FiT PPA market with all sites seeing values well above the relevant export rate.

FiT sites saw an average value retention of 103.3% (or £68.9/MWh), with intermittent technologies (wind and solar) achieving lower values compared to controllable technologies, 99.4% versus 106.3%.

Figure 6 details the average value retention and price achieved by FiT sites versus the administered export rates.

Figure 6: Average value retention by technology



3.3.2 Roc Sites

32 Roc sites took part in the auction, 26 of which sold both power and Rocs while six sold power only. Sites which sold Rocs continued to see higher average value retention (at 105.3%⁶) compared to FiT sites. This is likely due to forecasts of a short Roc market forecast both 2018-19 and 2019-20 compliance periods amid ambitious RO targets set by BEIS, which has acted to boost expected recycle values.

The CP17 (2018-19) market in particular is forecast to be undersupplied by almost 15%, with recent values on the monthly e-ROC auction at their highest since July 2009. Overall Roc projects saw a higher average value retention in this auction compared to the January 2018 auction.

⁶ Please note that for the purpose of the analysis, post-auction maximum benchmark values uses the buy-out price only. Any recycle value factored into bids therefore pushes values further above 100%.



3.4 Competition and auctioned contract numbers

56 projects totalling 126MW of capacity was sold in the auction. By number, it was the second largest auction to date with only the January 2018 auction seeing more sites at 65.

Participation in the auction remained high for several reasons, including:

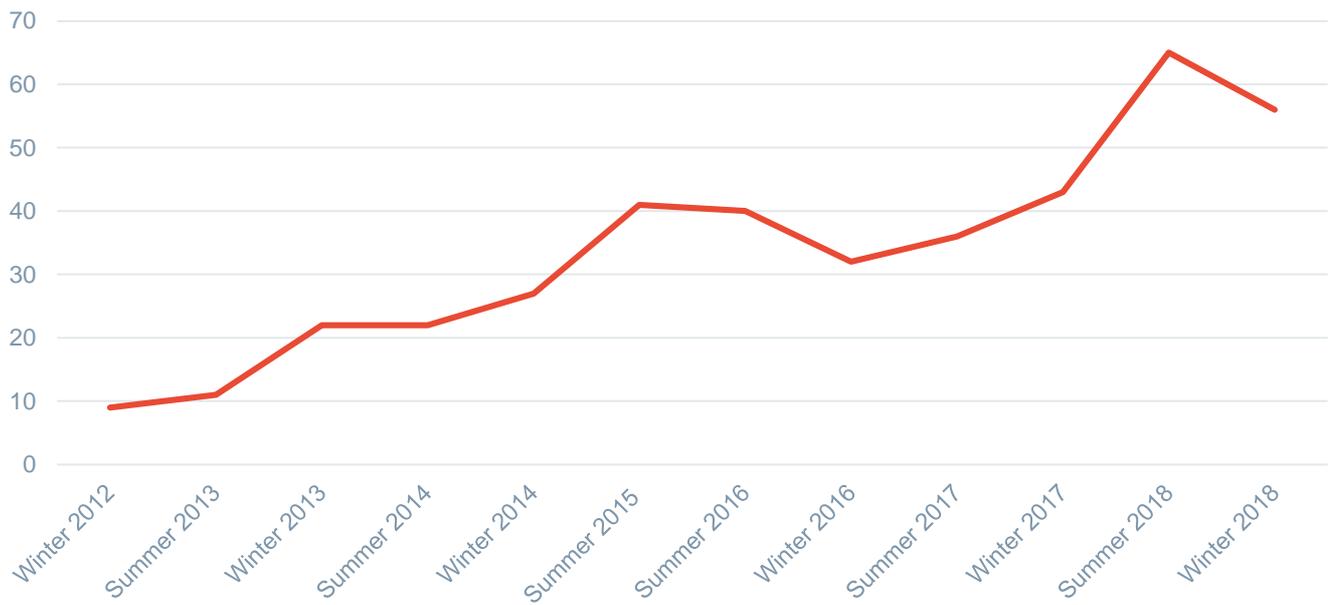
- A continued drive towards short-term PPA contracts (1 year or less) for some generators in light of backwardation in wholesale markets – meaning power contracts for delivery in the near future are higher than contracts further out
- A rising number of suppliers entering the e-POWER auctions as a route to market for green power. This has created high levels of bidding and liquidity.

There was a large increase in the number of FiT sites in the auction, but Roc sites experienced a decline by number. While the rise in FiT numbers is likely due to higher wholesale power prices, lower numbers overall could be due a rising number of sites participating in the recent monthly e-POWER auctions, taking advantage of the rise in wholesale prices during 2018.

With a rising number of offtakers in the short-term PPA market, now assessed as being above 40, high levels of competition have driven new records for value retention. The auction saw an average of 21 per site, with a couple of sites receiving over 40 bids.

Figure 7 below details the trends of contracts to be auctioned at the January and July auctions.

Figure 7:Trends in the Number of Contracts



3.5 Comparison with Previous Auctions

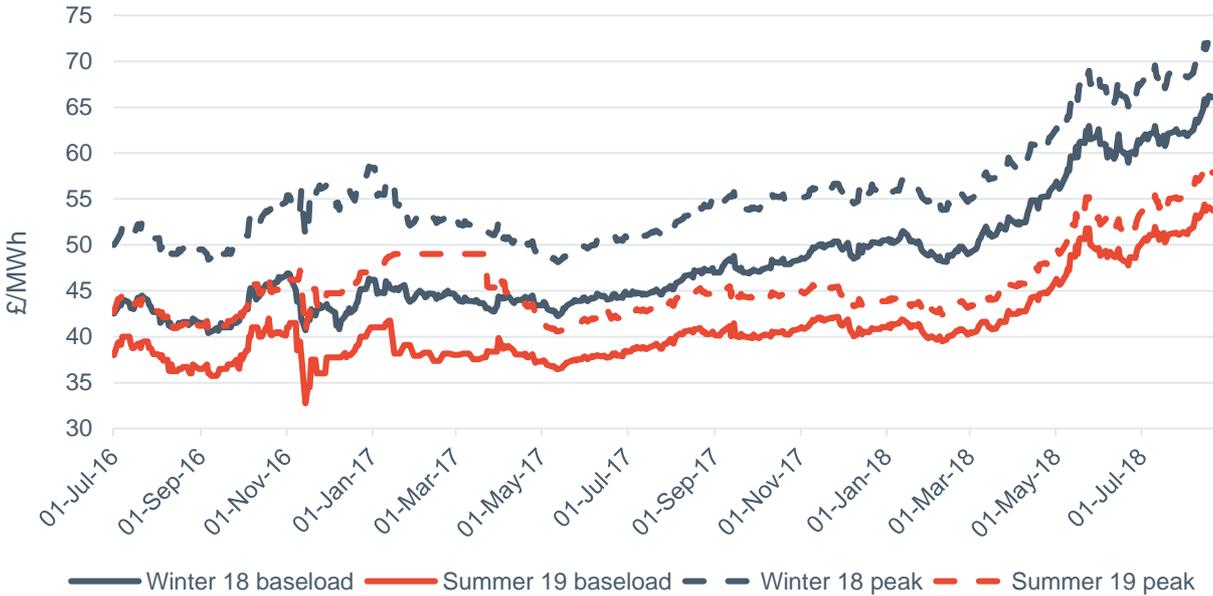
The July 2018 e-POWER auction saw a new record high for value retention compared to previous auctions. The average value share retained by generators was 103.8%, compared to 102.1% in January 2018, 100.8% in July 2017, and 97.2% in January 2017. The auction also saw a large increase in the absolute value of projects on a £/MWh basis following a rise in wholesale power prices, an increase in the traded value of Rocs and a slight uptick in embedded benefits compared to the previous auction.

Wholesale power prices experienced a significant rise – the annual October baseload power used for assessment in this report is £57.00/MWh, 21.7% above the annual April contract used at the time of the



January 2018 auction (£46.85/MWh). This has been due to an underlying rise in commodity prices, including gas, EU ETS carbon, coal and oil.

Figure 8: Wholesale Power Price Movements



In terms of Roc values, the buy-out price used for the assessment remained at £47.22, unchanged on the January auction. This is the CP17 (2018-19) buy-out price and does not include expected recycle values. However, the actual value of Rocs priced into offtakers’ bids will generally include expected recycle values. Based on the rising trend in monthly e-ROC auctions Rocs will likely also have been priced higher compared to the January 2018 auction, contributing further to higher value retention.

Average embedded benefit values were £1.73/MWh higher in this auction than in January; however, these can vary significantly by location and depends on site specific parameters.

Figure 9 shows the distribution of values achieved in recent auctions against the post-auction maximum benchmark values. Projects have continued to clustered more in the >100% segment.

Figure 10: Distribution of Values Achieved Compared to Maximum Benchmark Values and Changes Over Time

