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Analysis of the e-POWER January 2019 auction

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1 e-POWER Auction Analysis

1.1 Headlines

The January e-POWER auction took place across four days between the 22 and 26 January. The auction sold PPAs for 52 projects totalling 155MW. By number, it was the third largest auction to date with only the January 2018 and July 2018 auctions covering more sites at 65 and 56 respectively. The slight decline from the last auction is balanced by a higher proportion of sites opting in for the monthly auctions, as sites wished to capture higher wholesale prices during late September and early October. The majority of contracts sold in the auction were for power from 1 April 2019 for either six or 12 months; however, some contracts had alternative start dates and contract lengths.

Headlines from the January 2019 auction are:

- The auction saw a new record high for value retention, increasing by three percentage points on average on the July 2018 auction. The average value share retained by generators was 106.8% against assessed post-auction maximum energy benchmark values[1], compared to 103.8% in the July 2018 auction. Reasons behind the rise in value retention, with the 100% benchmark being breached again, include:
    - A high number of offtakers in the short-term PPA market, now assessed as being around 40, delivering high levels of competition. The auction saw an average of 30 bids per site, with six sites reaching over 40 bids, and one of which had 95 bids, pushing up prices across all technology classes
    - Forecasts of a short Roc market for 2019-20 has continued to support expected recycle values, and therefore the traded value of Rocs. This has been exemplified by recent monthly e-ROC auctions in which Rocs have been trading at their highest ever price going back to 2002. Although monthly e-ROC auctions are not yet trading 2019-20 Rocs, the high values seen in 2018-19 are expected to continue into the next year. 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 continued to place a higher premium on controllable baseload technologies such as landfill gas, biomass, anaerobic digestion (AD) and municipal waste (MIW). These sites are typically able to capture higher wholesale prices as well as earn higher embedded benefits revenues from TRIAD and GDUoS red rates. In contrast, solar and wind projects can suffer from price cannibalisation, the depressive influence on the wholesale price at times of high output from intermittent, weather driven generation such as solar and wind.
- Despite high value retention, the auction saw a slight fall in the average absolute value projects achieved on a £/MWh basis. This is because many sites in the July 2018 auction had six-month contracts for winter only when wholesale prices are valued higher. A slight rise in wholesale prices since July 2018 meant that on an annual basis, projects broadly achieved similar £/MWh values compared to the July 2018 auction
- 12 FiT sites were included in the auction, lower than the 22 FiT sites in the July 2018 auction, but with average value retention up at 105.9% (or £68.7/MWh) against previous values of 103.3% (or £68.9/MWh). FiT sites continued to achieve values in excess of the 2019-20 administered export rate (£53.80/MWh).
- 39 Roc sites took part in the auction, 35 of which sold both power and Rocs. Sites which sold power and Rocs continued to see higher average value retention (at 107.2%[2]) compared to FiT sites, equivalent to £123.46/MWh. However, this is slightly down on the July 2018 auction by £3.52/MWh, but is due to the fact that many of the Roc sites in the July 2018 auction went for a six month contract for winter 2018-19 only, and therefore captured a higher wholesale price compared to sites in this auction, which either sought an annual contract or a six month contract starting 1 April 2019.

[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 buy-out price.
[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 January 2019 e-POWER auction saw renewables projects selling green electricity achieve a new record high value retention, with a very high number of bids per site amid a very competitive PPA market. A high number of generators participated, at 52 sites, being the third largest auction to date.

Value retention continues to increase and remain in excess of 100%. In our last e-POWER auction analysis, we posed the question over how long these high prices and retention rates can be sustained, with offtaker margins in the wider renewables PPA market often being reported as “squeezed”. Despite this, the e-POWER auctions have continued to experience an uplift on value retention with the average at 106.8% compared to 103.8% in the previous auction.

Increased value retention has stemmed from the competitive offtake market. Cornwall Insight continues to estimate there are ~40 offtakers active in the short-term PPA market (PPAs six months to three years in length). These offtakers have continued to offer better terms for green generators, frequently passing ~97% of the wholesale price, ~97% of the Roc buy-out price and 100% of the recycle value, and up to 100% of embedded benefits. In addition, Regos are more frequently having value attributed to them, particularly when from wind and solar projects, with a rising number of 100% green renewables supply tariffs being offered in the retail market.

In the wider renewables PPA market, attractive projects can receive in excess of 20 offtakers bidding for the same project. This competitive landscape was exemplified in the auction by the high number of bids per site – 30 bids on average in this auction compared to 21 in the previous auction. In this auction, the number of sites receiving over 40 bids rose from two to six, one of which reached 95 bids.

Despite higher value retention, the absolute value on a £/MWh basis achieved by projects was down on the previous auction. This was due to many sites in the previous auction searching for six-month contracts only for winter 2018-19 when wholesale prices are higher, while most projects went for 6-month or 12-month contracts starting from the summertime in this auction. However, a peak in wholesale prices back in September and October led many sites to enter the monthly e-POWER auctions instead of the January six-monthly auction, and were able to achieve a premium price as they captured high wholesale prices

The last highlight was the value achieved by Roc projects. Roc values are trading at their highest ever levels on the monthly e-ROC auctions at more than £54/Roc, driven by ambitious RO targets set by BEIS, which has acted to boost expected recycle values. Cornwall Insight is forecasting recycle values for 2019-20 at almost £8/Roc, bringing expected maximum Roc values to more than £56/Roc.

Overall, liquidity in the renewables PPA market is one of relative health despite some recent stresses in the supply market with more than 10 suppliers exiting during the past year – none of which had a large amount of activity in the renewables PPA market. 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.

2 Methodology

This report analyses the results for contracts awarded in the January 2019 e-POWER auction across four days between the 22 and 26 January 2019. 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 Summer 19 baseload power price has been taken for six-month contracts from April 2019 at £55.83/MWh, and the annual baseload price for 12-month contracts from April 2019 at £59.31/MWh. The majority of contracts sold in the auction were for PPAs commencing from 1 April 2019 for 12 months with some 12 month contracts; however, some contracts had alternative start dates and lengths, but for these the 12-month price was used
- Green certificates
    - Renewables Obligation Certificates (Rocs). The buy-out price for 2018-19 has been taken as the benchmark price for Rocs at £48.50. 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 April 2019 to 31 March 2020 (Summer 19) are summarised in Figure 1, 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
Jan-19	£55.83	£59.31	£48.50	£0.9 to £14.3
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 January 2019 analysis

3.1 Auction Summary

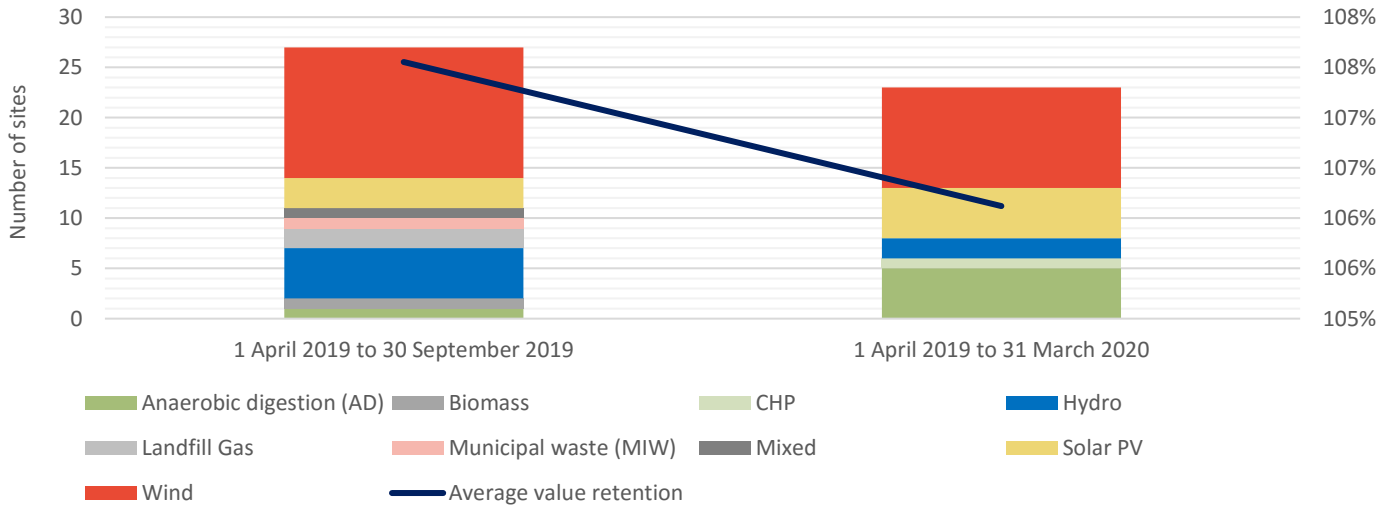
The January 2019 e-POWER auction sold PPAs for 52 projects totalling 155MW. By number, it was the third largest auction to date with only the January 2018 and July 2018 auction seeing more sites at 65 and 56 respectively. The slight decline from the last auction is balanced by a higher proportion of sites opting to sell their power in the monthly auctions. Sites entering the monthly auctions were aiming to capitalise on higher wholesale prices at the time (September and October), and achieve the best possible values for their sites.

Higher levels of values retention were achieved compared to the previous six-monthly auction, seeing the average retention for projects rising from 103.8% to 106.8% overall. This was largely due to a higher proportion of Roc sites compared to the last auction, which more frequently see retention values in excess of 100% with high Roc recycle values currently expected in the market. Increased value retention is also a consequence of strong competition in the offtake market, which was exemplified by a record number of bids seen on average per site - the auction saw an average of 30 per site, with a couple of sites receiving over 40 bids, and one project seeing over 90 bids.

However, the auction saw slight fall in the average value projects achieved on a £/MWh basis, when comparing projects under comparable subsidy schemes. This is because many sites in the July 2018 auction had six-month contracts for winter 2019-20 only when wholesale prices are valued higher, whereas the majority of sites in this auction were seeking 6-month or 12-month contracts from 1 April 2019.

Figure 2 below details average value retention for contracts auction from April 2018 for six or 12 months.

Figure 2: Contract length by technology and average value retention



3.2 Broken Down by Technology

Of the 52 sites awarded contracts in the auction, onshore wind had the largest presence by number with 24 projects. This is up by six on the July 2018 auction. Solar PV had the second largest presence in the auction by number with eight sites, followed by Hydro and AD both with seven sites.

Baseload technologies continued to sell at a premium to intermittent sites, with value retention averaging highest for mixed and landfill gas, while solar PV experienced the lowest value retention. However, average retention for all types of sites breached 100%. Overall, values in this auction were high for all technologies.

Highlights for each technology are below, and comparisons with the previous auction made where possible[3].

- **Onshore wind** had the most sites in the auction standing at 24 overall, up by two on the July 2018 auction. However, it had the second lowest level of average retention of all technology types at 106.0%. 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. The value of power for export only (i.e. without Rocs) for onshore wind sites on 12-month PPAs averaged £70.00/MWh with an average retention of 105.2%.
- **Solar PV** had the second largest presence in this auction with eight sites in total awarded contracts, matching the number that achieved contracts in the July 2018 auction. However, solar PV saw the lowest average value retention, reflective of the additional discount offtakers price in for intermittent technologies as stated for wind, but this was still at 103.0%. Higher average value retention for solar than the previous auction is reflective of the lower proportion of FiT sites, where the sites selling Rocs achieved value retention of >100% compared to the average for FiT sites of 97.4%. In addition, one extremely small (non-energised) solar project brought the average down, achieving only 76.6%, with the site receiving only a single bid. The value of power for 12-month power only PPAs averaged £59.90/MWh with a retention of 92.3%.
- **Hydro** had the joint third largest presence at the auction, just behind solar PV, at seven sites. It also had the third highest average retention of all technologies at 109.9%. This is likely due to the premium that offtakers place on more predictable technologies. One hydro site was particularly popular, receiving 95 bids from offtakers. In terms of absolute value achieved, the only hydro power site for export only (i.e. without Rocs) for a six-month contract was £75.00/MWh.
- **Landfill gas** saw two sites participate in the auction and achieved the second highest value retention among all technology types at 110.3%. 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 £122.65/MWh.
- **AD** had the joint third largest presence in the auction, with an average value retention of 109.1% across seven sites. As a baseload technology, higher retention values were expected, with power from AD for export only on 12-month PPAs averaging £69.80/MWh.
- **Biomass** had only one site represented in the auction, with a value retention of 109.4%.
- **Waste technologies** included one MIW site which achieved a retention value of 107.3%. The site was the largest in the auction at 42MW and the contract was power only achieving a value of £62.00/MWh.
- **Other sites** include one mixed technology site which achieved a retention of 110.8%, the highest across all technologies for this auction, and one CHP site which achieved a retention of 108.8%.

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 in terms of value retention alongside the average number of bids accrued.

[3] 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.

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	0	7	7
Biomass	0	0	0	0	1	1
CHP	0	0	0	0	1	1
Hydro	0	0	0	0	7	7
Landfill Gas	0	0	0	0	2	2
Municipal waste (MIW)	0	0	0	0	1	1
Mixed	0	0	0	0	1	1
Solar PV	1*	0	0	1	6	8
Onshore wind	0	1**	0	5	18	24
Total	**1**	**1**	**0**	**6**	**44**	**52**
Percent	**2%**	**2%**	**0%**	**12%**	**85%**	**100%**

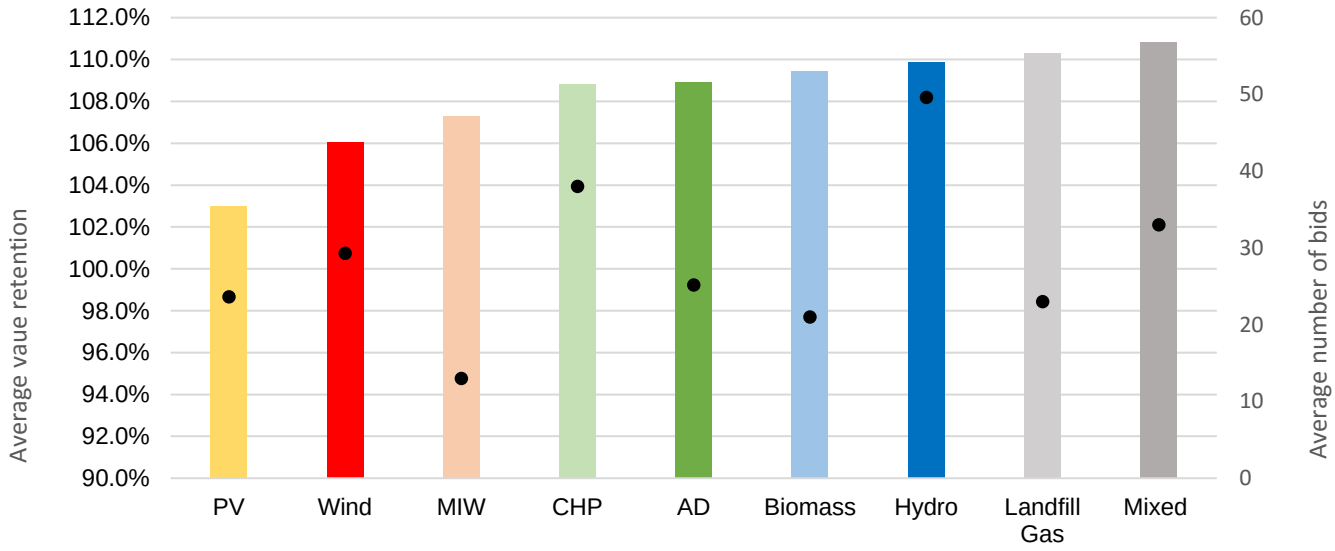
* This site achieved 76.6% retention due to a low number of bids for the site

** This achieve 94.8% retention most likely due to the small size of the site (75kW)

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

Value retention	AD	Biomass	CHP	Hydro	Landfill Gas	MIW	Mixed	PV	Wind
Average	**108.9%**	**109.4%**	**108.8%**	**109.9%**	**110.3%**	**107.3%**	**110.8%**	**103.0%**	**106.0%**
Maximum	111.5%	109.4%	108.8%	118.6%	110.3%	107.3%	110.8%	108.0%	110.3%
Minimum	105.9%	109.4%	108.8%	106.4%	110.2%	107.3%	110.8%	76.6%	94.8%

Figure 5: Average value retention and average number of bids 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 and made up a greater proportion of sites auctioned, FiT sites saw a decrease in activity by number.

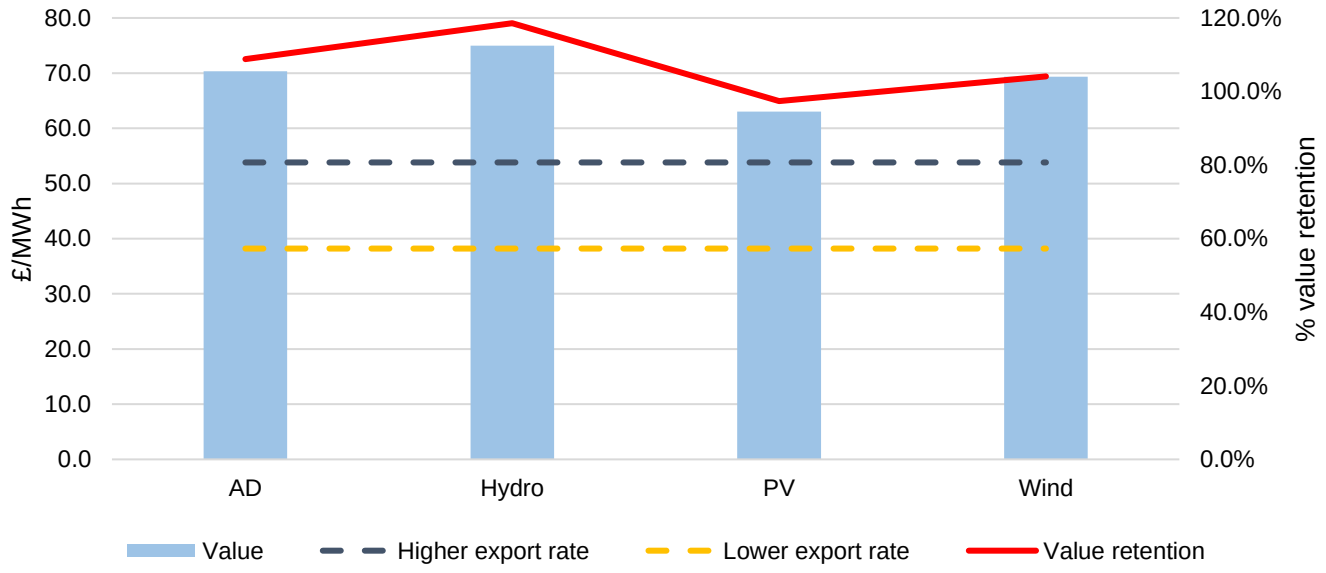
3.3.1 FiT Sites

12 FiT sites were included in the auction, lower than the 22 sites in the July 2018 auction. The decreased number of FiT sites in the auction was despite the annual baseload power price remaining above the administered export tariffs. This trend could be reflective of a recent decline in wholesale power prices, as well as backwardation in the power market meaning the power price in 2019-20 is expected to be lower than it was in 2018-19. The annual April 19 wholesale price used for this auction assessment was £59.31/MWh, versus the 2019-20 higher export rate of £54.8/MWh and lower rate of £38.2/MWh.

FiT generators have an annual choice to either take a PPA or the export tariff. For many years prior to 2018-19 this has seen the majority of FiT sites choose the export tariff amid low wholesale power prices. However, PPAs in this auction have continued to oppose this trend and offer better value than administered rates. FiT sites saw an average value retention of 105.9% (or £68.7/MWh), with intermittent technologies (wind and solar) achieving lower values compared to controllable technologies, with 97.4% for solar PV and 104.2% for wind compared to 108.8% for AD and 118.6% for hydro installations.

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

39 Roc sites took part in the auction, 35 of which sold both power and Rocs while 4 sold power only. Sites which sold power and Rocs continued to see higher average value retention (at 107.1%[4]) compared to FiT sites, and achieved £123.46/MWh on average. However, this is slightly down on the July 2018 auction by £3.52/MWh, and is due to the fact that many of the Roc sites in the July auction went for a six month contract

[4] 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%.

for winter 2018-19 only, and therefore captured a higher wholesale price compared to sites in this auction, which either sought an annual contract or a six month contract starting 1 April 2019. The average value retention for Roc sites has remained high due continued forecasts of a short Roc market for 2019-20 which has supported expected recycle values in the market. This has been exemplified by recent monthly e-ROC auctions in which Rocs have been trading at their highest ever price going back to 2002. Although monthly e-ROC auctions are not yet trading 2019-20 Rocs, the high values seen in 2018-19 are expected to continue into the next year.

3.4 Competition and auctioned contract numbers

52 projects totalling 155MW of capacity was sold in the auction. By number, it was the third largest auction to date with only the January 2018 and July 2018 auction seeing more sites at 65 and 56 respectively.

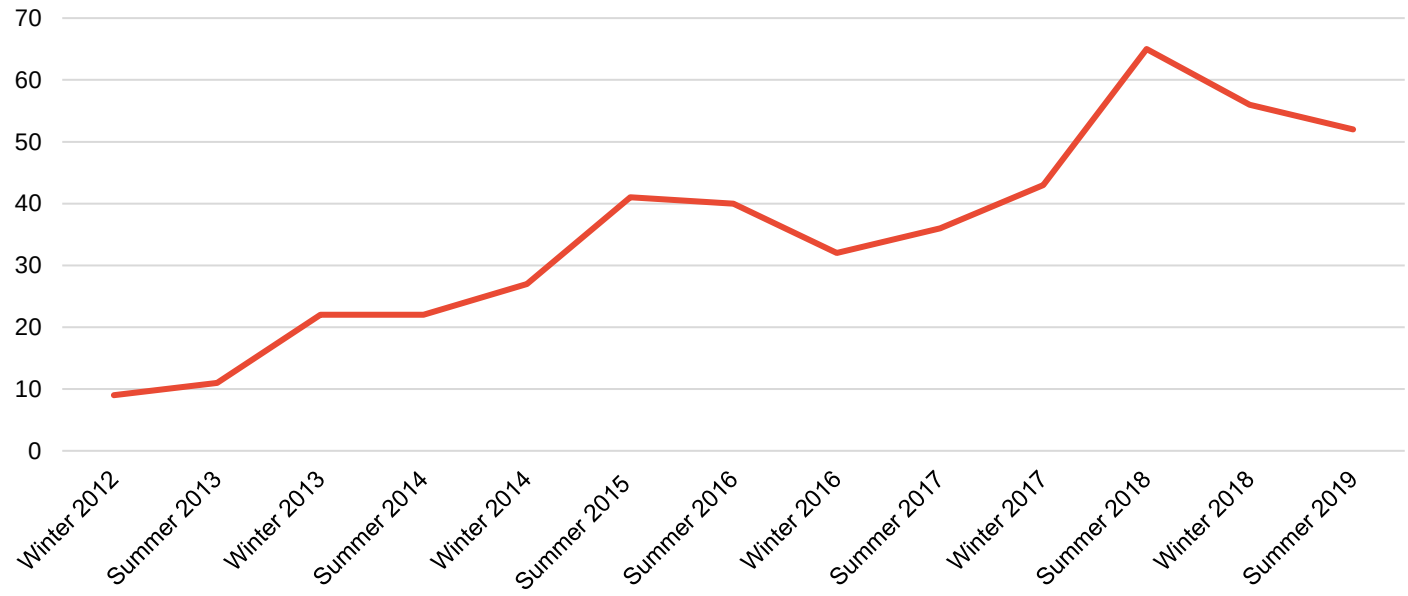
Participation in the auction remained high for several reasons, including:

- A continued drive towards short-term PPA contracts for some generators in light of backwardation in wholesale markets – meaning power contracts for delivery in the near future are priced higher than contracts for delivery further out
- A high number of suppliers entering the e-POWER auctions as a route to market for green power. This has created strong levels of competition, bidding and liquidity, uplifting values for generators

With a high number of offtakers in the short-term PPA market, now assessed as being approximately 40, high levels of competition have driven new records for value retention. The auction saw an average of 30 bids per site, with six sites receiving over 40 bids, one of which reach 95 bids alone.

Figure 7 below details the trends of contracts to be auctioned at the January auction.

Figure 7:Trends in the Number of Contracts



3.5 Comparison with Previous Auctions

The January 2019 e-POWER auction saw a new record high for value retention compared to previous auctions. The average value share retained by generators was 106.8%, compared to 103.8% in July 2018, and 102.1% in January 2018.

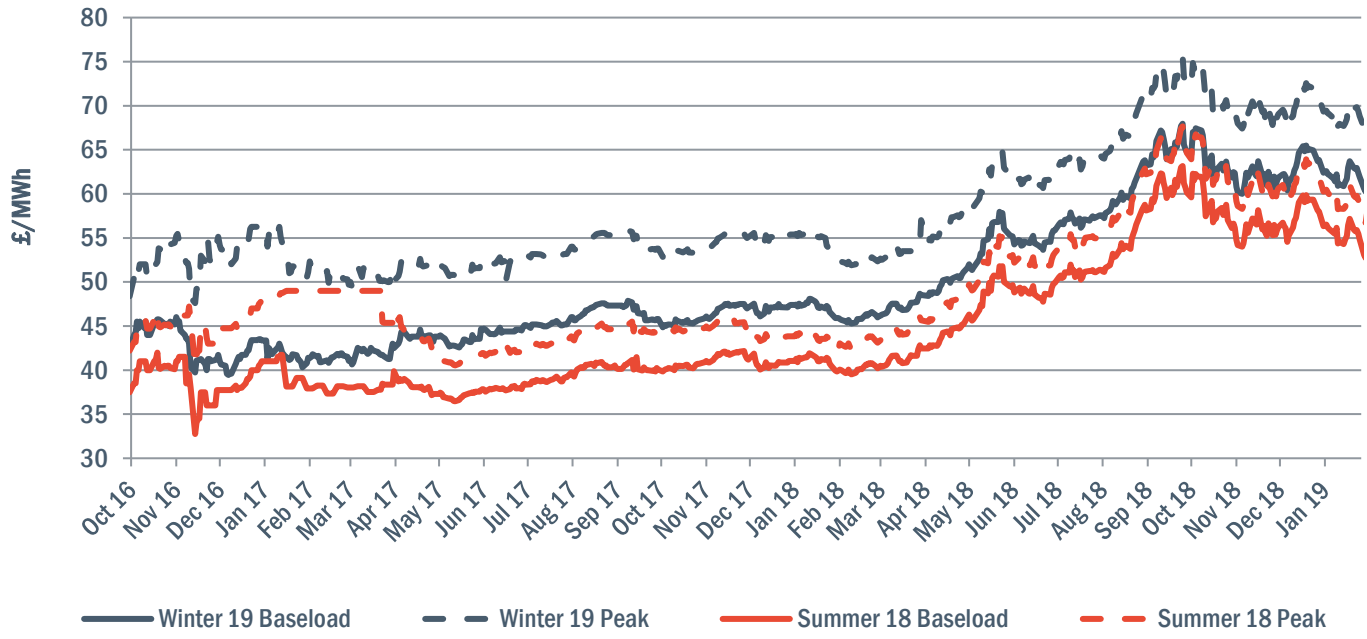
Despite high value retention, the auction saw a slight fall in the average absolute value projects achieved on a £/MWh basis. This is because many sites in the July 2018 auction had six-month contracts for winter only when wholesale prices are valued higher, whereas projects in this auction typically sought contracts for 6

months (i.e. the summer contract) or 12 months from 1 April 2018. A slight rise in wholesale prices in general since July 2018 meant that on an annual basis, projects broadly achieved similar £/MWh values compared to the July 2018 auction, with prices also support by an uptick in Roc values.

As touched upon, wholesale power prices experienced a rise since the previous auction – the annual baseload power price (from April 2019) used for assessment was £59.31/MWh, 4.05 percentage points above the annual contract (from October 2018) used at the time of the July 2018 auction (£57.00/MWh). This has been due to an underlying rise in gas and EU ETS carbon prices, both of which have a strong impact on the wholesale power market.

Wholesale prices peaked at the end of September and beginning of October, before decreasing again. This led many generators to lock in their deals prior to the January auction in order to capture the highest prices – activity in the monthly e-POWER auctions has been accentuated. Further analysis of monthly auctions can be found in section 3.6.

Figure 8: Wholesale Power Price Movements



In terms of Roc values, the buy-out price used for the assessment has risen to £48.50 from £47.22, since the July auction. This is the assumed CP17 (2019-20) 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, and is often a driver behind value retention being above 100%.

Average embedded benefit values were £1.07/MWh lower in this auction than in July; however, these can vary significantly by location and depends on site specific parameters.

Figure 10 shows the distribution of values achieved in recent auctions against the post-auction maximum benchmark values. Projects have continued to cluster in the >100% segment, now containing approximately 97% of all sites entered into the auction.

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