STOR Market Information Report TR28

Original Published 22nd March 2016. **Updated 13th April 2016 correction to PF/F final status figures 1,2,4,5 updated**

Foreword

Welcome to the TR28 Market Information Report, and the first tender opportunity for STOR Year 11 This is also the first report where we are able to show – for Year 11 only – the tendered MW for each bid. We hope that this change helps providers to analyse the market to a greater degree.

The first thing to note in this report is that it has been a very strange winter! We started off with a NISM, which made us look long and hard at our reserve margins and indeed sparked a lot of interest from demand side providers. This culminated in the tender for 'Enhanced Optional STOR', which gave a route to market for demand side MW's which did not have a contract with National Grid to provide reserve. Over this period, we have seen the warmest winter on record, the introduction of the new cash-out arrangements and the lowest outturn availability levels since the start of the STOR service (figure 1); all of which we believe has contributed to low utilisation of STOR.

The low outturn levels of STOR this winter are not solely attributable to unavailability of Flexible providers, we have also seen less available from some committed contracts. This has led to National Grid terminating committed contracts during year 9. National Grid have also revised our forecast of the value of Premium Flexible units for future winter seasons and the availability forecast for all Flexible providers over the winter period.

The last two Market Information Reports have laid out our intention to ensure sufficient STOR is available to us over the winter period. Whilst we acknowledge that a large subset of providers offer triad avoidance over this period (and, in fact, these are numbers we are able to build into our demand forecast), we are keen to find any additional MW not operating in that space, or wishing for a sustained income year round – hence we previously highlighted the 'all-or-nothing' option available across seasons (see TR27 Market Information Report). This tender round has seen a reasonable volume tendered for the next two winters, and in-line with our messaging we have again accepted higher prices than before including some all or nothing tenders. Summer prices remain low, and this is simply a factor of the market working competitively since all the triad avoiding contracts are also competing for STOR contracts in this period.

Lastly, we will be engaging over the next couple of months around the direction STOR should take as a service; and whether there are any step changes which would offer better value and certainty to both the market and consumers. We are keen to hear your thoughts and ideas, so please do get in touch.

Thanks,

Nick Blair – STOR Lead, Contract Services
Pete Underhill – Senior Analyst, Market Requirements

Introduction

This market report is produced after each tender round and is designed to give existing and potential STOR participants an overall view of the tenders received in tender round 28 (TR28). The report provides details of tendered utilisation and availability prices and National Grid's consequent forward contracted position; together with further details on the type and dynamics of the tendered plant. For further information regarding this product, Frequently Asked Questions, or how and when to tender please consult the STOR section found on the National Grid Balancing Services information website:

http://www2.nationalgrid.com/uk/services/balancing-services/reserve-services/short-term-operating-reserve/

This report is under continuous review and development, if you have any comments or suggestions of information you would like to see in future issues of this report, please contact your account manager or email the assessment team: box.AncillaryAssessment@nationalgrid.com

Data and charts that were previously found in this report can still be found in the associated Excel file available on the website.

Operating Reserve Requirement and STOR requirement and de-rating factors

As National Electricity Transmission System Operator (NETSO), National Grid holds an Operating Reserve Requirement (ORR) from 4 hours ahead of time to real time, to take account of demand forecast errors, plant losses and market imbalance. The ORR is met by headroom on market synchronised machines, additional actions taken by National Grid via the Balancing Mechanism (BM) and contracted reserve products. STOR is a contracted reserve product and as such STOR tenders can make up a finite proportion of the ORR. The amount of contracted STOR required is determined by the size of the ORR which changes due to forecast market length, market provided headroom, volume of intermittent generation and demand forecast errors. The proportion of the ORR met by STOR is determined by considering the technical system requirements and also the forecast cost of alternatives versus the cost of the tendered STOR units.

National Grid aims to procure STOR tenders such that a minimum of 1800MW of contracted STOR is made available throughout the STOR seasons. The daily and seasonal optimal STOR MW level varies due to real-time and seasonal pressures on the system, but National Grid typically aims to achieve approximately 2300MW of STOR available where economic to do so.

National Grid manages the optimal STOR MW level at a daily resolution through the week-ahead Flexible STOR assessment, refining the available portfolio in response to the forecast conditions for the week-ahead.

In order to achieve the optimal level at the week-ahead stage, National Grid examines historic availability profiles from Committed and Flexible providers to help determine the volume of STOR tenders to procure at the tri-annual tender round. During the assessment National Grid uses specific unit forecasts based on history where available and also based on any other information available, however as a general rule the following de-rated percentages can be applied to the data to develop a clearer understanding of the actual volume available. BM-C 90%, NBM-C 85%, NBM-F non winter 50% NBM-F winter 25%. These figures represent average outturn availability over the various seasons, the actual availability over the peak winter evenings has been as low as zero. When considering the capacity accepted and tendered it is important to think of it not in absolute volumes but instead the de-rated volume. Whilst there is currently no fixed limit to the amount of Committed, Flexible, or Premium Flexible we are willing to accept, committed units are key in meeting the requirement during those periods of low non-committed availability and as such National Grid values committed units particularly in the winter seasons.

The two versions of the chart below demonstrate this concept and also highlight the recent change in the market “available capacity” over the winter months in particular.

Figure 1 gives a breakdown of the accepted Flexible and Committed MW per season since the start of the STOR service. Premium Flexible tenders are included in the Flexible category for the purpose of this chart. The blue line represents the sum of the maximum tendered MW from unique units from any tender round for each season. Capacity is as tendered, in a change to previous charts unsuccessful tenders from 2010 long term tenders have been removed from the maximum MW tendered. For seasons with tender rounds still to come, this figure will increase if units that thus far have not tendered for that season, tender in. The black line on the chart represents the outturn average availability for each season (where available).

Figure 2 gives exactly the same data as figure 1 but using the general de-rating figures shown above. This demonstrates a much closer match between total de-rated MW and the actual outturn available MW. It also demonstrates how the excess capacity has decreased from ~2000MW in year 7 and 8 to ~1300MW for winter year 10.

It should also be noted that the Max tendered capacity is greater than (or equal to) the actual current capacity as some units have left the market or reduced their capacity. We are working on a way of collating and publishing a “current” market capacity figure.

Figure 1

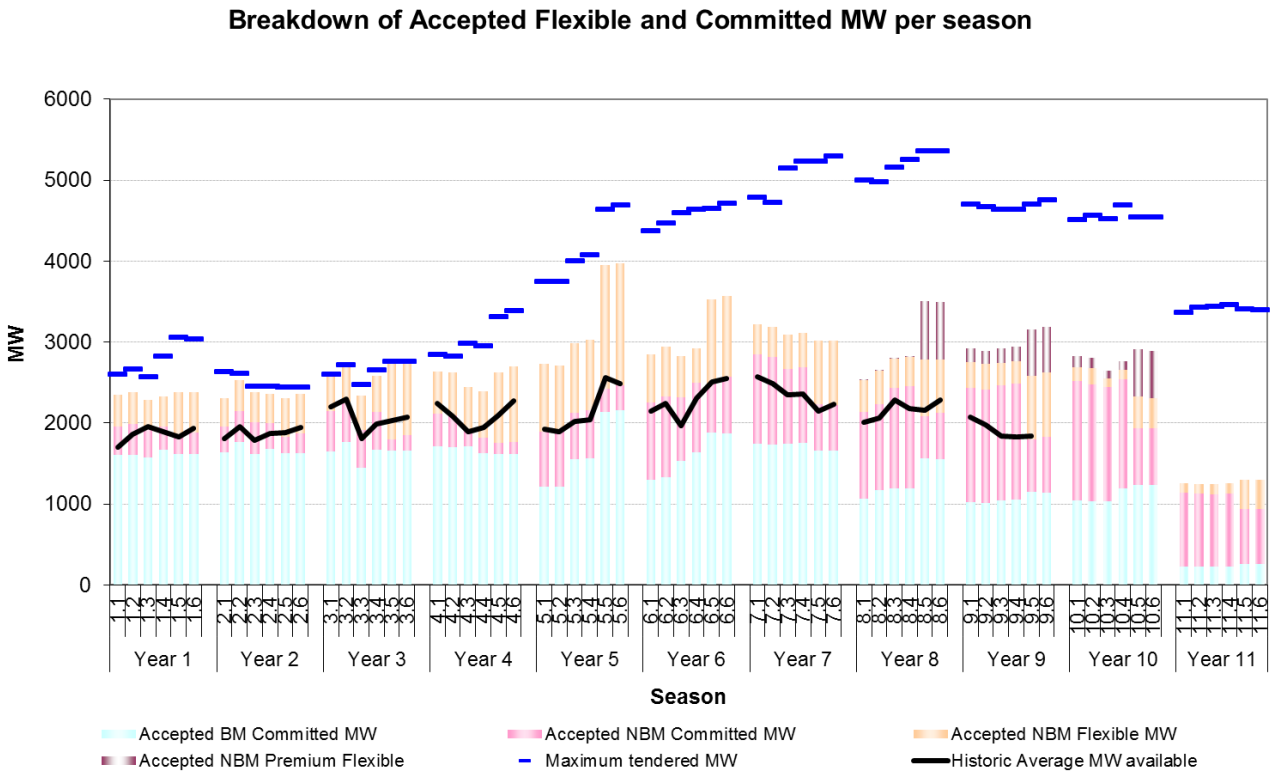
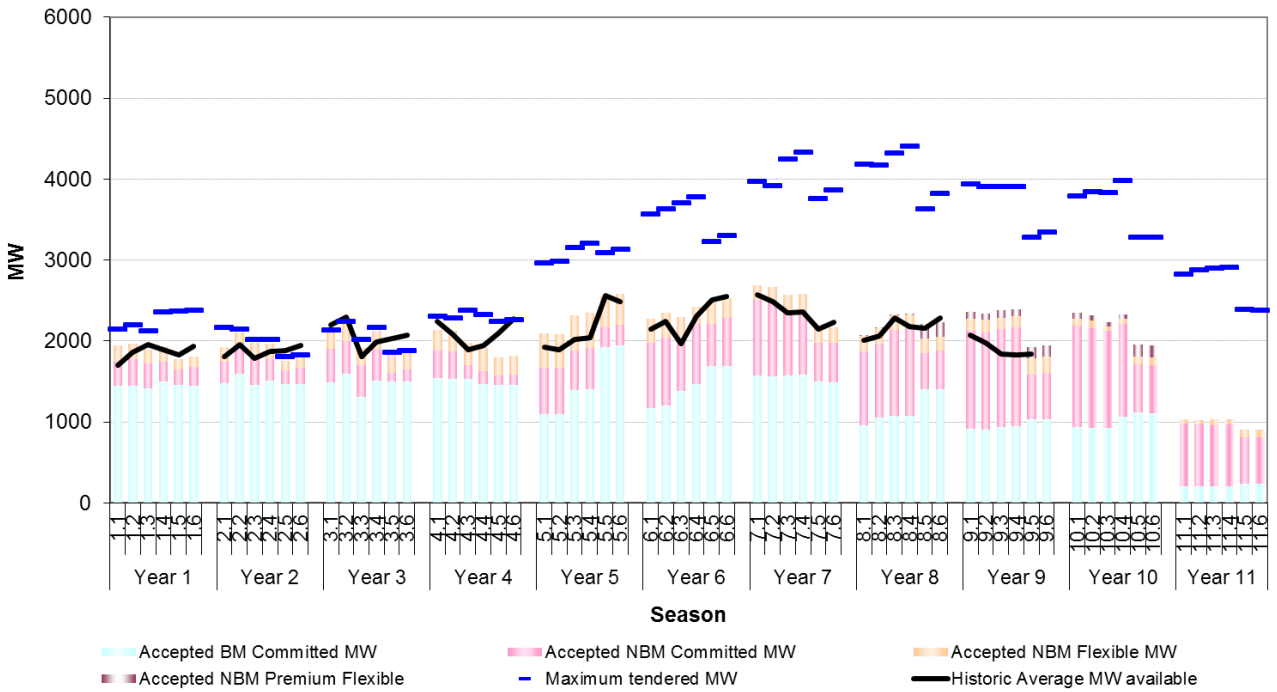


Figure 2



Tenders received and assessment results

Table 1 below summarises the tenders received including STOR Runway it also summarises the total contracted and de-rated. A full breakdown of contracted and tendered data can be found in the Excel file.

	TR 28 Tenders						STOR Runway TR28 tenders					Already contracted capacity	
Season Number	BM-C	NBM-C	NBM-F	NBM-PF	Total	De-rated Total	RW-C	RW-F	RW-PF	Total	De-rated Total	Total	De-rated Total
10.1	445	247	104	73	**869**	**699**	0	0	6	6	**3**	**2449**	**2076**
10.2	535	249	137	86	**1007**	**805**	0	0	9	9	**5**	**2390**	**2031**
10.3	535	287	26	54	**902**	**765**	3	0	28	31	**17**	**2396**	**2036**
10.4	675	345	26	54	**1100**	**941**	16	0	39	55	**33**	**2363**	**2004**
10.5	960	189	123	190	**1462**	**1103**	16	0	58	74	**28**	**2378**	**1615**
10.6	960	189	123	190	**1462**	**1103**	40	0	77	117	**53**	**2352**	**1605**
11.1	1230	1183	23	281	**2717**	**2265**	40	0	77	117	**73**	**389**	**331**
11.2	1306	1175	23	278	**2782**	**2325**	40	0	77	117	**73**	**387**	**329**
11.3	1313	1179	23	278	**2793**	**2334**	40	0	77	117	**73**	**388**	**330**
11.4	1324	1183	23	281	**2811**	**2349**	40	0	77	117	**73**	**389**	**331**
11.5	1342	434	23	956	**2755**	**1821**	40	0	77	117	**53**	**390**	**332**
11.6	1336	434	23	956	**2749**	**1816**	40	0	77	117	**53**	**390**	**332**

Table 2 below summarises the accepted units and the approximate requirement remaining for the next tender rounds.

	TR 28 Tenders Accepted						STOR Runway TR28 tenders Accepted					Remaining
Season Number	BM-C	NBM-C	NBM-F	NBM-PF	Total	De-rated Total	RW-C	RW-F	RW-PF	Total	De-rated Total	Total
10.1	40	186	120	28	**374**	**268**	0	6	0	6	**3**	
10.2	40	186	166	28	**420**	**291**	0	9	0	9	**5**	
10.3	40	147	65	0	**252**	**193**	0	19	0	19	**10**	**200**
10.4	180	151	65	0	**396**	**323**	6	19	0	25	**15**	**200**
10.5	180	143	220	0	**543**	**339**	6	23	0	29	**11**	**500**
10.6	180	143	220	0	**543**	**339**	30	27	0	57	**32**	**500**
11.1	226	520	118	0	**864**	**704**	30	27	0	57	**39**	**1300**
11.2	226	515	115	0	**856**	**699**	30	27	0	57	**39**	**1300**
11.3	226	507	130	0	**863**	**699**	30	27	0	57	**39**	**1300**
11.4	229	508	133	0	**870**	**704**	30	27	0	57	**39**	**1300**
11.5	260	292	358	0	**910**	**572**	30	27	0	57	**32**	**1400**
11.6	260	292	358	0	**910**	**572**	30	27	0	57	**32**	**1400**

Successful Tenders in TR28

Year 10 (2016/17)

In the past two tender rounds we highlighted the concern over Committed volumes for the winter seasons and the market has responded with significant volumes being tendered in TR28. A number of these tenders were all or nothing across the year some with profiled prices across the seasons and others with fixed prices across all season, figure 6 shows more details on this. Tender prices for the non-winter seasons are still relatively low with more than enough volume tendered to meet the requirements. Figures 1 and 2 show that total market size for year 10 is roughly similar to last year. TR28 was the final opportunity for seasons 10.1 and 10.2 and as such the cheapest units were accepted to meet the requirement; however as can be seen in the scatterplots the effect of all or nothing tenders can be seen with a gap in the accepted tenders. All or nothing tenders are assessed based on their total benefit over all seasons which may lead to a price appearing out of merit when compared to other single season tenders. Due to the low outturn levels seen this winter we have reduced our forecast of availability from Flexible units and hence the value of Premium Flexible units has decreased and resulting in no units being accepted over the winter.

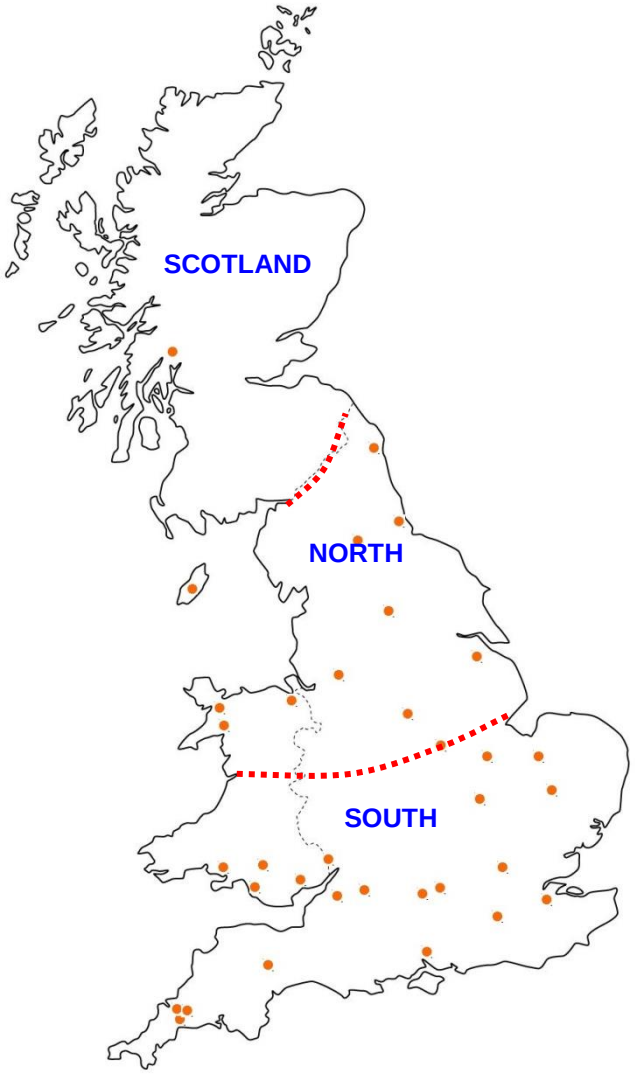
Year 11 (2017/18)

This was the first opportunity for tenders for year 11 excluding the long term contracts let in 2010. The pattern of tenders is roughly similar to year 10 tenders although as with all first opportunity tender rounds we have seen a jump in the tendered prices. Committed volumes for the winter seasons are a priority and we have accepted prices similar to those in year 10. NG have secured a relatively large volume for the first opportunity although there still remains a significant volume available for contract.

Tables demonstrating the breakdown of accepted and rejected tenders and average prices have been moved to the MIR Excel file.

Figure 3 presents the number of units and the total MW tendered and accepted for each season and each location. The orange dots on the map indicate the approximate location of the units tendered in any season (not including sites located in more than one region).

Figure 3 Map of Great Britain



SCOTLAND	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	3	2	71	46
10.2	3	2	71	46
10.3	3	2	71	46
10.4	3	2	71	46
10.5	2	2	46	46
10.6	2	2	46	46
11.1	-	-	-	-
11.2	-	-	-	-
11.3	-	-	-	-
11.4	-	-	-	-
11.5	-	-	-	-
11.6	-	-	-	-

NORTH	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	18	12	451	95
10.2	19	12	541	95
10.3	18	11	518	72
10.4	18	11	518	72
10.5	15	6	851	31
10.6	15	6	851	31
11.1	30	15	810	287
11.2	31	15	893	281
11.3	31	15	897	285
11.4	31	15	902	289
11.5	31	12	877	86
11.6	31	12	877	86

SOUTH	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	40	37	318	223
10.2	45	42	363	269
10.3	32	12	280	112
10.4	35	13	477	255
10.5	16	10	354	313
10.6	16	10	354	313
11.1	49	19	1,367	403
11.2	49	19	1,349	401
11.3	49	17	1,356	389
11.4	49	17	1,369	392
11.5	48	20	1,349	331
11.6	48	20	1,343	331

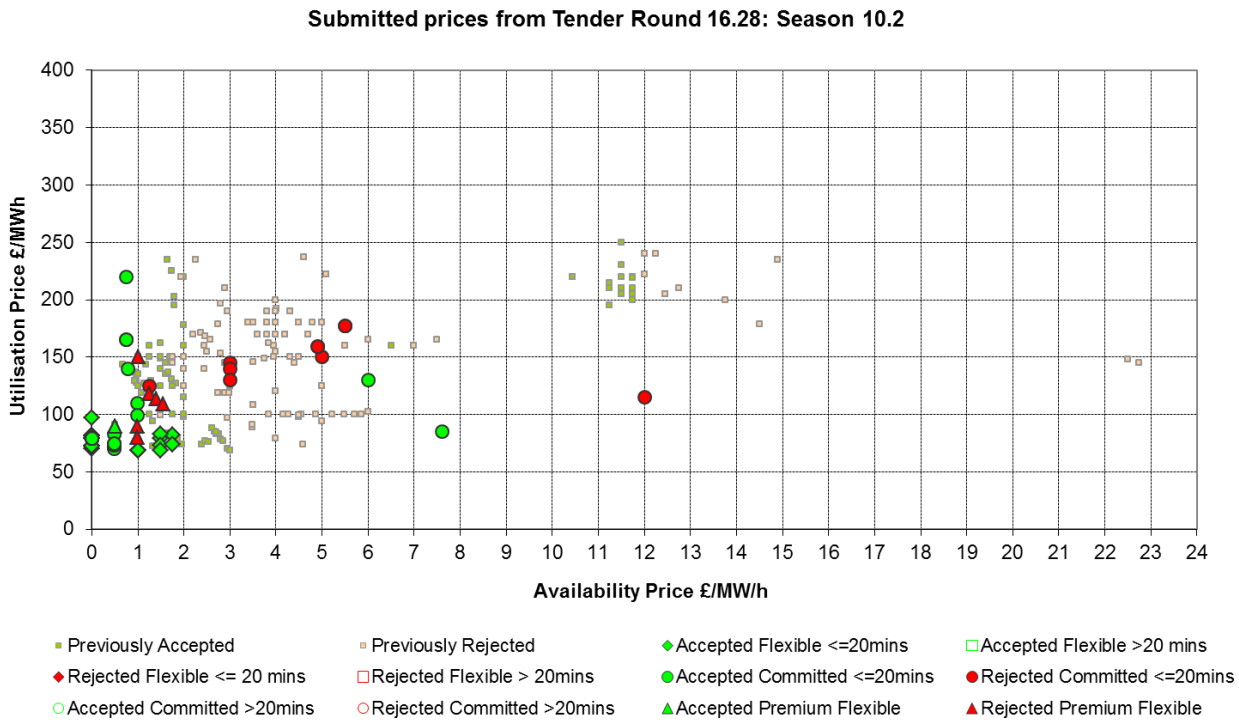
MULTIPLE LOCATIONS (Aggregated sites)

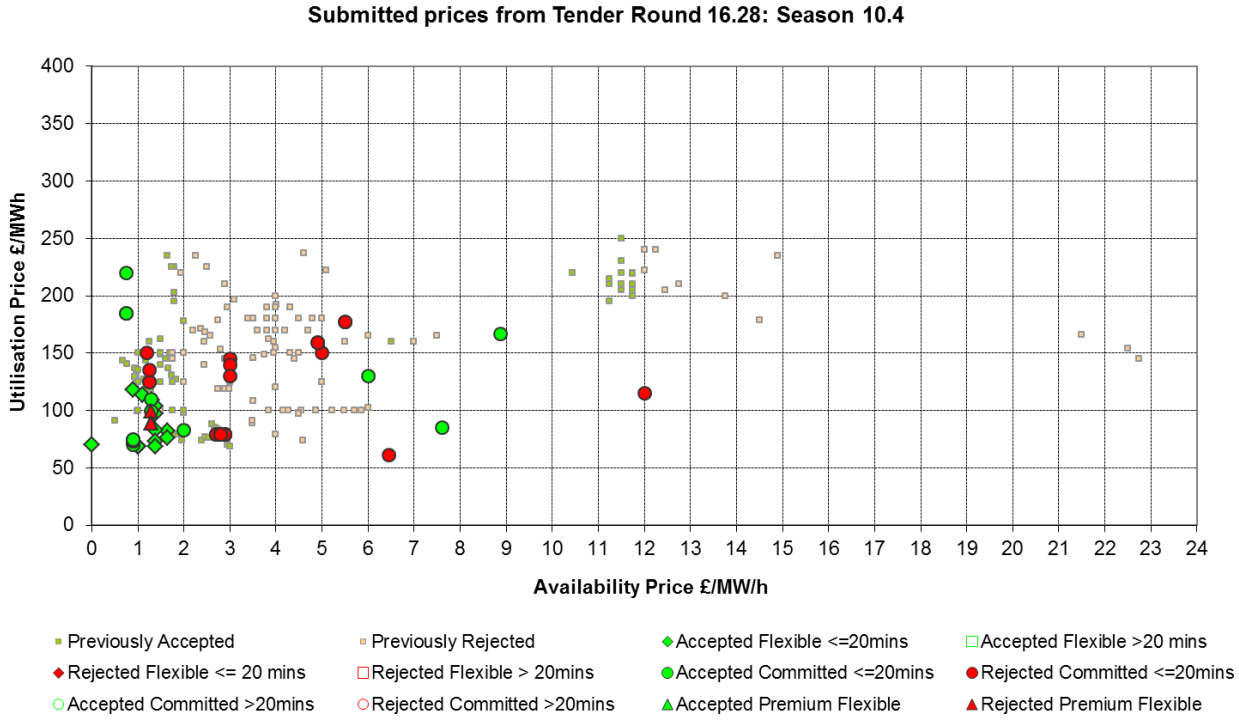
MULTIPLE	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	8	3	35	16
10.2	9	3	38	16
10.3	10	7	39	28
10.4	10	7	39	28
10.5	34	25	217	159
10.6	34	25	217	159
11.1	90	31	540	174
11.2	90	31	540	174
11.3	90	34	540	189
11.4	90	34	540	189
11.5	88	82	529	493
11.6	88	82	529	493

Prices

Figures 4 and 5 below show scatter plots of availability and utilisation price for each tender and for each season. The data is broken down into response time groups of >20 mins or <=20 mins, Flexible or Committed service and accepted or rejected tenders. These charts also display any units accepted as Premium Flexible, or rejected as Premium Flexible if they were not then assessed as Flexible. If a unit was rejected as Premium Flexible and then assessed as Flexible, they are represented on the chart as normal Flexible tenders. These charts also depict the accepted and rejected tenders from previous tender rounds. To keep this report short only seasons 2, 4 and 5 are displayed (these are the longest of each of the season pairs). The full data for all seasons is available in the MIR Excel file including the details of PF units and secondary assessment.

Figure 4 Year 10 Availability and Utilisation price charts





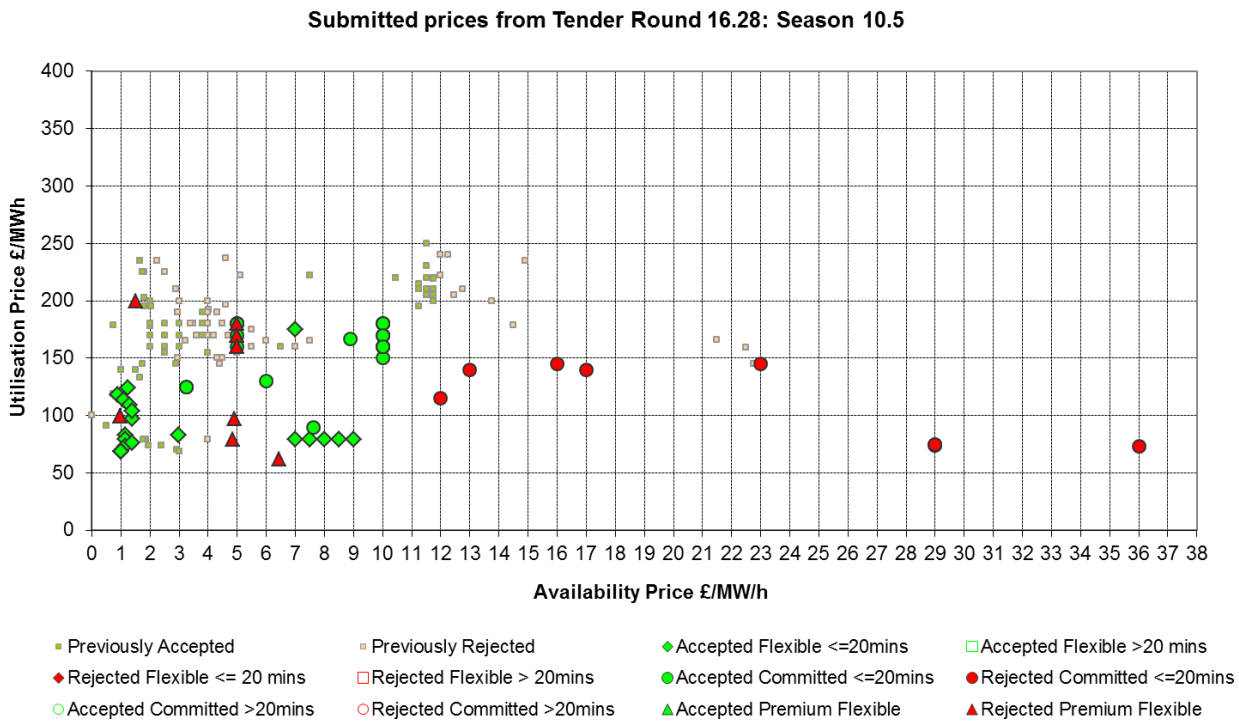
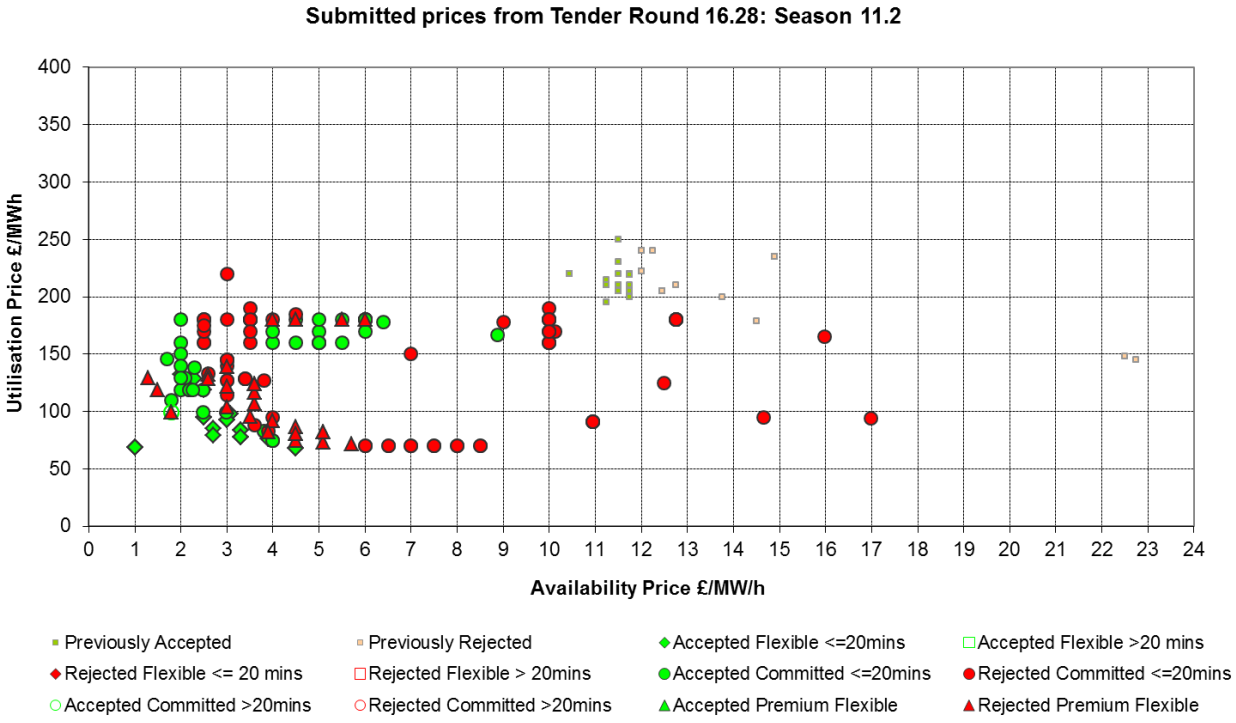
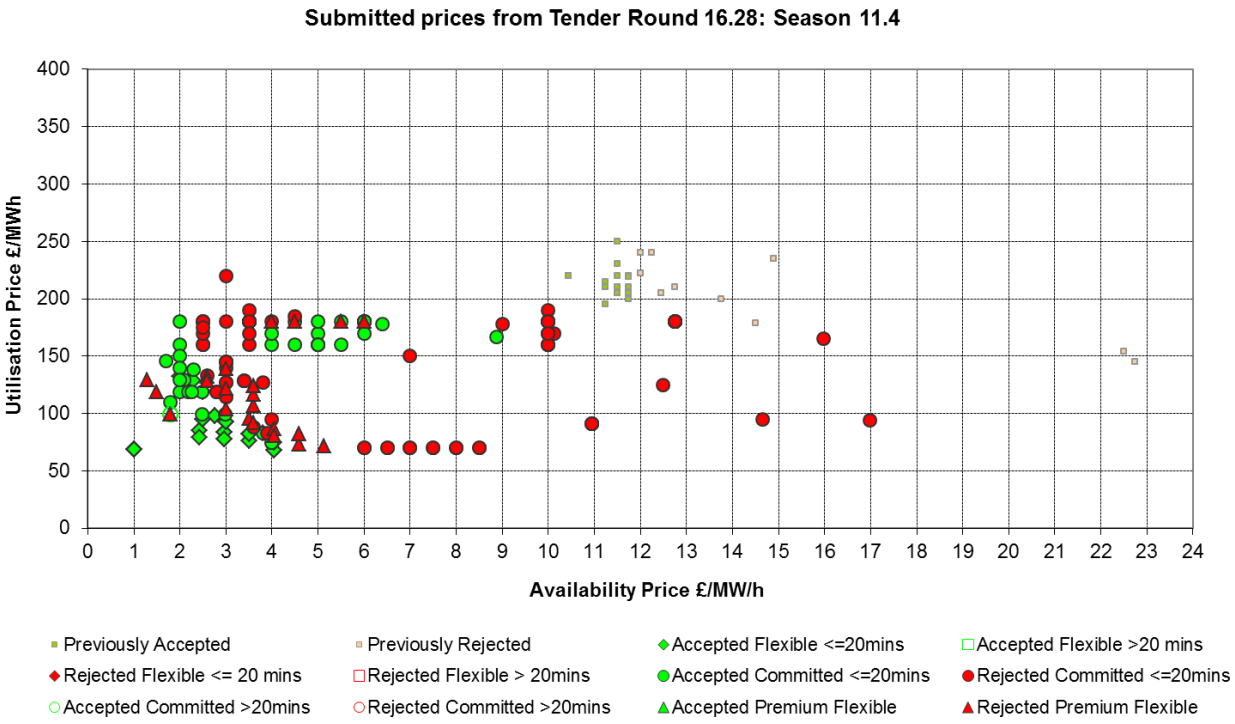


Figure 5 Year 11 Availability and Utilisation price charts





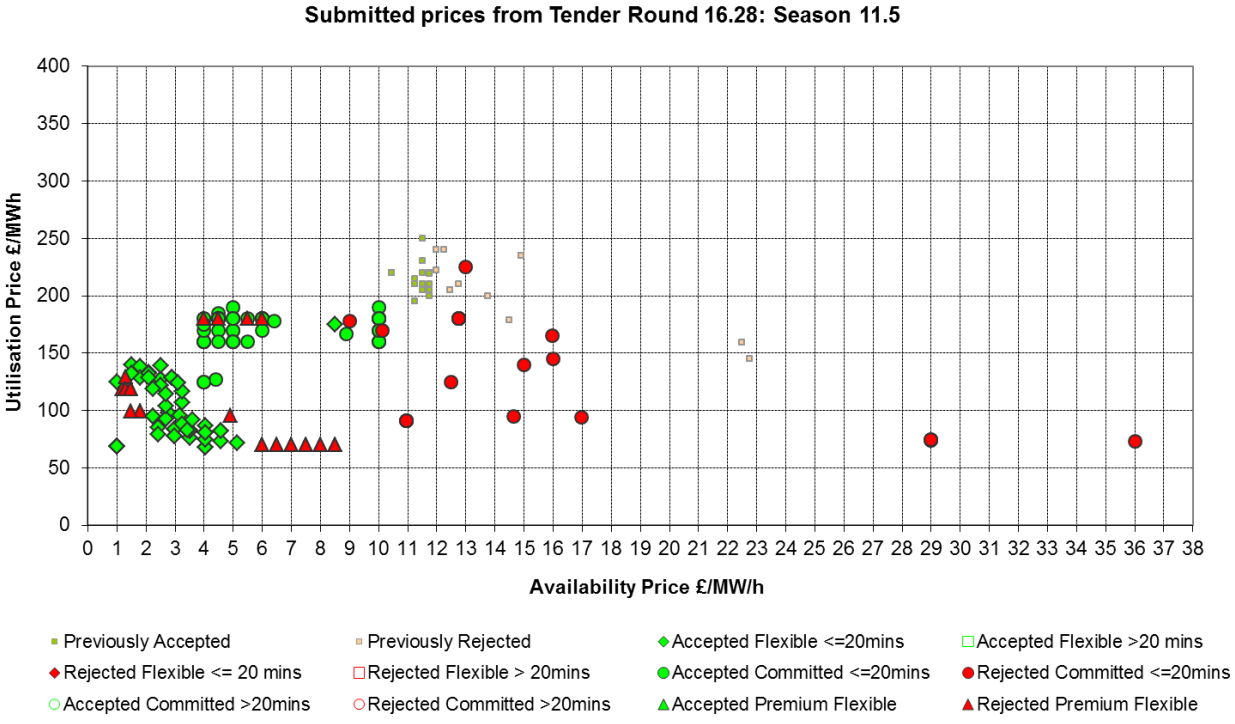


Table 3 below presents a summary of the highest accepted availability price for Committed and Flexible units with Premium Flexible tenders listed separately. The table also presents the highest and lowest Utilisation price accepted for each season as a guide. This is intended to display the difference in value between Premium Flexible and normal tenders, although it should be noted that it is the combination of utilisation and availability price that is key. This information can be seen on the scatter plots above. For this report we have added an extra column which is highest availability price accepted that is not from an “all or nothing” tender. This change is to help distinguish between “all or nothing” prices that were accepted due to their benefits in other seasons to those accepted for their benefit in the current season.

Table 3 Summary of accepted Prices

Season Number	Marginal Availability price accepted £/MW/h	Marginal Availability price accepted non all or nothing	Marginal PF availability price accepted £/MW/h	Highest Utilisation Price accepted £/MWh	Lowest Utilisation Price accepted £/MWh
10.1	7.61	1.75	0.50	220.00	68.88
10.2	7.61	1.75	0.50	220.00	68.88
10.3	7.61	1.99	-	220.00	68.88
10.4	8.88	1.99	-	220.00	68.88
10.5	10.00	10.00	-	180.00	69.00
10.6	10.00	10.00	-	180.00	69.00
11.1	8.88	4.50	-	180.00	67.89
11.2	8.88	4.50	-	180.00	67.89
11.3	8.88	4.05	-	180.00	67.89
11.4	8.88	4.05	-	180.00	67.89
11.5	10.00	10.00	-	190.00	67.89
11.6	10.00	10.00	-	190.00	67.89

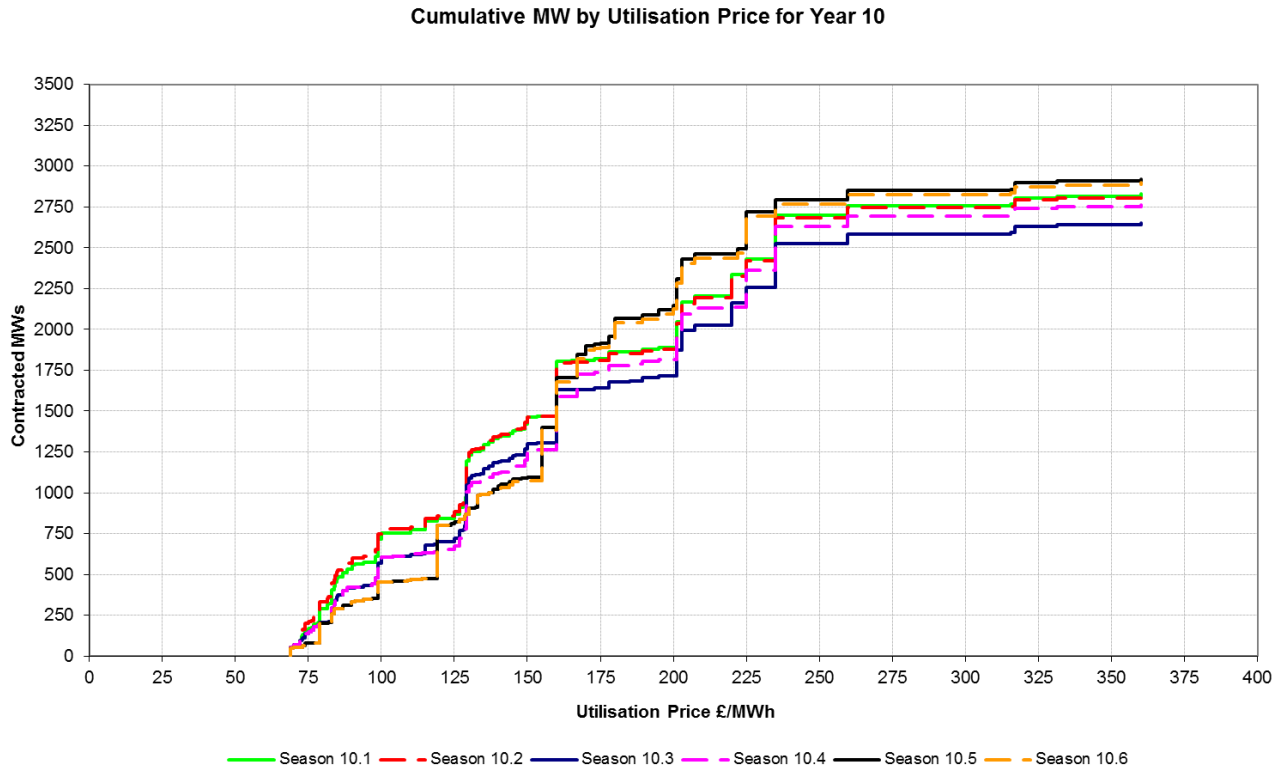
Figures 6 below shows the detail of all or nothing tenders. For simplicity multiple tenders of the same price are removed from the following charts. Also tenders which included PF as part of the all or nothing offer for winter are not displayed. Tenders that were accepted are colour green and rejected tenders coloured red.

Figure 6 All or nothing tenders.

Utilisation price and response time stacks

Figures 7 and 8 exhibit cumulative graphs. In these graphs the total accepted MW from previous tender rounds, up to and including the results from TR28, have been stacked according to two categories: **Figure 7a & 7b** is ranked according to utilisation price and **Figures 8a & 8b** according to the response time of the unit. **The utilisation prices have had indexation applied (seasonal and annual) these are final for season 9.1 but may change for the remaining seasons**.

Figure 7a illustrates that for seasons 10.1 and 10.2 approximately 1500MW of STOR is contracted with a utilisation prices of £150/MWh or less.



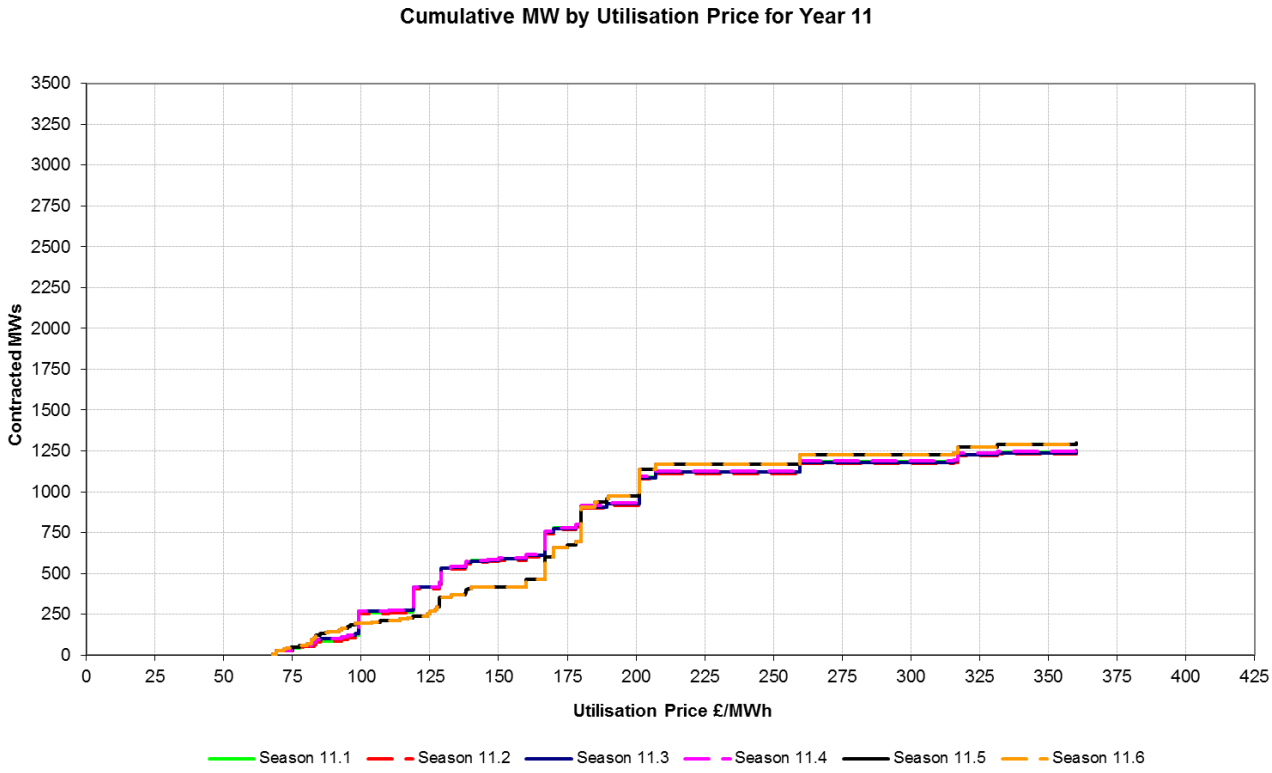
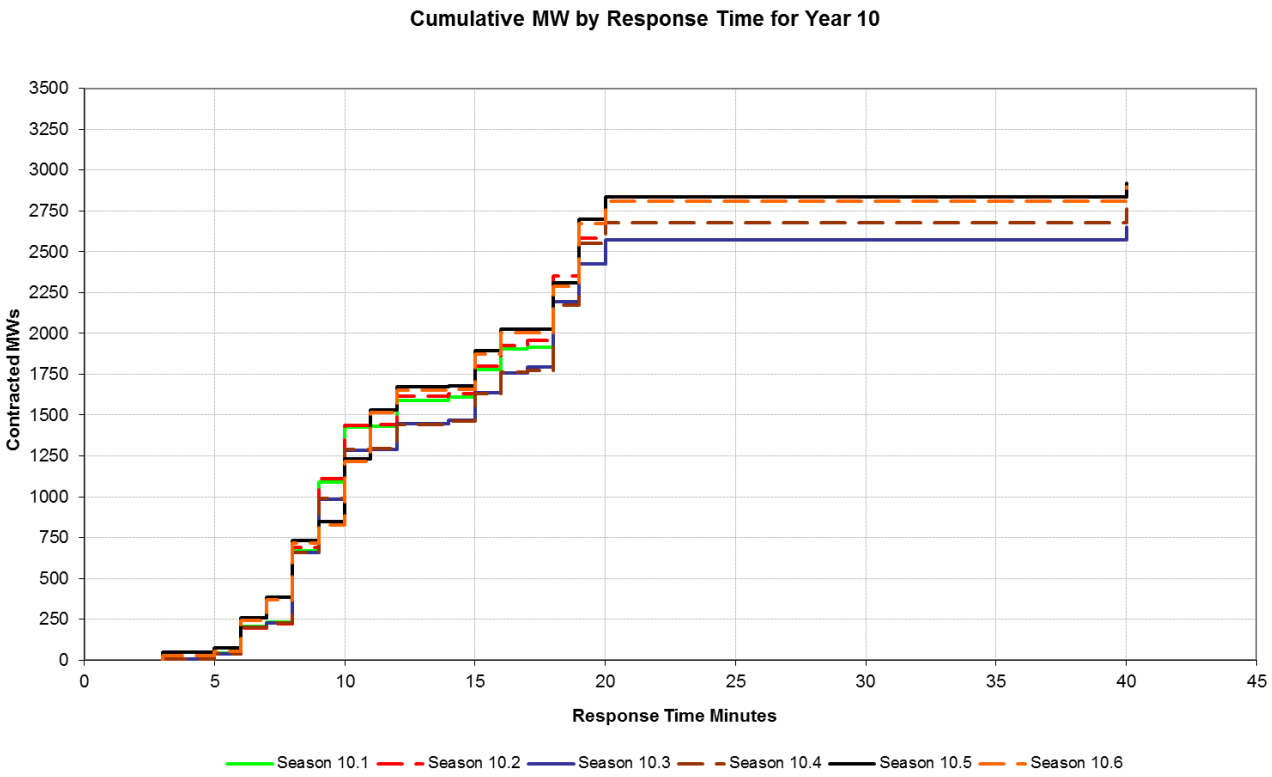
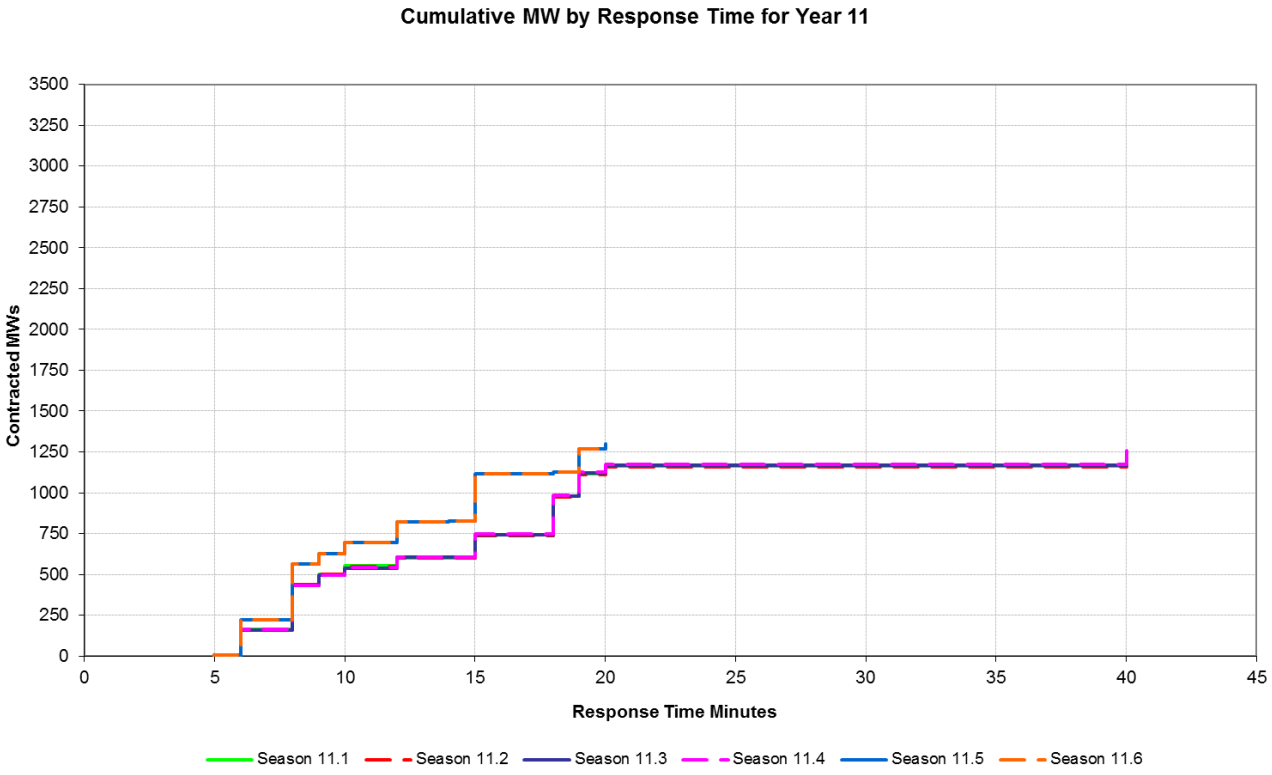


Figure 8a illustrates that for seasons 10.1 and 10.2 approximately 1450MW of STOR is contracted with a response time of 10 minutes or less.

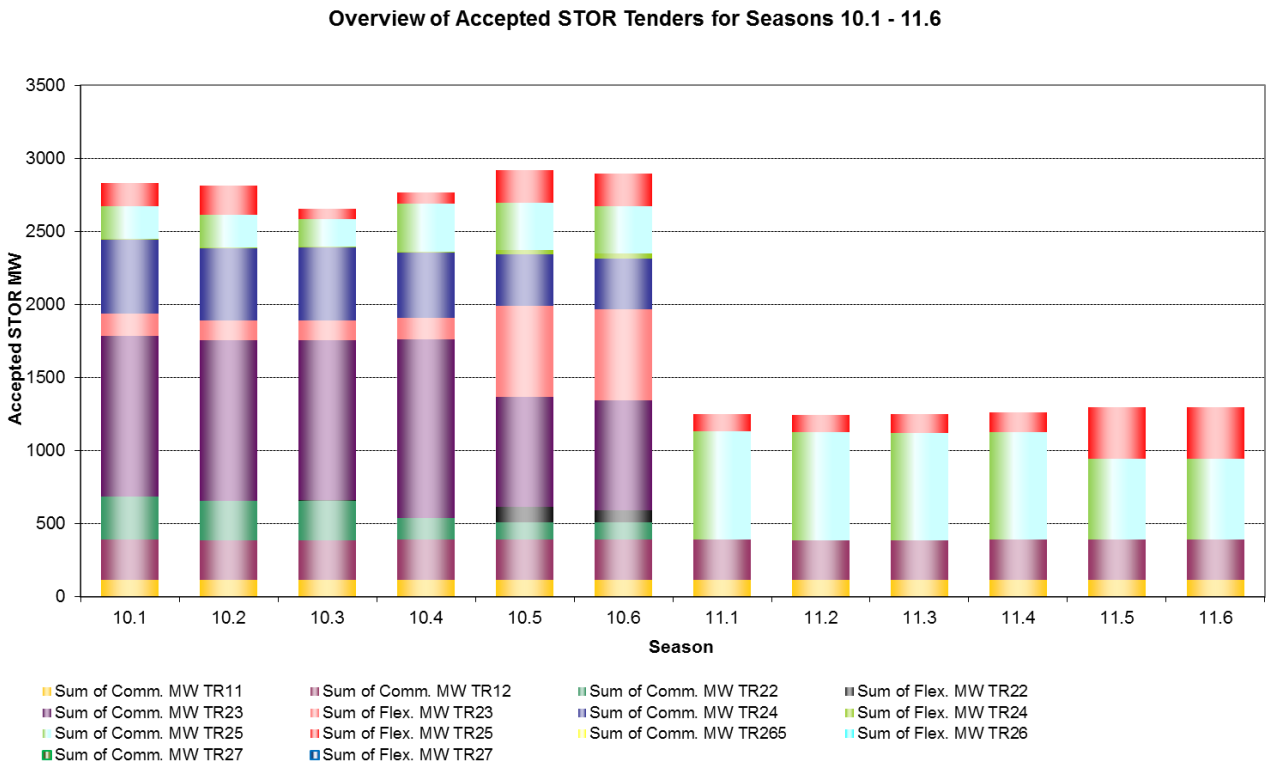




Total Contracted Position

Figure 9 shows the breakdown of accepted volumes from all previous tender rounds across the seasons of Years 10 and 11. The table accompanying Figure 9 below displays the same data in table format split by Committed or Flexible. For purpose of this chart and table Premium Flexible units are classed as Flexible units.

Figure 9 Year 10 and 11 summaries by tender round



	Season	10.1		10.2		10.3		10.4		10.5		10.6	
	Service Type	C	F	C	F	C	F	C	F	C	F	C	F
Accepted MW	TR11 (LT)	116		116		116		116		116		116	
	TR12 (LT)	273		271		272		273		274		274	
	TR25	294	3	268	3	270	3	148	3	120	104	120	84
	TR26	1098	152	1095	135	1093	135	1219	149	751	625	750	625
	TR27	508	5	497	5	502	5	450	5	352	31	347	31
	TR28	226	154	226	200	187	71	330	71	323	226	323	226
	Total	2515	314	2473	343	2440	214	2536	228	1936	986	1930	966

	Season	11.1		11.2		11.3		11.4		11.5		11.6	
	Service Type	C	F	C	F	C	F	C	F	C	F	C	F
Accepted MW	TR11 (LT)	116		116		116		116		116		116	
	TR12 (LT)	273		271		272		273		274		274	
	TR28	746	118	741	115	733	130	737	133	552	358	552	358
	Total	1135	118	1128	115	1121	130	1126	133	942	358	942	358

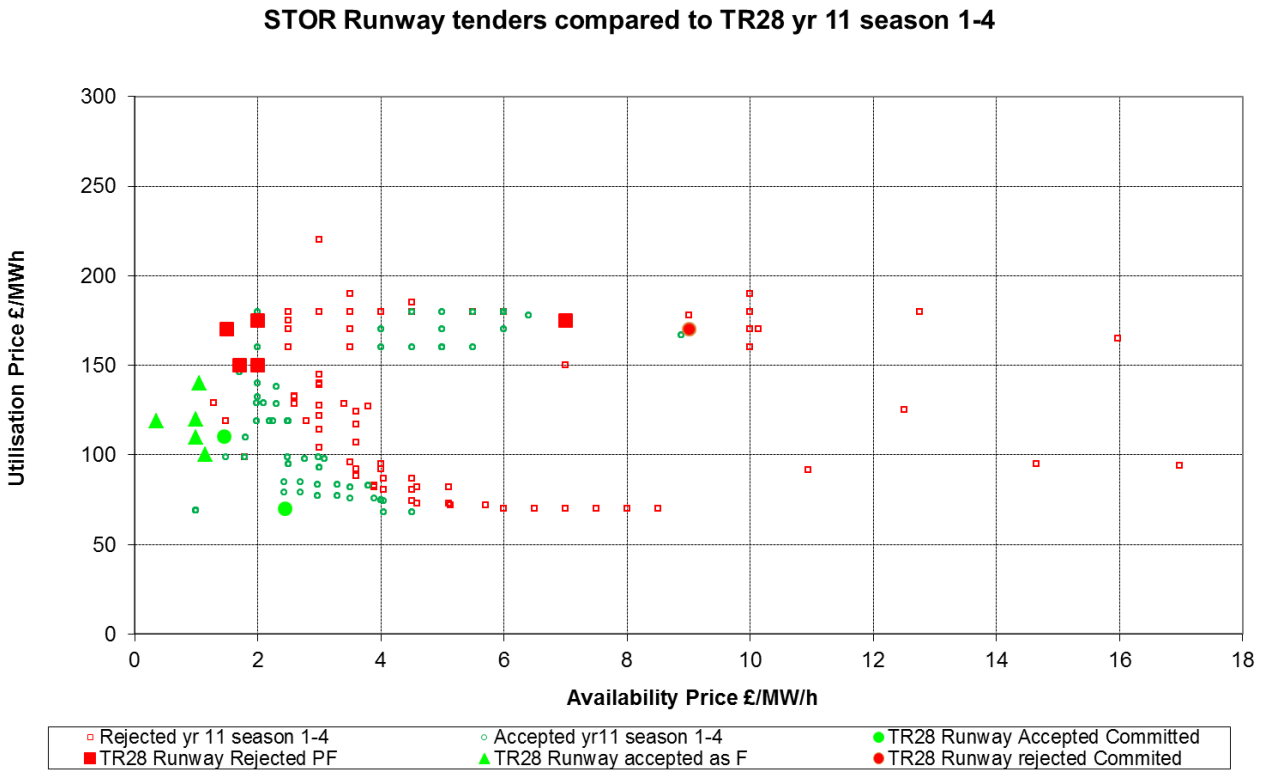
Contract Performance - Termination

National Grid closely monitor performance across contracts and expect a pro-active approach from providers should they encounter difficulties. National Grid will work closely with companies to try and resolve any issues and assist where possible. During Year 9 there were a significant number of units which consistently performed below the expectations of committed units. As a result 84MW of committed contracts were terminated during Year 9 across 11 units.

STOR Runway Tender details

Figure 10 shows STOR runway tenders plotted against the results of all other tenders for year 10 seasons 1-4. The full details including service type and growth plan can be found in the accompanying Excel file and in the appendix file.

Figure 10 STOR runway tender details



Runway results

117MW of Runway tenders were received, 40MW of committed units and 77MW of Premium Flexible units. As can be seen from the chart above a number of committed units were accepted with prices in-line with those accepted for year 11 in the main assessment, one high priced committed unit was rejected. Several PF units were accepted as Flexible at prices in-line with year 11. The remaining PF units were rejected based on their prices being too high when compared to other year 11 tenders and not having the option of secondary assessment.

Enhanced Optional STOR.

In December 2015 between TR27 and TR28, National Grid tendered for a new service under Enhanced Optional STOR. This was in response to the low level of STOR available during winter and feedback received from the market following the issuing of a NISM in November 2015. The product was targeted at those STOR units that currently were not contracted to National Grid but had the SRD communications system in place. There was no availability fee for this service only optional utilisation fees. 24 MW of tenders were received with one submission invalid. The remaining 20MW of tenders were accepted.

Unit	Contracted MW	Response time	Maximum utilisation period (hours)	Recovery Period (mins)	cease time (mins)	Run up rate	Run Down Rate	Utilisation Price £/MWh	Weekly limit	Fuel type	Accept/Reject
A	4	15	2	60	30	0.27	0.13	240	5	Multiple - Diesel CHP Load Reduction	Reject - ineligible
B	8	11	6	15	3	0.8	2.67	300	99999	Diesel	Accept
C	7	10	6	15	5	1.76	1.4	300	99999	Diesel	Accept
D	5	18	3	60	5	0.28	1	165	10	CHP	Accept

At the time of writing only one unit has been instructed for 1 hour during February.

Appendix 1: Terminology and Definitions

High level description of STOR:

STOR is designed to give National Grid sufficient Operating Reserve to replace sudden generation losses, or unpredictable changes in demand between four hours ahead of real time and real time and requires a large proportion of units to be available within 20 minutes. STOR also recognises that other potential reserve providers who cannot meet the 20 minute response time criteria can still be of value in meeting our reserve requirement. Hence a key aspect of the definition of the STOR product is that it extends the maximum response time to 240 minutes to allow alternative providers to participate. How value is placed on these units by National Grid is different to the sub 20 minute notice units as the longer notice units compete mainly with alternative options available in the Balancing Mechanism with equivalent response times. Location, reliability and utilisation parameters are also important elements of the STOR assessment.

The Committed service applies to all providers who wish to make themselves available for all required windows nominated by National Grid. Both BM and NBM providers can tender for this service. The Flexible service applies only to NBM providers and allows the provider to make the unit available or unavailable for particular windows. This availability is assessed on a week-ahead basis and providers are notified if their service is required or not. It is at the discretion of National Grid whether a unit is accepted or rejected at the week-ahead stage and this decision will be based on the same assessment principles as the main tender assessment. The increased accuracy of the week-ahead forecast means that some factors may have more importance such as location if specific constraint issues are forecast. Both Services attract an availability payment paid on a £/MW/h basis when available within defined windows and a utilisation payment on delivery of STOR MW when instructed by National Grid paid on a £/MWh basis.

A summary of the STOR service can be found on our website at the following link:

http://www.nationalgrid.com/NR/rdonlyres/083D0D9C-1A33-4336-8FA3-1A69DCC1C903/60303/TR20_General_Description.pdf

Appendix 2:

Accepted and Rejected Tenders TR28: A list of information containing prices, response time, location and unit type of all accepted and rejected tenders from this tender round, previously found in the appendix to the market information reports, can now be downloaded, in spreadsheet format, from the tender and reports section of the National Grid Balancing Services webpage:

http://www.nationalgrid.com/uk/Electricity/Balancing/services/STOR/

Appendix 3: Season Reference

The following tables summarise the season information for the current year (Year 10) and the following year (Year 11).

Seasons 2016/17

Season	Dates	WD Start Time	WD End Time	NWD Start Time	NWD End Time	Hours/Day Type WD	Hours/Day Type NWD	Total
1	05:00 on Friday 1st Apr 2016 - 05:00 on Monday 25th Apr 2016	07:00	13:30	10:00	14:00	190	26	216
		19:00	22:00	19:30	22:00			
2	05:00 on Monday 25th Apr 2016 - 05:00 on Monday 22nd Aug 2016	07:30	14:00	09:30	13:30	1150	133	1283
		16:00	18:00	19:30	22:30			
		19:30	22:30					
3	05:00 on Monday 22nd Aug 2016 - 05:00 on Monday 19th Sep 2016	07:30	14:00	10:30	13:30	276	30	306
		16:00	21:30	19:00	22:00			
4	05:00 on Monday 19th Sep 2016 - 05:00 on Monday 31th Oct 2016	07:00	13:30	10:30	13:30	396	39	435
		16:30	21:00	17:30	21:00			
5	05:00 on Monday 31th Oct 2016 - 05:00 on Monday 30th Jan 2017	07:00	13:30	10:30	13:30	862.5	120	982.5
		16:00	21:00	16:00	20:30			
6	05:00 on Monday 30th Jan 2017 - 05:00 on Saturday 1st Apr 2017	07:00	13:30	10:30	13:30	583	60	643
		16:30	21:00	16:30	21:00			
						3457.5	408	3865.5

Season	WD	NWD
1	20	4
2	100	19
3	23	5
4	36	6
5	75	16
6	53	8

Total Hours	3865.5

Seasons 2017/18

Season	Dates	WD Start Time	WD End Time	NWD Start Time	NWD End Time	Hours/Day Type WD	Hours/Day Type NWD	Total
1	05:00 on Saturday 1st Apr 2017 - 05:00 on Monday 24th Apr 2017	06:00	13:00	10:00	14:00	171	30	201
		19:00	21:30	19:30	21:30			
2	05:00 on Monday 24th Apr 2017 - 05:00 on Monday 21st Aug 2017	06:30	14:00	10:30	13:30	1200	104.5	1304.5
		16:00	18:00	19:30	22:00			
		19:30	22:00					
3	05:00 on Monday 21st Aug 2017 - 05:00 on Monday 25th Sep 2017	06:30	13:00	10:30	12:30	333.5	24	357.5
		16:00	21:00	19:30	21:30			
4	05:00 on Monday 25th Sep 2017 - 05:00 on Monday 30th Oct 2017	06:00	13:00	10:30	13:00	315	25	340
		17:00	20:30	17:30	20:00			
5	05:00 on Monday 30th Oct 2017 - 05:00 on Monday 29th Jan 2018	06:00	13:00	10:30	13:30	862.5	104	966.5
		16:00	20:30	16:00	19:30			
6	05:00 on Monday 29th Jan 2018 - 05:00 on Sunday 1st Apr 2018	06:00	13:00	10:30	13:00	594	48	642
		16:30	20:30	16:30	20:00			
						3476	335.5	3811.5

Season	WD	NWD
1	18	5
2	100	19
3	29	6
4	30	5
5	75	16
6	54	8

Total Hours	3811.5