STOR Market Information Report TR30

Original Published 15th October 2016. Updated 18th October Figures 4,5,7 and 8, Nov 3rd Figure 7 updated

Foreword

Welcome to the TR30 Market Information Report, and the final tender opportunity for STOR Year 10. Continuing from the previous Market Information Report we continue 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.

We have continued to monitor availability from Flexible and Premium Flexible units and as we have seen over the past few seasons, we have seen reduced availability from these units which in turn, lowers our forecast going forward. As a result we are looking to procure a large proportion of our requirement through committed tenders where economic to do so, while refining the remaining volume through Flexible tenders.

Lastly, we recently published an Outline Change Proposal (OCP) paper with areas within the existing STOR service that would benefit from refinement and can feasibly be implemented from 1st April 2017. The paper is on the following page, http://www2.nationalgrid.com/UK/Services/Balancing-services/Reserve-services/Short-Term-Operating-Reserve/Short-Term-Operating-Reserve-Information/ under the STOR Annual Review section

The deadline is 28th October for feedback to the proposals and should be directed to commercial.operation@nationalgrid.com. If you have any thoughts on how we can improve the STOR service or this report, we are keen to hear your thoughts, so please do get in touch.

Thanks,

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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 30 (TR30). 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.

Figure 1

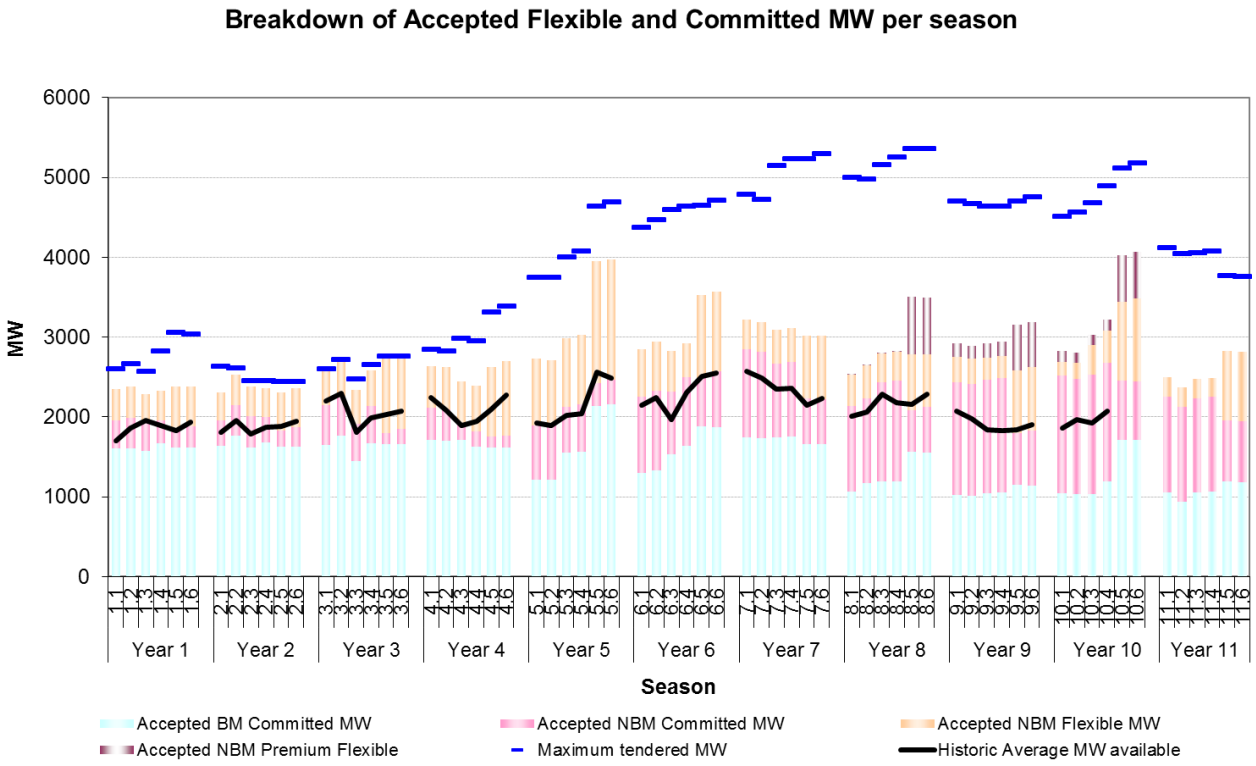
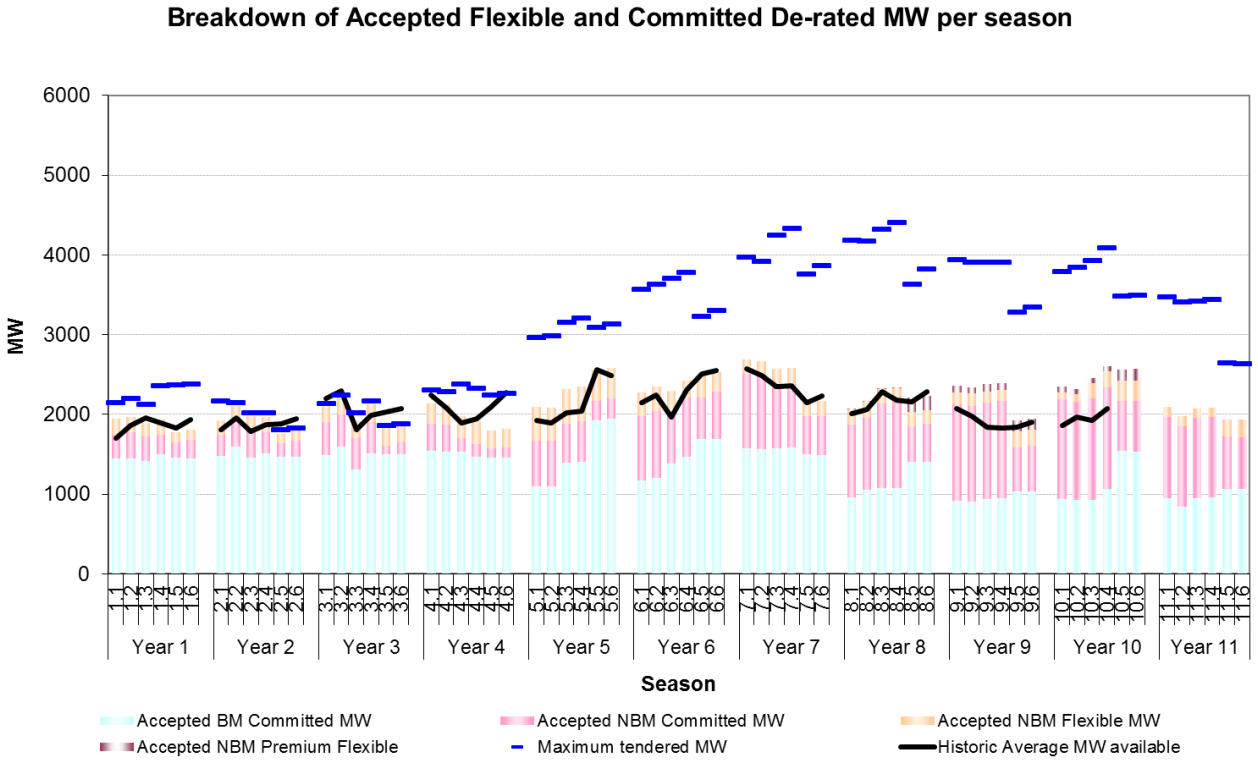


Figure 2



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 30 Tenders						STOR Runway TR30 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	0	0	0	0	0	**0**	-	-	-	-	**-**	**2714**	**2260**
10.2	0	0	0	0	0	**0**	-	-	-	-	**-**	**2683**	**2222**
10.3	0	0	0	0	0	**0**	-	-	-	-	**-**	**2911**	**2357**
10.4	0	0	0	0	0	**0**	-	-	-	-	**-**	**3105**	**2514**
10.5	624	112	392	33	1161	**763**	13	9	-	22	**13**	**2958**	**1931**
10.6	624	112	422	33	1191	**771**	30	9	-	39	**28**	**2992**	**1936**
11.1	982	380	0	28	1390	**1221**	30	9	-	39	**30**	**1943**	**1603**
11.2	980	379	0	28	1387	**1218**	30	9	-	39	**30**	**1810**	**1485**
11.3	980	391	0	25	1396	**1227**	30	9	-	39	**30**	**1919**	**1583**
11.4	982	392	0	25	1399	**1230**	30	9	-	39	**30**	**1935**	**1596**
11.5	755	69	6	13	843	**743**	30	9	-	39	**28**	**2196**	**1397**
11.6	755	69	6	13	843	**743**	30	9	-	39	**28**	**2190**	**1392**

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

	TR 30 Tenders Accepted						STOR Runway TR30 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	0	0	0	0	**0**	**0**	-	-	-	-	**-**	
10.2	0	0	0	0	**0**	**0**	-	-	-	-	**-**	
10.3	0	0	0	0	**0**	**0**	-	-	-	-	**-**	
10.4	0	0	0	0	**0**	**0**	-	-	-	-	**-**	
10.5	425	0	411	0	**836**	**485**	13	9	-	22	**13**	
10.6	425	0	455	0	**880**	**496**	30	9	-	39	**28**	
11.1	475	44	0	0	**519**	**465**	30	9	-	39	**30**	**300**
11.2	475	44	0	0	**519**	**465**	30	9	-	39	**30**	**300**
11.3	475	44	0	0	**519**	**465**	30	9	-	39	**30**	**300**
11.4	475	44	0	0	**519**	**465**	30	9	-	39	**30**	**300**
11.5	555	16	10	0	**581**	**516**	30	9	-	39	**28**	**500**
11.6	555	16	10	0	**581**	**516**	30	9	-	39	**28**	**500**

Successful Tenders in TR30

Year 10 (2016/17)

TR30 was the final opportunity for seasons 10.5 and 10.6, as such only the cheapest tenders were accepted to provide sufficient volume to meet the optimal level of 2300 when the de-ratings are considered. There was ~370MW of Flexible units tendered with £0/MW/h availability price for these two seasons, these tenders were accepted but their volume is not considered as part of the 2300MW. For the winter seasons 10.5 and 10.6, ~400MW of committed volume was accepted to meet the required volume. We have continued to de-value PF tenders based on the forecast of their availability during the premium windows and as such no PF tenders have been accepted for the winter seasons.

Year 11 (2017/18)

Of the ~1400MW tendered, ~850MW had all or nothing restrictions specified on part of the seasons (the majority are season 1-6 although there are some that were were other season combinations). Securing committed volume for the winter seasons remains a priority although with the large volume of all or nothing tenders we have to balance the volume taken in seasons 1-4 with further tender opportunities available. As such we have used very similar forecasts and cut-offs to those used in TR29.

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

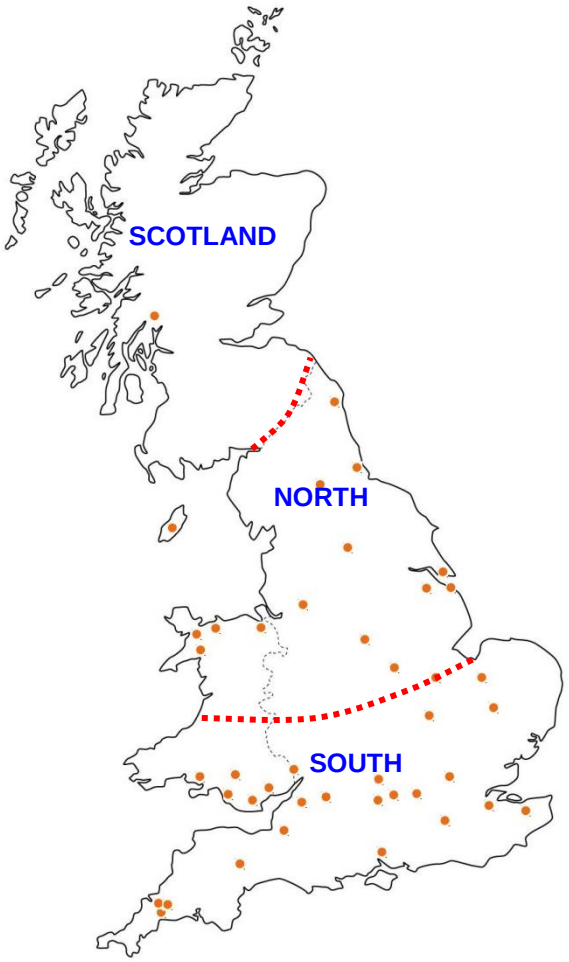
Expectations for TR31

This section is designed to clarify our intentions in the next tender round, including requirement remaining and likely strategy. We have published in our OCP, that we may not run TR32, to allow us time to resolve issues that have been raised regarding the current service. This may result in all volume for seasons 1-4 in 2017/18 being secured in TR31, with 2018/19 being available from TR33. The requirements below outline what we expect to do if we go with this strategy.

- **11.1 to 11.4** accept all of the remaining requirement (~300-500MW) from committed or flexible tenders, at prices in-line with those accepted in TR28-30. All or nothing committed tenders that cross into the winter seasons may be accepted in preference to this depending on the economics.
- **11.5 & 11.6** accept up to 100% of the remaining requirement (~500MW) from committed units if prices are economic, including all or nothing tenders. PF units will continue to be valued at 0% availability for the peak. Flexible units will be accepted in line with committed prices but high priced units are likely to be rejected at week ahead if there is a surplus of capability.

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	-	-	-	-
10.2	-	-	-	-
10.3	-	-	-	-
10.4	-	-	-	-
10.5	1	1	25	25
10.6	1	1	25	25
11.1	2	2	65	65
11.2	2	2	65	65
11.3	2	2	65	65
11.4	2	2	65	65
11.5	2	2	65	65
11.6	2	2	65	65

NORTH	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	-	-	-	-
10.2	-	-	-	-
10.3	-	-	-	-
10.4	-	-	-	-
10.5	22	21	539	440
10.6	34	33	589	490
11.1	20	8	640	429
11.2	20	8	640	429
11.3	20	8	640	429
11.4	20	8	640	429
11.5	10	10	462	462
11.6	10	10	462	462

SOUTH	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	-	-	-	-
10.2	-	-	-	-
10.3	-	-	-	-
10.4	-	-	-	-
10.5	57	48	592	366
10.6	56	47	572	346
11.1	38	-	554	-
11.2	38	-	551	-
11.3	40	-	563	-
11.4	40	-	566	-
11.5	11	2	312	50
11.6	11	2	312	50

MULTIPLE LOCATIONS (Aggregated sites)

MULTIPLE	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	-	-	-	-
10.2	-	-	-	-
10.3	-	-	-	-
10.4	-	-	-	-
10.5	1	1	5	5
10.6	1	1	5	5

MULTIPLE	Units tendered	Units Accepted	MW tendered	MW Accepted
11.1	24	4	131	25
11.2	24	4	131	25
11.3	23	4	128	25
11.4	23	4	128	25
11.5	1	1	4	4
11.6	1	1	4	4

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

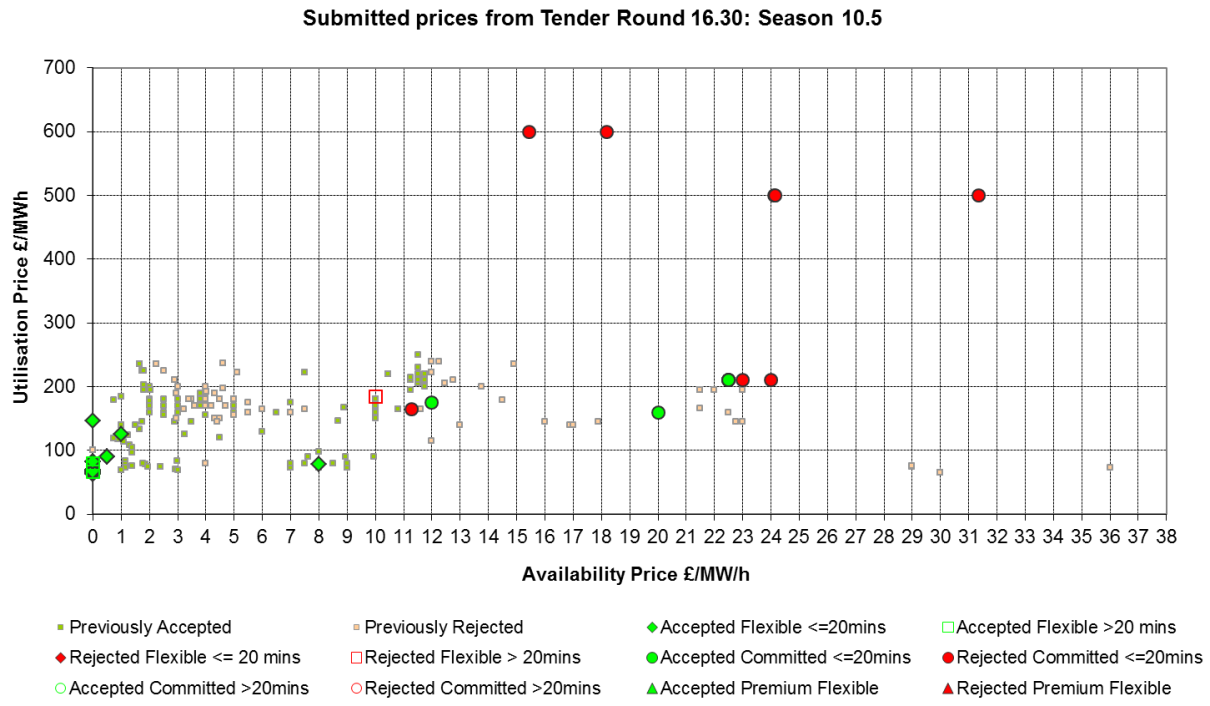
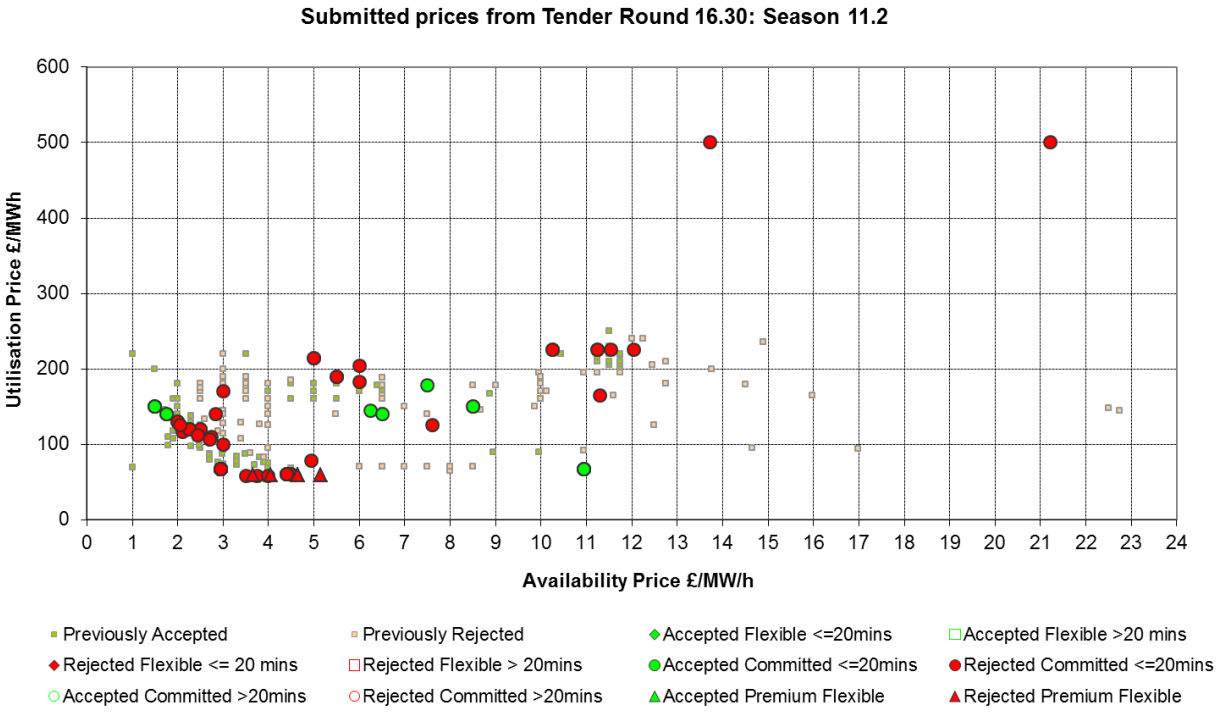
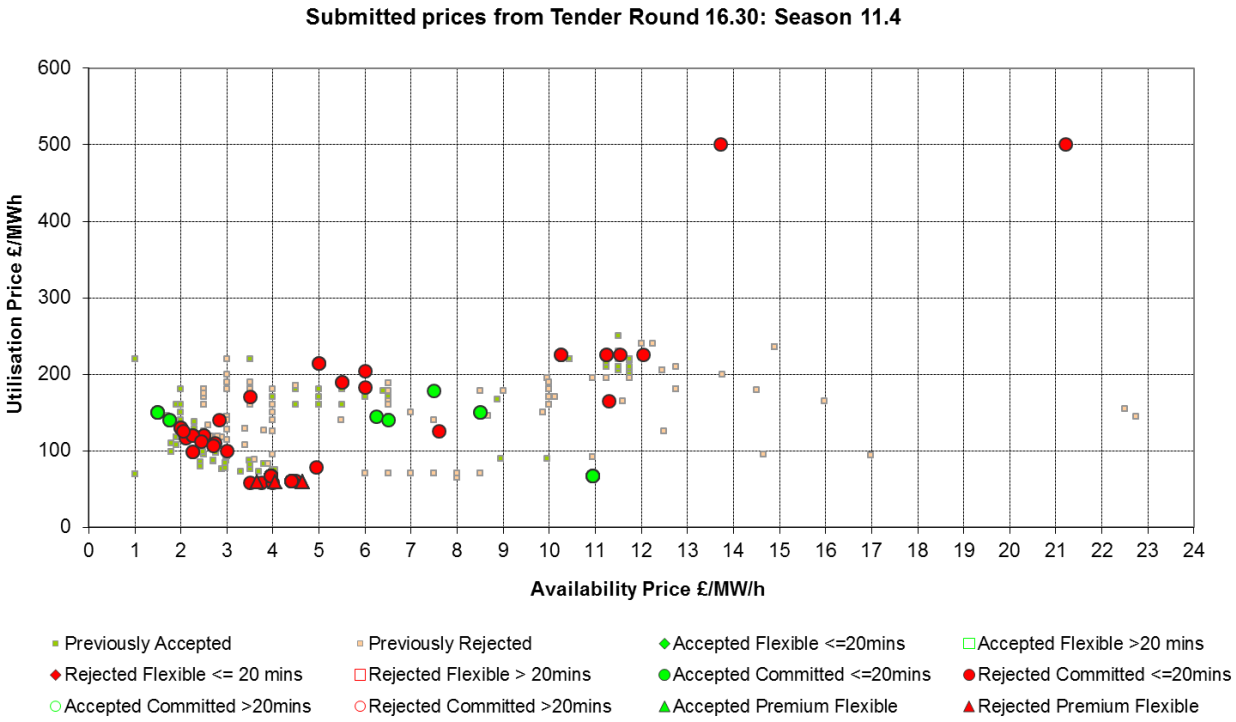


Figure 5 Year 11 Availability and Utilisation price charts





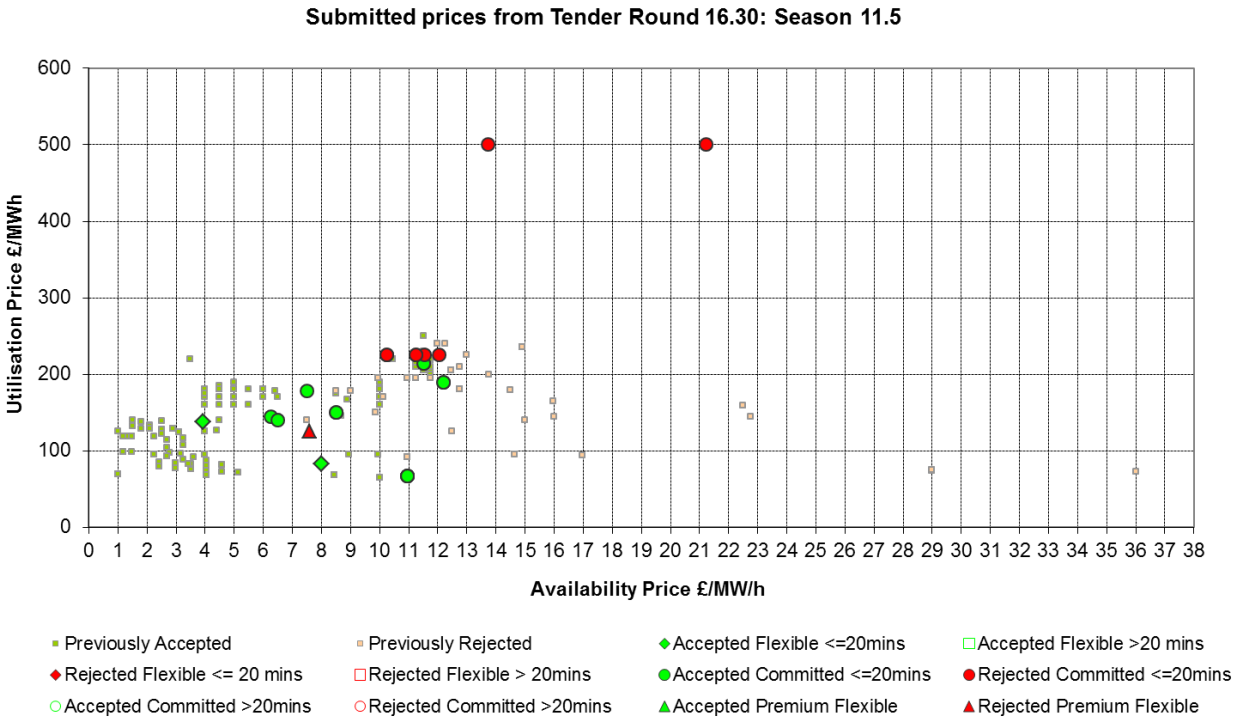


Table 3 below presents a summary of the highest accepted availability price for Committed and Flexible units with Premium Flexible tenders listed separately. The table also presents the highest and lowest Utilisation price accepted for each season as a guide. This is intended to display the difference 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
10.5	22.50	7.99	-	210.00	63.00
10.6	22.50	7.99	-	210.00	63.00
11.1	10.95	1.50	-	178.00	67.50
11.2	10.95	1.50	-	178.00	67.50
11.3	10.95	1.50	-	178.00	67.50
11.4	10.95	1.50	-	178.00	67.50
11.5	10.95	12.20	-	220.00	67.50
11.6	10.95	12.20	-	220.00	67.50

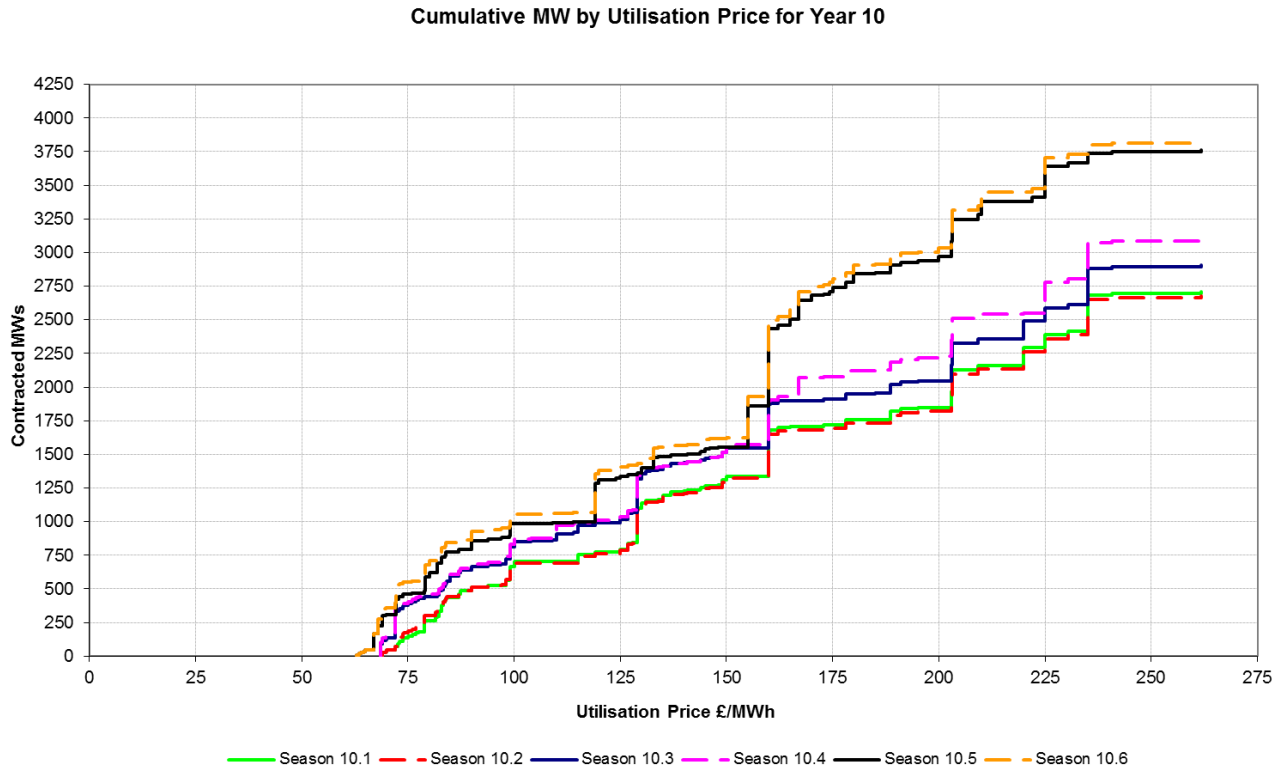
Figures 6 below shows the detail of all or nothing tenders. For simplicity multiple tenders of the same price are removed from the following charts. Also tenders which included PF as part of the all or nothing offer for winter are not displayed. Tenders that were accepted are colour green and rejected 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 TR30, 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 10.5 but may change for the remaining seasons**.

Figure 7a illustrates that for seasons 10.1 and 10.2 approximately 1250MW of STOR is contracted with a utilisation prices of £150/MWh or less.



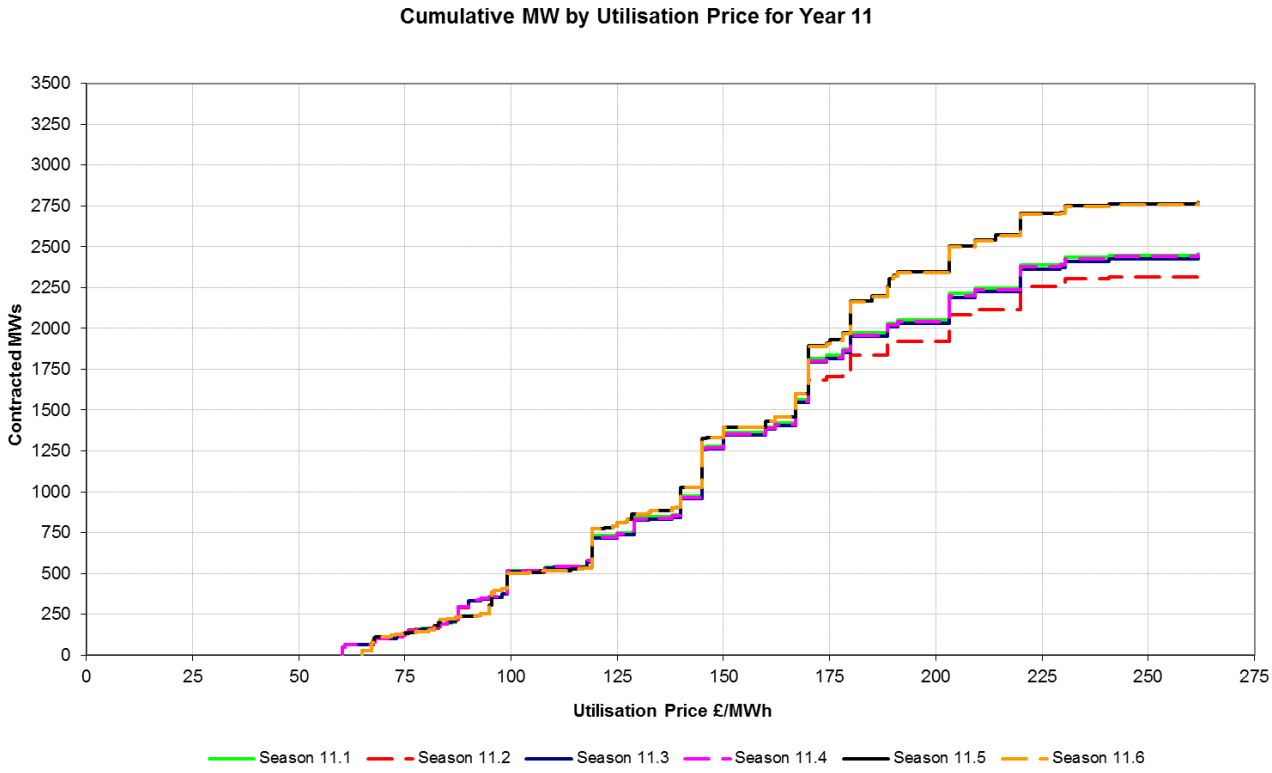
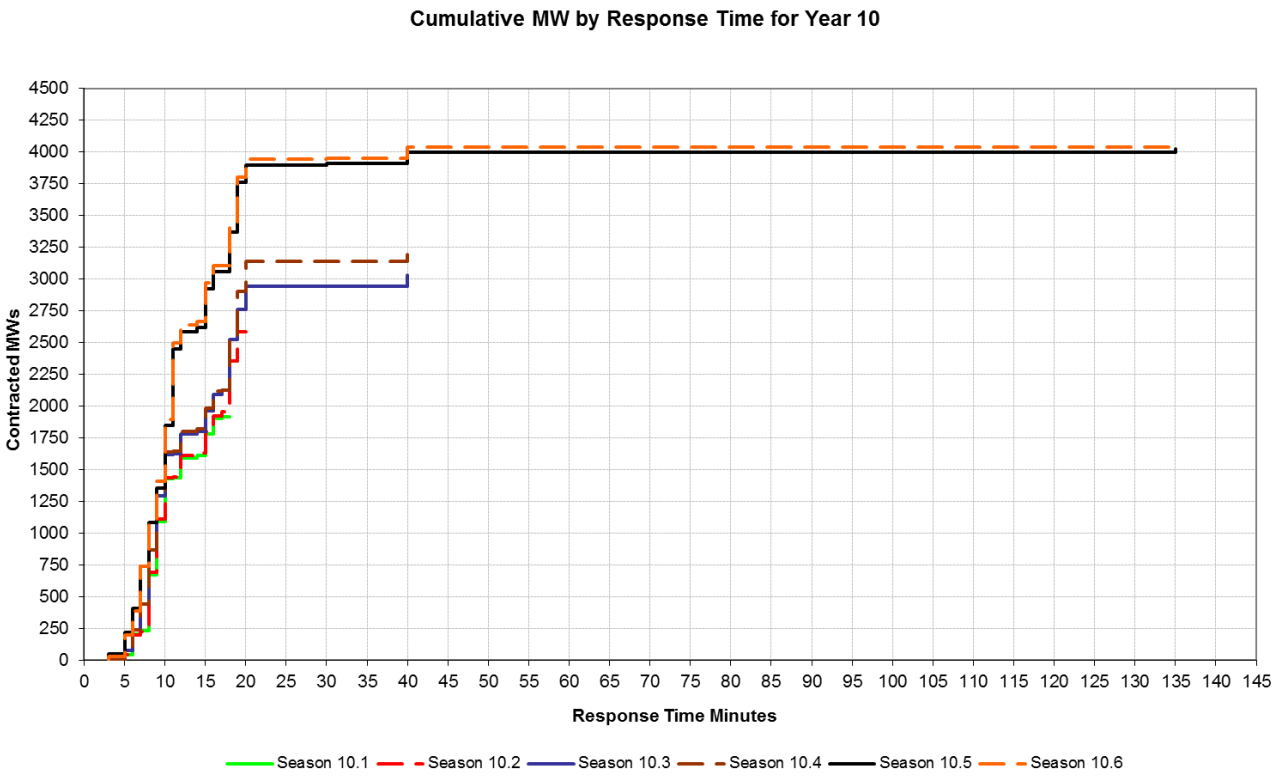
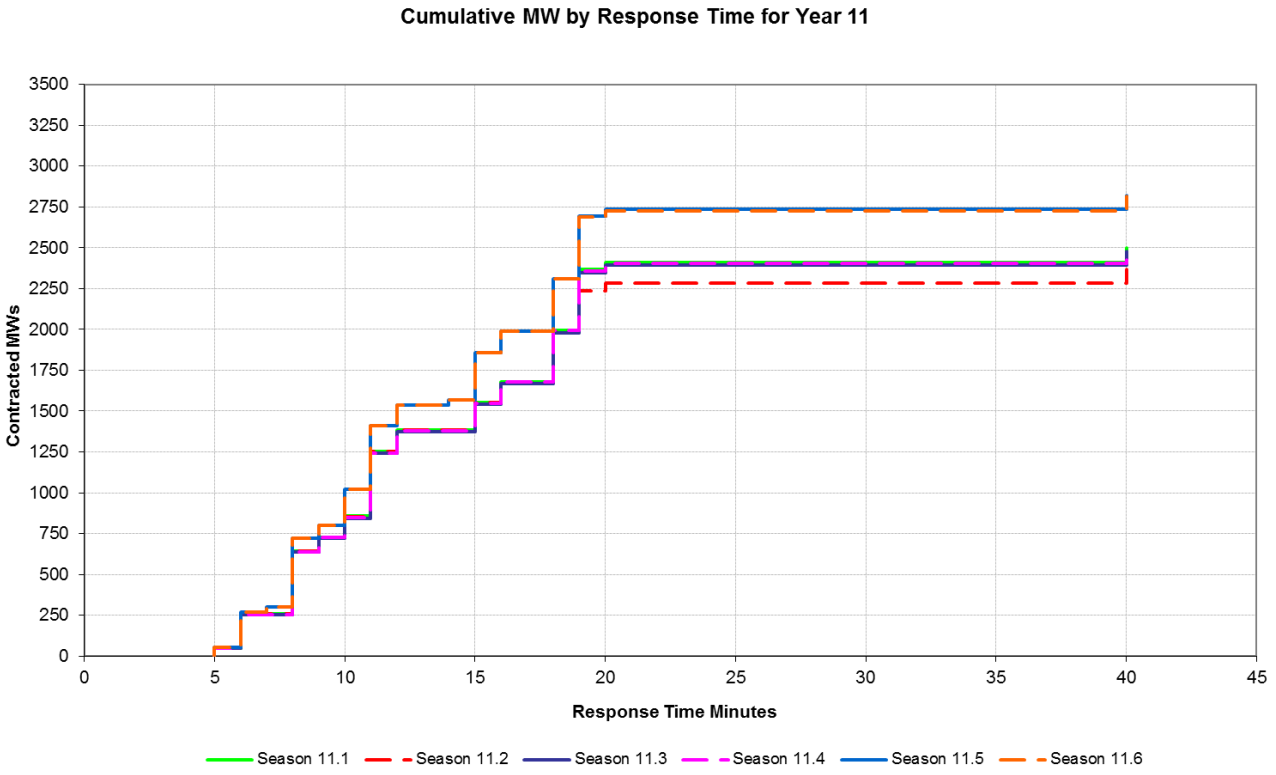


Figure 8a illustrates that for seasons 10.1 and 10.2 approximately 1450MW of STOR is contracted with a response time of 10 minutes or less.

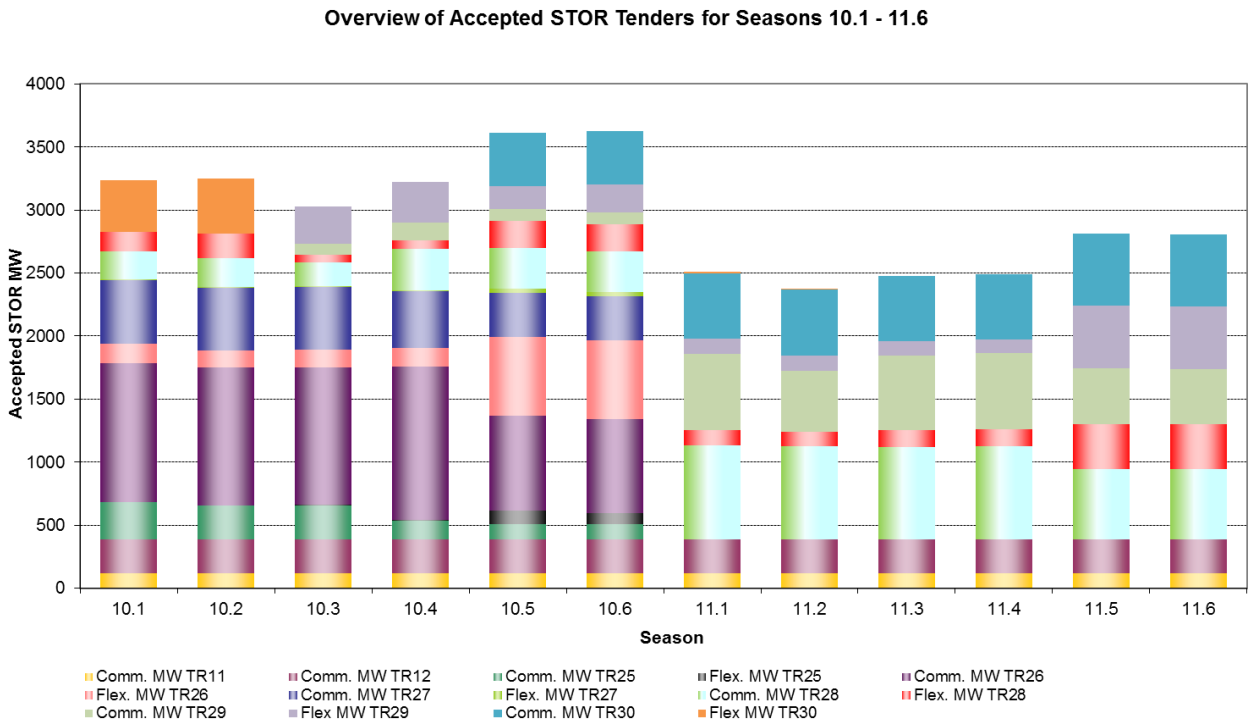




Total Contracted Position

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	148	226	194	187	65	330	65	323	220	323	220
	TR29					87	294	141	325	94	178	94	218
	TR30									425	411	425	441
	Total	**2515**	**308**	**2473**	**337**	**2527**	**502**	**2677**	**547**	**2455**	**1569**	**2449**	**1619**

	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
	TR29	604	124	480	125	597	109	605	109	443	497	437	497
	TR30	519		519		519		519		571	10	571	10
	Total	**2258**	**242**	**2127**	**240**	**2237**	**239**	**2250**	**242**	**1956**	**865**	**1950**	**865**

STOR Runway Tender details

In TR30 there were six tenders received, all of which were accepted as being economic when compared to tenders received in the main tender. A total of 39MW was received, with 30MW being committed and the remaining 9MW as flexible.

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 TR30: 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