STOR Market Information Report TR29

Original Published 18th July 2016.

Foreword

Welcome to the TR29 Market Information Report.

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 some 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.

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

As was highlighted at the Ops Forum at the end of June, for the week commencing 9th May, there was ~400MW of committed plant unavailable, roughly 20% of contracted volume. We have contacted providers to make them aware of their obligations under STOR, and that unavailability is only allowable for technical reasons. We are always monitoring the performance of contracted units and since the previous MIR; we have terminated 30 committed contracts across years 10 and 11. We encourage providers to confirm they are capable of fulfilling their tendered volumes to avoid terminations; in particular the STOR Runway service was developed to provide a growth platform for volume and is assessed in exactly the same way as the normal STOR market. Going forward, we will continue to monitor performance, and where necessary, will use termination history in assessing the value of a contract.

It is now close to the OCP process, and as such we are continuing to review the current STOR service and to those that have been involved; we thank you for your input. The intention is for the service to create the correct incentive for providers while offering the National Grid control room greater certainty over the volume they have at their disposal. If you do have any further comments please contact the STOR team.

As always we welcome any comments you may have on how we can provide further information to help you assess the market.

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 29 (TR29). 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

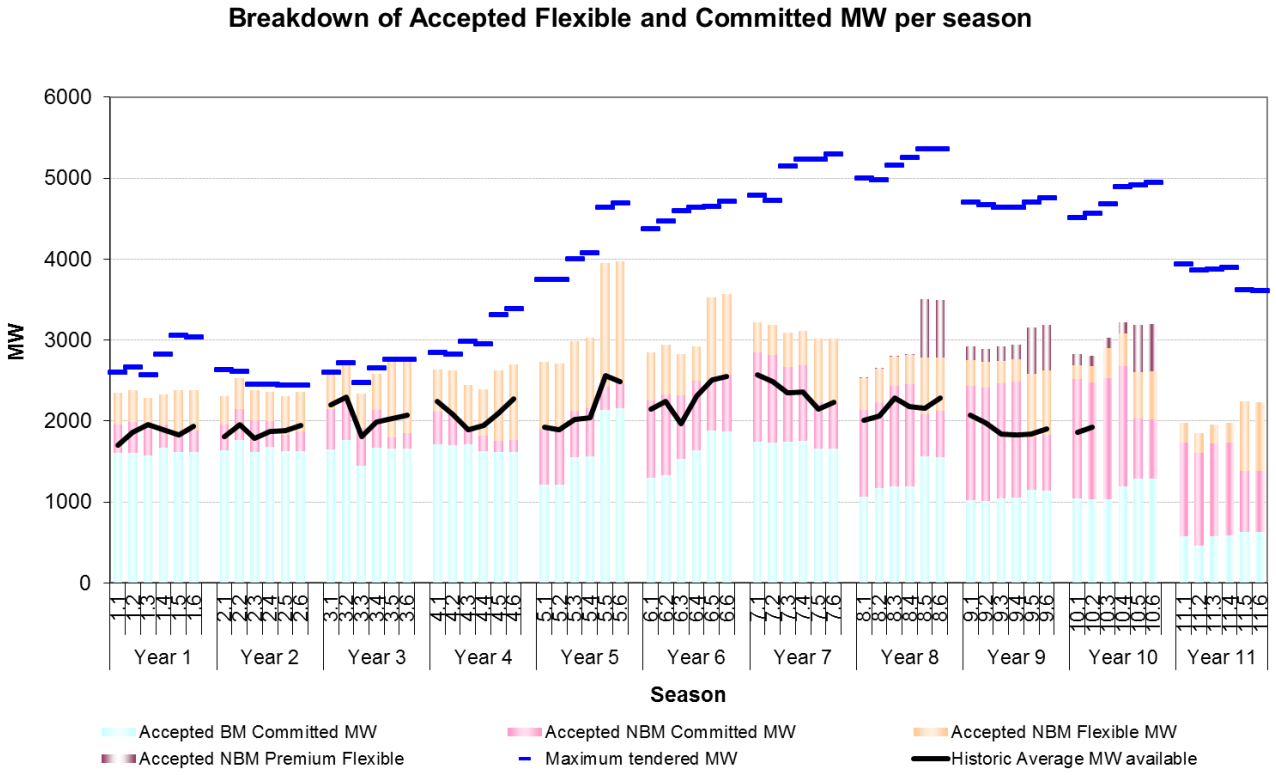
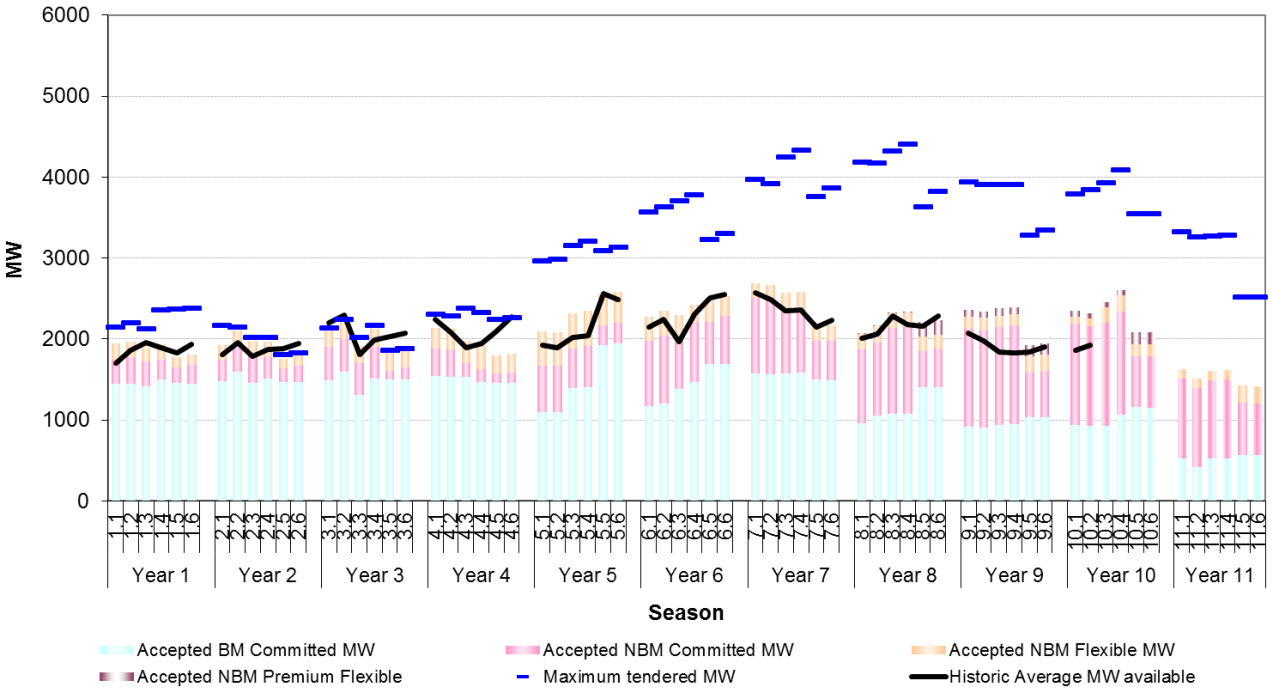


Figure 2



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 29 Tenders						STOR Runway TR29 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	-	Total	De-rated Total
10.1	0	0	0	0	0	**0**	-	-	-	-	-	**2739**	**2274**
10.2	0	0	0	0	0	**0**	-	-	-	-	-	**2746**	**2269**
10.3	80	103	266	28	477	**307**	-	-	-	-	-	**2588**	**2179**
10.4	80	161	290	82	613	**395**	-	-	-	-	-	**2698**	**2275**
10.5	739	60	170	8	977	**761**	-	-	-	-	-	**2816**	**1889**
10.6	739	60	210	8	1017	**771**	-	-	-	-	-	**2790**	**1879**
11.1	1338	469	0	139	1946	**1672**	-	-	-	-	-	**1009**	**816**
11.2	1214	421	0	140	1775	**1520**	-	-	-	-	-	**1225**	**1012**
11.3	1331	433	0	124	1888	**1628**	-	-	-	-	-	**1233**	**1014**
11.4	1339	436	0	124	1899	**1638**	-	-	-	-	-	**1241**	**1020**
11.5	1048	70	90	407	1615	**1127**	-	-	-	-	-	**1276**	**883**
11.6	1042	70	90	407	1609	**1122**	-	-	-	-	-	**1276**	**883**

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

	TR 29 Tenders Accepted						STOR Runway TR29 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	87	266	28	**381**	**221**	-	-	-	-	-	
10.4	0	141	282	43	**466**	**282**	-	-	-	-	-	
10.5	50	44	178	0	**272**	**127**	-	-	-	-	-	**300**
10.6	50	44	218	0	**312**	**137**	-	-	-	-	-	**300**
11.1	356	248	124	0	**728**	**593**	-	-	-	-	-	**700**
11.2	234	246	125	0	**605**	**482**	-	-	-	-	-	**700**
11.3	351	246	109	0	**706**	**580**	-	-	-	-	-	**700**
11.4	357	248	109	0	**714**	**587**	-	-	-	-	-	**700**
11.5	373	70	497	0	**940**	**519**	-	-	-	-	-	**900**
11.6	367	70	497	0	**934**	**514**	-	-	-	-	-	**900**

Successful Tenders in TR29

Year 10 (2016/17)

TR29 is the final opportunity for seasons 10.3 and 10.4, 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 ~260MW 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 sufficient committed volume has been tendered to meet the optimal requirement although the majority of the volume is at very high prices. With one further tender round remaining, we have accepted sufficient tenders to meet the minimum 1800MW requirement. 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)

The majority of rejected volume from TR28 re-tendered in this tender round with reduced prices, along with ~400MW of additional capability not tendered in TR28. Of the 1900-1600MW tendered ~1300MW had all or nothing restrictions specified on part of the seasons (the majority are season 1-6 although there are some that were season 1-4). 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 TR28.

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

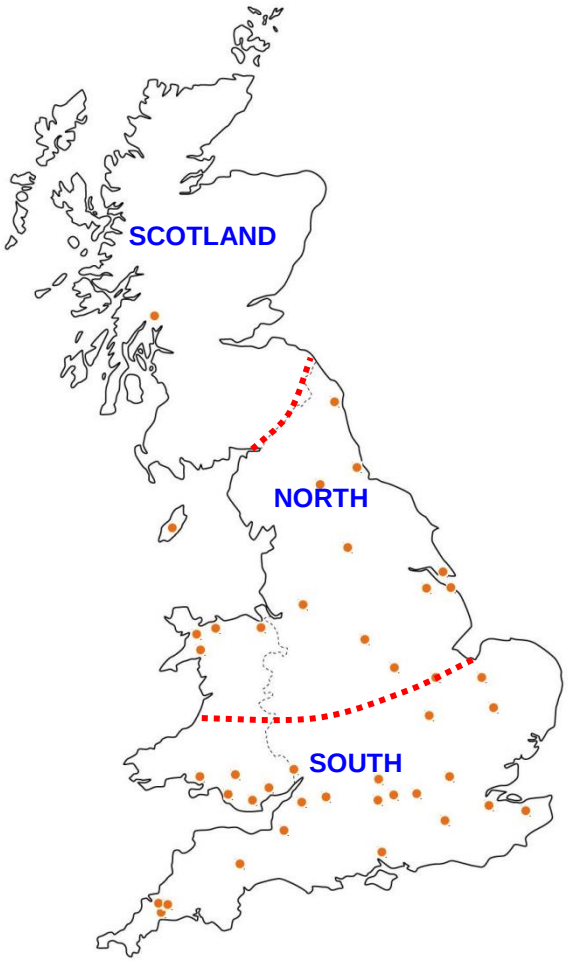
Expectations for TR30

This section is a new addition to the report and is designed to clarify our intentions in the next tender round, including requirement remaining and likely strategy.

- **10.5 and 10.6** we are looking to procure a further 300-600MW of committed units. If the prices are higher than our forecast of the cost of creating margin in the balancing mechanism this winter we will not accept this volume. PF units will continue to be forecast at 0% availability and will not be accepted. Flexible units will be accepted up to committed prices but levels will be managed at week ahead and any excess capability will be rejected.
- **11.1 to 11.4** accept between ~1/3 to 1/2 of the remaining requirement (~300-500MW) from committed or flexible tenders, at prices in-line with those accepted in TR28 & 29. 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 ½ of the remaining requirement (~500MW of tenders) from committed units 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	-	-	-	-
10.6	-	-	-	-
11.1	2	-	65	-
11.2	2	-	65	-
11.3	2	-	65	-
11.4	2	-	65	-
11.5	2	-	65	-
11.6	2	-	65	-

NORTH	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	-	-	-	-
10.2	-	-	-	-
10.3	5	2	74	28
10.4	10	6	98	44
10.5	10	3	547	42
10.6	10	3	547	42
11.1	12	2	628	44
11.2	12	2	627	43
11.3	12	2	627	43
11.4	12	2	628	44
11.5	13	10	693	283
11.6	13	10	693	283

SOUTH	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	-	-	-	-
10.2	-	-	-	-
10.3	38	36	399	349
10.4	42	38	496	403
10.5	19	13	356	156
10.6	21	15	396	196
11.1	31	14	1,012	523
11.2	30	14	842	401
11.3	31	13	967	514
11.4	31	13	977	521
11.5	17	11	823	623
11.6	17	11	817	617

MULTIPLE LOCATIONS (Aggregated sites)

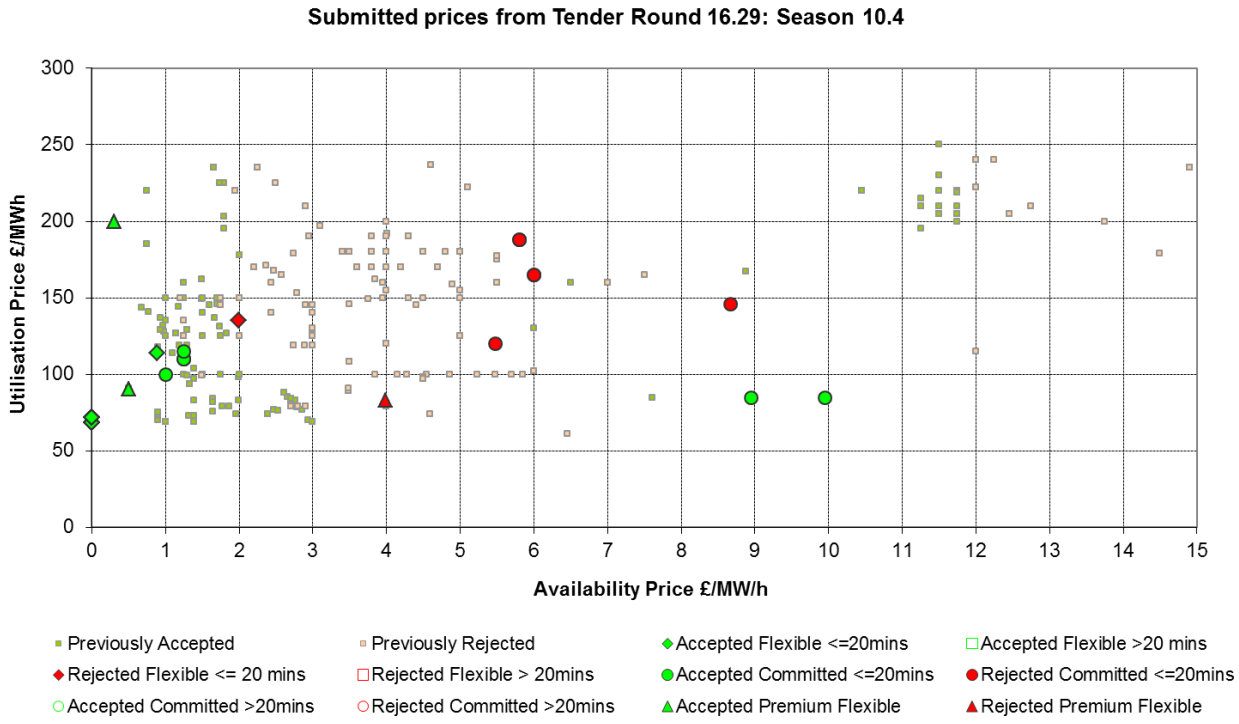
MULTIPLE	Units tendered	Units Accepted	MW tendered	MW Accepted
10.1	-	-	-	-
10.2	-	-	-	-
10.3	1	1	4	4
10.4	3	3	19	19
10.5	9	9	74	74
10.6	9	9	74	74

MULTIPLE	Units tendered	Units Accepted	MW tendered	MW Accepted
11.1	34	20	241	161
11.2	34	20	241	161
11.3	32	18	229	149
11.4	32	18	229	149
11.5	4	4	34	34
11.6	4	4	34	34

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



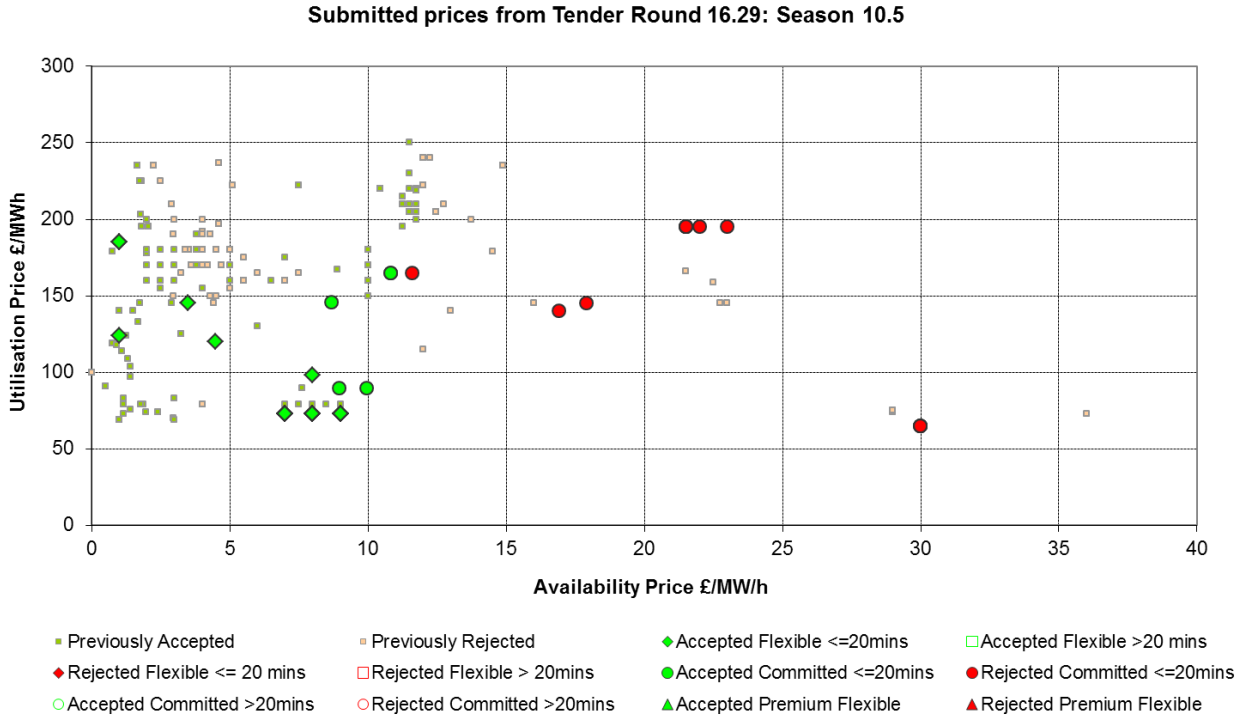
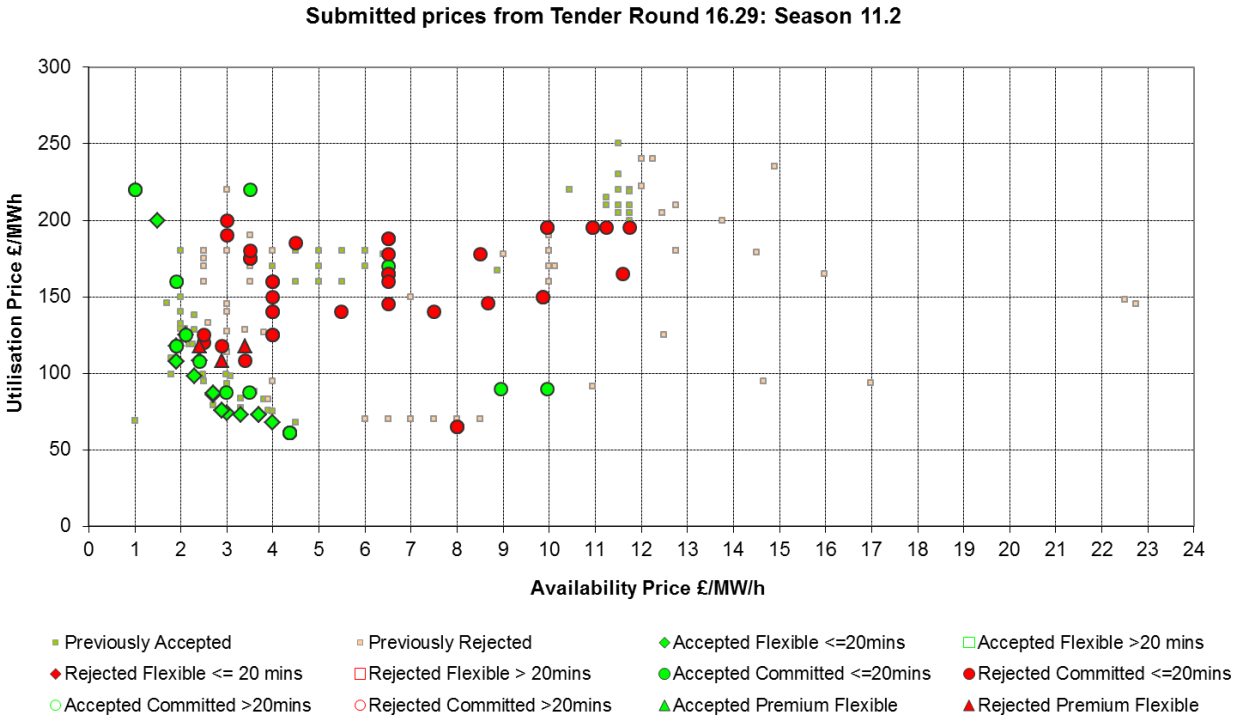
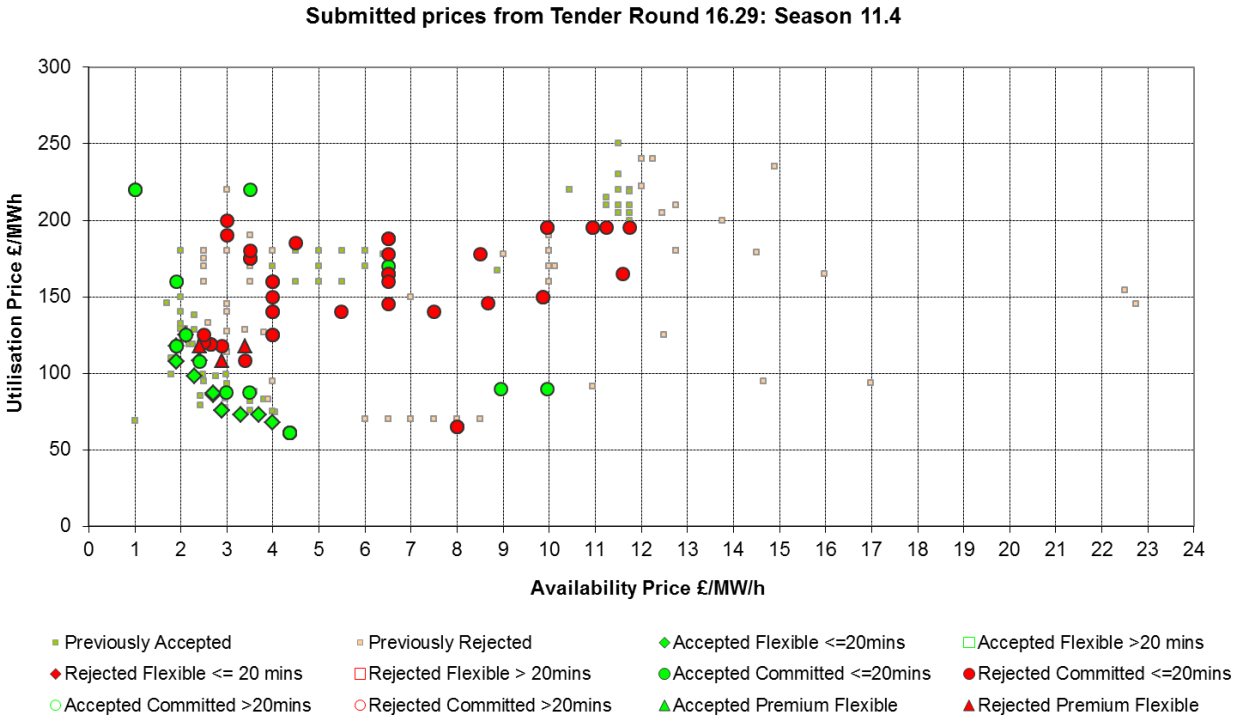


Figure 5 Year 11 Availability and Utilisation price charts





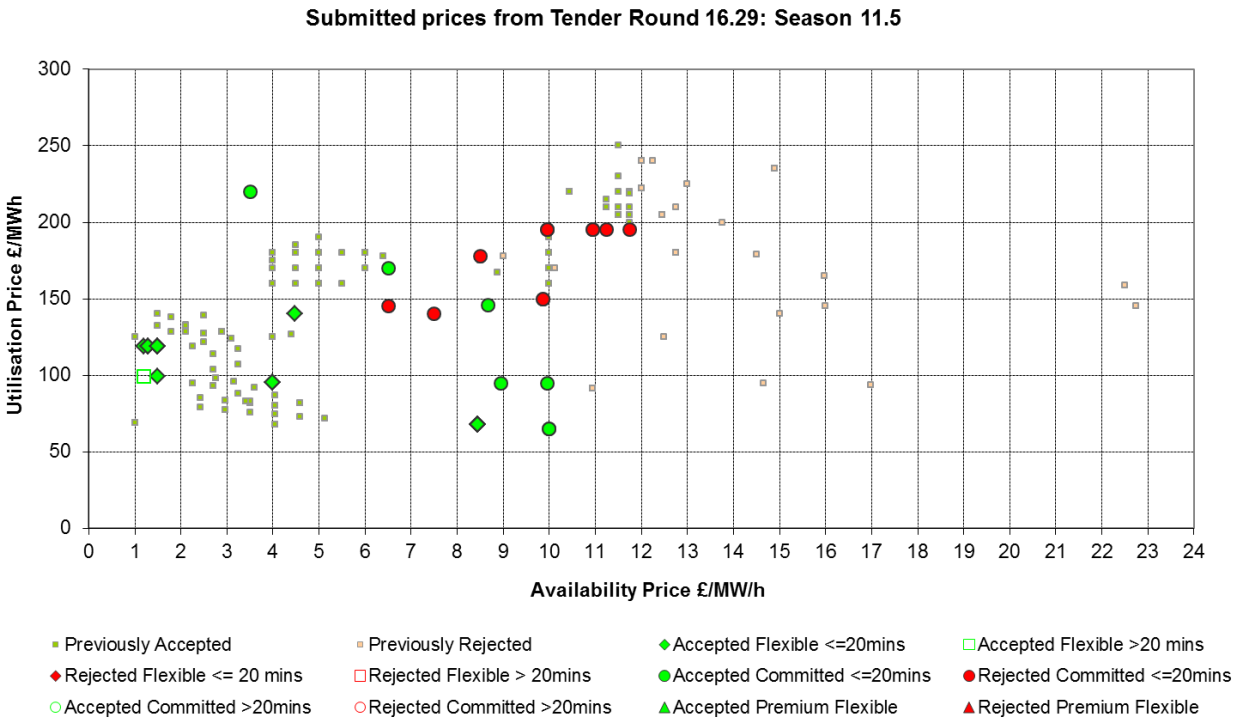


Table 3 below presents a summary of the highest accepted availability price for Committed and Flexible units with Premium Flexible tenders listed separately. The table also presents the highest and lowest Utilisation price accepted for each season as a guide. This is intended to display the difference 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
10.3	1.25	9.95	0.50	114.00	68.50
10.4	1.25	9.95	0.50	200.00	68.50
10.5	10.80	9.95	-	185.00	72..9
10.6	10.80	9.95	-	185.00	72.00
11.1	4.36	9.95	-	220.00	60.85
11.2	4.36	9.95	-	220.00	60..85
11.3	4.36	9.95	-	220.00	60.85
11.4	4.36	9.95	-	220.00	60.85
11.5	10.00	9.95	-	220.00	64.98
11.6	10.00	9.95	-	220.00	64.98

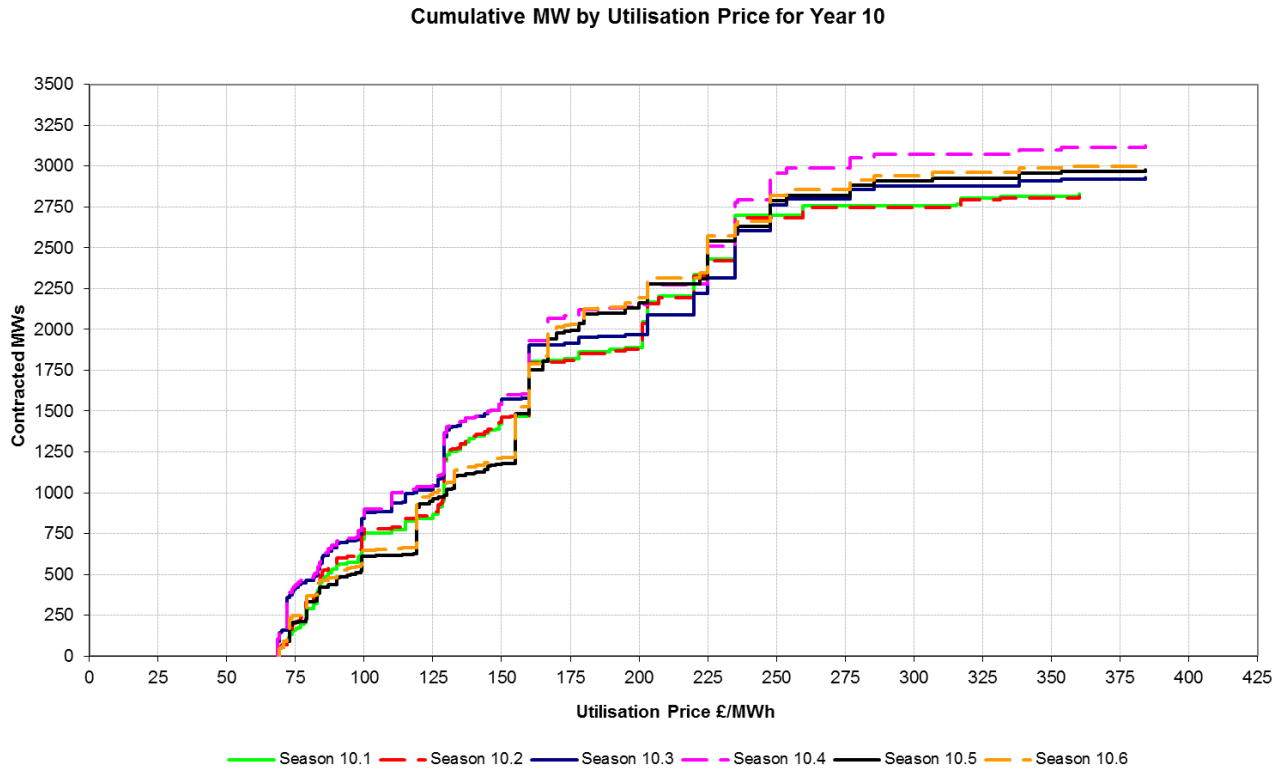
Figures 6 below shows the detail of all or nothing tenders. For simplicity multiple tenders of the same price are removed from the following charts. Also tenders which included PF as part of the all or nothing offer for winter are not displayed. Tenders that were accepted are colour green and rejected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



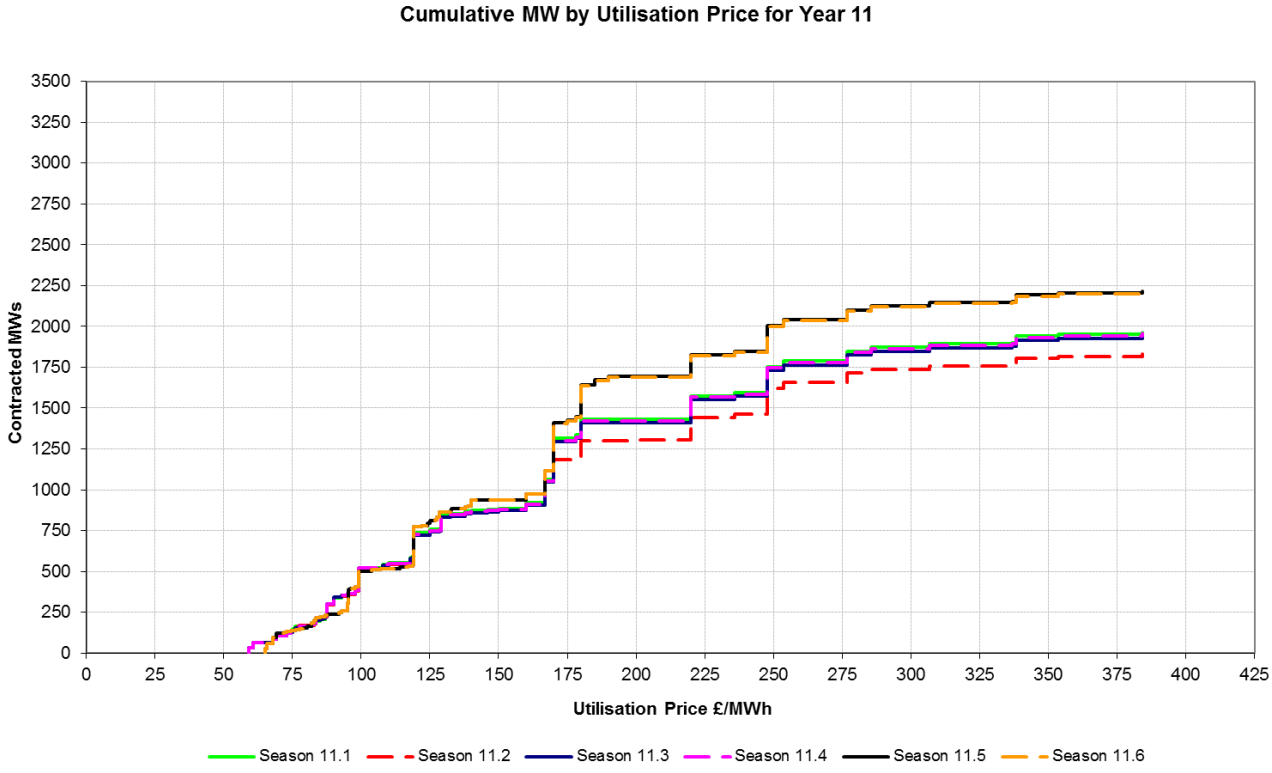
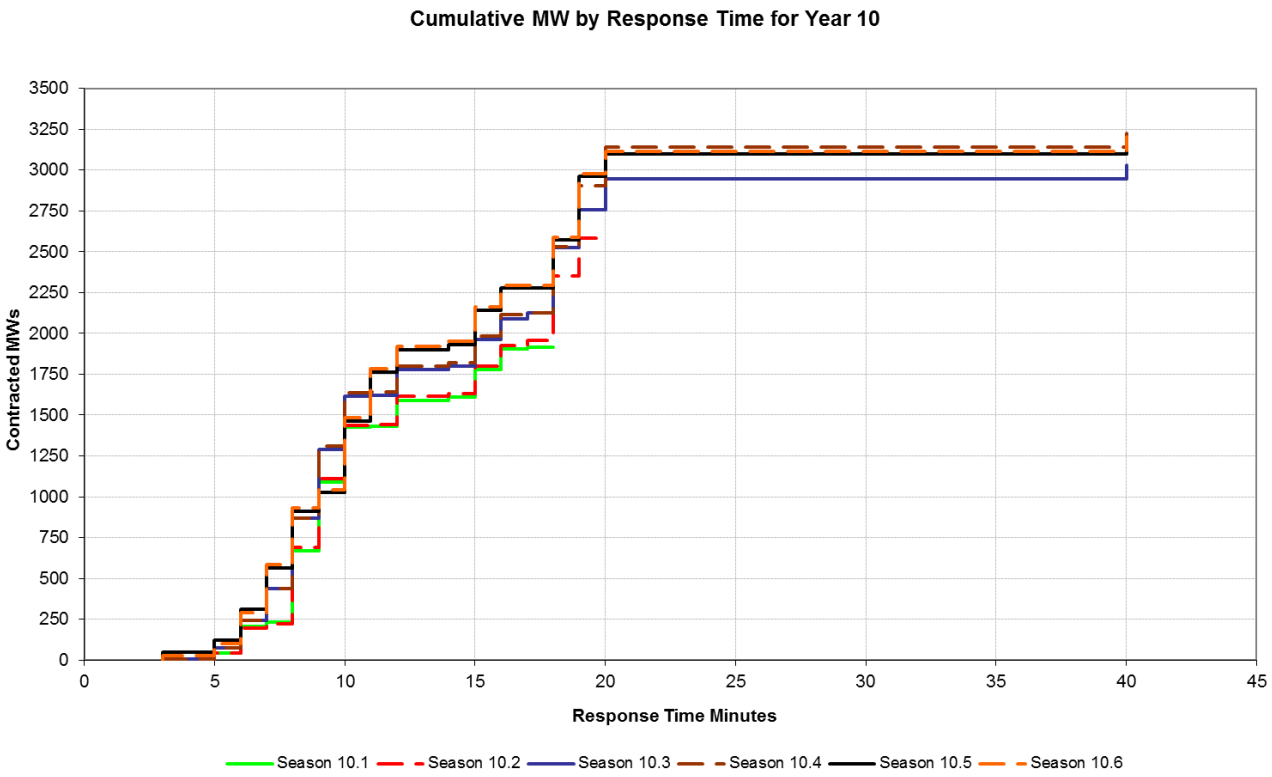
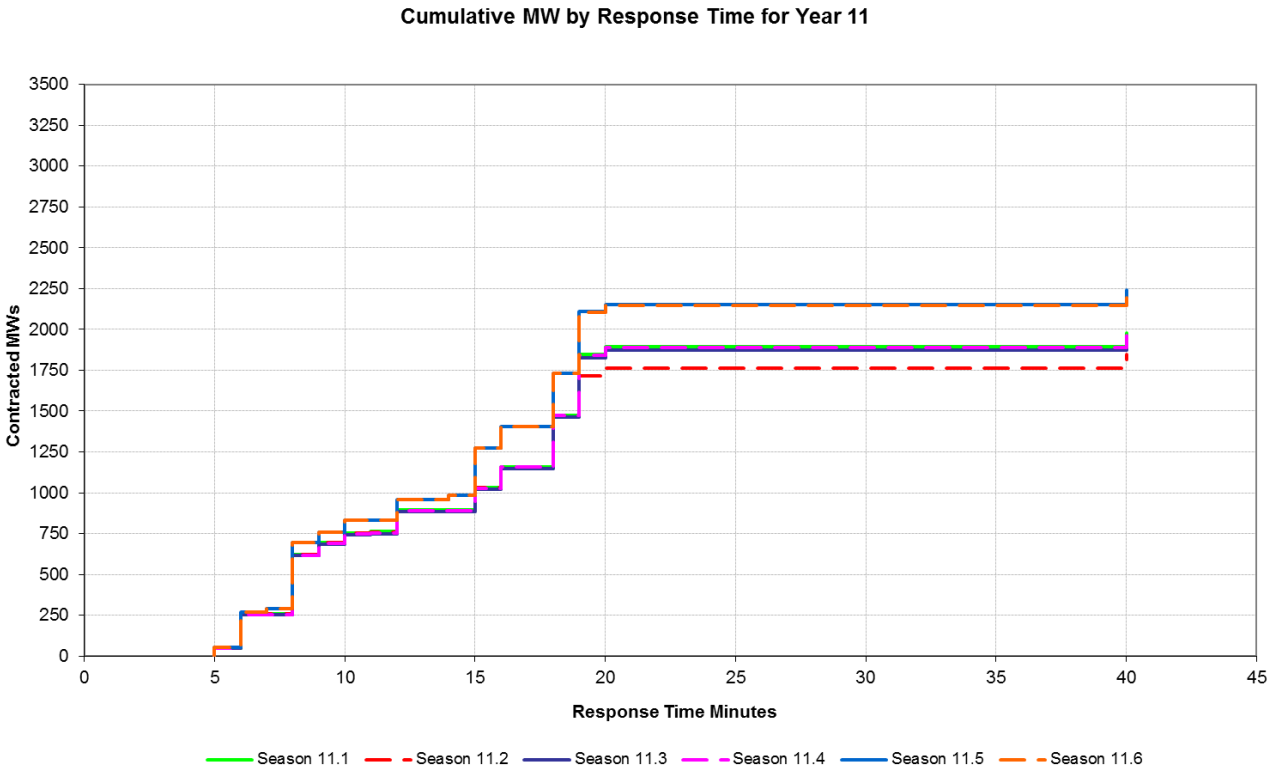


Figure 8a illustrates that for seasons 10.1 and 10.2 approximately 1450MW of STOR is contracted with a response time of 10 minutes or less.

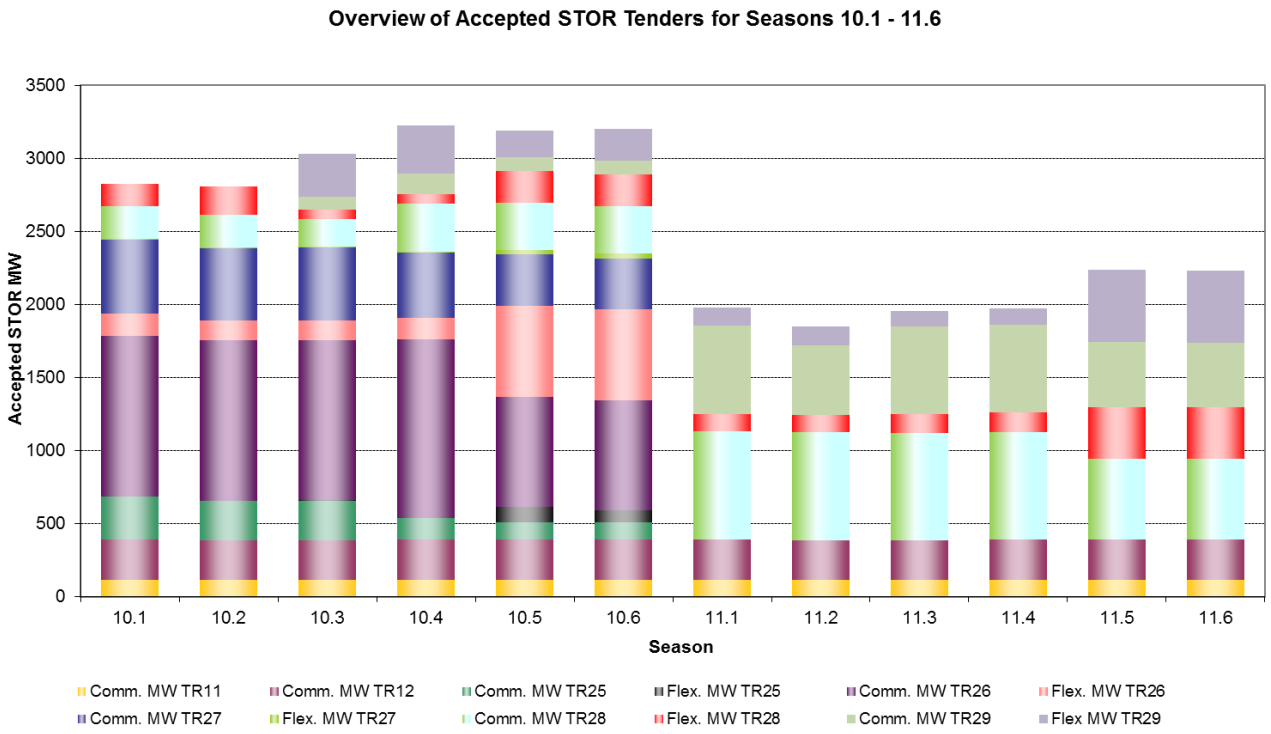




Total Contracted Position

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	148	226	194	187	65	330	65	323	220	323	220
	TR29					87	294	141	325	94	178	94	218
	Total	2515	308	2473	337	2527	502	2677	547	2030	1158	2024	1178

	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
	Total	1739	242	1608	240	1718	239	1731	242	1385	855	1379	855

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.

Since the previous MIR, a total of 30 committed contracts across years 10 and 11 were terminated. Providers are encouraged to consider whether they are capable of fulfilling their volume when tendering in.

Terminations: 38MW Committed for 10.2-10.4. 109MW Committed for 10.5-10.6. 18MW Committed 11.1-11.4. 24MW Committed for 11.5-11.6

STOR Runway Tender details

In TR29 there were no STOR runway tenders received.

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