STOR Market Information Report TR27

Original Published 2nd October 2015. Update published 30th October 2015 minor volume corrections

Foreword

Welcome to the TR27 Market Information Report. It was good to get feedback on the re-formatted report we launched for TR26, and as such we have continued with the same look and feel.

In the last report we talked a lot about the changes in the STOR market, and in particular the shift in committed STOR levels over the winter period as Non-Balancing Mechanism (NBM) STOR providers pursue other revenue streams. This brings significant challenge to National Grid as we look to hold a strong level of Operating Reserve at a price which still benefits consumers over the alternative actions available. Our forecasting teams are continually reviewing these requirements, and particularly in comparison against Triad periods, to ensure that we have a clear view on the secure and economic management of the electricity transmission system.

Previously, we made reference to the difficulty we face in meeting the requirement during winter peaks, when large volumes of Flexible STOR are unavailable to National Grid. We stated our desire to contract sufficient committed volumes during winter and subsequently the greater value we placed on this. The market responded to this, although not in the way we had intended, by lowering prices for the Premium Flexible service. As you will see in this report, we have re-iterated our previous pricing signal by accepting all units for the winter seasons to secure committed volume including some prices much higher than in non-winter seasons.

We would also like to make comment on the submission of all-or-nothing tenders. In assessing these tenders we consider the total cost and total benefit across all seasons tendered for, which may result in a tender being accepted at prices higher than other tenders for some seasons because of the extra value it provides during the winter season. This has resulted in us accepting a year-long tender with availability of £6.50/MW, and hopefully further enforces that good prices are there for volume which is able to be committed all year.

It is an exciting time to be involved in balancing services – and as always we look forward to your thoughts and ideas on how we continue to develop the way we work together.

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 27 (TR27). 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

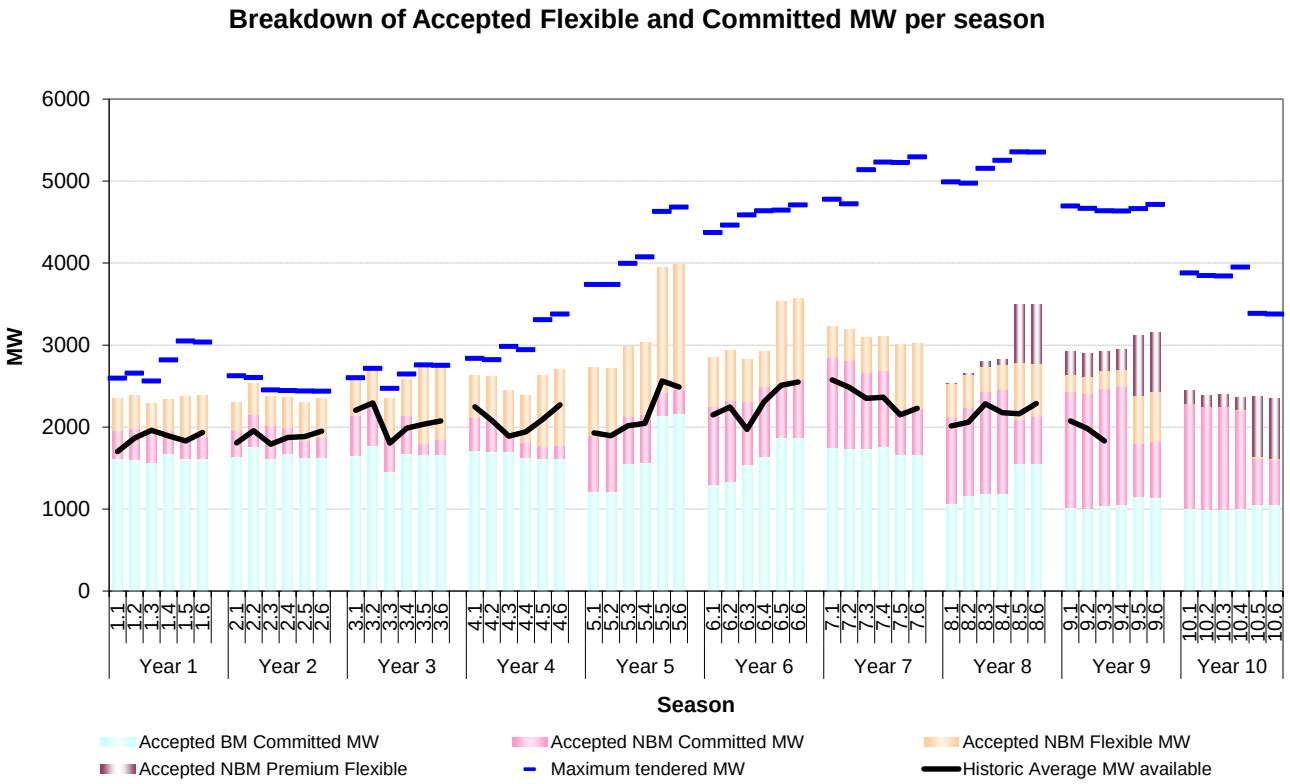
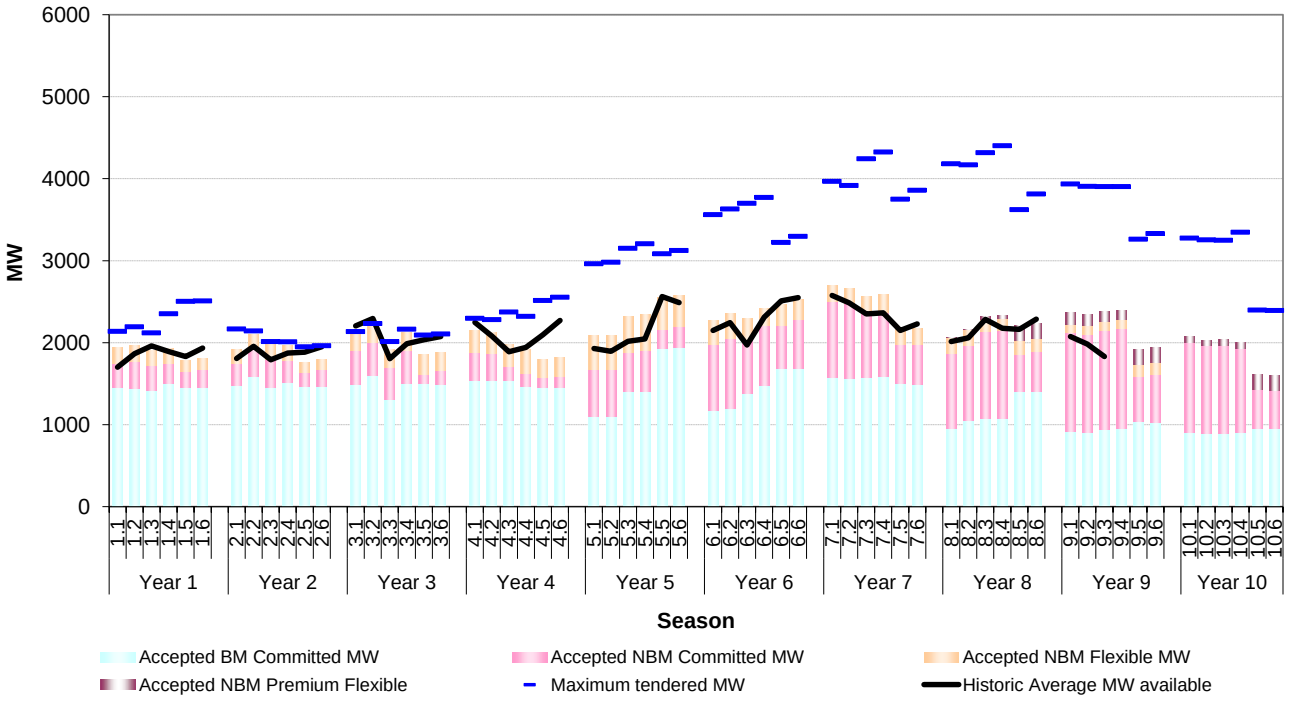


Figure 2



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 27 Tenders						STOR Runway TR3 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
9.5	40	5	312	52	**409**	**131**	7	0	3	10	**7**	**2705**	**1785**
9.6	40	5	325	52	**422**	**135**	36	0	6	42	**32**	**2733**	**1807**
10.1	632	436	0	5	**1073**	**942**	36	0	6	42	**34**	**1936**	**1591**
10.2	622	459	0	5	**1086**	**952**	36	0	6	42	**34**	**1888**	**1560**
10.3	627	440	0	5	**1072**	**941**	36	0	6	42	**34**	**1889**	**1561**
10.4	627	396	0	5	**1028**	**903**	36	0	6	42	**34**	**1908**	**1570**
10.5	270	82	0	36	**388**	**322**	36	0	6	42	**32**	**1990**	**1294**
10.6	265	82	0	36	**383**	**317**	36	0	6	42	**32**	**1969**	**1288**

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

	TR 27 Tenders Accepted						STOR Runway TR3 tenders Accepted					Remaining Requirement
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
9.5	40	5	312	52	**409**	**131**	4	0	0	4	**3**	
9.6	40	5	325	52	**422**	**135**	30	0	0	30	**26**	
10.1	230	278	0	5	**513**	**446**	30	0	0	30	**26**	**200**
10.2	220	277	0	5	**502**	**436**	30	0	0	30	**26**	**200**
10.3	225	277	0	5	**507**	**440**	30	0	0	30	**26**	**300**
10.4	225	225	0	5	**455**	**396**	30	0	0	30	**26**	**300**
10.5	270	82	5	31	**388**	**322**	30	0	0	30	**26**	**700**
10.6	265	82	5	31	**383**	**317**	30	0	0	30	**26**	**700**

Successful Tenders in TR27

Year 9 (2015/16)

TR27 was the final opportunity for seasons 9.5 and 9.6, in the TR26 Market Information Report we highlighted our concern regarding the low volumes tendered for the winter seasons particularly from Committed units. In TR26 this resulted in accepting all committed units. As can be seen from the tendered volumes in TR27 there was still insufficient committed volumes tendered such that even when accepting all tenders the predicted available volume is only just at the minimum level. As can be seen in the scatterplots below the market response to TR26 feedback was to drop the price of Premium Flexible units rather than any additional committed units being made available.

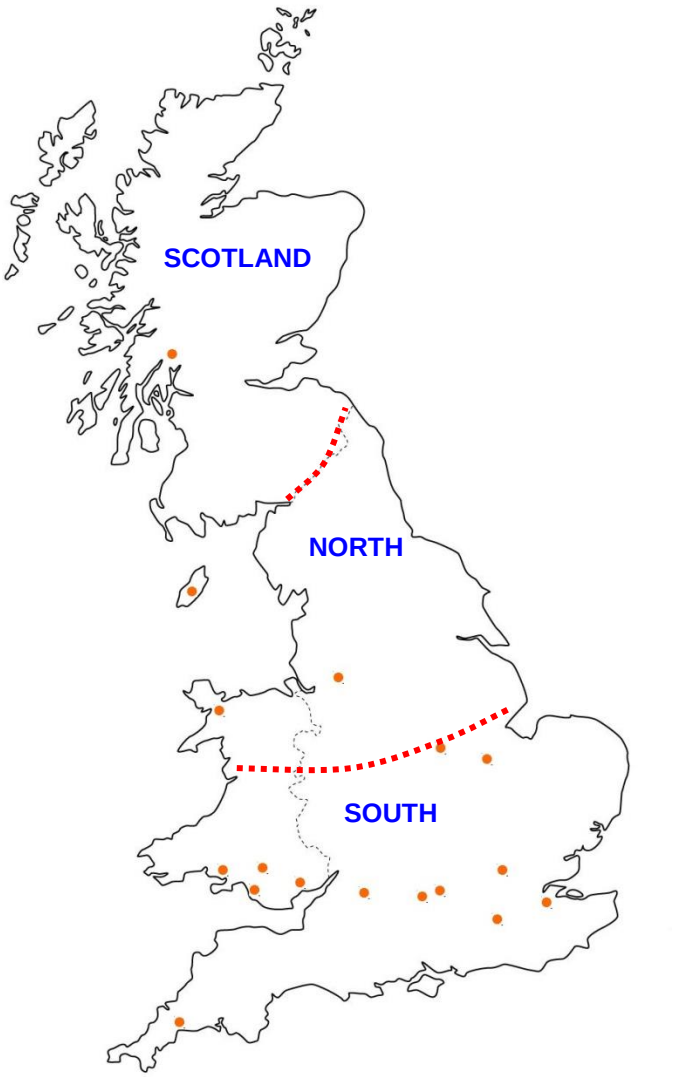
Year 10 (2016/17)

Once again the trend for year 10 is very similar to that seen in TR26 and to the trend seen for year 9 over the past few tender rounds. For seasons 1-4 of year 10 sufficient volume was received to more than meet the optimal requirement, almost exclusively from committed units. However as with year 9 the volume tendered for seasons 5 and 6 would still leave a significant requirement outstanding. The only significant volume of committed tenders for season 5 and 6 were from an all or nothing tender (a tender across seasons 1-6 that cannot be accepted for just part of the tendered seasons). Given the low volumes tendered and the situation faced for year 9 all tenders for season 10.5 and 10.6 were accepted, including the all or nothing tender. This appears as more expensive than some tenders rejected for seasons 1-4 however it is the additional benefit that this tender delivers in the winter seasons that offsets the higher price during seasons 1-4.

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
9.1	-	-	-	-
9.2	-	-	-	-
9.3	-	-	-	-
9.4	-	-	-	-
9.5	1	1	40	40
9.6	1	1	40	40
10.1	3	-	72	-
10.2	3	-	72	-
10.3	3	-	72	-
10.4	3	-	72	-
10.5	-	-	-	-
10.6	-	-	-	-

NORTH	Units tendered	Units Accepted	MW tendered	MW Accepted
9.1	-	-	-	-
9.2	-	-	-	-
9.3	-	-	-	-
9.4	-	-	-	-
9.5	7	7	56	56
9.6	6	6	53	53
10.1	8	4	385	31
10.2	8	4	377	31
10.3	8	4	377	31
10.4	8	4	385	31
10.5	5	5	60	60
10.6	5	5	60	60

SOUTH	Units tendered	Units Accepted	MW tendered	MW Accepted
9.1	-	-	-	-
9.2	-	-	-	-
9.3	-	-	-	-
9.4	-	-	-	-
9.5	22	22	232	232
9.6	26	26	248	248
10.1	24	8	433	343
10.2	32	8	454	332
10.3	29	8	440	337
10.4	27	6	388	285
10.5	3	3	252	252
10.6	3	3	247	247

MULTIPLE LOCATIONS (Aggregated sites)

MULTIPLE	Units tendered	Units Accepted	MW tendered	MW Accepted
9.1	-	-	-	-
9.2	-	-	-	-
9.3	-	-	-	-
9.4	-	-	-	-
9.5	11	11	81	81
9.6	11	11	81	81
10.1	32	24	183	139
10.2	32	24	183	139
10.3	32	24	183	139
10.4	32	24	183	139
10.5	14	14	76	76
10.6	14	14	76	76

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 9 Availability and Utilisation price charts

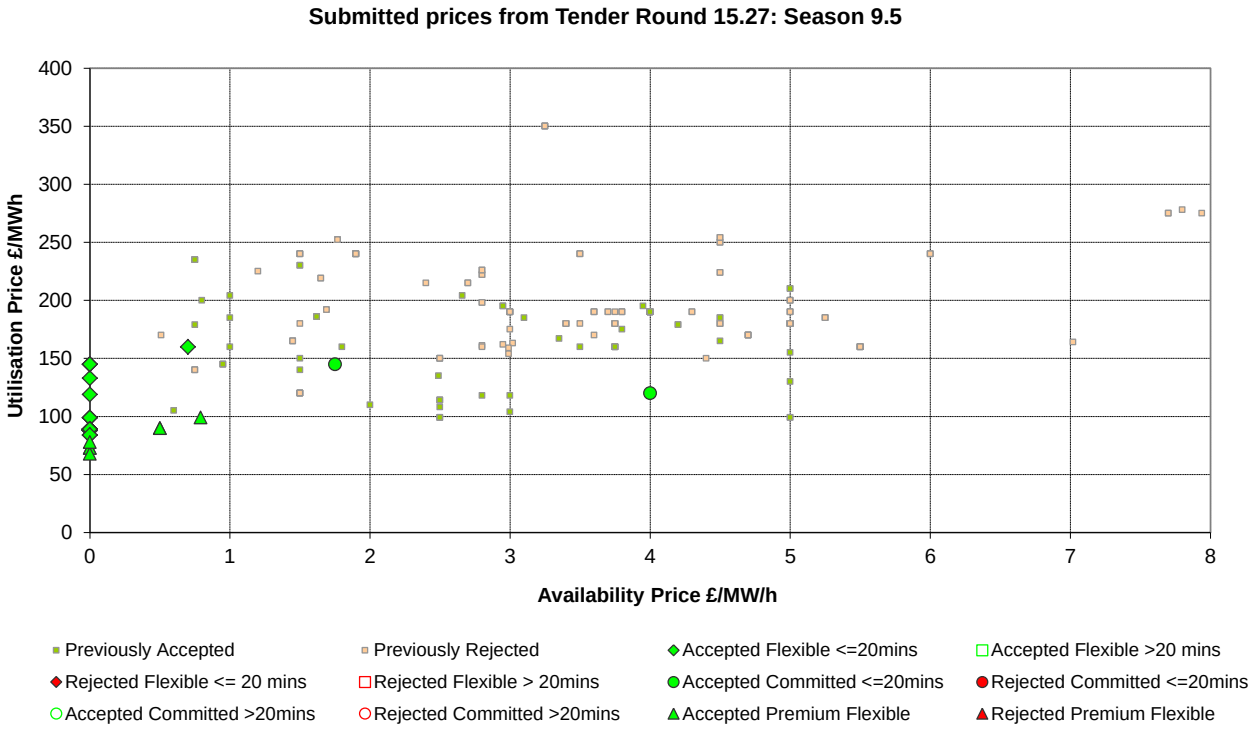
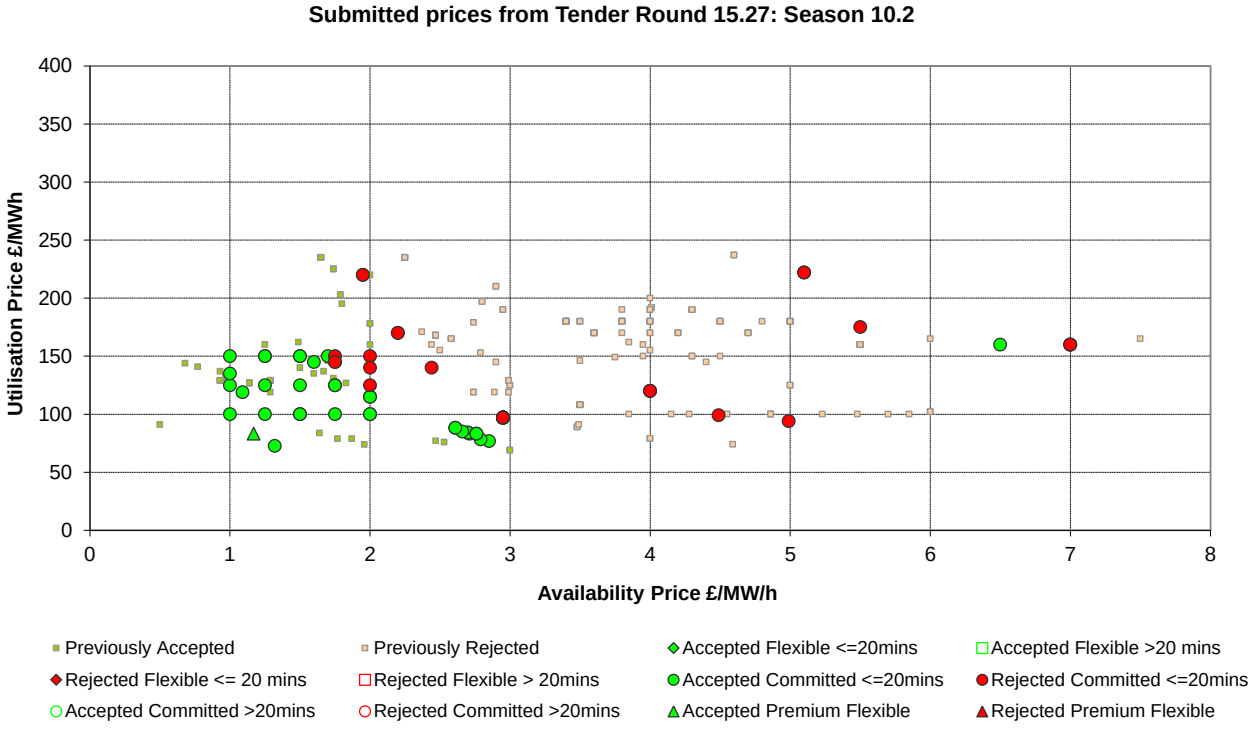
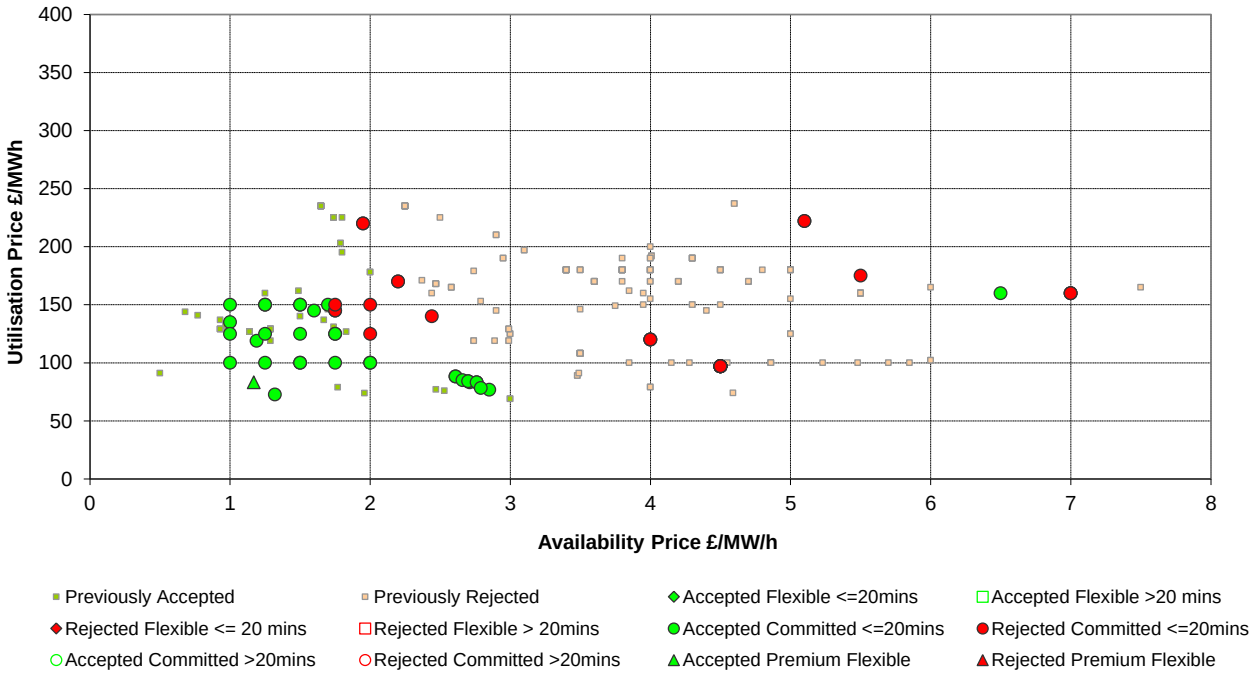


Figure 5 Year 10 Availability and Utilisation price charts



Submitted prices from Tender Round 15.27: Season 10.4



Submitted prices from Tender Round 15.27: Season 10.5

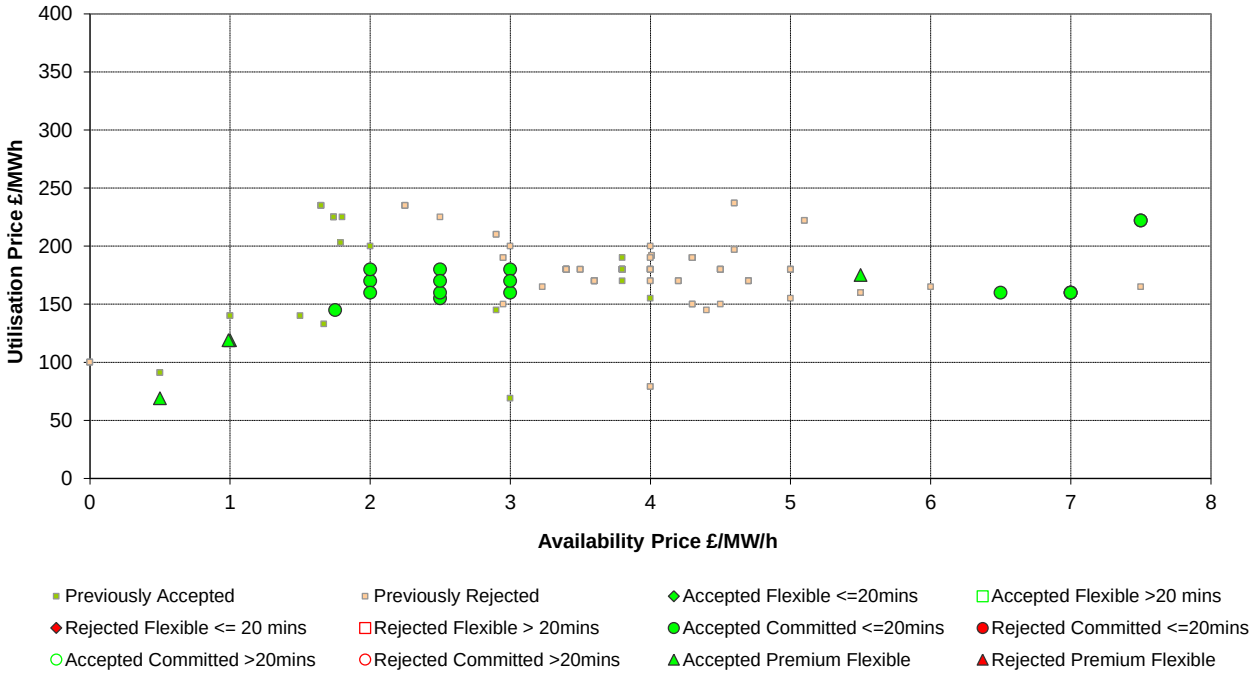


Table 3 below presents a summary of the marginal accepted availability prices for normal tenders and Premium Flexible tenders along with the highest and lowest Utilisation price accepted by season. This is intended to display the difference in value between Premium Flexible and normal tenders, although 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.

Table 3 Summary of accepted Prices

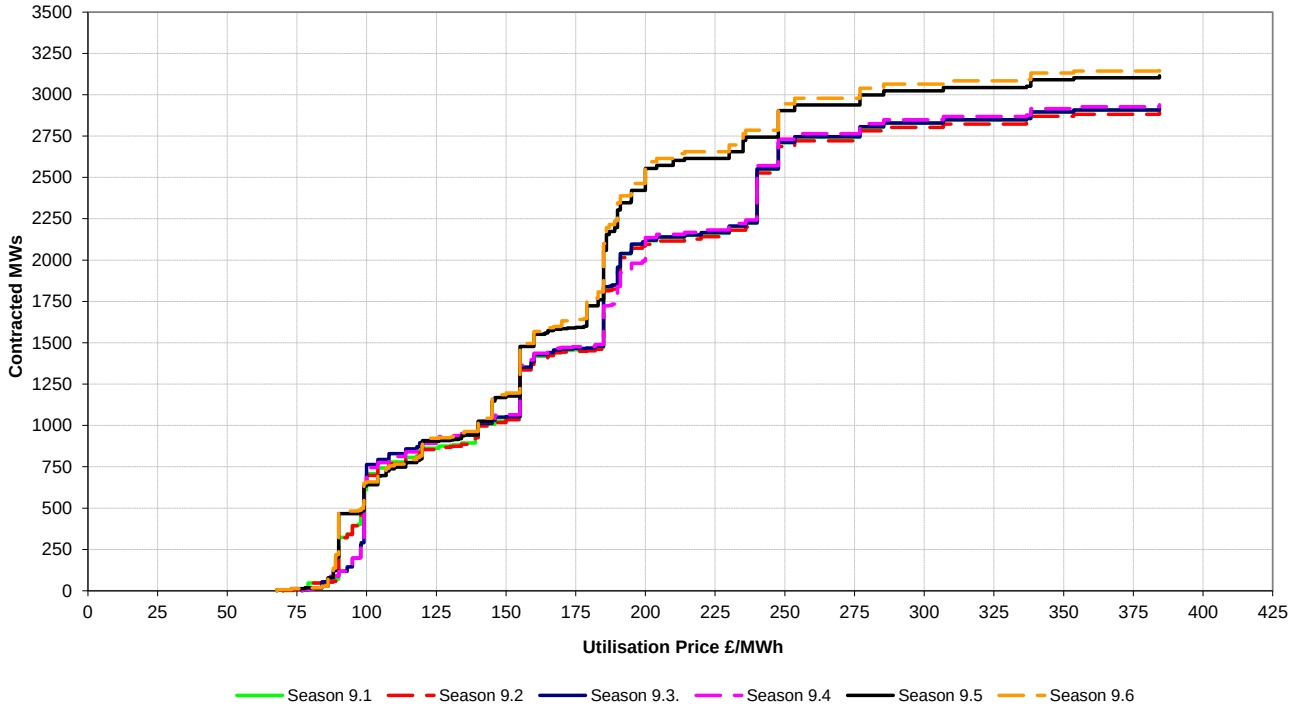
Season Number	Marginal Availability price accepted £/MW/h	Marginal PF availability price accepted £/MW/h	Highest Utilisation Price accepted £/MWh	Lowest Utilisation Price accepted £/MWh
9.5	4.00	0.79	160.00	67.77
9.6	4.00	0.79	145.00	67.77
10.1	6.50	1.17	235.00	72.75
10.2	6.50	1.17	235.00	72.75
10.3	6.50	1.17	235.00	72.75
10.4	6.50	1.17	235.00	72.75
10.5	7.50	1.64	235.00	69.00
10.6	7.50	1.64	235.00	69.00

Utilisation price and response time stacks

Figures 6 and 7 exhibit cumulative graphs. In these graphs the total accepted MW from previous tender rounds, up to and including the results from TR27, have been stacked according to two categories: **Figure 6a & 6b** is ranked according to utilisation price and **Figures 7a & 7b** 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 6a illustrates that for seasons 9.5 and 9.6 approximately 1200MW of STOR is contracted with a utilisation prices of £150/MWh or less.

Cumulative MW by Utilisation Price for Year 9



Cumulative MW by Utilisation Price for Year 10

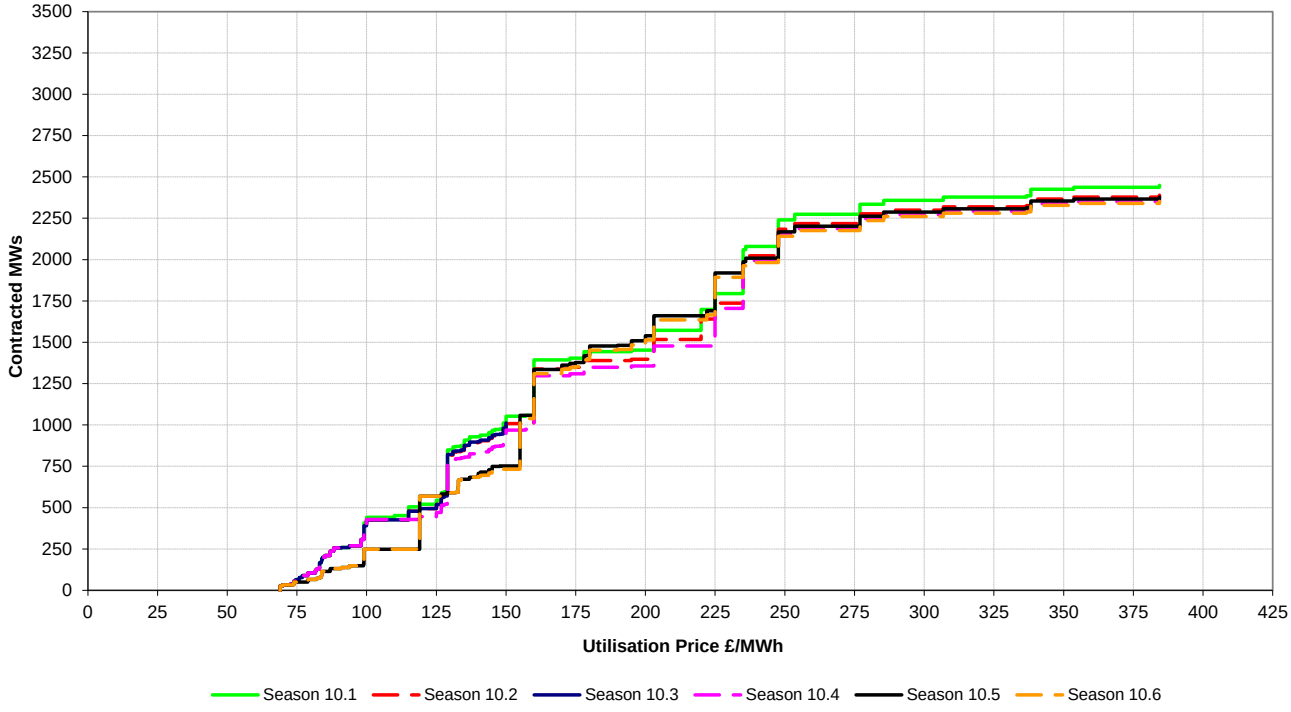
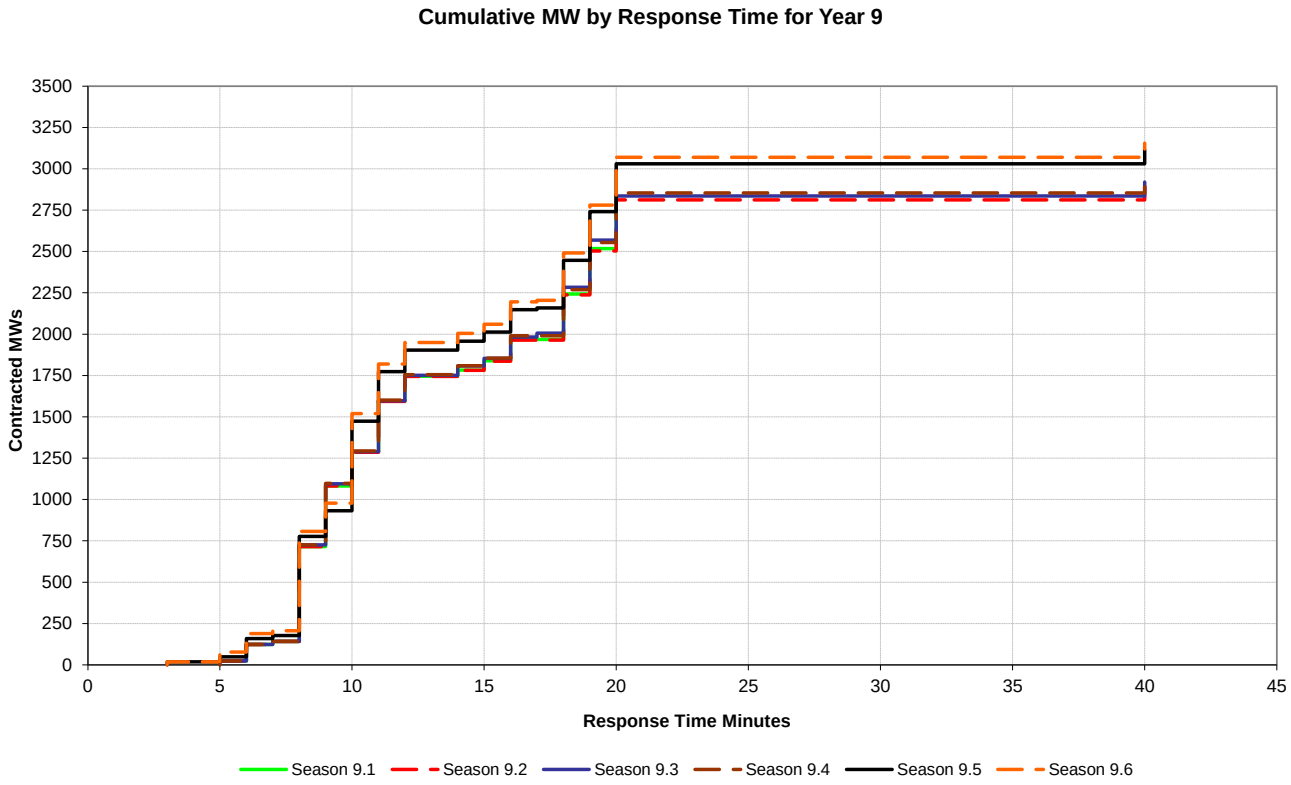
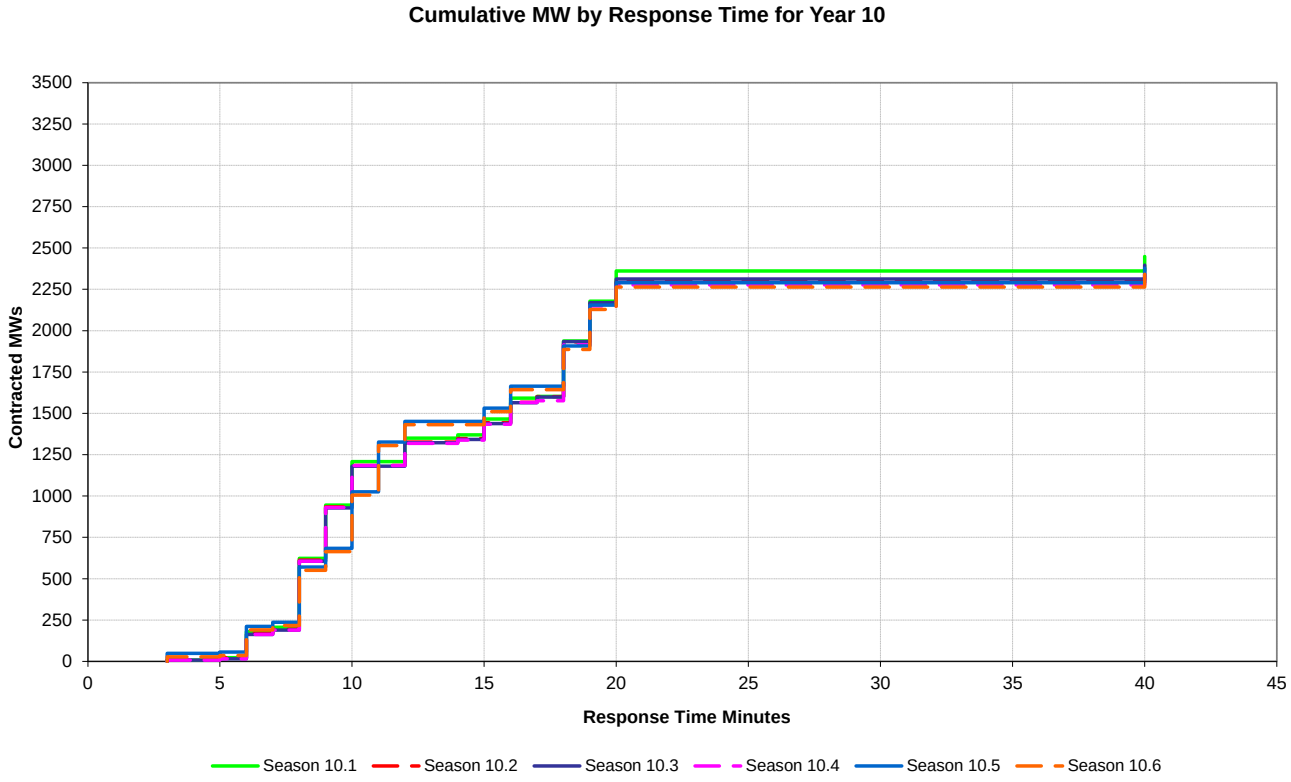


Figure 7a illustrates that for seasons 9.5 and 9.6 approximately 1500MW of STOR is contracted with a response time of 10 minutes or less.

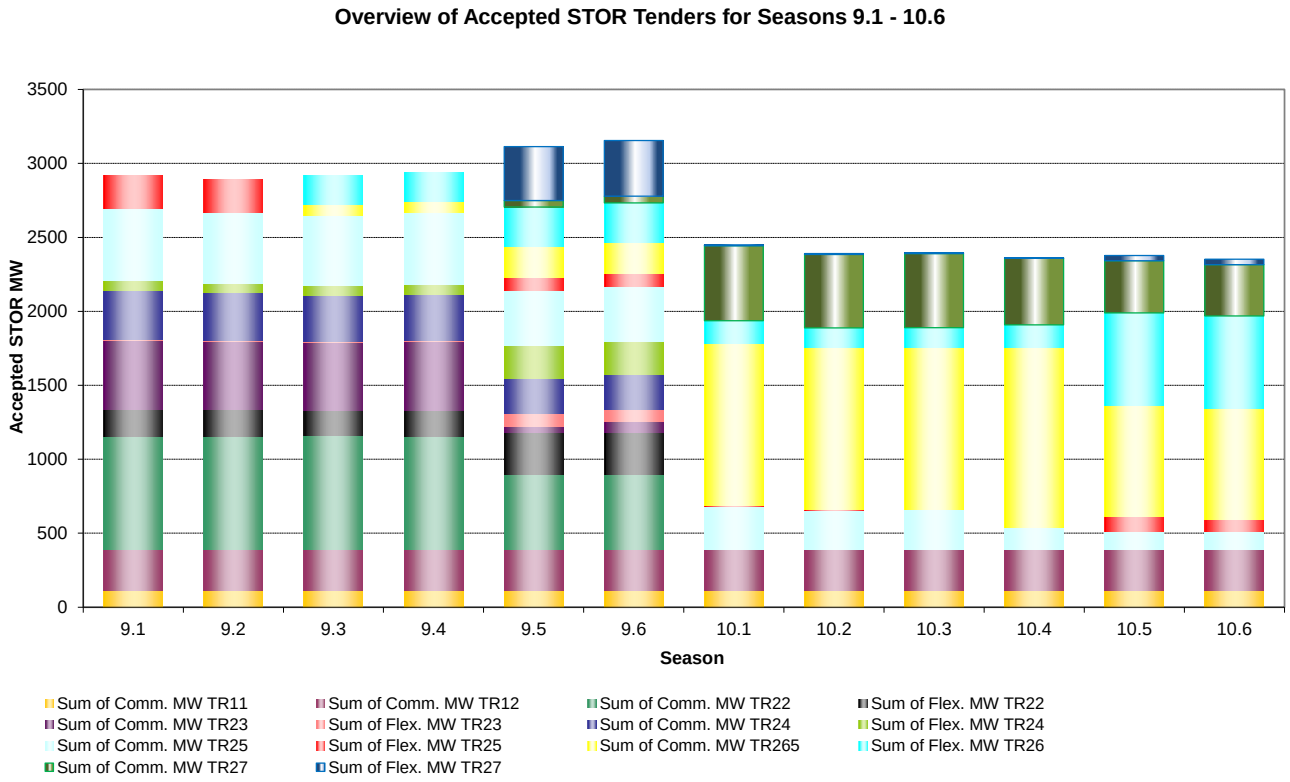




Total Contracted Position

Figure 8 shows the breakdown of accepted volumes from all previous tender rounds across the seasons of Years 9 and 10. The table accompanying Figure 7 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 8 Year 9 and 10 summaries by tender round



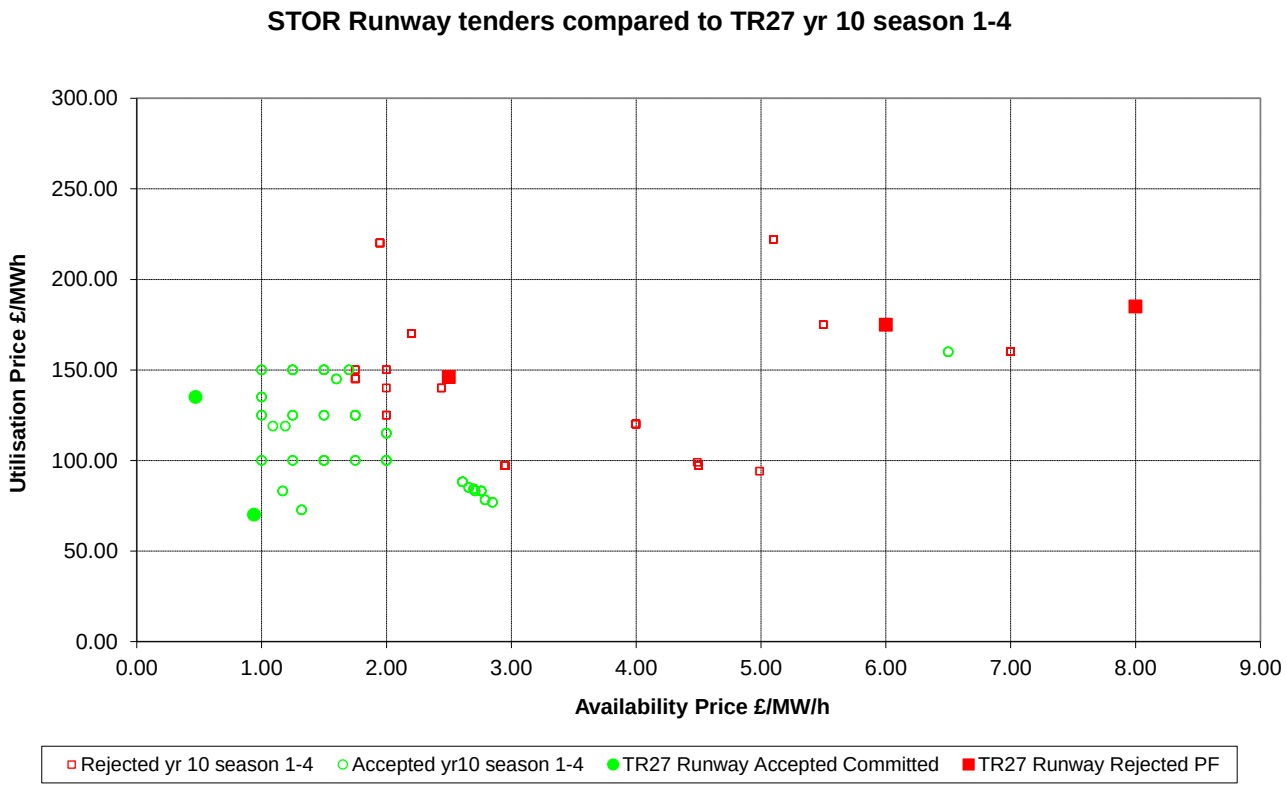
	Season	9.1		9.2		9.3		9.4		9.5		9.6	
	Service Type	C	F	C	F	C	F	C	F	C	F	C	F
Accepted MW	TR11 (LT)	116		116		116		116		116		116	
	TR12 (LT)	273		271		272		273		274		274	
	TR22	764	186	769	181	769	172	767	172	506	286	508	286
	TR23	463	6	461	7	461	6	466	6	40	85	70	85
	TR24	336	66	320	66	309	72	311	72	240	220	235	220
	TR25	486	222	478	225	473		483		373	91	372	93
	TR26					70	200	74	200	206	268	206	268
	TR27									45	364	45	377
	Total	**2438**	**480**	**2415**	**479**	**2470**	**450**	**2490**	**450**	**1800**	**1314**	**1826**	**1329**

	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	36	347	36
	Total	**2289**	**160**	**2247**	**143**	**2253**	**143**	**2206**	**157**	**1613**	**765**	**1607**	**745**

STOR Runway Tender details

Figure 9 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 9 STOR runway tender details



Runway results

42MW of Runway tenders were received, 30MW of committed units and 12MW of Premium Flexible units. As can be seen from the chart above the committed units were accepted with prices in-line with those accepted for year 10 in the main assessment, the PF units were rejected due to their prices being higher than those accepted for year 10.

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 an 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 TR27: 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 9) and the following year (Year 10).

Seasons 2015/16

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 Wednesday 1st Apr 2015 - 05:00 on Monday 27th Apr 2015	07:00 19:00	13:30 22:00	10:00 19:30	14:00 22:00	199.5	32.5	232
2	05:00 on Monday 27th Apr 2015 - 05:00 on Monday 24th Aug 2015	07:30 16:00 19:30	14:00 18:00 22:30	09:30 19:30	13:30 22:30	1150	133	1283
3	05:00 on Monday 24th Aug 2015 - 05:00 on Monday 21st Sep 2015	07:30 16:00	14:00 21:30	10:30 19:00	13:30 22:00	276	30	306
4	05:00 on Monday 21st Sep 2015 - 05:00 on Monday 26th Oct 2015	07:00 16:30	13:30 21:00	10:30 17:30	13:30 21:00	330	32.5	362.5
5	05:00 on Monday 26th Oct 2015 - 05:00 on Monday 1st Feb 2016	07:00 16:00	13:30 21:00	10:30 16:00	13:30 20:30	920	135	1055
6	05:00 on Monday 1st Feb 2016 - 05:00 on Friday 1st Apr 2016	07:00 16:30	13:30 21:00	10:30 16:30	13:30 21:00	561	67.5	628.5
						3436.5	430.5	3867

Season	WD	NWD
1	21	5
2	100	19
3	23	5
4	30	5
5	80	18
6	51	9

Total Hours	3867

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 19:00	13:30 22:00	10:00 19:30	14:00 22:00	190	26	216
2	05:00 on Monday 25th Apr 2016 - 05:00 on Monday 22nd Aug 2016	07:30 16:00 19:30	14:00 18:00 22:30	09:30 19:30	13:30 22:30	1150	133	1283
3	05:00 on Monday 22nd Aug 2016 - 05:00 on Monday 19th Sep 2016	07:30 16:00	14:00 21:30	10:30 19:00	13:30 22:00	276	30	306
4	05:00 on Monday 19th Sep 2016 - 05:00 on Monday 31th Oct 2016	07:00 16:30	13:30 21:00	10:30 17:30	13:30 21:00	396	39	435
5	05:00 on Monday 31th Oct 2016 - 05:00 on Monday 30th Jan 2017	07:00 16:00	13:30 21:00	10:30 16:00	13:30 20:30	862.5	120	982.5
6	05:00 on Monday 30th Jan 2017 - 05:00 on Saturday 1st Apr 2017	07:00 16:30	13:30 21:00	10:30 16:30	13:30 21:00	583	60	643
						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