SHORT TERM OPERATING RESERVE

ANNUAL MARKET REPORT 2013/14

Summary

This annual market report summarises the seventh year (1st April 2013 to 31st March 2014) of the Short Term Operating Reserve (STOR) service.

Information is presented by service type and day type providing insight into the dynamics of STOR availability and utilisation over the year. For information by Balancing Mechanism (BM) and Non-Balancing Mechanism (NBM) Providers please refer to the 2013/14 Procurement Guidelines Report. The link can be found at the end of this report.

- In 2013/14 National Grid contracted on average 3097MW at a cost of £58.3m in availability payments. This was made up from 2534MW of the Committed service and 560MW of the Flexible service. The actual availability provided through STOR during the peak demand of each day averaged 2376MW. This is a 1.4% increase over the previous year
- There were 323 units that tendered for 2013/14, of this 166 units received a contract and 157 did not. Of the units that did get a contract 88 units were Committed, 58 were Flexible, and 20 were a mixture of both
- The average contracted prices were £5.83/MW/h and £191.20/MWh for Availability and Utilisation respectively. Removing long-term STOR contracts, this reduces to £4.94/MW/h and £183.76/MWh, representing a 28% and 7% reduction year-on-year
- National Grid utilised a total of 292.5GWh, yielding utilisation payments of £40.2m. This is a 75% and 53% increase relative to the previous year respectively. This is a result of increased capacity contracted at lower Utilisation prices
- The total expenditure for STOR in 2013/14 was £98.4m

1. Introduction

STOR is a source of extra power either in the form of generation or demand reduction that is non-synchronised and manually instructed. It is used primarily to support energy balancing. This report covers the seventh year (Y7) of STOR from 1st April 2013 to 31st March 2014.

Because the requirement for STOR varies by time of year, week, and day, the financial year is divided into six Seasons of varying lengths. The STOR Seasons are often expressed in the form of 'Year.Season' for example '7.2' refers to Year 7 Season 2. The times during the day in which STOR is required are known as Windows. There are normally two, up to three, Windows a day. The Window times vary by Season and day type - Working Day (WD) and Non Working Day (NWD). The Windows for Y7 can be found in Appendix A.

STOR is procured through Tender Rounds (TR), typically three a year. The tendered period can be for any Season up to two financial years ahead set at the first TR that year. Each TR is given a number designation for example 'TR25' is Tender Round 25.

STOR Providers can take the form of a Committed (C), Flexible (F), or Premium Flexible (PF) service. The latter was introduced in Y8 and so is not mentioned in this report. Providers are paid an Availability fee when available within the contracted Window, and a Utilisation fee when instructed to deliver ("Call-off"). These prices are tendered parameters.

For more information on the STOR service please refer to the General Description of the Service document. The link can be found at the end of this report. Any feedback on this report is welcome and should be directed to commercial.operation@nationalgrid.com or through your Account Manager.

2. Tender Information for 2013/2014

Table 1 summarises all the tenders received for Y7 delivery by TR in terms of tendered capability, Availability prices and Utilisation prices. Indexation which is applicable to some prices has not been applied here. Note that contracts agreed during TR10, 11, and 12 were long-term STOR contracts. The opportunity to tender for such contracts has been discontinued hence the gap between TR12 and TR16.

Figure 1 illustrates the proportion of STOR Providers by size[1] and response time across all Seasons. The differences between the Seasons are minimal. Note that size is not specifically assessed during the tender as benefits are compared on a per MW basis, but is a consideration in meeting the volume requirement.

The charts show that 15% of contracted units were greater than 30MW and 66% can deliver their contracted level within ten minutes of instruction.

[1] For aggregators using multiple sub sites for the provision of a single contract, the contract is used to denote the unit size

Table 1: STOR Tendered capacity, Availability price, and Utilisation price Y7

		Season	7.1		7.2		7.3		7.4		7.5		7.6	
		Type of Service	Committed	Flexible	Committed	Flexible	Committed	Flexible	Committed	Flexible	Committed	Flexible	Committed	Flexible
MW	Tender Round													
	TR10	Accepted	68	-	68	-	68	-	68	-	68	-	68	-
		Tendered	68	-	68	-	68	-	68	-	68	-	68	-
	TR11	Accepted	116	-	116	-	116	-	116	-	116	-	116	-
		Tendered	347	-	343	-	345	-	347	-	554	-	554	-
	TR12	Accepted	276	-	274	-	275	-	276	-	277	-	277	-
		Tendered	863	-	857	-	860	-	863	-	866	-	866	-
	TR16	Accepted	31	10	31	10	31	10	31	10	21	10	21	10
		Tendered	2,160	29	2,158	29	2,068	29	2,146	29	2,120	48	2,120	48
	TR17	Accepted	939	9	937	9	937	9	936	9	939	9	939	9
		Tendered	2,185	142	2,181	142	2,093	142	2,188	142	2,107	237	2,106	237
	TR18	Accepted	640	273	633	270	648	265	658	257	462	348	459	348
		Tendered	1,698	401	1,675	398	1,712	393	1,638	393	1,582	587	1,619	543
	TR19	Accepted	775	84	753	86	593	37	604	37	347	-	346	-
		Tendered	1,528	206	1,477	215	1,321	119	1,413	119	987	155	1,009	155
	TR20	Accepted	-	-	-	-	-	102	-	106	-	-	-	-
		Tendered	-	-	-	-	810	301	838	308	587	333	764	246
	TR21	Accepted	-	-	-	-	-	-	-	-	-	415	-	421
		Tendered	-	-	-	-	-	-	-	-	254	980	334	927
		Accepted MW for season	2,845	376	2,812	375	2,668	423	2,689	419	2,230	782	2,226	788
		Total Accepted MW	3,221		3,187		3,091		3,108		3,012		3,014	
Availability Price (average £/MW/h)*	Tender Round													
	TR10	Accepted	7.00	-	7.00	-	7.15	-	7.15	-	7.45	-	7.45	-
		Tendered	7.00	-	7.00	-	7.15	-	7.15	-	7.45	-	7.45	-
	TR11	Accepted	11.00	-	11.00	-	11.00	-	11.00	-	11.00	-	11.00	-
		Tendered	14.38	-	14.29	-	14.34	-	14.38	-	17.42	-	17.42	-
	TR12	Accepted	11.50	-	11.50	-	11.50	-	11.50	-	11.50	-	11.50	-
		Tendered	12.02	-	12.01	-	12.02	-	12.02	-	12.03	-	12.03	-
	TR16	Accepted	7.30	7.21	7.30	7.21	7.30	7.21	7.30	7.21	6.97	7.21	6.97	7.21
		Tendered	7.59	7.65	7.59	7.65	7.57	7.85	7.59	7.85	7.57	8.58	7.57	8.58
	TR17	Accepted	5.64	7.90	5.63	7.90	5.63	7.90	5.63	7.90	5.63	7.90	5.63	7.90
		Tendered	6.62	7.78	6.62	7.78	6.58	7.78	6.61	7.78	6.58	7.45	6.58	7.45
	TR18	Accepted	6.14	6.08	6.15	6.15	6.13	6.15	6.12	6.18	6.40	5.87	6.41	5.87
		Tendered	6.26	6.11	6.26	6.16	6.26	6.16	6.25	6.20	6.12	6.08	6.12	6.12
	TR19	Accepted	2.93	3.90	2.94	3.87	3.27	4.49	3.37	4.49	3.70	-	3.70	-
		Tendered	4.04	4.56	4.00	4.53	4.15	5.09	4.44	5.09	4.44	4.39	4.47	4.38
	TR20	Accepted	-	-	-	-	-	0.73	-	0.67	-	-	-	-
		Tendered	-	-	-	-	5.11	1.85	5.03	1.76	5.68	2.75	5.08	2.60
	TR21	Accepted	-	-	-	-	-	-	-	-	-	0.36	-	0.37
		Tendered	-	-	-	-	-	-	-	-	2.52	1.47	2.79	1.27
		*Average Accepted Availability Price per Season £/MW/h	5.82		5.84		5.95		5.94		5.71		5.70	
Utilisation Price (average £/MWh)*	Tender Round													
	TR10	Accepted	350	-	350	-	350	-	350	-	360	-	360	-
		Tendered	350	-	350	-	350	-	350	-	360	-	360	-
	TR11	Accepted	224	-	224	-	224	-	224	-	224	-	224	-
		Tendered	222	-	222	-	222	-	222	-	198	-	199	-
	TR12	Accepted	206	-	206	-	206	-	206	-	206	-	206	-
		Tendered	217	-	217	-	217	-	217	-	217	-	217	-
	TR16	Accepted	187	190	187	190	187	190	187	190	193	190	193	190
		Tendered	228	248	228	248	229	248	228	248	228	219	228	219
	TR17	Accepted	242	139	242	139	242	139	242	139	242	139	242	139
		Tendered	209	170	209	170	210	170	209	170	210	175	210	175
	TR18	Accepted	151	141	151	140	151	141	151	140	146	151	146	151
		Tendered	168	157	168	156	168	157	169	157	167	166	168	165
	TR19	Accepted	151	118	151	120	158	115	162	115	190	-	190	-
		Tendered	156	137	157	138	161	143	162	143	179	158	180	158
	TR20	Accepted	-	-	-	-	-	90	-	90	-	-	-	-
		Tendered	-	-	-	-	179	104	185	103	194	152	185	167
	TR21	Accepted	-	-	-	-	-	-	-	-	-	118	-	118
		Tendered	-	-	-	-	-	-	-	-	152	129	145	126
		*Average Accepted Utilisation Price per Season £/MWh	188.85		189.24		190.56		191.12		193.85		193.59	

*Average prices are weighted by MW and hours tendered

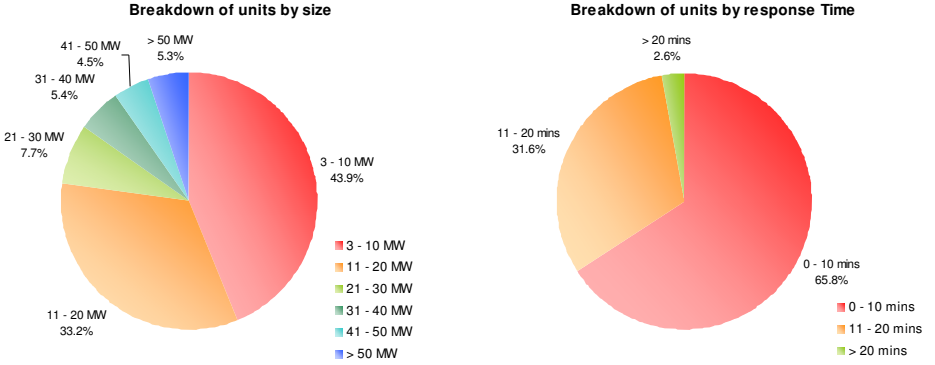


Figure 1: Breakdown of STOR Provider parameters by size and response time

3. Availability and Utilisation

Figure 2 shows the daily average Window availability and contracted level. The average contracted capacity across the six Seasons was 3097MW, weighted by Season hours, whilst the outturn average availability across all Settlement Periods in Y7 was 2403MW. This is 78% of the average contracted capacity.

The difference between contracted and outturn is due to breakdowns, outages, and flexible operation. The total availability payments made in Y7 was £58.3m.

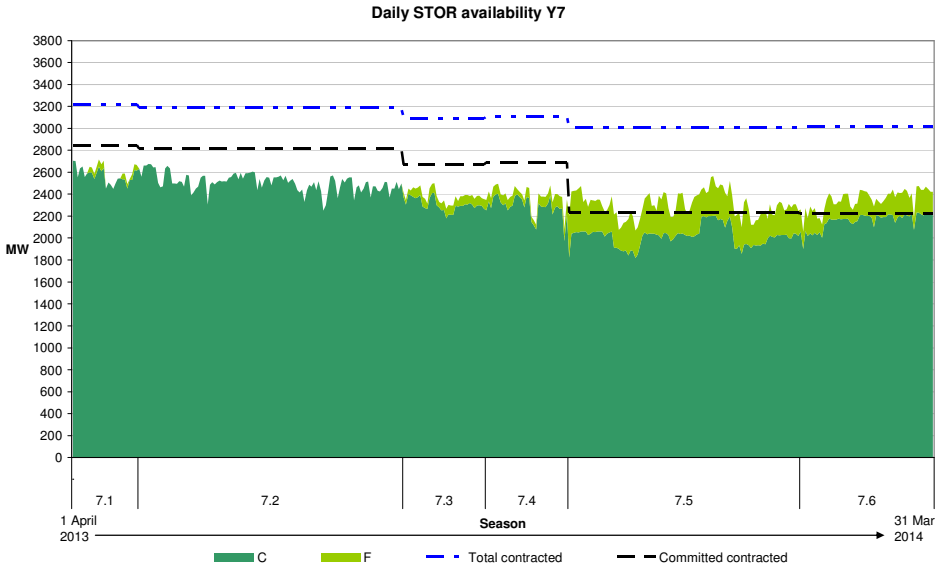


Figure 2: Average daily availability and contracted level Y7

Table 2: Outturn availability, utilisation, and expenditure by Season

		Season					
		7.1	7.2	7.3	7.4	7.5	7.6
No. days STOR was synchronised:		27	103	35	33	97	57
Average availability out-turn (MW)	C	2,568.0	2,508.0	2,306.4	2,287.9	2,016.5	2,156.7
	F	50.0	0.0	76.9	86.7	288.3	191.7
Total availability expenditure (£m)	C	3.9	19.0	5.9	5.5	14.9	8.8
	F	0.0	0.0	0.0	0.0	0.2	0.1
Total utilisation (GWh)	C	23.2	72.1	26.9	17.8	37.3	30.7
	F	1.5	0.0	5.4	5.2	46.6	25.9
Total utilisation expenditure (£m)	C	3.2	10.1	3.7	2.5	5.8	4.8
	F	0.2	0.0	0.6	0.5	5.5	3.1

Figure 3 is a stacked timeline chart that shows when Committed and Flexible STOR was synchronised and the total daily energy provided, represented by a slim bar. Relative to the previous year there has been a significant increase in non-winter Season utilisations. As Section 4 sets out, this is a result of an increase in contracted capacity at lower Utilisation prices. The volume weighted average Utilisation price fell 7% to £183.76/MWh excluding long-term STOR contracts.

The average STOR utilisation for Y7 was 830MWh per day. The total STOR utilised over the whole year was 292.5GWh at a cost of £40.2m. This includes Optional Window (OW) utilisations, which are periods outside of the defined STOR Windows.

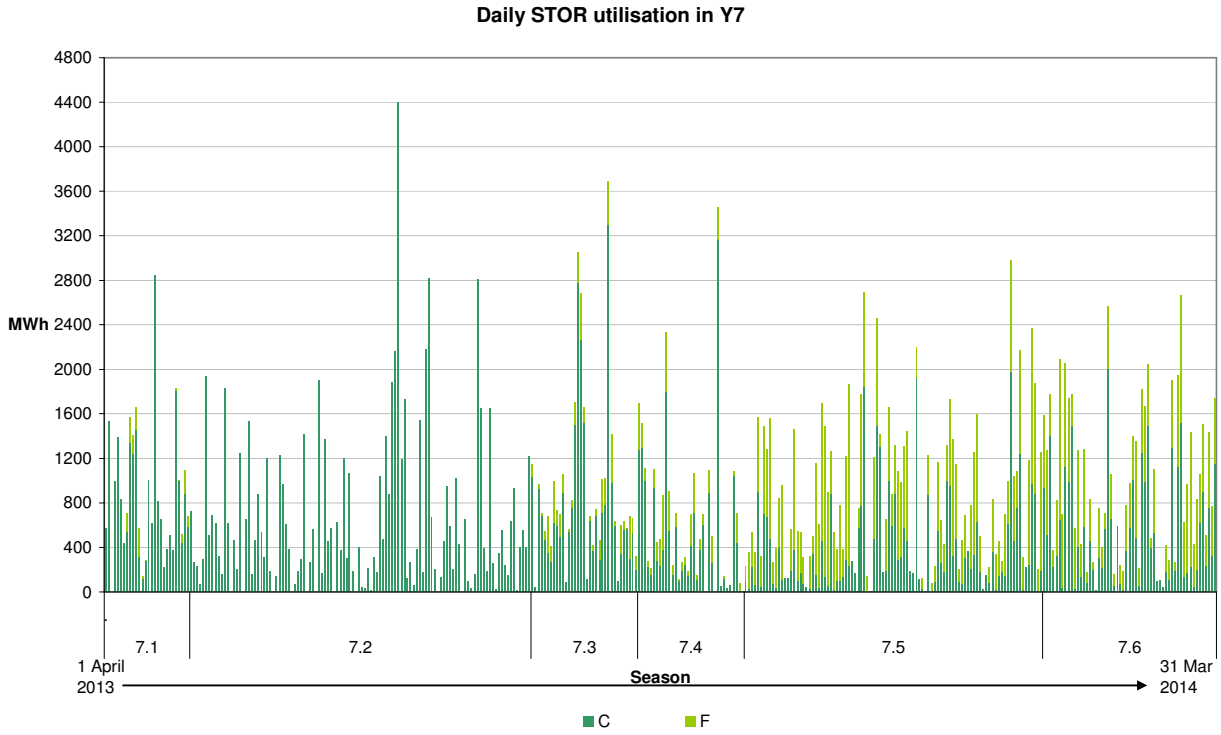
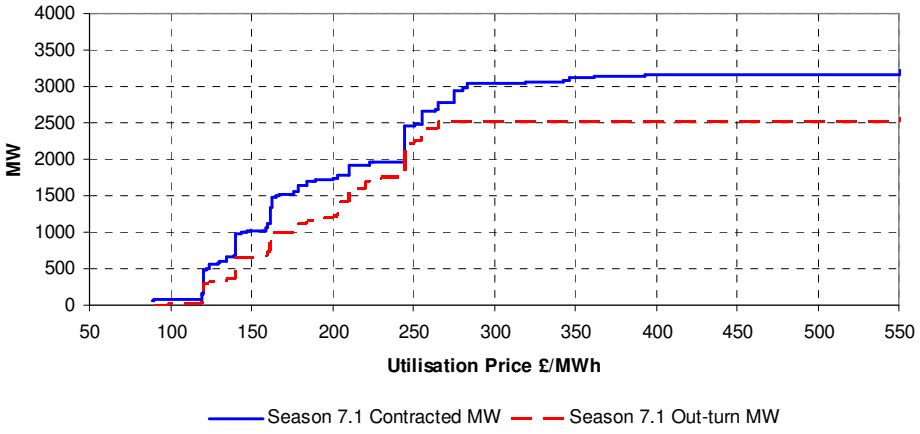


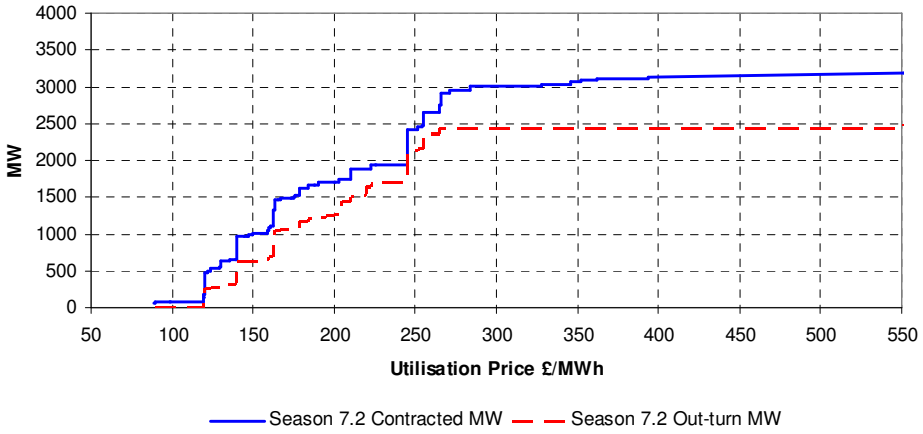
Figure 3: Daily STOR utilisation in Y7

Figure 4 shows the Utilisation price stack as contracted (blue line) and outturn (dashed red line) for each Season in Y7. The units are sorted in ascending order according to its Utilisation price. The Utilisation prices include indexation where it applies. Table 3 gives the volume of STOR that is less than or equal to £150/MWh.

Cumulative MW by Utilisation Price for Season 7.1



Cumulative MW by Utilisation Price for Season 7.2



Cumulative MW by Utilisation Price for Season 7.3

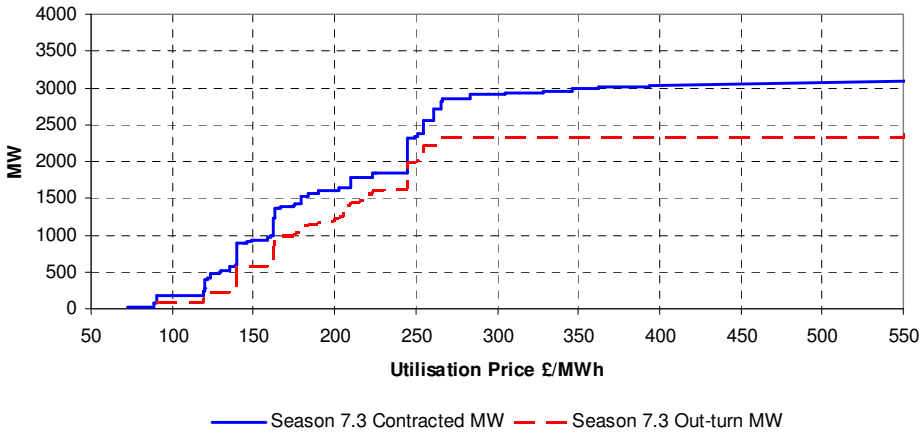
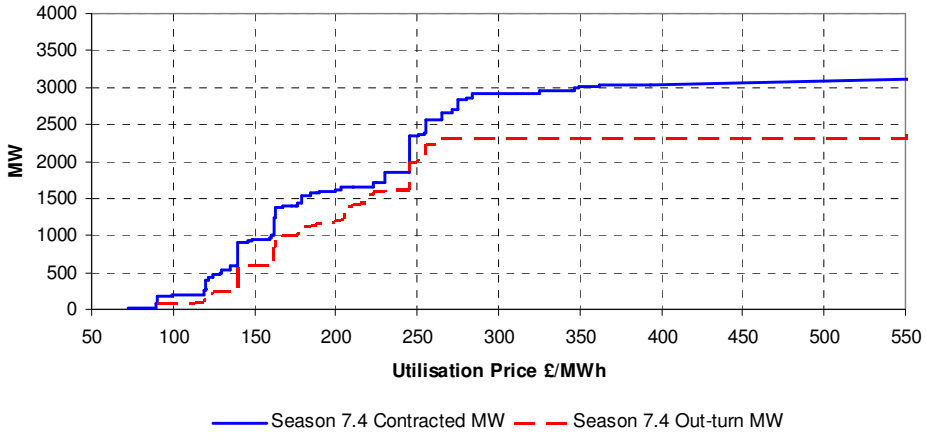
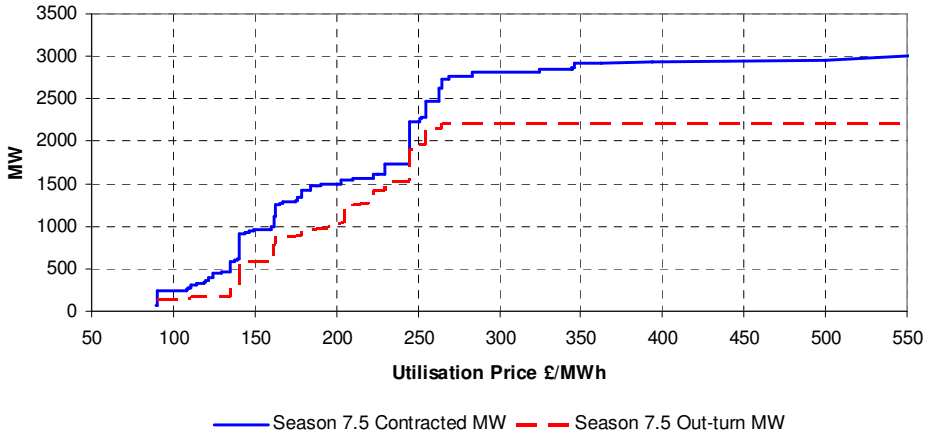


Figure 4a: Contract and outturn stack based on Utilisation price

Cumulative MW by Utilisation Price for Season 7.4



Cumulative MW by Utilisation Price for Season 7.5



Cumulative MW by Utilisation Price for Season 7.6

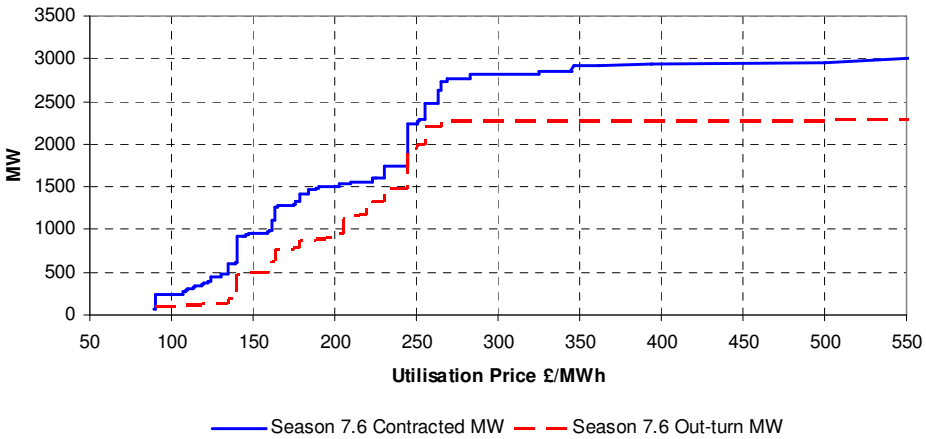


Figure 4b: Contract and outturn stack based on Utilisation price

Table 3: Volume of STOR where Utilisation price ≤£150/MWh (MW)

	Season					
	7.1	7.2	7.3	7.4	7.5	7.6
Contracted	1,022	1,008	937	938	953	959
Outturn	662	624	577	593	577	488

4. Utilisation by Season and Price

Figure 5 plots utilisation volume per Season hour, excluding OW, to allow direct comparison between Seasons of varying lengths. The data for the plot is provided in Table 4.

Figure 6 shows the total STOR utilisation by Utilisation price bins and Window type. The number of units contracted and the capacity by Utilisation price is given in Table 5, showing around 1000MW contracted at the lower Utilisation price bands (51-150 £/MWh). In Y6 this figure was around 250MW during the non-winter Seasons and 650MW during the winter Seasons. The lower base in the former Seasons explains the larger year-on-year increase in utilisations. A link to the 2012/13 Annual Market Report can be found in Section 9.

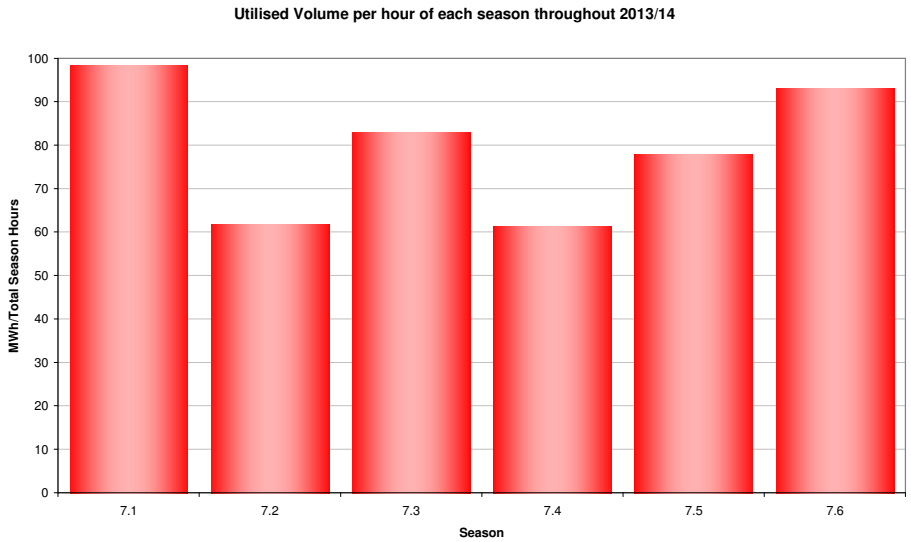


Figure 5: Total STOR utilisation per Season hour

Table 4: Total STOR utilisation per Season

Season	Total Utilised (GWh) (excludes OW)	STOR Hours in Season	Utilisation (MWh)/ Hours
7.1	24.7	251.0	98.4
7.2	74.6	1,207.0	61.8
7.3	31.9	384.0	83.0
7.4	22.2	362.5	61.3
7.5	82.5	1,059.0	77.9
7.6	55.8	599.0	93.2

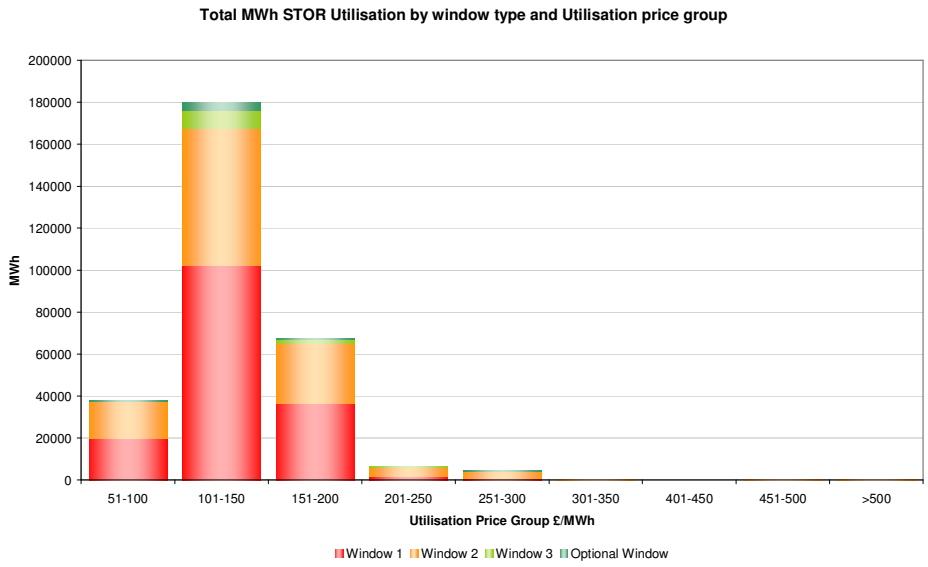


Figure 6: Total STOR utilisation by Utilisation Price

Table 5: Contracted number of units and capacity by Utilisation price bins

Utilisation price group £/MWh	Season											
	7.1		7.2		7.3		7.4		7.5		7.6	
	Units	MW	Units	MW	Units	MW	Units	MW	Units	MW	Units	MW
51 - 100	7	88	7	88	10	187	10	191	9	239	9	245
101 - 150	47	934	47	920	43	750	42	747	48	714	48	714
151 - 200	34	757	32	697	31	669	31	671	28	547	30	589
201 - 250	49	1062	24	715	25	737	24	730	25	734	50	1078
251 - 300	11	312	28	586	27	566	28	586	28	586	11	312
301 - 350	4	68	7	69	8	90	8	91	8	92	0	0
351 - 400	0	0	3	44	2	24	2	24	2	24	4	68
451 - 500	0	0	0	0	0	0	0	0	1	8	1	8
>500	0	0	4	68	4	68	4	68	4	68	0	0

5. Utilisation by Location

There are occasions in which particular STOR units are utilised with consideration of its geographic location along with its submitted prices, for example when there are transmission constraints. Figure 7 shows the total utilised energy, including OW and irrespective of reason, by the differing locations. Note that Multiple refers to aggregated units containing sub-units from various geographic locations.

Table 6 gives additional information by the locations including the number of units, capacity, and hours utilised.

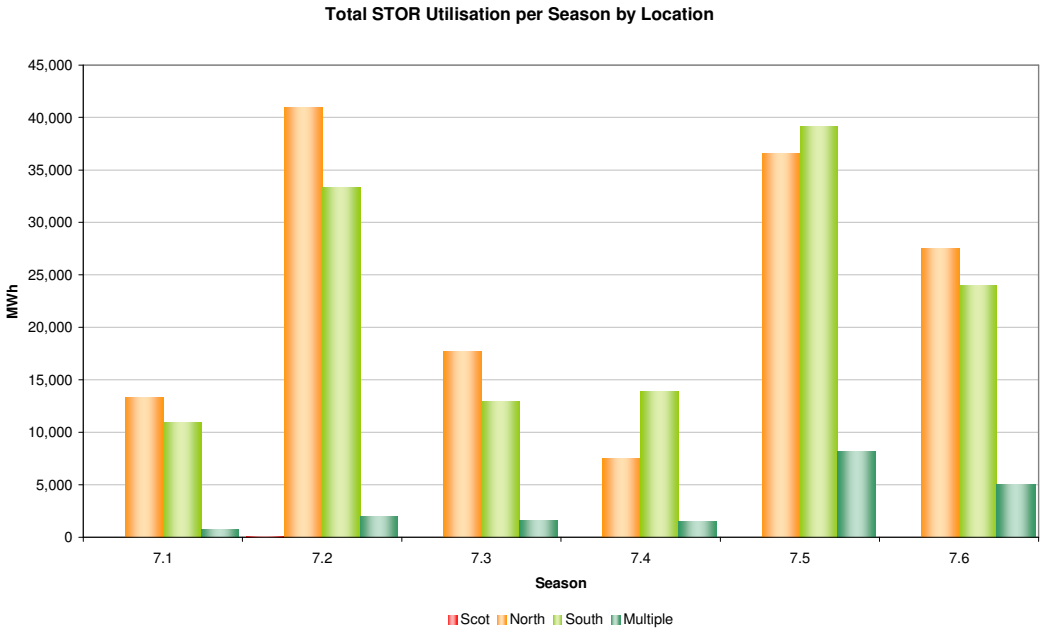


Figure 7: Total STOR energy utilisation per season by location

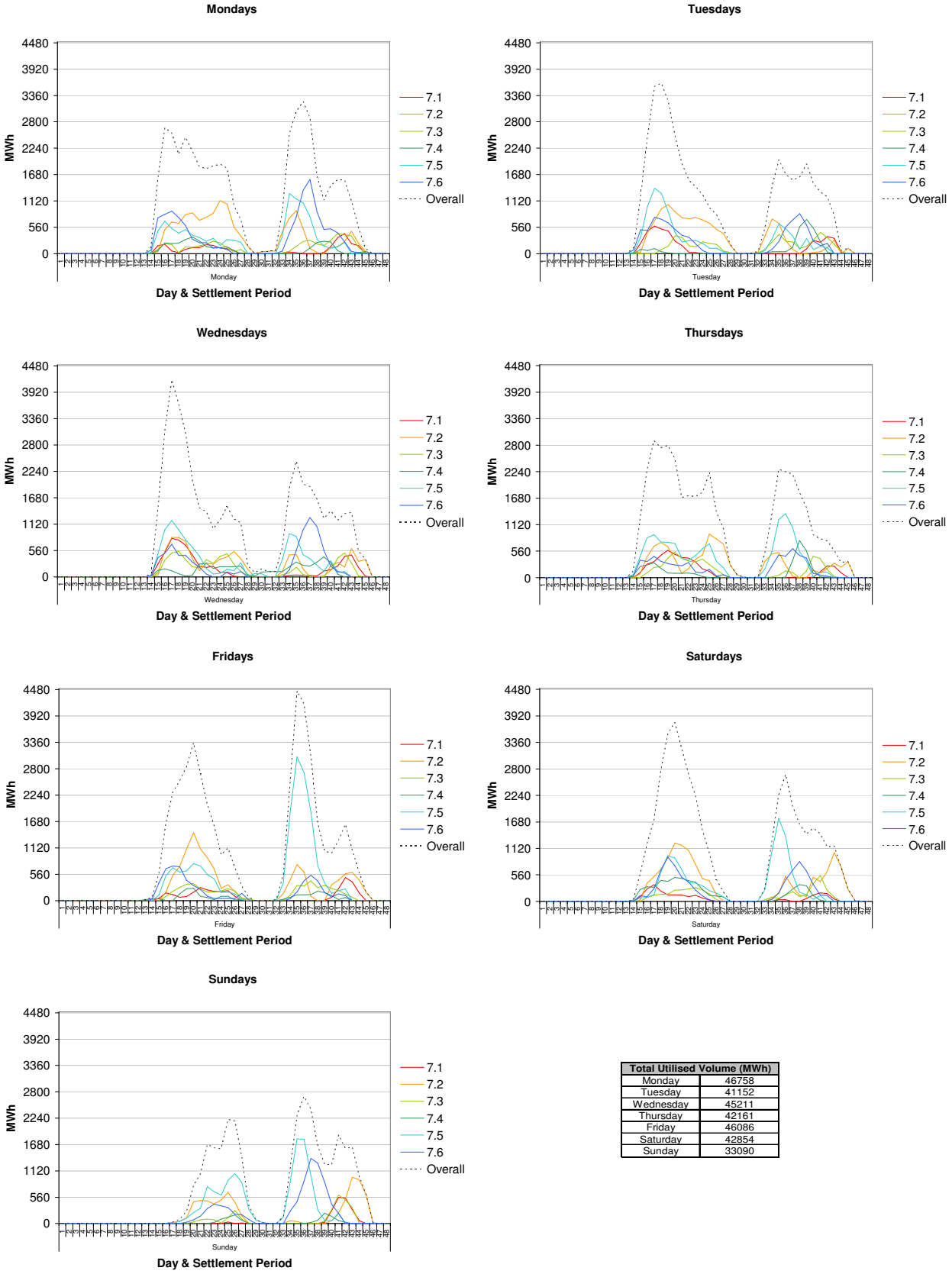
Table 6: Number of units, capacity, hours and energy utilised by location

Unit Location	Season											
	7.1				7.2				7.3			
	No. of units	Total MW	Total Util. Hours	Total Util. MWh	No. of units	Total MW	Total Util. Hours	Total Util. MWh	No. of units	Total MW	Total Util. Hours	Total Util. MWh
Scotland	4	61	-	-	4	61	3	37	4	61	-	-
North	61	1,430	334	13,374	61	1,415	1,203	41,018	59	1,334	473	17,749
South	65	1,563	603	10,918	65	1,544	1,707	33,379	64	1,514	905	12,965
Multiple	22	167	133	787	22	167	400	2,018	23	182	300	1,579

Unit Location	Season											
	7.4				7.5				7.6			
	No. of units	Total MW	Total Util. Hours	Total Util. MWh	No. of units	Total MW	Total Util. Hours	Total Util. MWh	No. of units	Total MW	Total Util. Hours	Total Util. MWh
Scotland	4	61	-	-	4	61	-	-	4	61	-	-
North	58	1,332	330	7,515	55	1,265	1,097	36,590	55	1,267	714	27,508
South	64	1,533	853	13,948	68	1,471	2,158	39,151	68	1,471	1,495	24,053
Multiple	23	182	293	1,542	26	215	1,276	8,175	26	215	776	5,006

6. Utilisation by Day Type

Figure 8, overleaf, depicts the total STOR utilisation, including OW, for each day of the week for each Season in Y7. Note that Seasons are of differing lengths reflected in the magnitudes of the curves. The Season lengths are given in Appendix A.



Total Utilised Volume (MWh)	
Monday	46758
Tuesday	41152
Wednesday	45211
Thursday	42161
Friday	46086
Saturday	42854
Sunday	33090

Figure 8: Total utilised energy for each day of the week

7. Frequency of Call-offs

The duration profile of Call-offs is given in Figure 9. It shows that around 90% of instructions last for at least thirty minutes. The average call-off duration is approximately 90 minutes.

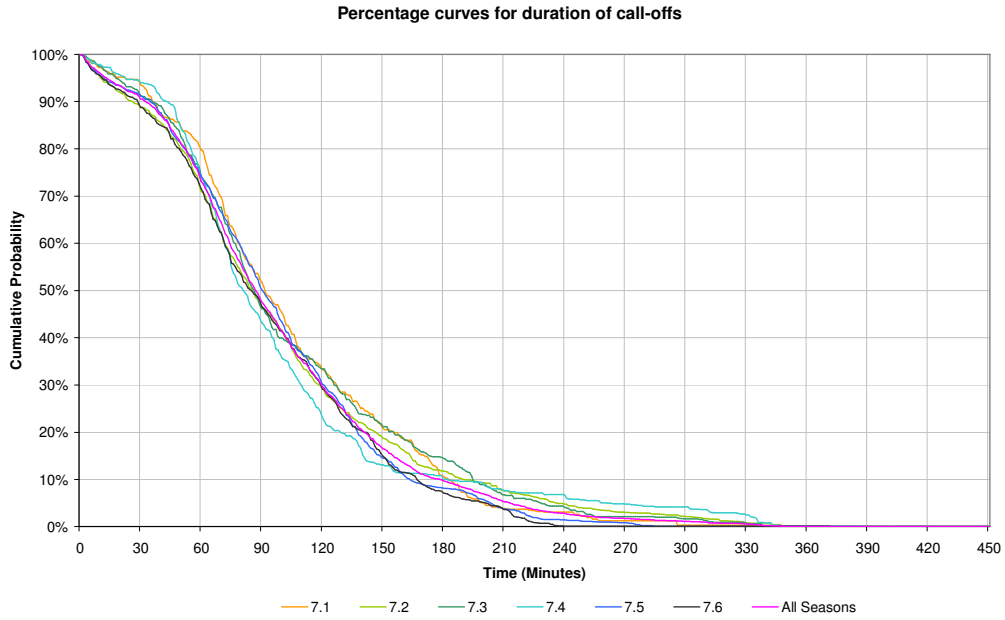


Figure 9: Duration curves showing the percentage of Call-offs and length of utilisation

8. Flexible STOR Assessments

The Flexible STOR service is assessed weekly following Provider submissions of week-ahead availability. Figure 10 shows the amount of capacity accepted, rejected, and unavailable for each week of Y7. Note that this is the week-ahead availability and actual availability may differ.

With reference to Figure 2, the higher levels of contracted Committed STOR in Seasons 1-4 meant lower levels of Flexible were contracted. In Seasons 5-6 a higher proportion of contracted capacity came from Flexible units.

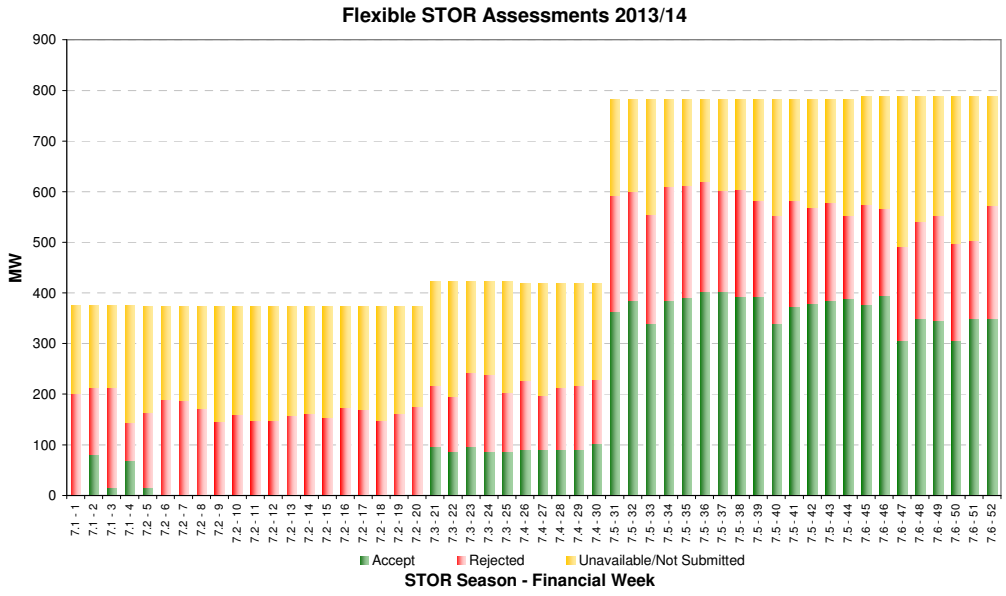


Figure 10: Flexible STOR assessments at week-ahead

9. Further Information

STOR: General Description of the Service	http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=29274
Tender Assessment Principles	http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=29290
Procurement Guidelines Report	13/14: http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=32997 12/13: http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=14732
Previous STOR Annual Market Reports	Y6: http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=31977 Y5: http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=11749 Y4: http://www.nationalgrid.com/NR/rdonlyres/AD980857-E490-4943-81D5-D08A84B6776B/50871/STOR_End_of_Year_Report_2010_11.pdf Y3: http://www.nationalgrid.com/NR/rdonlyres/41B8C2BF-4A3B-471B-9FF8-6EBE9C51C9BF/44264/STOR_End_of_Year_Report2009_10.pdf Y2: http://www.nationalgrid.com/NR/rdonlyres/DC24F8EF-FFC4-4681-B3F5-55B4E91ED61C/37024/STOREndofYearReport0809.pdf Y1: http://www.nationalgrid.com/NR/rdonlyres/209E0BFA-17EB-4140-9CCF-3C92BE803191/27564/STOREndofYearReport0708_Final.pdf

Appendix A

STOR windows for Year 7 (2013/14)

Seasons 2013/14								
Season	Dates	WD		NWD		Hours/Day Type		Total
		Start Time	End Time	Start Time	End Time	WD	NWD	
1	05:00 on Monday 1st Apr 2013 - 05:00 on Monday 29th Apr 2013	07:00	13:30	10:00	14:00	218.5	32.5	251
		19:00	22:00	19:30	22:00			
2	05:00 on Monday 29th Apr 2013 - 05:00 on Monday 19th Aug 2013	07:30	14:00	09:30	13:30	1081	126	1207
		16:00	18:00	19:30	22:30			
		19:30	22:30					
3	05:00 on Monday 19th Aug 2013 - 05:00 on Monday 23rd Sep 2013	07:30	14:00	10:30	13:30	348	36	384
		16:00	21:30	19:00	22:00			
4	05:00 on Monday 23rd Sep 2013 - 05:00 on Monday 28th Oct 2013	07:00	13:30	10:30	13:30	330	32.5	362.5
		16:30	21:00	17:30	21:00			
5	05:00 on Monday 28th Oct 2013 - 05:00 on Monday 3rd Feb 2014	07:00	13:30	10:30	13:30	931.5	127.5	1059
		16:00	21:00	16:00	20:30			
6	05:00 on Monday 3rd Feb 2014 - 05:00 on Tuesday 1st Apr 2014	07:00	13:30	10:30	13:30	539	60	599
		16:30	21:00	16:30	21:00			
						3448	414.5	3862.5

Season	WD	NWD
1	23	5
2	94	18
3	29	6
4	30	5
5	81	17
6	49	8

Total Hours	3862.5