

# **REACTIVE POWER MARKET**

## **REACTIVE MARKET REPORT**

### **TWENTY FIFTH TENDER ROUND FOR OBLIGATORY AND ENHANCED REACTIVE POWER SERVICES**

**FOR REACTIVE MARKET AGREEMENTS  
EFFECTIVE 1 APRIL 2010**

7<sup>th</sup> May 2010

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## **Executive Summary**

### 25<sup>th</sup> Tender Round

This report describes the 25<sup>th</sup> Tender Round evaluation process for Reactive Power Market Agreements for service commencement on 1 April 2010. This report would normally include the prices and reactive capability data of the successful tenders, however, as there were no successful tenders no such data is available. The report also includes metered Mvarh utilisation from all eligible service providers for the period 1 October 2009 to 31 March 2010. Estimates of the reactive contribution of the GB Transmission System for the same period are also included.

National Grid evaluated all the tenders received against both economic purchase and technical performance criteria in accordance with the agreed terms of the market mechanism.

The main points are as follows:

- Tenders were received from 18 BM Units representing 8 power stations from 2 Generating Companies of which all 18 were in respect of the Grid Code Obligatory Reactive Power Service
- Tenders were offered for a duration of 12 months
- National Grid has rejected all of the 18 tenders evaluated
- There are no BM Units on Market Agreements for the period 1 April 2010 to 30 September 2010.

Following the approval of CAP173 the Twenty Sixth Reactive Power Market tender round will be subject to condensed timescales to improve the efficiency of the process. Therefore the next market day for Reactive Power Market Agreements commencing on 1 October 2010 will be 23 July 2010. Invitation to Tender (ITT) Documentation for this Tender Round will be available on the National Grid Industry Information website from 18 June 2010.

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Note: Monthly utilisation volume data, split by BM Unit, has been removed from this report but is available on the National Grid Industry Information website at the following address:-

<http://www.nationalgrid.com/uk/Electricity/Balancing/services/ReactivePower/ReactiveUtilisation/>

## 1. Introduction

- 1.1 This market report provides information on the results from the assessment process carried out for Reactive Power Tender Round 25 (for contracts that commenced 1 April 2010). This includes details on the contractual position for the provision of Reactive Power Services to the GB Transmission System as at 1 April 2010.
- 1.2 National Grid manages the voltage of the GB supergrid system to meet Transmission Licence requirements for secure and stable power transmission and to ensure quality of supply to customers. Voltages are largely determined by the flows of Reactive Power on the system. National Grid ensures that Reactive Power is provided on a local basis to meet the constantly varying needs of the system and that there is sufficient Reactive Power reserves available to meet contingencies.
- 1.3 Generating Units provide Reactive Power Capability, and are capable of varying their Reactive Power output as a requirement of the Grid Code. The power system itself has inherent Reactive Power gains and losses, which vary in accordance with changes in real power flows and voltage. National Grid installs reactive compensation plant in parts of the system where there is insufficient generator reactive capability to meet licence requirements, and where voltages cannot be regulated effectively or economically by other means.
- 1.4 Dynamic reserves of Reactive Power are essential for system operation. National Grid values capability based Reactive Power Market Agreements as this payment mechanism helps to ensure that the availability of post-fault Reactive Power reserves is maintained.
- 1.5 Tender Round 25 was undertaken to secure such capability based Reactive Power Market Agreements from 1 April 2010. The service definitions, requirements and contract terms may be found in Schedule 3 to the Connection & Use of System Code (CUSEC), the Grid Code and the ITT (Invitation to Tender) Documentation. These can be accessed via National Grid's industry website at: <http://www.nationalgrid.com/uk/Electricity/Balancing/services/ReactivePower/marketender/>

## 2. Tender Process

- 2.1 On 13 November 2009, National Grid Electricity Transmission plc held the Market Day for the Reactive Power Tender Round 25. This enabled any potential provider that fulfilled the qualification criteria specified in Schedule 3 of the CUSC to tender for a Reactive Power Market Agreement.
- 2.2 Tenderers could elect to choose the term of tenders from a minimum period of 12 months and thereafter in 6-month increments (12, 18, 24, 30, 36 months, etc.).
- 2.3 Tenderers who submitted tenders for periods greater than 12 months were also able to include indexation criteria on the tendered prices to be applied to any period(s) beyond the first 12 months.
- 2.4 Tenderers could tender for either the ORPS and/or the Enhanced Reactive Power Service (ERPS), as defined in Schedule 3 of the CUSC.
- 2.5 Potential tenderers comprised the following:
  - Generators required to provide the minimum Grid Code ORPS and already in receipt of the Default Payment Mechanism, who wished to tender for alternative payment terms for the ORPS.
  - Generators that had a reactive capability in excess of the minimum Grid Code ORPS, known as the "Grid Code plus Enhanced Reactive Power Service" (Grid Code ERPS).
  - Any other eligible Service Provider able to offer other plant or apparatus that could generate or absorb Reactive Power, known as ERPS. The only requirement was that these Service Providers had to fulfil the market qualification criteria and have been capable of making their capability available for use by National Grid.

### **3. Tenders Submitted**

- 3.1 A total of 18 discrete tender submissions were received, representing 2 generating companies and 8 power stations. 18 tenders were for BM Units offering the Grid Code ORPS service; and no tenders were received for the Grid Code ERPS service. All tenders offered contract duration of 12 months.
- 3.2 Tenders were received from directly connected power stations. No tenders were received from non-BM providers.
- 3.3 Not all of the tenders received sought reactive capability based payments but all sought utilisation payments.
- 3.4 All tenders that were evaluated were compliant with the submission criteria specified in Schedule 3 of the CUSC.

### **4. Tender Assessment**

- 4.1 Tender assessment was carried out in accordance with the evaluation criteria specified in Appendix 6 of Schedule 3 of the CUSC. Details of this are more fully described in Appendix 6 of this report.
- 4.2 This assessment included input from the Reactive Power Capability Index updated from that shown in Appendix A of the Invitation to Tender & Guidance Notes for Completion of Tenders that was included in the ITT Documentation. The purpose of this index is to provide an indication of the Reactive Power requirement in each of the zones defined. These requirements are based on the historic need for Reactive Power in the zones and any planned changes to the GB Transmission System (or the generation and demand connected to it) that are likely to affect the zonal reactive requirement.
- 4.3 Tenders were assessed via a process, which considered the following:
  - Economics (i.e. cost of market compared with default),
  - The intrinsic capability value of the tendered reactive service (against the alternative of National Grid reactive assets);
  - A number of other criteria, for example how competitive the utilisation price was, and what incentive the Generator was placing on itself to maintain the reactive capability.

Please refer to Appendix 6 in Schedule 3 of the CUSC for full details on the qualification and evaluation criteria.

## 5. Tender Observations

- 5.1 This tender round received 18 tender submissions from two generating companies. A major of these (16 out of 18) also tendered in the previous tender round. Two submissions were from returning participants after a two year gap.
- 5.2 All received tenders were for a 12 month period between 01/04/10 and 31/03/2011.
- 5.3 The Mvar capability banding remained largely unchanged. Two submissions changed their maximum lead and maximum lag limits compared to their previous tenders.
- 5.4 Different BM Units placed different value across the payment structure of Available Capability, Synchronised Capability and Utilisation.
- 5.5 There was significant variation between the emphasis placed on Available Capability and Synchronised Capability prices between the tenders.
- 5.6 All tenders continued to seek capability worth with non-zero Available Capability prices submitted.
- 5.7 Only 4 out of the 18 tenders submitted non-zero Synchronised Capability prices.
- 5.8 Despite an increase in the published assessment default price, utilisation prices submitted varied from fairly large decrease to moderate increase in prices compared to their last respective tenders. The differences were possibly due to different pricing strategies and expectation of Default price.
- 5.9 In general, and especially for typical ORPS providers, Synchronised capability is more useful to National Grid than Available capability, but the valuation of the two differs, depending on the total time for which the BM Unit is synchronised and when this occurs. National Grid places higher value on tenders with high synchronised capability prices compared with Available Capability prices if the plant tends to run less frequently but at times of high system need. Conversely, National Grid places a lower value on tenders with relatively high Synchronised Capability prices if the plant is expected to run for a large part of the assessment period, as this is more likely to include significant periods when the capability is not essential to secure the transmission system.
- 5.10 This tender round, as with previous ones, has taken into account our views on expected utilisation of generating units in the energy market. We continued to factor in our view of the likely running under emissions trading and other market changes.

**6. Assessment Results**

6 Of the 18 tenders evaluated, National Grid offered Reactive Market Agreements to none (an acceptance rate of 0%).

6.1 Tenders were scored against the specified assessment criteria and Figure 1 below shows the attractiveness of tenders from the assessment outcome. The tenders at the accepted side of Figure 1 were assessed with a positive score indicating they should be offered Market Agreements. Likewise the tenders at the rejected side of Figure 1 were assessed with a negative score indicating they should not be offered a Market Agreement. The tenders at either end of these measures were considered to be very “attractive” or “unattractive”. Those considered unattractive could, for example, have sought capability payments significantly above expectations of default payments and National Grid’s value of capability.

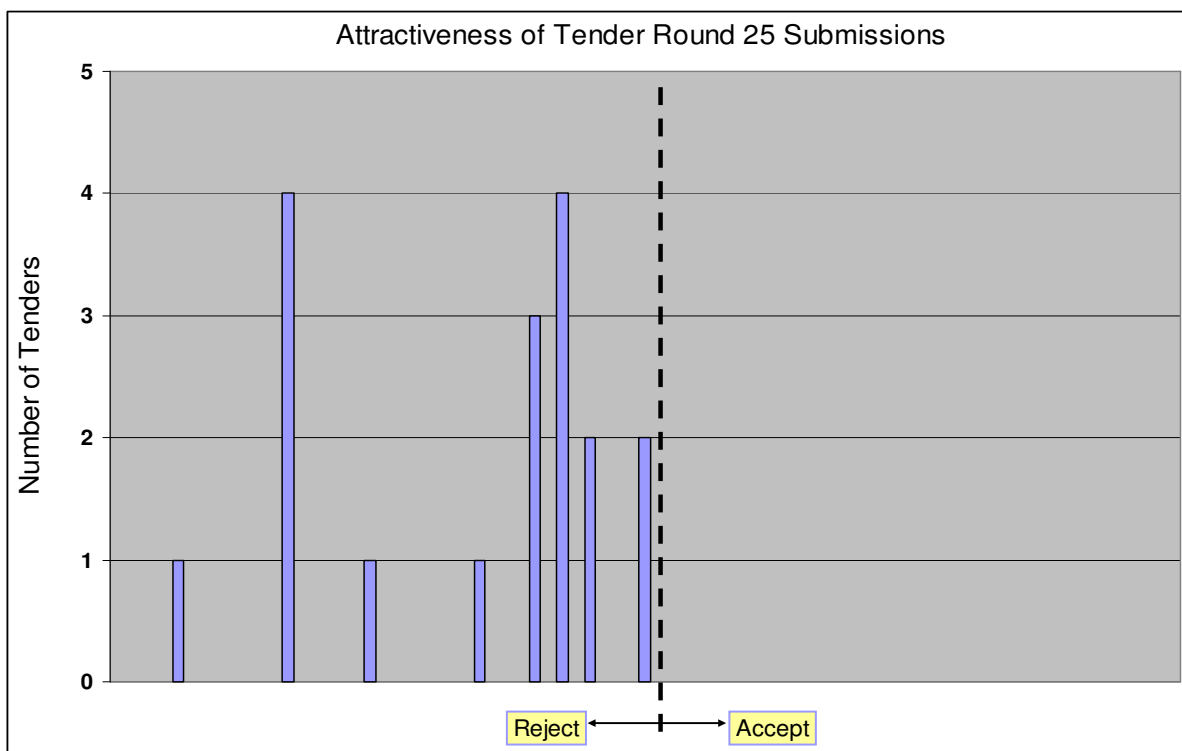


Figure 1

6.2 A complete list of all generator BM Units as at 1 April 2010 obliged under the Grid Code to be capable of providing the ORPS is given in Appendix 2. This list includes a record of which BM Units are on Reactive Power Market Agreements and which are on the Default Payment Mechanism (DPM).

6.3 Appendix 3 provides a list of BM Units on Market Agreements applicable as at 1 April 2010 showing when the agreements will terminate.

- 6.4 Appendix 6 shows the geographic distribution of BM Units on market and default agreements.
- 6.5 Details of the successful tenders that proceeded to contract commencing 1 April 2010 are listed in Appendix 4.

## 7 Comparisons with previous Tender Rounds

7.1 Figure 2 below shows the percentage participation of eligible BM Units for all Tender Rounds since the commencement of the Reactive Power Market. Tender Round 25 follows a recent trend of decreasing numbers of participants within the reactive market.

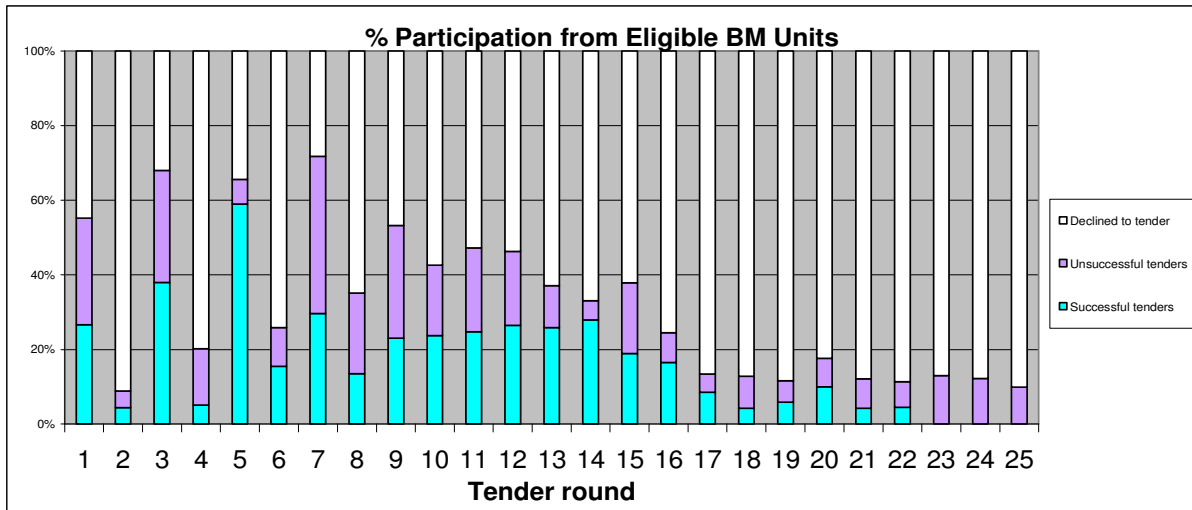


Figure 2 (Source: Appendix 1)

7.2 Figure 3 shows the acceptance rate for all Tender Rounds since the commencement of the Reactive Power Market.

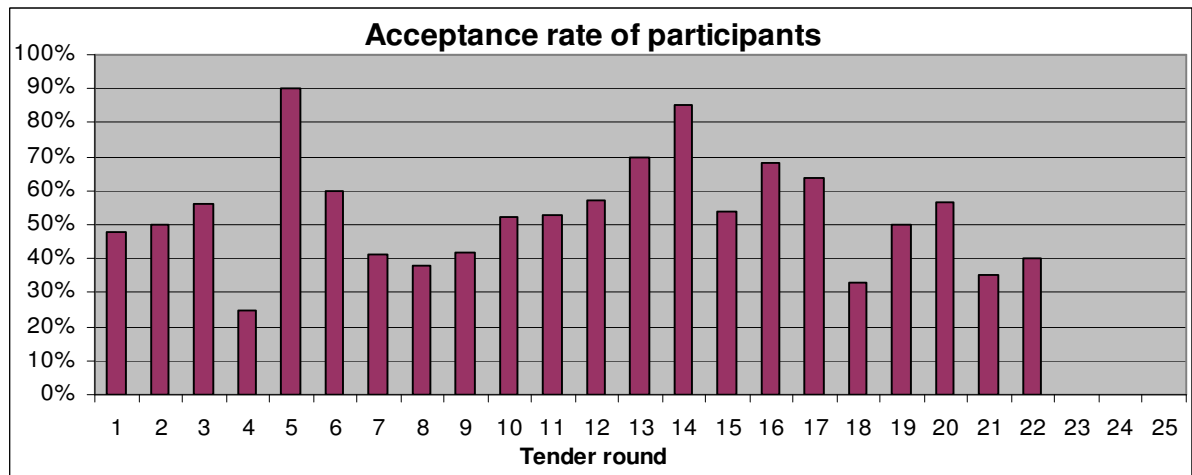


Figure 3 (Source: Appendix 1)

7.3 On 1 April 2010 there are no BM Units on Reactive Power Market Agreements. This information is shown in Figure 4 in percentage terms, including comparison with BM Units on default payment arrangements that are eligible to tender for a Market Agreement.

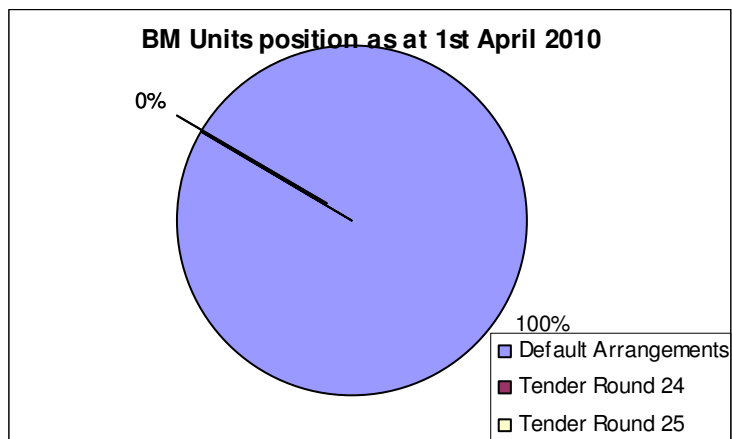


Figure 4 (Source: Appendix 2)

7.4 Figure 5 shows the percentage of total available lagging capability that has been contracted via Reactive Power Market Agreements since the commencement of the Reactive Power Market.

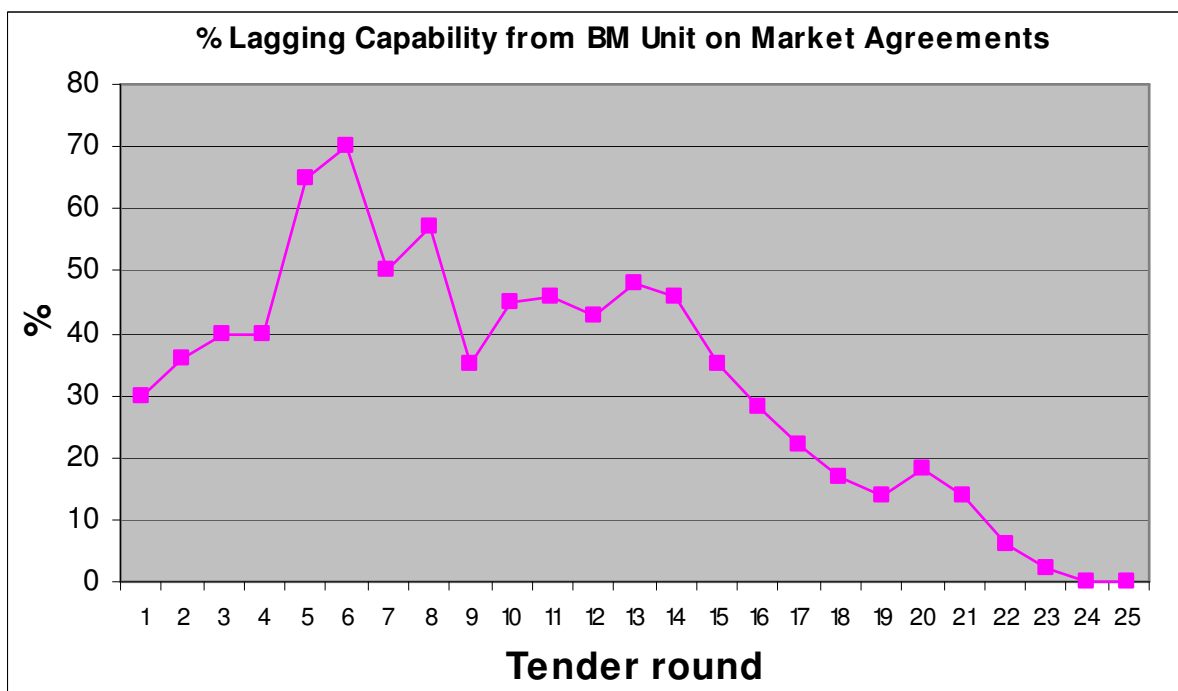


Figure 5 (Source: Appendix 1)

## 8. Generating Unit Reactive MVarh Utilisation

- 8.1 This section summarises a six-month breakdown of metered BM Unit Reactive Power utilisation over the period 1 October 2009 to 31 March 2010.
- 8.2 Table 1 shows the MVarh utilisation volumes (Lead plus Lag) for all eligible BM Units on a monthly basis.

### Utilisation Volume (MVarh)

Month	Default Payment Mechanism	Market Agreements	Total = Market Agreements + DPM
Oct-09	1,755,871	0	1,755,871
Nov-09	1,732,781	0	1,732,781
Dec-09	1,846,131	0	1,846,131
Jan-10	1,858,889	0	1,858,889
Feb-10	1,595,079	0	1,595,079
Mar-10	1,662,035	0	1,662,035
<b>Total</b>	<b>10,450,786</b>	<b>0</b>	<b>10,450,786</b>

Table 1 – Summary of Generator Reactive Utilisation Oct 09 – Mar 10

- 8.3 Table 2, on the next page, shows six-monthly utilisation totals since 1996, sorted by the Seven Year Statement defined regions – North, Midlands and South up to March 2005 and from April 2005 onwards – Scotland, North, Midlands and South.
- 8.4 The volumes set out in Table 2 refer to all BM Units eligible for a Reactive Utilisation Payment (default plus market). MVarh lag and MVarh lead are calculated according to the aggregation methodology described within Appendix 2 in Schedule 3 of the CUSC and also within the companion document “Methodology Document for the Aggregation of Reactive Power Metering” by which reactive utilisation payments are made.
- 8.5 The reduction over the last 10 years is attributable to more distributed generation and lower power flows across the system that has resulted in a reduction in reactive losses on the supergrid and hence the reactive utilisation required from generation.

Table 2 – Generator Reactive Utilisation (TVArh) by region

	NORTH		MIDLANDS		SOUTH		TOTAL		
	lead	lag	lead	Lag	Lead	lag	Lead	lag	Lead + lag
<b>Apr96 – Sep96</b>	2.86	9.79	0.37	1.94	1.49	2.29	4.72	14.02	18.74
<b>Oct96 – Mar97</b>	2.72	12.71	0.36	3.07	1.74	2.72	4.82	18.50	23.32
<b>Apr97 – Sep97</b>	2.89	8.65	0.41	1.60	1.87	1.77	5.17	12.02	17.19
<b>Oct97 – Mar98</b>	2.78	10.67	0.31	3.07	1.54	2.01	4.63	15.75	20.38
<b>Apr98 – Sep98</b>	1.96	7.68	0.44	2.02	1.85	1.51	4.25	11.20	15.45
<b>Oct98 – Mar99</b>	1.71	9.54	0.36	2.07	1.65	1.66	3.76	13.48	17.24
<b>Apr99 – Sep99</b>	1.77	7.25	0.37	1.52	1.27	1.40	3.40	10.20	13.60
<b>Oct99 – Mar00</b>	1.98	10.45	0.27	2.13	1.35	2.19	3.60	14.77	18.37
<b>Apr00 – Sep00</b>	1.44	6.31	0.48	1.69	1.59	1.32	3.51	9.32	12.83
<b>Oct00 – Mar01</b>	1.52	7.40	0.40	2.72	1.48	1.73	3.40	11.85	15.25
<b>Apr01 – Sep01</b>	1.80	4.59	0.50	1.76	1.94	1.18	4.24	7.53	11.77
<b>Oct01 – Mar02</b>	1.70	5.79	0.58	3.07	1.50	1.78	3.79	10.65	14.44
<b>Apr02 – Sep02</b>	1.59	4.70	0.52	0.95	1.76	1.20	3.87	6.85	10.72
<b>Oct02 – Mar03</b>	1.71	5.73	0.47	2.51	1.53	1.78	3.71	10.02	13.73
<b>Apr03 – Sep03</b>	1.40	3.96	0.56	1.59	1.92	1.36	3.88	6.91	10.79
<b>Oct03 – Mar04</b>	2.28	5.48	0.34	1.89	1.69	2.29	4.31	9.66	13.97
<b>Apr04 – Sep04</b>	2.26	3.97	0.85	1.08	2.16	1.29	5.27	6.34	11.61
<b>Oct04 – Mar05</b>	1.89	5.26	0.66	1.84	1.85	1.99	4.40	9.09	13.49

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	SCOTLAND		NORTH		MIDLANDS		SOUTH		TOTAL		
	lead	lag	Lead	lag	lead	Lag	lead	lag	Lead	lag	Lead + lag
<b>Apr05 – Sep05</b>	1.32	0.39	2.07	3.28	0.83	1.04	2.07	1.03	6.29	5.74	12.03
<b>Oct05 – Mar06</b>	1.06	0.80	2.10	4.56	0.76	1.91	1.88	1.48	5.80	8.75	14.55
<b>Apr06 – Sep06</b>	1.09	0.56	2.29	3.00	0.74	0.67	1.79	0.87	5.91	5.09	11.00
<b>Oct06 – Mar07</b>	0.74	0.96	2.49	4.27	0.57	1.17	1.79	1.18	5.59	7.58	13.17
<b>Apr 07 – Sep 07</b>	1.04	0.31	2.30	2.63	0.64	0.69	1.63	0.74	5.61	4.39	10.00
<b>Oct 07 – Mar 08</b>	1.17	0.53	2.28	3.98	0.64	0.74	1.49	1.08	5.58	6.33	11.90
<b>Apr 08 – Sep 08</b>	1.27	0.31	1.84	2.15	0.59	0.44	1.24	0.61	4.95	3.50	8.45
<b>Oct 08 – Mar 09</b>	1.63	0.55	1.85	1.89	0.60	0.64	1.18	0.79	5.26	3.86	9.12
<b>Apr 09 – Sep 09</b>	1.91	0.25	2.66	1.36	0.86	0.44	1.53	0.54	6.96	2.60	9.56
<b>Oct 09 – Mar 10</b>	1.98	0.31	2.62	1.99	0.53	0.70	1.54	0.78	6.67	3.78	10.45

## 9. Estimates of the reactive contribution of the GB Transmission System for October 2009 to March 2010

9.1 National Grid is required by Schedule 3 of the CUSC to ‘use all reasonable endeavours’ to provide estimates of the Reactive Power absorption and generation in MVARh by the GB Transmission System for the six-month period ending 31 March 2010.

9.2 This has been approached in two stages:

- The net Reactive Power utilisation (TVArh) of the GB Transmission System has been derived from the difference between the reactive output of generating units and the Net Reactive Demand at Grid Supply Points (GSPs). This is shown in Table 3 where the accuracy of the data is consistent with the underlying meter readings. The generation figures are a national monthly summation of the Settlements figures given in Appendix 5. At this stage, the data in Table 3, on the next page, may be subject to amendment via accruals or any outstanding disputes.
- The net TVArh described above has been broken down by Transmission System component and is also shown in Table 3. It should be noted that this information is based on estimates and operational records only. The ‘net reactive demand at GSP’ figures have been derived from operational records. The figures shown are net, i.e. lagging demand minus leading demand, and in the case of the figures in Table 3 they show lagging demand in each month. These figures represent the net effect of the consumer demand plus the LV losses minus the LV gain.

9.3 The simple reactive balance found in Table 3 can be described by the equation:

$$|\text{Generation Net TVArh}| = |\text{Net Reactive Demand at GSPs TVArh}| - |\text{Net System TVArh}|$$

From Table 3 it can be seen that the TVArh contribution from generation is small compared with the other components of the equation.

9.4 The more detailed breakdown found in Table 3 can be described by the following equation:

- $\text{Generation Net TVArh} = \text{Net Reactive Demand at GSPs} - \text{HV network shunt gain (BV}^2\text{)} + \text{HV network series loss (I}^2\text{X)} + \text{SGT series loss (I}^2\text{X}_t\text{)} - \text{Shunt capacitor gain} - \text{net SVC output} + \text{Shunt reactor loss.}$

Table 3 - Net System Effect October 2009 to March 2010

Component (TVArh)	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	6 month total
MSC	2.89	3.16	3.63	3.97	3.50	3.53	20.68
Shunt Reactor	-3.30	-3.44	-3.74	-3.45	-3.22	-3.85	-21.00
SVC generation	0.06	0.07	0.10	0.12	0.09	0.06	0.50
SVC absorption	-0.11	-0.14	-0.15	-0.13	-0.13	-0.20	-0.86
HV network shunt gain	9.99	10.05	10.62	10.68	9.59	10.30	61.23
HV network series losses	-3.56	-3.37	-4.00	-4.74	-3.48	-3.27	-22.42
SGT series losses	-1.49	-1.57	-1.85	-2.10	-1.86	-1.79	-10.66
<b>Net System Utilisation</b>	4.48	4.77	4.61	4.36	4.50	4.77	27.49
<b>Generation Lead</b>	-0.95	-1.01	-0.94	-0.68	-0.69	-0.90	-5.17
<b>Generation Lag</b>	0.71	0.65	0.77	0.86	0.61	0.55	4.15
<b>Net Demand at GSPs</b>	-2.20	-2.43	-2.34	-2.63	-2.48	-2.41	-14.49

9.5 The above values are all on an entirely GB basis, and thus include the contributions from English, Welsh and Scottish transmission systems, including all the 132kV and lower voltages.

9.6 Points to note when considering Table 3 include:

- HV gain varies due to circuit switching, outages and system operating voltage
- HV losses are driven by active power flows across the system
- Supergrid transformer series reactive losses are predominantly driven by local distribution company demand
- Switching of MSCs (Mechanically Switched Capacitors), SVCs (Static Var Compensators) and shunt reactors is determined by operational security requirements.

## **10. Exceptional Reactive Power Requirements**

- 10.1 Paragraph 5 in Schedule 3 of the CUSC (Statutory and Regulatory Obligations) enables National Grid to contract outside of the Reactive Power Market tender process in specific circumstances for the provision of Enhanced Reactive Power Services. National Grid is required to publish details of circumstances surrounding this in the proceeding six-month period. During the period 1 October 2009 to 31 March 2010 National Grid did not require any service contracts for the provision of enhanced voltage support.

## **Appendices**

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**Appendix 1 - Comparisons with previous Tender Rounds**

Tender Round	Tender Round Start date	BM Units able to tender	No. of BM/Non BM Unit tenders Received	ORPS	ORPS + ERPS	12 month duration	>12 months duration	Successful Gensets Offered Market Agreements	Successful Gensets signing Market Agreements	% total MVar lagging capability with Market Agreements
1	1 Apr 1998	154	85	76	9	85	0	41	41	~30%
2	1 Oct 1998	113	10	10	0	9	1	5	5	~36%
3	1 Apr 1999	150	102	102	0	102	0	75	57	~40%
4	1 Oct 1999	99	20	20	0	14	6	5	5	~40%
5	1 Apr 2000	151	99	98	1	97	2	98	89	~65%
6	1 Oct 2000	58	15	15	0	15	0	9	9	~70%
7	1 Apr 2001	145	104	104	0	104	0	43	43	~50%
8	1 Oct 2001	111	39	39	0	39	0	17	15	~57%
9	1 Apr 2002	138	76	76	0	68	8	32	32	~35%
10	1 Oct 2002	123	52	52	0	48	4	29	27	~45%
11	1 Apr 2003	125	59	59	0	57	2	31	30	~46%
12	1 Oct 2003	121	56	56	0	49	7	32	23	~43%
13	1 Apr 2004	126	46	46	0	41	5	32	32	~48%
14	1 Oct 2004	118	39	38	1	38	1	33	21	~46%

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Tender Round	Tender Round Start date	BM Units able to tender	No. of BM/Non BM Unit tenders Received	ORPS	ORPS + ERPS	12 month duration	>12 months duration	Successful Gensets Offered Market Agreements	Successful Gensets signing Market Agreements	% total MVar lagging capability with Market Agreements
15	1 Apr 2005	153	58	58	0	57	1	29	25	~35%
16	1 Oct 2005	151	37	36	1	33	4	25	13	~28%
17	1 Apr 2006	164	22	22	0	22	0	14	12	~20%
18	1 Oct 2006	164	21	20	1	21	0	7	6	~17%
19	1 Apr 2007	172	20	20	0	20	0	10	10	~14%
20	1 Oct 2007	170	30	30	0	30	0	17	15	~18%
21	1 Apr 2008	165	20	20	0	20	0	7	4	~14%
22	1 Oct 2008	176	20	20	0	20	0	8	3	~6%
23	1 Apr 2009	177	23	23	0	23	0	0	0	~2%
24	1 Oct 2009	180	22	22	0	22	0	0	0	0%
25	1 Apr 2010	181	18	18	0	18	0	0	0	0%

**NB: Tender Round 1-14 inclusive incorporates England and Wales BM Units ONLY. Tender Round 15 onwards comprise of GB BM units.**

**Appendix 2 - BM Units' contractual position at 1 April 2010**

**Scotland**

	BM Unit	Contract		BM Unit	Contract		BM Unit	Contract
1	Clachan 1	DPM	10	FIFE_01Z	DPM	19	LOAN_04Z	DPM
2	COCK_01Z	DPM	11	FOYE_01Z	DPM	20	PEHE_01Z	DPM
3	COCK_02Z	DPM	12	FOYE_02Z	DPM	21	PEHE_02Z	DPM
4	COCK_03Z	DPM	13	GRMO_01Z	DPM	22	PEHE_03Z	DPM
5	COCK_04Z	DPM	14	HUNB_07Z	DPM	23	PEHE_04Z	DPM
6	CRUA_01Z	DPM	15	HUNB_08Z	DPM	24	SLOY_04Z	DPM
7	CRUA_02Z	DPM	16	LOAN_01Z	DPM	25	TORN_01Z	DPM
8	CRUA_03Z	DPM	17	LOAN_02Z	DPM	26	TORN_02Z	DPM
9	CRUA_04Z	DPM	18	LOAN_03Z	DPM			

**North**

	BM Unit	Contract		BM Unit	Contract		BM Unit	Contract
27	BRGG_01Z	DPM	51	DRAXX10G	DPM	75	HRTL_02Z	DPM
28	CDCL_01Z	DPM	52	DRAXX12G	DPM	76	HUMR_01Z	DPM
29	CNQPS01Z	DPM	53	EGGPS01Z	DPM	77	KEAD_01Z	DPM
30	CNQPS02Z	DPM	54	EGGPS02Z	DPM	78	KILLN01Z	DPM
31	CNQPS03Z	DPM	55	EGGPS03Z	DPM	79	KILLP01Z	DPM
32	CNQPS04Z	DPM	56	EGGPS04Z	DPM	80	KILLP02Z	DPM
33	COTPS01Z	DPM	57	FELL_01Z	DPM	81	ROCK_01Z	DPM
34	COTPS02Z	DPM	58	FERR_01Z	DPM	82	ROOS_01Z	DPM
35	COTPS03Z	DPM	59	FERR_02Z	DPM	83	SCCL_01Z	DPM
36	COTPS04Z	DPM	60	FERR_03Z	DPM	84	SCCL_02Z	DPM
37	DEEP_01Z	DPM	61	FERR_04Z	DPM	85	SCCL_03Z	DPM
38	DINO_01Z	DPM	62	FFES_01Z	DPM	86	SHBA_01Z	DPM
39	DINO_02Z	DPM	63	FFES_02Z	DPM	87	SHBA_02Z	DPM
40	DINO_03Z	DPM	64	FFES_03Z	DPM	88	SHOT_01Z	DPM
41	DINO_04Z	DPM	65	FFES_04Z	DPM	89	TESI_01Z	DPM
42	DINO_05Z	DPM	66	FIDL_01Z	DPM	90	TESI_02Z	DPM
43	DINO_06Z	DPM	67	FIDL_02Z	DPM	91	WBUPS01Z	DPM
44	DRAXX01Z	DPM	68	FIDL_03Z	DPM	92	WBUPS02Z	DPM
45	DRAXX02Z	DPM	69	FIDL_04Z	DPM	93	WBUPS03Z	DPM
46	DRAXX03Z	DPM	70	HEYM101Z	DPM	94	WBUPS04Z	DPM
47	DRAXX04Z	DPM	71	HEYM102Z	DPM	95	WYLF_01Z	DPM
48	DRAXX05Z	DPM	72	HEYM207Z	DPM	96	WYLF_02Z	DPM
49	DRAXX06Z	DPM	73	HEYM208Z	DPM	97	WYLF_03Z	DPM
50	DRAXX09G	DPM	74	HRTL_01Z	DPM	98	WYLF_04Z	DPM

**Midlands**

	BM Unit	Contract		BM Unit	Contract		BM Unit	Contract
99	CORB_01Z	DPM	106	PETEM01Z	DPM	113	RUGPS06G	DPM
100	DERW_01Z	DPM	107	RATS_01Z	DPM	114	RUGPS07G	DPM
101	GYAR_01Z	DPM	108	RATS_02Z	DPM	115	SIZB_01Z	DPM
102	IRNPS01Z	DPM	109	RATS_03Z	DPM	116	SIZB_02Z	DPM
103	IRNPS02Z	DPM	110	RATS_04Z	DPM	117	SIZEA01Z	DPM
104	KLYNA01Z	DPM	111	RUGPS06Z	DPM	118	SIZEA02Z	DPM
105	LBAR_01Z	DPM	112	RUGPS07Z	DPM	119	SPLN-1	DPM
						120	SUTB_01Z	DPM

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**South**

	<b>BM Unit</b>	<b>Contract</b>		<b>BM Unit</b>	<b>Contract</b>		<b>BM Unit</b>	<b>Contract</b>
121	ABTHB07Z	DPM	141	DIDC_03G	DPM	161	LITTD01G	DPM
122	ABTHB08Z	DPM	142	DIDC_04G	DPM	162	LITTD02G	DPM
123	ABTHB09Z	DPM	143	DNGB_21Z	DPM	163	LITTD03G	DPM
124	BAGE_01Z	DPM	144	DNGB_22Z	DPM	164	LITTD01Z	DPM
125	BAGE_02Z	DPM	145	DUNGA01Z	DPM	165	LITTD02Z	DPM
126	BARK_02Z	DPM	146	DUNGA02Z	DPM	166	MEDP_01Z	DPM
127	BARK_11Z	DPM	147	DUNGA03Z	DPM	167	MRWD-1	DPM
128	BRYP_01Z	DPM	148	DUNGA04Z	DPM	168	OLDS_01Z	DPM
129	COSO_01Z	DPM	149	EECL_01Z	DPM	169	OLDS_02Z	DPM
130	COWE_01Z	DPM	150	FAWL_01Z	DPM	170	RYHPS01Z	DPM
131	COWE_02Z	DPM	151	FAWL_03Z	DPM	171	SEAB_01Z	DPM
132	DAMC_01Z	DPM	152	FAWN_01Z	DPM	172	SEAB_02Z	DPM
133	DIDC_01Z	DPM	153	GRAI_01Z	DPM	173	SHOS_01Z	DPM
134	DIDC_02Z	DPM	154	GRAI_04Z	DPM	174	TAYL_02Z	DPM
135	DIDC_03Z	DPM	155	HINB_07Z	DPM	175	TAYL_03Z	DPM
136	DIDC_04Z	DPM	156	HINB_08Z	DPM	176	TILBB08Z	DPM
137	DIDCB05Z	DPM	157	KINO_01Z	DPM	177	TILBB09Z	DPM
138	DIDCB06Z	DPM	158	KINO_02Z	DPM	178	TILBB10Z	DPM
139	DIDC_01G	DPM	159	KINO_03Z	DPM	179	USKM_13Z	DPM
140	DIDC_02G	DPM	160	KINO_04Z	DPM	180	USKM_14Z	DPM
						181	USKM_15Z	DPM

**Notes:**

Eligible BM Units for Market Agreements are those with reactive capability, leading or lagging greater than 15 MVar at the commercial boundary, and the further stipulations stated in CUSC Schedule 3.

There are no contracts for Enhanced Capability through the Reactive Tender process.

**BM Units with MSAs incorporating reactive capability, leading or lagging less than 15 MVar**

	<b>BM Unit</b>	<b>Contract</b>		<b>BM Unit</b>	<b>Contract</b>		<b>BM Unit</b>	<b>Contract</b>
1	Beauly – AIGA_01Z	DPM	18	Conon - ORRI_01Z	DPM	34	Killin - LOCH_02Z	DPM
2	Beauly – AIGA_02Z	DPM	19	Conon – TORA_01Z	DPM	35	Killin - LUBR_01Z	DPM
3	Beauly – CULL_02Z	DPM	20	Conon – TORA_02	DPM	36	Moriston - CEAN_01Z	DPM
4	Beauly - DEAN_01Z	DPM	21	ERRO_01Z	DPM	37	Moriston - CEAN_02Z	DPM
5	Beauly - DEAN_02Z	DPM	22	ERRO_02Z	DPM	38	Moriston - GLEN_01Z	DPM
6	Beauly - KIOR_01Z	DPM	23	ERRO_03Z	DPM	39	Moriston - GLEN_02Z	DPM
7	Beauly - KIOR_02Z	DPM	24	FASN_01Z	DPM	40	Moriston - Livishie 1	DPM
8	Black Law	DPM	25	FASN_02Z	DPM	41	NANT_01Z	DPM
9	Clunie - CLUN_01Z	DPM	26	FASN_03Z	DPM	42	Shin 1	DPM

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10	Clunie - CLUN_02Z	DPM	27	FINL_01Z	DPM	43	Shin 2	DPM
11	Clunie - CLUN_03Z	DPM	28	Garry - INGA_01Z	DPM	44	SLOY_01Z	DPM
12	Clunie - Pitlochry 1	DPM	29	Garry – QUOI_01Z	DPM	45	SLOY_02Z	DPM
13	Clunie - Pitlochry 2	DPM	30	Grudie Bridge 1	DPM	46	SLOY_03Z	DPM
14	Conon - LUIC_01Z	DPM	31	Grudie Bridge 2	DPM	47	Tongland	DPM
15	Conon - LUIC_02Z	DPM	32	Killin – CASH_01Z	DPM	48	Tummel Bridge 1	DPM
16	Conon - MOSS_01Z	DPM	33	Killin – LOCH_01Z	DPM	49	Tummel Bridge 2	DPM
17	Conon - MOSS_02Z	DPM						

### Notes:

Non-eligible BM Units for Market Agreements are those with reactive capability, leading or lagging less than 15 MVAR at the commercial boundary. The BM Units, above, do receive default payments as they have Mandatory Service Agreements.

**Appendix 3 - Reactive Market Agreement status at 1 April 2010**

<b>Contracts Continuing on 1 April 2010</b>			
	<b>Company</b>	<b>BM Unit ID</b>	<b>Contract Expiry Date</b>
1	None	None	N/A

<b>New Contracts Commencing on 1 April 2010</b>			
	<b>Company</b>	<b>BM Unit ID</b>	<b>Contract Expiry Date</b>
1	None	None	N/A

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**Appendix 4 - Successful tender details for contracts commencing 1 April 2010**

**Note:** There were no successful tenderers

## Appendix 5 - Tender Assessment Procedure

### A5 Introduction

A5.1 National Grid assessed Reactive Power Tender Round 25 in a manner consistent with the processes applied to all previous Tender Rounds, as detailed in Schedule 3 of the CUSC. Analytical processing was conducted in six-month time periods (Summer – from 1 April to 30 September and Winter – from 1 October to 31 March) in order to consider any interaction with the overlap of contracts secured during the previous Reactive Power Market Tender Rounds and also to take into account the effects of the implementation of CUSC Modification CAP045.

A5.2 National Grid has divided the process of assessing tenders into several stages, which were addressed as follows:

- *Tender Receipt and Registration:* The tenders were opened, in the presence of a separate witness and all tender data submitted was entered into TARDIS (Transmission Ancillary Reactive Database Information System).
- *Tender Data validation:* All TARDIS entries were then separately checked back to the original tender sheets. Compliance checks within TARDIS showed that all the tenders submitted were compliant.
- *Reactive Power Service Assessment:* The tenders were assessed against forecast, taking into account the many interacting factors associated with each tender acceptance decision, as described in Appendix 6 in Schedule 3 of the CUSC. This involved, inter-alia, evaluation against projections of expenditure and availability of service against historical and forecast MVar and MVarh data to produce central views of the money payable under the DPM (Default Payment Mechanism) or a Market Agreement (described below). The overall assessment was supported by an examination of a number of credible sensitivities around the central assessment.

### A5.3 Core Analytical Processing

- Tender assessment takes place in the context of uncertainties and interactions affecting reactive payments and transmission requirements. To initiate the assessment of the overall value of each tender, it is considered necessary to construct a central view of future payments so that the relative impact of the factors influencing the economic evaluation of tenders can be fully addressed.

For each BM Unit tendered, the processing was as follows:

- Forecast Mvarh generated, in each band by reactive Mvar breakpoints,

based on historical trends and forecast load factors. The historical observations covered the period April 2005 to December 2009 and came from the Ancillary Services records against which Reactive Power utilisation is currently being paid.

- The alternative DPM utilisation payment was forecast as the forecast Mvarh multiplied by the forecast utilisation prices. These utilisation prices were £2.47/Mvarh for summer and £2.88/Mvarh for winter. The utilisation prices were derived from the calculation defined in the CUSC Schedule 3, using a forecast of indices. Utilisation prices and the associated forecasted indices were communicated to all potential service providers and published before Market Day.
- The market agreement capability payment was forecast as tendered price multiplied by tendered capability, allowing for break-points, multiplied by forecast hours for both available and synchronised capability.
- The market agreement utilisation payment was forecast as tendered prices multiplied by the same forecast Mvarh as those used in the alternative DPM payment forecast, respecting the tendered break-point bands of Mvarh utilisation.
- The core comparison of default versus market agreement is based on the forecast payments detailed above. However, Reactive Power assessment is by no means as simple as taking the cheapest option. A full understanding of the factors influencing Reactive Power requirements on the GB Transmission System must be taken into account to provide a complete economic assessment of tender value

#### A5.4 Assessment Sensitivities

- The Reactive Power market tender evaluation process is subjective in nature, based as it is on forecast assumptions. It has therefore been important to establish a framework within which this subjectivity could be exercised in a consistent fashion across all tenders.
- The principal role of tender assessment is to quantify and evaluate consistently the many factors that should be considered. These factors are referred to in 3.3(e)(ii) of Schedule 3 of the CUSC. National Grid assessment has developed and implemented a process enabling these factors and associated uncertainties to be methodically considered.
- In the light of CAP045, the variability in the DPM price will affect the balance between market and default payments. The robustness of the core contract decisions was considered against a range of Default prices from the central forecast Default prices used. A range of +/-10% on Default prices was considered alongside historic trends.

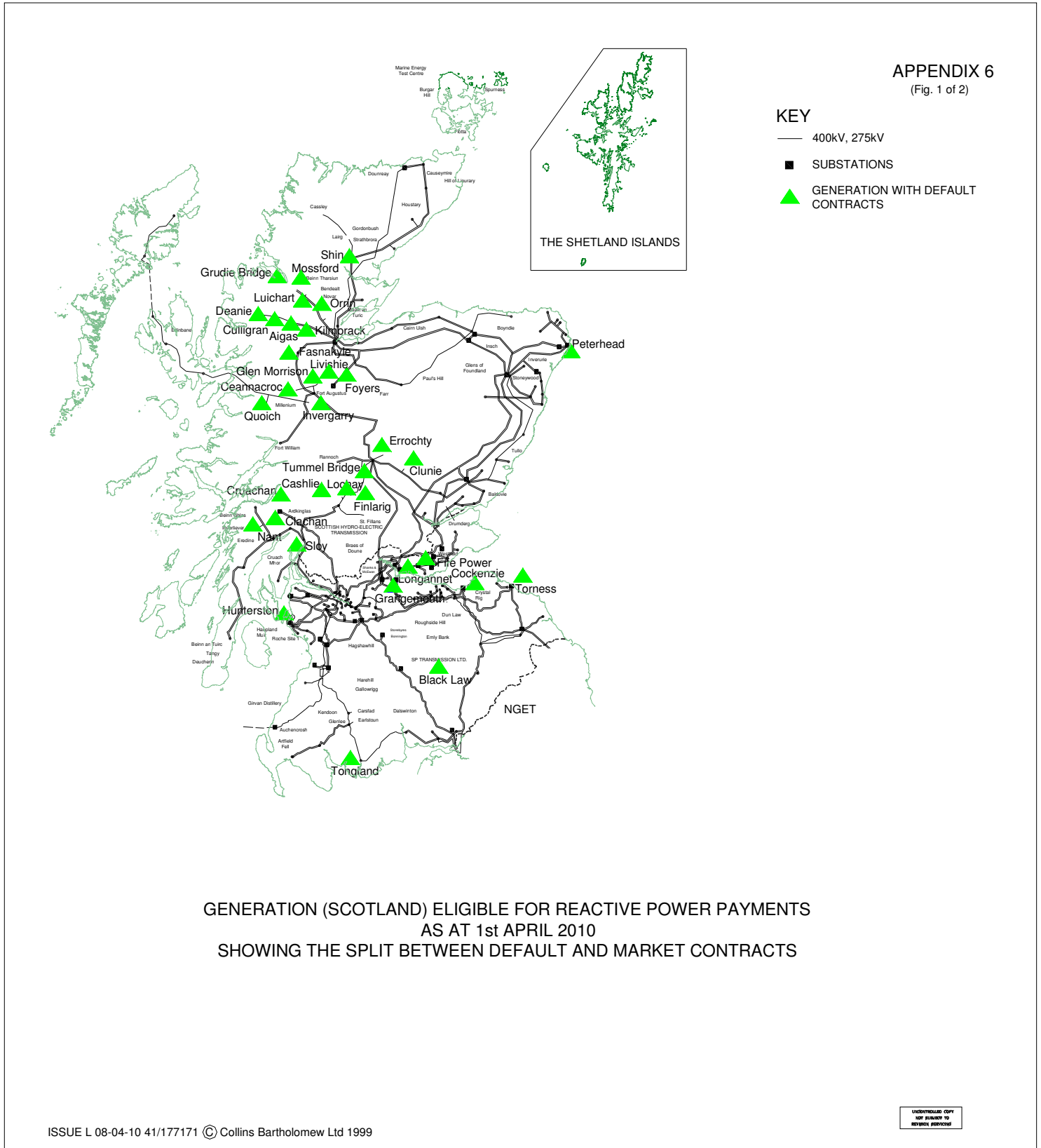
- National Grid recognised that availability and maximum MVarh from a BMU is affected by outage plans and unforeseen break downs. A central MVarh forecast from each BMU was first developed considering given outage plan and historic reliability. The robustness of the central contract decisions was then tested against a range of variation on planned outage and estimated breakdown rate.

Specific questions were asked of each tender, examples of which follow:

- *Would a Market Agreement (central case assessment) give a reduction in payments?*
- *Would a Market Agreement reflect the effectiveness at providing voltage support at that location?*
- *Would a Market Agreement be robust against expected individual variations in utilisation due to any of the following:*
  - ◆ *A new station opening nearby*
  - ◆ *An existing nearby station closing*
  - ◆ *A change in local Reactive Power demand*
  - ◆ *A change to the transmission system (including planned outages)*
- *Would a Market Agreement enhance the incentive on the Generator to maintain its Grid Code capability?*
- *How would a Market Agreement affect operational despatch?*
- *To what extent might a Market Agreement potentially offset National Grid investment?*
- *Would a Market Agreement for ORPS enable a desired contract for ERPS?*
- All other criteria in CUSC Schedule 3, paragraph 3, are covered by this methodology.
- In all cases, National Grid continued to consider interaction with forecast transmission constraints. In all cases, there were insignificant interactions with the constraints identified.
- In all cases, National Grid considered possible interaction with National Grid planned investments. The commissioning of new National Grid transmission equipment, which includes some reactive compensation equipment, influenced National Grid's view of forecast MVarh. All of the commissioning

equipment is required for compliance with Transmission Licence Standards, and re-phasing of planned National Grid investments within a 12-month contract period is not a practical option.

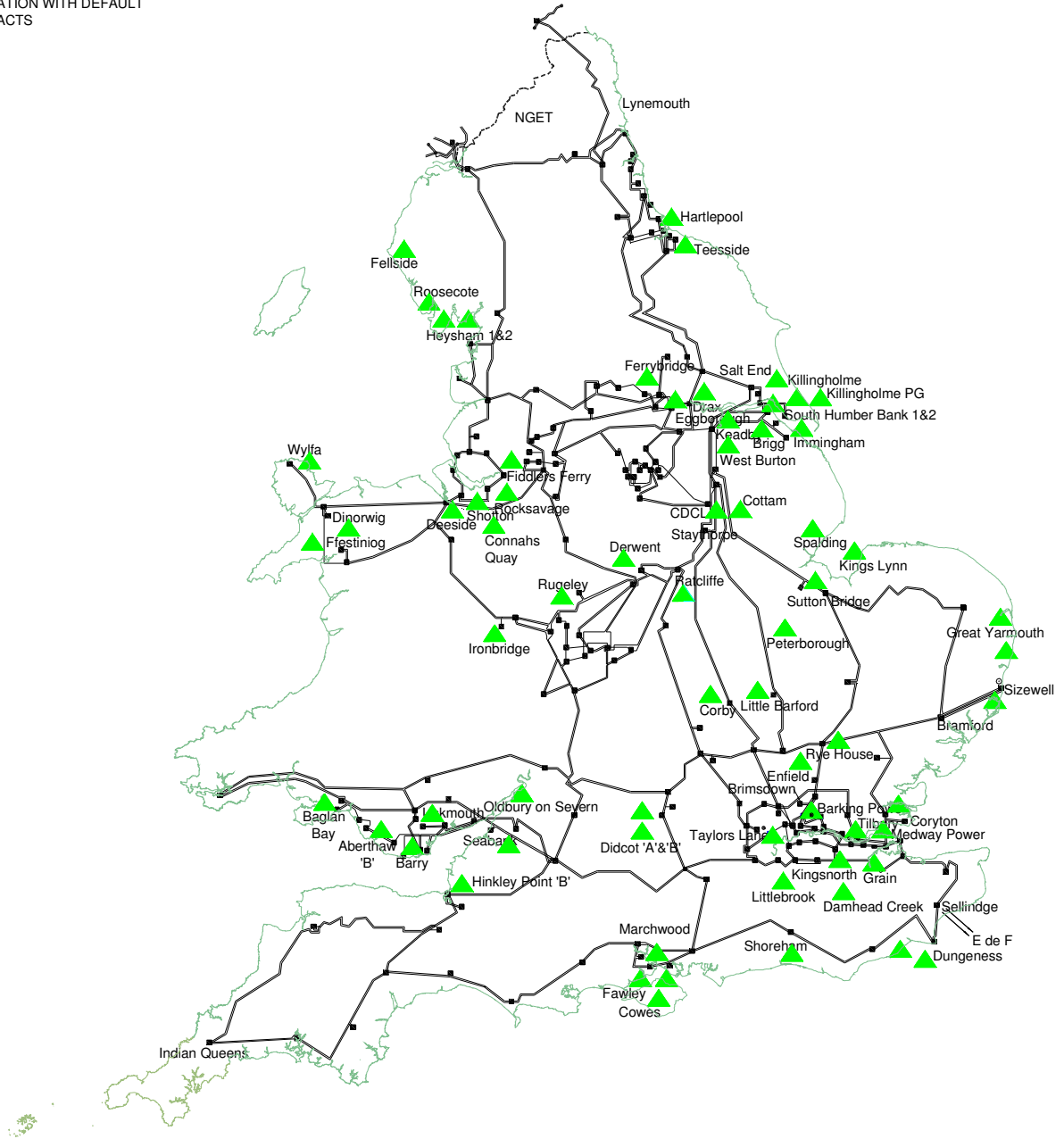
**Appendix 6 - Geographic Distribution between DPM and Market Contracts**



APPENDIX 6  
(Fig. 2 of 2)

KEY

- 400kV, 275kV
- SUBSTATIONS
- ▲ GENERATION WITH DEFAULT CONTRACTS



GENERATION (ENGLAND AND WALES) ELIGIBLE FOR REACTIVE POWER PAYMENTS  
AS AT 1st APRIL 2010  
SHOWING THE SPLIT BETWEEN DEFAULT AND MARKET CONTRACTS

## **Appendix 7 - Contact Information**

A7.1 Further report information, comments suggestions and enquiries can be directed to:

**David Preston  
Network Operations (B2)  
National Grid  
National Grid House  
Warwick Technology Park  
Gallows Hill  
Warwick  
CV34 6DA**

On telephone number: **01926 655909**  
Email: **david.a.preston@uk.ngrid.com**

A7.2 For any other information please visit the National Grid website on the following address:

**<http://www.nationalgrid.com/uk/Electricity/Balancing/services/ReactivePower/markettender/>**