BM System Replacement

Industry Consultation

On

System interfaces and BMU modelling

11 October 2010

Responses requested by 11 November 2010

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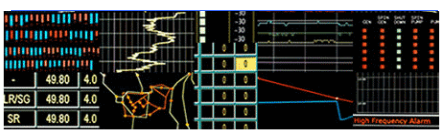

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1 Executive Summary

Purpose of this document

National Grid's industry consultation on 7 October 2008 sought industry views on the proposed replacement of the Balancing Mechanism (BM) system which National Grid uses to balance the system and manage real-time electricity supply and demand. It interfaces with market participant systems, other National Grid systems, and delivers data to the Balancing Mechanism Reporting Service (BMRS) and the Settlement Administration Agent (SAA).

National Grid has now agreed a contract[1] with ABB to supply the replacement system and the design stage of the contract will commence shortly. It is now possible to consider the detailed functionality contained within ABB's offering and National Grid is keen to obtain industry views for inclusion in the design stage of the new system. As this project is likely to continue into 2013, National Grid would also like industry views on the ongoing industry engagement during the duration of the BM replacement project.

This consultation seeks industry's views on:

- The new industry electronic interfaces that will be offered after system go-live;
- Enhancements to the modelling of Balancing Mechanism Units (BMUs);
- Ongoing industry involvement in the BM replacement project.

Responses to this consultation should be sent to balancingservices@uk.ngrid.com by 5pm on 11 November 2010.

[1] Full details of the announcement of the contract award on 7 October 2010 can be found on http://www.nationalgrid.com/uk/Electricity/Balancing/consultations/

2 Introduction

This section provides a background to the consultation and summarises the key points from the October 2008 industry consultation, including how the industry requirements for the new system have been addressed. It also provides information on contract award for the new system and the indicative project timeline.

2.1 Background

The Balancing Mechanism (BM) system is used by National Grid to balance the system and manage real-time electricity supply and demand. It interfaces with market participant systems, other National Grid systems, and delivers data to the BMRS (Balancing Mechanism Reporting Service) and the Settlement Administration Agent (SAA).

The current BM system has evolved from operational IT systems developed in the 1980s and 1990s. National Grid believes that the BM system is not equipped to meet the imminent challenges resulting from anticipated large volumes of renewable generation. A new system is therefore needed to facilitate de-carbonisation of electricity in order to meet UK emissions targets.

Given the system age and associated reliability and supportability risks, National Grid considers that delaying the replacement of the current system to accommodate other ongoing initiatives is not a feasible option.

2.2 October 2008 Industry Consultation[2]

National Grid consulted with the industry in October 2008 on the proposed replacement of the BM system with a global best-practice IT system. The industry responses covered a number of system replacement topics ranging from system replacement objectives to automated despatch instructions. In order to minimise the

[2] Industry consultation document (dated 7 October 2008) is available on http://www.nationalgrid.com/NR/rdonlyres/B961884A-EC28-4771-A40F-02F254B00A18/28752/bmrepconsultationv10.pdf and the associated consultation report (dated 18 December 2008) can be found on http://www.nationalgrid.com/NR/rdonlyres/24F16112-AB64-426E-AC4E-20B88F0ACE21/30687/bmrepconsultationreportv10.pdf

impact of BM replacement on the industry, National Grid proposed a phased way forward and the industry's views were categorised accordingly:

Phase 1 of BM replacement summarised industry views that needed to be considered in the procurement of the new system; any areas that needed further discussions with the industry were also highlighted.
Phase 2 of BM replacement summarised industry views that focussed on system enhancements after implementation of the new system.

The above industry views are summarised in Appendix 1.

2.2.1 Incorporation of Industry views

Although the industry views covered a wide range of areas including post-implementation system enhancements, the focus to date has been on the procurement of the new system and ensuring that it has the required functionality to meet existing requirements and the capability to meet the future needs of the industry.

The industry views on system procurement were incorporated in the System Requirements Specification (SRS) which formed the basis for assessing the overall capabilities of the vendor systems. The vendor responses (written submissions) to the SRS were complemented by 'proof of concept' demonstrations by the vendors.

The industry views and requirements for system procurement have been of great value in assessing the overall capabilities of the vendor systems. Appendix 2 lists the industry's stated requirements and details National Grid's proposals to meet these requirements.

2.3 System Procurement and Contract Award

Following an independent global review of the IT systems used by other system operators and an open tender process which initially attracted 17 interested parties (9 of whom requested information packs), National Grid followed a rigorous assessment process to reduce the number of potential vendors to 3 who are all major players in the energy sector. The final decision on the selection of the preferred vendor was based on the detailed assessment of technical and commercial offerings of the three vendors.

Consequently, National Grid has agreed a contract with ABB for the replacement of its Balancing Mechanism (BM) system with a global best-practice IT system[3]. The new system will be referred to as the Electricity Balancing System (EBS) in this document and subsequent industry communications. The total cost of the EBS (including ABB and National Grid's internal costs covering both the software and the hardware) is estimated to be around £30m and the new system is expected to go live in 2013.

The EBS will require some customisation[4] to comply with the GB market rules and other requirements.

2.4 Indicative Project Timeline

The October 2008 consultation provided an indicative go-live date of Q3 in 2012. However, the contract negotiations have taken longer than anticipated and the revised go-live date is estimated to be around mid 2013.

An indicative timeline for system development and implementation is shown in Table 1. The timeline is not definitive and is only intended to give an overview of the duration of the BM replacement project.

The main impact on the market participants is likely to be during End-to-End testing towards the end of 2012 (prior to this date, the project activities are internal to National Grid). National Grid will provide further details of the testing approach in advance of this date so that the industry has sufficient time to plan the testing of their systems with the EBS.

Table 1

Indicative Timeline for System Development and Implementation

Key Task	2010				2011				2012				2013			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Contract award																
Industry consultation 2																
Design																
Build & National Grid/vendor testing																
Market participant interface testing																
Transition																
Go-live																

[3] Full details of the announcement of the contract award on 7 October 2010 can be found on http://www.nationalgrid.com/uk/Electricity/Balancing/consultations/

[4] All vendor systems assessed by National Grid, including the EBS supplied by ABB, required customisation.

2.5 Change Freeze Period

Following responses to the October 2008 consultation where National Grid outlined a change freeze period of 3 years (from the end of vendor selection to go-live), National Grid acknowledged industry views that regime changes may be needed during this period. From past experience of modifications to the BM system, National Grid identified that only three out of the ten modifications involved changes to the core BM systems. The remaining seven modifications were essentially interface changes and such changes are anticipated to be much easier in the EBS and hence would not be subject to change freeze.

National Grid considered that any proposed market changes during the change freeze period would undergo thorough impact assessment (e.g. cost / benefit and urgency) as these changes could have major implications for BM replacement project costs, delays in delivering the project and impact on the robustness of the new system.

3 Purpose of Consultation

This section outlines the main reason for the consultation.

Following the agreement of a contract with ABB for the delivery of a global best-practice system, the design stage of the EBS will commence shortly.

Whilst there will be no impact on the market participant systems during the design phase, National Grid is now in a position to seek industry views on some of the key vendor-specific aspects of the system that may impact the system design. This will give the industry an opportunity to provide input into the areas of the new system that may affect them after go-live, and will allow the EBS to be designed in line with the industry's requirements.

4 Scope of Consultation

This section outlines areas covered by the consultation.

In the October 2008 consultation, National Grid stated that some requirements may require further consultation with the industry. This consultation covers a number of

such requirements, the majority of which were raised by the industry in their responses to the October 2008 consultation.

National Grid is seeking industry views on the following:

- The electronic interfaces for communications between market participants systems and the Electricity Balancing System;
- Proposals to change the modelling of generating units in the balancing mechanism e.g. the modelling of multi-shaft CCGT[5] modules, time-varying dynamic parameters etc.

5 Industry Interfaces in the EBS

This section provides details of the main industry interfaces that will be available in the new IT system, and seeks industry views on migrating to the new interfaces.

5.1 Industry Views from October 2008 Consultation on Industry Interfaces

The industry views on the existing industry interfaces, including EDL[6] and EDT[7], are summarised in Appendix 3. These views show a wide range of comments, from maintaining the existing EDL and EDT interfaces to the use of XML[8]-based standard formats.

5.2 Support for Existing Industry Interfaces

As stated in the October 2008 consultation, National Grid intended to maintain the existing interfaces of EDL and EDT at and after go-live. The industry responses to the consultation confirmed that this was a pragmatic way forward as it minimised the impact on the industry at go-live.

ABB has confirmed that its system will support the existing EDL and EDT interfaces.

[5] Combined Cycle Gas Turbine

[6] Electronic Data Logging – allows National Grid to send Bid-Offer Acceptances and other instructions to Control Points (power stations) and Control Points to submit Import and Export Limits and Dynamic Parameters

[7] Electronic Data Transfer – allows Trading Points to submit Physical Notifications, Bid-Offer Data, Import and Export Limits and day ahead Dynamic Parameters to National Grid

[8] eXtensible Markup Language

In line with the industry views, National Grid will therefore maintain the existing industry interfaces at and after go-live.

Sections 5.3 – 5.5 outline the capabilities of the EBS that could be made available at or after go-live.

5.3 Availability of New Industry Interfaces

In line with the industry views, ABB has confirmed that the data exchanges with the industry will be based on the web technologies. ABB's standard Market Participant Interface for data exchanges with external users provides three mechanisms for data exchanges with external users:

1. Web-browser forms-based data submission;
2. Web browser-based XML file upload/download capability;
3. Web services-based computer-to-computer data exchanges.

Each of these mechanisms are potential future replacements for EDT, and in conjunction with different communications options (internet, ISDN or leased line etc.), they should offer market participants a range of solutions with different levels of complexity and cost. Market participants would then be able to select the solution(s) that best meets their business requirements.

With all three data exchange mechanisms, the market participants will immediately receive a notification of the receipt of their data along with a transaction ID and the information about the acceptance or rejection of their submission; in the event of a rejection, errors in the submission will be identified. Such notifications will be in the same format as the submission; for example, participants submitting data using a web form will receive their notification on a web page.

ABB is also offering a future replacement for EDL which is more specific to the GB market than the replacements for EDT. Most other markets dispatch generation by publishing the 5-minute-resolution dispatch algorithm results to the market participants; this is not compatible with the closed volume Bid-Offer Acceptances used in the GB market. The replacement for EDL will be based on web services standards that rely on the Control Point's IP addresses to implement what amounts to a peer-to-peer web service. It should remove the need for market participants to

install National Grid software (e.g. the existing CTC Message Client Software[9]) on their infrastructure in order to utilise the EDL service.

In terms of the receipt of data from market participants, for historic reasons current EDL and EDT receive data in different file formats which are processed in different ways by the current BM Systems. It is National Grid's intention that the new technology replacements for EDL and EDT have a common format for market participant data submissions.

ABB has confirmed that its base software will support the ENTSO-E[10] standards, and will closely follow ENTSO-E standards templates where data exchanges do not have a parallel ENTSO-E standard.

Consultation Question 1
Do you have a preference for one of the following mechanisms for data exchange with EBS:
(i) Web-browser forms-based data submission;
(ii) Web browser-based XML file upload/download capability;
(iii) Web services-based computer-to-computer data exchanges
(iv) A different mechanism or a variation on the above (please provide details and benefits of such a mechanism over other mechanisms mentioned above)?

5.4 Widening the Range of Electronic Data submission

There are a number of items of Balancing Mechanism or Ancillary Service related data that cannot be submitted via the existing EDL and EDT interfaces and are therefore submitted by fax. The new industry interfaces have been specified to allow the electronic submission of various additional items of data including:

i) Other Relevant Data[11] i.e. the Two Shifting Limit and the Station Synchronising and De-synchronising Intervals;
ii) Re-declarations of frequency response and reactive power capabilities;
iii) Instructions to specify a different target frequency.

[9] This software can be found on http://www.nationalgrid.com/uk/Electricity/Balancing/EDL
[10] European Network of Transmission System Operators for Electricity
[11] As defined in the Grid Code BC1.4.2(f)

In addition, the new industry interfaces would support any revisions to the modelling of Balancing Mechanism Units that may be agreed by the industry (see section 6 of this consultation).

5.5 Transition from EDL/EDT to New Industry Interfaces

As stated in section 5.2, National Grid will continue to support EDL and EDT for an agreed period after go-live. However, in the longer term, maintaining both the existing and new industry interfaces has cost implications for both the industry and National Grid which we are keen to minimise. At some point, it would be desirable to discontinue EDL and EDT and transfer all remaining users to the new industry interfaces. National Grid would like to gauge industry interest in the transition from EDL and EDT to the new industry interfaces.

Consultation Question 2
Would you be interested in moving to the new industry interfaces with their capability to electronically submit a wider range of data?

Consultation Question 3
If the answer to Q1 is yes, please indicate when you would envisage moving to the new industry interfaces:

(i) Soon after go-live?
(ii) Within 2 years of go-live?
(iii) Within 5 years of go-live?
(iv) More than 5 years (please specify)?

Consultation Question 4
Would you support a cut-off date for migrating to the new interfaces? If so, please provide views on the cut-off date.

6 Modelling of Balancing Mechanism Units

This section provides details of the potential modelling approaches in the new system for Balancing Mechanism Units (BMUs).

6.1 Current Approach to the Modelling of CCGT Modules

Currently, a CCGT module[12] is formally represented in the GB Balancing Mechanism by a single BM Unit. There are separate, fax-based processes to allow market participants to submit Other Relevant Data specific to multi-shaft CCGT modules to National Grid. These are:

- CCGT Module Matrix[13]
- "Notification to NGET of Active Power Increase Above Submitted MEL via a GT Unit Synchronisation on a CCGT Module" fax form; this data is subsequently made available to market participants on SONAR https://www.nationalgrid.com/sonar/
- "Notification to NGET of Active Power Reduction below Submitted SEL via a GT Unit Desynchronisation on a CCGT Module" fax form; this data is subsequently published on SONAR

Copies of the fax forms described above can be found in Appendix 4.

There is currently no single model that consolidates these different sources of data in one place in order to describe the key characteristics of multi-shaft CCGT modules. This is a key example of the restrictive nature of the present BM system which the EBS would be able to overcome.

6.2 Industry Views from October 2008 Consultation on Modelling of Multi-Unit BMUs

The October 2008 consultation provided the following industry views in relation to the modelling of generator modules:

- Facilitate altering ramp rates for first and second GT (Gas Turbine) in a '2+1' CCGT configuration; allow for up to 5 ramp rate configurations;
- Deal with availability of additional GTs in a CCGT module;
- Allow additional dynamic parameter data set for multi shaft BMUs and unlock extra BMU flexibility (e.g. for cascade hydros);

[12] Defined in the Grid Code as "A collection of **Generating Units** (registered as a **CCGT Module** under the PC) comprising one or more **Gas Turbine Units** (or other gas based engine units) and one or more **Steam Units** where, in normal operation, the waste heat from the **Gas Turbines** is passed to the water/steam system of the associated **Steam Unit** or **Steam Units** and where the component units within the **CCGT Module** are directly connected by steam or hot gas lines which enable those units to contribute to the efficiency of the combined cycle operation of the **CCGT Module**."

[13] As specified in Grid Code BC1.A.1.1.6

- Add a system feature to deal with operation below declared SEL.

The above industry views support the need for the consolidation of existing data sources and the review of existing parameter sets in order to adequately model the key characteristics of multi-shaft CCGT modules and other multi-unit BMUs in the GB Balancing Mechanism.

6.3 Modelling of Multi-shaft CCGTs in the EBS

The new system offers three broad approaches to the modelling of multi-shaft CCGTs comprising Gas Turbines (GTs) and Steam Turbines (STs) which are briefly described below. Given the limitations of the current modelling approach described in section 6.1, it would be desirable to incorporate one of these approaches at go-live.

6.3.1 Single Unit Modelling

In this approach, the CCGT is modelled as a single unit with its own operating characteristics and costs (the approach used presently in the BM system is closest to this modelling approach). The ramp rate modelling would be enhanced to allow up to ten Run-Up and Run-Down rates along with slower minimum rates (see section 6.4); this would allow better modelling of the multiple ramps, holds and units' notice to synchronise involved in the start-up and shutdown of component GTs and the STs.

The advantage of this approach is that it is simple and very similar to the current approach. However, it has no concept of the GTs and STs that comprise the module and nor, consequently, of any parameters relating to these units such as the individual GT Minimum Zero or Non-Zero Time currently available for submission using the "Notification to NGET…" fax forms. In practical terms, this approach would mean that EBS would have no knowledge of the impact of Physical Notifications or Bid-Offer Acceptances on the number of GTs and STs in operation.

6.3.2 Pseudo Unit Modelling

This approach applies to a CCGT that has one or more GTs and a single ST. Pseudo GTs consist of a single GT and the associated share of the ST. It could be combined with the increased number and range of Run-Up and Run-Down Rates as described in section 6.4.

This approach allows parameters relating to individual GTs to be modelled accurately e.g. Stable Export Limit, Notice to Deviate from Zero, Minimum Zero and Non-Zero Times, and the selection of the applicable frequency response contract. However, this approach would be likely to mean that each multi-shaft CCGT module would be represented in the Balancing Mechanism as multiple BMUs – one for each gas turbine. This is in contrast to National Grid's understanding that most modules are controlled in "block load" mode for the majority of the time i.e. as a whole module, rather than individual units. If the module was represented in the Balancing Mechanism as multiple BMUs, these would each receive their own Bid-Offer Acceptances and there is the possibility, albeit remote, that if they were the marginal units then they could be issued non-symmetrical Bid-Offer Acceptances even if their Bid-Offer Data prices were the same. Introducing multiple BMUs could also have implications for metering and settlement etc.

6.3.3 Configuration Modelling

In this approach, each configuration of the CCGT module is modelled separately with its own operating characteristics. For example, a CCGT with 2 GTs (GT1 and GT2) and a single ST could have the following possible configurations:

- GT1
- GT2
- GT1 + GT2
- GT1 + ST
- GT2 + ST
- GT1 + GT2 + ST

A requirement (internal to the EBS) will be added that only one configuration can operate at any one time. ABB have implemented this approach in a similar system developed for another market.

This could be implemented in the GB market by amending the CCGT Module Matrix (ref. Grid Code BC1.A.1.6.1) and allowing it to be submitted electronically using the new industry interfaces. Such an approach may also be applicable to cascade hydro schemes. The amended CCGT module matrix might look like the example shown below:

Example - extended CCGT Module Matrix

Minimum generation in configuration	Availability in configuration	Units synchronised in configuration			Run-Up Rate(s)	Run-Down Rate(s)	Last unit on minimum on time (mins)	Last unit off minimum off time (mins)
		1st GT	2nd GT	ST				
OFF	OFF				80 minutes (module NDZ)	-	-	360 (module MZT)
1st Transition					10MW/min	10MW/min		
150MW	224MW	X			10MWmin	10MW/min	240 (module MNZT)	360
2nd Transition					0.05MW/min	15MW/min		
225MW	375MW	X		X	15MW/min	15MW/min	240	360
3rd Transition					0.04MW/min	20MW/min		
					to 376MW then			
					20MW/min			
450MW (module SEL)	750MW (module MEL)	X	X	X	20MW/min	20MW/min	240	-

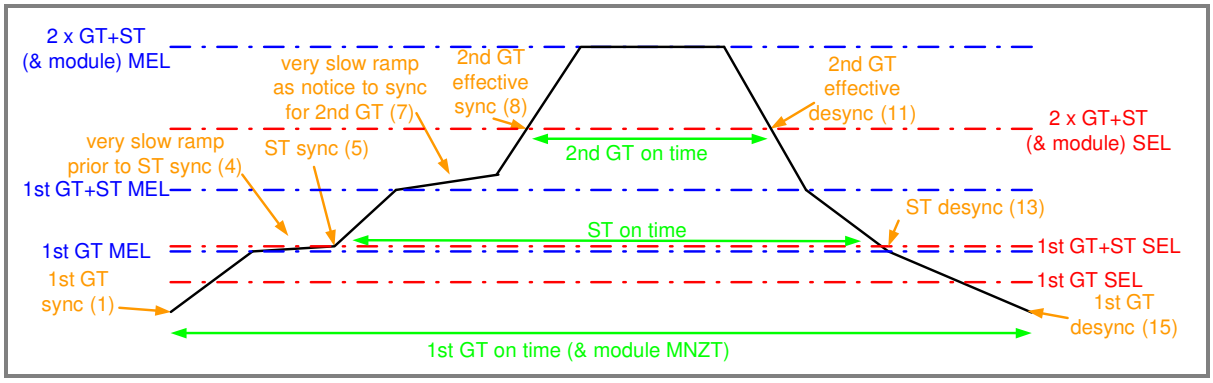
The data in the “Minimum generation in configuration” column is the Stable Export Limit (SEL) for the configuration in question.

The data in the “Availability in configuration” column is the effective Maximum Export Limit (MEL) of the module in that configuration.

If the only information sent to the power station is the Bid-Offer Acceptance’s power vs. time profile, this restricts each configuration to having only one “increase load” and one “decrease load” adjacent configurations.

For the same reason, the minimum and maximum generation ranges for each configuration cannot overlap with the ranges for any other configuration as the Bid-Offer Acceptance’s power vs. time profile does not communicate enough information to be able to distinguish between configurations with overlapping generation ranges. It may be possible to send information relating to the configuration with the Bid-Offer Acceptance in a similar way to pumped storage instructions, but this may add complexity to the solution.

The following illustration shows how this approach (with two GTs and one ST) could work.



Here is a worked example of the start-up and shutdown of a module in accordance with the example extended module matrix on the previous page and the above illustration (bracketed numbers in the illustration correspond to the relevant steps below):

1. At 08:05 issue BOA for module (1st GT) to synchronise at 09:25 (80 minutes notice to sync).
2. The module (1st GT) then runs up from 0MW to the minimum generation of 150MW at 10MW/min getting there at 09:40.
3. It then continues to run up to the availability in the 1 x GT configuration of 224MW at 10MW/min getting there at 09:48.
4. The module then transitions from the 1 x GT to the 1 x GT + ST configuration and holds at an (approximately) constant load for 20 minutes which is modelled by it running up from 224MW to 225MW at the very slow rate of 0.05MW/min.
5. The ST is considered synchronised at 10:08.
6. It then runs up from 225MW to 375MW at 15MW/min getting there at 10:18.
7. The module then transitions from the 1 x GT + ST to the 2 x GT + ST configuration and to do this holds at (approximately) constant load for 25 minutes which is modelled by it running up at 0.04MW/min from 375MW to 376MW which takes until 10:43.
8. It then runs up from 376MW to 450MW at 20MW/min getting there at 10:47. At this point the second GT is considered synchronised (e.g. for the purposes of calculating minimum on time) even though the actual synchronisation may have occurred earlier.
9. The module then runs up from 450MW to 750MW at 20MW/min getting there at 11:02.
10. At 14:32 the module then runs down to 450MW at 20MW/min getting there at 14:47.

11. It then starts to transition from the 2 x GT + ST configuration to 1 x GT + ST configuration from 450MW to 375MW at 20MW/min (for the purposes of minimum on time the 2nd GT is considered desynchronised when its output is instructed below the minimum generation for the 2 x GT + ST configuration i.e. at 14:59 which is the earliest it can do without breaking the 240 minute "Last unit on minimum on time"). It achieves 375MW at 14:51.
12. It then runs down from 375MW to 225MW at 15MW/min getting there at 15:01.
13. It then starts to transition from the 1 x GT + ST configuration to 1 x GT running down to 224MW at 15MW/min getting there at 15:02. At this point the ST is considered desynchronised.
14. It then runs down to 150MW at 10MW/min getting there at 15:10.
15. It starts its transition to off and runs down to 0MW at 10MW/min with the module being off at 15:25.

Out of the three modelling approaches outlined above, this is the most detailed and complicated approach, but it does seem to model the key characteristics of multi-shaft CCGT modules as currently submitted by EDT and EDL and fax. It would be necessary for market participants to regularly review and if necessary resubmit their extended electronic module matrix data e.g. as ambient conditions change, as this data would be the sole information used to determine the power vs. time profile of the Bid-Offer Acceptances issued.

6.3.4 Comparison of Modelling Approaches

The following table summarises the high level advantages and disadvantages of the three modelling approaches:

	Approach	Advantages	Disadvantages
1	Single Unit	▪ Simple ▪ Unlikely to require a Grid Code change	▪ This approach to CCGT modelling contains no information relating to the individual GTs and STs that form the module, nor any parameters that relate to them such as minimum on or off times or minimum generation levels.
2	Pseudo Unit	▪ Good for modelling each GT's minimum on and off times and	▪ Seems to conflict with CCGT modules being controlled,

	Approach	Advantages	Disadvantages
		each Pseudo Unit can have its own Notice to Deviate from Zero (NDZ)	metered and settled etc. as modules, rather than individual units. ▪ Requires a Grid Code change
3	Configuration	▪ Consolidates the key data submitted by the existing processes in a form that can be utilised by the replacement system and its interaction with market participants; ▪ Specifically it models parameters associated with individual units including minimum on and off times, their impact on module SEL; ▪ Variation to this approach may also improve modelling of cascade hydro schemes.	▪ Complicated ▪ This data would be used to create Bid-Offer Acceptances and therefore the onus would be on market participants to regularly review this data, e.g. for ambient conditions. ▪ Requires a Grid Code change

The above table shows that each modelling approach has benefits and drawbacks. National Grid would like to seek industry views on how the CCGTs should be modelled in the new system.

Consultation Question 5
Do you have a preference for one of the following modelling approaches offered by the vendor:
(i) Single unit modelling?
(ii) Pseudo unit modelling?
(iii) Configuration modelling?
(iv) A different approach or a variation on the above (please provide details and benefits of such an approach over other approaches mentioned above)?

6.4 Dynamic Parameters

6.4.1 Run-Up and Run-Down Rates

The Grid Code specifies details of submission of dynamic parameters such as the Run-Up Rates and Run-Down Rates, and states that up to three such rates can be submitted.

The new system has the capability to meet industry requirement for more than three ramp rates; it allows the submission of up to ten run-up and run-down rates via the new industry interfaces.

Should the industry require this functionality to be available soon after go-live via the new industry interfaces, changes to the Grid Code will be required in a timely manner (e.g. the change process will need to be initiated in advance of the system go-live).

Consultation Question 6
Do you think that the increased number of ramp rates should be made available soon after system go-live?

6.4.2 Other Improvement to the Dynamic Parameters

i) In the new system and for submission by the new industry interfaces, the lower limit on the Run-Up and Run-Down Rates could be set to a lower level than the existing minimum value of 0.2 MW/min. This limit could, for example, be set to 0.02 MW/min. Under current market arrangements, the value could not be much smaller than 0.02MW/min. This is because, in order to ensure that Bid-Offer Acceptances do not involve BMUs ramping at rates even marginally in excess of their submitted parameters, BOA target MWs are always rounded down – if a BMU ramped at 0.02MW/min then it would take 50 minutes to change load by one whole MW which is not much shorter than the minimum (60 minutes) duration of the Balancing Mechanism Window Period;

ii) The new system will allow submission of Stable Export Limits (SEL) and Stable Import Limits (SIL) that vary with time (e.g. to reflect planned changes in SEL overnight); the current submission of SEL and SIL is time-independent.

Consultation Question 7
Do you think that the minimum value for ramp rates should be set to a lower value than the current value of 0.2MW/min? If yes, what should it be?

Consultation Question 8
Do you think that the new system should provide functionality for a time-dependent Stable Export Limit (SEL) and Stable Import Limit (SIL)?

7 Ongoing Industry Engagement

National Grid envisages a need for the ongoing involvement of the industry in the detailed design, development and ultimately the testing of the new system (including industry interfaces) and is interested in receiving suggestions for how this might best be achieved.

Consultation Question 9

(a) Please state which of the following methods we should, or should not, use in engaging the industry in on-going issues relating to EBS e.g. detailed design of new industry interfaces:

1. *Consultation documents*
2. *Individual meetings*
3. *Group seminars*
4. *Dedicated EBS project webpage*
5. *Information bulletins*
6. *Other, or a combination of the above (please state).*

(b) Please state if any of the engagement methods listed above we should definitely not use. Please give reasons in each case.

8 Consultation Responses

8.1 Summary of Consultation Questions

The consultation questions are summarised in Appendix 5. The proforma in Appendix 5 can be used to respond to the consultation questions.

8.2 How to Respond

Responses should be submitted by replying to the consultation questions in Appendix 5 and e-mailing the completed proforma to balancingservices@uk.ngrid.com.

If you do not wish any elements of your response to be made publicly available, please mark these as confidential.

8.3 Deadline for Responses

The consultation period for this consultation is one month from the date of publication (11 October 2010) of this document. Therefore responses are required **by 11 November 2010**.

Following this, National Grid will aim to publish a consultation report in December 2010 or early 2011.

8.4 Help with Queries

If you have queries regarding any aspect of this consultation, please contact:

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9 Next Steps

Once the consultation responses have been received, National Grid will summarise these responses in a consultation report which will be published on its website http://www.nationalgrid.com/uk/Electricity/Balancing/consultations/.

National Grid will keep the industry informed of the progress of the system development work via normal communications such as the Operational Forum.

10 Appendix 1: Summary of Industry Views in the October 2008 Consultation

10.1 Phase 1 - System Procurement Considerations

The following areas have been considered in the procurement of the new system: fuller details are given in Appendix 2.

- Availability of standard interfaces within the new system, including those adopted by ETSO;
- Data validation;
- Disaster Recovery;
- Significant allowance for future growth of market participants (in addition to accommodating the current volume of market participants);
- Requirement to limit the number and effect of instructions produced by the automated despatch process;
- Procurement of a system that delivers value for money (e.g. via robust tendering process);
- Minimising the impact of change freeze by rigorous impact assessment of any regime changes required by the market;
- Requirement to maintain delivery of existing market information and incorporate new requirements (e.g. tagging of constraint costs);
- Minimising voice/fax communications (e.g. for notification of availability of Frequency Response);

The following areas highlighted by the respondents will require further discussion with the market participants (either separately or as part of phase 2 consultation):

- Industry discussion on the impact of more frequent despatch instructions on market participant systems, processes and costs;
- Consideration of any undesirable IT system limitations for the GB market revealed during vendor/system assessment process;
- Recovery of costs incurred by National Grid in the procurement of the new system;
- Development of communication plan detailing the duration, timing and level of system testing by National Grid and market participants[14];

[14] The initial target date of mid 2010 for the communication plan has been delayed due to contract negotiations taking longer than anticipated; this will now be progressed in 2011.

- Consideration of any impact on Industry Codes resulting from implementation of Phase 1 system development;
- data buffering or backfilling of missing data during outages;
- Consideration of the consequential changes resulting from implementation of tagging of constraint costs (i.e. P217).

10.2 System Enhancement Considerations in Phase 2

- Industry discussion on the impact of more frequent despatch instructions on market participant systems, processes and costs[15];
- Discussion on the merits and implementation of open instructions and AGC (Automatic Generation Control);
- Incorporation and use of standard interfaces for communications between market participant and National Grid systems;
- Electronic communications with demand side;
- Additional demand forecasts (may be considered via the normal BSC governance arrangements);
- Provision of market information on a single platform;
- Prompt calculation of system prices;
- Proposals to change the modelling of generating units in the balancing mechanism e.g. CCGT module configuration, operation below SEL[16].

[15] Following further review since the October 2008 consultation, the automated facility dispatch functionality will be available at go-live; we don't plan to turn it on immediately at go-live, but only after a bedding-in period.

[16] This functionality forms part of the current consultation.

11 Appendix 2: Incorporation of industry requirements in system procurement

Industry Requirement	Incorporation in new system	Requirement addressed?
Availability of standard interfaces within the new system, including those adopted by ETSO	XML[17] is the standard format for data exchange; this format can be used for both the file uploads and downloads, web form-based data submission and the computer-to-computer communications. The new system will also be compliant with XML SOAP[18] which has more strict definitions but also has flexibility to alter protocols. The new system will either meet the ETSO standards or will closely follow ETSO standards templates wherever possible.	✓
Data validation	Validation rules built-in but configurable.	✓
Disaster Recovery	Server failover expected to be less than half-hour (typically 2 hours at present); Unavailability expected to improve tenfold;	✓
Requirement to limit the number and effect of instructions produced by the automated despatch process	The automated dispatch facility will be configurable to control the number of instructions that are issued and their effect e.g. additional instructions that continue the current direction of load change may be allowed, but there may be restrictions on instructions that reserve the direction.	✓
Procurement of a system that delivers value for money (e.g. via robust tendering process)	Robust procurement process followed to procure a fit-for-purpose modern system; Following an independent global review of the IT systems used by other system operators and an open tender process which initially attracted 17 interested parties (9 of whom received information packs), National Grid followed a rigorous assessment process to reduce the number of potential vendors to 3 who are all major players in the energy sector. The final decision was based on the detailed assessment of technical and commercial (price) offerings of the three vendors.	✓
Minimising the impact of change freeze by	The impact of change freeze will be assessed on an ongoing basis, taking into account the	ongoing

[17] e-business Extensible Markup Language

[18] Simple Object Access Protocol

Industry Requirement	Incorporation in new system	Requirement addressed?
rigorous impact assessment of any regime changes required by the market	importance and urgency of any regime changes required by the market. The change freeze will be an important part of delivering an efficient system in a timely manner and with minimum risk to the operation of the power system and the electricity market..	
Requirement to maintain delivery of existing market information and incorporate new requirements (e.g. tagging of constraint costs)	A key requirement of the new system is to maintain the delivery of the existing market information and this has been agreed with the chosen vendor. Any new requirements in this area prior to system go-live will need an assessment of their impact on the delivery of the new system as well as the existing system.	✓
Minimising voice/fax communications (e.g. for notification of availability of Frequency Response)	In addition to the computer-to-computer data exchanges, the new system has the following data exchange channels: ▪ Web browser forms-based data submission; ▪ XML file uploads The above channels could be used to minimise the existing voice/fax communications.	✓

12 Appendix 3: Summary of Industry Views on EDL/EDT in October 2008 Consultation

Respondents to the October 2008 consultation provided the following comments on the future changes to the industry interfaces:

- Any changes to industry interfaces should have minimal impact unless there are justifiable benefits for the industry as a whole;
- Support all existing interfaces in order to minimise industry costs;
- Enforce compliance with industry standards such as EFET[19] eCM[20] and UN/CEFACT[21] ebXML[22] (adopted by ETSO[23]); these standards also encompass generic W3C[24] standards such as XML, WSDL[25] and SOAP[26];
- Use standard interface formats such as the XML standard SOAP which provide strict definitions but also flexibility to alter protocols; this may enable a wide range of Users to interact with the new system and may improve the ability for the BSC Parties and National Grid to make changes to the data flows;
- Interfaces should move away from proprietary file formats and protocols that do not support effective handshaking (e.g. FTP[27]) towards open standards (e.g. web services);
- Incorporate all interfaces; however, this will require careful consideration because of high impact and costs and will require a phased approach;
- Ensure that the new system interfaces are adaptable to the output of 'EU ADDRESS' project which is investigating future standards;
- The new system should remove reliance on faxes;
- Data submissions for target frequency instructions, availability of Frequency Response and reactive power capability should be carried out electronically;

[19] European Federation of Energy Traders

[20] electronic Confirmation Matching

[21] United Nations Centre for Trade Facilitation and Electronic Business

[22] e-business Extensible Markup Language

[23] European Transmission System Operators

[24] World Wide Web Consortium

[25] Web Service Description Language

[26] Simple Object Access Protocol

[27] File Transfer Protocol

- A new optimisation package should avoid operational staff's subjective preference for a particular technology type but allow manual override;
- The overriding criterion should be efficient operation of the network and any omission of rules in the new system should not require a major system rewrite;
- Improve internal interfaces and hence the accuracy and consistency of data for settlement of ancillary services; provide such data to the industry in a more efficient manner.

13 Appendix 4: Sample Fax Forms

Notification to NGET of Active Power Reduction below Submitted SEL via a GT Unit Desynchronisation on a CCGT Module and utilising a PGBT

Contact details:

Generating Company	Telephone: Standby Telephone: Fax: Standby Fax:

Operational Day(s):	e.g. 7th & 8th May 2008

BMU:	
Start and End Time	e.g. 23:00 7th May 08 – 12:00 8th May 08
Notice to desynchronise a GT unit	[] minutes
The effective MZT of the desynchronised GT unit	[] minutes
Reduced SEL during GT Unit Desync period	[]MW
Approximate MEL during Desync period	[]MW
Notice to re-synchronise the GT unit	[] minutes
Additional comments: e.g. 1 - Only 1 event in a rolling 24 hour period e.g. 2 - RUR and RDR as declared parameters unless different rates agreed at the time of the PGBT.	

Signature: Date/Time:

……..

Acknowledged by (Print Name):

Notification to NGET of Active Power Increase Above Submitted MEL via a GT Unit Synchronisation on a CCGT Module and utilising a PGBT

Contact details:

Generating Company	Telephone: Standby Telephone: Fax: Standby Fax:

Operational Day(s):	e.g. 7th & 8th May 2008

BMU:	
Start and End Time	e.g. 23:00 7th May 08 – 12:00 8th May 08
Notice to synchronise a GT unit	[ ] minutes
The effective MNZT of the synchronised GT unit	[ ] minutes
Increased SEL during GT Unit sync period	[ ] MW
Approximate MEL during GT Unit sync period	[ ] MW
Notice to de-synchronise the GT unit	[ ] minutes
Additional comments: e.g. 1 - Only 1 event in a rolling 24 hour period e.g. 2 - RUR and RDR as declared parameters unless different rates agreed at the time of the PGBT.	

……..

Acknowledged by (Print Name):

Signature: Date/Time:

14 Appendix 5: Consultation Questions

National Grid invites responses to this consultation **by 11 November 2010**. The responses to specific consultation questions (summarised below) or any other aspect of this consultation can be provided by completing the following proforma.

Please return the completed proforma to balancingservices@uk.ngrid.com.

Respondent:	
Company Name:	
Does this response contain confidential information?	

No	Question	Response (Y/N)	Rationale
1	*Do you have a preference for one of the following mechanisms for data exchange with EBS:* *(i) Web-browser forms-based data submission;* *(ii) Web browser-based XML file upload/download capability;* *(iii) Web services-based computer-to-computer data exchanges* *(iv) A different mechanism or a variation on the above (please provide details and benefits of such a mechanism over other mechanisms mentioned above)?* ***(section 5.3)***		
2	*Would you be interested in moving to the new industry interfaces with their capability to electronically submit a wider range of data?* ***(section 5.5)***		
3	*If the answer to Q1 is yes, please indicate when you would envisage moving to the new industry interfaces:* *(i) Soon after go-live?* *(ii) Within 2 years of go-live?*		

No	Question	Response (Y/N)	Rationale
	(iii) Within 5 years of go-live? *(iv) More than 5 years (please specify)?* ***(section 5.5)***		
4	*Would you support a cut-off date for migrating to the new interfaces? If so, please provide views on the cut-off date.* ***(section 5.5)***		
5	*Do you have a preference for one of the following modelling approaches offered by the vendor:* *(i) Single unit modelling?* *(ii) Pseudo unit modelling?* *(iii) Configuration modelling?* *(iv) A different approach or a variation on the above (please provide details and benefits of such an approach over other approaches mentioned above)?* ***(section 6.3.4)***		
6	*Do you think that the increased number of ramp rates should be made available soon after system go-live?* ***(section 6.4.1)***		
7	*Do you think that the minimum value for ramp rates should be set to a lower value than the current value of 0.2MW/min? If yes, what should it be?* ***(section 6.4.2)***		
8	*Do you think that the new system should provide functionality for a time-dependent Stable Export Limit (SEL) and Stable Import Limit (SIL)?* ***(section 6.4.2)***		
9	*(a) Please state which of the following methods we should, or should not, use in engaging the industry in on-going issues relating to EBS e.g. detailed design of new industry interfaces:*		

No	Question	Response (Y/N)	Rationale
	1. Consultation documents *2. Individual meetings* *3. Group seminars* *4. Dedicated EBS project webpage* *5. Information bulletins* *6. Other, or a combination of the above (please state).* *(b) Please state if any of the engagement methods listed above we should definitely not use. Please give reasons in each case.* ***(section 7)***		
10	*Are there any other comments that you wish you to make on this consultation?*		