

08/09 Constraints Outturn & Commercial Framework Update

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nationalgrid

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Agenda

- ◆ Update on outturn on constraint figures 08/09
- ◆ Look at outturn of 08/09 against 09/10 forecast
- ◆ Where we are today with National Grid initiatives

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England & Wales (E&W) 08-09

	Original (Mar 08) forecast	Feb 09 forecast	Full Outturn
E&W Total Constraint Costs (£m)	£25	£28	£31
E&W Total Volume (GWh)	4550	546	780
E&W Average Price of action (£/MWh)	£5.4	£51.3	£39.9

Original forecast to outturn

- ◆ Increased costs as BM volumes increased, in part due to fault outages
- ◆ Reduced constraint volume due to unexpected plant losses in the first 3 quarters of the (BSIS) year resulting in reduced intertrip requirements
- ◆ As such, the average 'action' price increased as intertrips are a lower cost solution

February forecast to outturn

- ◆ Plant returned reactivating constraints that were managed via intertrips (as originally planned for the entire year)

Scotland – Cheviot & Internal 08-09

	Original (Mar 08) forecast	Feb 09 reconciled* forecast	Full Outturn#
Cheviot	£75	£168	£181
Internal Scotland	£39	£42	£48
Total Constraint Costs (£m)	£114	£210	£229
Cheviot	1290	3646	4386
Internal Scotland	975	784	712
Total Volume (GWh)	2265	4430	5098
Cheviot	£58.1	£46.1	£41.1
Internal Scotland	£40.0	£53.6	£67.7
Average Price of action (£/MWh)	£50.3	£47.4	£44.8

Original forecast to outturn

- ◆ Cheviot volumes higher due to outage overruns, faults & market prices increasing in merit generation running which exacerbated constraints
- ◆ Cheviot average price reduced due to greater use of commercial intertrips with a corresponding increase in volume
- ◆ Within Scotland volumes were slightly lower than forecast through optimising contracting strategy with Cheviot outages
- ◆ Within Scotland average price increased due to higher BM differentials and contract prices. This was due to offer prices and contract prices following the upward trend in energy prices

February forecast to outturn

- ◆ More intact constraint issues on Cheviot than anticipated particularly due to high wind in off peak periods

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England & Wales 08-09 outturn versus 09-10 forecast

	Outturn 08/09	Forecast 09/10
Total Constraint Costs (£m)	£31	£50
Total Volume (GWh)	780	6067
Average Price of action (£/MWh)	£39.9	£8.2

Increase in costs

- ◆ Increase in BM requirements due to a major long term outages to connect new generation

Increase in volume

- ◆ Increase in assumed generation availability, specifically nuclear plant

Decrease in price

- ◆ Larger proportion of intertrip usage

Scotland – Cheviot & Internal 08-09 outturn versus 09-10 forecast

	Outturn 08/09	Forecast 09/10
Cheviot	£181	£142
Internal Scotland	£48	£70
Total Constraint Costs (£m)	£229	£212
Cheviot	4386	2448
Internal Scotland	712	1090
Total Volume (GWh)	5098	3538
Cheviot	£41.1	£58.0
Internal Scotland	£67.7	£64.2
Average Price of action (£/MWh)	£44.8	£59.9

Volume & cost

- ◆ Cheviot volumes are forecasted to decrease due to the Internal Scotland outages restricting the flow to the Cheviot boundary and less volume to be resolved over the off peak period due to the decrease in market prices.
- ◆ In Internal Scotland there has been an increase in wind generation connected leading to higher volume of constraints.

Price

- ◆ For Cheviot there is less volume on inter trip, increasing the average price.
- ◆ For Internal Scotland the average cost of resolution decreases slightly following market prices.
- ◆ For both Internal and Cheviot, the constraints head into Autumn/Winter leading to a higher resolution cost and therefore a higher unit cost.

Latest view

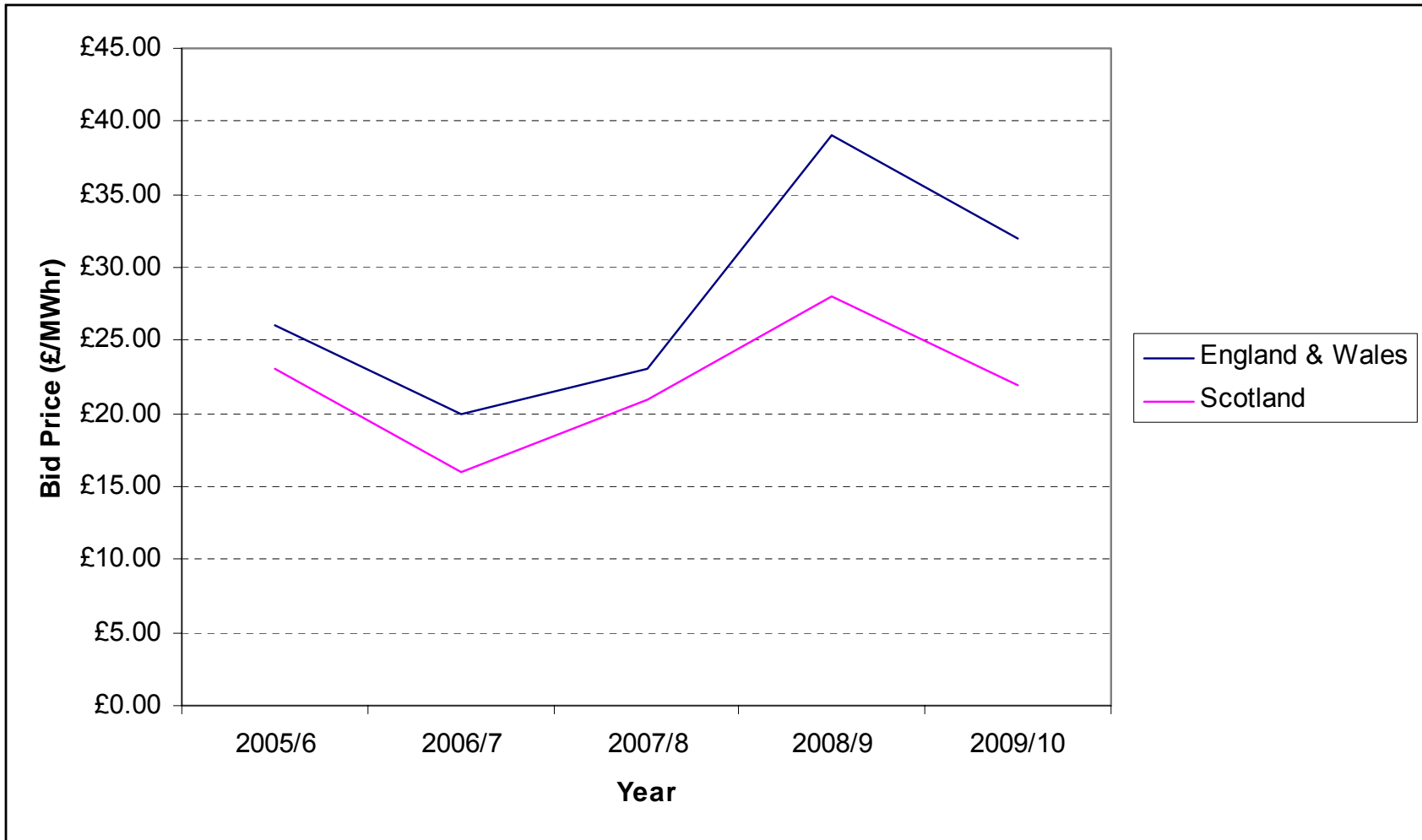
- ◆ Increasing volume and costs due to generator outage changes.

Scottish Bids and Costs

Question: Is it the Scottish Bids or E&W offers that is driving the higher unit cost in Scotland?

- ◆ The high unit cost of Scottish constraints, particularly those resolved by BM actions are due to Scottish bid assumptions which have previously proved to be accurate.
- ◆ The same E&W offers are used to resolve both Scottish and E&W constrained off volume and therefore would drive both equally.

Historic Bid Prices



Historic Bid Prices

Financial Year	2005-06	2006-07	2007-08	2008-09	2009-10
England & Wales (£/MWh)	£26	£20	£23	£39	£32
Scotland (£/MWh)	£23	£16	£21	£28	£22

Replacement energy costs

Question: Is the increase in Scottish costs attributable to requiring more expensive replacement energy due to the increased overall volume?

- ◆ The higher average unit cost (£/MWh) is, in part, associated with replacement energy costs, although another factor, is that the location of 'Internal Scotland' constraints means that the inter trip cannot be used.
- ◆ The same energy/margin replacement costs are used for both Scotland and England & Wales (constrained off).

System reinforcements

Question: How long do we see the issue persisting before reinforcement manages down to an efficient constraint cost?

- ◆ Reinforcing works over the next few years continue to improve the transfers across constraint boundaries; however, we also need to accommodate an increasing amount of wind generation, of which the majority lies in Scotland.
- ◆ Strategic investment is perhaps the only way to catch up with the necessary reinforcement to meet increasing connections
- ◆ In relation to TO methods of resolving constraints, we are also:
 - Actively seeking further opportunities for Inter trips
 - Developing mechanisms to place incentives on TO in relation to constraints

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Status of National Grid's proposals

◆ CAP 170 Administered intertrips

- ◆ Impact assessment published, responses required by 2nd July

◆ Locational BSUoS – report submitted 22nd May

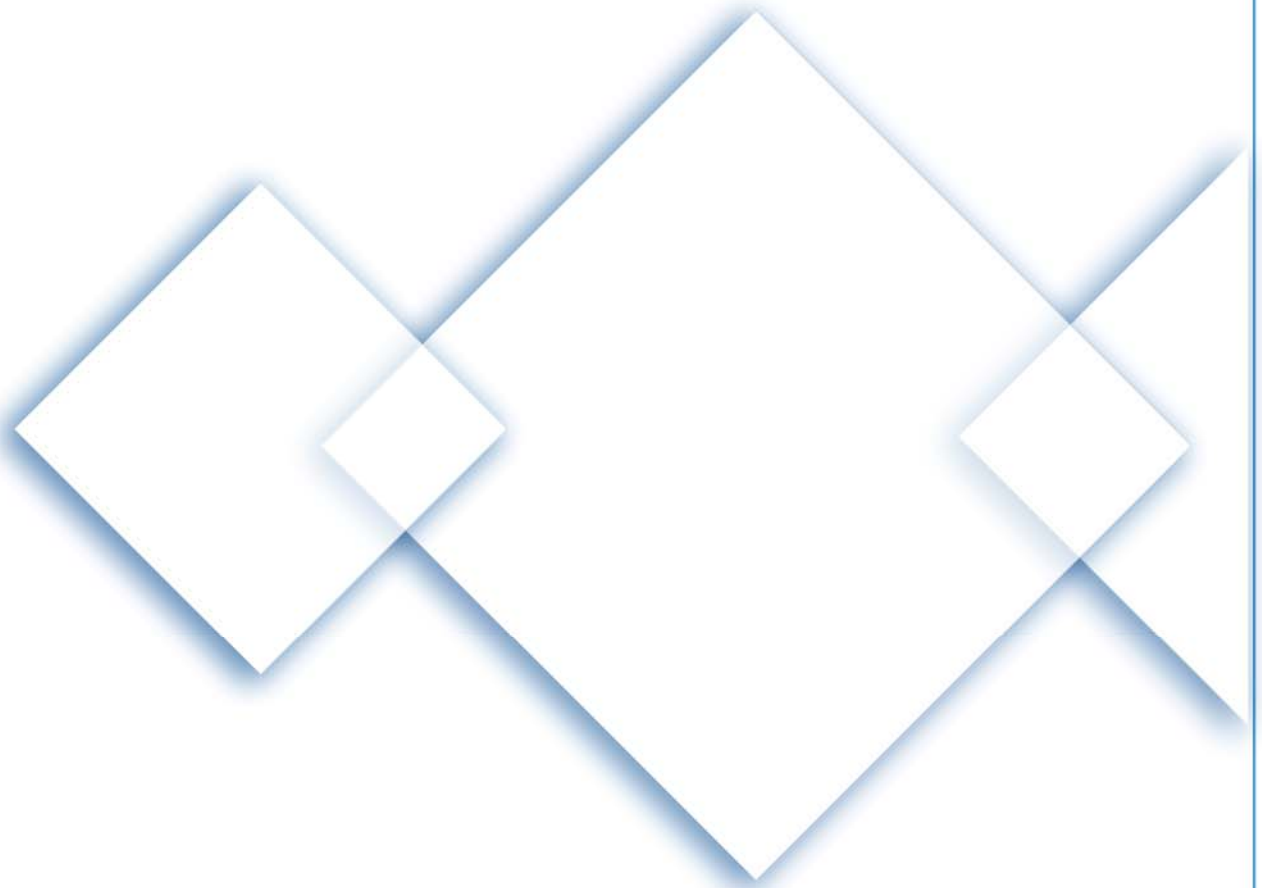
- ◆ Ofgem intend to publish impact assessment, expected soon

◆ SO-TO aligned incentives

- ◆ Work progressing, looking at boundary capability
- ◆ Further TO discussions later this month

◆ Administered bid prices

- ◆ On hold, awaiting outcome of Ofgem's market power consultation



Balancing Services Update

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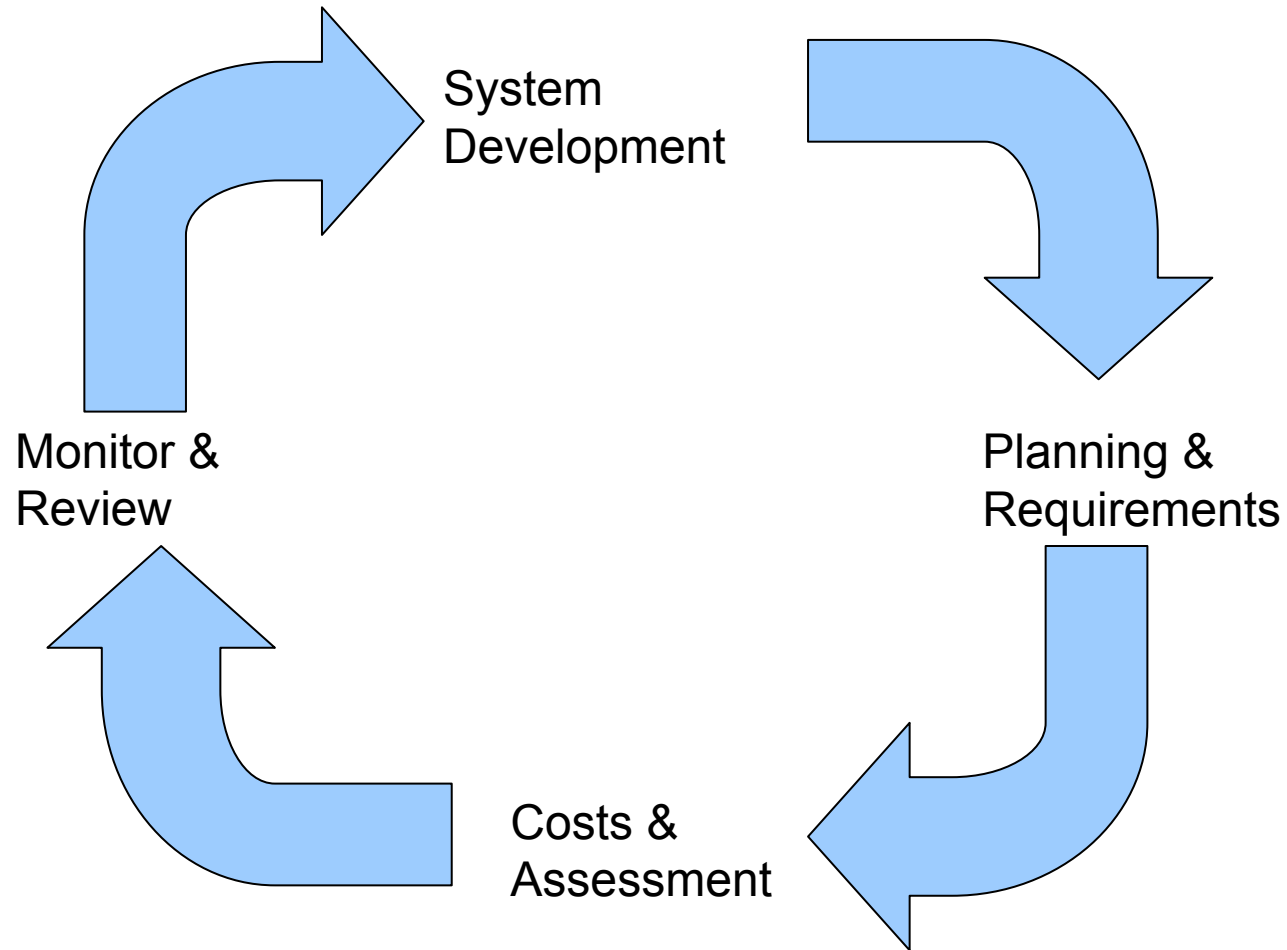
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- ◆ Constraint Management Workshop
- ◆ Commercial Intertrip Requirement
- ◆ Frequency Response Requirement
- ◆ SO Access to Wind
- ◆ PN and NDZ Submissions
- ◆ Black Start
- ◆ STOR and Reserve

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The Constraint Life-Cycle



Constraints Management Workshop

◆ **Contracting Strategy** – an interactive session to discuss the options open to National Grid in negotiating contracts that go some way to eliminating any risk

◆ **Interactive intertrip discussion**

- ◆ Arming fee
 - Should be cost reflective
 - Small element of financing risk
- ◆ Tripping fee
 - Where most of risk should be costed
- ◆ Statistics on increased risk of trip would be useful
- ◆ Greater transparency on value/costs

Constraints Management Workshop Cont'd

- ◆ **The workshop was well attended by industry representatives**
- ◆ **Feedback showed that attendees found the session informative and appreciated the opportunity to discuss constraints and intertrips**
- ◆ **Attendees also highlighted a want to more debate in this area**
- ◆ **The slide are now available on our website alongside the Operational Forum slide packs**
- ◆ **<https://www.nationalgrid.com/uk/Electricity/Balancing/operationalforum/2009/>**

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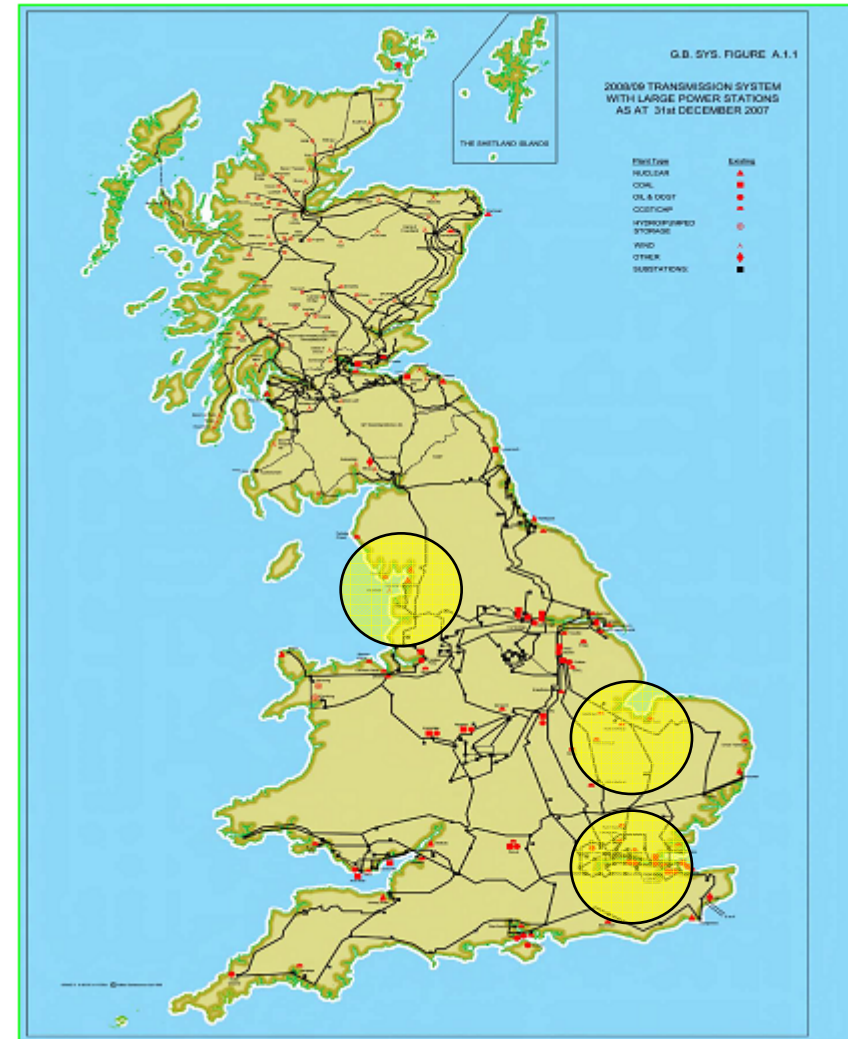
Requirements as Currently Identified

Three areas identified where Commercial Intertrips are required to:

- ◆ Facilitate connection works
- ◆ Manage Transmission System outages

In order to ultimately:

- ◆ Minimise Transmission System constraints



Methodology and Next Steps

◆ Work is underway to identify:

- ◆ Detailed technical requirements
- ◆ Timescales
- ◆ Potential parties involved with future service provision
- ◆ An appropriate contracting methodology

◆ Upon identifying the above, the next steps will be to:

- ◆ Contact relevant parties with specific requirements
- ◆ Gauge interest for service provision
- ◆ Develop Commercial Intertrip terms/ agreements as required

◆ Further information contact your Account Manager or Katharine.Clench@uk.ngrid.com

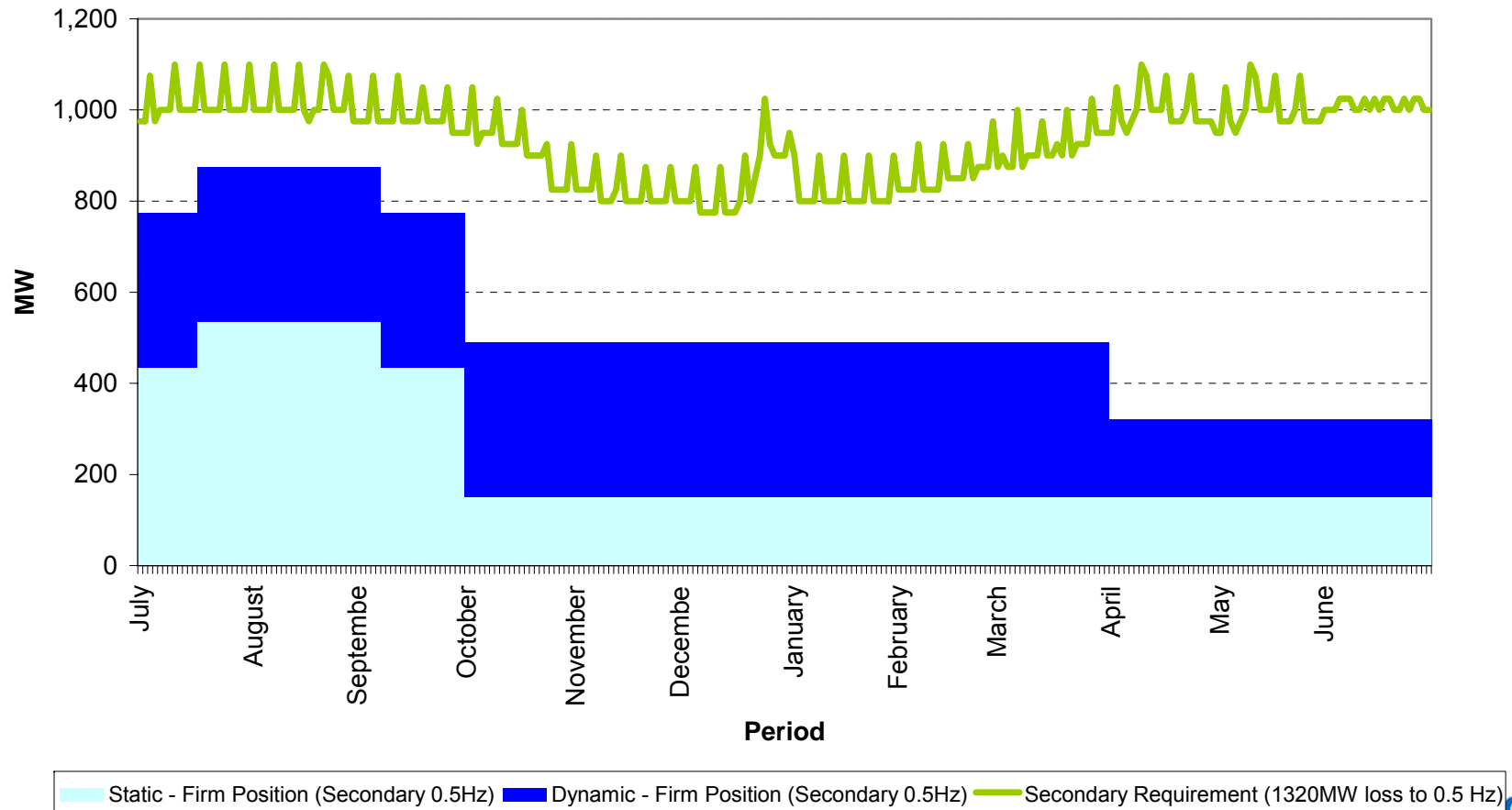
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Low frequency response requirement (1)

National Grid has a requirement to procure more Static Frequency Response from September 2009 onwards

Current 12 month forward contracted outlook - Weekday



Low frequency response requirement (2)

- ◆ We currently spend in excess of £70m per year on LF response
- ◆ Procurement would be through existing FFR contract terms
- ◆ Statistically likely to be tripped between 10 & 30 times a year due to a low frequency event around 49.7Hz
- ◆ Requires operational metering and a trip relay
- ◆ Majority of payment made through availability fee
- ◆ Our requirements outlined in FFR Market Information Report, this can be found at:

◆ <https://www.nationalgrid.com/uk/Electricity/Balancing/services/frequencyresponse/ffr/>
- ◆ Out there now, speaking to potential providers

High frequency static response requirement

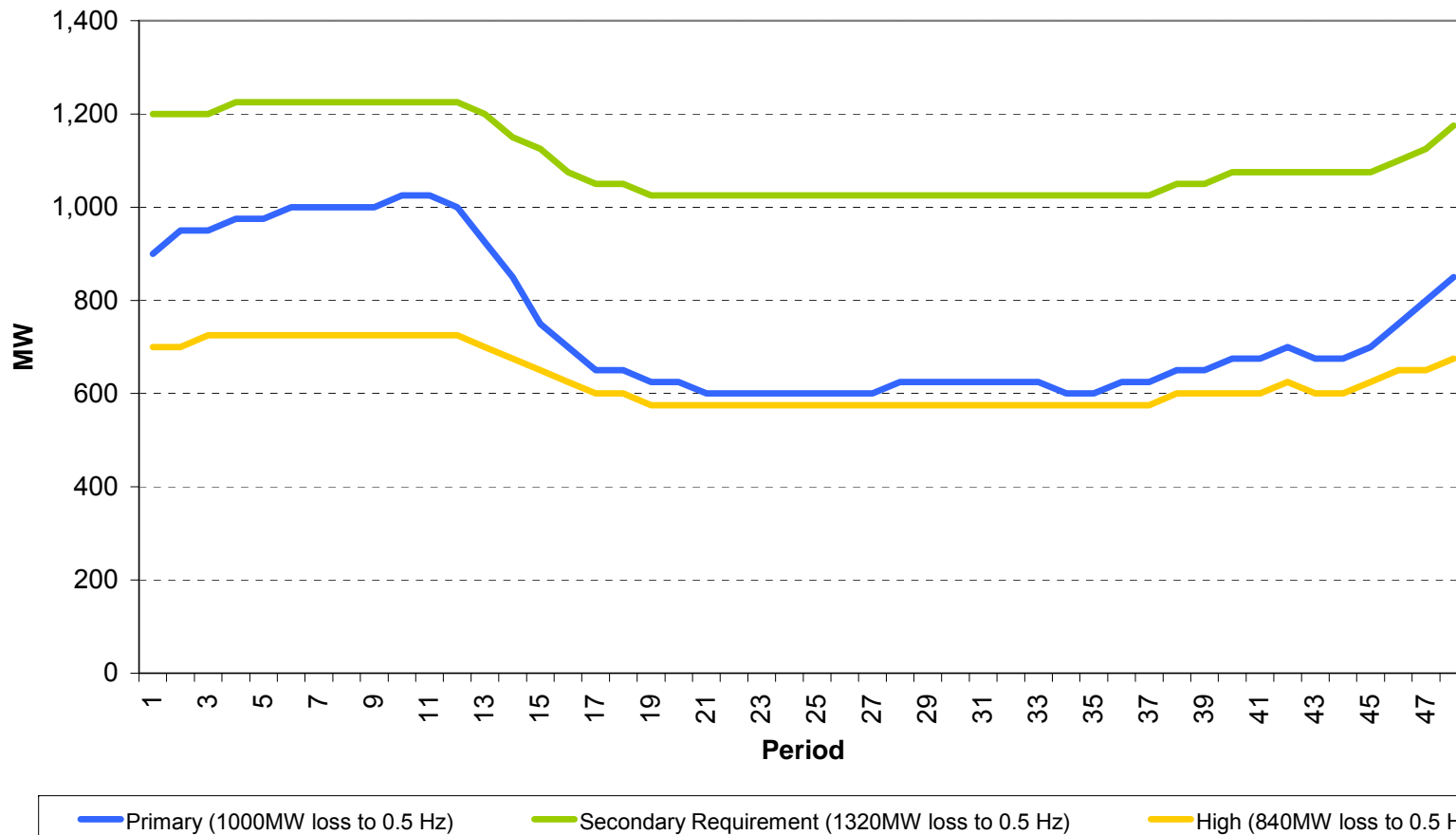
There is an ongoing and consistent requirement for additional static HF response.

- ◆ **We currently spend in excess of £50m per year on HF response**
- ◆ **HF requirements overnight increase due to lower demands, but higher demand risks on the transmission system**
- ◆ **These requirements can exceed 1000MW of HF response when demand risk is high overnight**
- ◆ **FFR Market information report illustrates typical requirements**
- ◆ **<https://www.nationalgrid.com/uk/Electricity/Balancing/services/frequencyresponse/ffr/>**

High frequency static response requirement

There is an ongoing and consistent requirement for additional static HF response.

Indicative Total Response Requirement - Weekday



Specific High Frequency Response Requirement

- ◆ **Why?**

Transmission system outage increases risk of a large demand loss

- ◆ **When?**

Additional requirement likely to be September and October with further requirements in the future

- ◆ **What?**

Dynamic Response - principles of the FFR Standard Contract Terms with a similar pricing structure

Non-Dynamic response – HF relay trip at 50.35 Hz with availability and tripping fee

- ◆ **How?**

Tender process using FFR terms or similar, or bilateral contracts

Publication of submitted parameters and prices to provide transparency

Firm Frequency Response Bi-Lateral Contract

◆ Background

- Lack of competition in FFR tender market
- No successful tenders for April and May
- Uncertainty and risk increased through buying alternatives in the open market

◆ Decision

- Bilateral Agreement with First Hydro

◆ Future

- Still opportunity for FFR provision
- Continue tender process which may be used for HF/LF service procurement

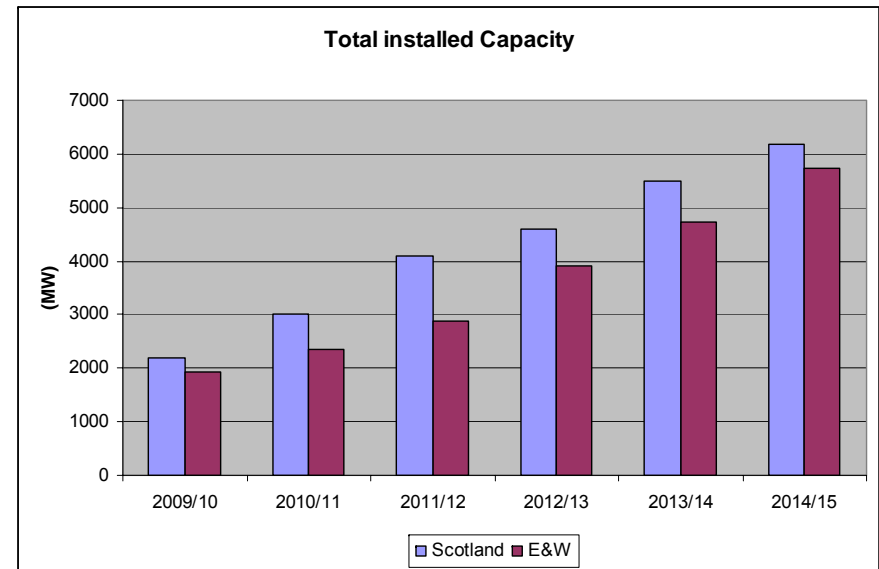
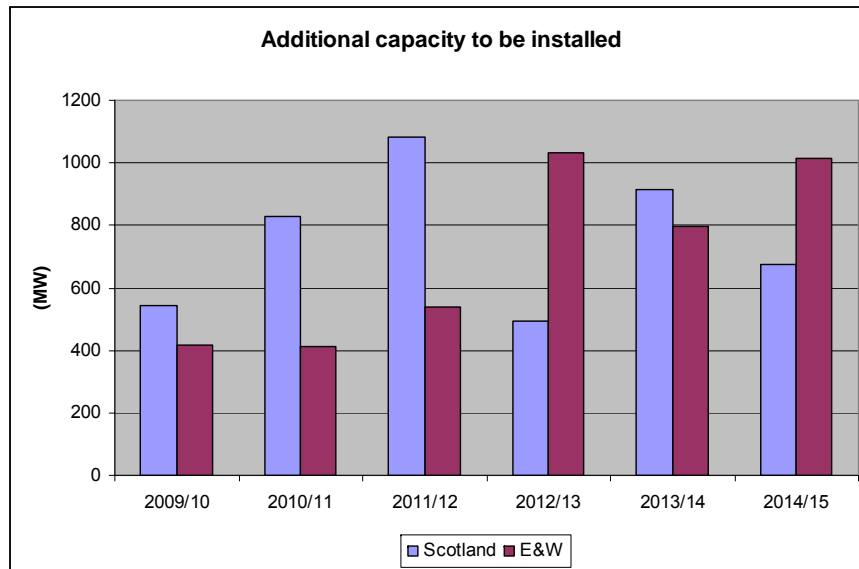


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- ◆ **SO Access to Wind**
- ◆ PN and NDZ Submissions
- ◆ Black Start
- ◆ STOR and Reserve

Managing the Wind from the SO perspective

- ◆ Wind Turbine installation has shown rapid growth in Great Britain.
- ◆ There are at present over 2100 turbines operating, giving a total installed capacity (including offshore) of almost 3.1GW.
- ◆ This is split approximately 55/45 between Scotland and E&W.
- ◆ Wind Turbines produce a range of challenges for National Grid as SO to manage over the next ten years with the immediate issue being present over the coming 2 months;



Managing the Wind from the SO perspective

SO Imminent Issues

- ◆ During periods of high wind and low demand (especially within Scotland) the potential for localised **NRAPM (Negative Reserve Active Power Margin)** conditions have begun to arise
 - August Bank Holiday
- ◆ Limited options for taking actions in the Balancing Mechanism, currently very few windfarm owners/operators are involved in full participation in the BM
- ◆ Highly priced and/or negative bids submitted in the Balancing Mechanism
- ◆ Many disaggregated smaller sites – therefore accessing volume of Flexible MW's required is further hindered by considering operational timescales.
- ◆ This is not just constraints – this is system balancing

Accessing the Wind

SO Solutions

- ◆ We are working to progress control room options to manage potential NRAPM conditions. Initiatives being pursued are;
 - Introduction of NRAPM assessments,
 - Improving engagement with windfarm owners/operators.
 - Highlighting the commercial opportunities available via BM participation and/or bilateral commercial balancing services
 - Identifying a range of workable balancing services contracts which could be potentially put in place.
- ◆ Contact – Your account manager or Sam.Wither@uk.ngrid.com

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PN and NDZ Declarations

- ◆ **BMUs submitting a PN with a sync time that is within the declared NDZ**
- ◆ **Several issues for System Operator:**
 - ◆ Not having accurate or quality information
 - ◆ Having to take alternative actions – incurring costs
- ◆ **Account Managers have written to all their accounts requesting general comment/feedback**
- ◆ **Control closely monitoring these occurrences**
 - ◆ Recording
 - ◆ Contacting EMCs if required

PN and NDZ Declarations

◆ But, National Grid recognises potential reasons:

- ◆ NDZ unlikely to be amended as plant is warming
- ◆ Using units to manage own risk of loss of plant
- ◆ Plant returning from outage

◆ Recognise goodwill in market when National Grid needs the MWs

- ◆ Loss of unit on a day in May. Control rang a station that significantly redeclared down it's NDZs on unit(s) making them accessible earlier

◆ Welcome feedback and comments

◆ Contact your Account Manager

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Black Start Update

- ◆ **Generic terms now published on website**
- ◆ **Currently 22 Black Start stations**
 - ◆ 5 due to close by 2015
 - ◆ Refurbishment will coming through for others
- ◆ **Reviewing overall strategy**
- ◆ **Speaking to c15 potential providers for future Black Start requirements – now**
- ◆ **Contact: Account Manager or David.Wildash@uk.ngrid.com**

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Short Term Operating Reserve

2008 review

- Introduced changes effective from 1st April 2009, namely:
 - Longer term service
 - Effective from Tender Round 8
 - Price indexation
 - Tender before investment
 - Governance provisions
 - Other major term changes

Short Term Operating Reserve Issues for further consideration

- Flexible services
- Mechanism to allow service providers to change tender parameters
- Creation of a route for flexible providers to re-declare their availability for windows previously declared unavailable at week ahead stage
- Introduction of electronic tender submission
- Alignment of season start with clock change

Is a further major review of STOR required this year?

- Contact: Craig.Maloney@uk.ngrid.com

Reserve

- National Grid is intending to undertake a comprehensive review of reserve services
- Recognise need to act now to meet future requirements
- Current suite of reserve (and response) products may not be enough alone
 - Simplify the services
 - Increase flexibility
 - Meet future SO requirement
- Contact: Mark.Duffield@uk.ngrid.com