

Operational Performance

Richard Price

Items to cover

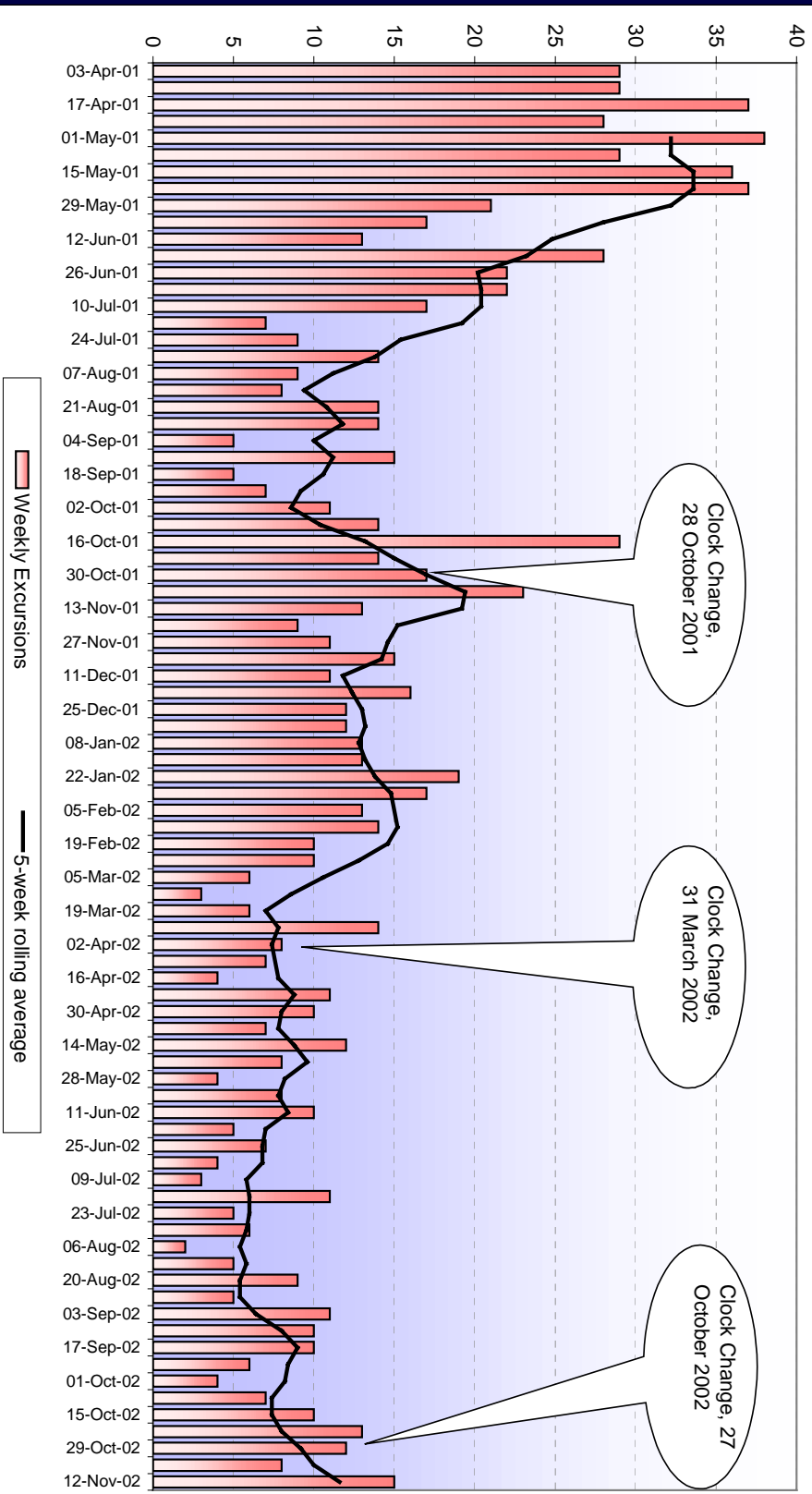
- ◆ **System Frequency and Margin**
- ◆ **BMU Performance**
- ◆ **PN accuracy from day ahead**

Frequency Performance

- ◆ **Statutory Limits ($\pm 0.5\text{Hz}$)**
 - ◆ **No excursions since NETA go-live (27 March 2001)**
- ◆ **Operational Limits ($\pm 0.2\text{Hz}$)**
 - ◆ **Downward trend since go-live, slight reversal around clock changes. Now averaging less than 1 per day.**

Weekly excursions since NETA

Total Weekly Excursions



System Margin

- ◆ **Margin is becoming tighter this winter - 2 NISMs already issued for Mon 4 Nov & Thu 21 Nov**
- ◆ **In common: both soon after clock change; DP plant shortages identified at day ahead due to unusually high plant breakdowns during day ahead; reasonable volume of plant still on maintenance outages ahead of the winter**
- ◆ **However, interesting differences between these two NISM occasions**

Differences between 4 & 21 Nov

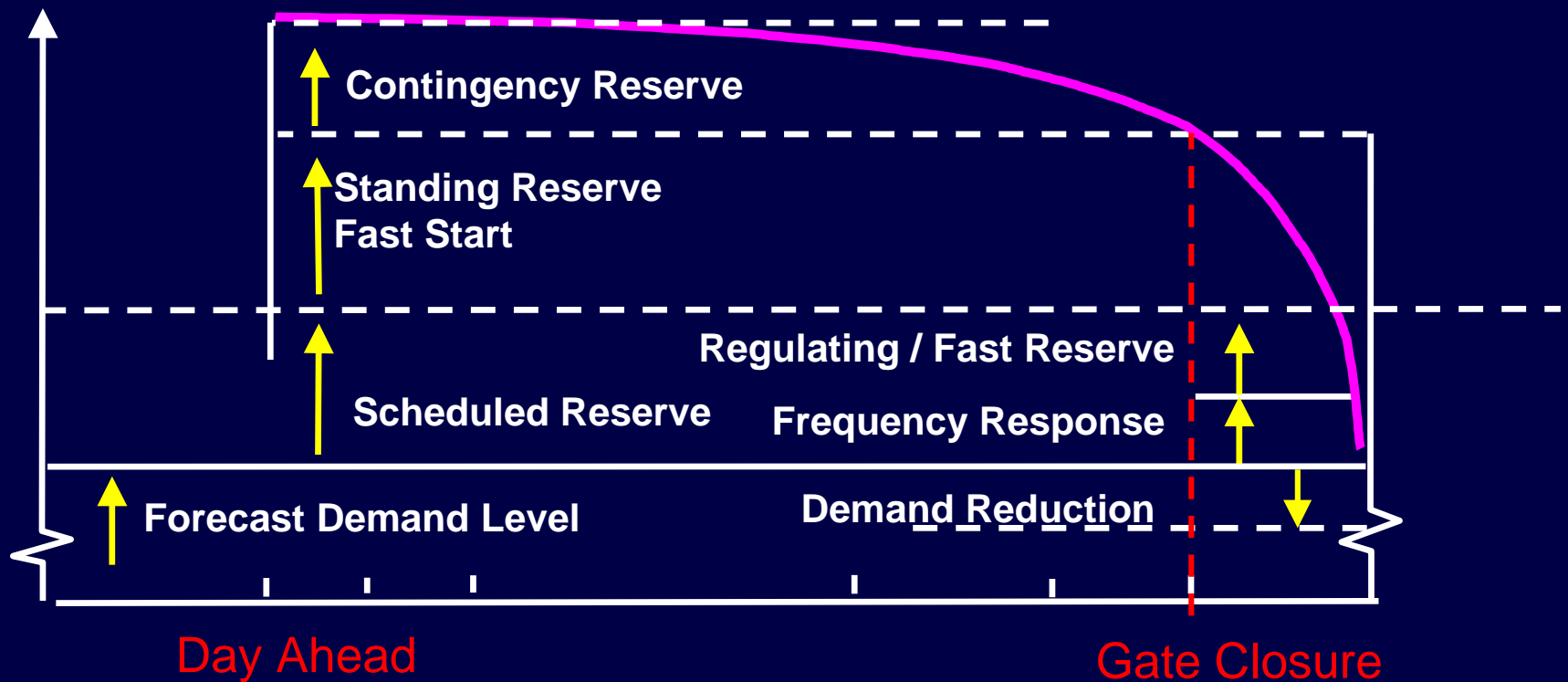
- ◆ **For 4 Nov, there was a 2200MW shortfall at 14:00 on Sunday 3 November which had reduced to below the NISM threshold by 02:00 on the Monday morning, due to upward MEL redeclarations**
- ◆ **For 21 Nov there was a shortfall of between 1000MW & 2100MW and the NISM remained in force until 18:02 on the day. Demand forecast and outturn were close but MEL was declared down towards gate**

NISM Process (1)

- ◆ **Overall System MEL compared with total system requirement (demand + all reserve including contingency)**
- ◆ **If shortfall > NISM trigger threshold, NISM issued**
- ◆ **Situation regularly review every few hours and updates issued**
- ◆ **Towards gate closure, contingency ramps down to zero, but NISM trigger threshold also reduces**

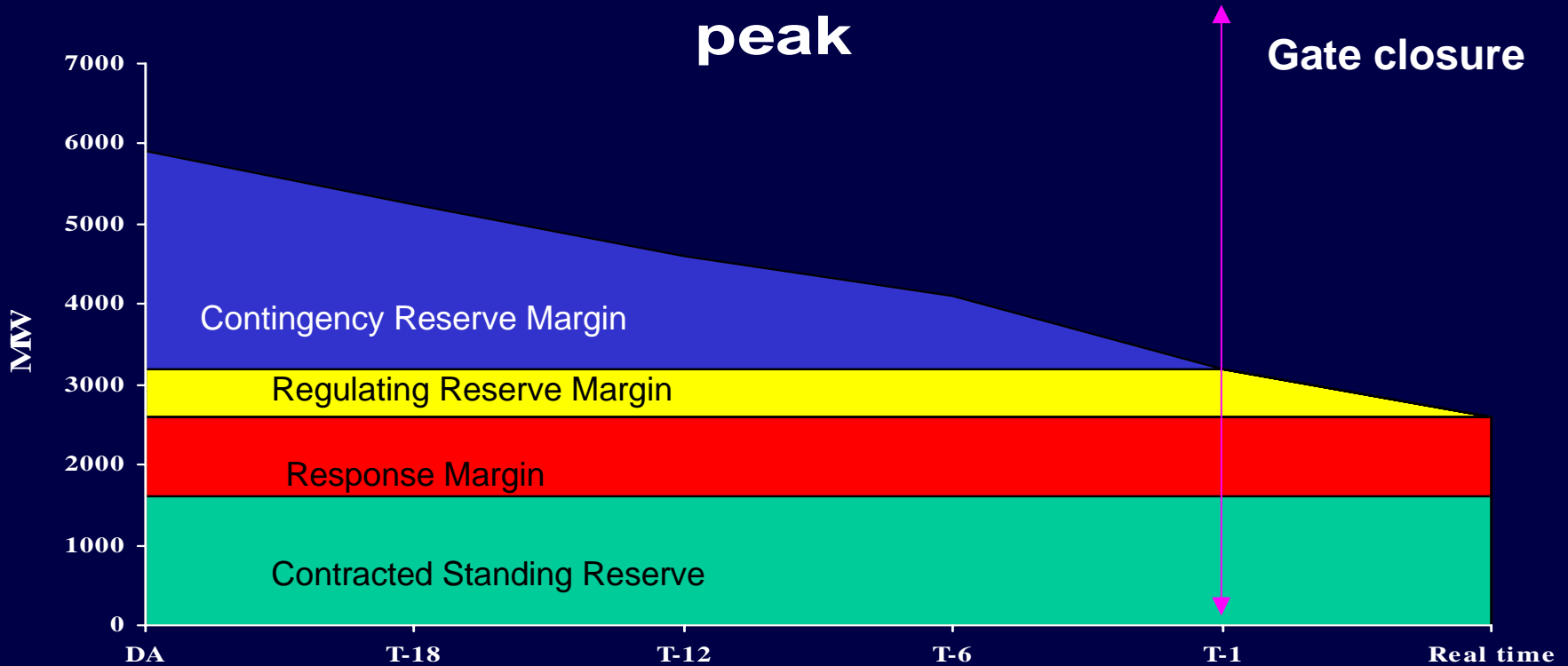
Reserve

◆ Types and Time-frames



Operating Margin - what is it?

Operating Margin for Winter darkness



Operating margin is demand dependent and varies throughout the day.

The above chart does not include 'expected plant loss' from, say, commissioning or returning plant.

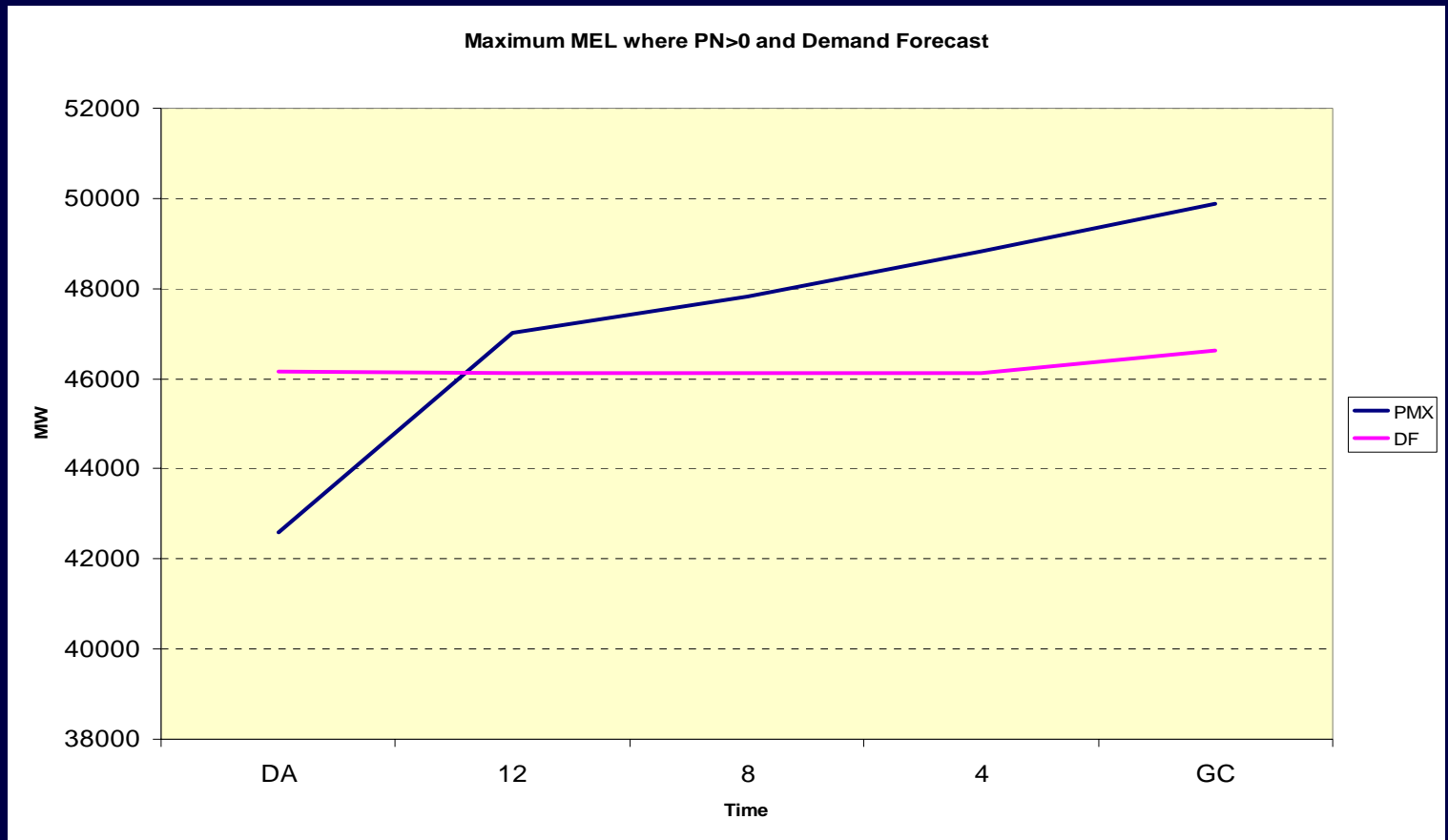
NISM Process (2)

- ◆ **Trading points, control points and Interconnectors requested to maintain current MEL and notify National Grid of any additional capacity**
- ◆ **Suppliers requested to notify any demand control available**
- ◆ **Network Operators and Non-embedded customers notified that unless there is an improvement in System Margin, demand reduction may be instructed**

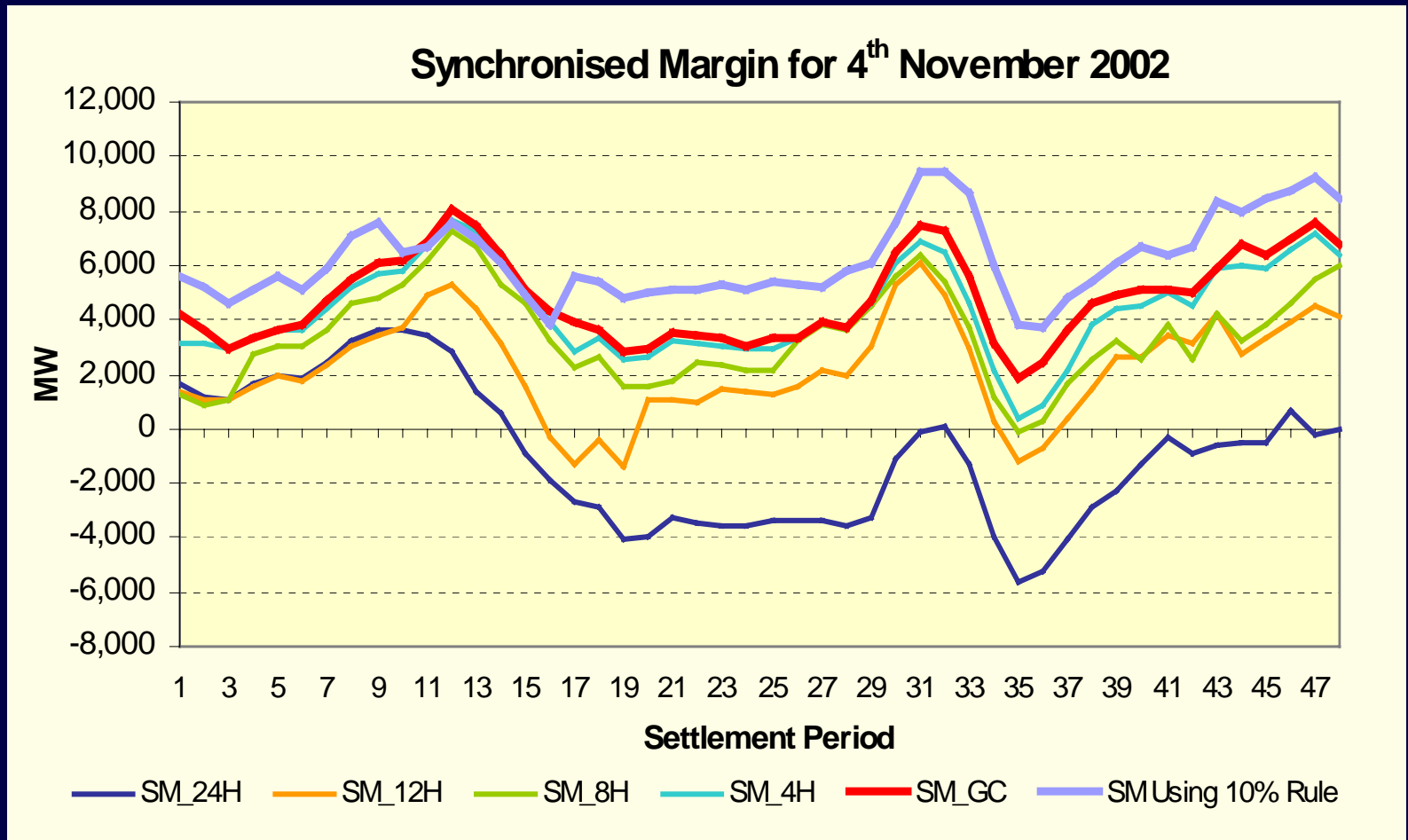
Other system warnings

- ◆ **High Risk of Demand Reduction**
 - similar to NISM but still tighter margins (no day ahead contingency or erosion of standing reserve)
- ◆ **Demand Control Imminent**
 - DR instructions likely in next 30min
- ◆ **Risk of System Disturbance**
 - widespread disturbance to whole or part of the transmission system
- ◆ **Cancellation of System Warning**

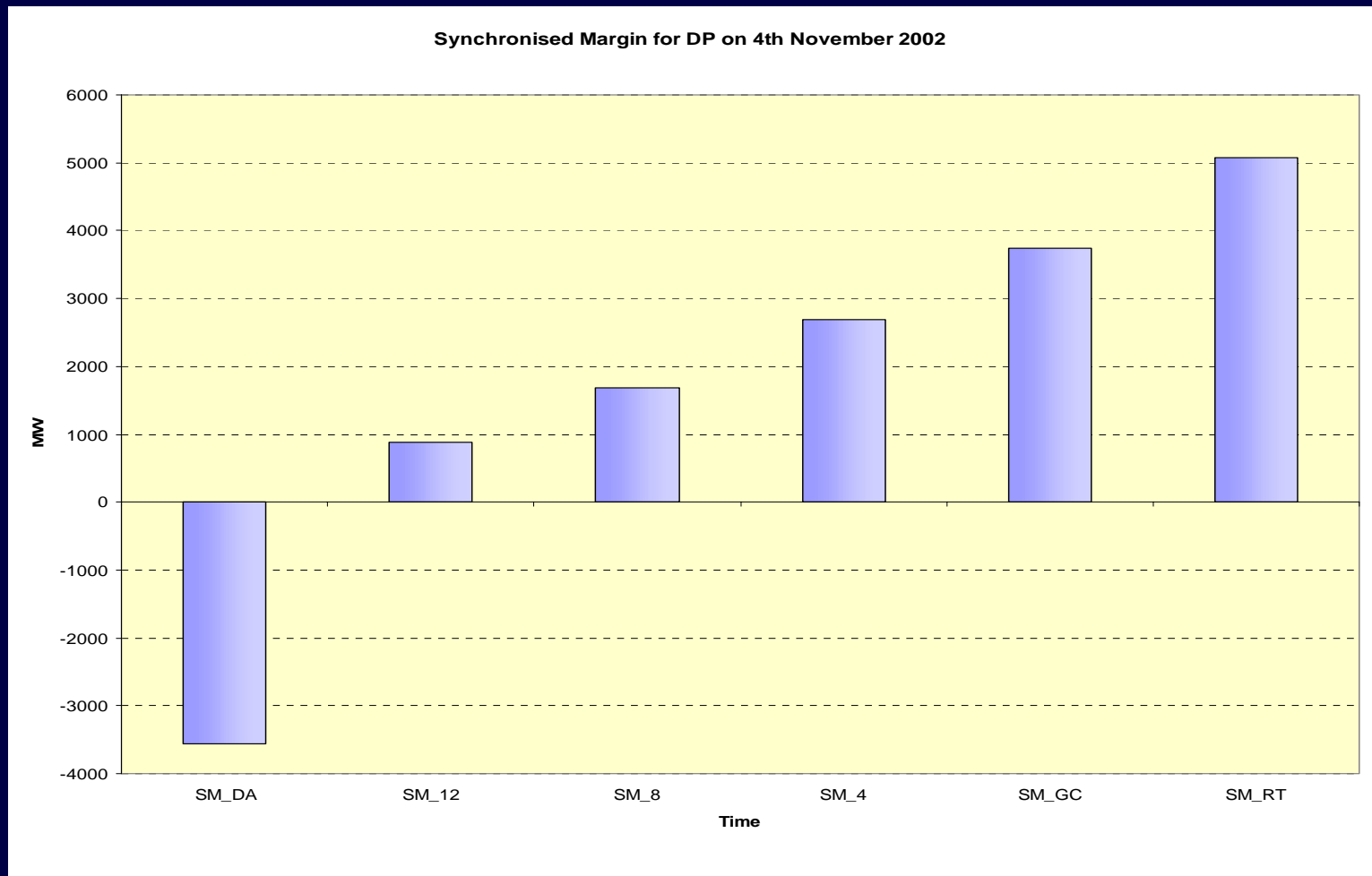
4 Nov: MEL (PN>0) and Demand



Synchronised Margin - 4 Nov



Sync Margin - Darkness Peak 4 Nov



Outlook on Wed 20 / Thu 21 Nov

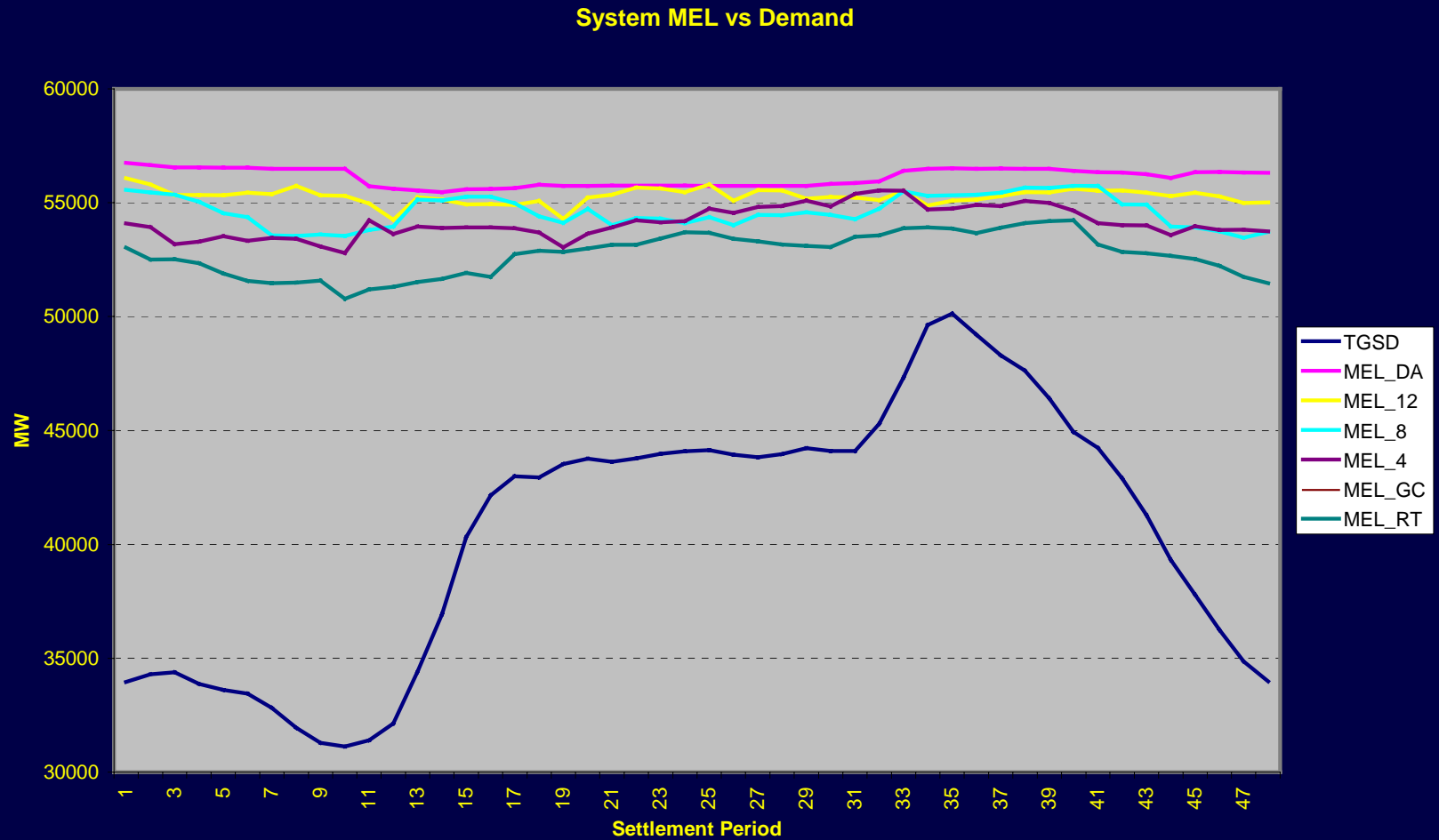
◆ NISM Summary

Time	Demand forecast	Identified shortfall
23:45 (T-18)	49900 MW	1500MW
06:50 (T-11)	49900 MW	2100MW
11:00 (T-7)	49900 MW	1500MW
14:45 (T-3)	50000 MW	1000MW
15:45 (T-2)	49900 MW	1000MW

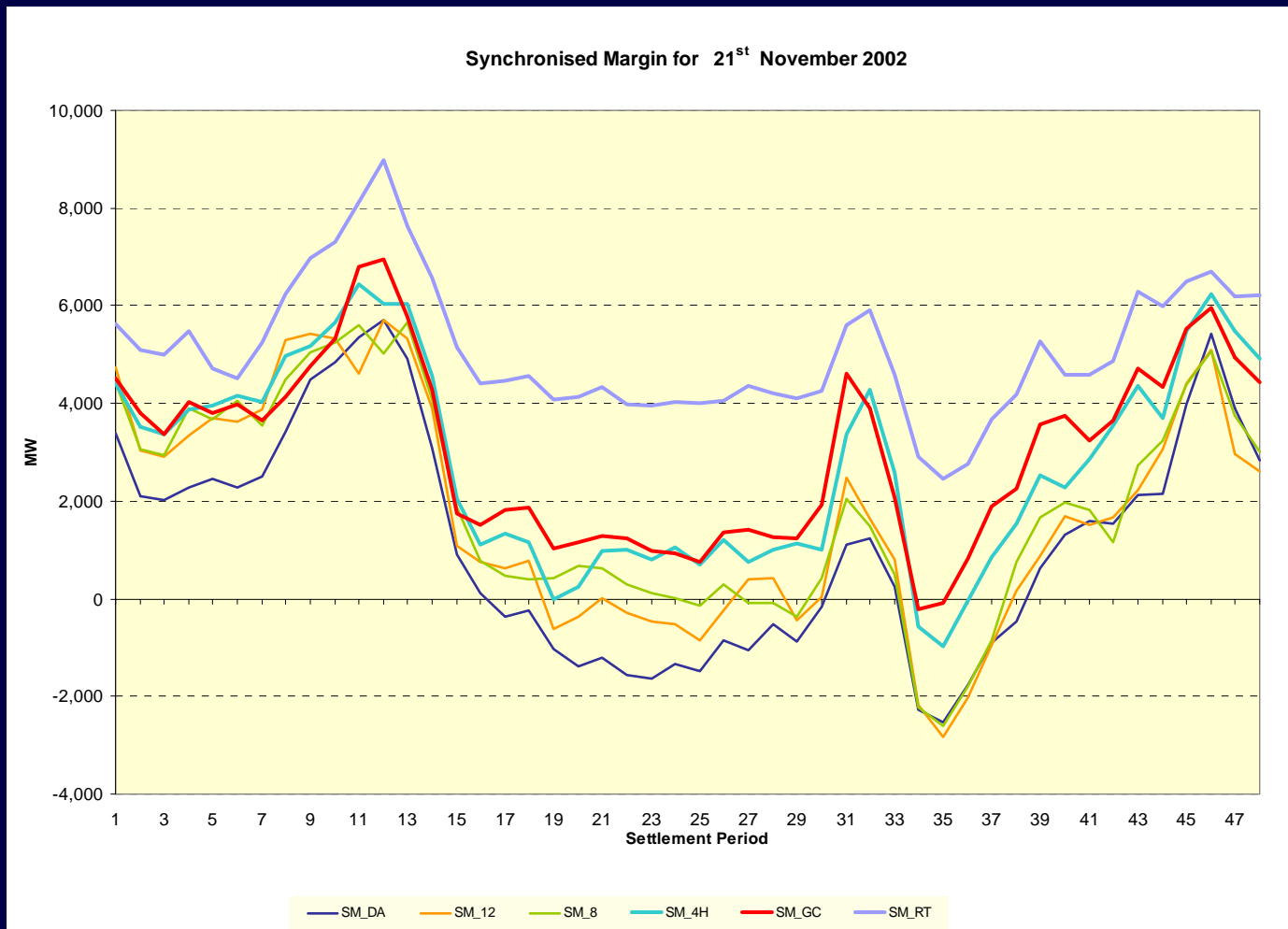
NISM last Thursday 21 Nov

- ◆ **Plant losses of >3500MW on Wed led to shortage of contingency at 18 hours ahead for Thu DP**
- ◆ **1500MW shortfall for Thu DP identified at 23:45 previous night**
- ◆ **4 PGBTs agreed for DP: total level ~900MW**
- ◆ **Around 700MW standing reserve was run from 16:14 to 17:46**
- ◆ **Actual Demand outturned at 49700MW (+400MW station demand) HHE 17:30 max forecast error ~300MW**

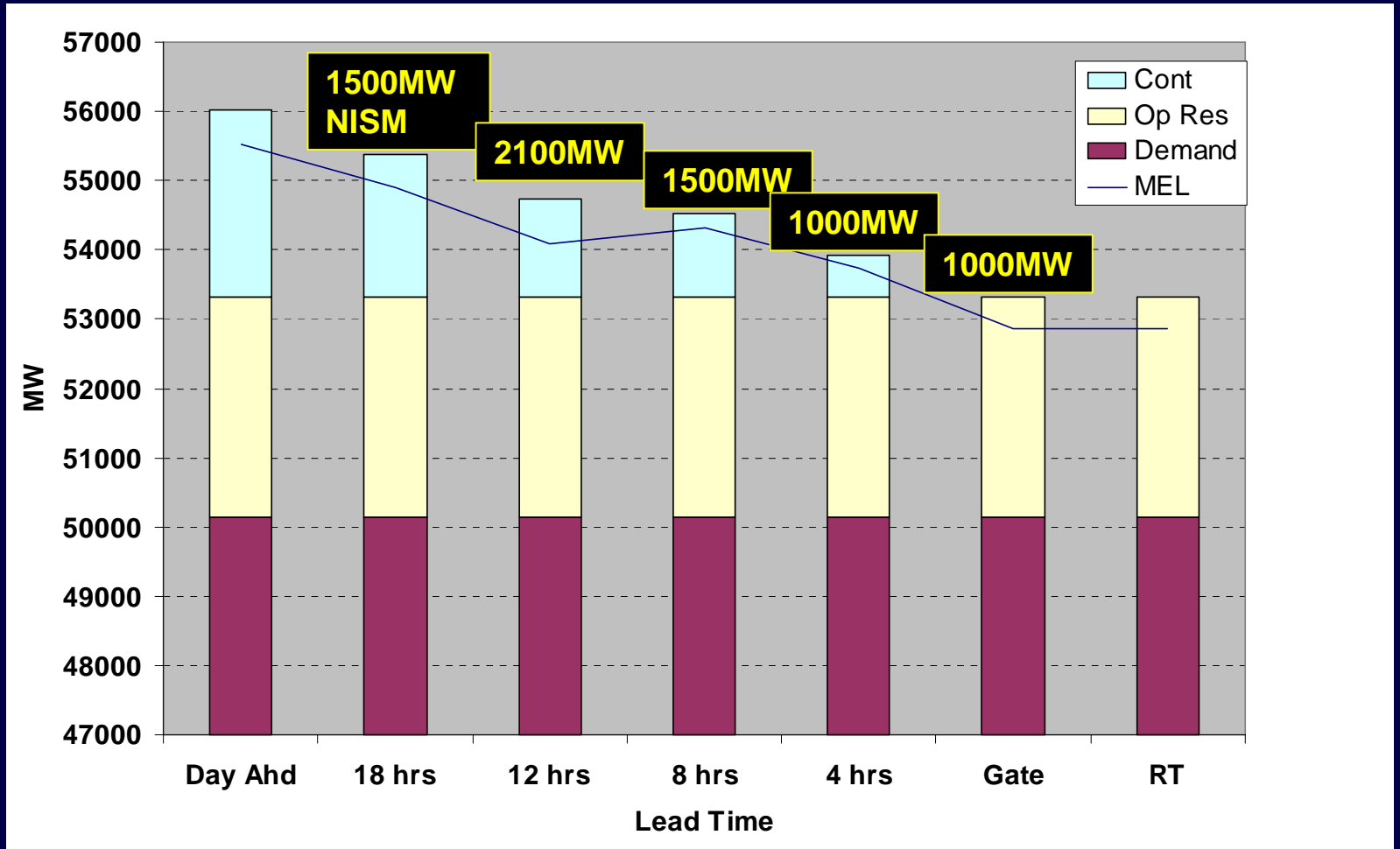
System MEL vs Demand - 21 Nov



Synchronised Margin - 21 Nov



System MEL vs Total System Reqqt

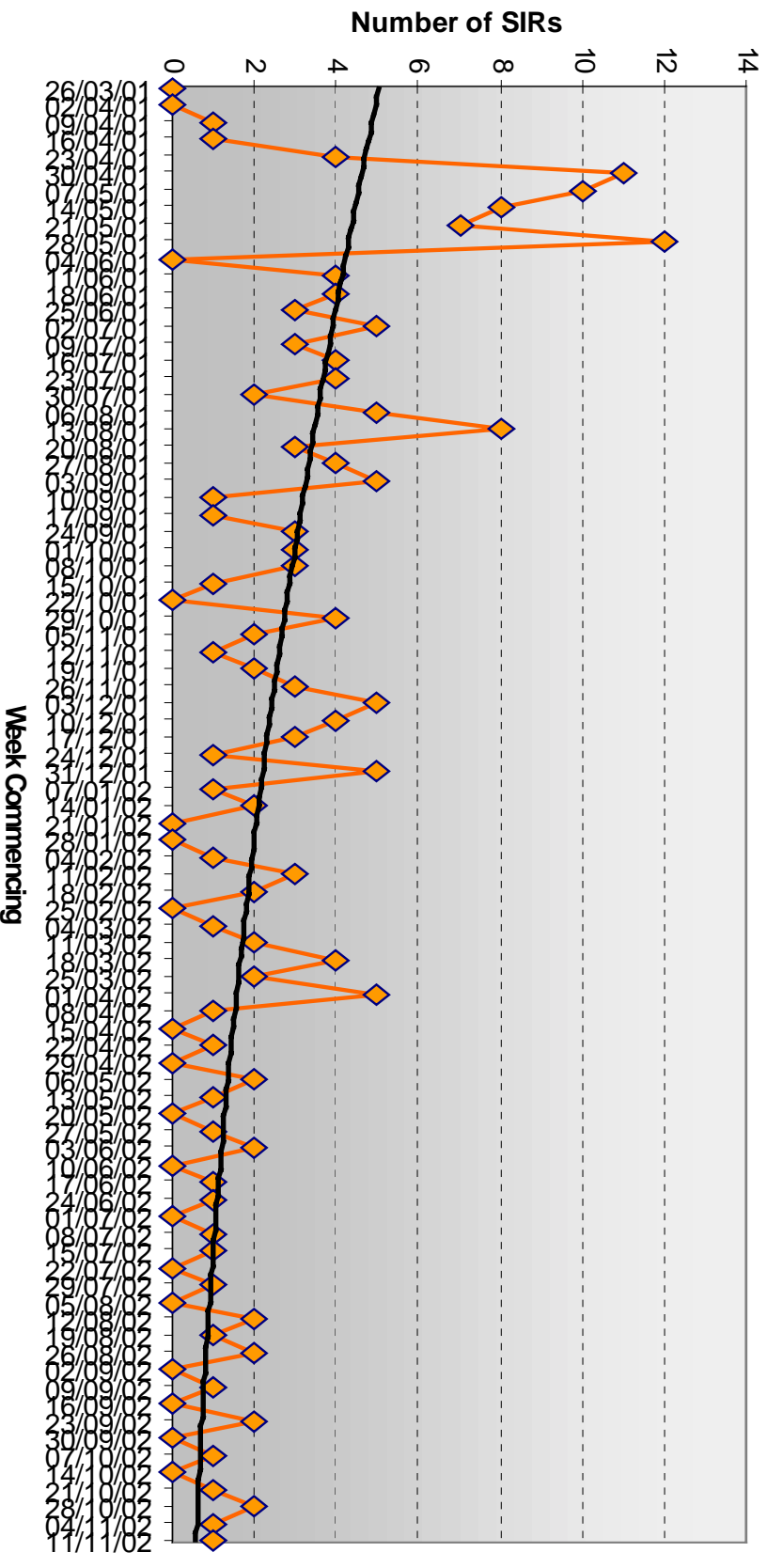


BMU Performance

- ◆ **Since NETA go-live, we have seen an improving trend in general CCL following performance.**
- ◆ **Number of SIRs is now at a low level of around 3-5 per month or 1 per week**
- ◆ **SIR process does not capture all problems with CCL following**

SIR Monitoring

Number of SIRs Requested per week since NEIA go-live



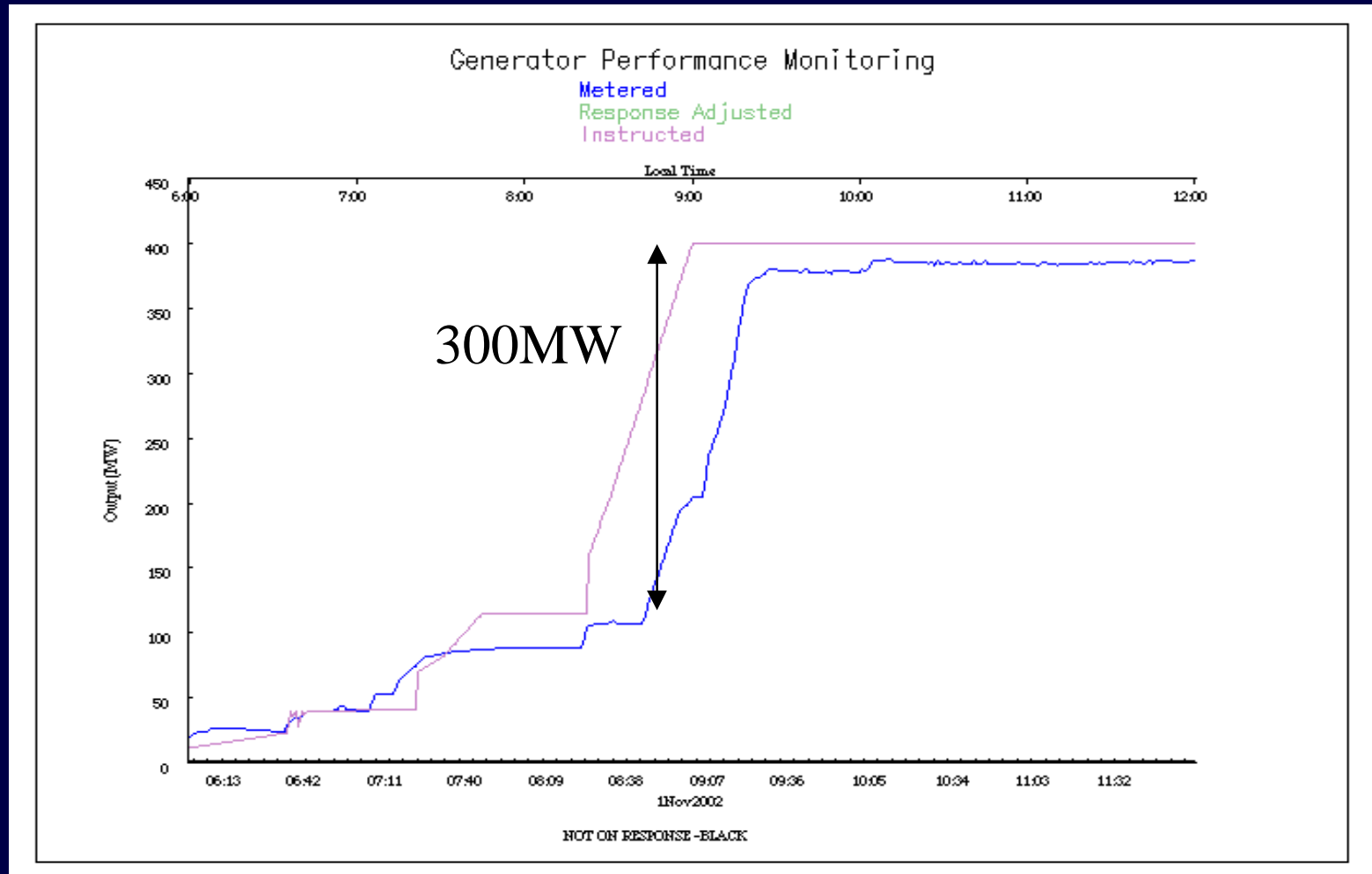
Statistical monitoring

- ◆ **Errors won't always result in an SIR request, but could still impact our operation of the system**
- ◆ **Statistical monitoring has therefore been implemented to supplement the SIR process and look at minute by minute CCL error (cf. AMIGO)**
- ◆ **We have chosen a threshold (20MW) which separates noticeable CCL errors from those which are negligible**
- ◆ **Typically since June, there have been around 4 BMUs per day with a daily mean CCL error greater than 20MW**

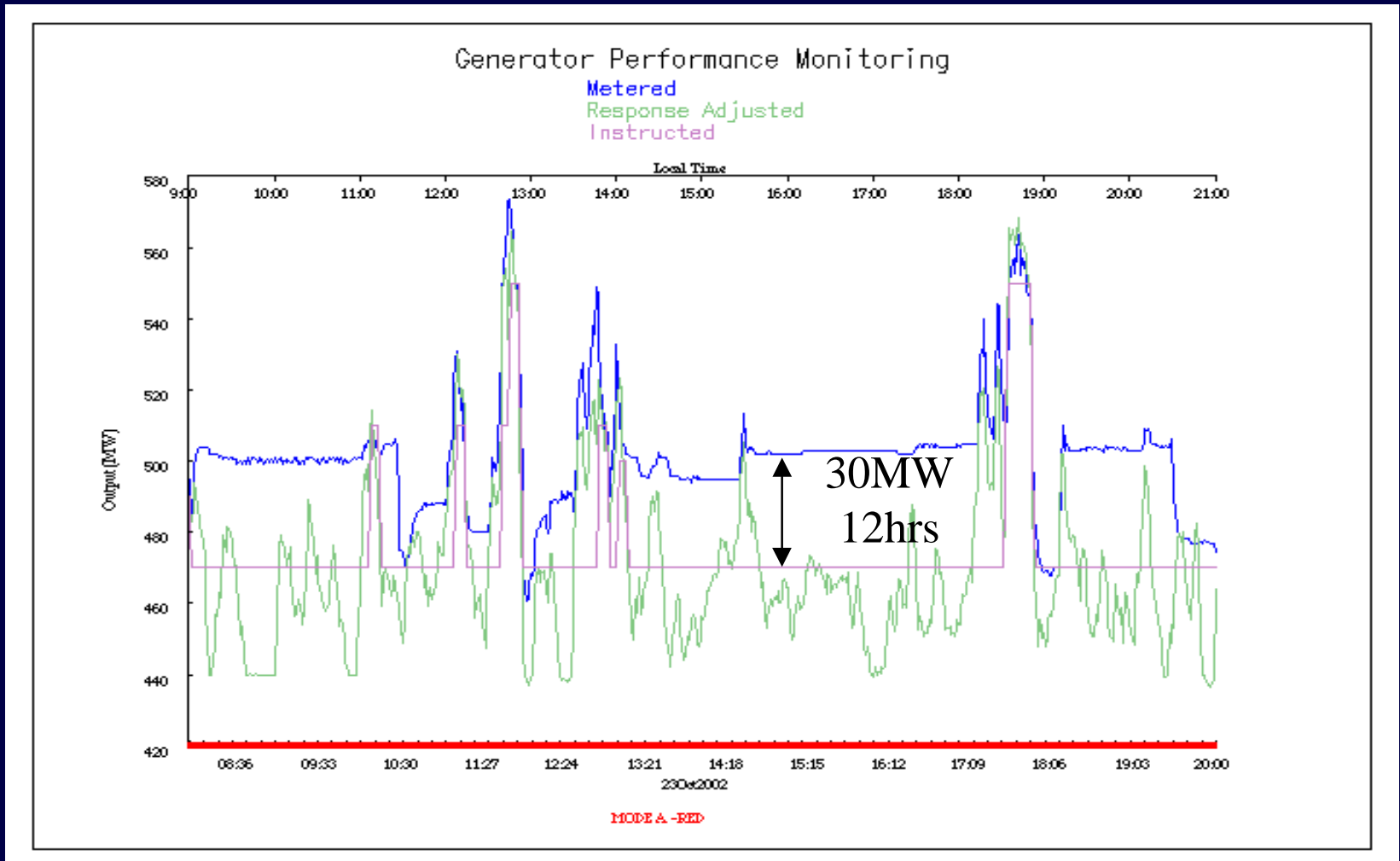
BMU Performance - main error categories

- ◆ **Ramping errors**
- ◆ **Continuous steady state errors**
- ◆ **Early, late sync, failure to sync**
- ◆ **Unrealistic step changes, data errors**

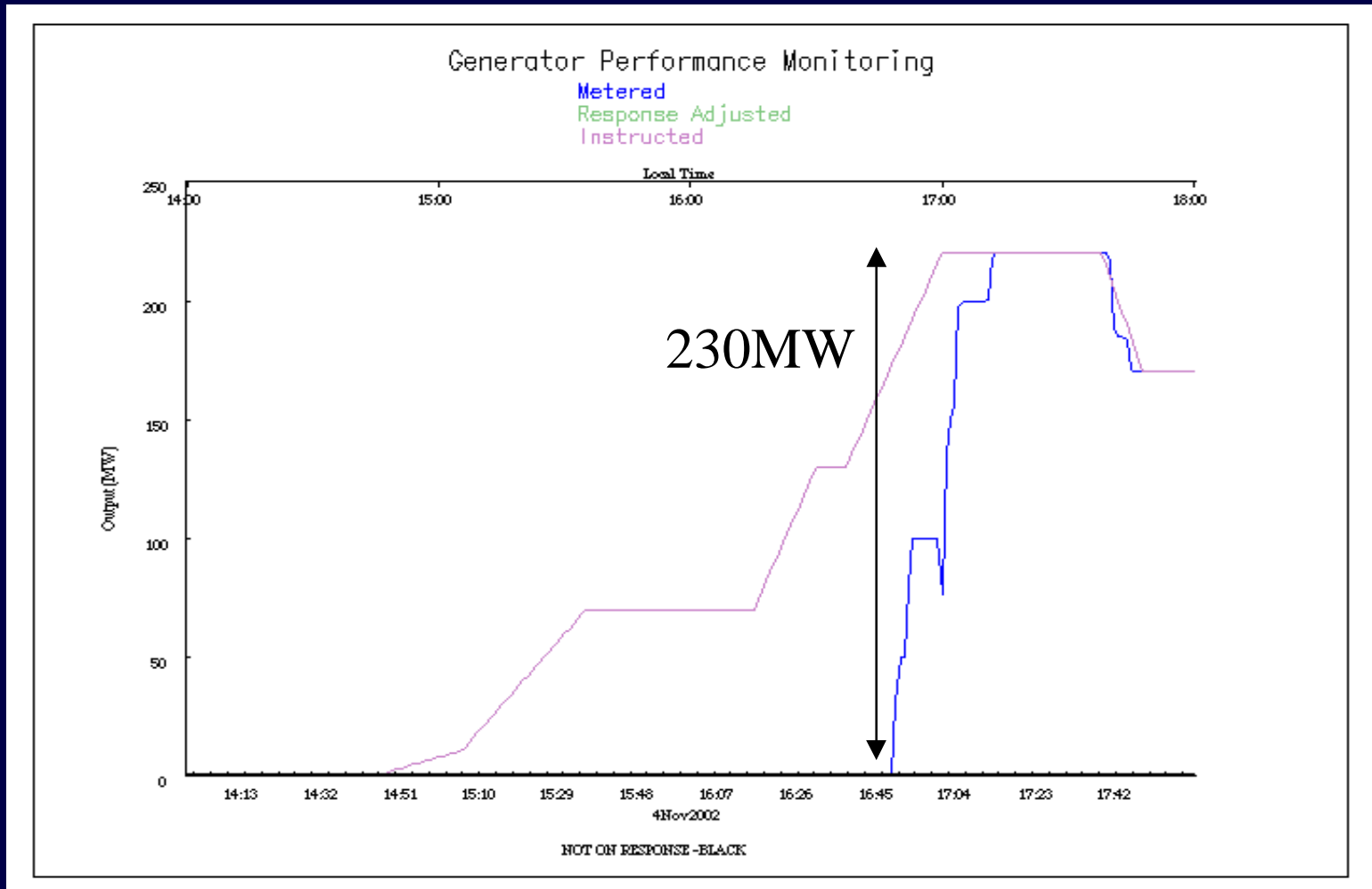
Ramping errors



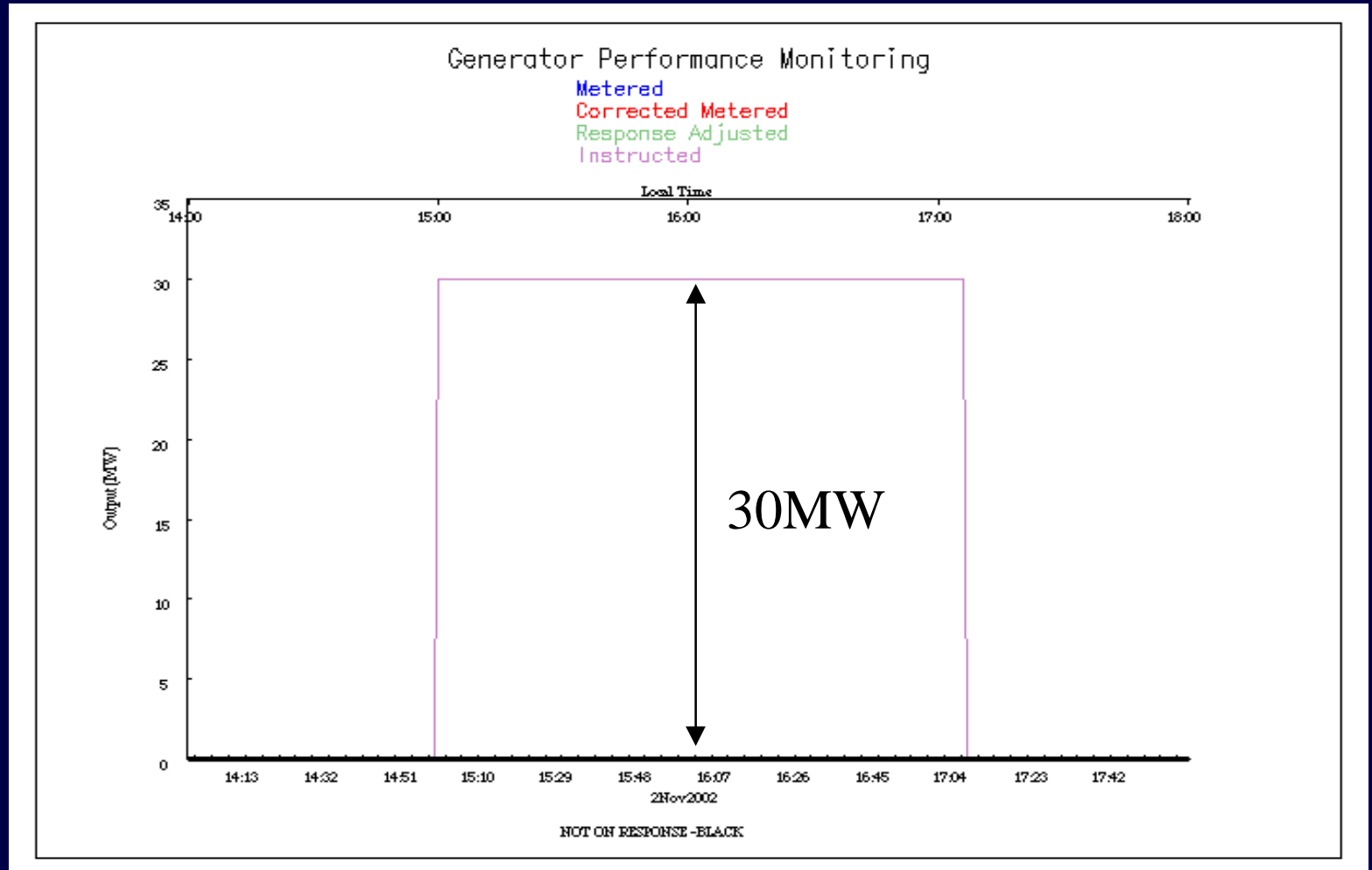
Continuous steady state errors



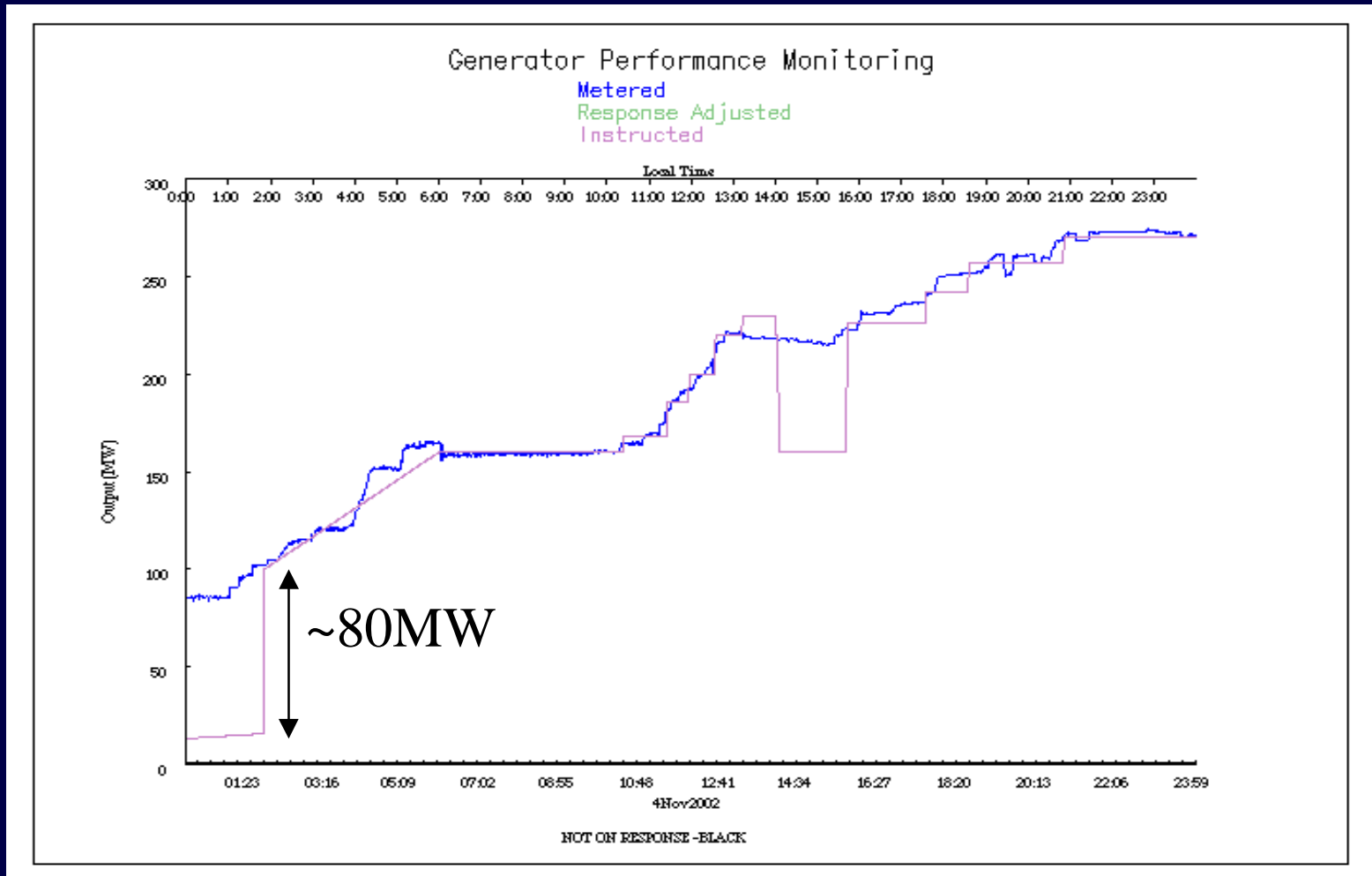
Late synchronisation



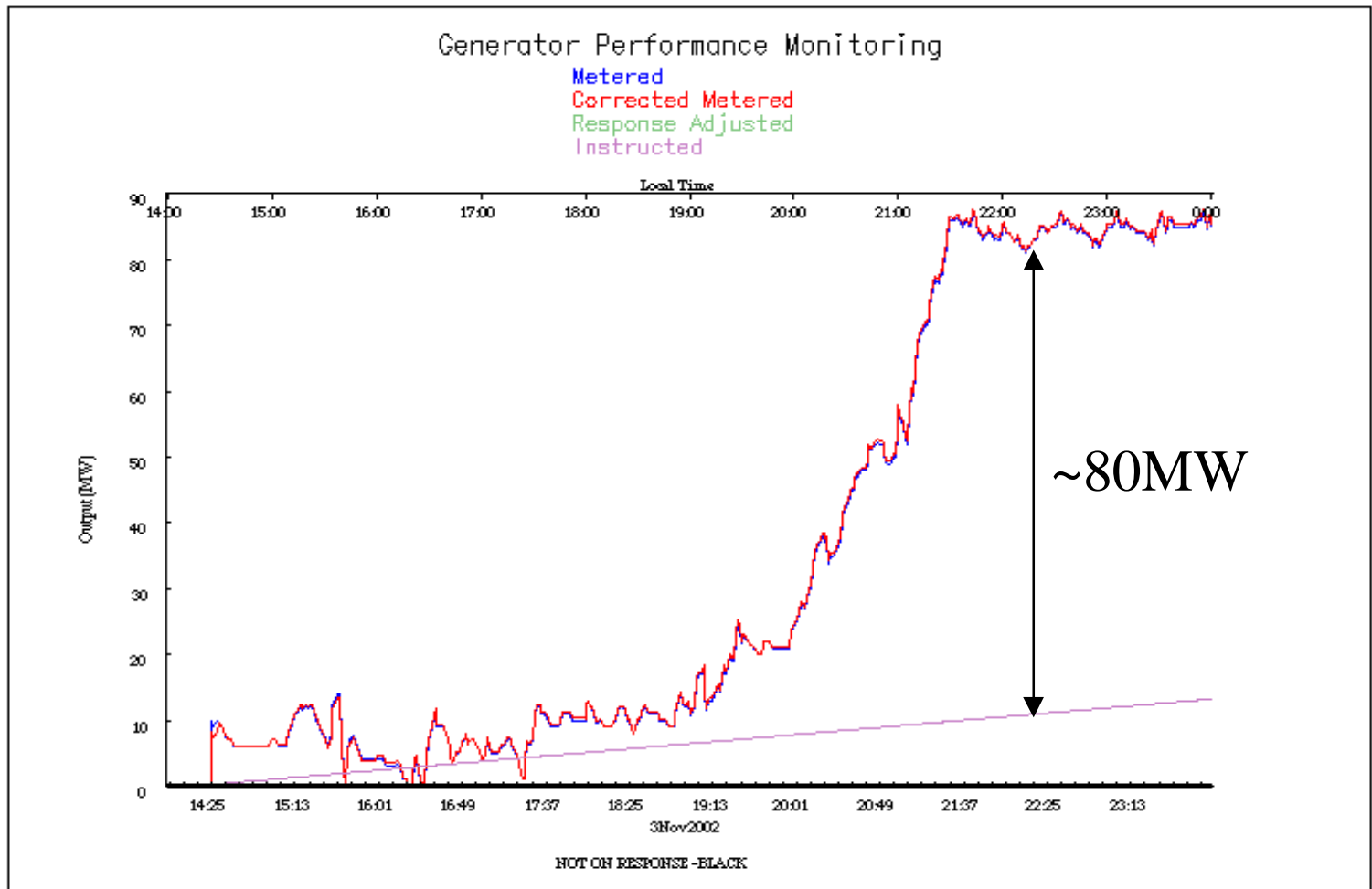
Failure to sync



Unrealistic step changes



Data errors



BMU Performance - process summary

- ◆ **Discuss worst cases with individual companies**
- ◆ **Include details of specific BMU statistical monitoring errors in SIR letters**
- ◆ **Follow up any specific trends identified**
- ◆ **Correct MEL redeclaration could have avoided nearly all CCL error examples shown**

PN accuracy

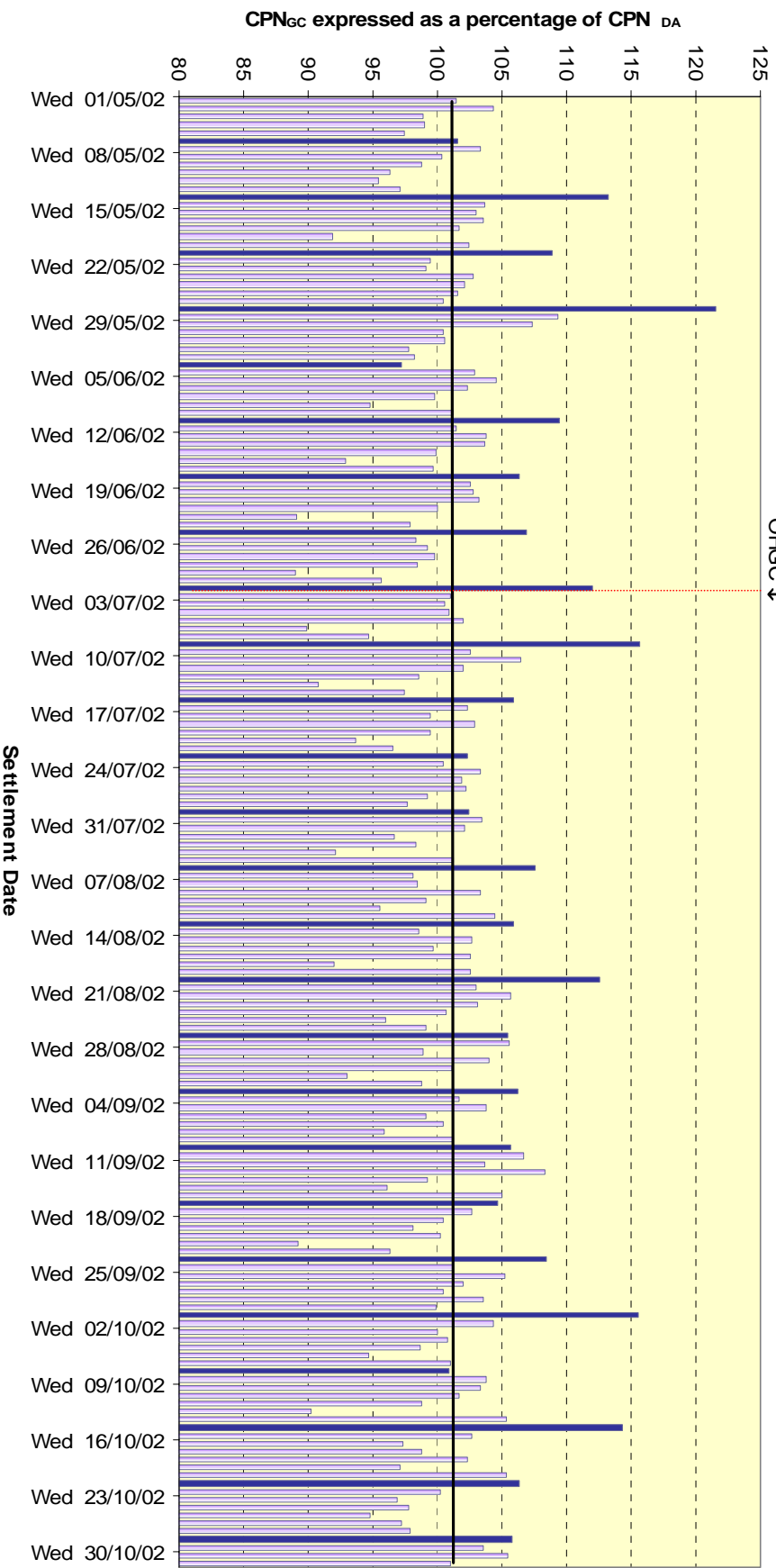
- ◆ **No specific pattern from DA to GC - but considerable volatility**
- ◆ **Sunday IPN for Monday clearly worst day of week for accuracy**
- ◆ **Recognition that some volatility is inevitable but trying to distinguish normal market effects from issues relating to preparation of data submissions**

PN accuracy (2)

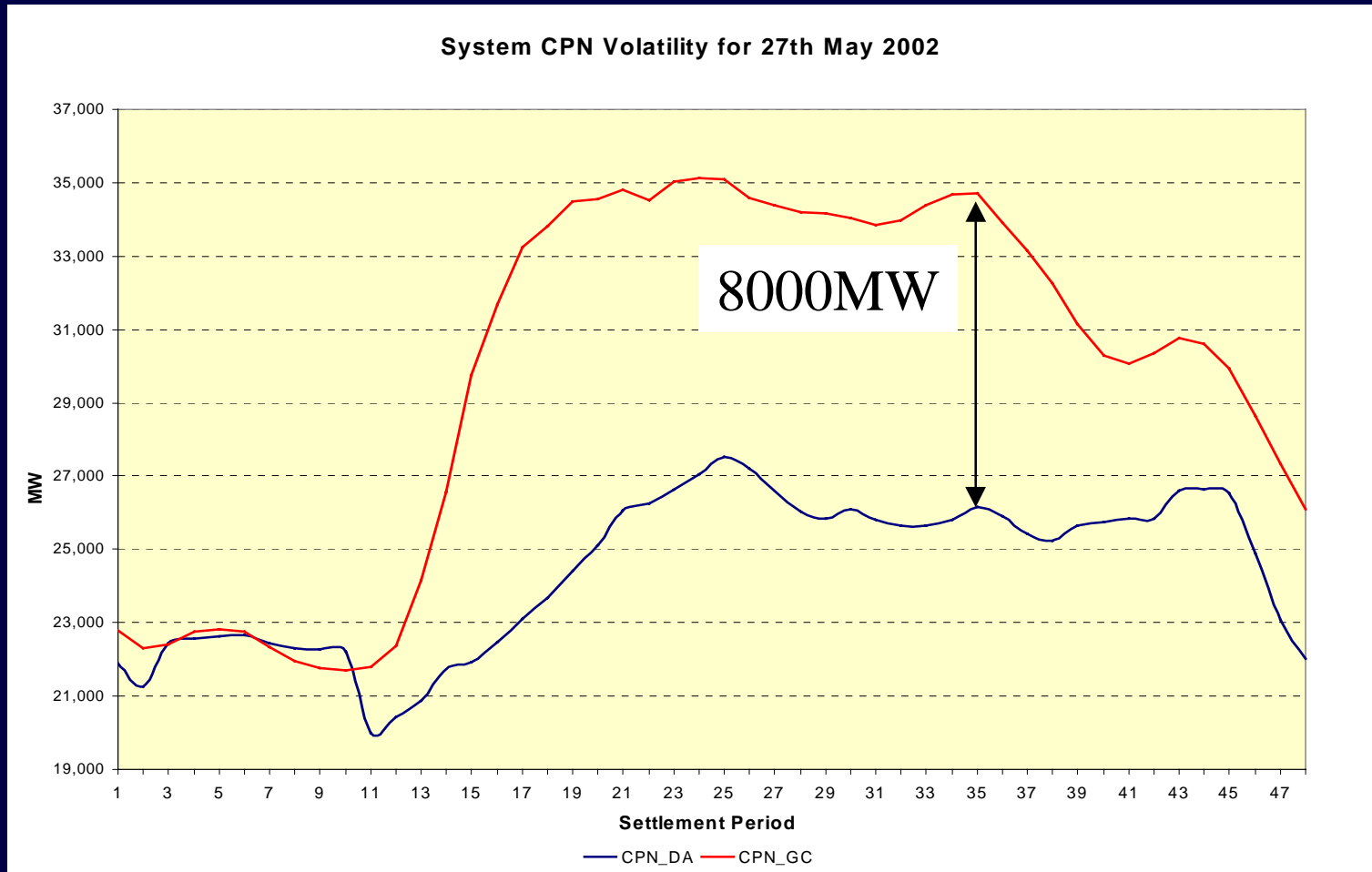
- ◆ **2% error on 50GW is 1GW or 2 large BMUs of uncertainty**
- ◆ **Some errors are attributable to commissioning plant or data oversights (e.g. DA MEL still zero after plant returns from outage).**
- ◆ **Capped PN plotted because a significant proportion of BMUs choose to declare MEL below PN level particularly at day ahead.**
- ◆ **We are unsure why - no obvious reason why MEL should be lower than PN**

Capped FPN/IPN May-Oct

Capped FPN as expressed as a percentage of Capped IPN

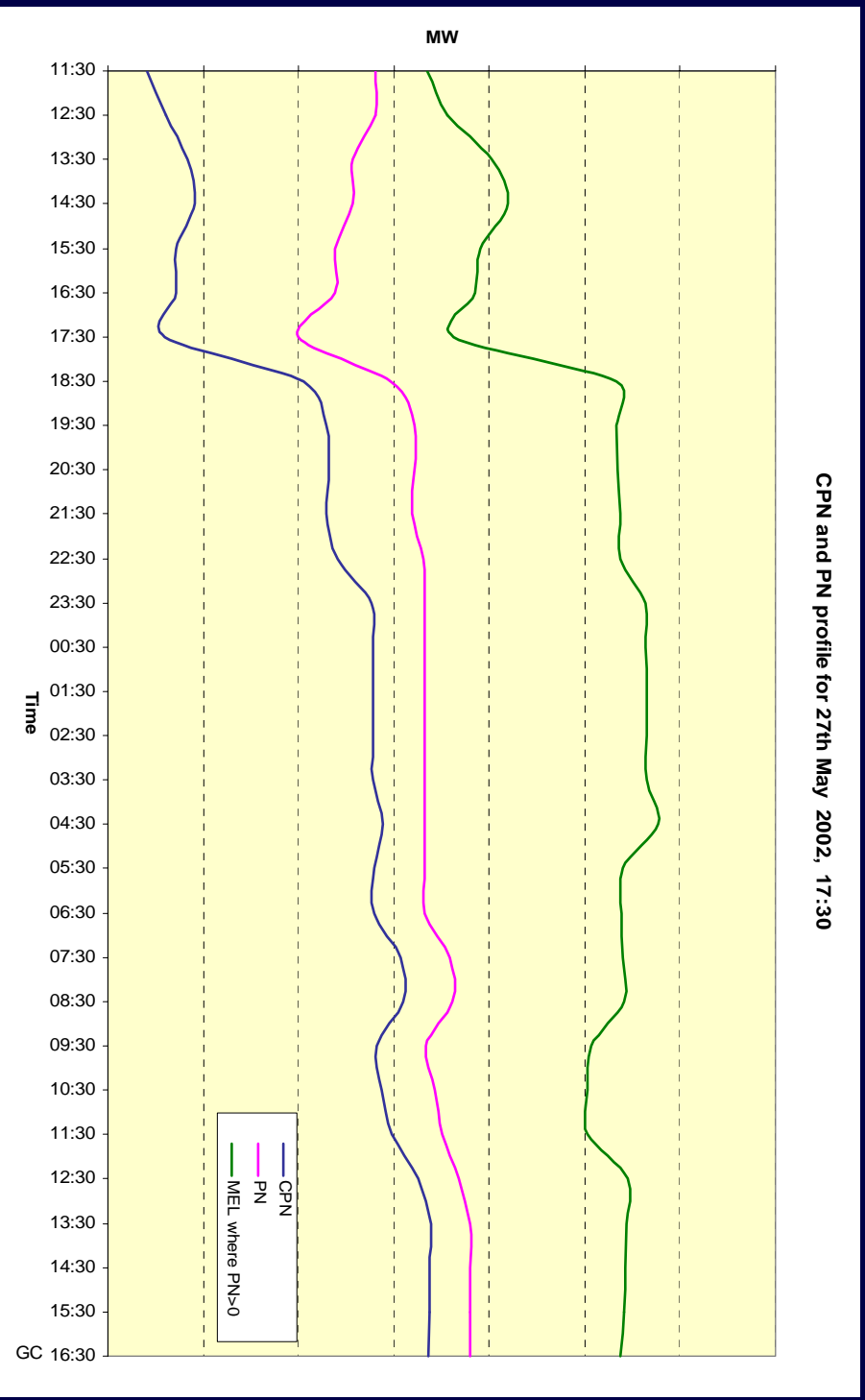


System CPN volatility - 27 May

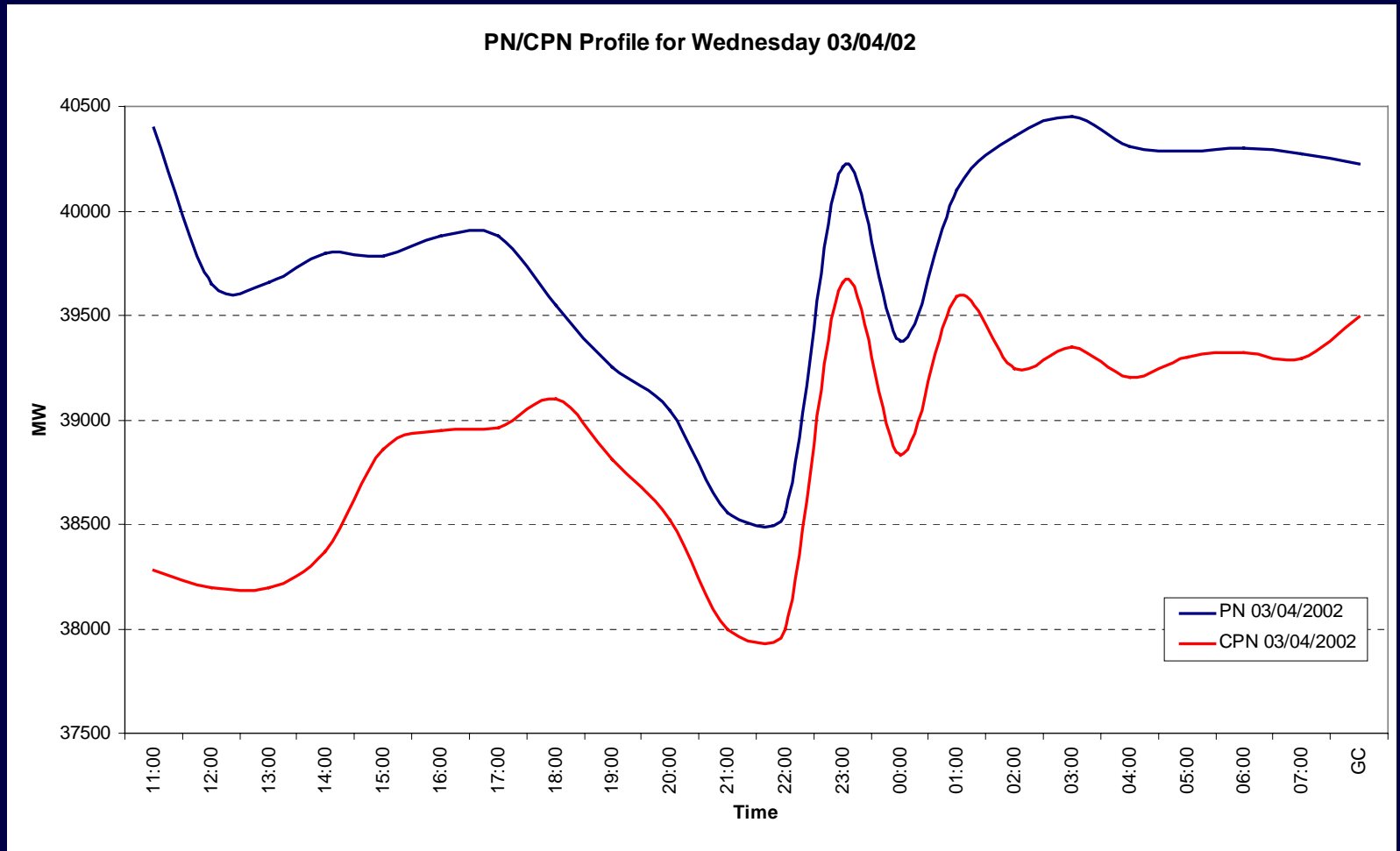


CPN, PN & MEL variation

CPN and PN profile for 27th May 2002, 17:30



PN and Capped PN profiles - 3 April



Impact of Day Ahead Uncertainty

- ◆ **Graphs show unpredictable nature of day ahead submissions - defaulting effect for Sat and Mon as well as uncertainty for $CPN < PN$**
- ◆ **We need to take day ahead / pre-gate decisions with this level of volatility / uncertainty**
- ◆ **Most of the time contingency plant is not run but we have to hold sufficient levels to cover those occasions when it is called on.**
- ◆ **We can only plan the operation of the system on the data submitted to us at the time.**

Summary

- ◆ **Operating Performance has continued to be good since the last forum**
- ◆ **Statistical monitoring is now enhancing SIR process by highlighting additional CCL following errors**
- ◆ **Inaccuracy / unpredictability of IPN & MEL data is distorting assessment of operating margin**

Contact information

- ◆ **New website for National Grid Transco:**
 - ◆ **www.ngtgroup.com**
 - ◆ **links: Business / NG UK**
- ◆ **www.nationalgrid.com/uk**
 - ◆ **then to:**
- ◆ **<http://www.nationalgrid.com/uk/indinfo>**
- ◆ **Helpdesk still 0800 777 770**