

System Events of 27th May

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DSWG meeting

16th July 2008

Agenda

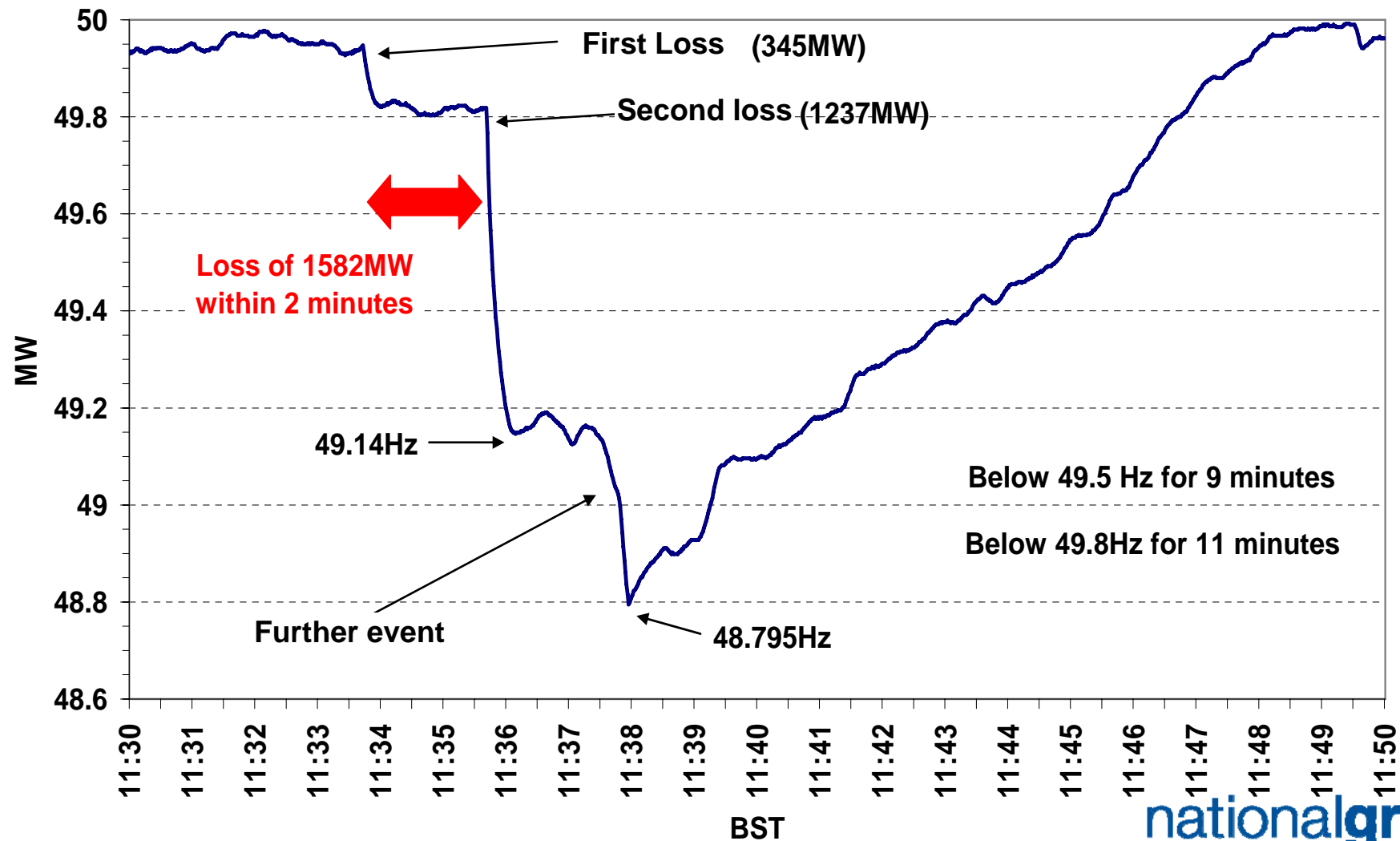
- ◆ Introduction
- ◆ Time Line of Events
- ◆ Feedback from Demand Side

Introduction

- ◆ Exceptional Loss of 1582MW within two minutes
 - ◆ 11:34am – loss of 345MW
 - ◆ 11:36am – loss of 1237MW
- ◆ Frequency
 - ◆ Initial Frequency drop to 49.14Hz
 - ◆ Lowest recorded point = 48.795Hz
 - ◆ 581MW of automatic low frequency demand control
 - ◆ Below 49.5Hz for 9 minutes
 - ◆ Outside operational limits (49.8Hz) for 11 min

Overview of frequency event

27th May 2008 - Overview



Near Simultaneous loss

- ◆ Several losses through the morning
- ◆ Major loss of two units in two minutes, 1582MW
- ◆ OCGT's on LF settings of 49.6 / 49.5Hz initiate
- ◆ Control Room take additional actions to recover
 - ◆ Additional STOR instructed (~1000MW)
- ◆ When combined with earlier losses, lead to complete erosion of reserve

Summary of Recovery

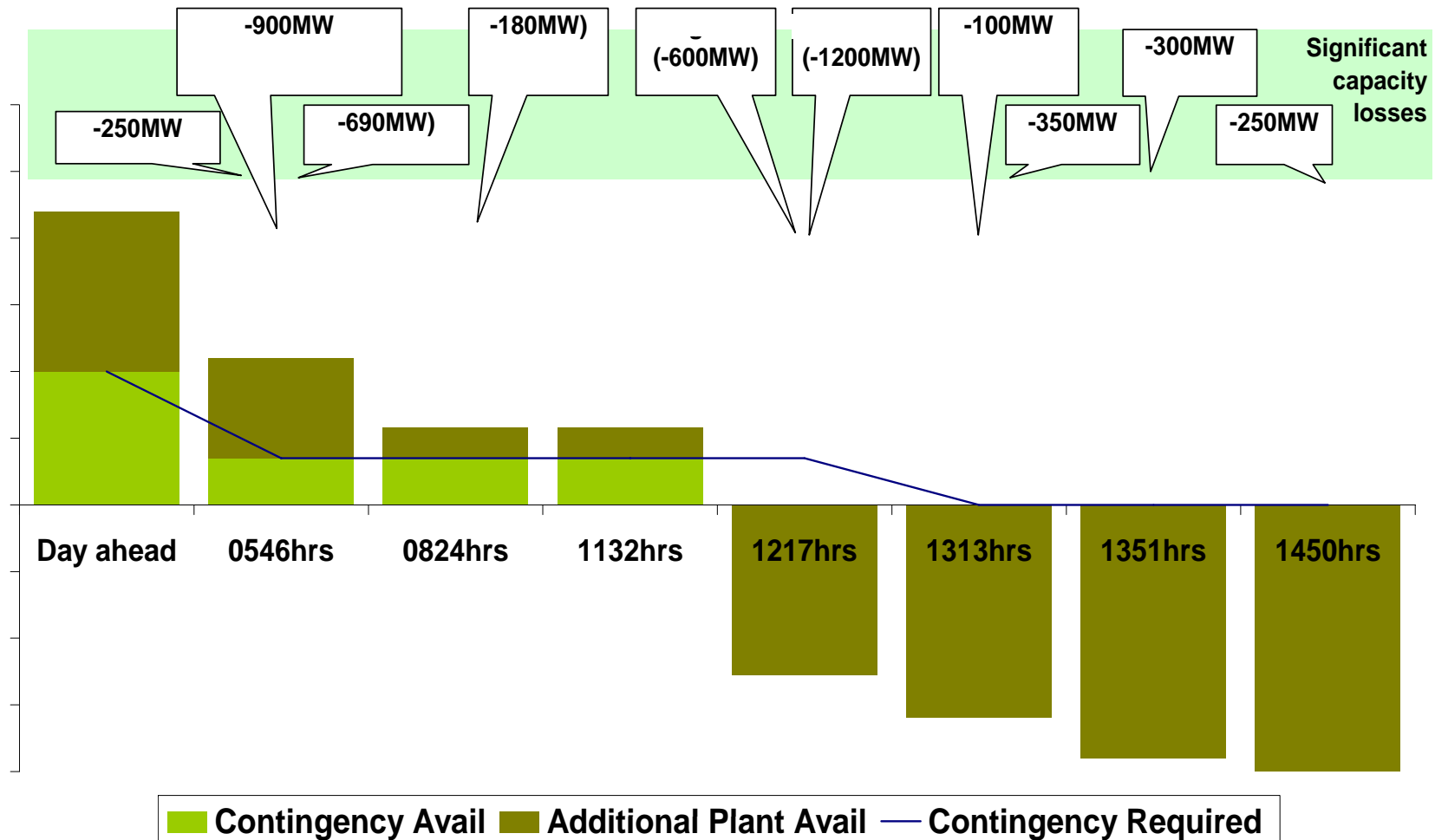
- ◆ Control Room took the following additional action on frequency reaching 48.8Hz
 - ◆ 2 minutes later, decision to instruct one stage of demand reduction
 - ◆ 9 DNO's (1200MW) of Demand Control by Voltage Reduction
- ◆ Frequency Recovers
 - ◆ Outside Operational Limits for 11 minutes
 - ◆ Control Room manage recovery to avoid any high frequency events
 - ◆ Response recovered in 15 minutes by Control Room to secure for next largest loss
 - ◆ Within 40 minutes – DNO's instructed to restore automatically disconnected demand

Post Recovery of Frequency

- ◆ Control Room
 - ◆ Demand automatically disconnected by LF instructed to be restored within 40 minutes
 - ◆ 485MW BMU instructed to synch at 12:59
 - ◆ 11:52am – Control Room start to contact EMCs to make additional plant available
 - ◆ Instructions issued to bring a number of units to a state of readiness
 - ◆ HRDR issued

Evening Peak

Summary of Operating Margin leading up to Evening Peak Demand



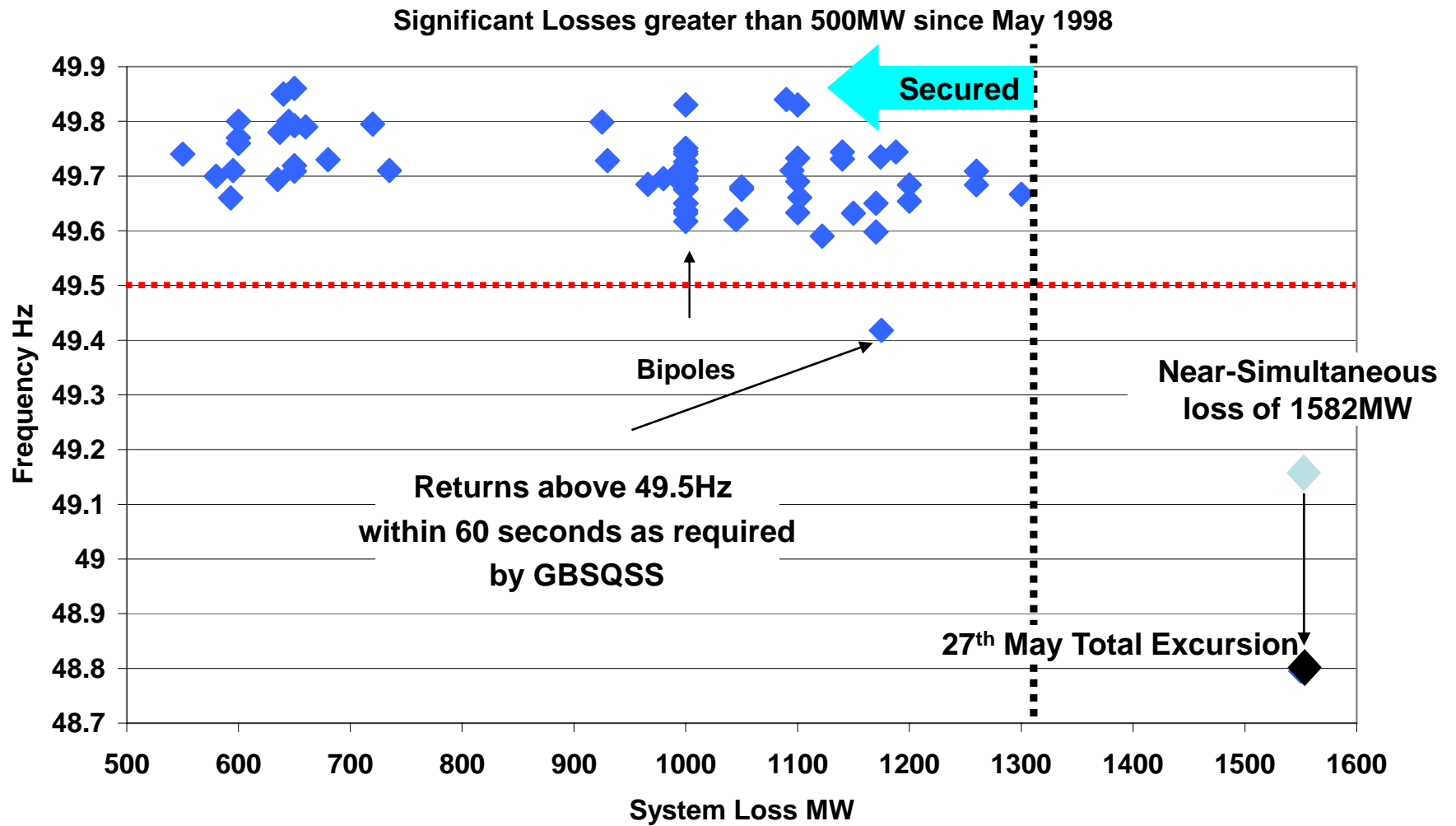
Evening Peak

- ◆ Further generation losses occurred across afternoon
- ◆ Demand Control reduced as demand falls and additional generation synchronises
- ◆ All feasible plant ordered
- ◆ All Demand Control lifted by 18:07
- ◆ No system warnings in force from 19:00

Summary of events

- ◆ Loss of two units totalling 1582 MW within two minutes was exceptional
- ◆ The dual challenge of a major system disturbance and the generation loss pattern represented a significant challenge to the Control Room
- ◆ Demand Control measures remained in place to secure the system balance through the afternoon

Historical Context of major loss



Focus of Current Work

- ◆ Initial report sent to OFGEM / BERR on 13th June 2008
- ◆ Additional Information being sought from DNOs:
 - ◆ performance of embedded plant
 - ◆ performance of Low Frequency Demand Disconnection Scheme
 - ◆ actual demand relief delivered by manually instructed Demand Control
- ◆ It is expected that any operational/technical lessons for future will be reported to Energy Emergency Executive Committee (E3C) and Grid Code Review Panel (GCRP)

Input from Demand Side

- ◆ Exceptional event, broadly things worked as expected.
- ◆ Interim report available on our website:
<http://www.nationalgrid.com/uk/Electricity/Codes/gridcode/associateddocs/>
- ◆ Any further information relating to the third frequency dip, e.g. trips of embedded generation would be welcome

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- ◆ Questions