

# Operations Perspective

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# Introduction

- Manager Power System Control
- Reporting to Director, Operations
- Responsible for short term operations, including National Control Centre, up to 1 week ahead

# Presentation Structure

- Discuss plant portfolio
- Challenges for system operation
  - Reserve
  - Minimum demand (Night Valley)

# Summary System Statistics

Generating Plant (excl wind) 6050 MW

Wind Generating Plant 671 MW

Generating Stations 21

Energy 2005 27 TWh

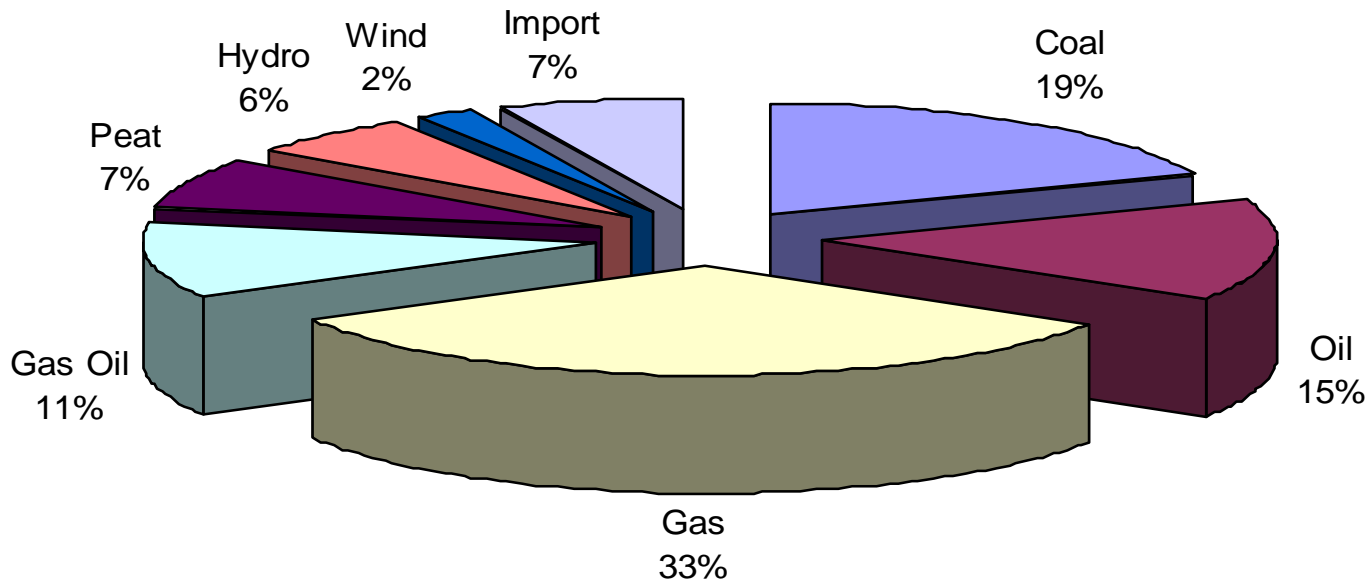
Load variation from 1803 to 4828 MW

*Max/Min ratio of 2.7*

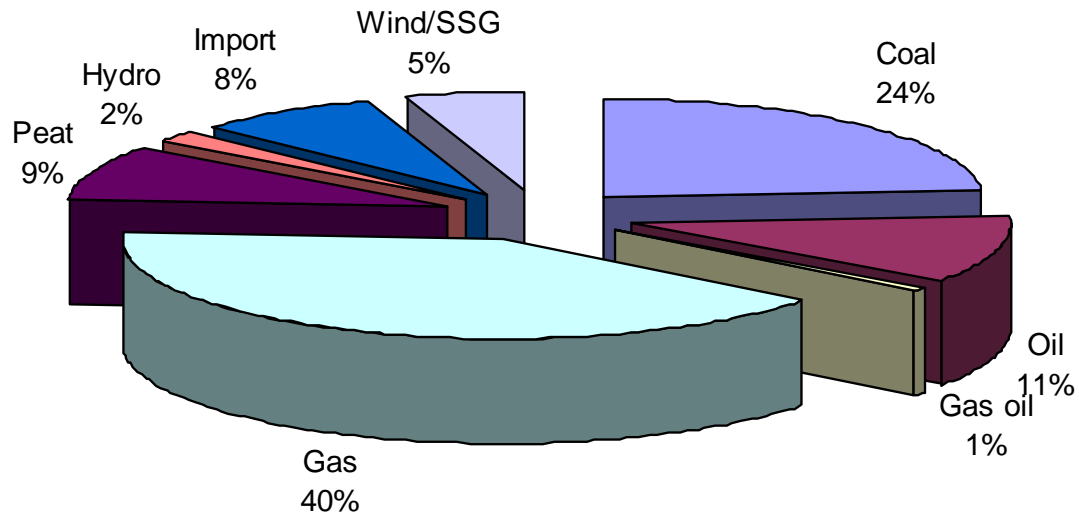
N-S imports up to 330 MW

*(See 'System Records' under 'System Operations' on Eirgrid.Com)*

# Fuel Mix for All Time Peak of 4828 MW on Dec 13th 2005



# Energy 2005 – Fuel Mix



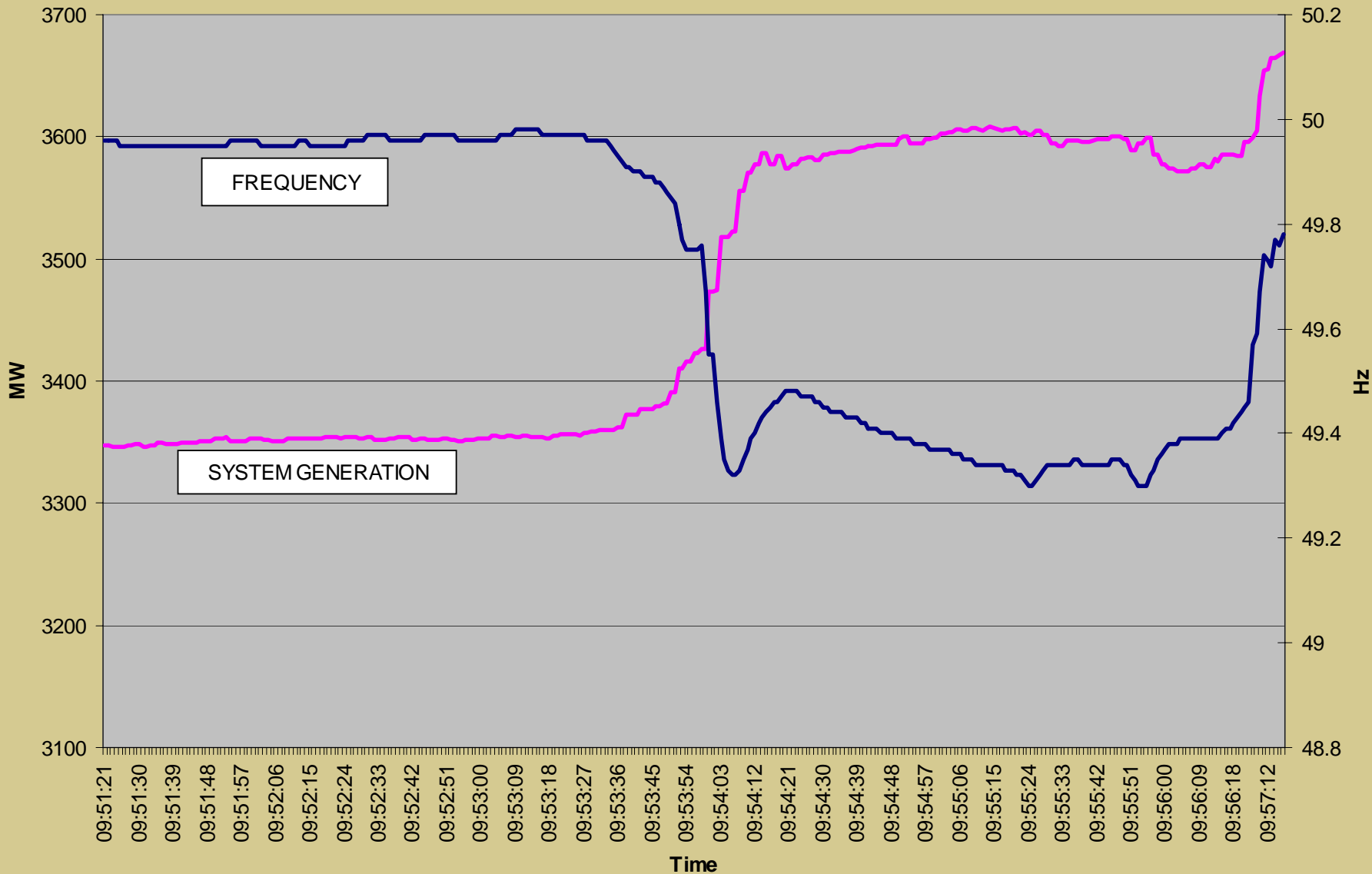
# Plant Mix (MW and % of Installed)

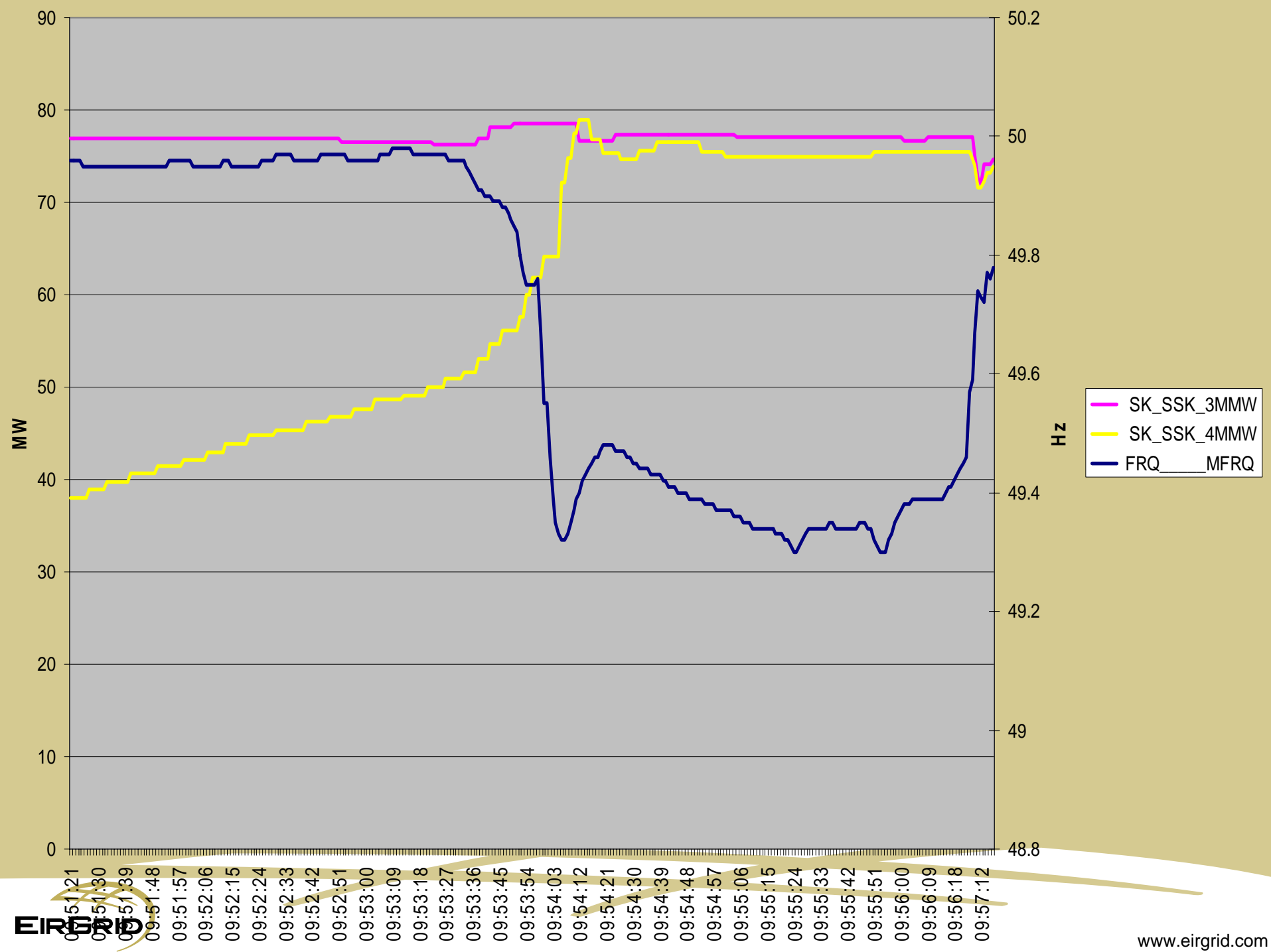
- Steam 2904 MW (48%)
- Combined cycle 2070 MW (34%)
- Open cycle 359 MW (6%)
- Peakers 208 MW (3%)
- Hydro 217 MW (4%)
- Pumped storage 292 MW (5%)

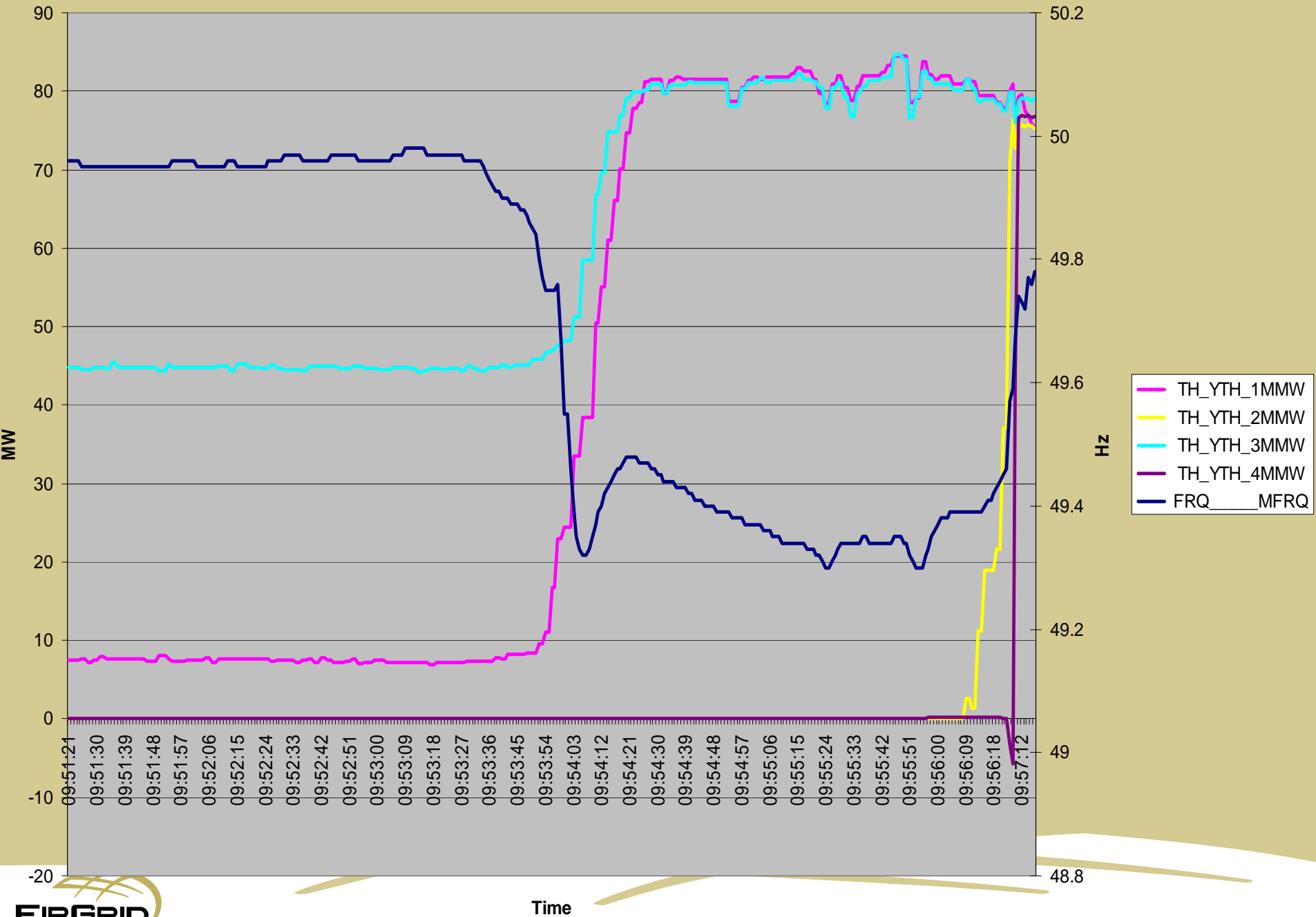
# Steam

- Total of 2904 MW
  - 3 x 305 MW coal units
  - 3 x 256 MW oil/gas units
  - 1 x 270 MW gas unit
  - 3 x 115 MW oil/gas units
  - 4 x 57 MW oil units
  - 150, 128 and 100 MW peat units

# Reserve





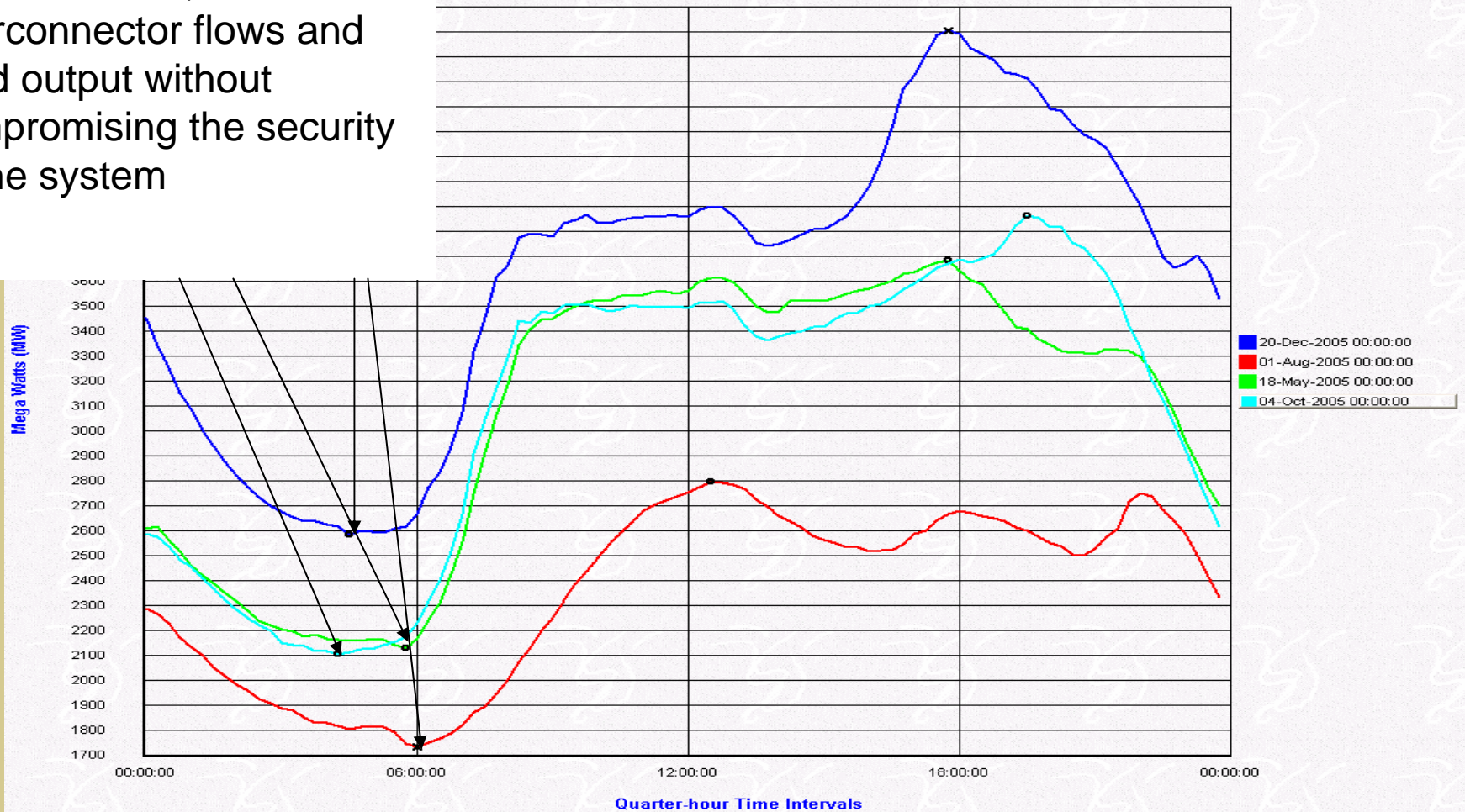


# Minimum Demand (Night Valley)

Must be able to dispatch plant in order to meet the minimum load of the day while respecting plant characteristics, interconnector flows and wind output without compromising the security of the system

# Minimum Demand

Load Comparison



# Cycling – 1

- Thermal
  - 115 and 57 MW Oil plant can easily cycle
  - 256/270 MW oil and gas plant can have cycling restrictions but have low minimum loads of 40 MW
  - Peat units have high minimum loads and are difficult to cycle
  - Coal units cannot cycle easily but have a wide operating range

# Cycling – 2

- Combined Cycle
  - Smaller CCs can cycle easily
  - Larger CCs have difficulty with steam conditions on startup which makes cycling difficult
  - Larger CCs have narrow control ranges and have difficulty operating at low loads due to emissions restrictions

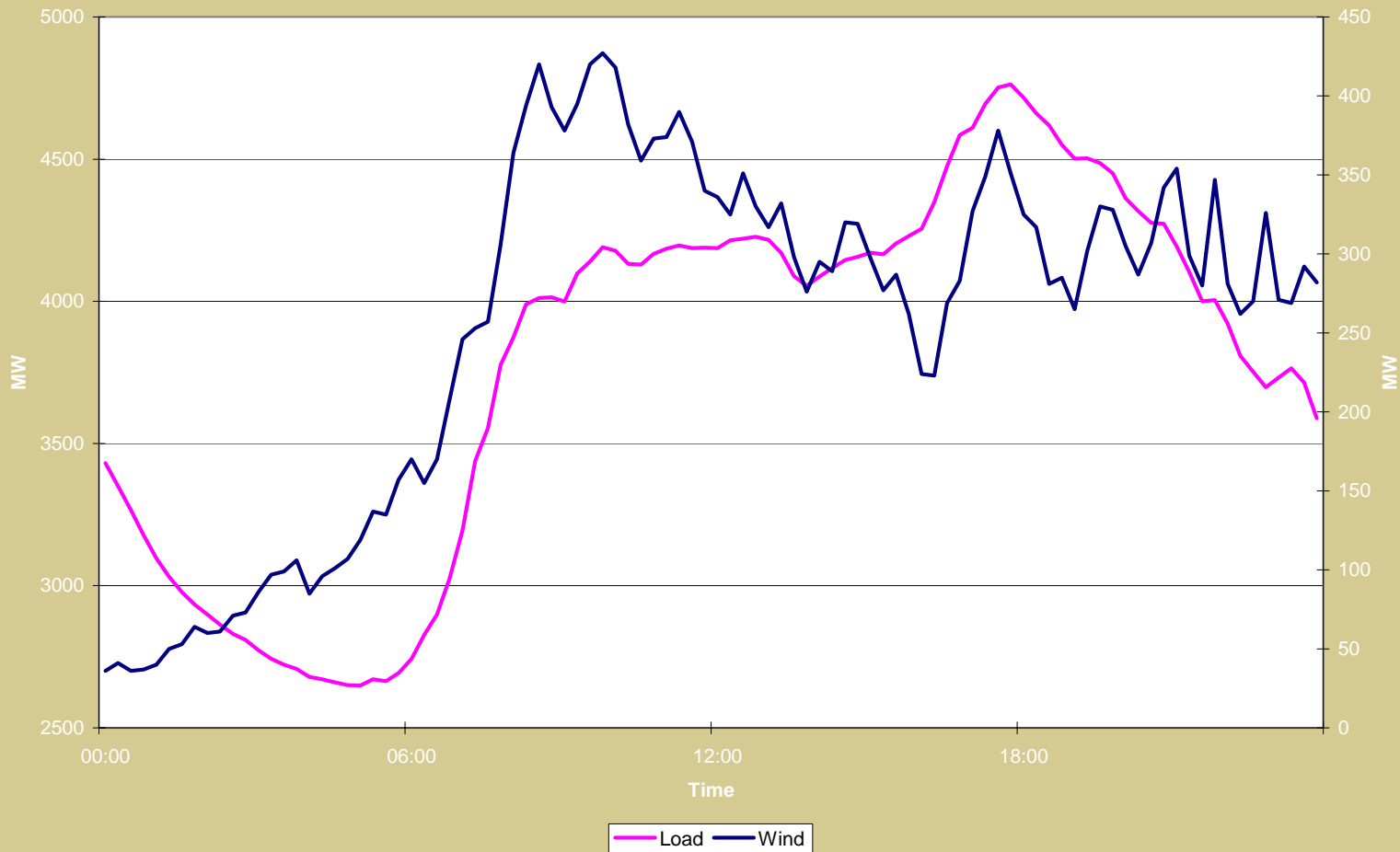
# Cycling – 3

- Hydro, Open cycle turbines, Peakers and Pumped Storage
  - Easy to cycle
  - Provide large amounts of reserve

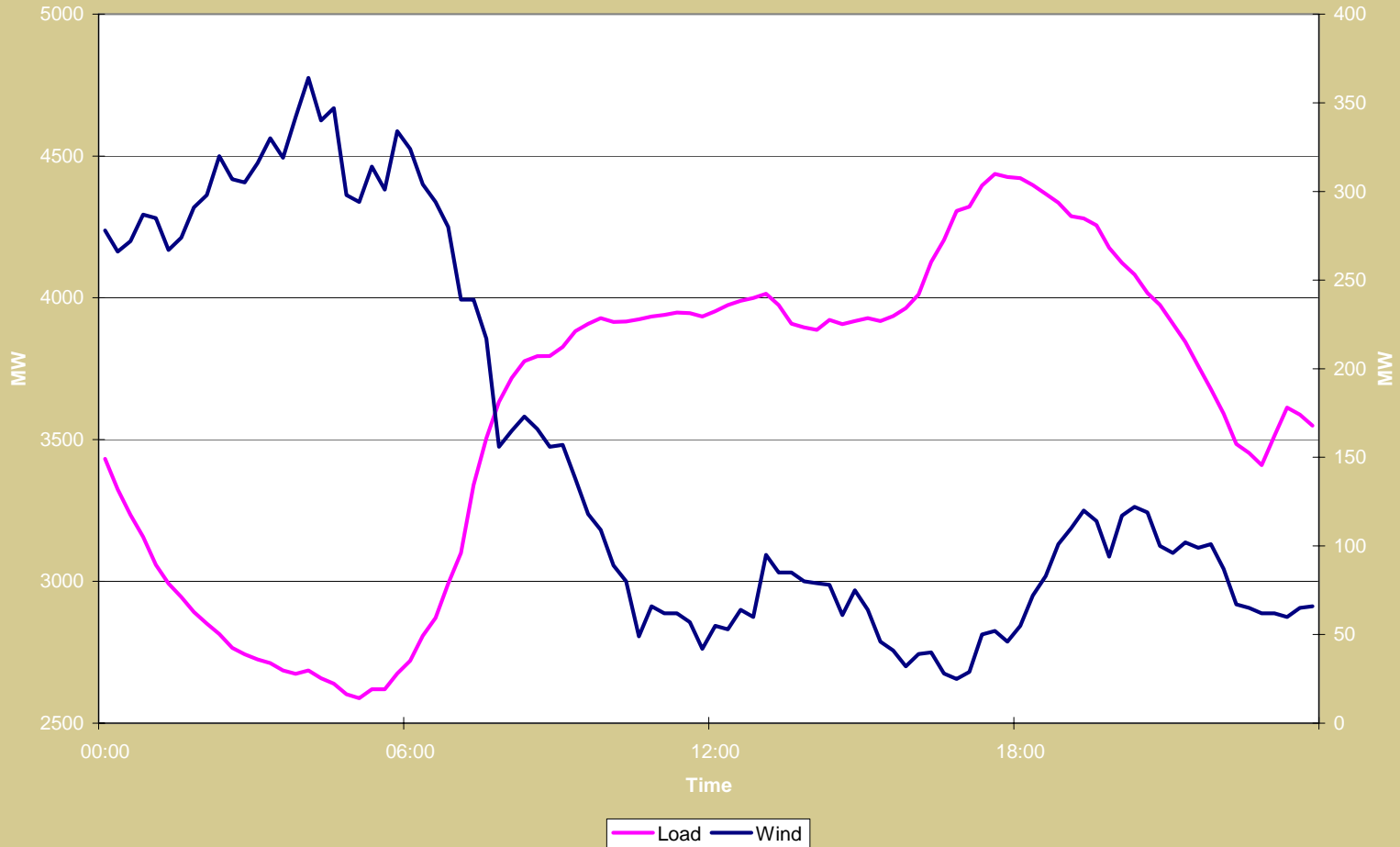
# Minimum Demand – Other Issues

- High overnight imports force reduction in plant output
- Arrange counter-trades
- High minimum loads on large CCs, peat and coal plant may force cycling of at least one CC in the next 6 months.
- Likewise high wind output may force more plant cycling and impact on frequency control
- Wind may have to be curtailed for reasons of system security

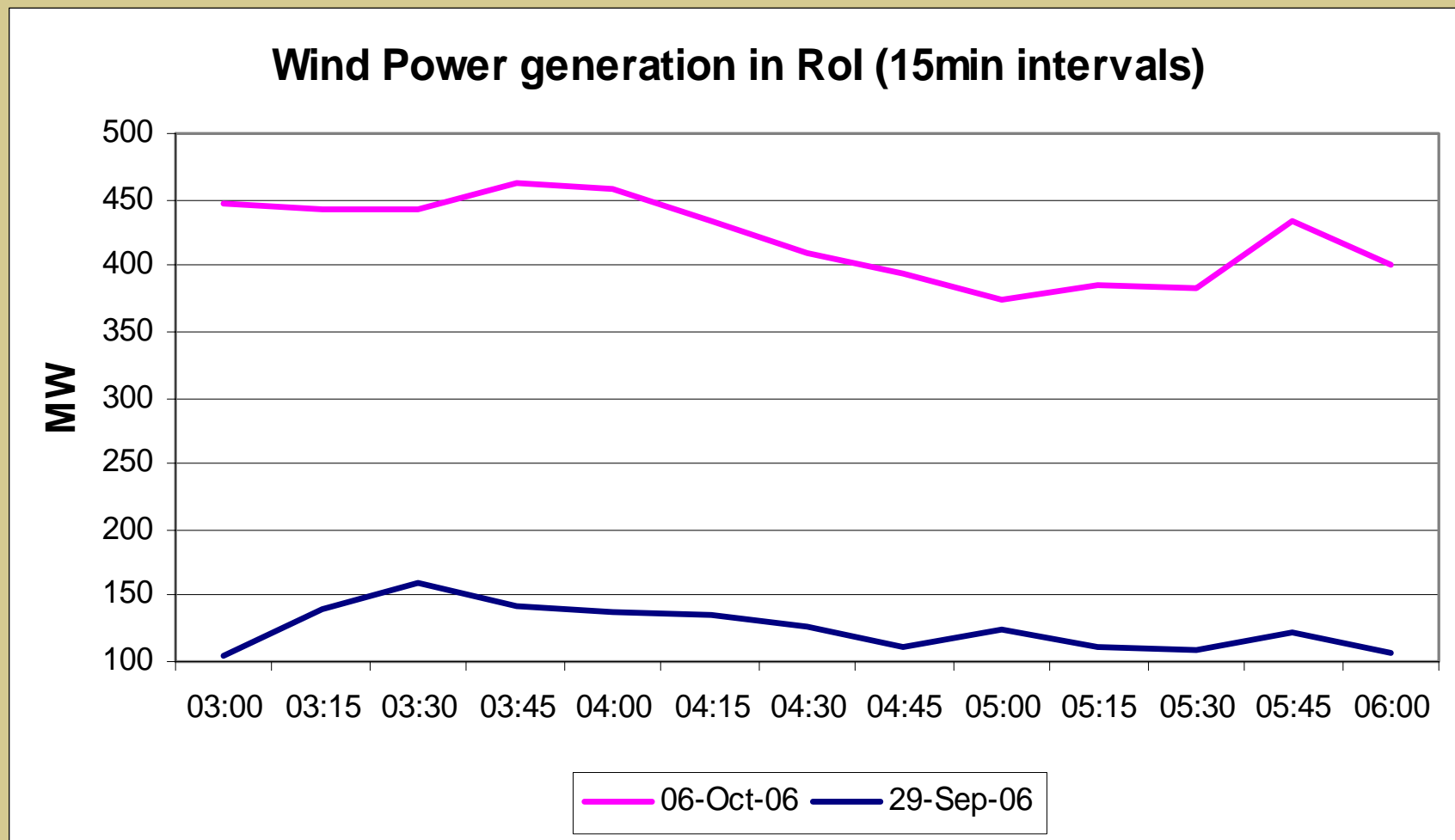
# Wednesday 07 Dec 2005



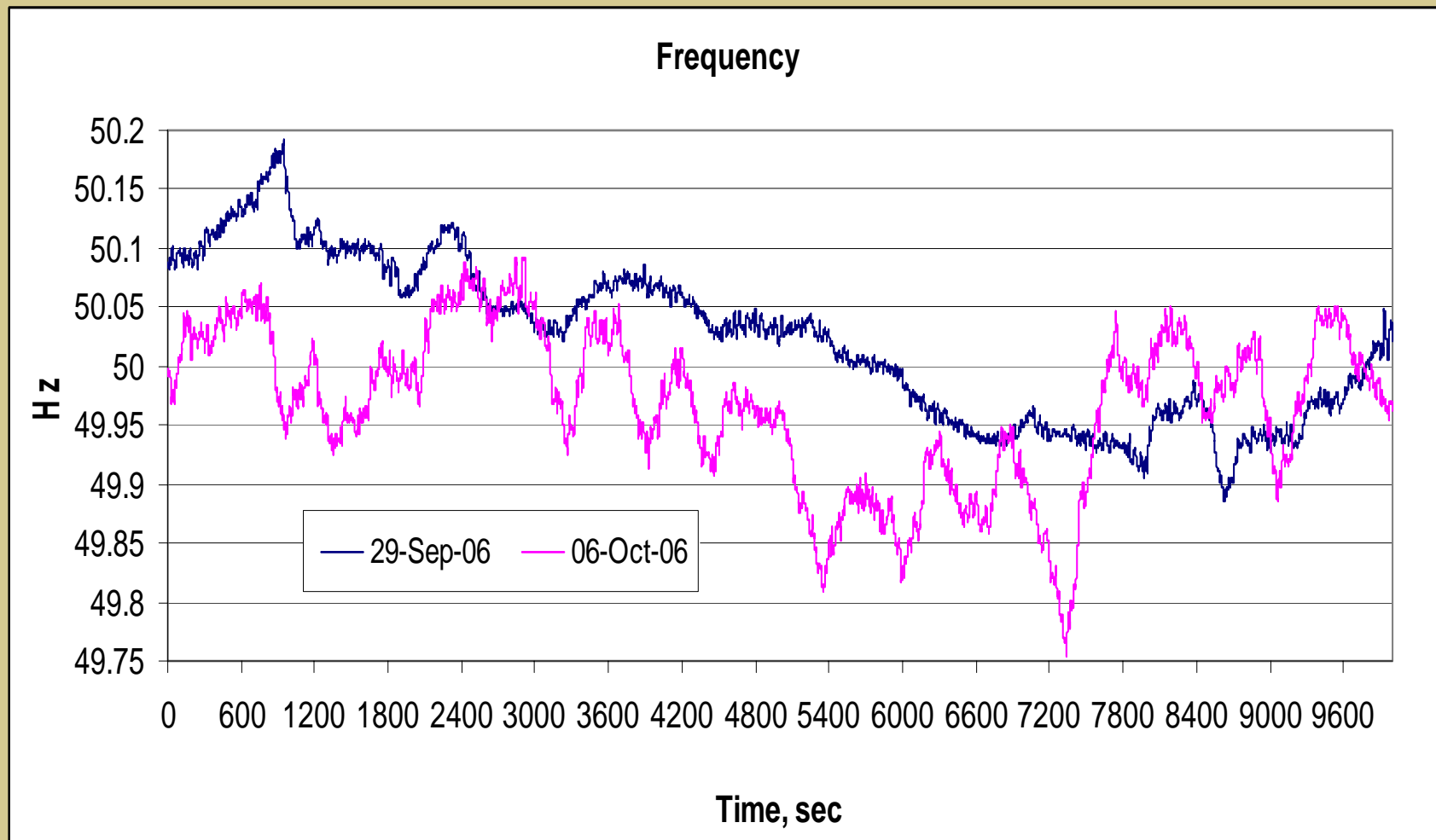
# Friday 02 Dec 2005



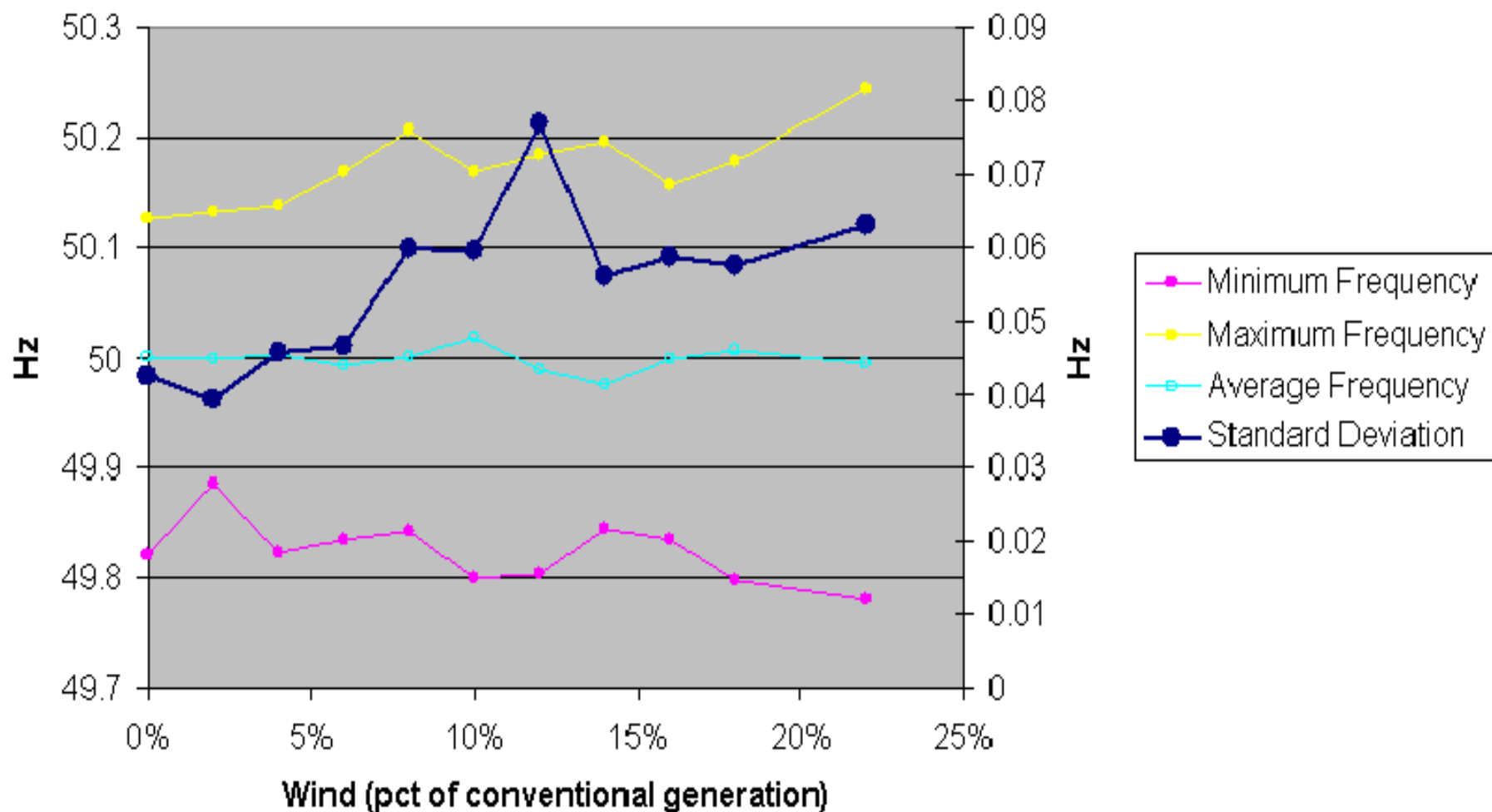
# Frequency Variations due to Wind



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## Frequency Deviation as Function of Wind Generation



# TSO Response

- Placing increased focus on ensuring all generators meet performance obligations
- Working with wind developers to test and implement frequency response & other control features
- Working to improve SCADA from existing wind farm sites and from new wind farms – both transmission & distribution system-connected

# Plant Challenges for Future

- Responsive i.e. provide regulation/reserve
- Flexible
- High availability

END