



# Performance Monitoring Workshop

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## Overview

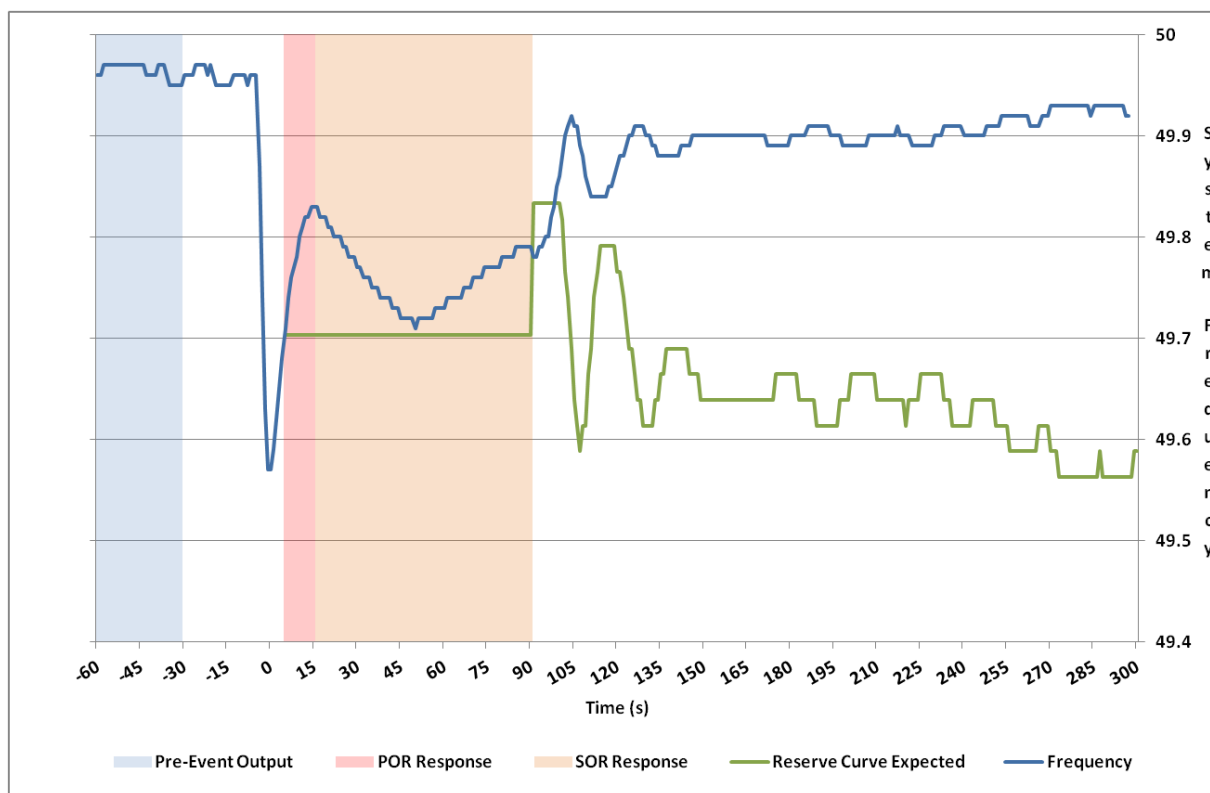
- **Operating reserve**
- **Trip Charges**
- **Loading Rate**

# Ancillary Services

- The Grid Code defines operating reserve as a static event
  - CC 7.3.1.1 u)
  - OC 4.6.3.3
  - When testing a unit, it is consistently required to add more MWs for a continuous period of time.
  - It is a test of the ability of a unit to provide reserve under a defined set of circumstances and is as such a static event
    - The frequency is simulated
    - The unit is partially isolated from the rest of the system
- Units pass this test and performance monitoring is designed to monitor this in real life.
- Theory versus real life

# Operating Reserve

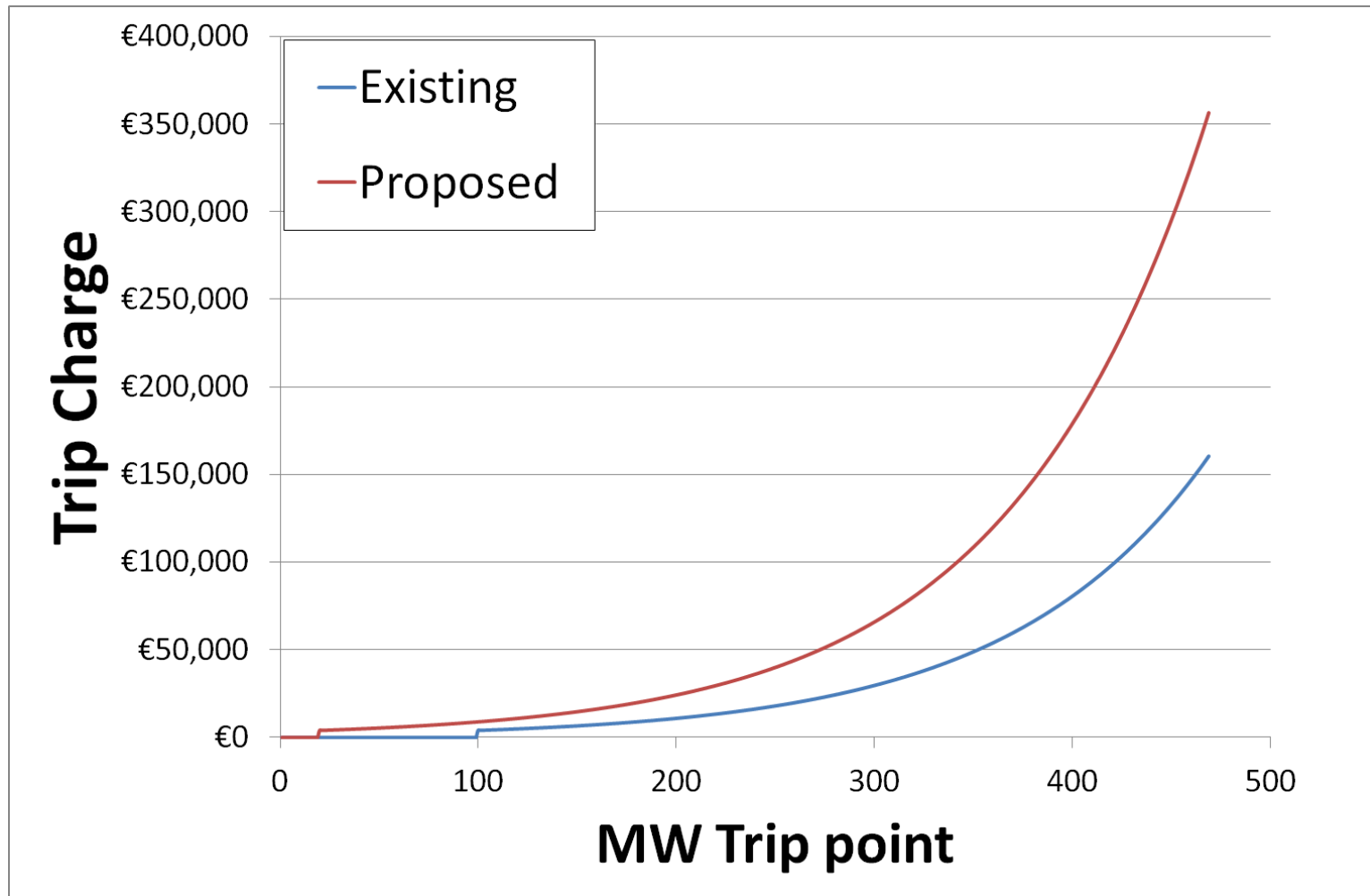
- Grid Events are dynamic



- There are many elements at play in a frequency event
  - Inertia, Governor droop, Unit and system limits
  - Overall system impact of one unit on another
- With better provision of operating reserve and a lighter grid, the speed at which events are happening has increased
- Recently events have recovered very quickly (before the end of POR) indicating that the units on the system are responding accordingly
  - Red Flags still applied to theoretical values even though the event has not posed any threat to the system
- Measuring performance of operating reserve is not a black and white exercise
  - We need to understand the dynamic nature of grid events

# Other system charges

# Trip charges





- Exponential nature of the charges are not reflective of the reality of the situation
  - 300MW charge
    - Existing €30k
    - Proposed €66k
  - 400MW charge (almost three times more?)
    - Existing €80k
    - Proposed €180k
- Proportionally the increase in charges is overly penal on larger generators
  - Increase in output of 33%
  - Increase in penalty of 266%

- Existing discreet warmth states are not reflective of the capability of modern CCGTs
- It doesn't full fill the need of the TSO to be able to accurately predict when plant will be fully dispatchable i.e. at Min Gen
  - Temp matching is generally much lower than Min Gen
- There are very few options available to operators to improve on their loading times:
  - The decision by the plant is almost always binary
  - The process is generally a function of time and irreversible

# Final Comments

- Performance is more complicated than the Grid Code definitions
- Monitoring needs to be aligned to the **real** needs of the Grid
- The new proposed products are very complex and performance monitoring will need to be carefully designed or they become counter productive