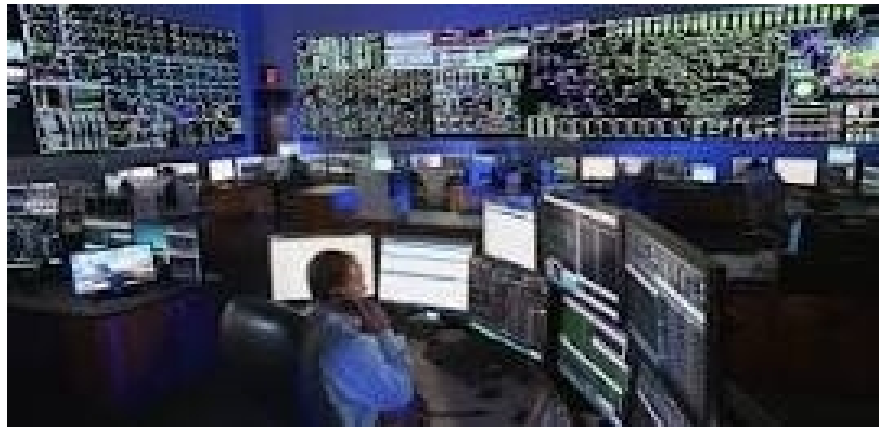
PJM Dispatch – Deploying Synchronized Reserves

PJM Generation Dispatcher

- Two Generation Dispatcher (GD) on shift 24 x 7
  - Coordinate generation moves with transmission
  - Handle ~ 500 phone calls in a 24 hour period

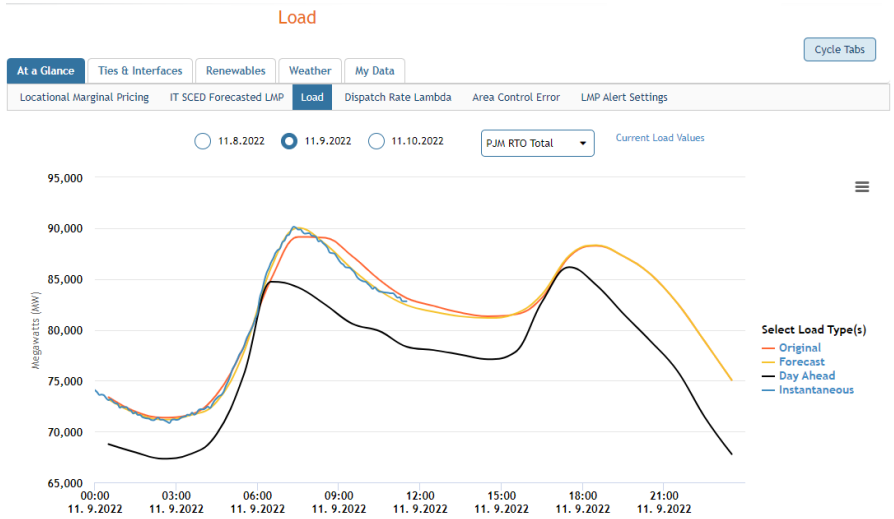


- Area Control Error (ACE) GD
  - SCED case approvals
  - Calling/ releasing units
  - ACE monitoring & adjusting supply to meet demand

- Ancillary Service Optimizer (ASO) GD
  - Ensures reserve & regulation objective is met
  - Assign/De-assign regulation and synchronize reserves
  - Assist ACE GD with monitoring and calling units

Activating Synchronized Reserves

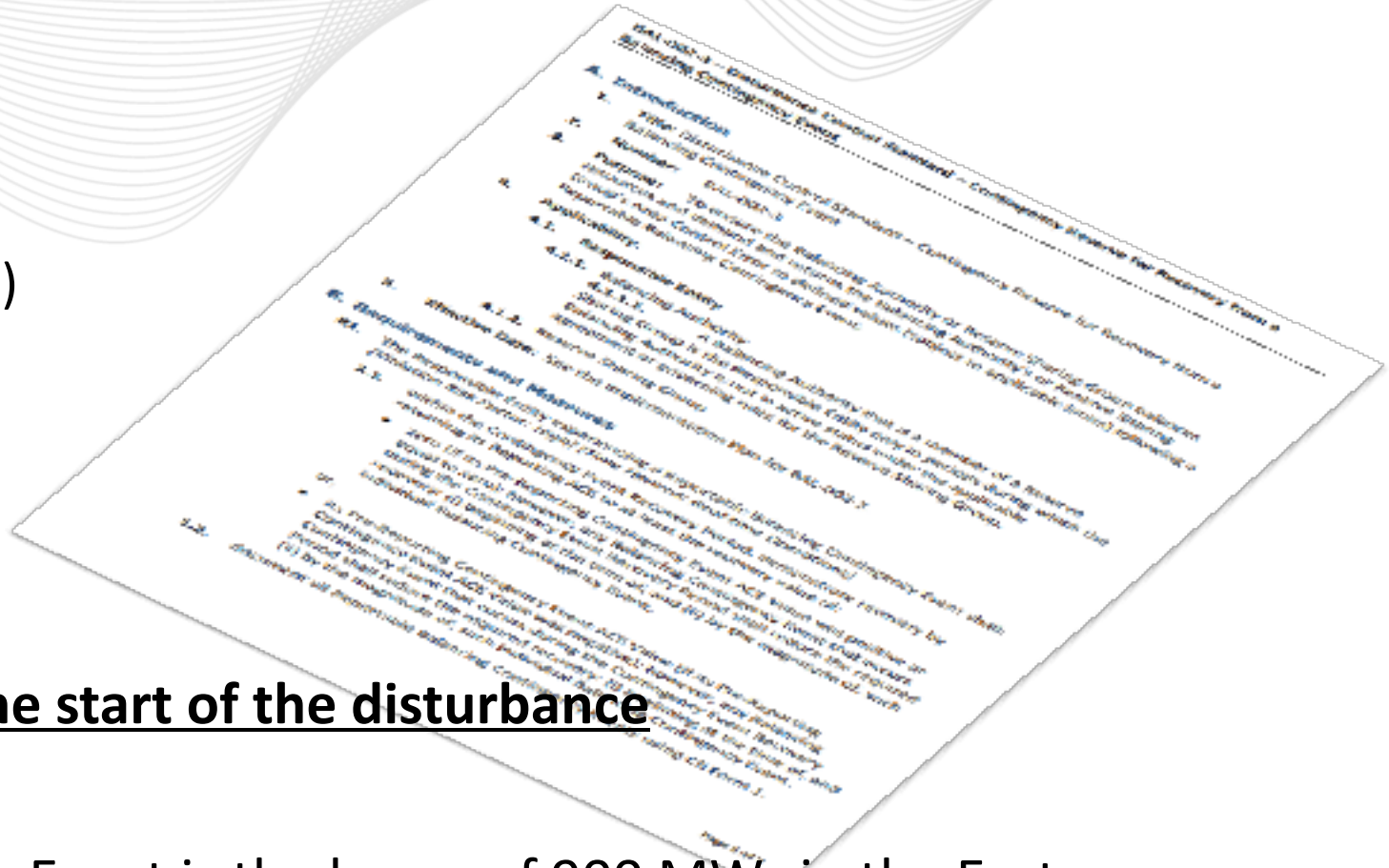
- Critical task by the PJM Generation Dispatcher
- PJM will correct for the sudden loss of generation within the PJM Balancing Area
- PJM Generation Dispatcher will make several checks before activating Synchronize Reserves
  - Time of day relative to the load with respect to its rate of change expected
  - Scheduled Generation coming on/off
  - Interchange Schedule changes
  - Regulation available
  - Frequency deviation
  - Tie Schedule deviation



Reasons for Activating Synchronized Reserves

Sudden loss of generation

- NERC Standard BAL-002
- Disturbance Control Standard (DCS)



ACE must return either to

- Zero or
- Its pre-disturbance level

Within fifteen minutes following the start of the disturbance

A Reportable Balancing Contingency Event is the lesser of 900 MWs in the Eastern Interconnection or 80% of the Most Severe Single Contingency

Reasons for Activating Synchronized Reserves

- Sustained Low ACE
  - Usually occurs when there is a sudden unexpected increase in system load, or during significant Morning/Evening pickups
  - Generation slow to respond
  - Combination of events where reserves are needed to maintain PJM ACE within its BAAL (NERC Standard BAL-001-2)
    - PJM frequency bias ~ 135 MWs/ .01 Hz (for a time correction, PJM ACE moves by 270 MWs at the start/ end due to this bias)

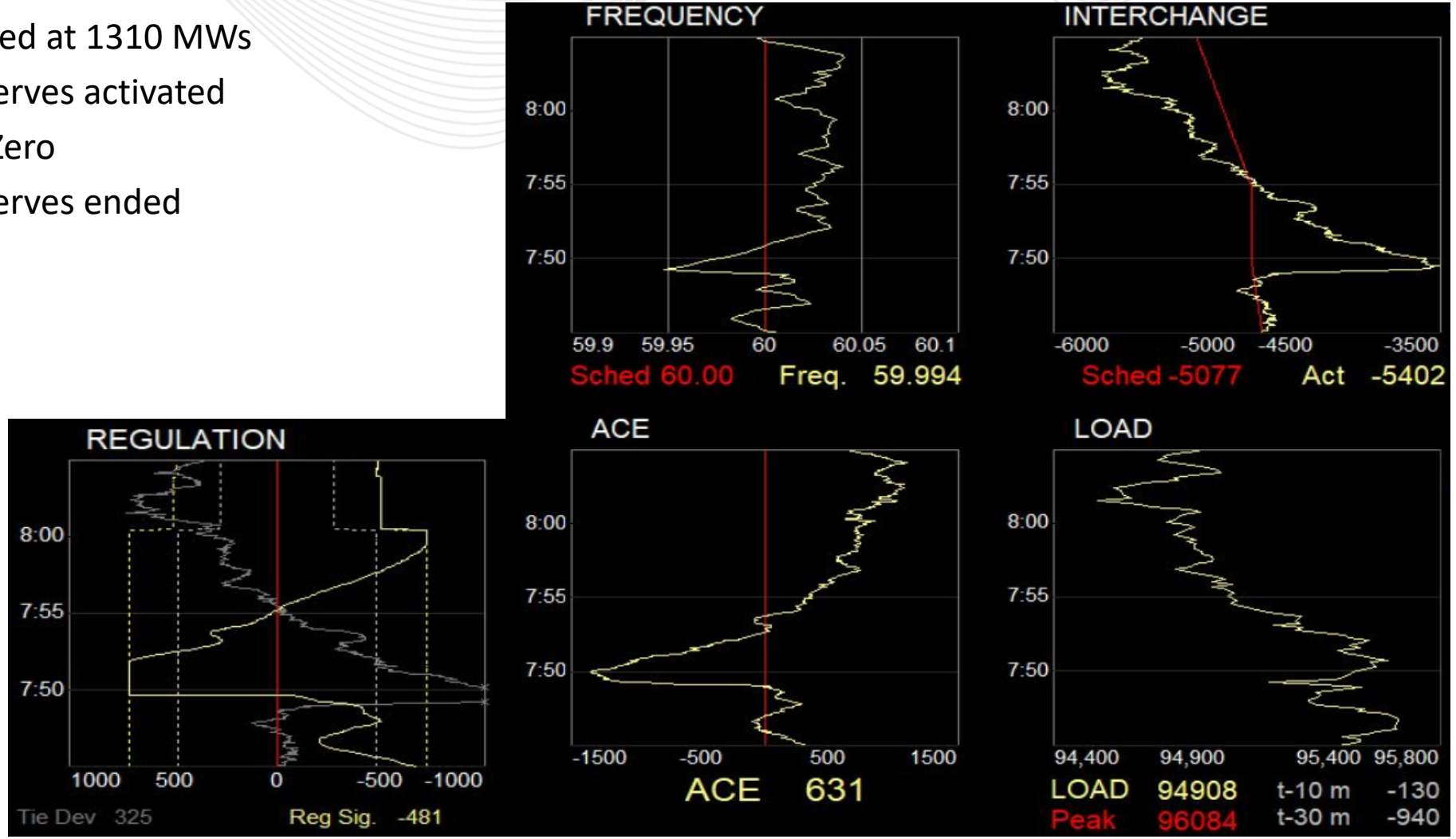
Loss of a Major Unit

07:49 Unit Tripped loaded at 1310 MWs

07:50 Synchronized reserves activated

07:53 ACE returned to Zero

08:01 Synchronized reserves ended



Sustained Low ACE

Regulation at full raise

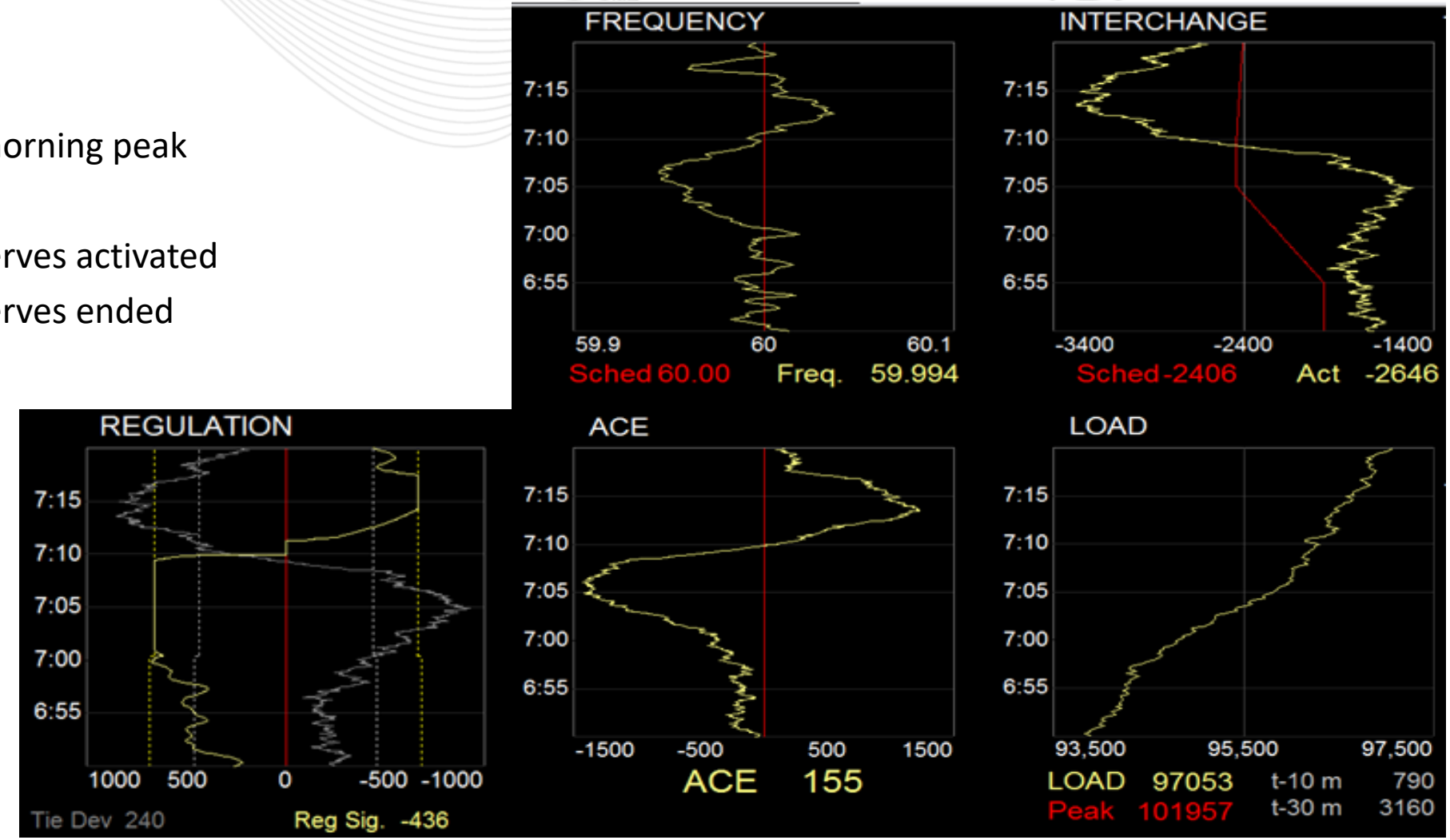
Load was still increasing

~6,000 MWS until the morning peak

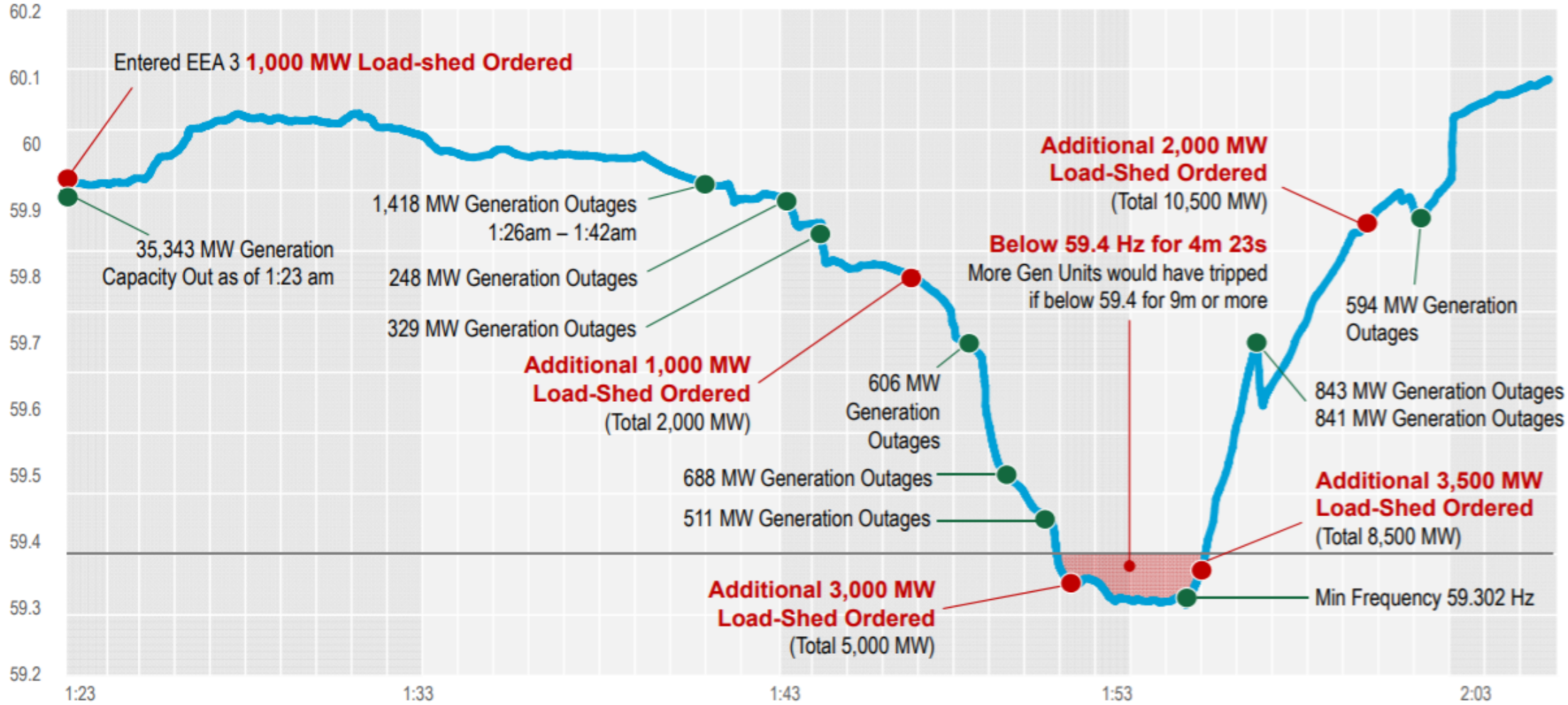
Frequency Decaying

07:06 Synchronized reserves activated

07:12 Synchronized reserves ended



Rapid Decrease in Generation Causes Frequency Drop



CAISO Low Frequency Event

ACE, Hz & Total Generation, 13:30 – 14:00