



***REP Relations Workshop 2011***

# Power Systems are Never 100% Reliable



- **Northeast Blackout – 2003**
  - **Affected an estimated 10 million people in Ontario and 45 million people in eight U.S. states**
- **Florida Blackout – Feb 26, 2008**
  - **As many as 3 million people from Daytona Beach to the Keys lost power in wake of the fire**
- **Southwest Blackout – Sept 8 2011**
  - **More than 1.4 million people in the southern California area were without power for up to twelve hours**

# TDU Responses to Short Supply Situations



- **Automatic system- Under-frequency relays**
  - **Designed to operate at 3 stages**
    - **5% of load at 59.5 Hz**
    - **10% of load at 58.9 Hz**
    - **10% of load at 58.3 Hz**
- **Manual load shed system**
  - **Remaining circuits are placed on manual load shed lists in 6 geographic areas**
  - **Circuits are placed on the list in the priority order of shedding**
- **Circuits with some critical loads are on both the automatic and manual lists.**

***Circuits in the downtown Fort Worth and Dallas Networks as well as Transmission points of delivery are not subject to load shed lists.***

# Emergency Load Shedding – Process



- ERCOT directs utilities to reduce voltage (EEA – 2A)
- ERCOT drops Load Resource customers (EEA – 2A)
- ERCOT directs interruptible customers to drop within a 15 minutes period (EEA – 2B)
- ERCOT directs utilities to shed load per load shedding plans (EEA – 3)
- ERCOT directs utilities to restore loads

## *Previous Recent Load Shedding Events*

*The last time ERCOT directed utilities to initiate a load shedding event was in the Spring of 2006; however, it only included 1,000 MW, one-fourth the amount directed by ERCOT in February 2011.*

*The last winter load shedding event occurred in 1989.*

***Oncor follows its plan when directed by ERCOT to manually shed load, which ensures that critical loads are the last affected.***

# Emergency Load Shedding – Manual Shedding Procedure



- **ERCOT directs utilities to shed load per load shedding plans (EEA – 3)**
- **Oncor utilizes predefined lists to drop its prescribed portion of ERCOT system load**
- **At approximately 15 minute intervals the next circuits on the list are dropped and the previous list is restored as soon as possible**
- **Process is continued until Emergency supply situation has improved and ERCOT directs the full restoration of loads**

# Emergency Load Shed – Fast Acting and Automatic Process

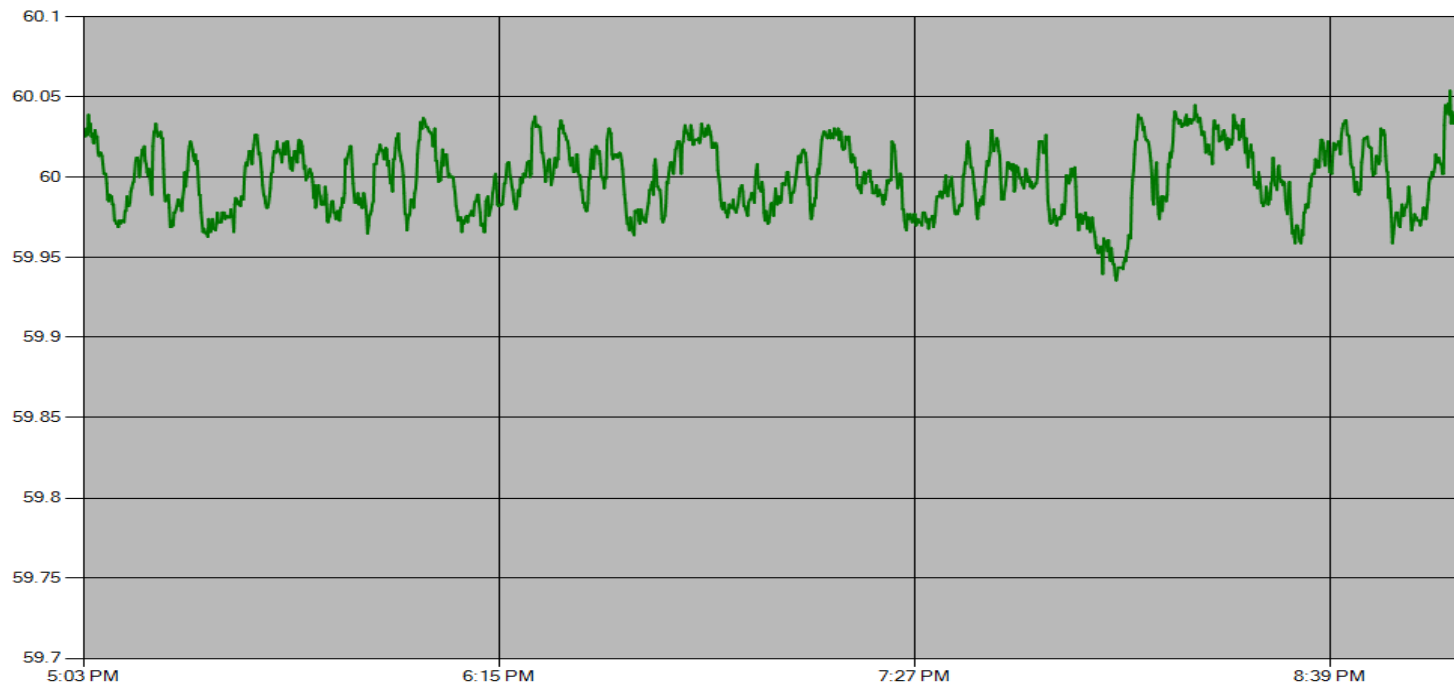


- **Frequency quickly drops below the 59.5 Hz**
- **Circuits equipped with UF relays open immediately**
- **System stability is regained**
- **Distribution Operations Centers recognize UF operation via SCADA**
- **An equal amount of load from the manual load shed list is dropped as the circuits with UF relays are returned to service; this “re-arms” the system should another frequency drop occur**
- **Shedding of load follows the manual process until the emergency situation is cleared and ERCOT directs the full restoration of loads**

# System Frequency-Typical Day



System Frequency  
Rolling 4 Hours



59.956 Hz  
9/29/2011 9:03:01 PM

Downloading picture [http://172.30.153.31/SysFreqCurve/ChartAxd.axd?i=dcp\\_e7ed18616.png&\\_guid\\_=c952e33c-09ft](http://172.30.153.31/SysFreqCurve/ChartAxd.axd?i=dcp_e7ed18616.png&_guid_=c952e33c-09ft)

Internet

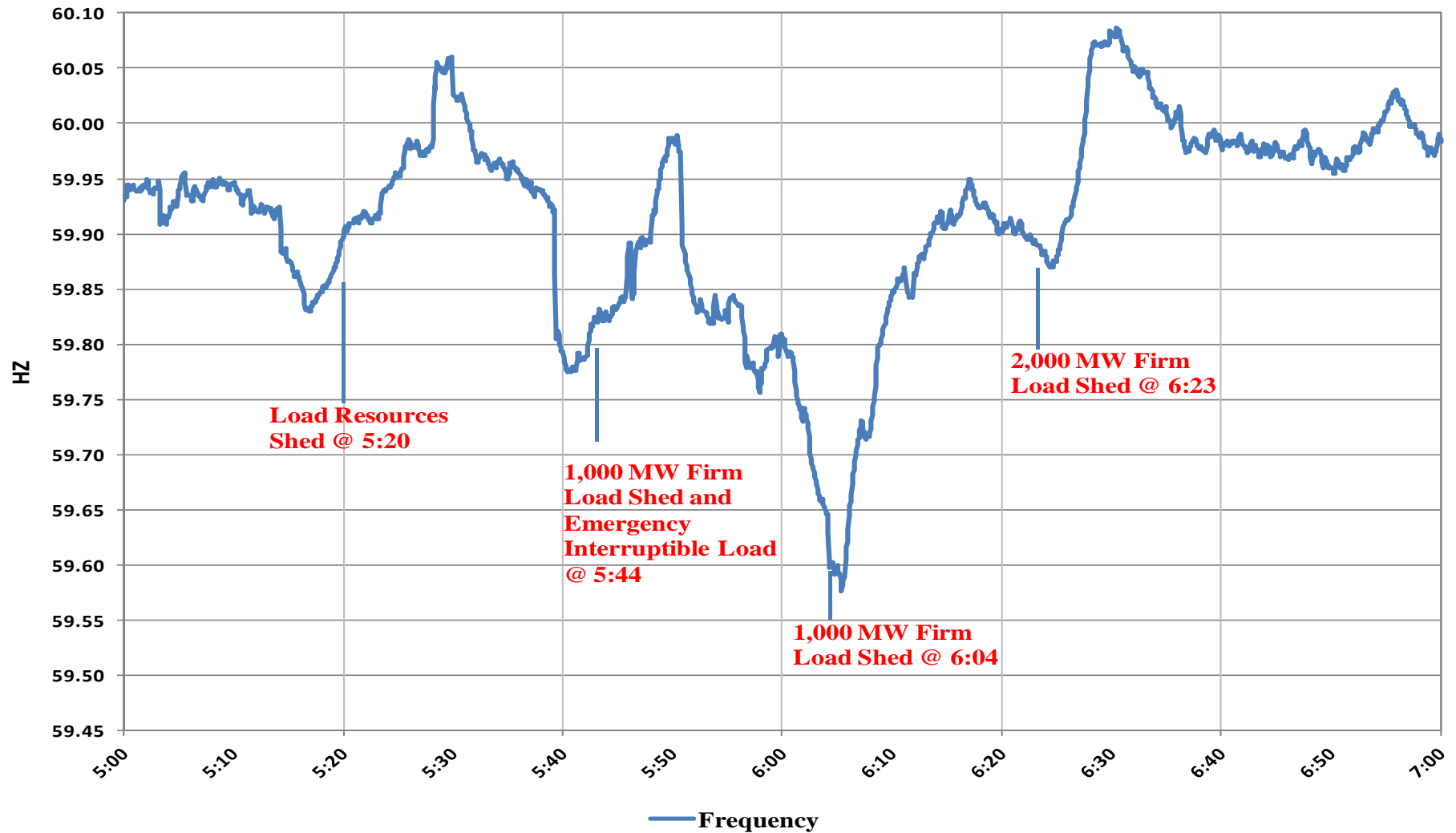
100%

# ERCOT System Frequency on Feb 2, 2011

Source TAC special meeting 2/14/2011



## Frequency vs. Load Shed



# Summary-Short Supply Plan



- **Necessary when electric supply cannot support the level of demand**
- **Executed under the direction of grid operators like ERCOT**
- **Employed by utilities as an emergency response measure**
- **Utilized to restore stability to the System while following the PUCT Substantive Rules for Service Restoration**
- **May be executed manually using a pre-planned process, or automatically through the use of under-frequency relays**

***Without the ability to shed load, the System potentially becomes imbalanced which can lead to a blackout scenario.***