



Southwest Area Transmission Study (SATS) Update

Presented to the

SWAT Oversight Committee

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Las Vegas, NV

2010 - 2011 SATS Meetings

- January 21, 2010
- April 8, 2010
 - Conference Call
- June 15, 2010
- July 29, 2010
- August 23, 2010
 - Conference Call
- November 11, 2010
 - Conference Call
- February 10, 2011
 - Conference Call

2010 Approved Study Plan

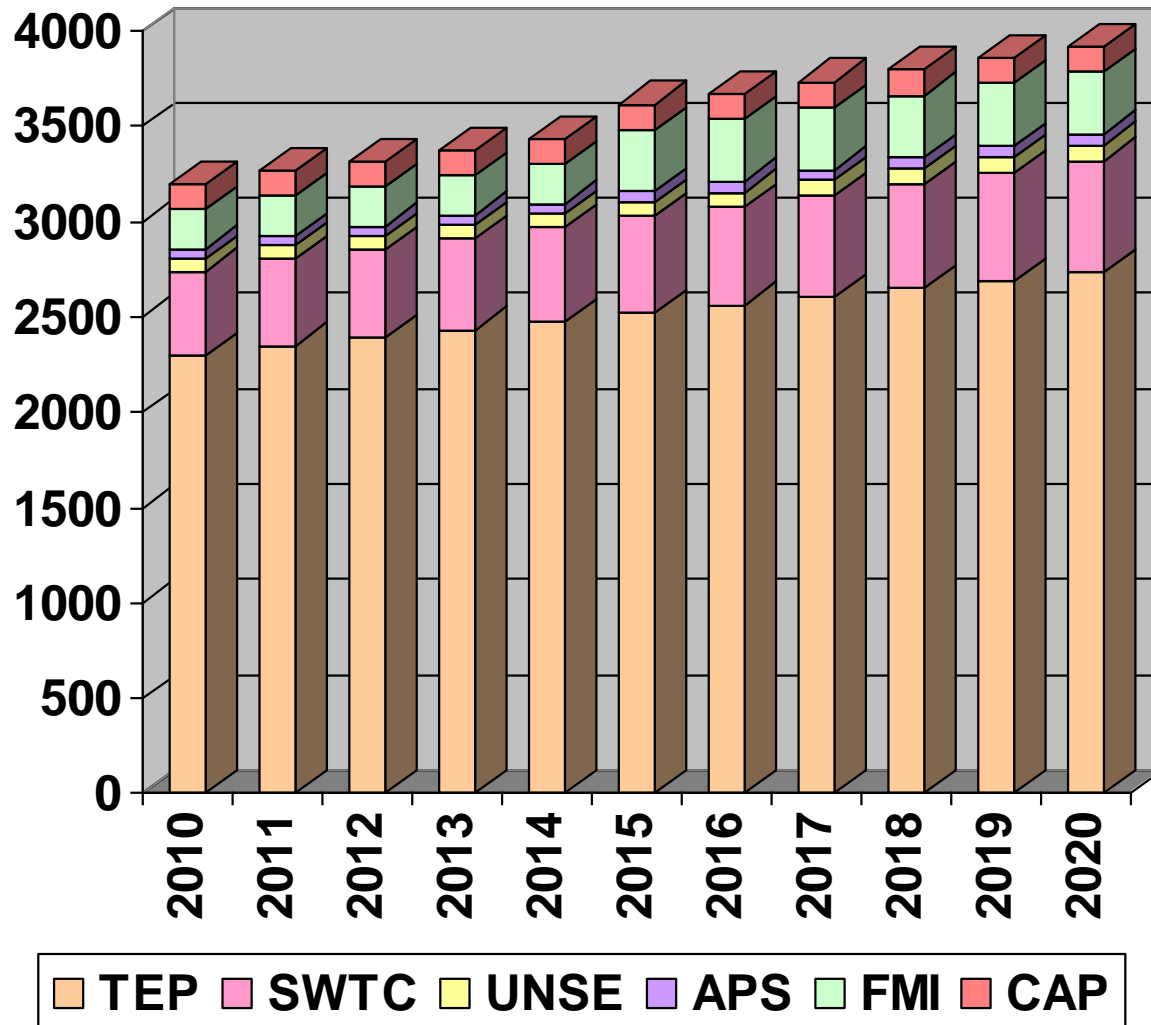
- Present plan & subsequent findings to SWAT, WestConnect and to local stakeholders
 - Complete
- Revise load forecasts
 - Complete
- Develop base cases for 2010 study
 - Complete
- Conduct study to determine impact of deferring previously planned projects
 - Complete
- Investigate alternative configurations to mitigate high flows on the Winchester 345/230kV transformer, Apache – Bicknell 230kV line and 230/345kV Bicknell transformer caused by EHV system contingencies
 - Deferred to 2011

2009 Approved Study Plan

continued

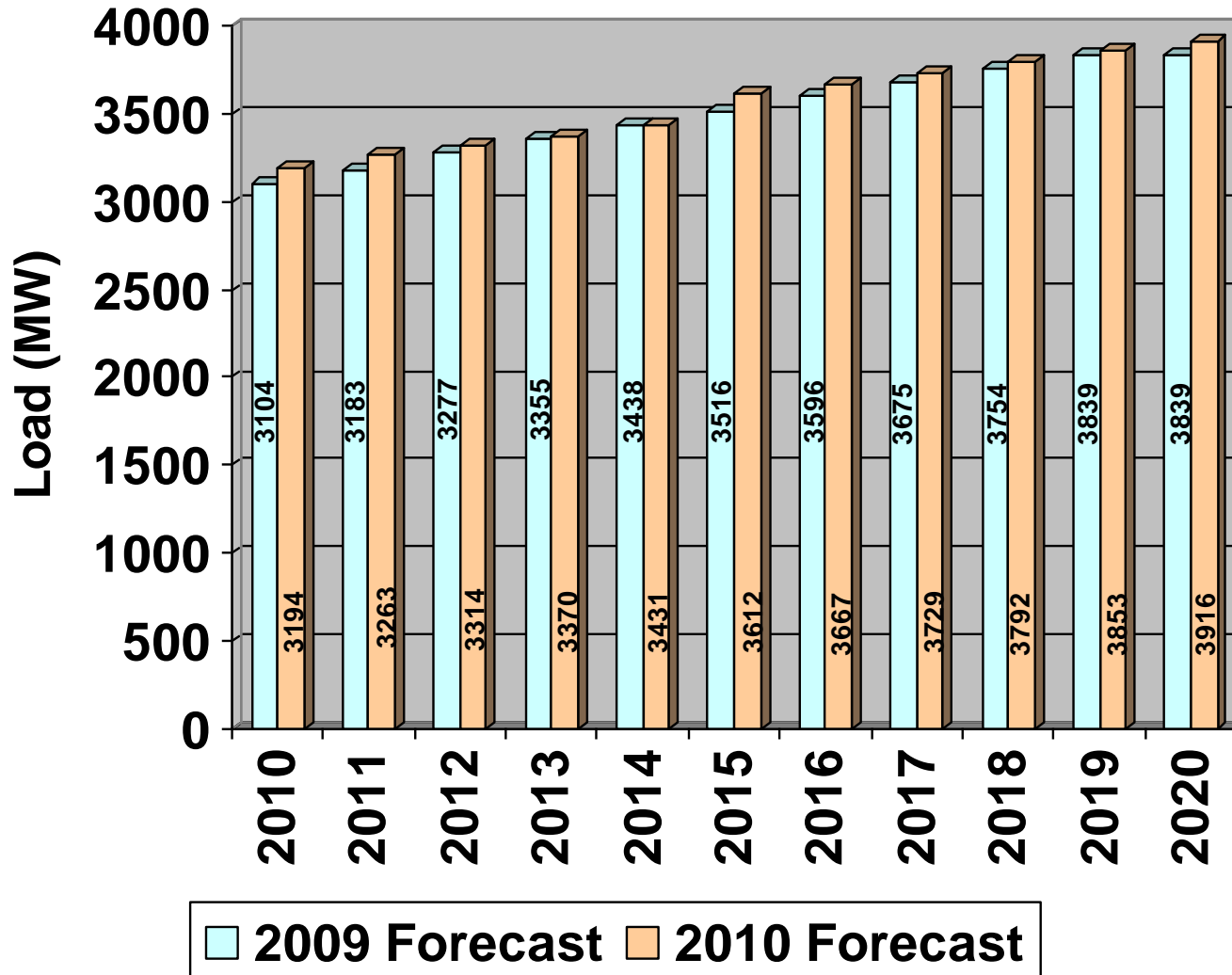
- Develop and evaluate alternatives to the two joint Tortolita – North Loop 345kV proposal based on the SPPR Three Terminal proposal;
 - Deferred to 2011
- Develop and evaluate alternatives for joint SWTC/TEP substation(s) to supply TEP/Trico loads south of Tucson
 - Deferred to 2011
- Identify potential projects
 - Completed
- VAR margin study for 230 kV and above buses
 - Removed from Study Plan

2010 Load Forecast



Load Forecast

2009 vs. 2010



2010 SATS Study

- Analysis Conducted for Years 2011, 2012, 2015 and 2020
- Evaluated Impact of Project Deferrals on Ability to Meet NERC Reliability Standards and WECC System Performance Criteria
- Determined Projects Needed in 2011 – 2020 Time-Frame

Analysis Results

- Identified thermal overloads on the TEP and SWTC transmission systems
- Identified Delta-V violations on the SWTC transmission system for outages on the SWTC and TEP systems
- Identified mitigation for all violations

Mitigation Measures

- Transformer Additions
- Transmission Line Re-rates
- Transmission Line Reconductors
- Shunt Capacitor Banks Additions
- Series Capacitor Replacement
- Continued Use of Existing Operating Procedures
- Generator Re-dispatch
- **These Facilities/Actions Mitigate All Violations**

6th BTA

- ACC Order
 - “APS, SWTC and TEP shall conduct additional analysis of potential 230 kV and 138 kV voltage deviations in Southeastern Arizona as noted in the 2009 SATS report and file an update based on the 2010 SATS by February 28, 2011, and shall finalize mitigation plans if needed for this voltage concern in ten-year plan filing(s) for the 7th BTA by January 31, 2012.”
- SATS Response
 - SWTC voltage-switched capacitor bank additions in 2013 and 2020 should mitigate these issues
 - Capacitor bank additions not included in all analysis
 - Further evaluation in SATS 2011 study

Delta-V Issues

- 2009 Violations

- Bicknell 230 and 115
- New Tucson 230
- Pantano 230 and 115
- Sahuarita 230
- Kartchner 115
- Canez 138
- Sonoita 138
- Valencia 138

- 2010 Violations

- Bicknell 230 and 115
- New Tucson 230
- Pantano 230
- Kartchner 115

- Mitigation Measures

- Marana Tap to Marana 115 kV upgrade (post-peak 2011)
- Marana to Avra 115 kV upgrade (2012)
- Voltage-switched capacitor banks
 - Avra, Hackberry, and New Tucson (2013)
 - Redtail and San Rafeal (2020)

2010 SATS Report

- SATS approved at February 10, 2011 meeting
- Distributed to SWAT on February 11th
 - No Comments have been received
- Upon Approval, SATS Report will be Filed with ACC Docket Control by TEP

Questions



SATS 2010 Report Approval

- SATS Requests SWAT Approval of the Report