APS
Reliability Must-Run Analysis
2010 – 2019

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Outline of Presentation

- 2010 RMR Study Process
- Phoenix and Yuma
  - Description of Networks
  - Load serving capability & transmission limits
  - RMR - demand, energy and duration
  - Economic impact of transmission constraint
  - Observations

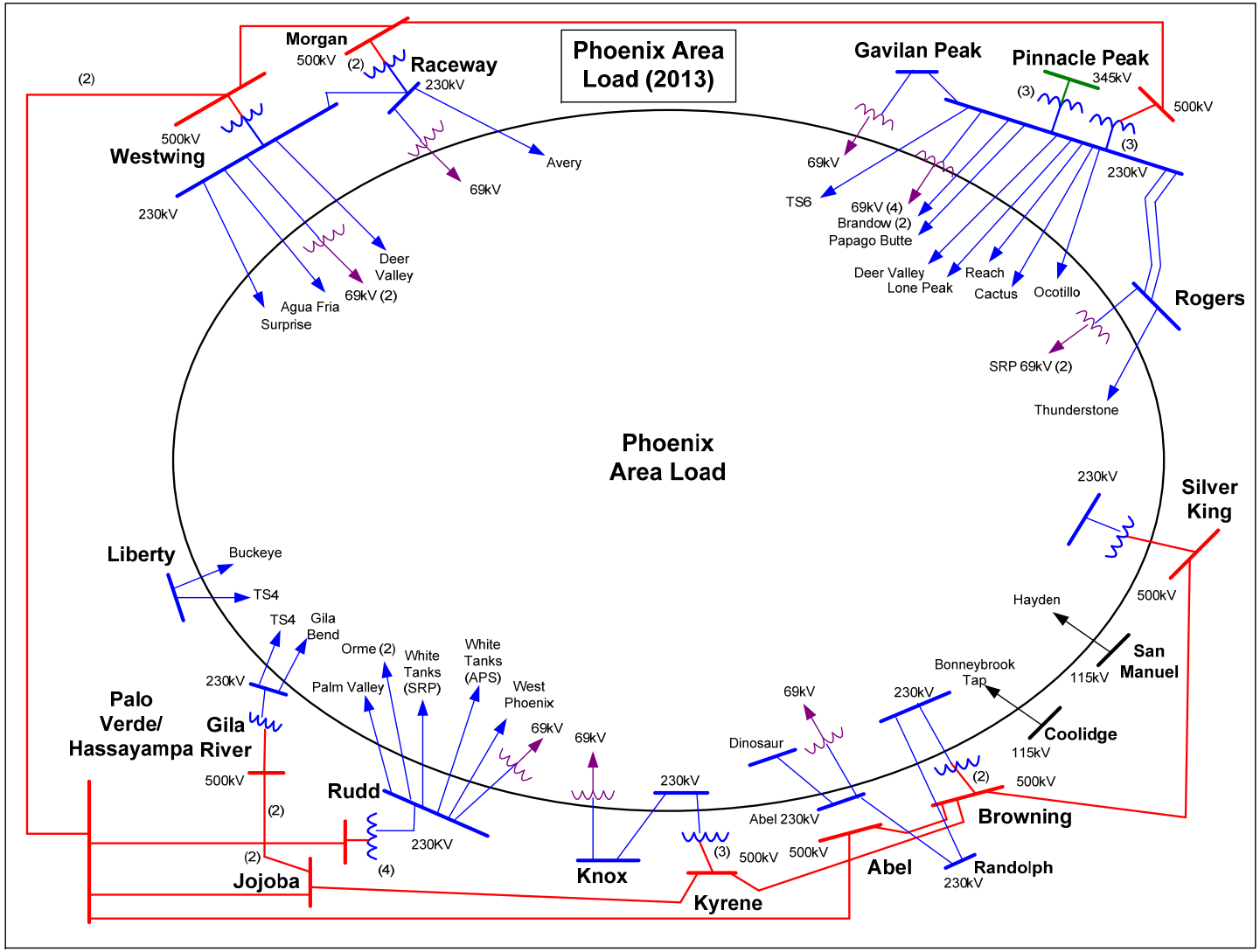
2010 RMR Study Process

- SWAT forum used to facilitate public discussion and input for 2010 RMR Study
- APS lead an open forum under the guidance of the Colorado River Transmission (CRT) sub-regional study group
  - In response to ACC Fifth BTA, Per Decision No. 70635 that there needs to be a system perspective of the RMR conditions for the entire Yuma County area rather than limiting analysis solely to the APS 69kV system.
  - WAPA, IID, and WMIDD agreed that the cut plane for the Yuma RMR study is to remain as it was previously defined.
  - APS performed additional sensitivity studies to evaluate impact of external generation and transmission projects to the Yuma Area.
  - The sensitivity studies resulted in a minimal impact to the Yuma Area.
- "APS Reliability Must-Run Analysis" report was filed with the ACC on January 29, 2010
  - The report is available on OASIS
- Data used in the production cost model comes from;
  - Publicly available WECC's Transmission Expansion Planning Policy Committee (TEPPC) 2019 Base Case (dated October 21, 2009)
  - APS Resource Plan Filing, ACC Docket E-01345A-09-0037
  - Updated forecasts of system load and fuel prices
  - Phoenix area generation data coordinated with SRP

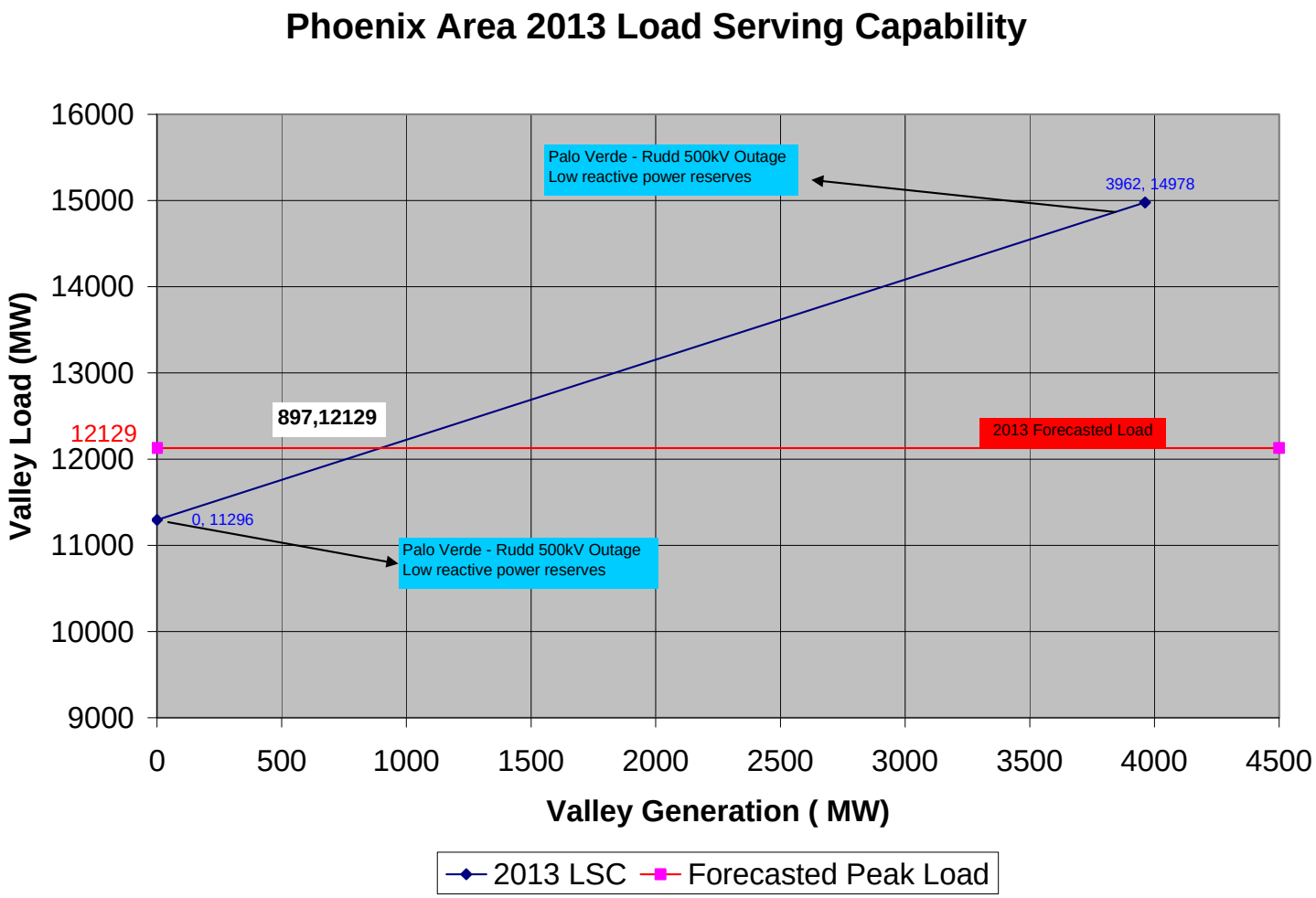
RMR Economic Analysis

- New Energy PROMOD production-cost simulator
- SRP and APS control areas modeled
- Hourly least cost dispatch with transmission constraints
- Annual cost to serve area load determined
- Study repeated ignoring local import limit
- Difference is the RMR cost

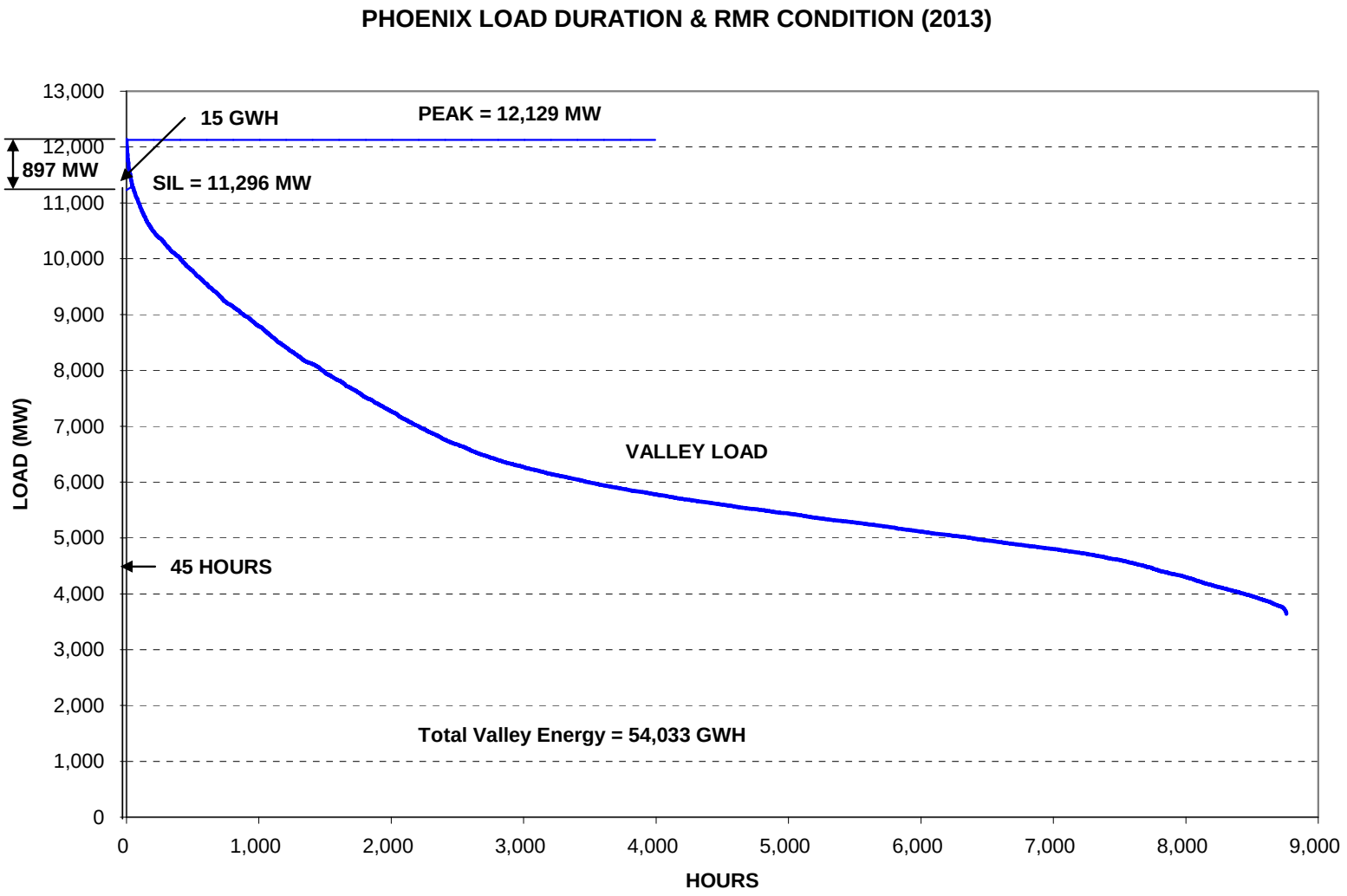
Phoenix Area Load 2013



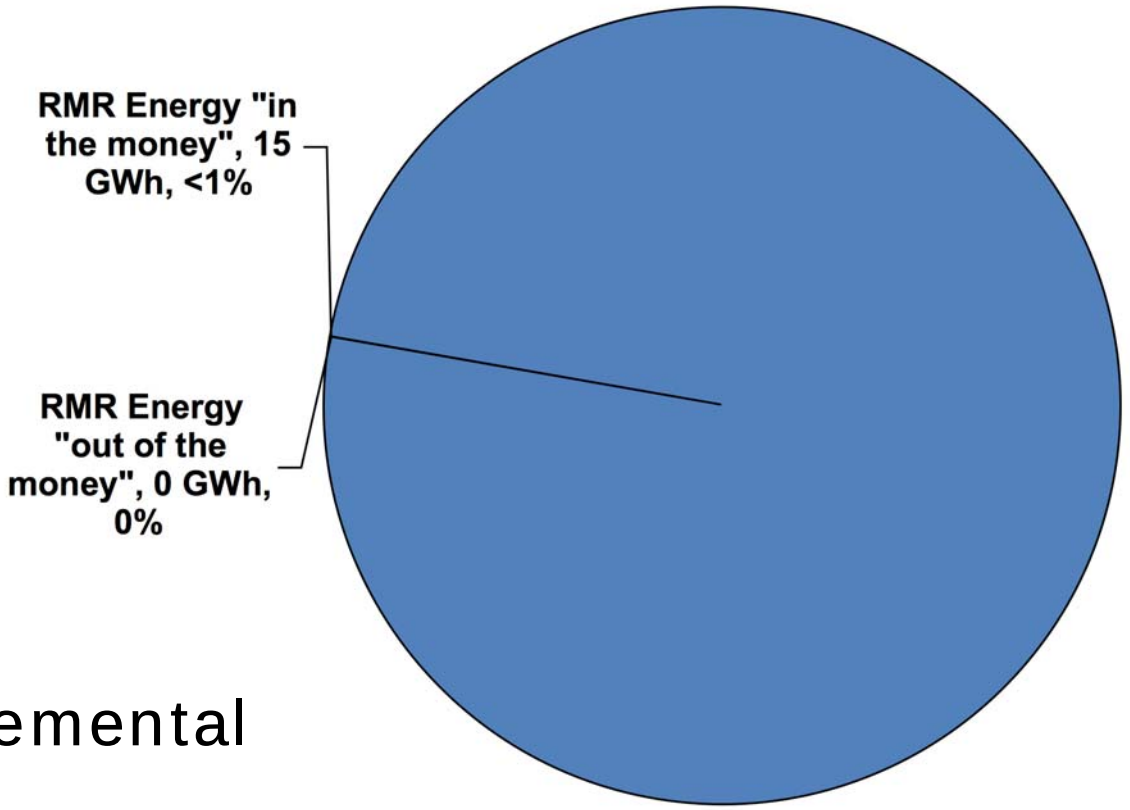
2013 Phoenix Load Serving Capability



2013 Phoenix Load Duration and RMR Conditions



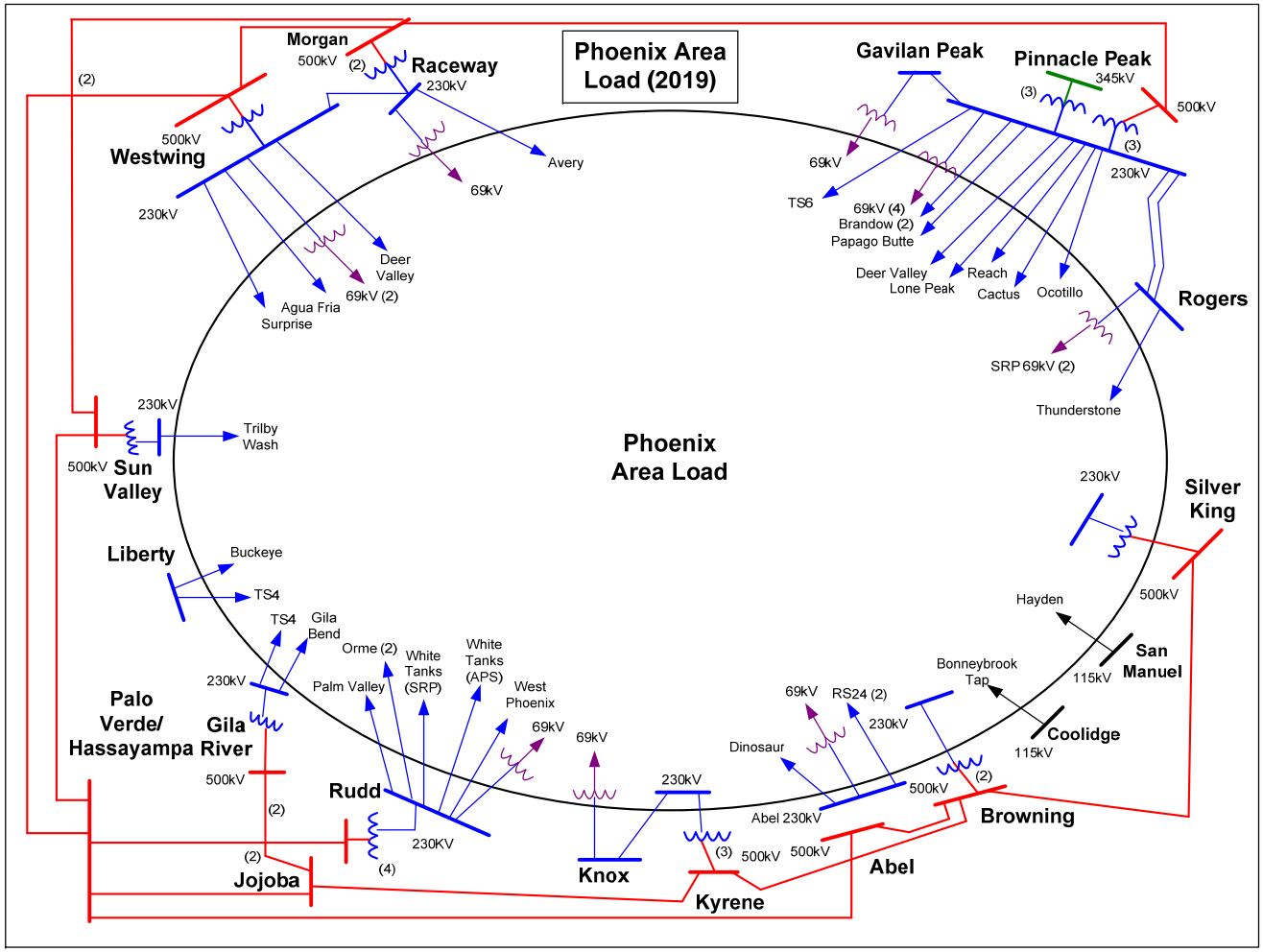
2013 Phoenix Area Energy



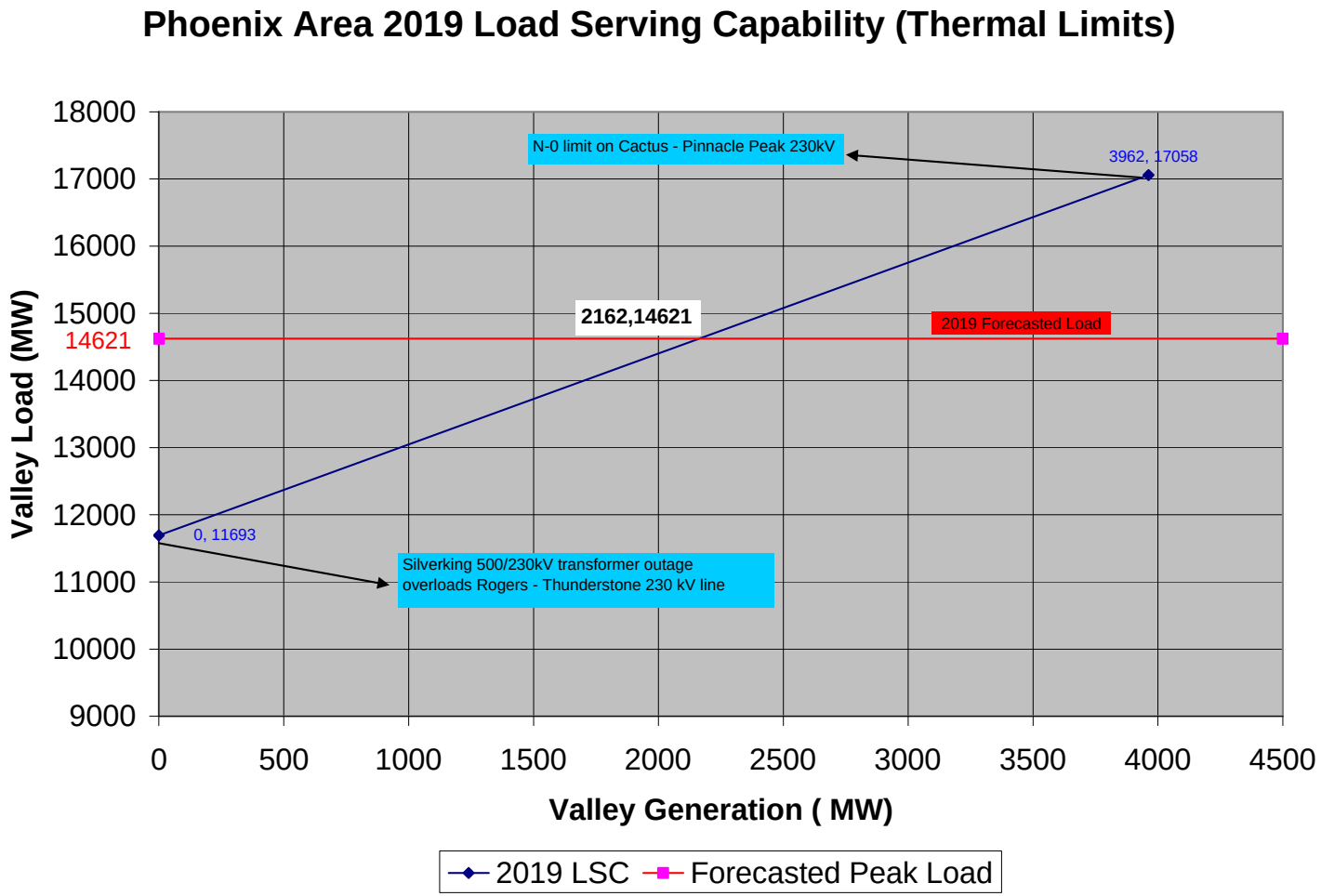
Phoenix Area Total Load = 54,033 GWh

$0M incremental cost

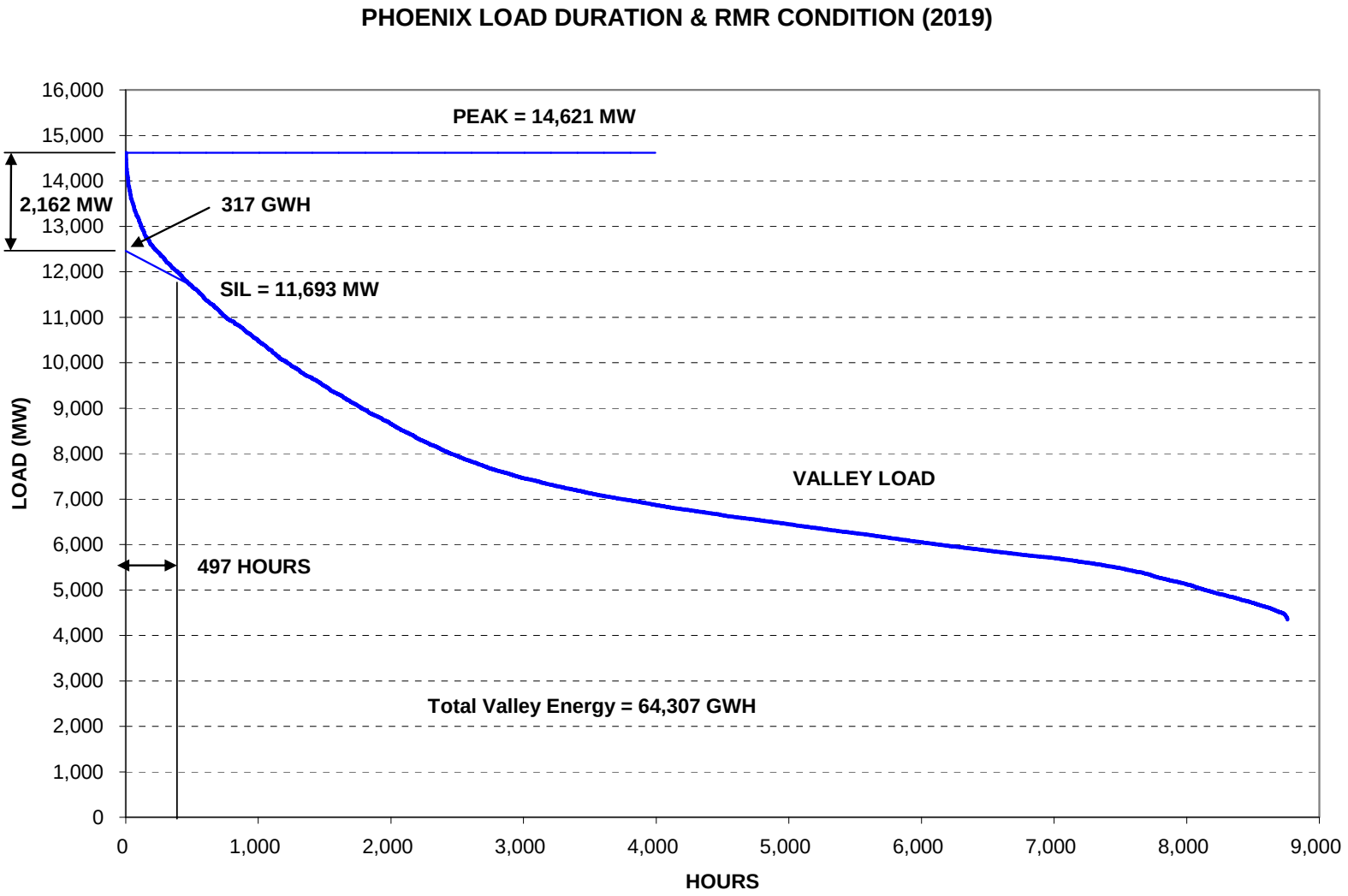
Phoenix Area Load 2019



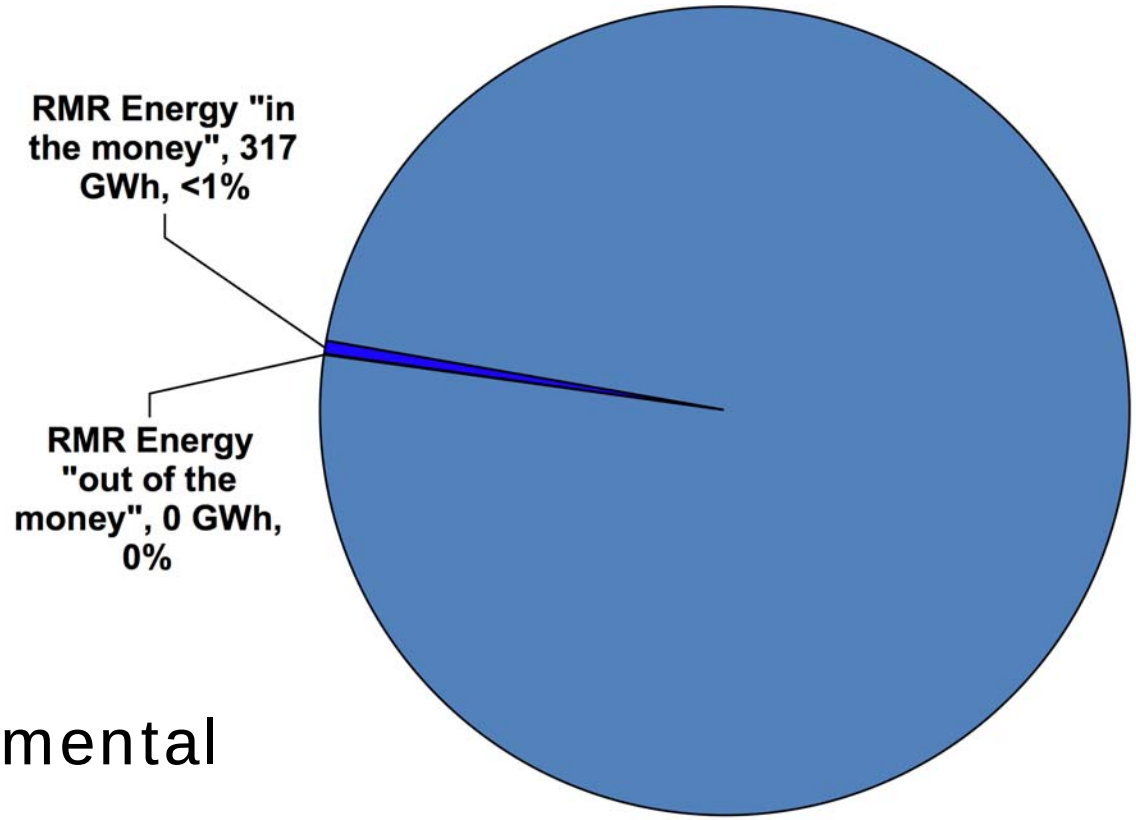
2019 Phoenix Load Serving Capability



2019 Phoenix Load Duration and RMR Conditions



2019 Phoenix Area Energy



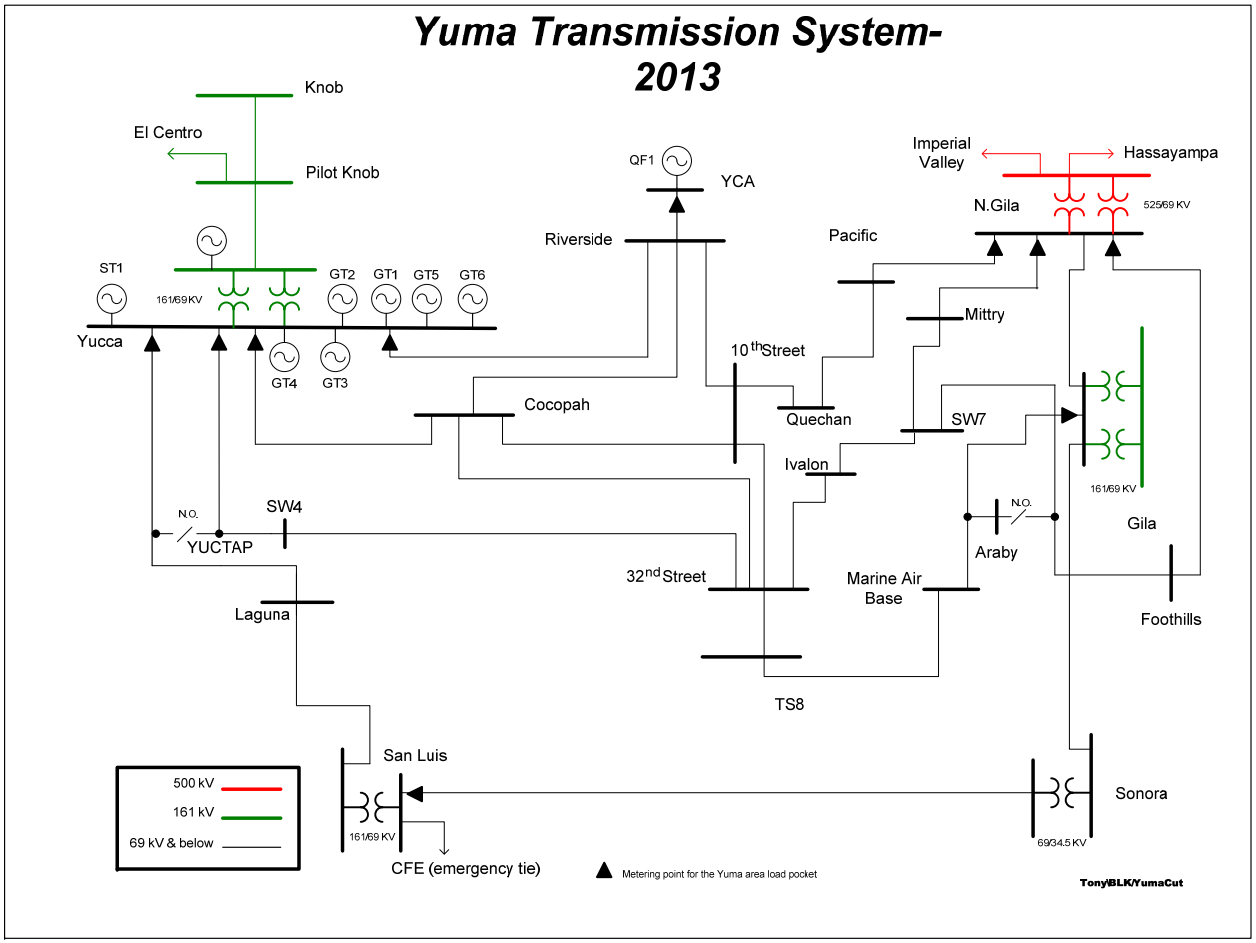
Phoenix Area Total Load = 64,307 GWh

$0M incremental cost

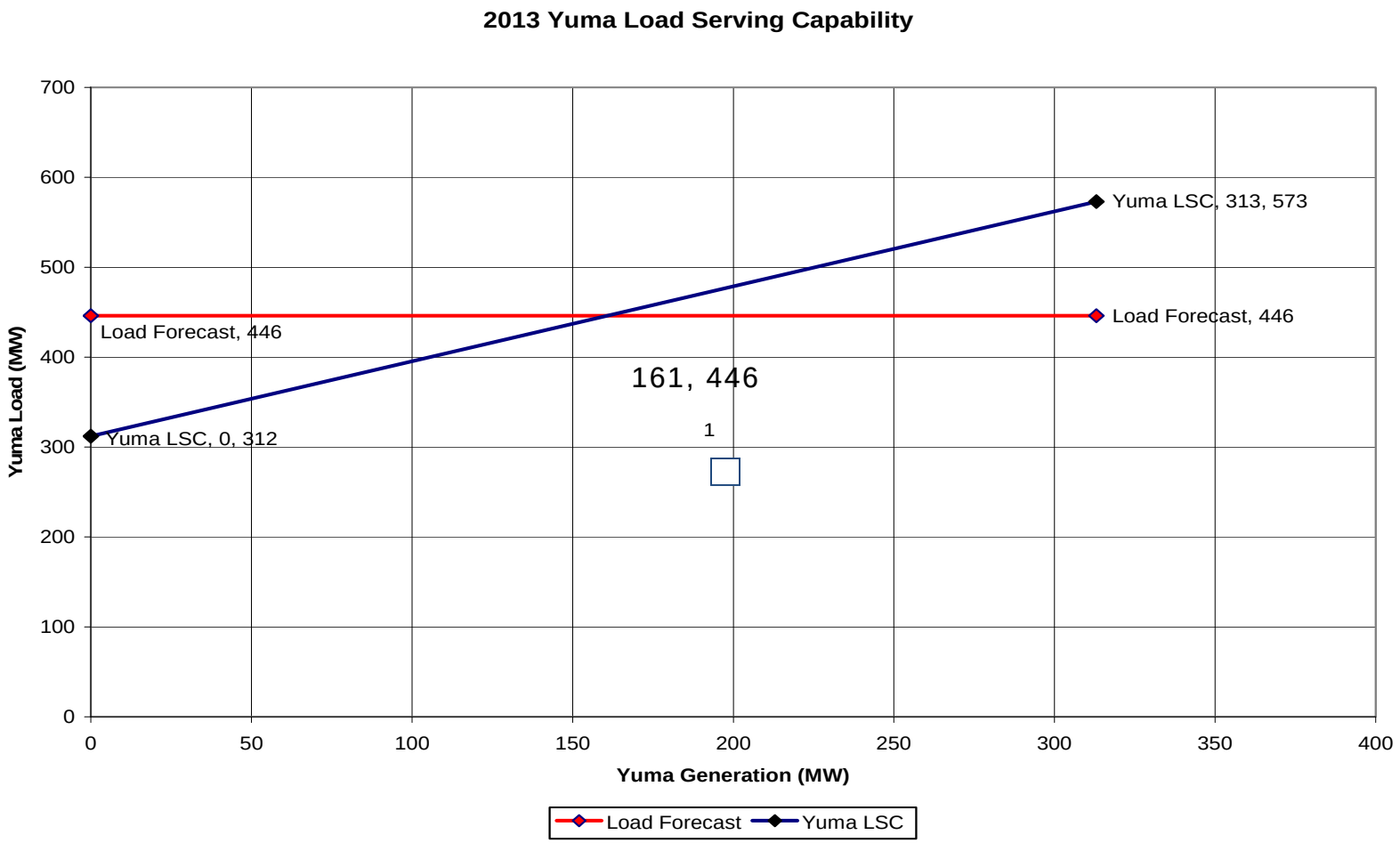
Phoenix RMR Observations

- APS load is expected to exceed import capability for 45 hours in 2013, and 497 hours in 2019. RMR energy represents less than 1% of the total energy.
- All the RMR hours are dispatched “in the money” in both 2013 and 2019. No additional cost to run local generation.

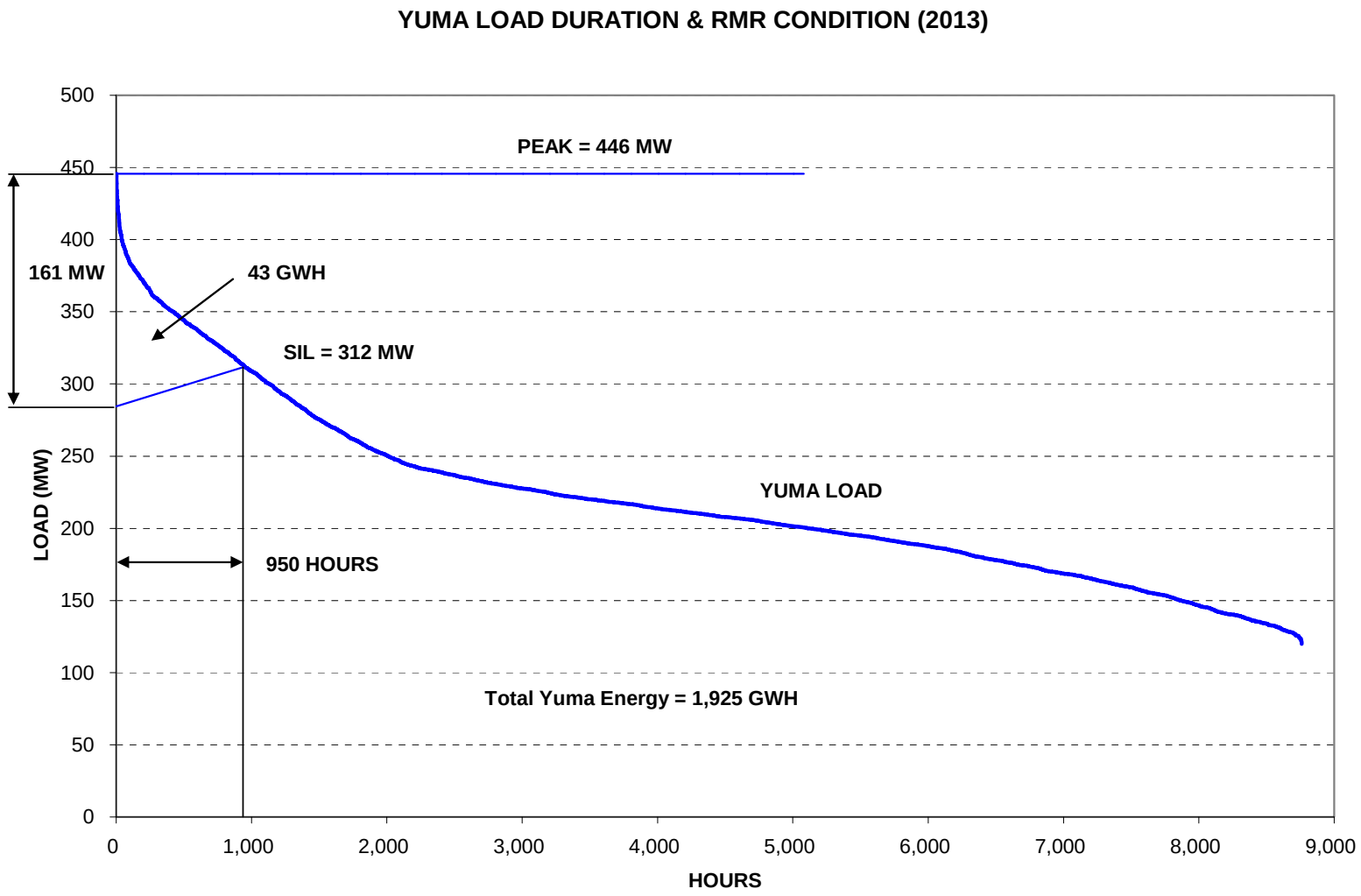
2013 Yuma Transmission System



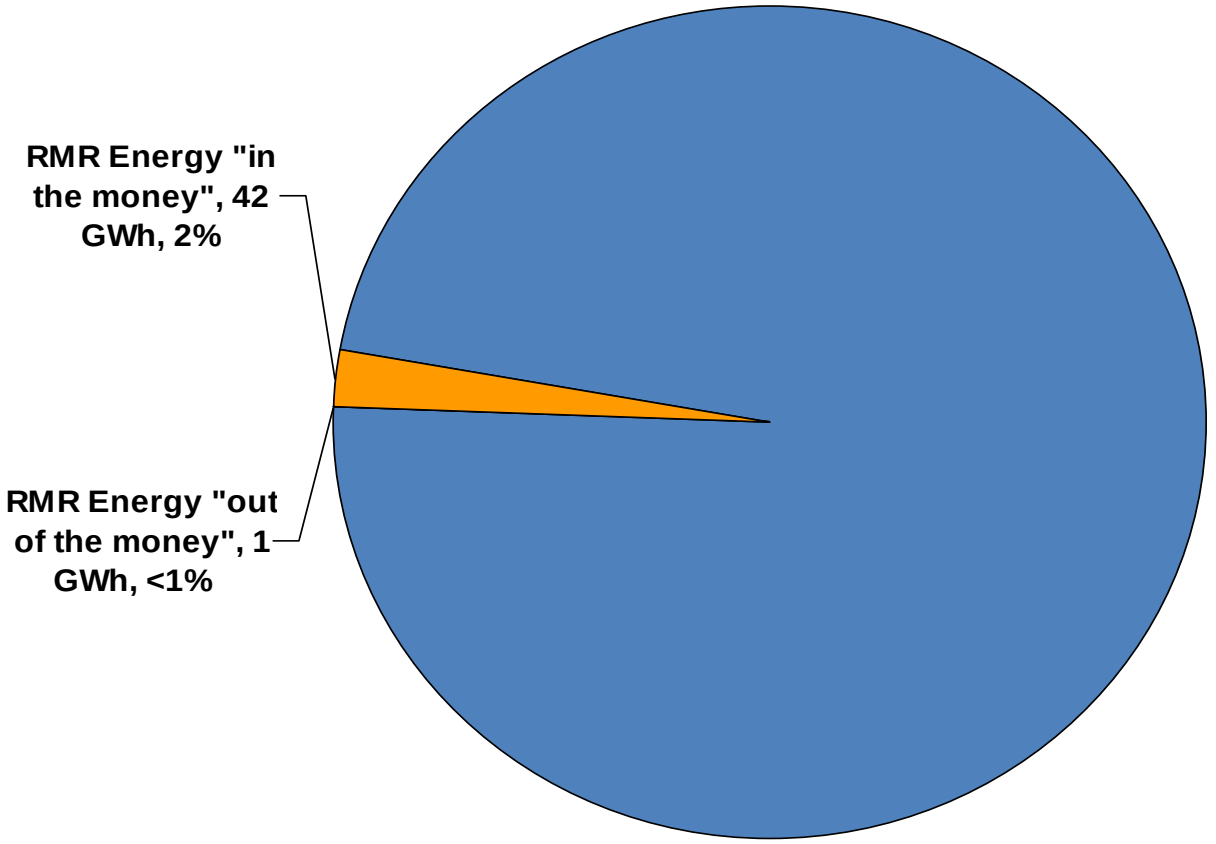
2013 Yuma Load Serving Capability



2013 Yuma Load Duration and RMR Conditions



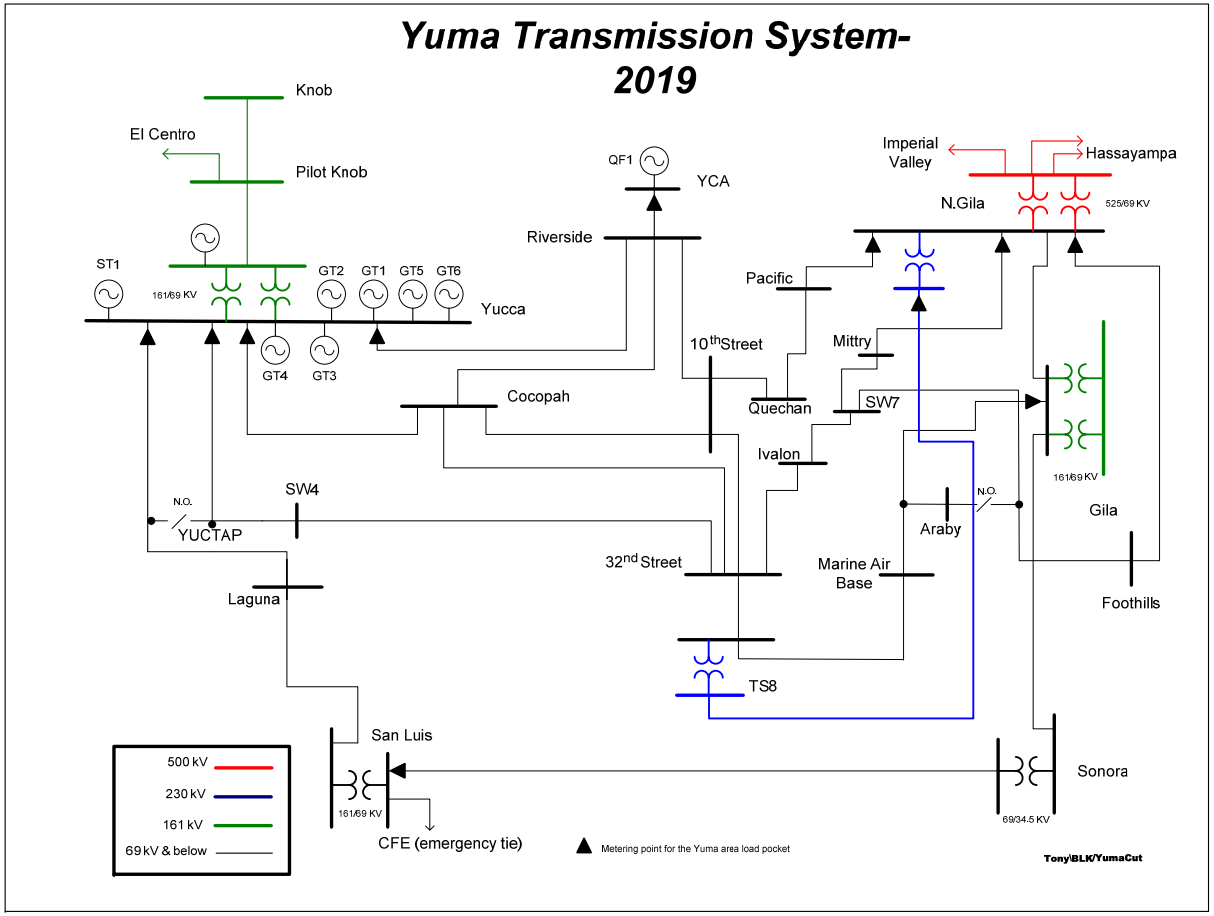
2013 APS Yuma Energy



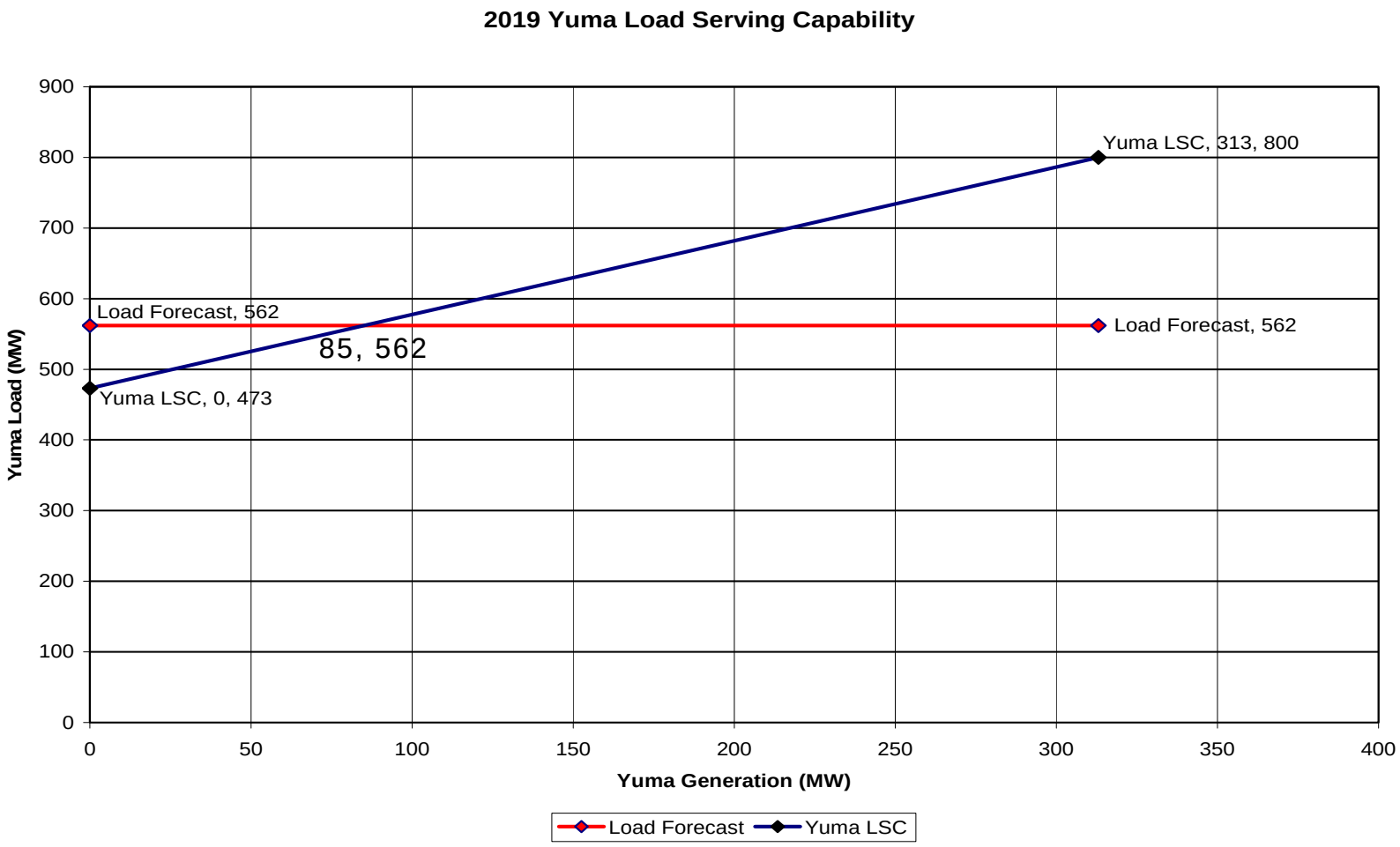
APS Yuma Area Total Load = 1,925 GWh

<$1M incremental cost

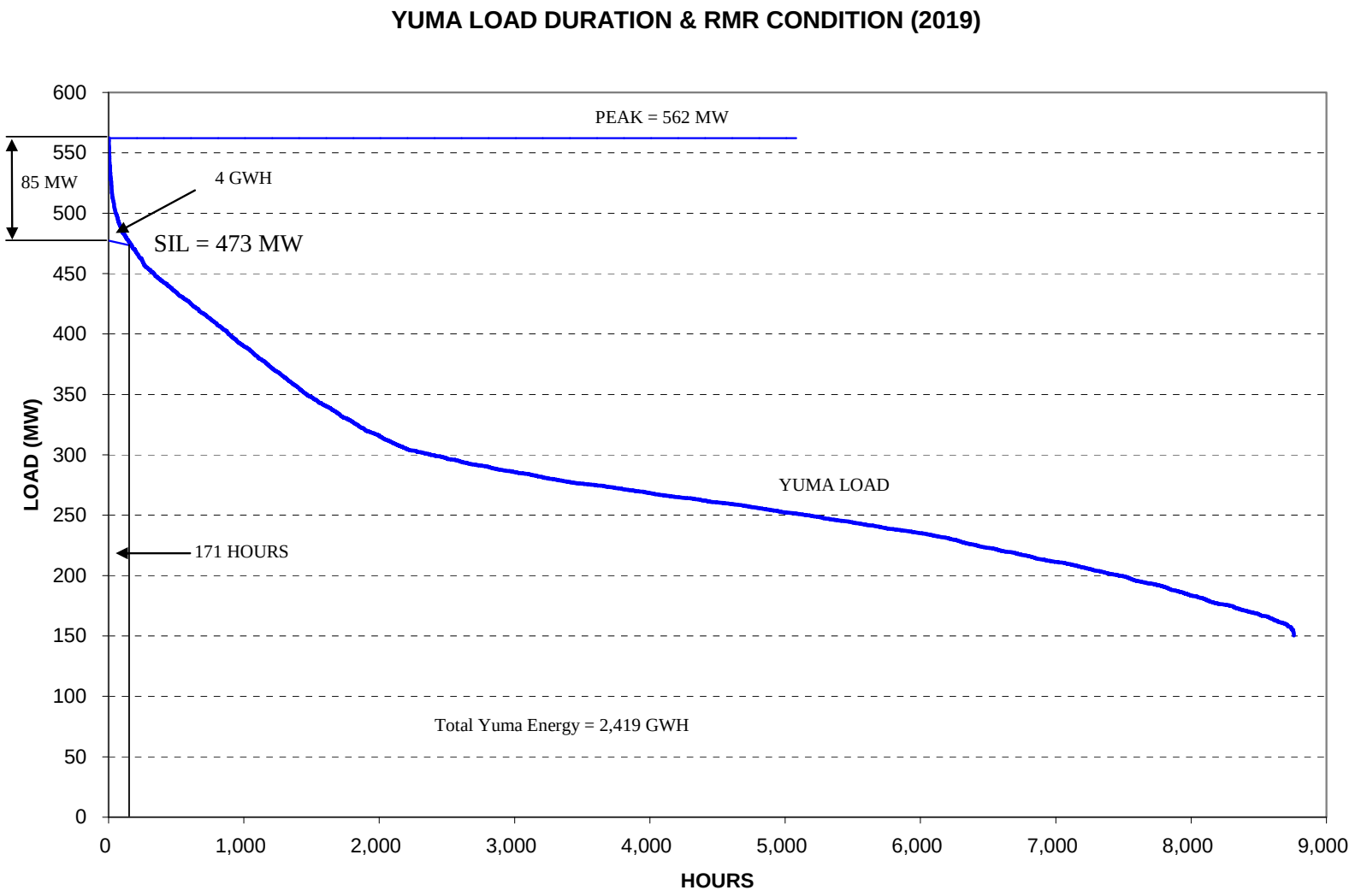
2019 Yuma Transmission System



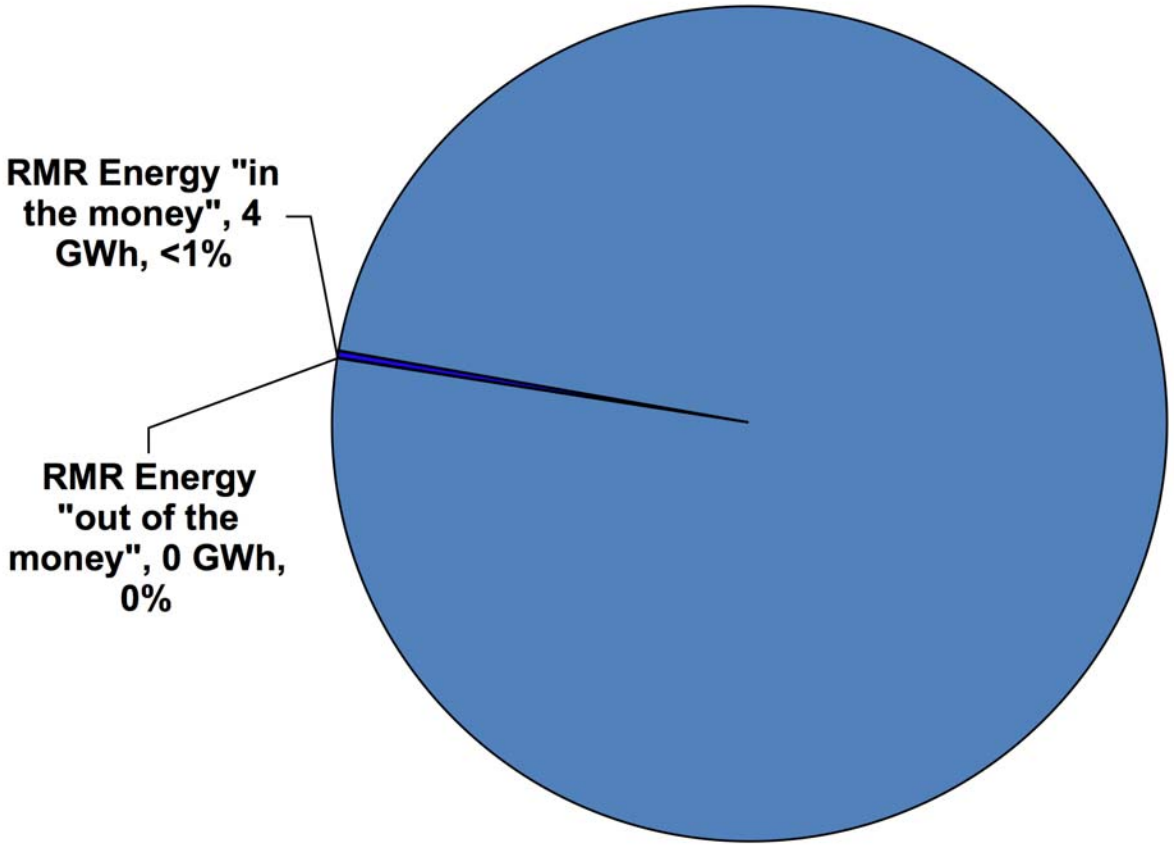
2019 Yuma Load Serving Capability



2019 Yuma Load Duration and RMR Conditions



2019 APS Yuma Energy



APS Yuma Area Total Load = 2,419 GWh

$0M incremental cost

Yuma RMR Observations

- Yuma load is expected to exceed import capability for 950 hours in 2013, and 171 hours in 2019.
- Cost to run local generation outside of economic dispatch in 2013 is negligible.
- All the RMR hours are dispatched “in the money” in 2019. No additional cost to run local generation.
- Advancement of transmission projects to increase import capability is presently not cost justified.