

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

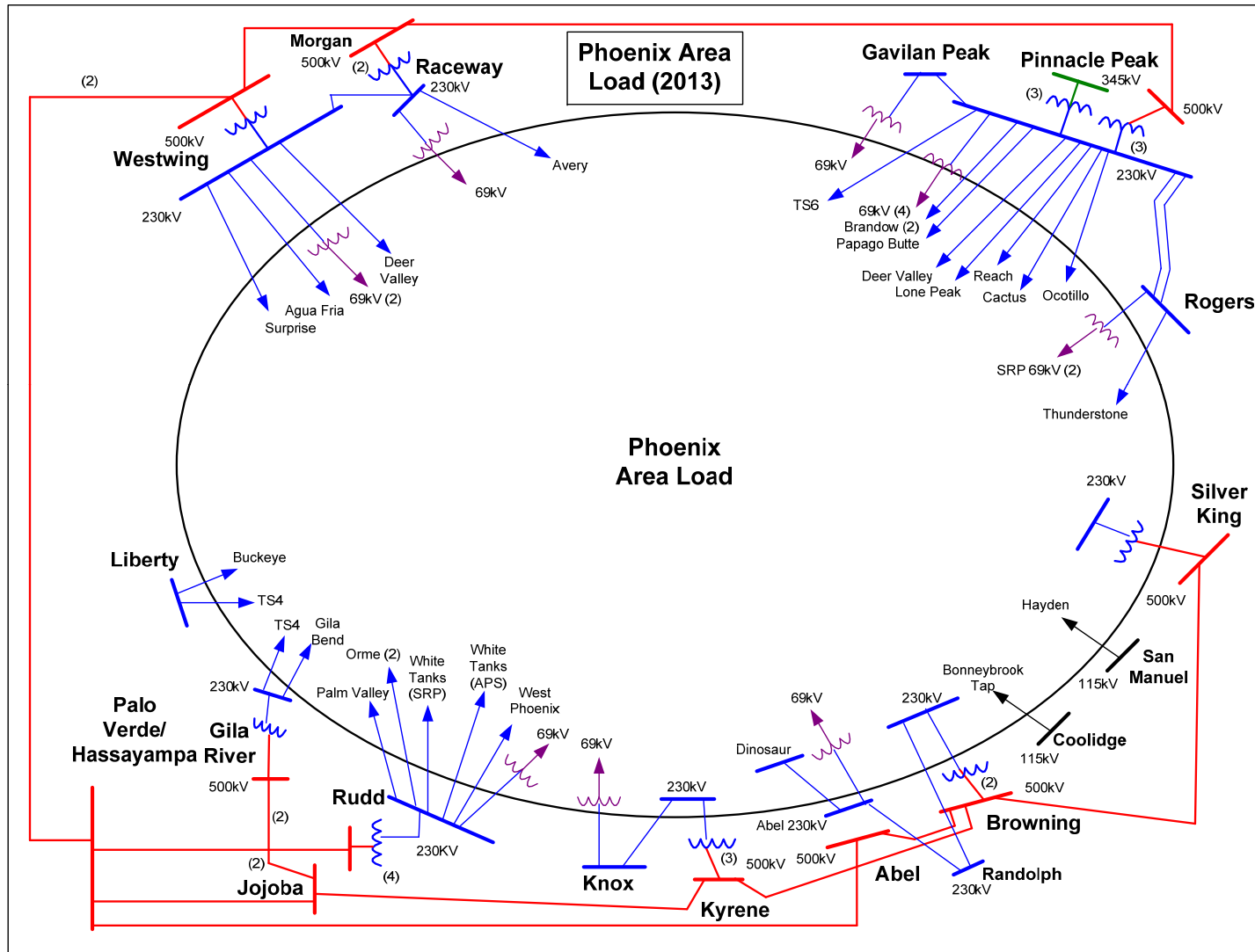
# 2010 RMR Study Process

- 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

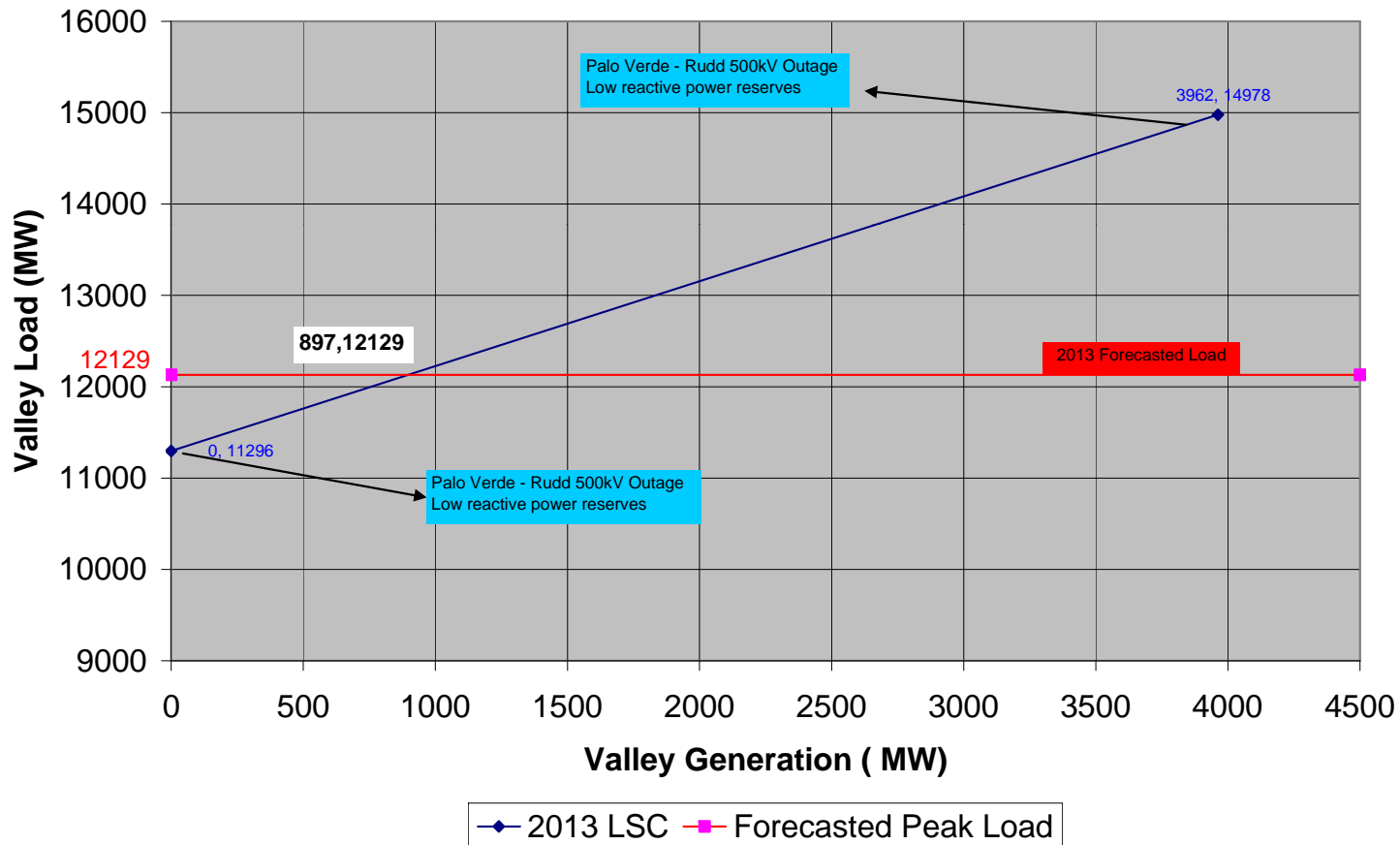
- New Energy PROMOD production-cost simulator
- SRP and APS control areas modeled
- Hourly least cost dispatch with transmission constraints
- Annual cost to serve area load determined
- Study repeated ignoring local import limit
- Difference is the RMR cost

# Phoenix Area Load 2013



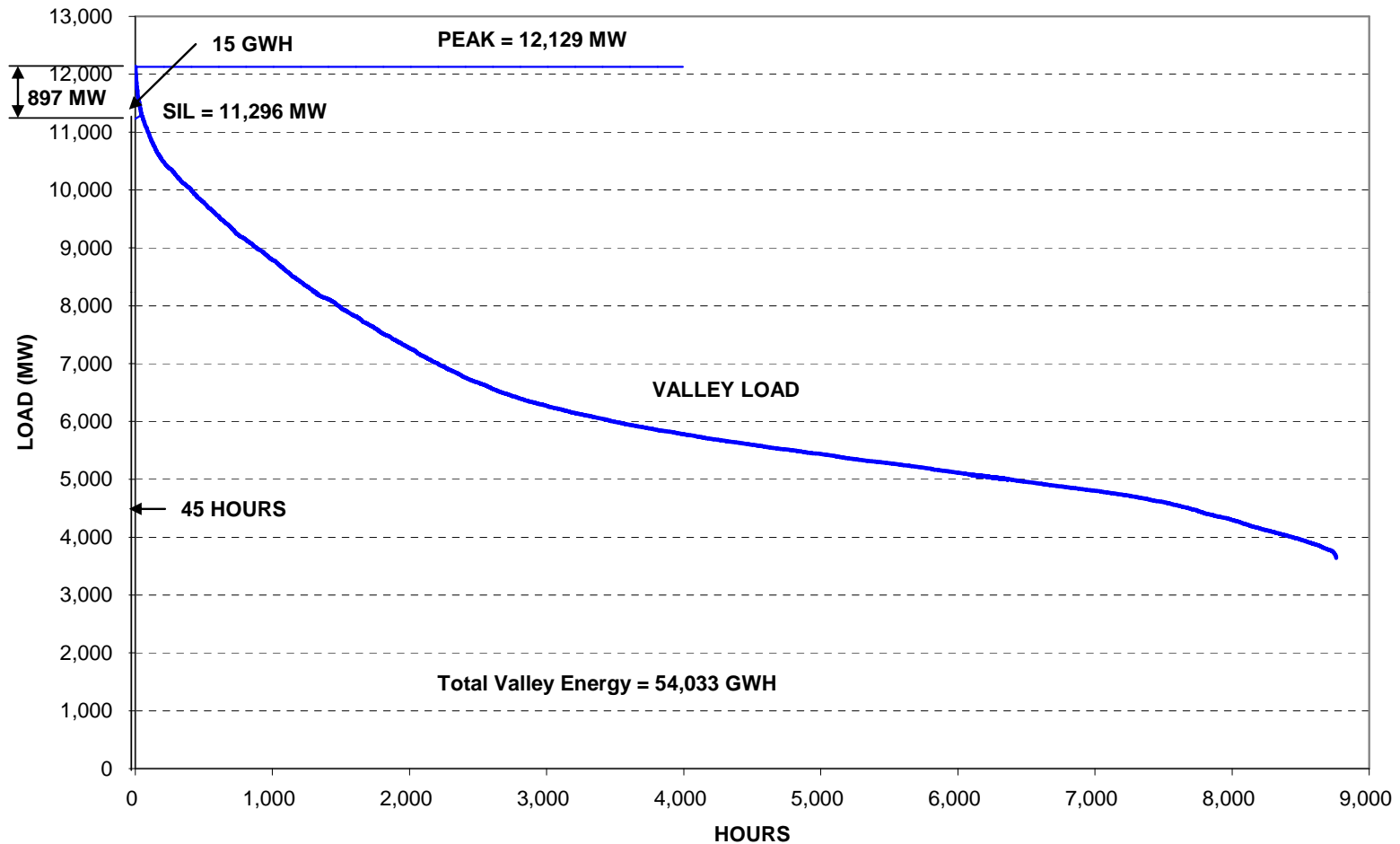
# 2013 Phoenix Load Serving Capability

## Phoenix Area 2013 Load Serving Capability

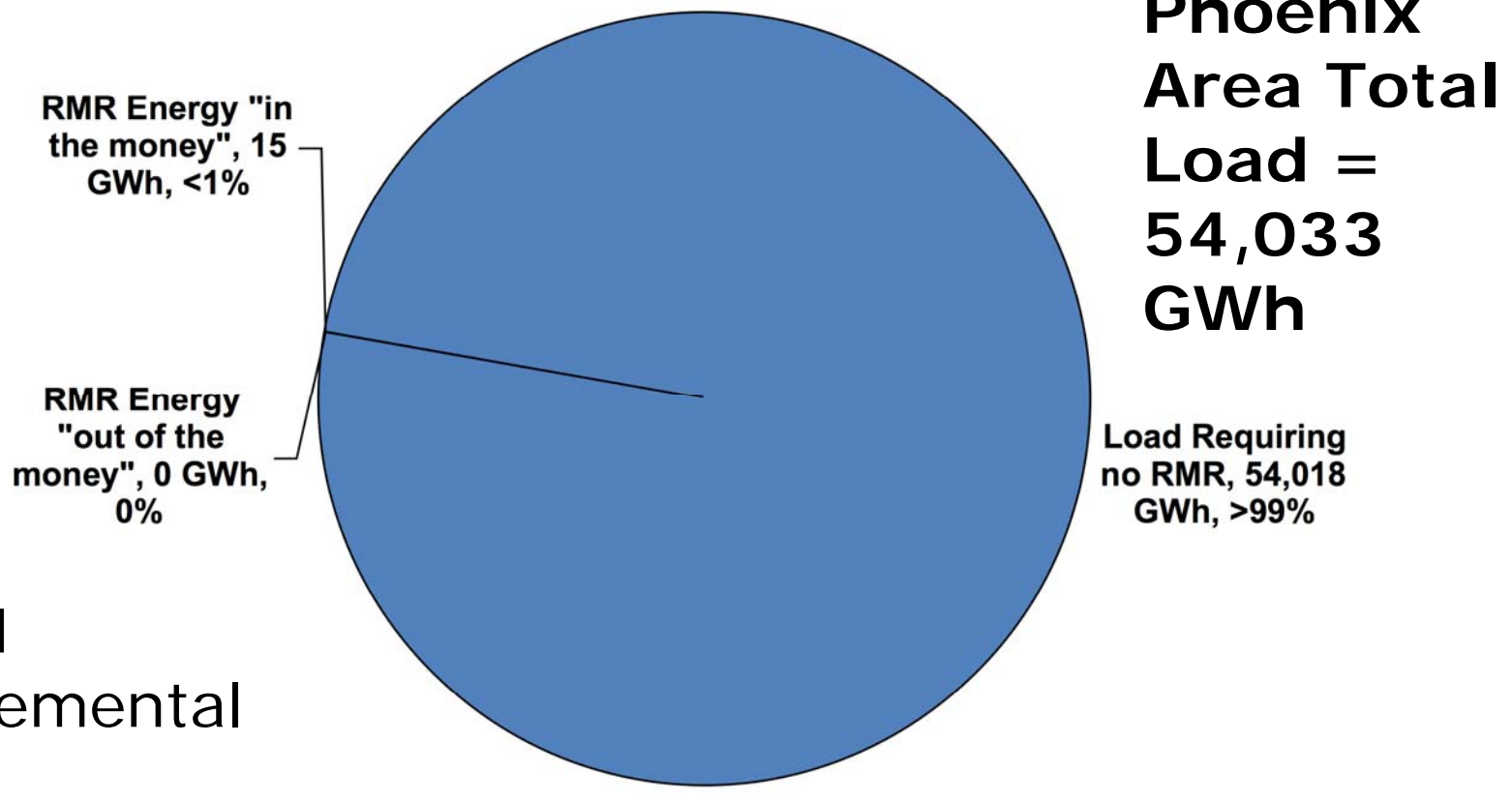


# 2013 Phoenix Load Duration and RMR Conditions

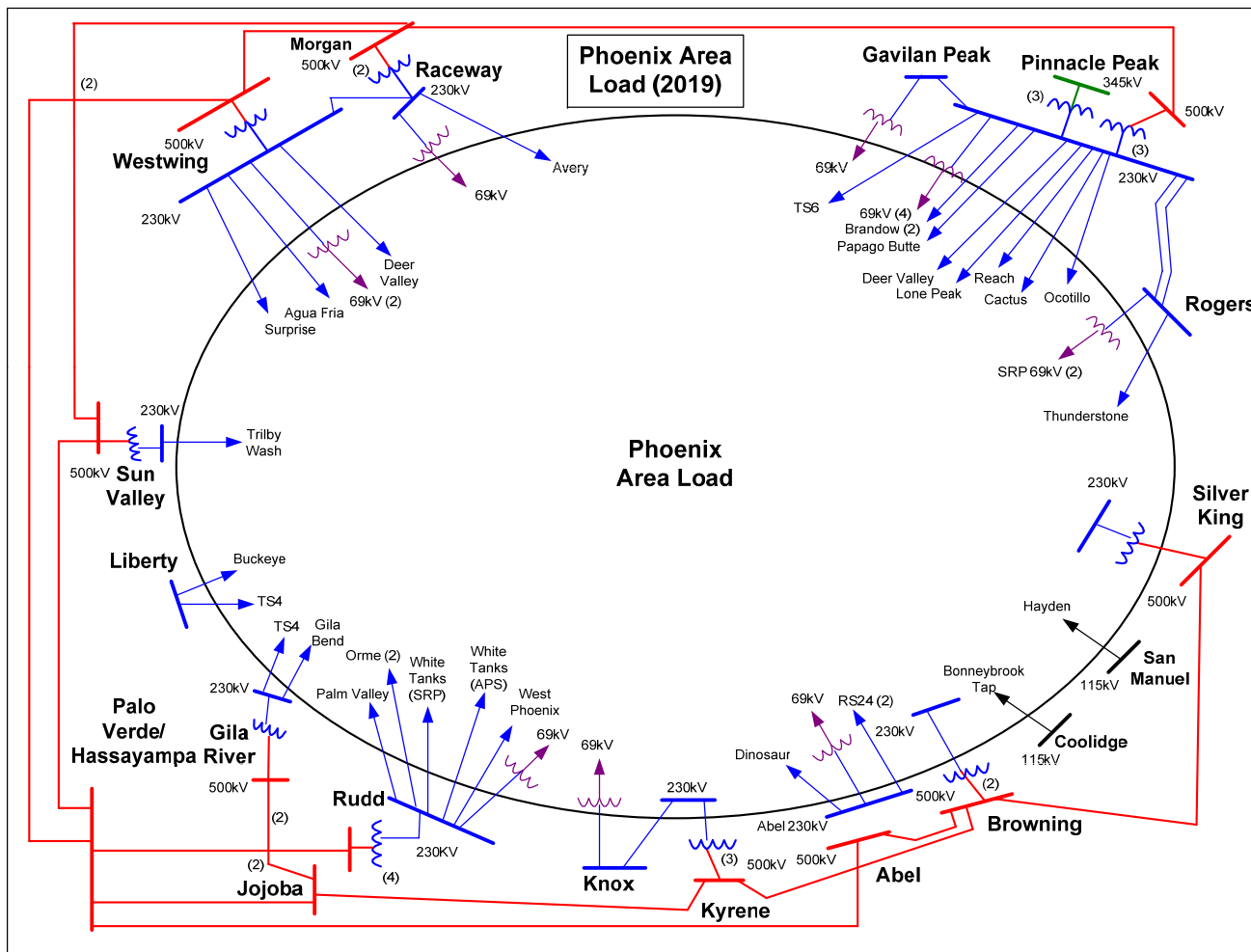
PHOENIX LOAD DURATION & RMR CONDITION (2013)



# 2013 Phoenix Area Energy

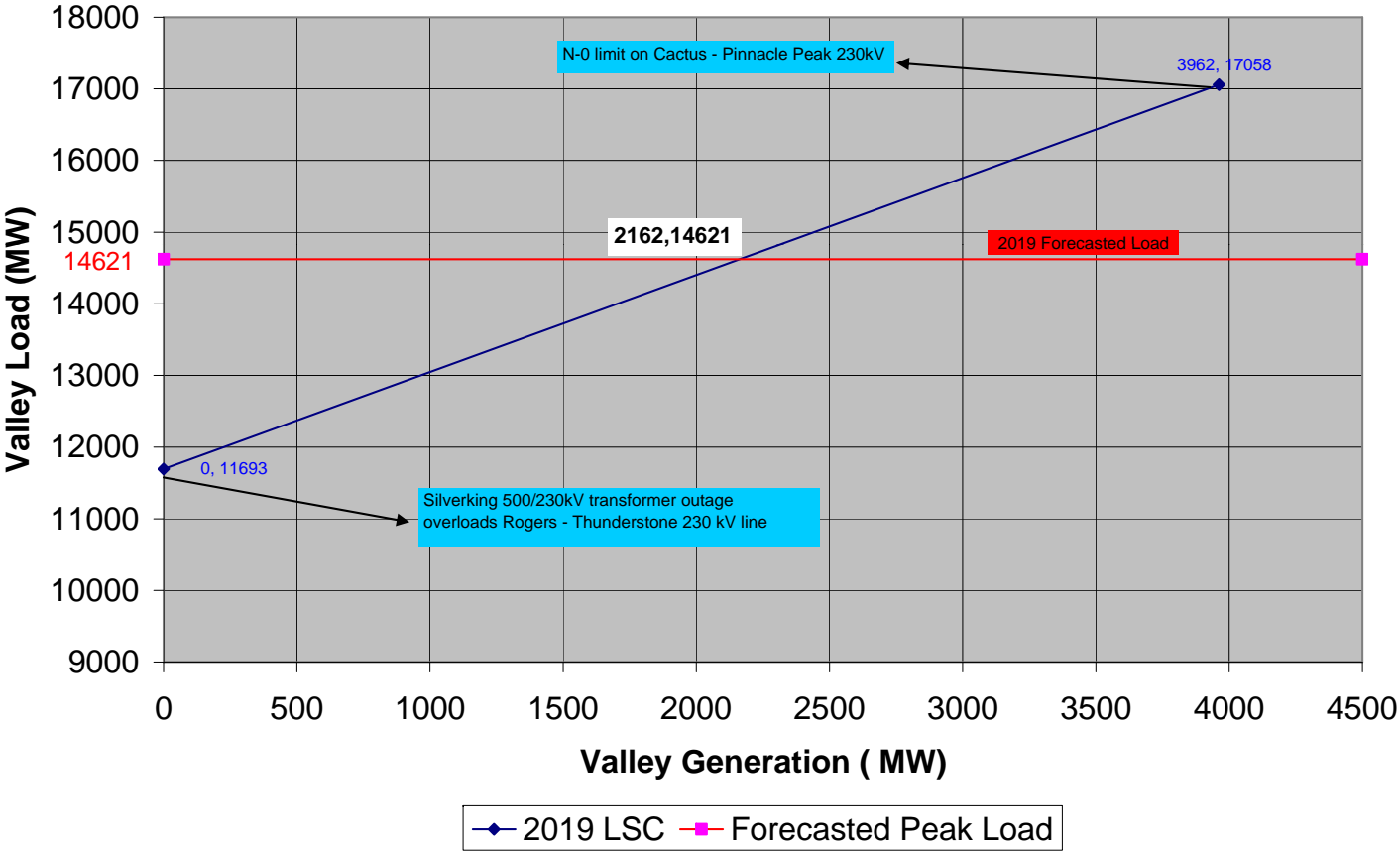


# Phoenix Area Load 2019



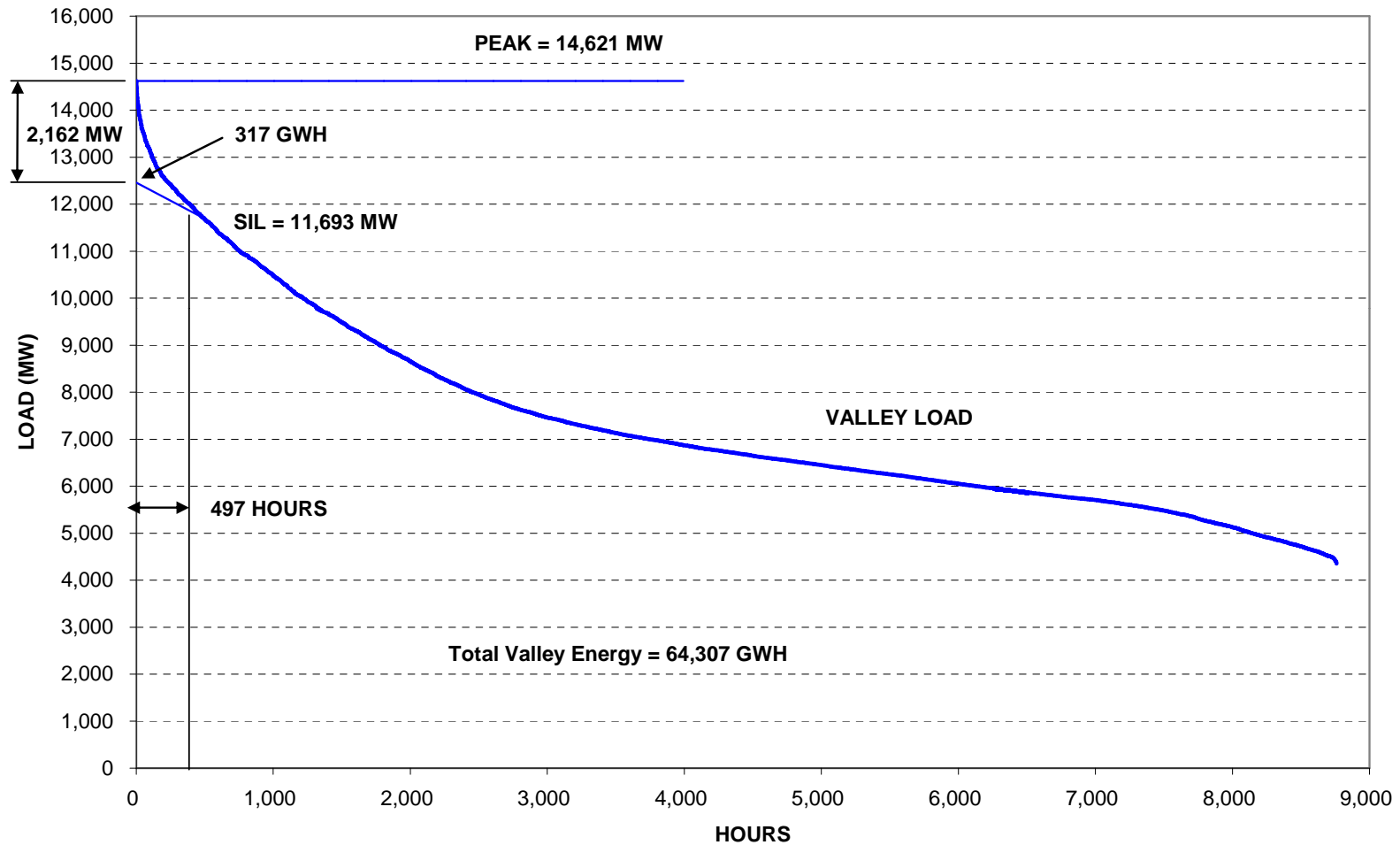
# 2019 Phoenix Load Serving Capability

Phoenix Area 2019 Load Serving Capability (Thermal Limits)

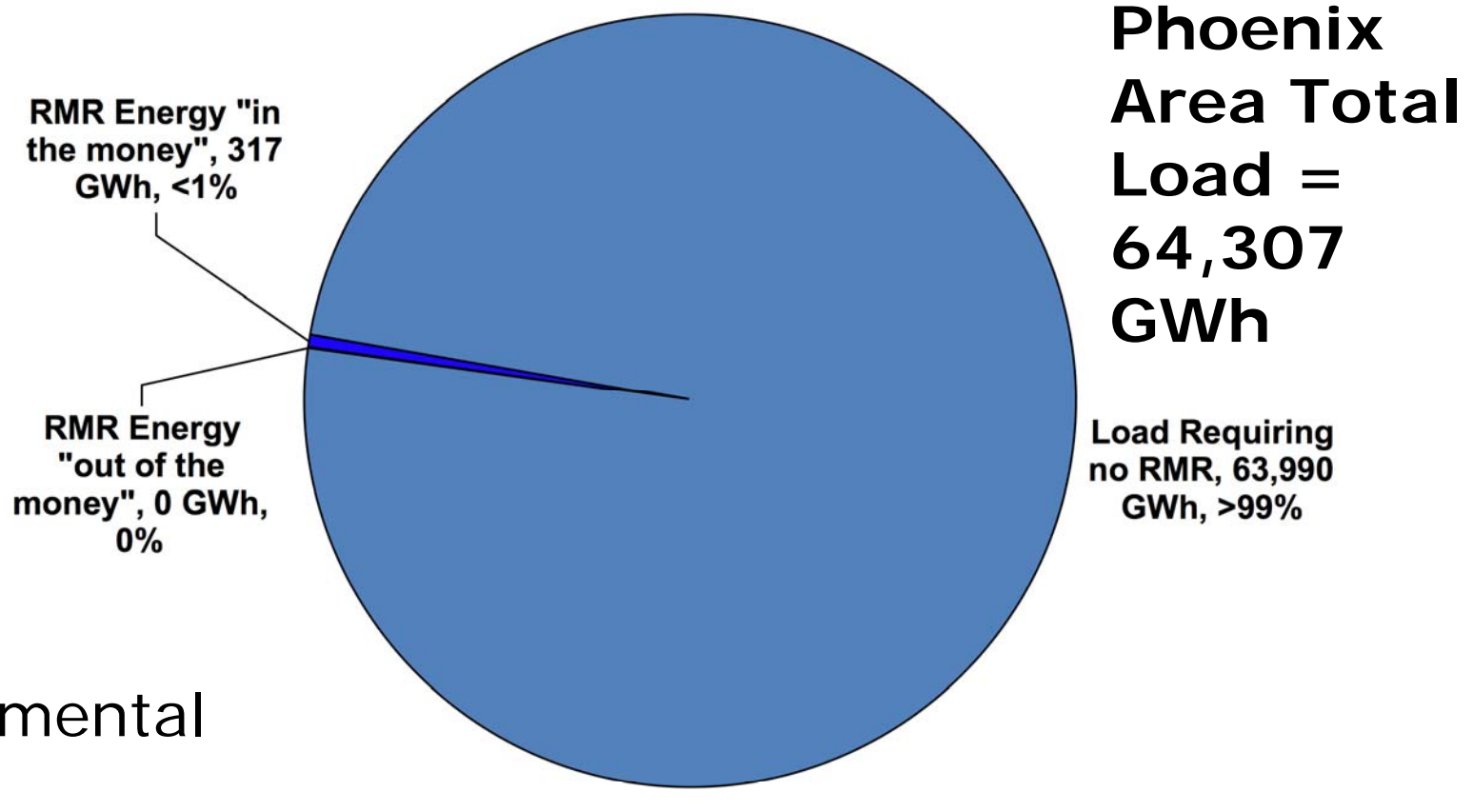


# 2019 Phoenix Load Duration and RMR Conditions

PHOENIX LOAD DURATION & RMR CONDITION (2019)



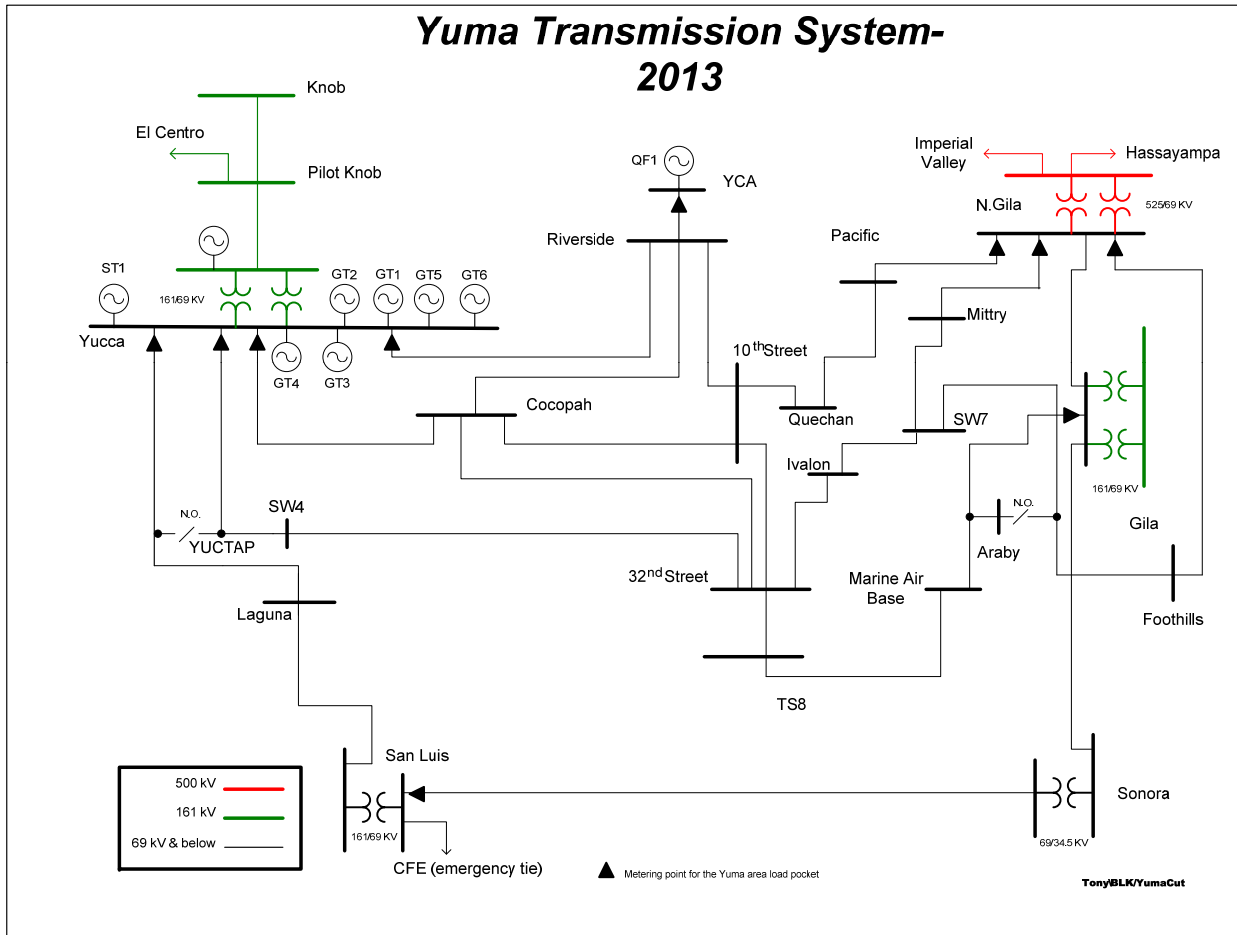
# 2019 Phoenix Area Energy



# Phoenix RMR Observations

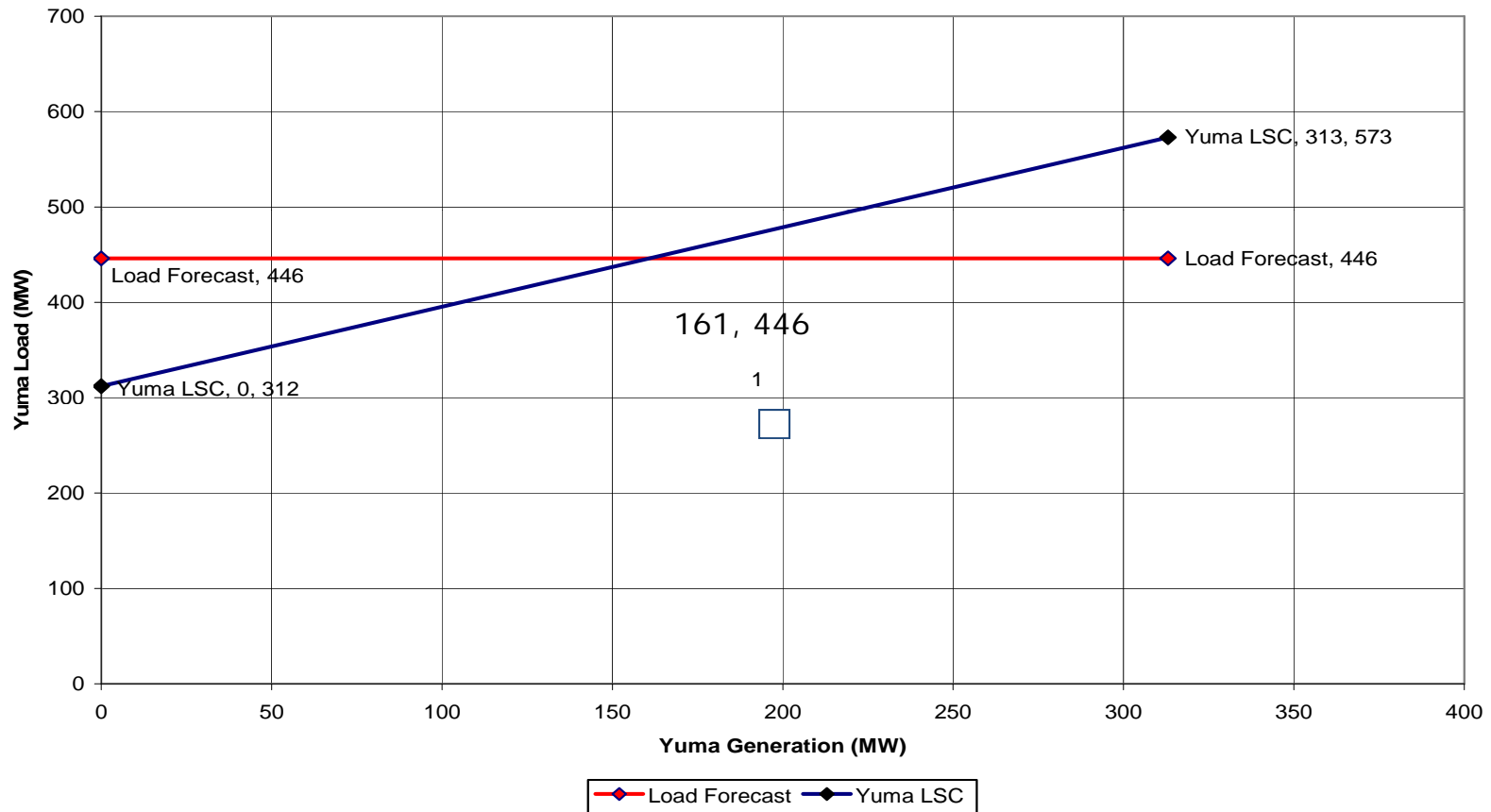
- APS load is expected to exceed import capability for 45 hours in 2013, and 497 hours in 2019. RMR energy represents less than 1% of the total energy.
- All the RMR hours are dispatched “in the money” in both 2013 and 2019. No additional cost to run local generation.

# 2013 Yuma Transmission System



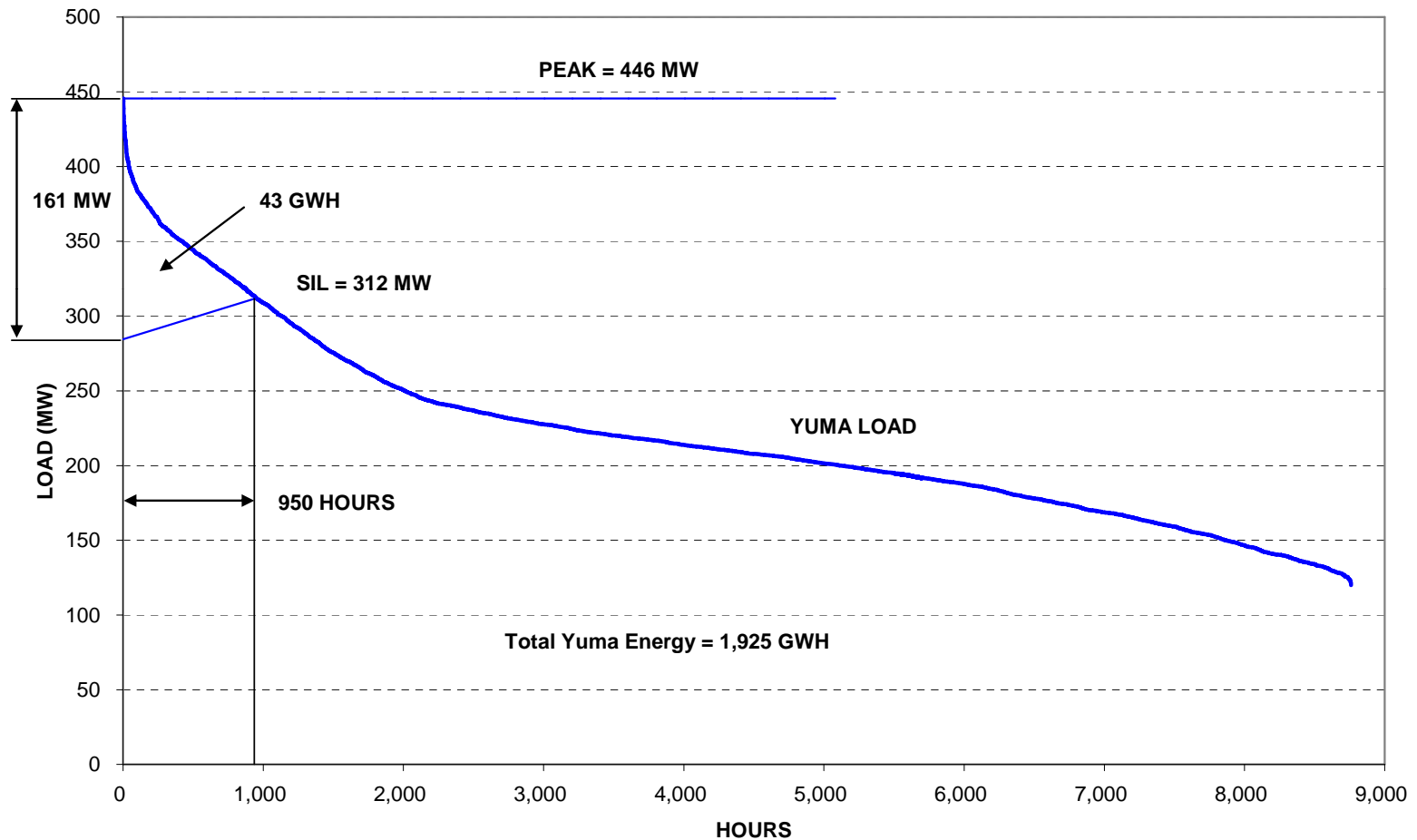
# 2013 Yuma Load Serving Capability

2013 Yuma Load Serving Capability

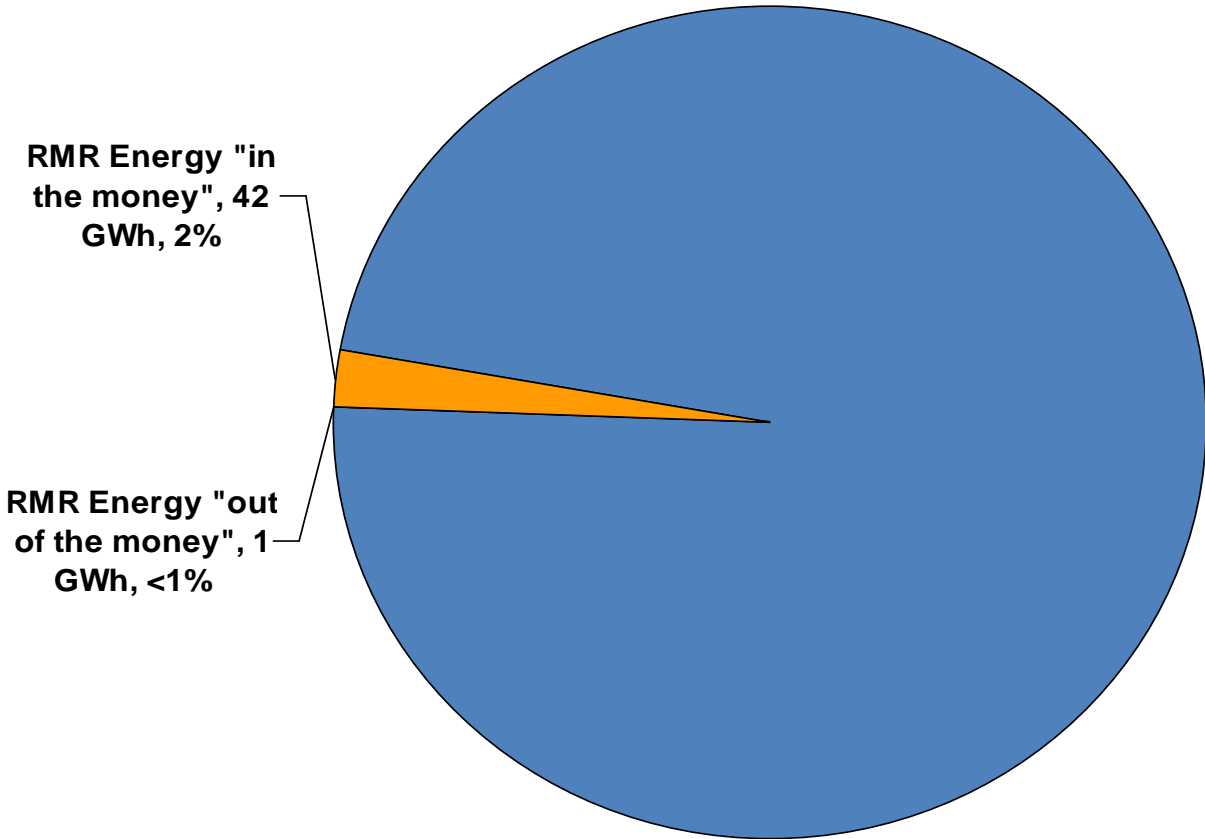


# 2013 Yuma Load Duration and RMR Conditions

YUMA LOAD DURATION & RMR CONDITION (2013)



# 2013 APS Yuma Energy

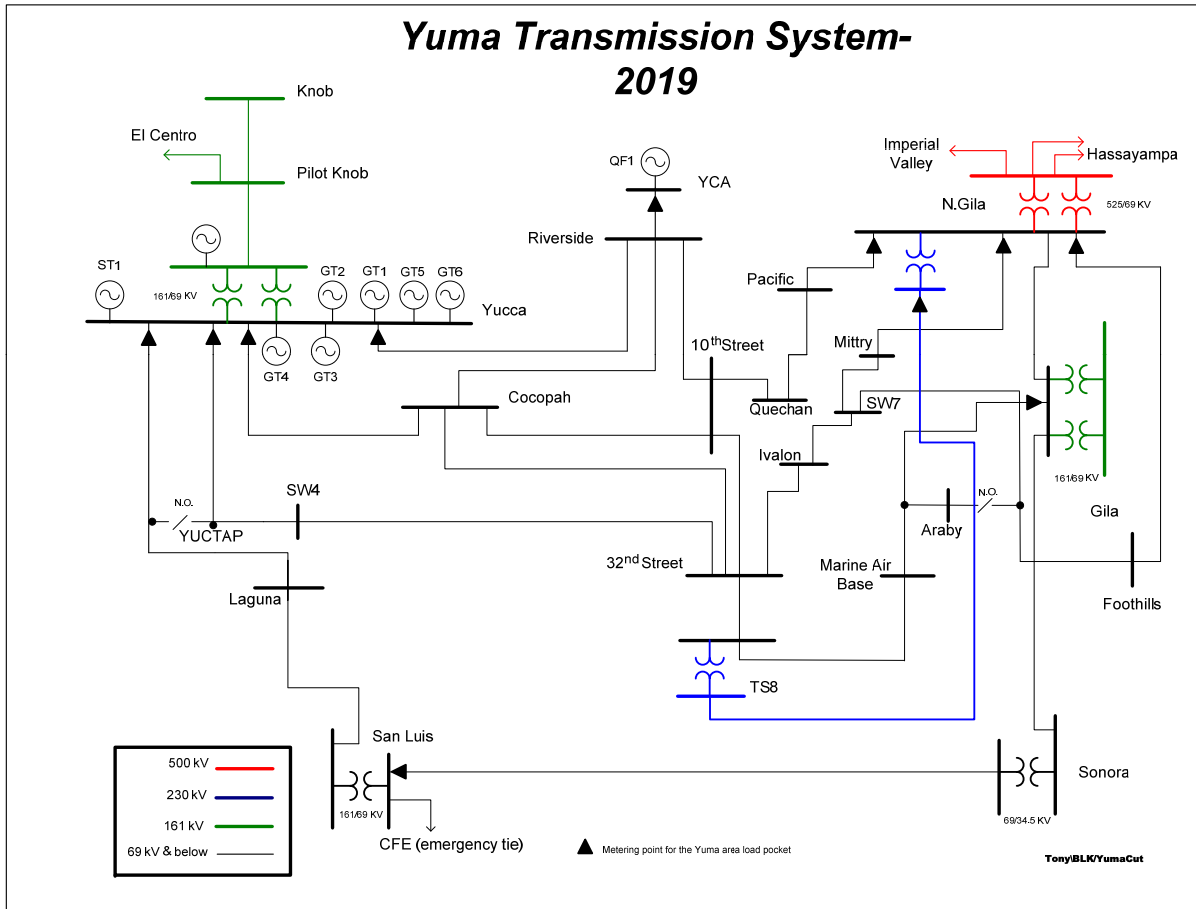


**APS Yuma  
Area Total  
Load =  
1,925  
GWh**

Load Requiring no  
RMR, 1,882 GWh,  
98%

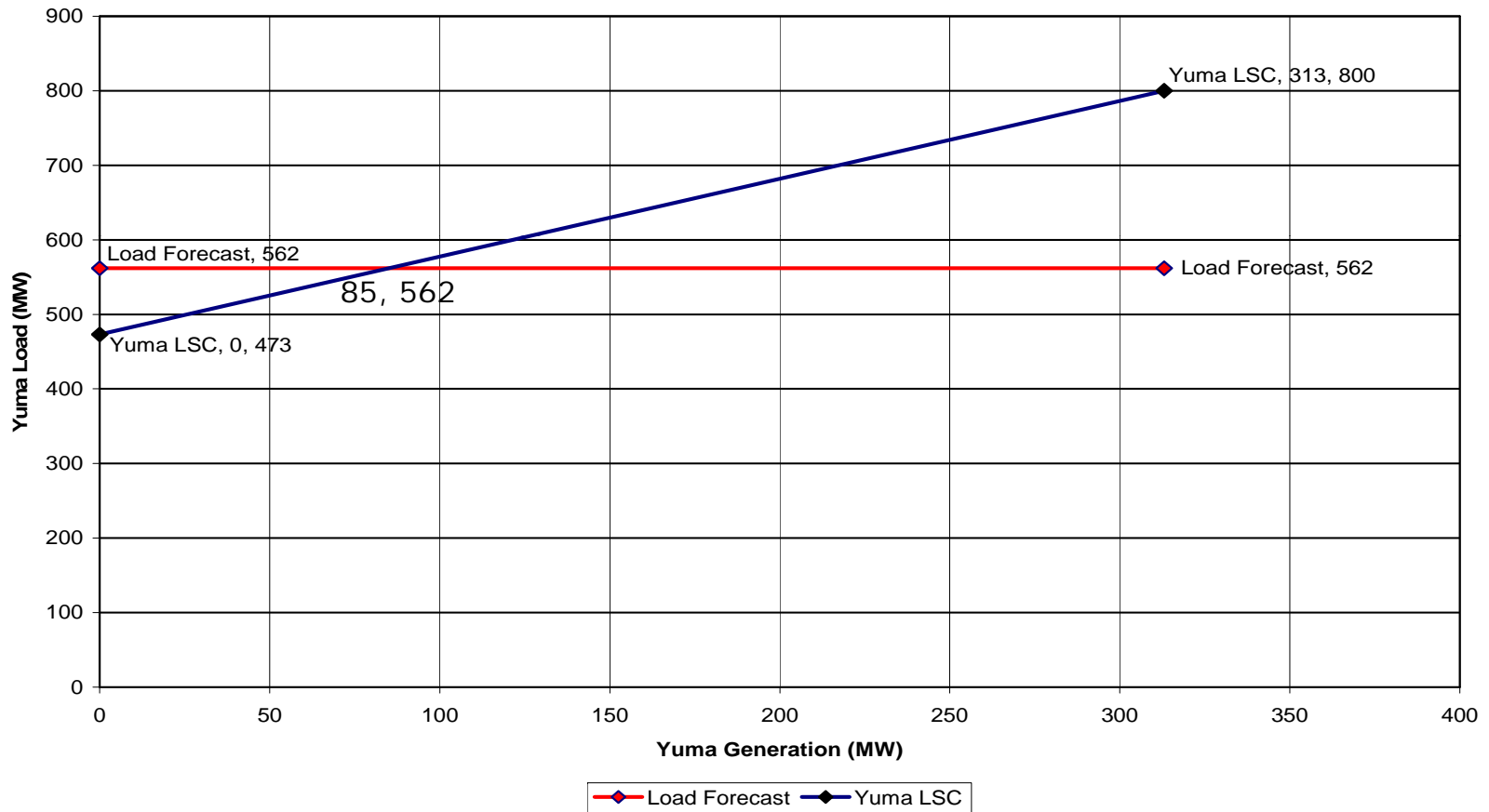
<\$1M  
incremental  
cost

# 2019 Yuma Transmission System



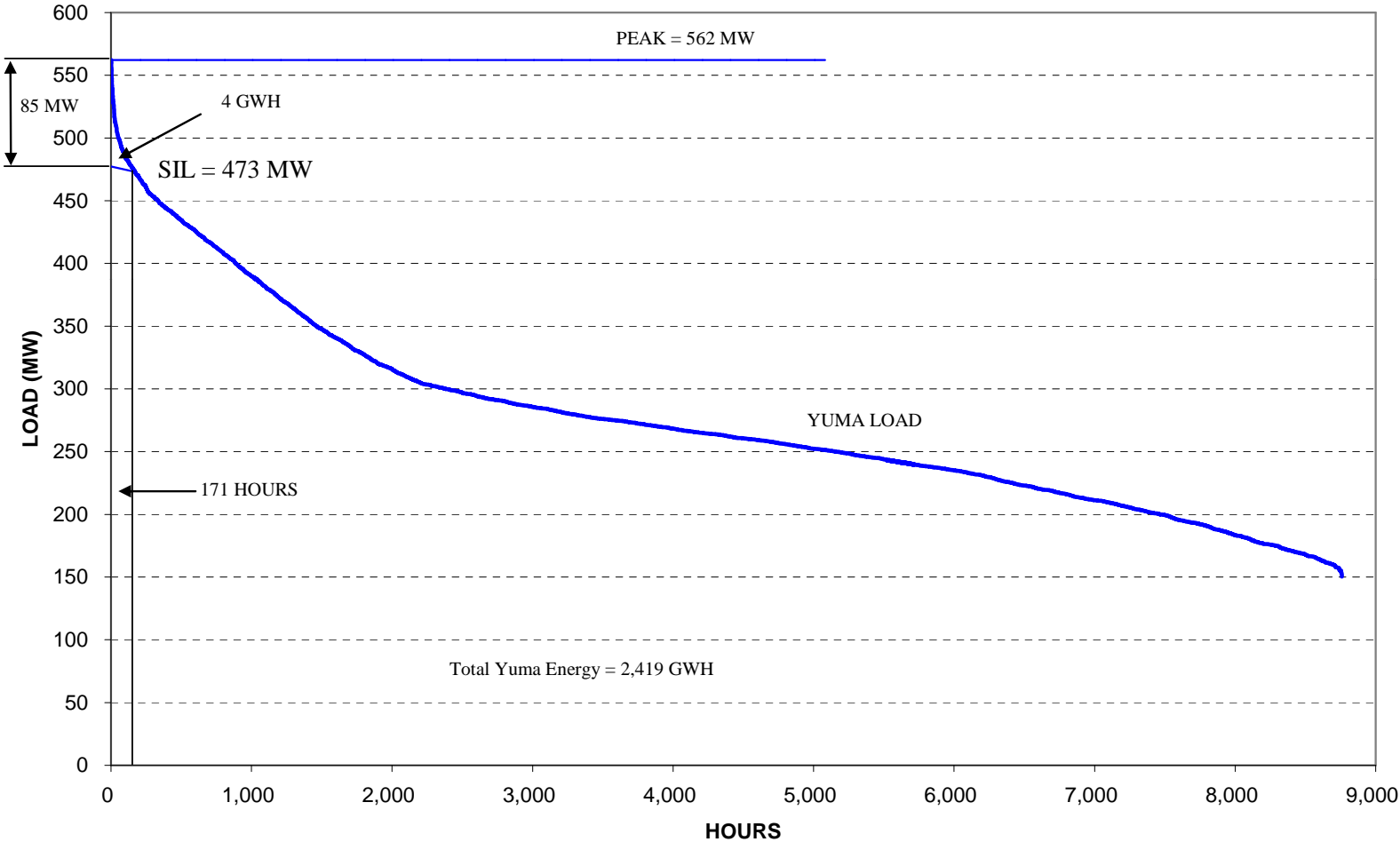
# 2019 Yuma Load Serving Capability

2019 Yuma Load Serving Capability



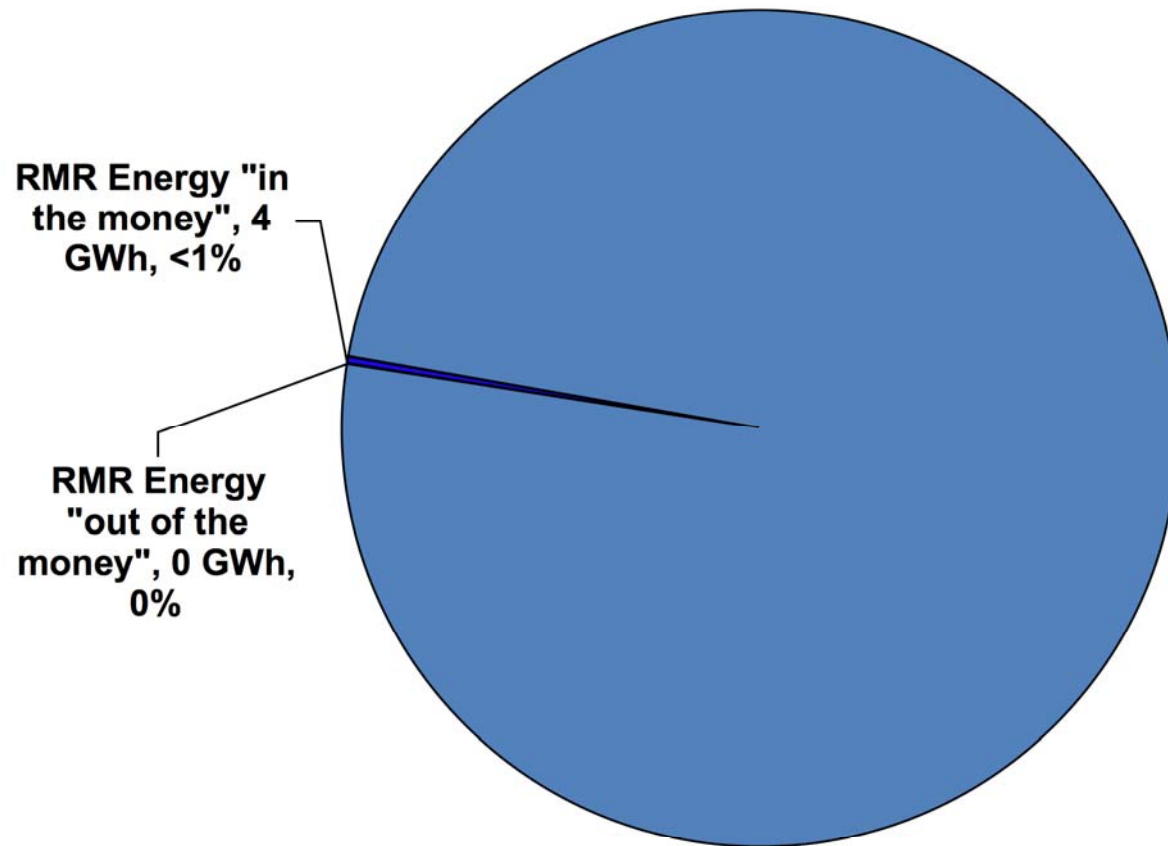
# 2019 Yuma Load Duration and RMR Conditions

YUMA LOAD DURATION & RMR CONDITION (2019)



# 2019 APS Yuma Energy

**APS Yuma  
Area Total  
Load =  
2,419  
GWh**



**Load Requiring  
no RMR, 2,415  
GWh, >99%**

**\$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.