

APS Reliability Must-Run Analysis 2012 – 2021

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Outline of Presentation

- 2012 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

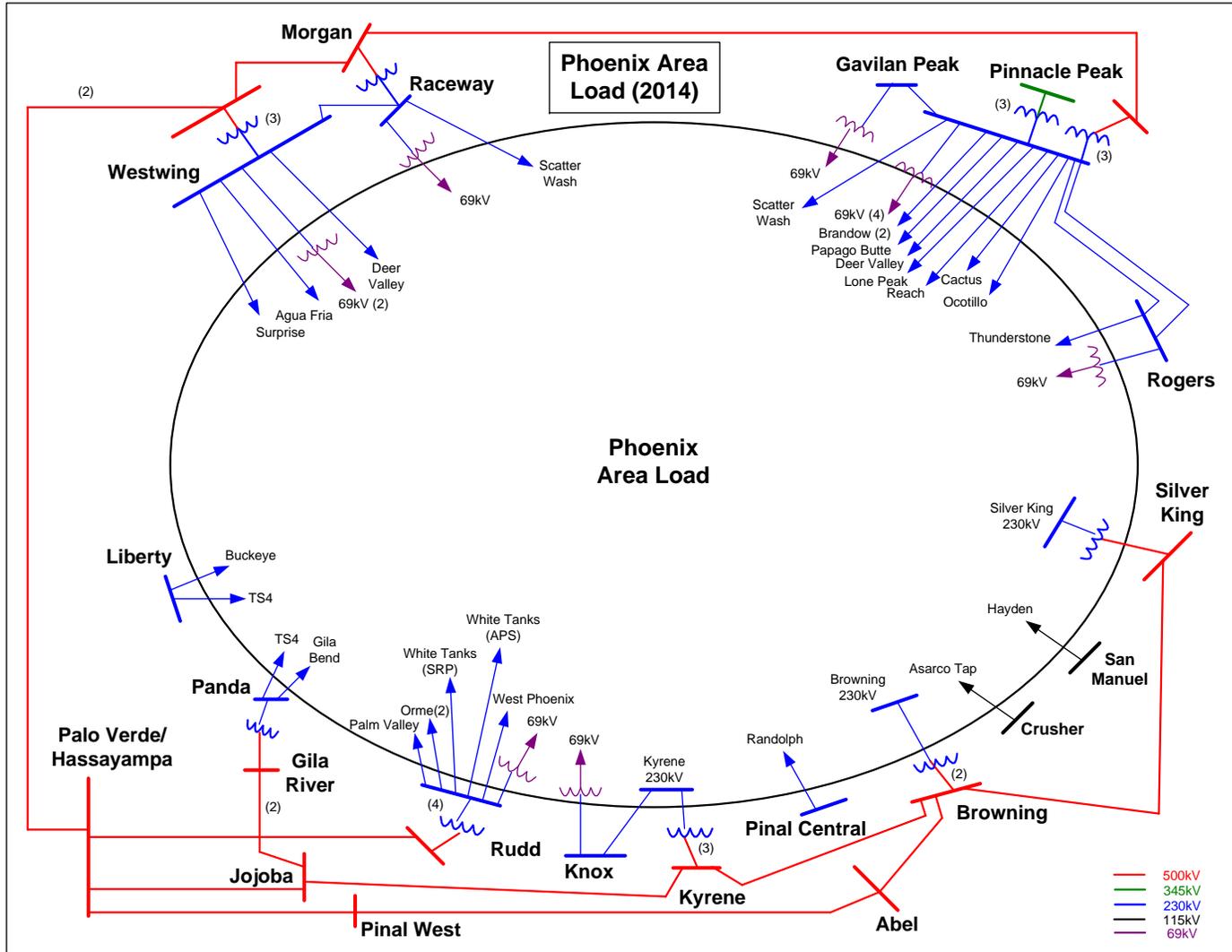
2012 RMR Study Process

- SWAT forum used to facilitate public discussion and input for 2012 RMR Study
 - Phoenix – under guidance of Central Arizona Transmission System (CATS) study group
 - Yuma – Colorado River Transmission (CRT) subcommittee
- APS Reliability Must-Run Analysis (RMR) was filed with the ACC in January 2012
 - RMR report available on OASIS
- Data used in the production cost model comes from
 - Publicly available WECC's Transmission Expansion Planning Policy Committee (TEPPC) 2020 Base Case (dated October 31, 2010)
 - APS Resource Plan Filing, ACC Docket E-00000A-11-0113
 - Phoenix area generation data coordinated with SRP

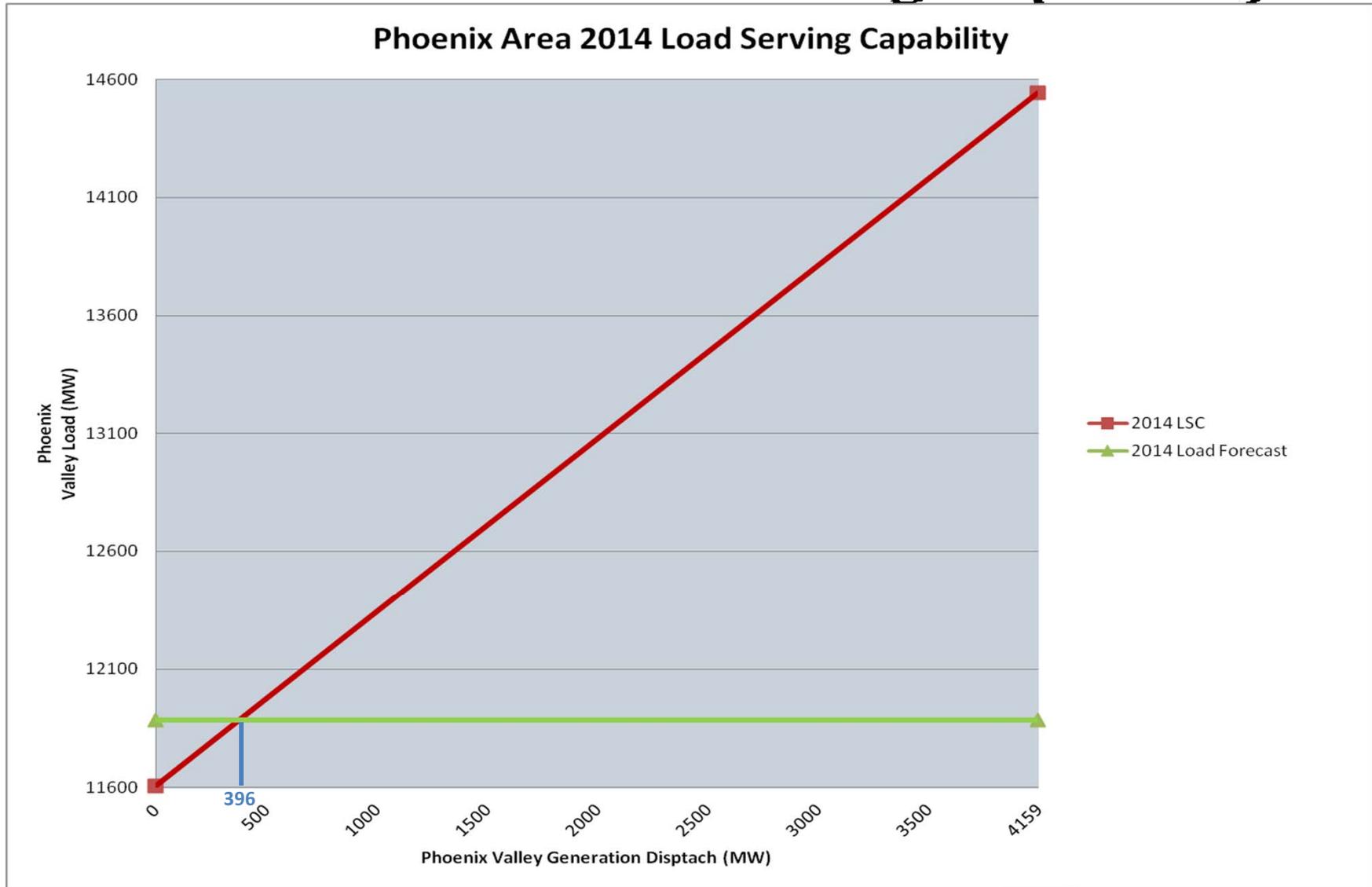
RMR Economic Analysis

- Ventyx 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 2014

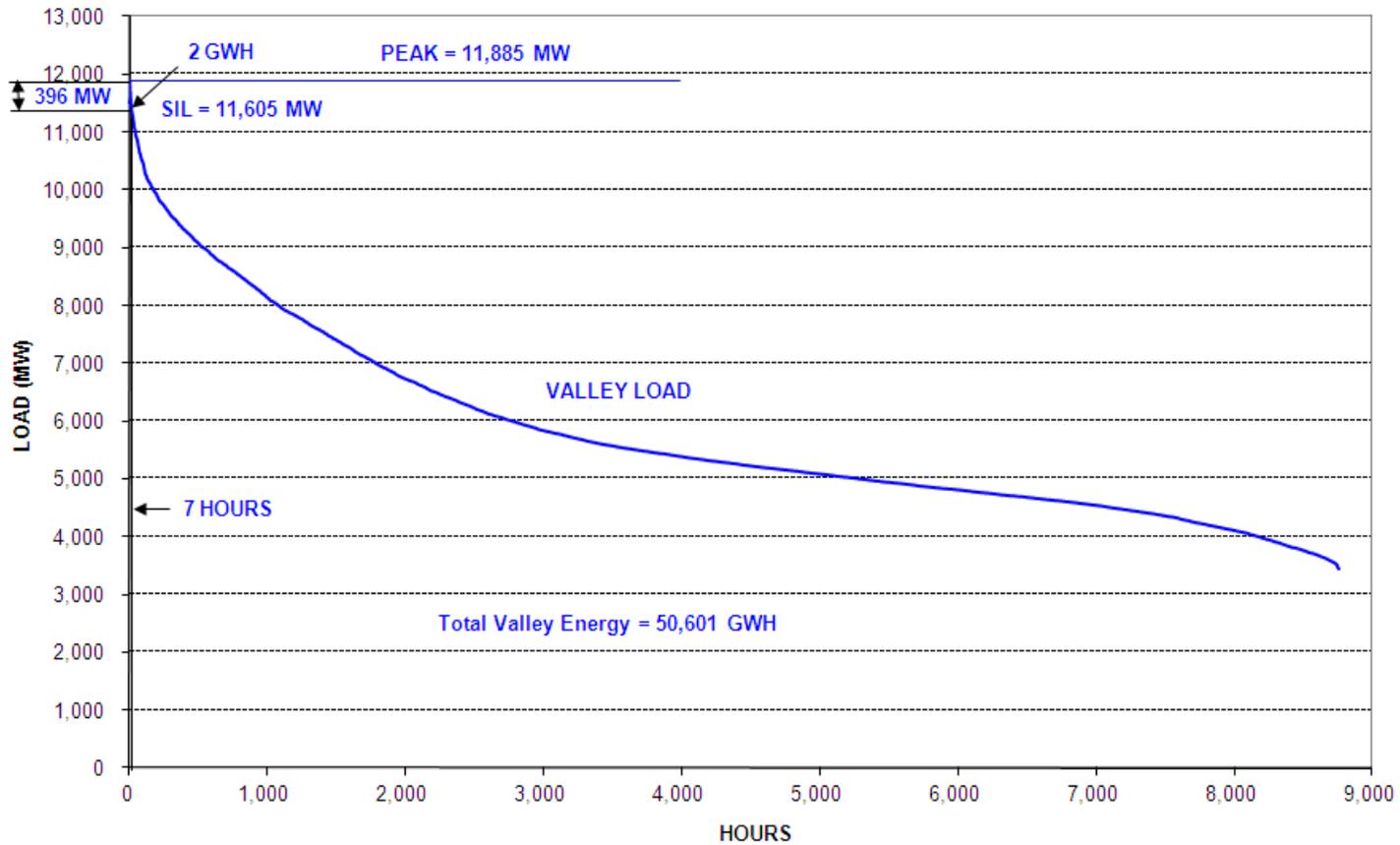


2014 Phoenix Load Serving Capability



2014 Phoenix Load Duration and RMR Conditions

PHOENIX LOAD DURATION & RMR CONDITION (2014)



2014 Phoenix Area Energy

Phoenix Area
Total Load = 50,601 GWh

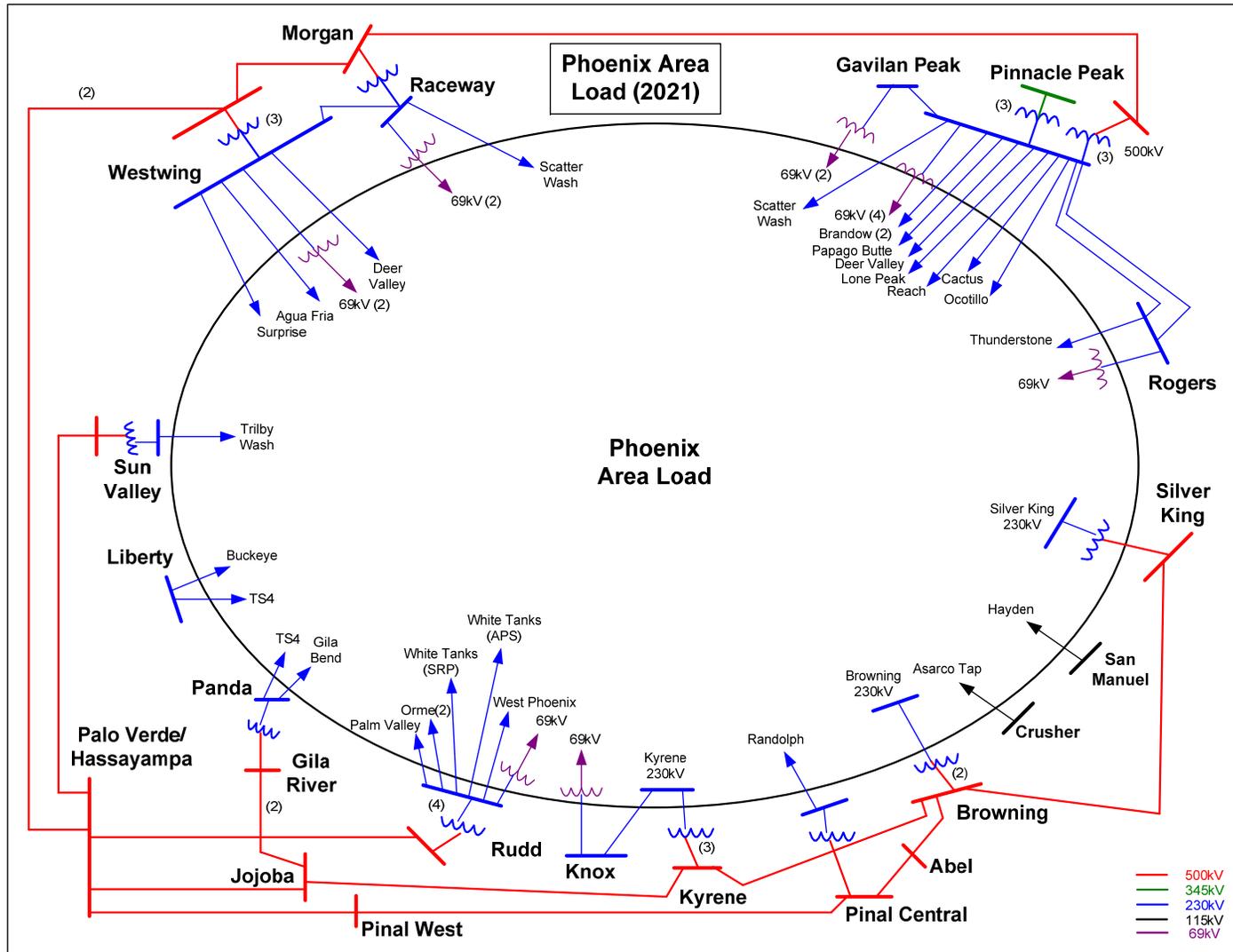
RMR Energy "in
the money",
2 GWh, ~0%

RMR Energy
"outside of
economic
dispatch",
0 GWh, 0%

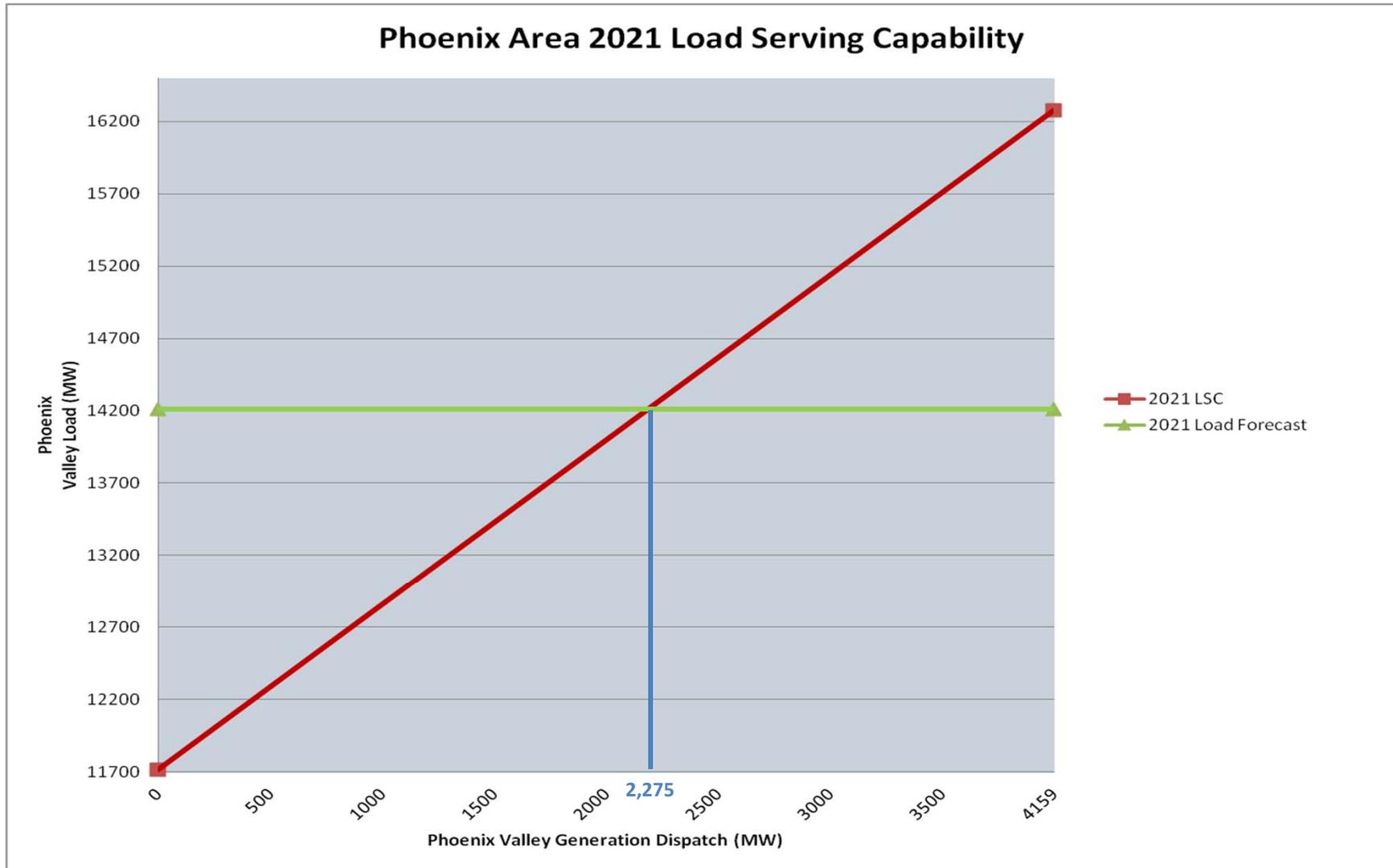
Load Requiring
no RMR,
50,599 GWh,
~100%

\$0M incremental cost

Phoenix Area Load 2021

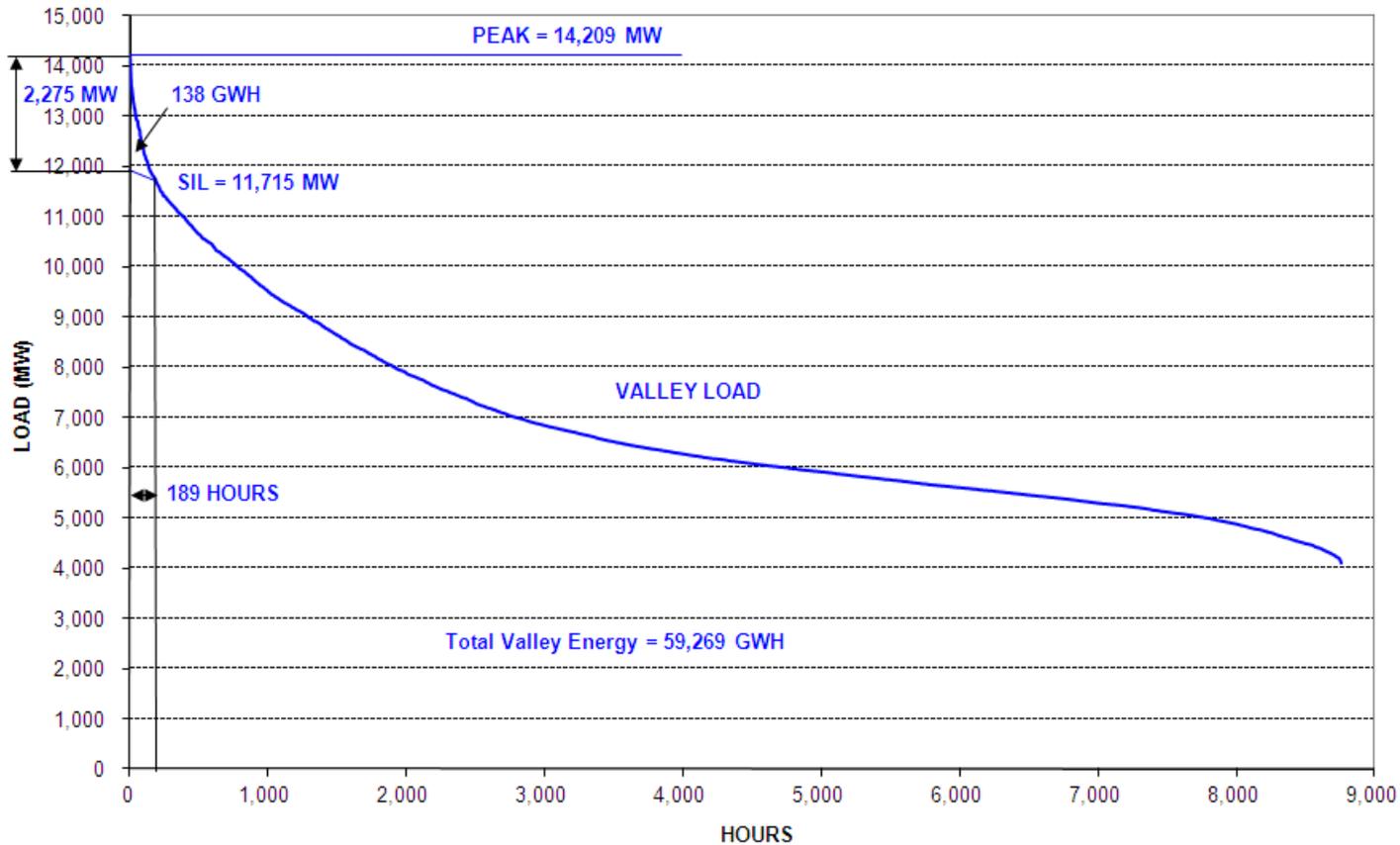


2021 Phoenix Load Serving Capability



2021 Phoenix Load Duration and RMR Conditions

PHOENIX LOAD DURATION & RMR CONDITION (2021)



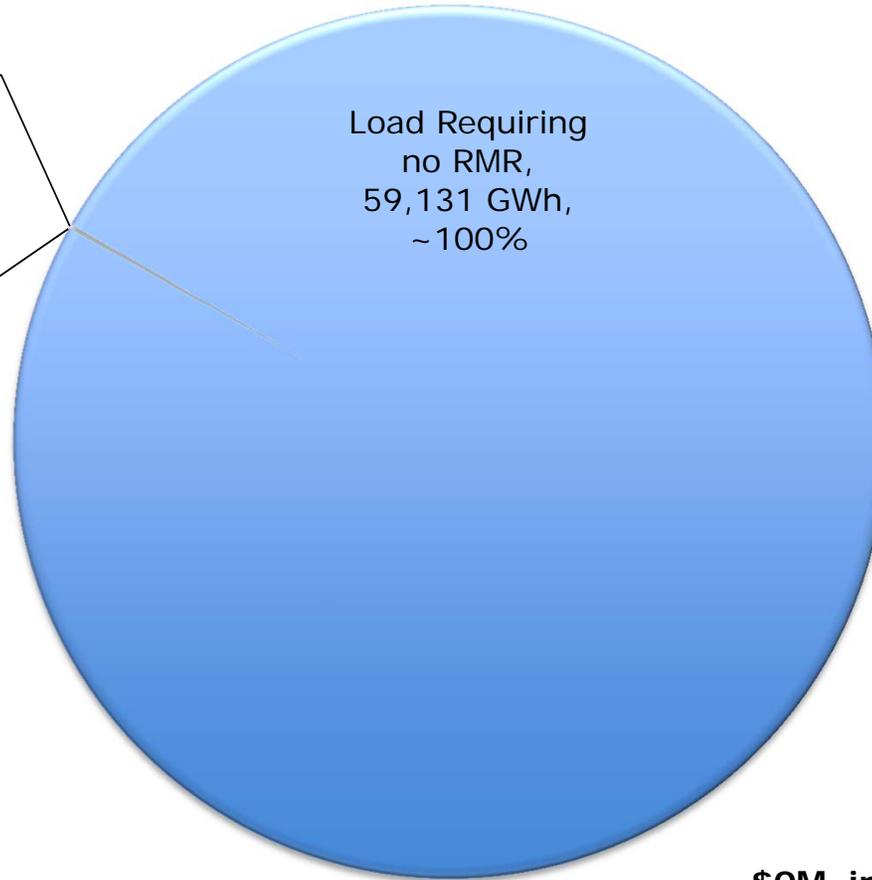
2021 Phoenix Area Energy

Phoenix Area
Total Load = 59,269 GWh

RMR Energy "in
the money",
138 GWh, 0%

RMR Energy
"outside of
economic
dispatch",
0 GWh, 0%

Load Requiring
no RMR,
59,131 GWh,
~100%

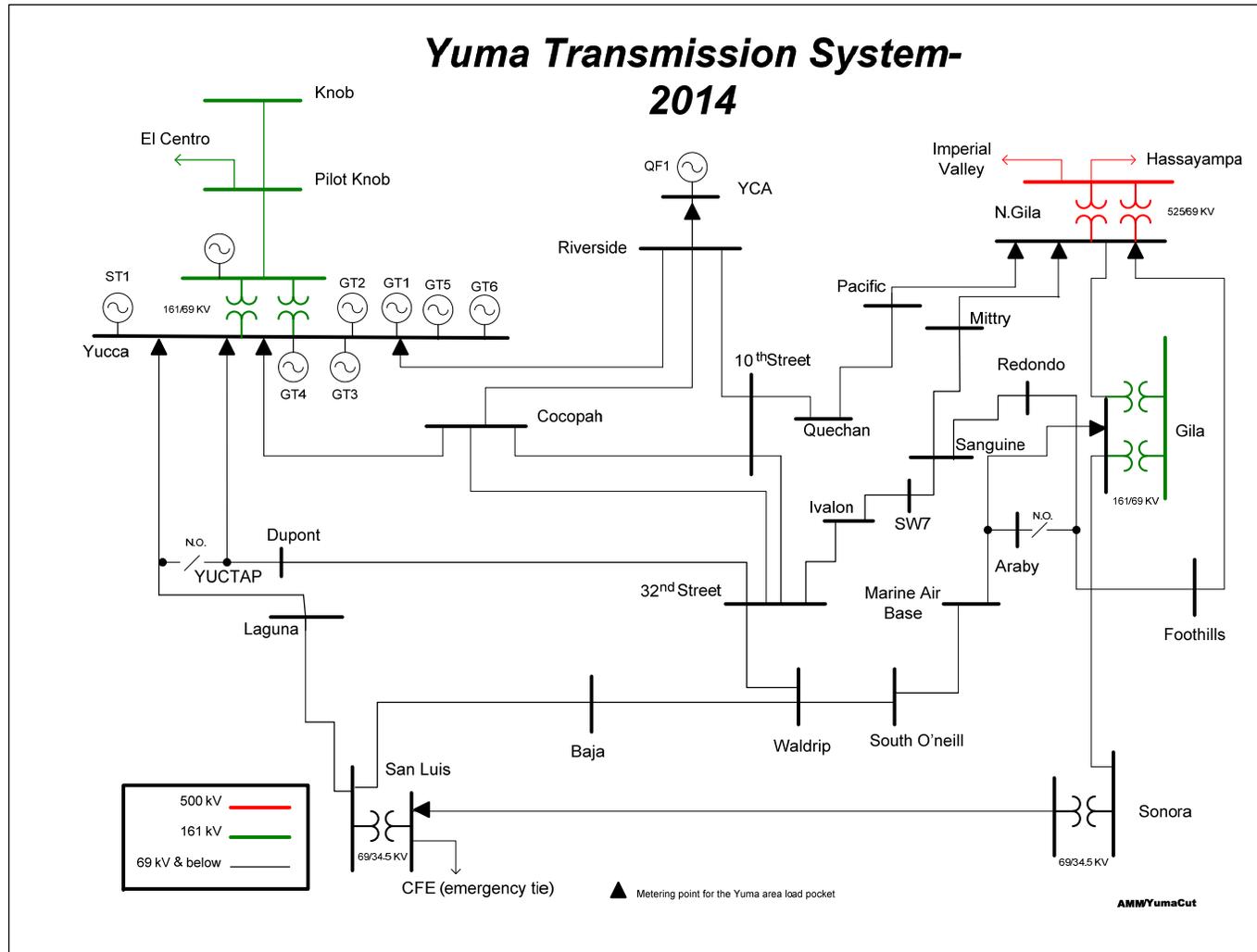


\$0M incremental cost

Phoenix RMR Observations

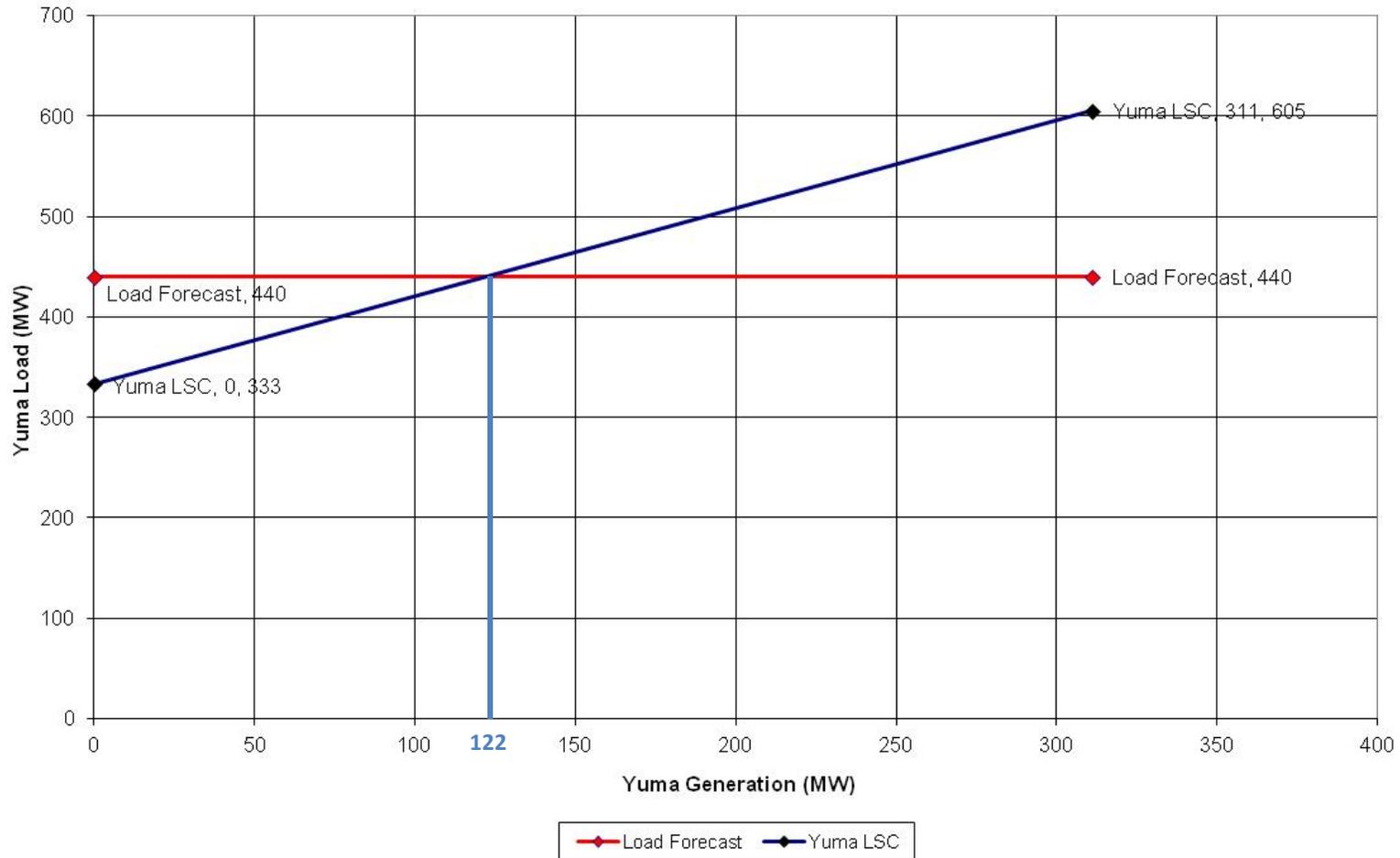
- Phoenix load is expected to exceed import capability for 7 hours in 2014, and 189 hours in 2021. RMR energy represents less than 1% of the total energy
- All the RMR hours are dispatched “in the money” in both 2014 and 2021. No additional cost to run local generation

2014 Yuma Transmission System



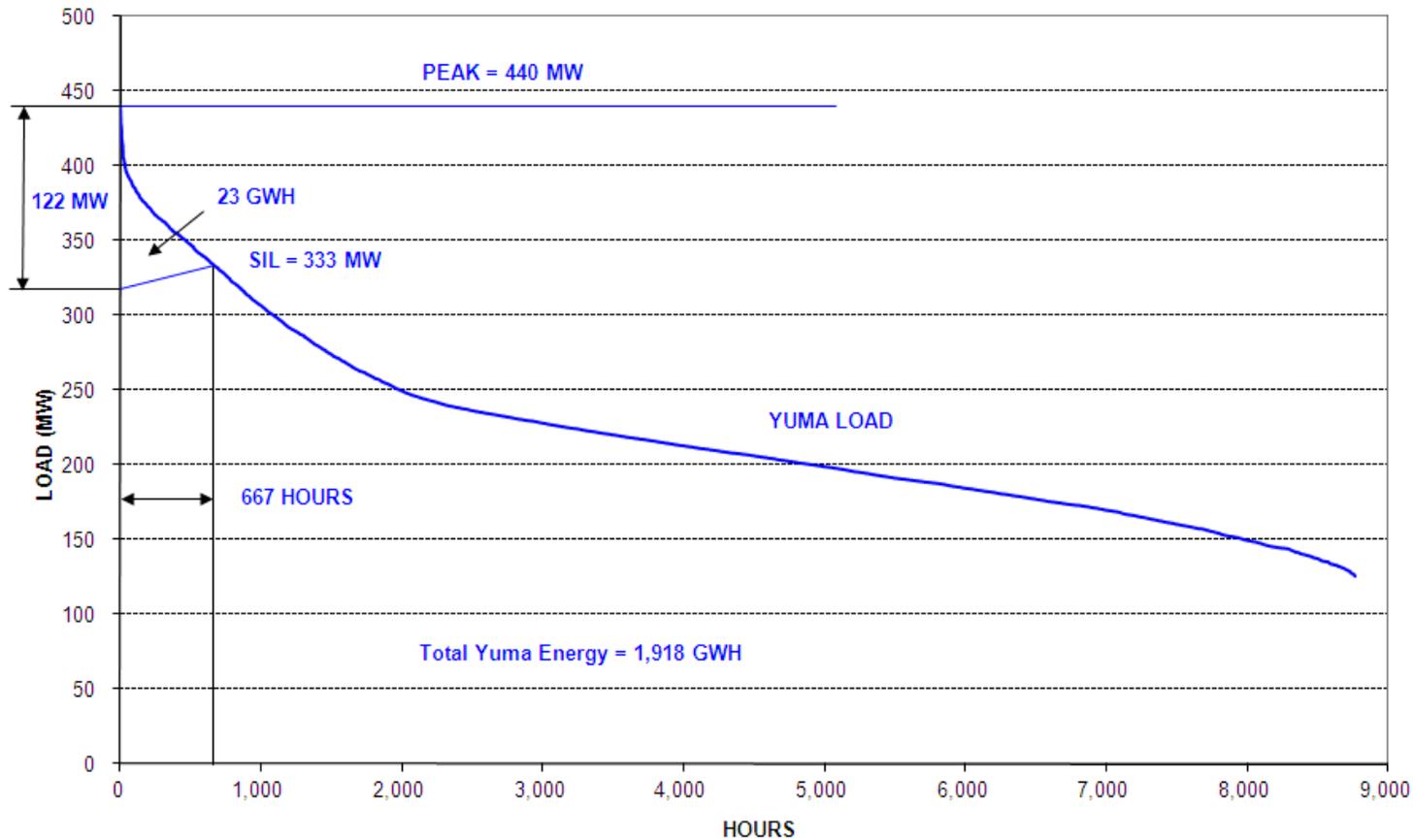
2014 Yuma Load Serving Capability

2014 Yuma Load Serving Capability



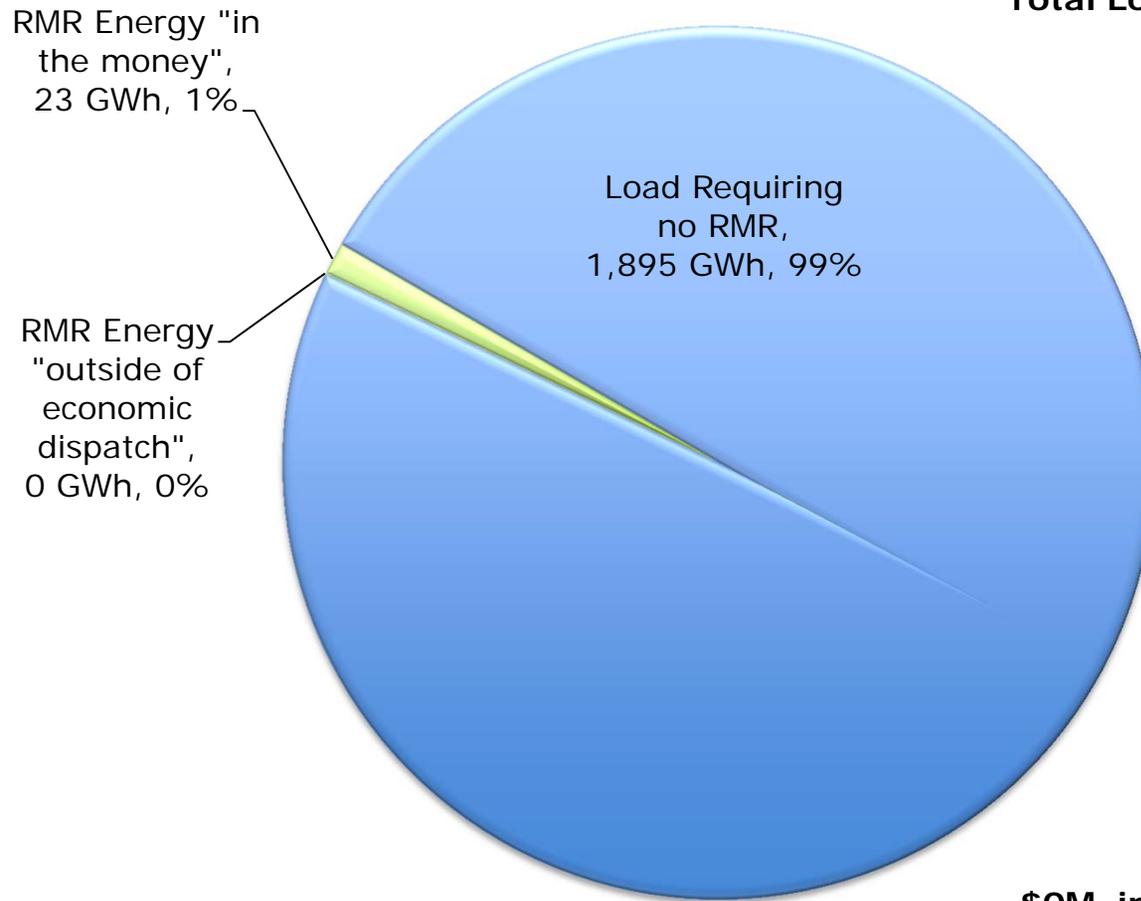
2014 Yuma Load Duration and RMR Conditions

YUMA LOAD DURATION & RMR CONDITION (2014)



2014 APS Yuma Energy

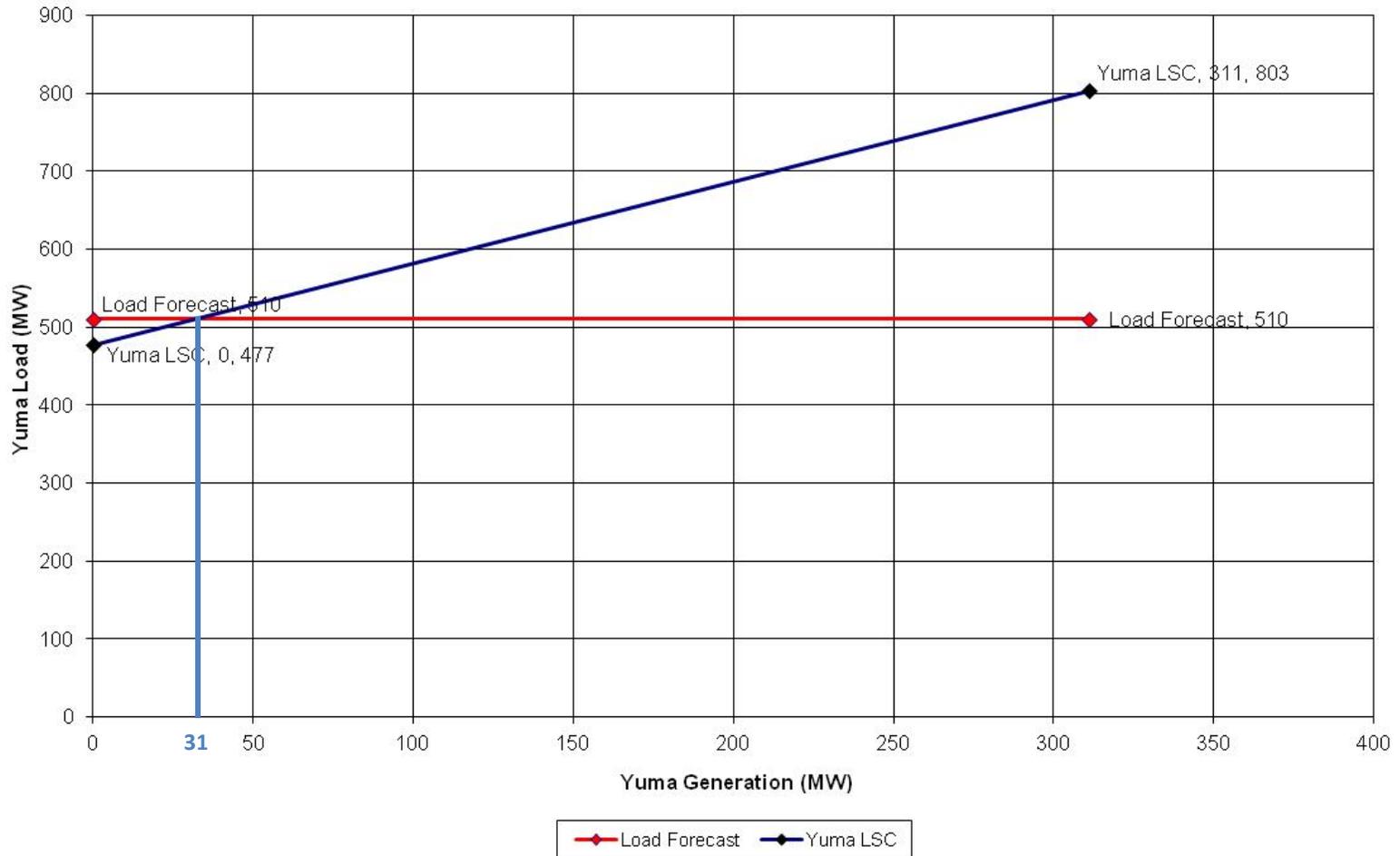
APS Yuma Area
Total Load = 1,918 GWh



\$0M incremental cost

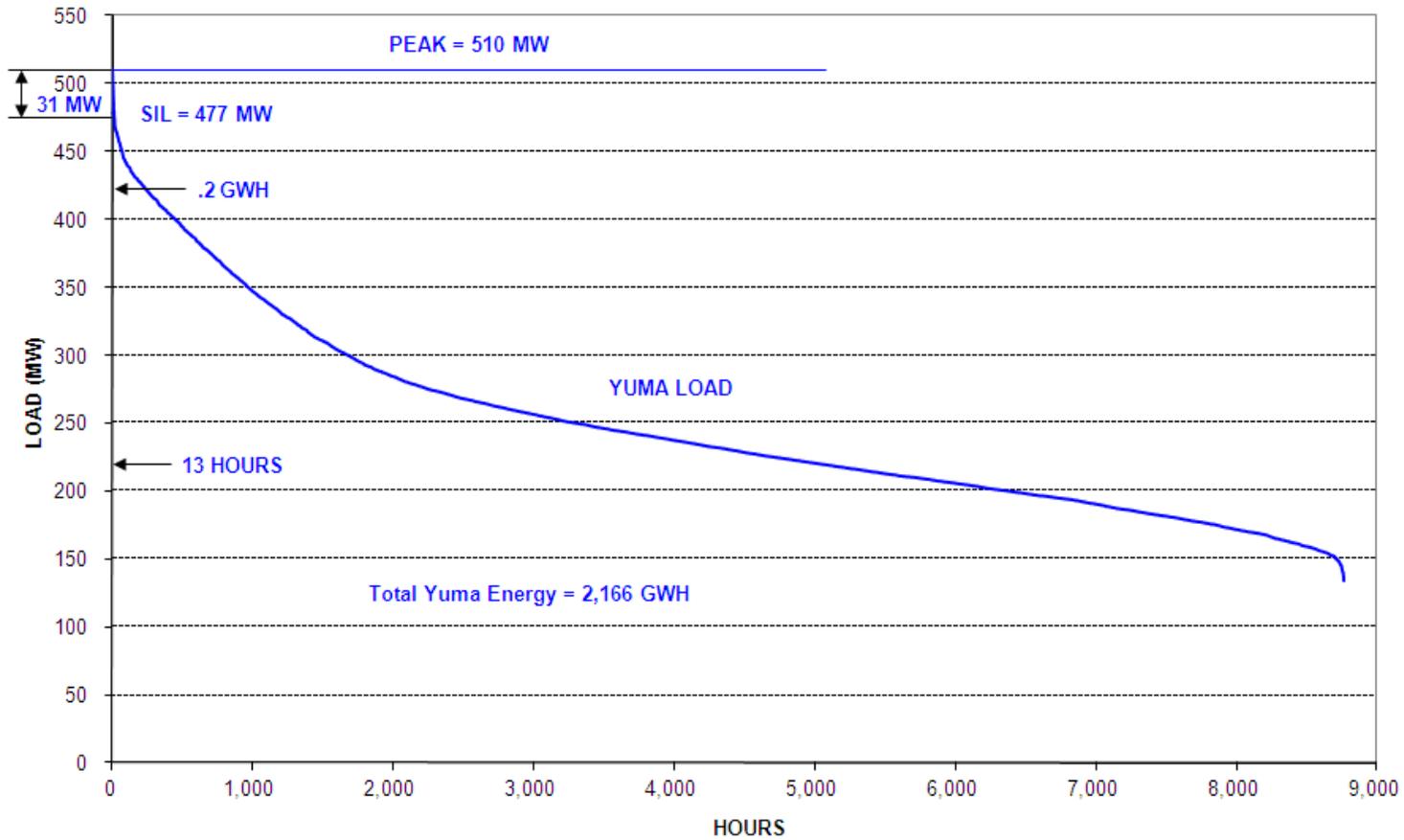
2021 Yuma Load Serving Capability

2021 Yuma Load Serving Capability



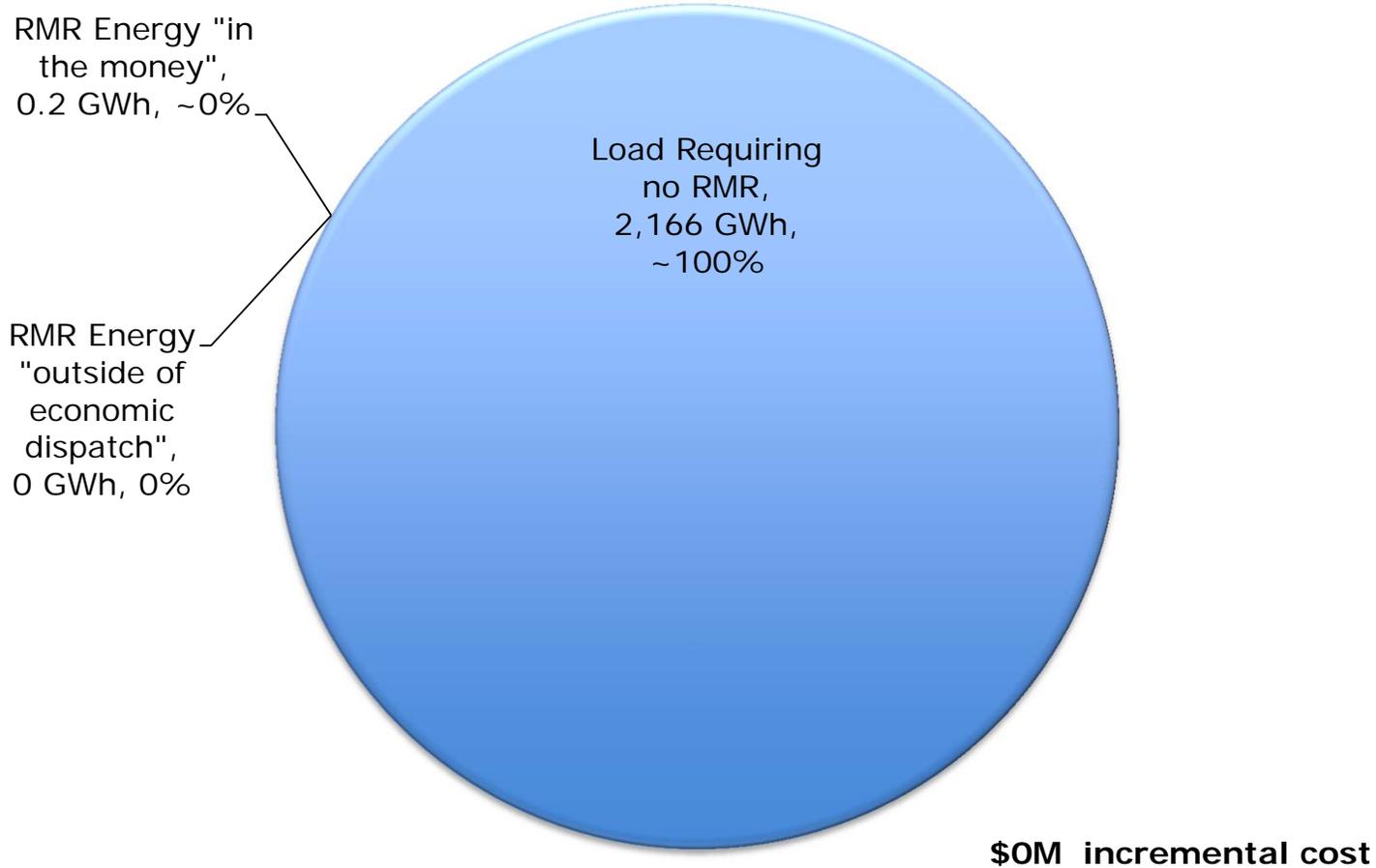
2021 Yuma Load Duration and RMR Conditions

YUMA LOAD DURATION & RMR CONDITION (2021)



2021 APS Yuma Energy

APS Yuma Area
Total Load = 2,166 GWh



Yuma RMR Observations

- Yuma load is expected to exceed import capability for 667 hours in 2014, and 13 hours in 2021
- Yuma could be constrained for 3 hours in 2014
 - Energy associated with these hours would be negligible
 - Cost to run local generation outside of economic dispatch is negligible
- All the RMR hours are dispatched “in the money” in 2021 - No additional cost to run local generation
- Transmission projects in excess of current plans are presently not cost justified