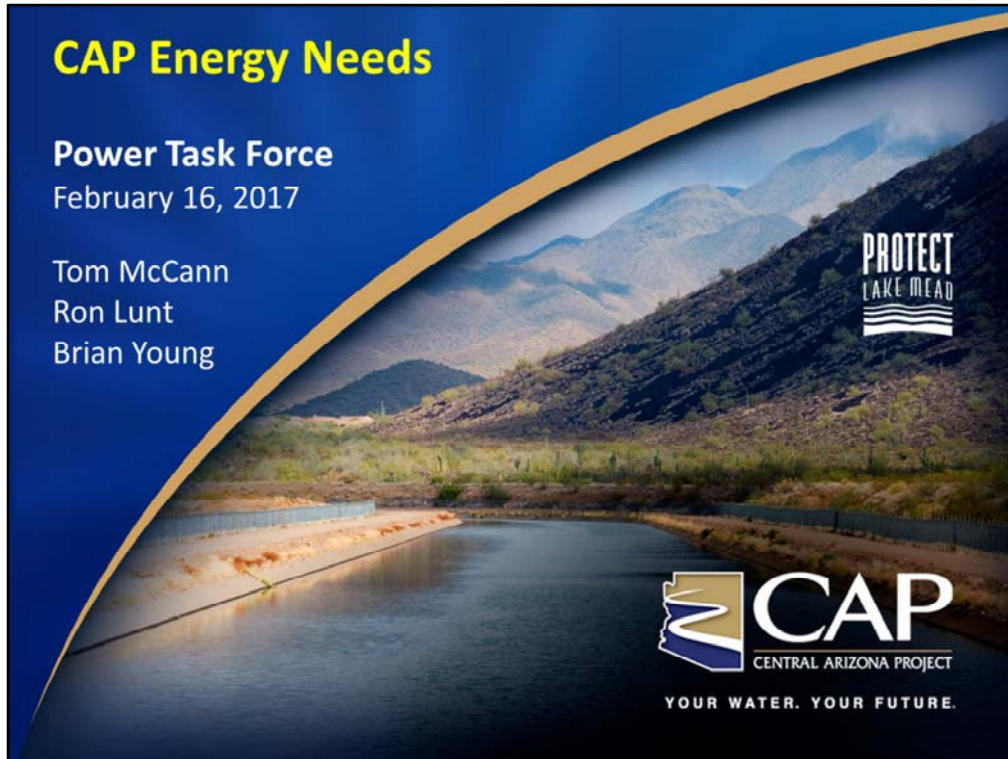


# Power Task Force Agenda Number 3.



**CAP Energy Needs**

**Power Task Force**  
February 16, 2017

Tom McCann  
Ron Lunt  
Brian Young

**PROTECT  
LAKE MEAD**

**CAP**  
CENTRAL ARIZONA PROJECT

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## CAP Energy Supply

- NGS historically supplied about 92% of CAP pumping energy needs
- Hoover provides approximately 5% of the energy requirements, but more importantly it provides the ramping, regulation, and reserves required for CAP operation
- New Waddell generation and the market provide the remaining requirements



As a metered subsystem of the Western Area Power Administration CAWCD is required to continuously match generation and load. This requirement is fulfilled through the use of the dynamic signal associated with the Hoover resource and is automatically adjusted every four (4) seconds. The challenge with the Hoover resource is that it has a very limited energy component; therefore, the CAP system would be extremely challenged to directly integrate large amounts of variable resources such as solar or wind.

In 2016 more than 20% of CAP load was served from market purchases as these displaced NGS energy during periods when market power was lower than the variable cost of generation (fuel cost) at NGS.

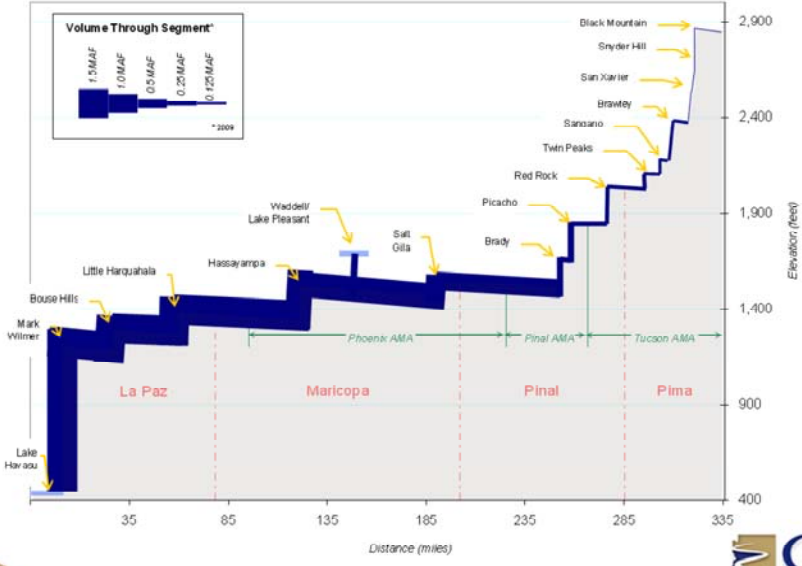
## CAP Power Management

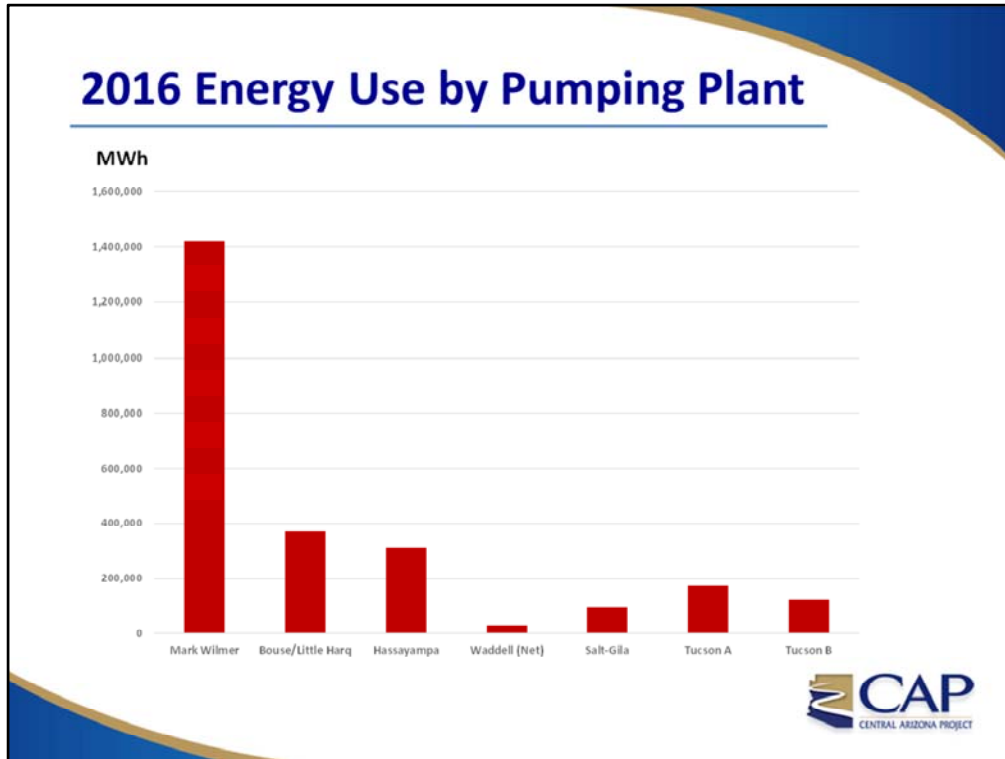
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- Lake Pleasant provides regulatory storage for CAP and seasonal pumping
  - Pump from Colorado River to fill lake in spring and fall when energy costs are lower
  - Release from lake in summer when energy costs are higher
- Storage in Reach 1 allows Mark Wilmer (Havasu) to shape pumping on daily basis



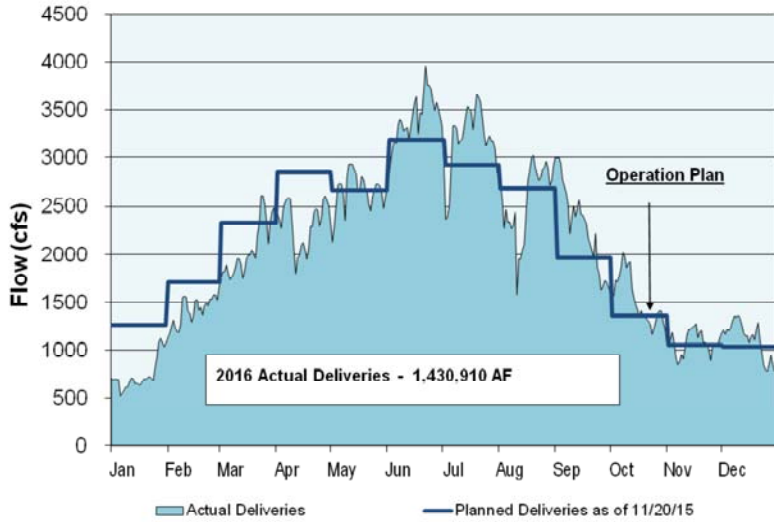
# CAP Elevation Profile



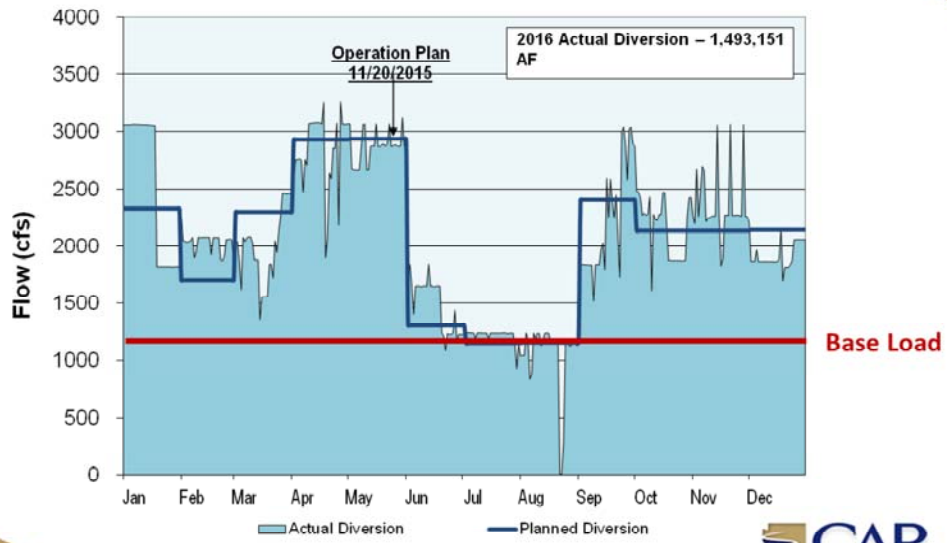


Mark Wilmer and the other western plants through Hassayampa comprise almost 85% of total CAP load.

# CAP 2016 Water Deliveries



# CAP 2016 Colorado River Diversions



## **CAP Base Load Power Needs**

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- CAP system downstream of Reach 1 is designed to operate at constant volume
  - Potential canal damage if water levels fluctuate
- CAP customers require deliveries 24/7
- Pumping volume must closely match customer deliveries in all canal segments at all times





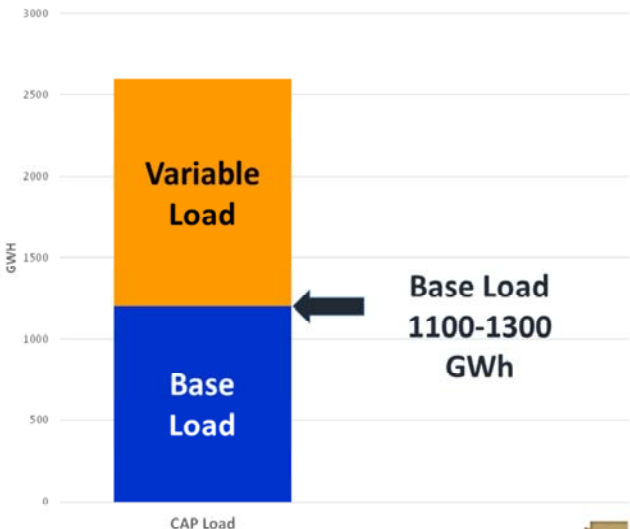
## **Havasu Pumping is Variable**

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- Reach 1 is oversized and designed to allow for fluctuating water levels
- Reach 1 provides operational storage for Mark Wilmer Pumping Plant
- MWPP pumping can be shaped daily and seasonally to take advantage of changes in the power market



# CAP Base & Variable Loads



## Summary

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- **Base Load** is more constant, requiring more certain resource supplies. CAP pumping plants could be served in geographic groups or as one aggregate load.
- **Variable Load** at Mark Wilmer Pumping Plant offers daily and seasonal flexibility, allowing CAP to optimize pumping to lower energy costs. That load that may best be captured by separate, market-based supplies.

