

Arizona's Cooperatives Summer Preparedness Report to ACC

Presented by Arizona G&T Cooperatives

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Who are the Arizona G&T Cooperatives?

- Arizona Electric Power Cooperative (AEPCO) is the not-for-profit Generation and Transmission Owner & Provider for 3 All Requirements Member (ARM) and 3 Partial Requirements Member (PRM) Distribution Cooperatives.
- AEPCO and its Members serve a large geographical area—12 counties, numerous cities, and 8 tribes – 150,000 meters and 350,000 member-consumers.



- Arizona Electric Power Cooperative and Southwest Transmission Cooperative merged into a single entity in 2016. Arizona G&T (AZGT) refers to the collective of AEPCO's generation transmission functions, as well as Sierra Southwest Cooperative Services.

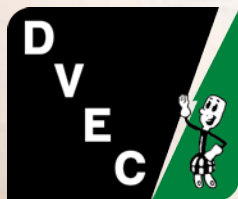
Distribution Cooperatives Represented by AZGT

- G&T *All* Requirement Members:


Anza Electric Cooperative, Inc.

A Touchstone Energy® Cooperative 

Anza, California



**Duncan Valley
Electric Cooperative, Inc.**

A Touchstone Energy® Cooperative 

Duncan, Arizona



A Touchstone Energy® Cooperative 


Pima, Arizona

Distribution Cooperatives Represented by AZGT (Cont.)

- G&T *Partial* Requirement Members:




**Sulphur Springs Valley
Electric Cooperative, Inc.**

A Touchstone Energy® Cooperative 

Sierra Vista & Wilcox, Arizona




A Touchstone Energy® Cooperative 

Marana, Arizona



electric cooperative

A Touchstone Energy® Cooperative 

Bullhead City, Arizona

Other AZ Cooperatives Included in AZGT's Report



Lakeside, Arizona

AZGT Member Cooperatives' Service Territories



Resource Providers' Services

- G&T Cooperatives
 - All Requirements Members receive all resource-related scheduling, trading and ancillary services under their All Requirements contracts.
 - PRMs need to contract for such services from G&T or third party providers.
 - For the summer of 2017, all PRMs will reside in the AZGT subsystem of Western Balancing Area with AEPCO as their Scheduling & Trading Agent.
 - Navopache receives all necessary resource-related services from TEP and is in the TEP Balancing Area.

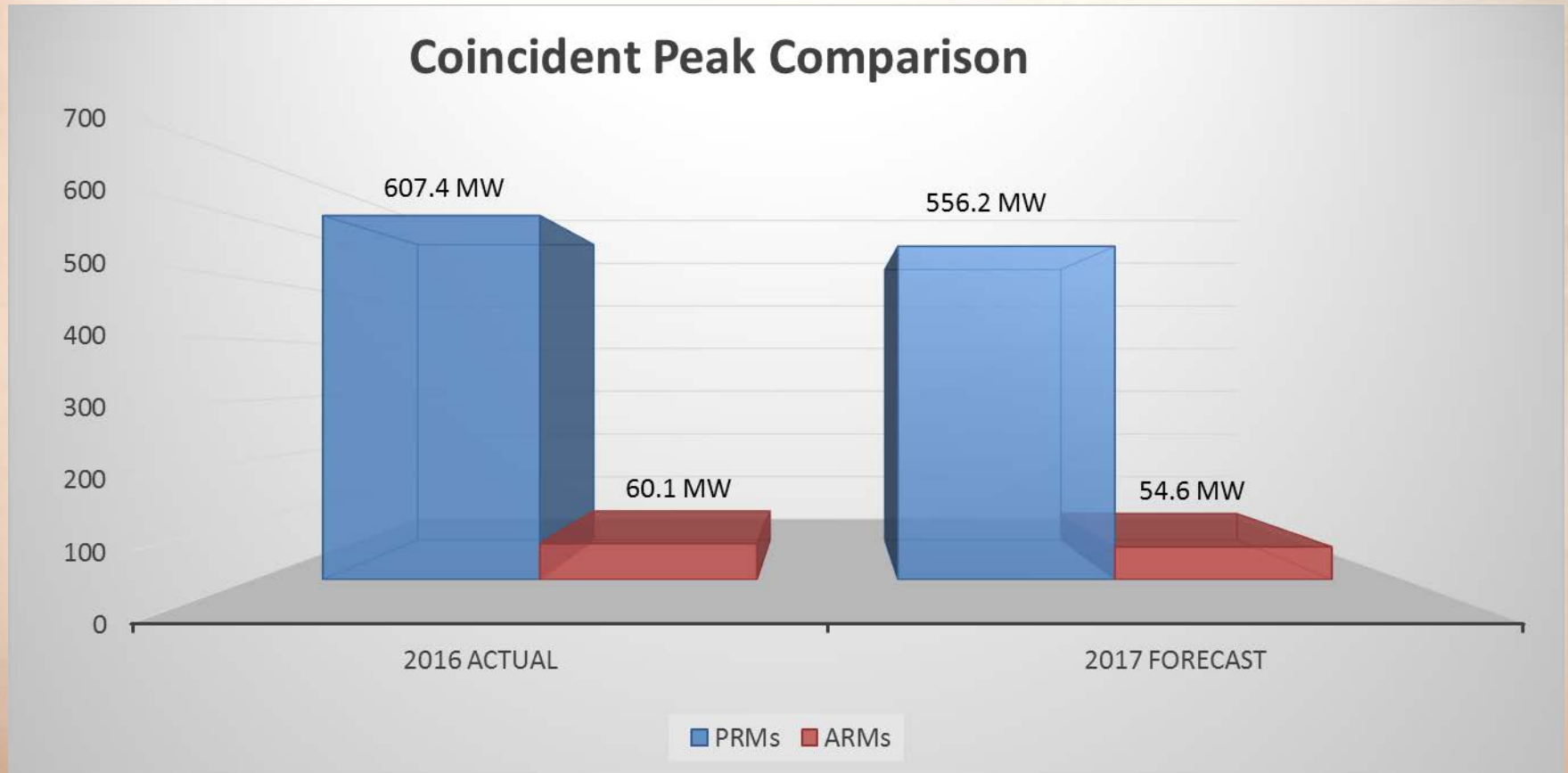
Peak Demand Summary

AEPCO has secured sufficient resources to meet the coincident peak demand for its ARMs and its allocated capacity obligation to each of its PRMs.

- Summer peak demand for AEPCO's ARMs for 2017 is projected to be 54.6 MW, in comparison with 2016's actual peak of 60.1 MW.
- Summer peak demand for AEPCO's PRMs for 2017 is projected to be 556.2 MW, in comparison with 2016's actual peak of 607.4 MW.
- PRMs supplement their Allocated Capacity (AC) in AEPCO resources in order to satisfy their summer peak load requirements. Additional resources and firm purchased power transactions are scheduled to fully meet PRM peak load requirements.

Navopache's projected summer peak load of 73 MW will be met by its 7 MW of federal hydro and the balance will be supplied by TEP as firm energy from TEP resources.

2017 Peak Forecast vs. 2016 Actual



Loads represented are as seen by AEPSCO at the transmission meter, and implicitly include resources behind that meter.

AZGT Resource Portfolio - 2017

AEPCO Owned/Contracted Resources* (Net Available Capacity - MW)

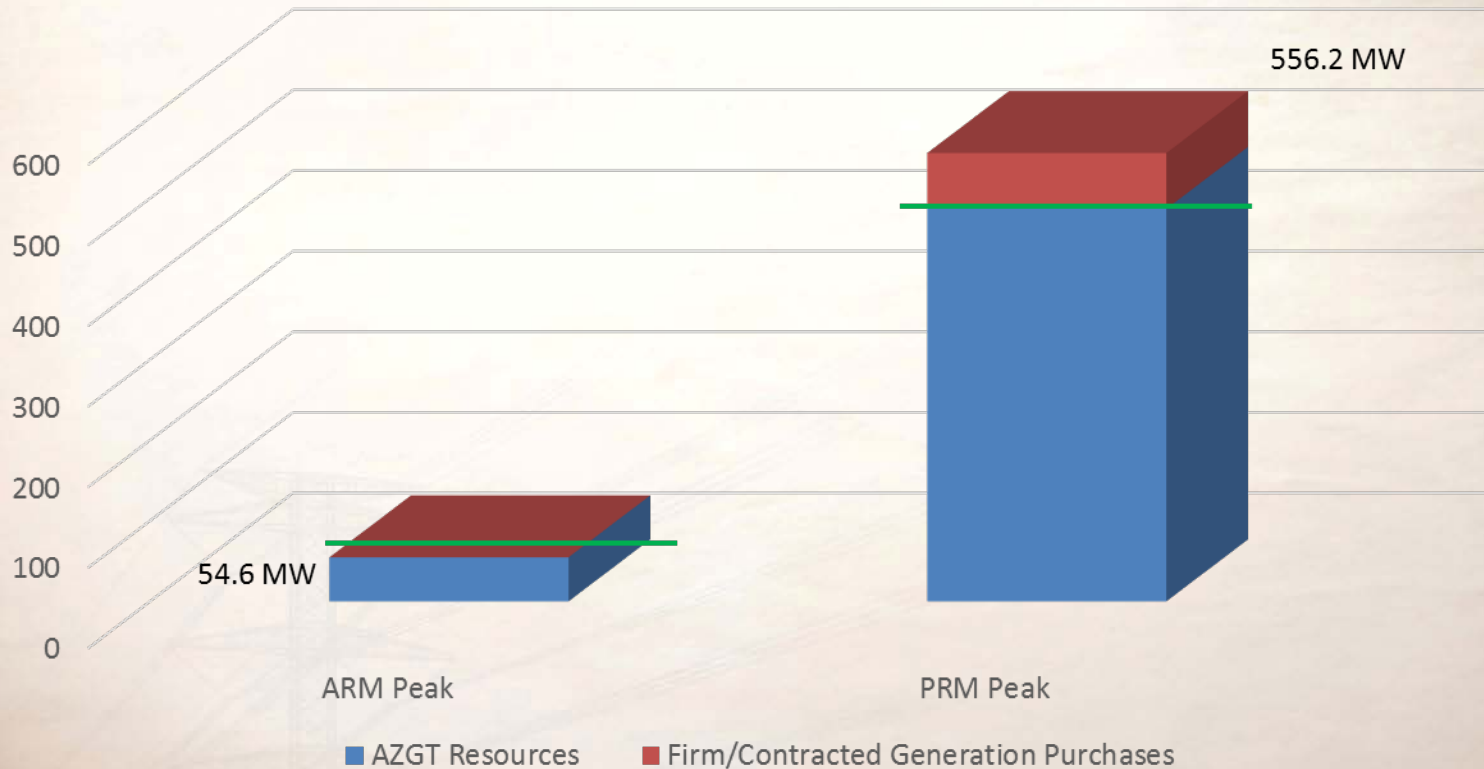
Apache Coal Generation	350
Apache Natural Gas Generation	205
Hydroelectric Purchase Capacity	31
Other Power Purchase Agreements	15
Apache Solar**	17
Total:	618 MW

*Excludes MW designated for losses and contingency reserves, as well as renewables located behind the transmission meter.

** Apache Solar begins July, 2017. Chart includes only resources/renewables owned by AZGT.

Summer 2017 Demand Forecast

Meeting 2017 Summer Peak Demand*



*Represents possible capacity mix for peak load service under normal operating conditions. Reported demand is as seen by AZGT, and is net of distribution cooperative solar, which is behind the transmission meter.

AZGT Reserves

- The Cooperative maintains an annually updated plan in case of the loss of its single largest hazard under peak load conditions.
 - For immediate response, AEPCO continues membership in the Southwest Reserve Sharing Group (SRSG).
 - For the event of an extended outage, AEPCO maintains:
 - Additional generation capacity used for operating reserves under normal conditions
 - Transmission Capacity to cover the largest unit outage
 - Additional arrangements with transmission counterparties for emergency market access
- These arrangements are sufficient to respond to forced generation outages or other potential service disruptions.



AZGT Fuel Summary

- Coal

- Guidelines are in place to maintain adequate fuel supply for full-load, prolonged operation.
- Coal inventory is currently and is expected to be at adequate levels per Cooperative guidelines.
- Coal supply and rail transportation contracts are in place to meet full requirements.

- Natural Gas

- AEPCO has contracted with Kinder Morgan/El Paso natural gas system for firm gas transportation to supply its Apache Station units.
- Transportation has been secured for both hourly peak usage and daily burn requirements.

AZGT Generation Preparedness

- Coal Unit Maintenance

- Units are regularly tested to peak capacity performance standards.
- In the Fall of 2016, Apache Steam Unit 2 underwent a minor outage in which the unit was inspected and serviced. In September of 2017, Unit 2 will have another outage to convert the unit to natural gas.
- Unit 3 is currently on outage to install low-NOx retrofits, as well as a complete inspection of the steam turbine.



- Gas Unit Testing

- All gas units have been recently tested to ensure startup capability and readiness for operational and reserve obligations.
- ST1 completed a maintenance overhaul in which low-NOx burners were upgraded and extensive capacity tests were performed.

AZGT Transmission Overview



- 622 Miles of Transmission Line
- 26 Substations
- Transmission service agreements in place to meet all members load requirements:
 - WAPA
 - APS
 - SCE
 - Point-To-Point Contracts
- Backup and Contingency Agreements
 - APS
 - TEP

AZGT Transmission System Summer Preparation

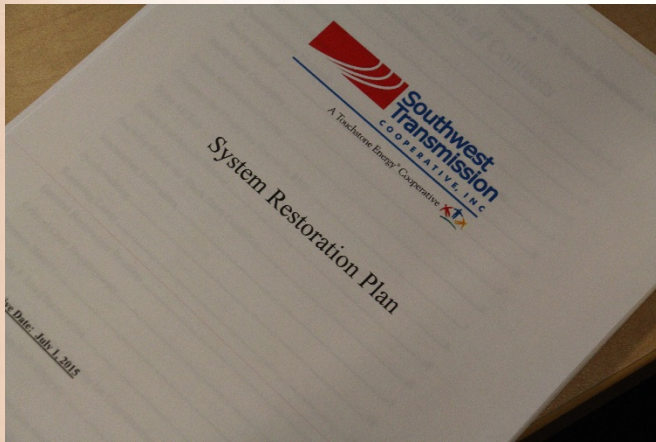
- Transmission and substation maintenance and assessment activities include:
 - Scheduled preventative maintenance prior to summer loads
 - All power circuit breakers are tested on an annual basis to ensure functioning.
 - Transformer setting adjusted for optimal voltage levels.
 - Focused infrastructure inspection and vegetation management activities
 - Inspection of all transmission lines performed biannually.
 - Every substation is inspected every 90 days.
 - In Winter and Spring, special attention is given to high vegetation areas to avoid contact with transmission infrastructure.
 - In 2016, AEPCO completed a five year transmission wood pole ground line inspection program- testing pole strength and durability. Identified damaged poles were replaced before the start of each summer season.
 - Partnership amongst cooperatives and other utilities
 - Sharing of replacement transmission inventory for summer storm damage.
 - Participation in joint-planning and reliability working groups.



Recent AZGT Transmission System Upgrades

Upgrade/Improvement	Substation	System Benefit
Capacitor Bank Installation	Three Points San Rafael Butterfield	Voltage Stability
Breaker & Relay Upgrades	Marana SaddleBrooke Ranch	System & Fault Reliability
Rebuilt Grounding Transformer	Greenlee Substation	System Reliability
RTU Installations/Smart Relays	All AZGT Substations	Grid Intelligence & Control

AZGT Operational Preparedness



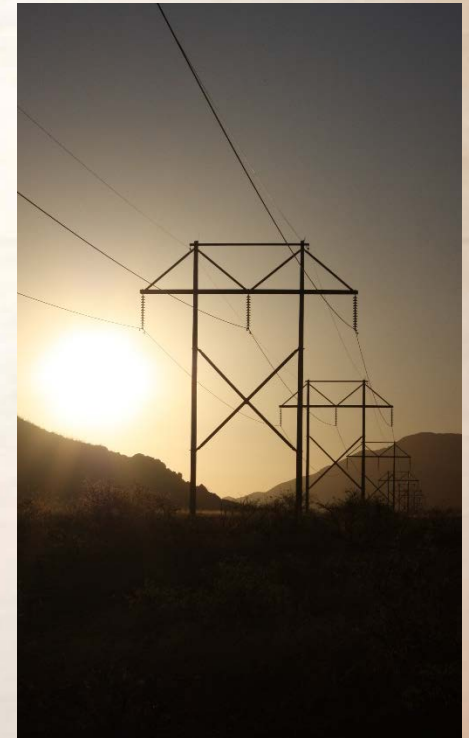
- In March/April of 2017, in addition to other regular training, all system operators participated in the Peak Reliability Coordinator regional restoration training.
- Updated G&T Joint Generation Contingency Reserve Plan for outage of largest generator.

Major Operational Improvements

- 2015**
 - Completed WECC Audit of operations with *zero* violations.
- 2016**
 - Added System State Estimator to EMS System.
 - Upgraded Remote Terminal Units at substations.
- 2017**
 - Added Real-Time Contingency Analysis (RTCA) to EMS System.

Summary of 2017 Summer Preparedness

- Existing resources, supplemented by firm purchases, will be sufficient to meet forecasted demand and energy needs.
- Fuel supply and transmission are in place to meet AEPCO's peak obligation.
- Operationally, AEPCO is well prepared and contingency plans and more than adequate reserves are in place for emergencies.
- Transmission system is well-maintained and ready to serve the load of ARM and PRM Members.





Questions?