Arizona Public Service Company
2017 Summer Preparedness

Arizona Corporation Commission

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Presenters

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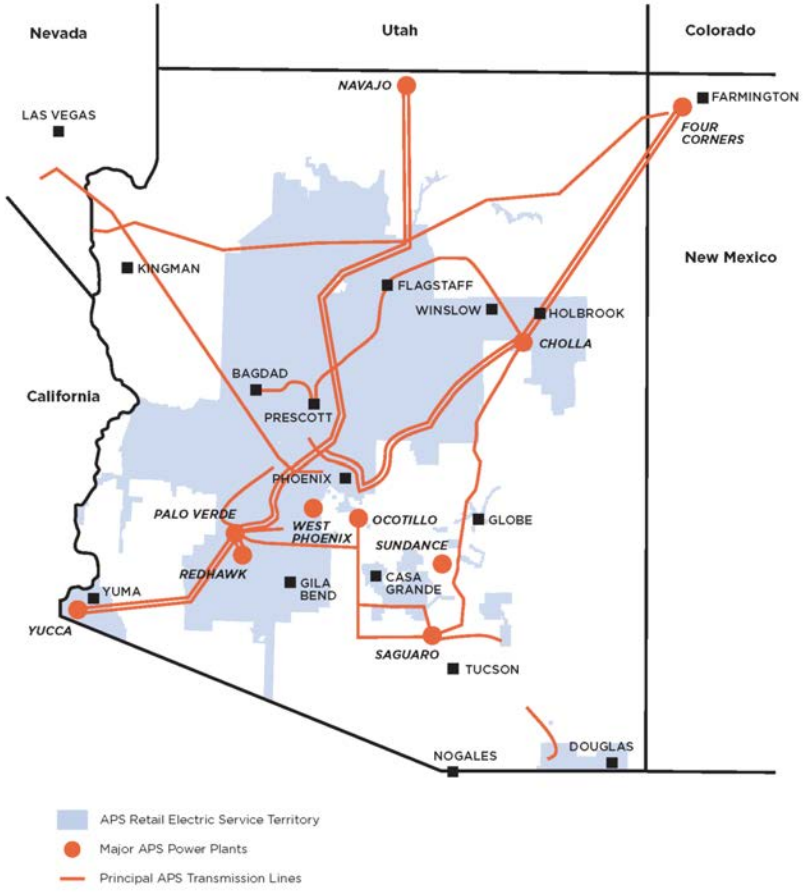
APS 2017 Summer Readiness Overview

- Generation resources, fuel supplies and transmission capacity in place to meet reliably customer demand
  - 2017 expected peak of 7,023 MW
- Emergency response improvements and improved integration with external agencies
- New and improved technology and communication channels in place for customers
- Additional system improvements and maintenance efforts on track for summer

APS Service Territory

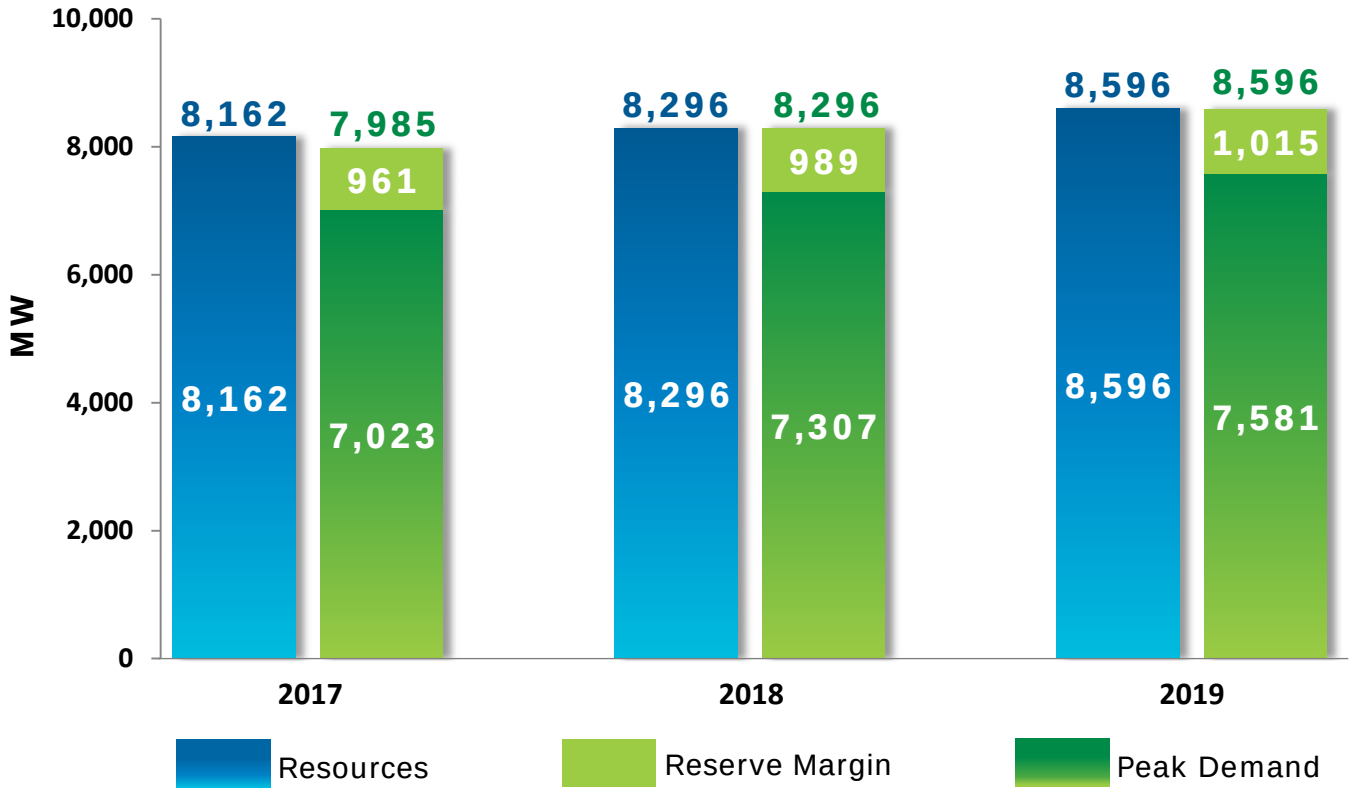
- 11 of Arizona's 15 counties
- 34,646 square mile service area
- Serving about 2.7 million people
- 430 substations, 300,000 transformers, more than 550,000 poles and structures
- More than 35,000 miles of transmission and distribution lines



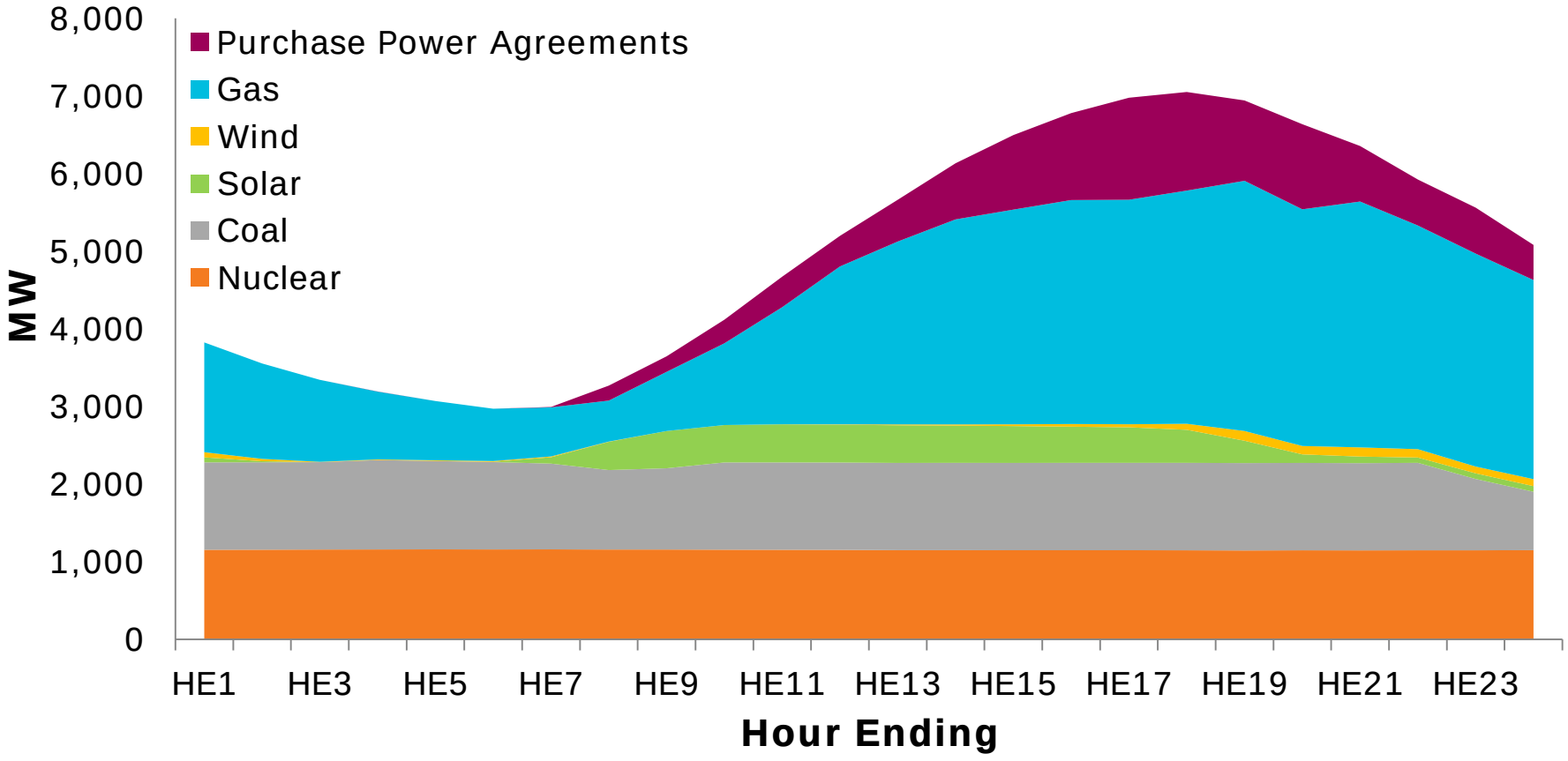
2017 - 2019
Peak Resources and Demand – System

Planned reserve margin to manage uncertainties

- Unplanned unit outages
- Varying levels of customer participation in resource standards
- Resource additions needed in 2017 and beyond to maintain 15% reserve margin minimum

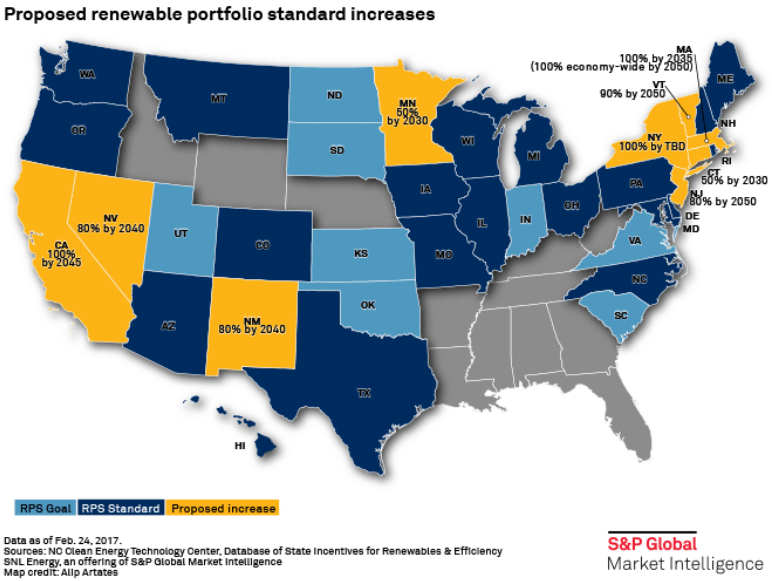


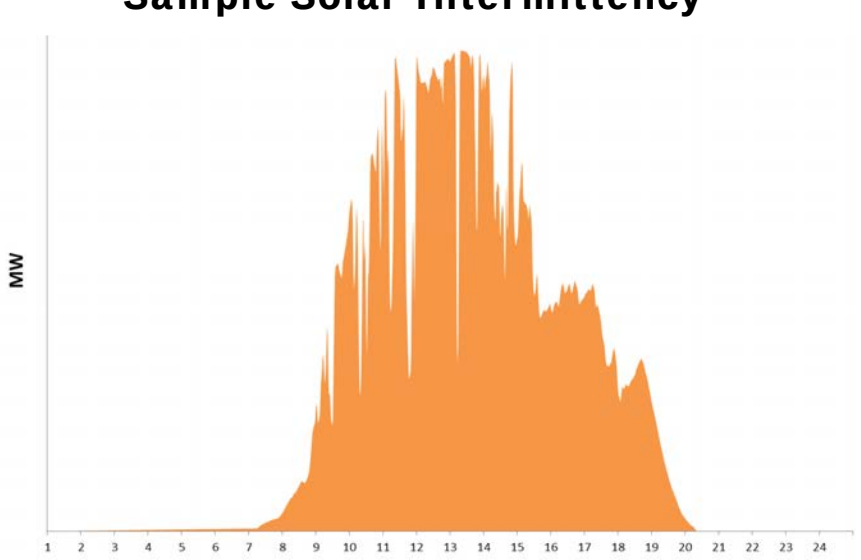
Peak Day Generation Stack June 19, 2016



Changing System Resources and Summer Reliability

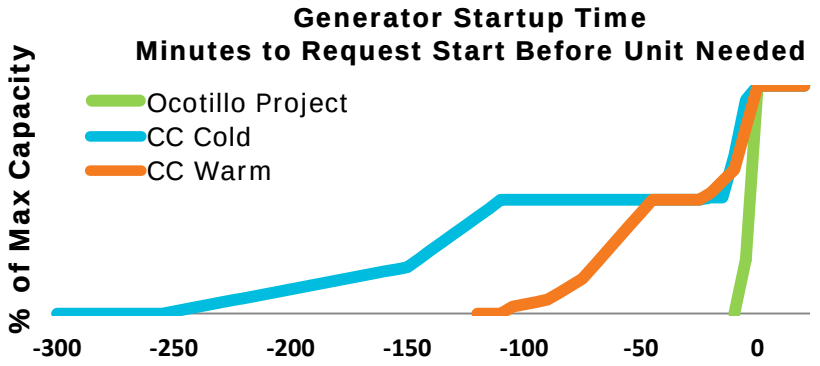
- Regional state renewable mandates are increasing solar resources throughout the west
- Solar intermittency is increasing the need for flexible generation

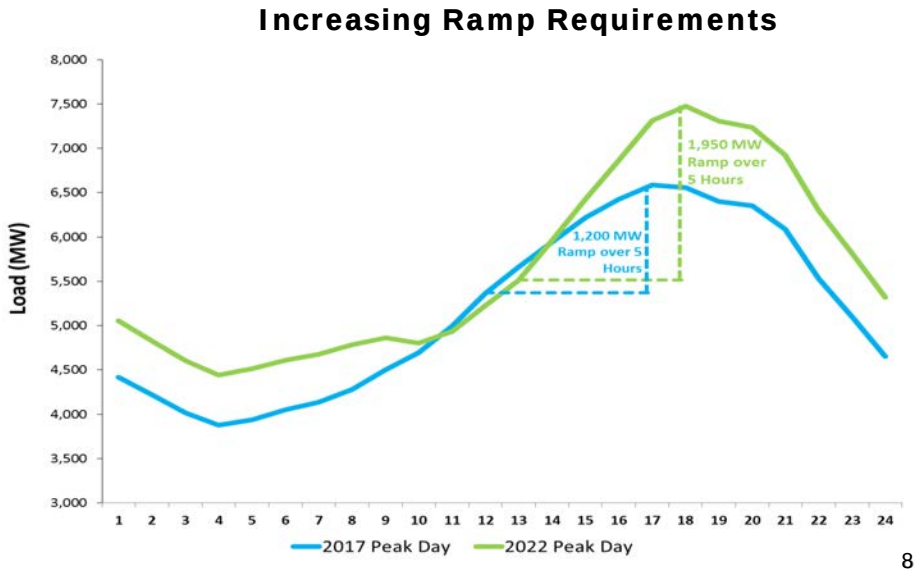




Flexible Natural Gas Resources Will Provide Affordable Near-Term Reliability

- Increasing deployment of solar resources drives the need for fast-starting and quick-ramping capacity
- Flexible resources can be used for both summer capacity needs as well as non-summer net load management
- APS will continue to use EIM to enhance customer economics





Microgrids and Storage Solutions

Microgrids

- Yuma Marine Corps Air Station Microgrid has responded to 10 regional grid events to date
- Provides autonomous frequency response
- Full output in less than 20 seconds

APS Storage Projects

- APS pilot storage deployments available for support throughout summer months allowing for performance evaluation
  - Solar Power Partners (SPP) – Two batteries (2 MW/2MWh each)
  - Solar Integration Study (SIS) – Ten batteries (20 kW/20kWh)

2017 Available Generation Resources At Peak

Fuel Source	Capacity (MW)
Gas Combined Cycle	1,852
Coal	1,672
Gas/Oil CT, Steam (504 MW Quick Start)	1,254
Long-Term Contracts (Gas Tolling)	1,235
Nuclear	1,146
Renewables (nameplate 885 MW)	514
Incremental Rooftop Solar (nameplate 180 MW)	15
Microgrid (Quick Start)	33
Demand Response	18
Short-Term Purchase	325
Total	**8,064**

APS has adequate fuel supply for all of its generating facilities

- **Palo Verde**
  - Fuel sourced from multiple suppliers
  - 100% of 2017 fuel sourced
    - Spring Outage, all fuel is on site
    - Fall Outage, all fuel components procured, fabrication on normal schedule
  - 100% of fuel requirements contracted through 2018
  - Overall station capacity factor over 93% in 2016
- **Other Conventional Generation**
  - Fuel contracts in place for all other APS generating facilities

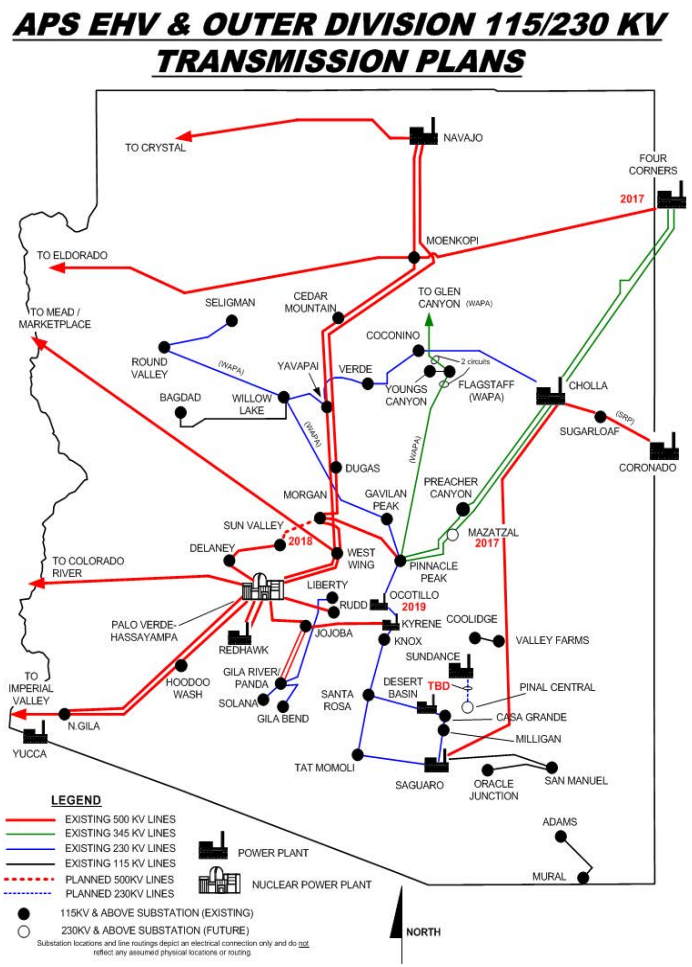
Summer Storms of 2016

- APS replaced 150 poles following July 29, 2016 storm
- Due to hotter weather, 33% more transformers replaced than average
- West Valley experienced the highest storm impact

Liberty to Panda 230kV Line Storm Damage

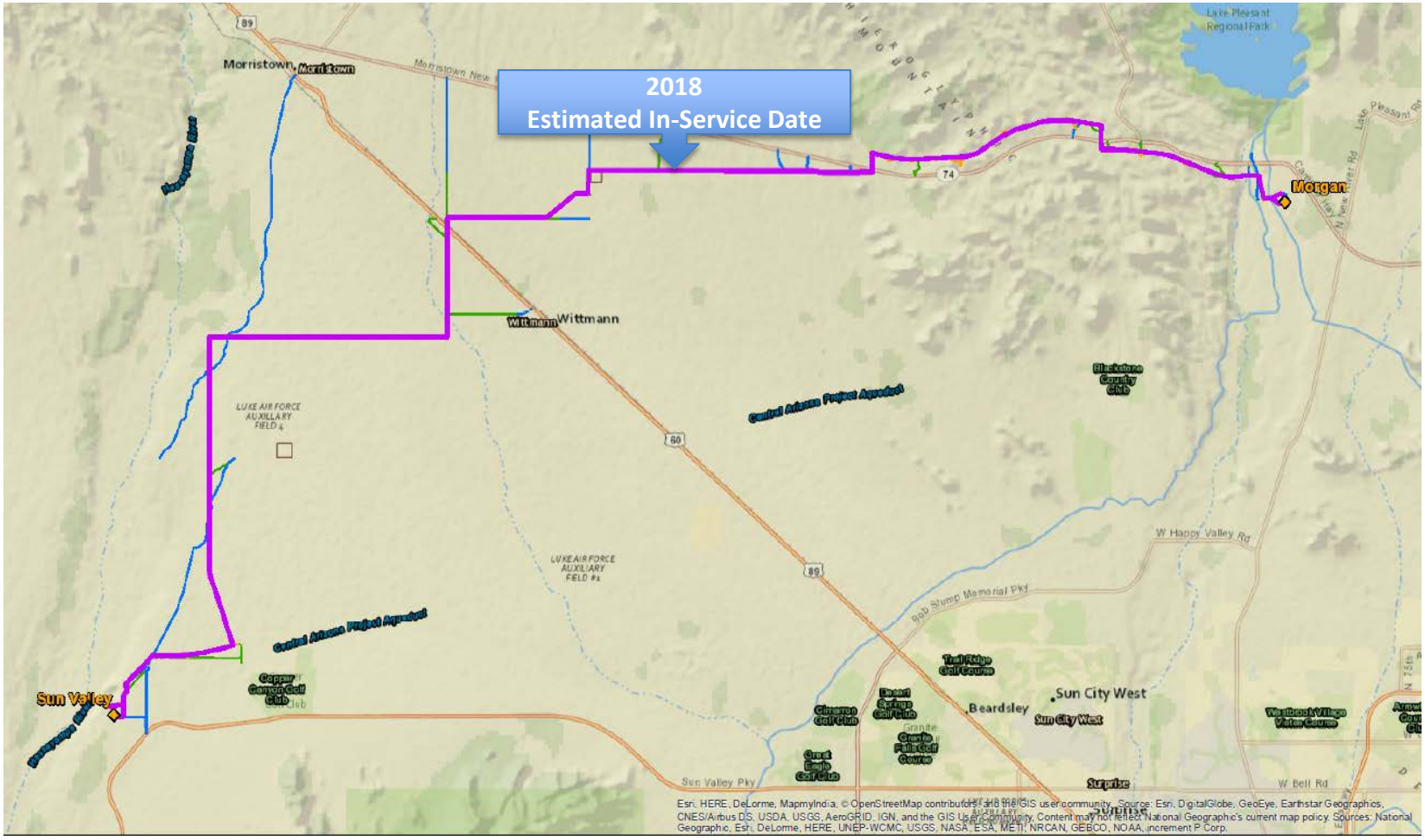
Transmission Planning

- Significant amount of coordination occurs for the transmission system
- Situational awareness of the transmission grid within the western interconnect has improved
- Access to markets is an important factor in managing supply contingencies and bringing new resources to load



Transmission Improvements

Morgan – Sun Valley 500kV Line



Planned Reliability Activities

Category	Activities
System preparation	• Line patrols and tower inspections • Predictive and preventative maintenance programs • Transmission peak load studies • Daisy Mountain substation, serving Anthem area, projected in service May 23, 2017
Vegetation management	• Tree trimming on cycle for all transmission circuits and distribution feeders • Wildfire prevention training with APS crews and first responders • Defensible Space Around Poles (DSAP) Program

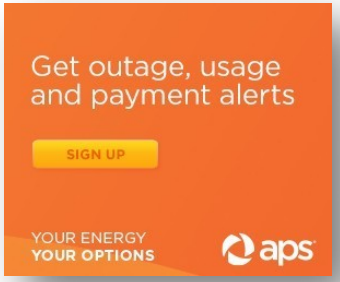
Planned Reliability Activities

Category	Activities
External Emergency Preparedness and Response	• Contacts and process updated for mutual assistance with neighboring utilities (SRP & TEP) • Coordination of summer operating study with nearby utilities • Fire and emergency management coordination with various Federal, State, and Local agencies.
Internal Emergency Preparedness and Response	• Black start system restoration drill • Electric Load Curtailment Plan filed with ACC • Incident Command System training • Operations 101 for media and customer care teams

Customer Service and Technology Solutions Available 24x7

People

- Associates available 24/7 to handle outage and electric emergency calls
  - Leveraging of over 50 at home associates when needed for larger storms
- Correspondence assistance with customer specific inquiries on social media



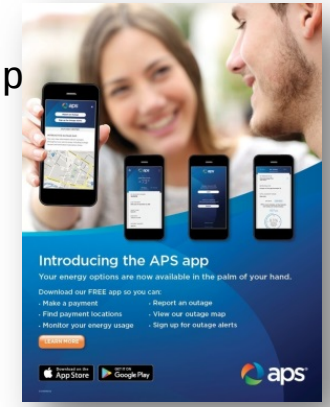
Alerts and notifications campaign

Process

- Distribution Operation Center (DOC) listening to customer calls to continue our efforts to strengthen communication between Customer Operations and DOC
- Ongoing marketing efforts to promote outage map, outage alerts, mobile app and social media

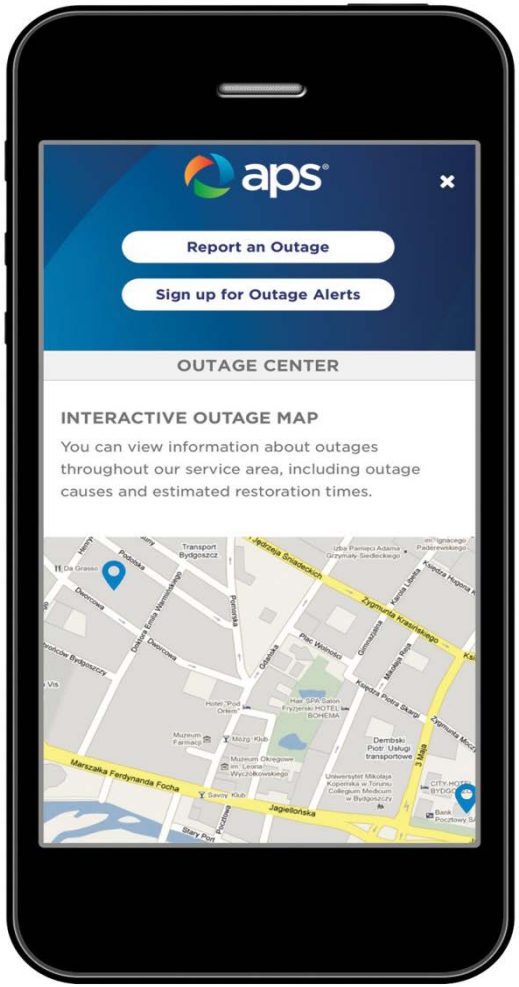
Technology

- Launch of Advanced Distribution Management System(ADMS) to report outages
- Improved Interactive Voice Response (IVR) experience
- Outbound dialer utilized for longer duration outage updates



Mobile app campaign

Digital tools to help customers manage usage



APS mobile app

- Create transparency in-usage and demand information

Notifications and alerts center

- Alert customers via text and email set to their threshold preferences
  - Overall energy usage
  - Peak usage alert
  - Payment alert
  - Outage reporting and map

Summary

- APS has adequate generation resources, fuel supplies and transmission capacity in place to reliably meet customer demand
- APS has made improvements to its emergency response processes and has improved integration with external agencies
- APS is prepared with new and improved technology and communication channels for its customers
- APS's additional system improvements and maintenance efforts are on track and progressing