

Arizona Public Service Company 2016 Summer Preparedness

Arizona Corporation Commission
April 28, 2016



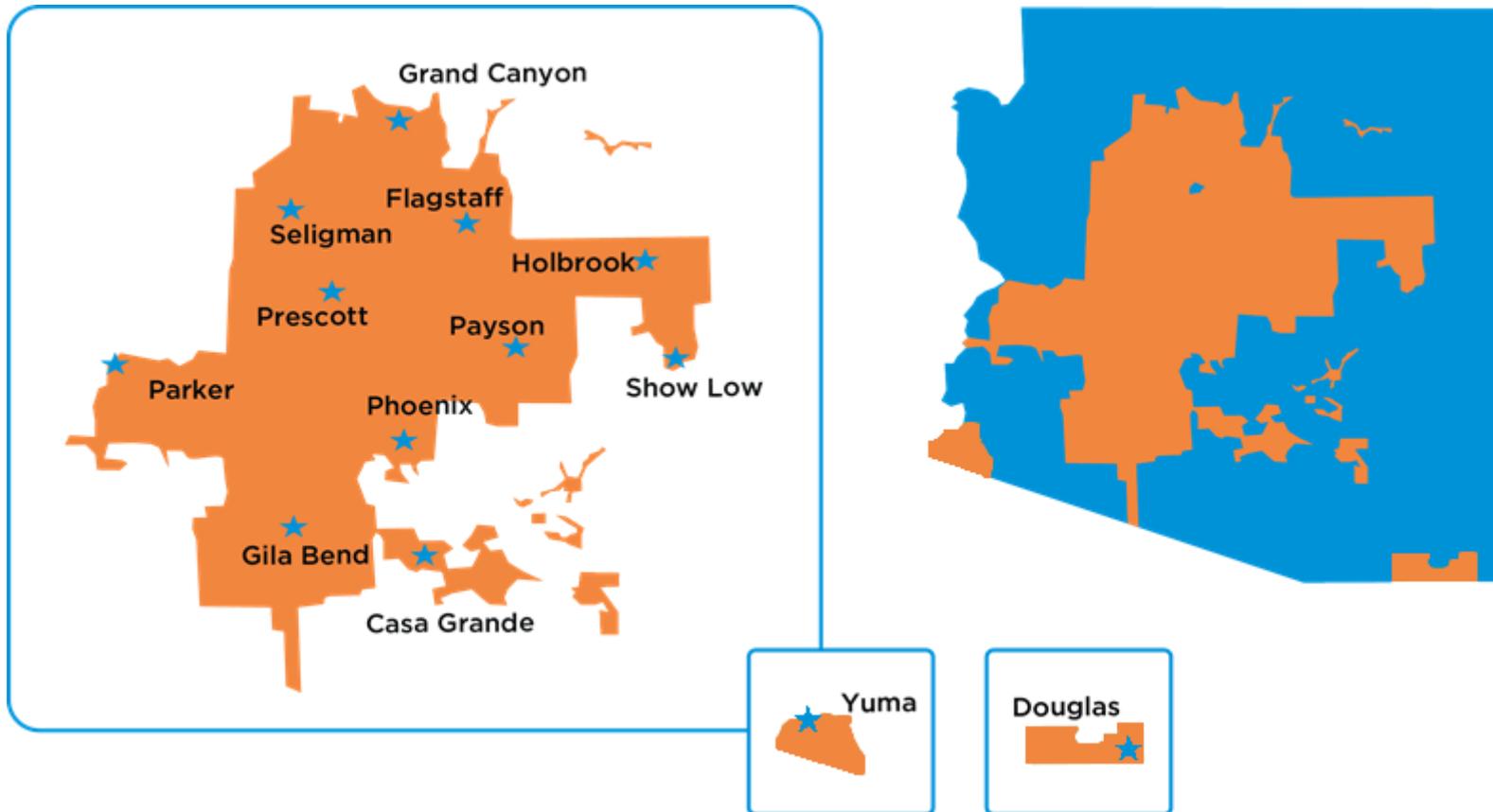
Presenters

- **Jim Wilde**
Director, Resource Planning
- **Jacob Tetlow**
General Manager, Transmission and Distribution
Operations and Maintenance

Agenda

- Changing Market Conditions
- Loads and Resources
- Fuel Supplies
- Summer of 2015
- Transmission and System Improvements
- Reliability Activities & Vegetation Management
- Emergency Preparedness
- Customer Outreach and Communication
- Summary

APS Service Territory

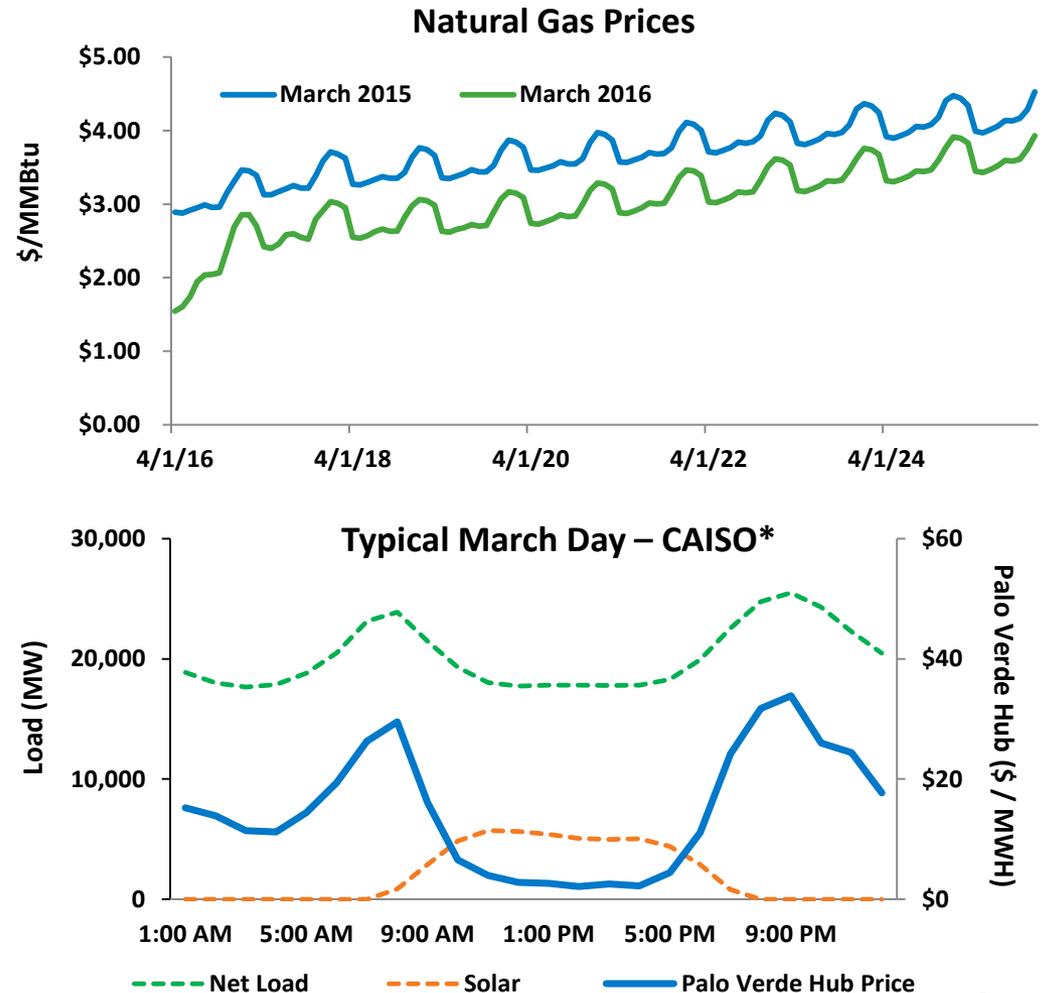


APS Service Territory Statistics

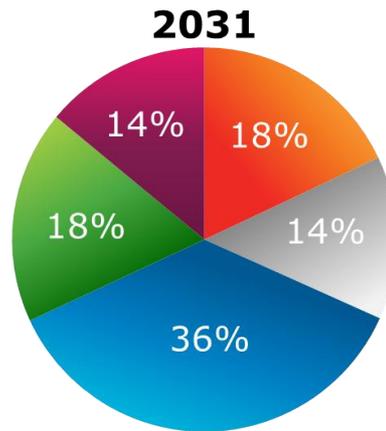
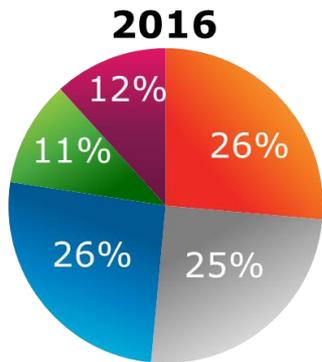
- 11 counties
- 34,646 square mile service area
- 1.2 million customers
- 430 substations
- 29,148 distribution line miles
- 6,068 transmission line miles
- 65 generation units

Changing Market Conditions

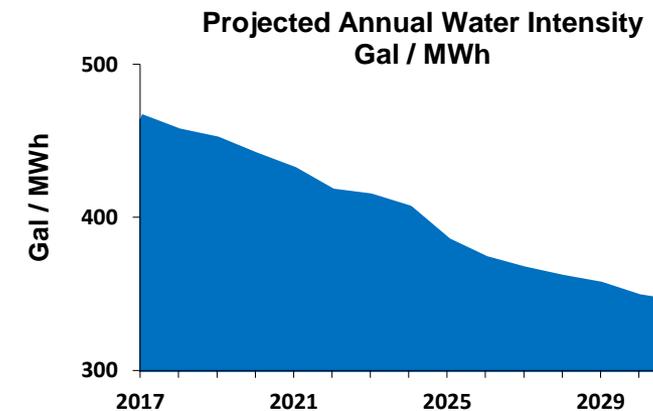
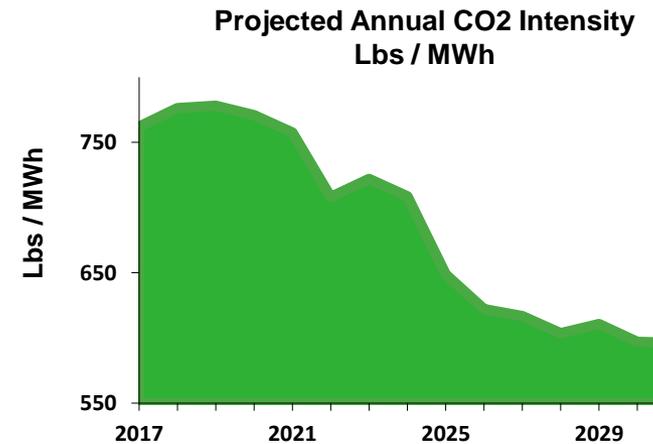
- Lower natural gas pricing reflects abundant supplies of the fuel source
- As more solar is added to the region, wholesale market price shapes have changed
- As load shapes and power markets evolve, APS will need to add more dispatch flexibility (like Ocotillo) to integrate increasing levels of renewable energy
- All-source RFP issued March 11, 2016 seeking flexible capacity



APS – Sustainable Planning Diverse Energy Mix



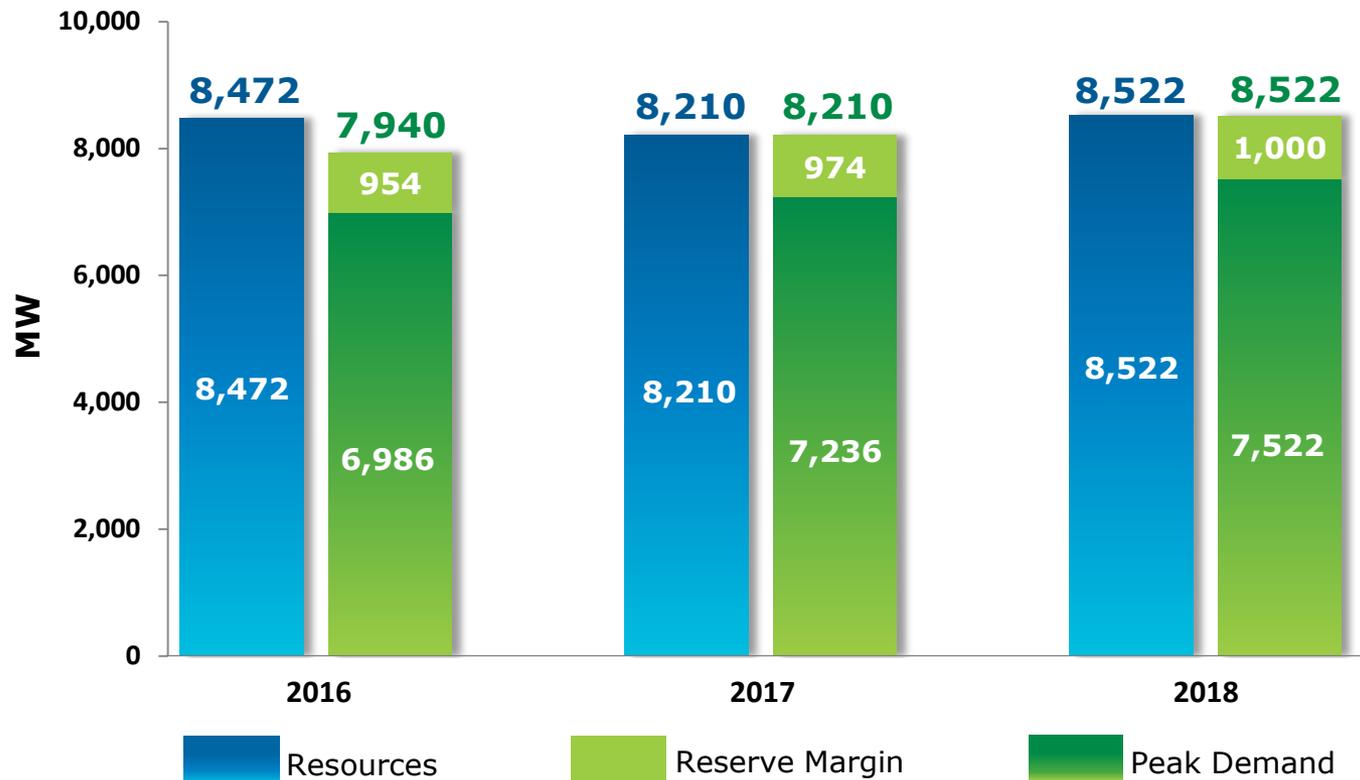
- Over 50% of energy growth planned to be supplied by zero emission resources
- Growth in natural gas generation to meet peak demand and integrate renewable energy resources



2016 - 2018 Peak Resources and Demand - System

Planned reserve margin to manage uncertainties

- Load forecast uncertainties (weather, economy)
- Unplanned unit outages
- Varying levels of customer participation in resource standards
- Resource additions needed in 2017 and beyond to maintain 15% reserve margin

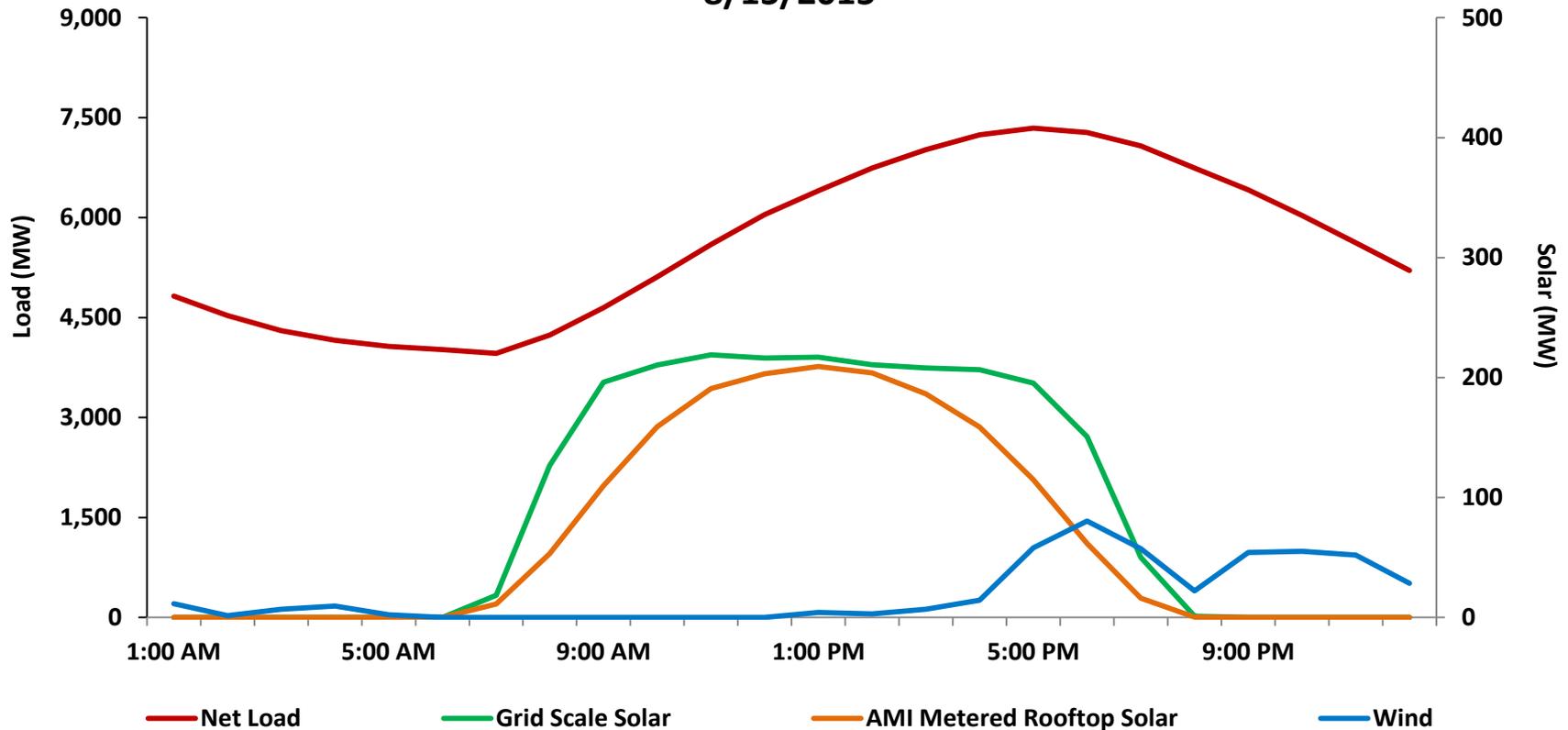


2016 Total Generation Resources

Fuel Source	Capacity at Peak (MW)
Nuclear	1,146
Coal	1,672
Gas Combined Cycle	1,852
Gas/Oil CT, Steam	1,254
Long-Term Contracts	1,911
Renewables (nameplate 804 MW)	500
Incremental Rooftop Solar (nameplate 115MW)	28
Incremental Energy Efficiency	109
Total	<hr/> 8,472

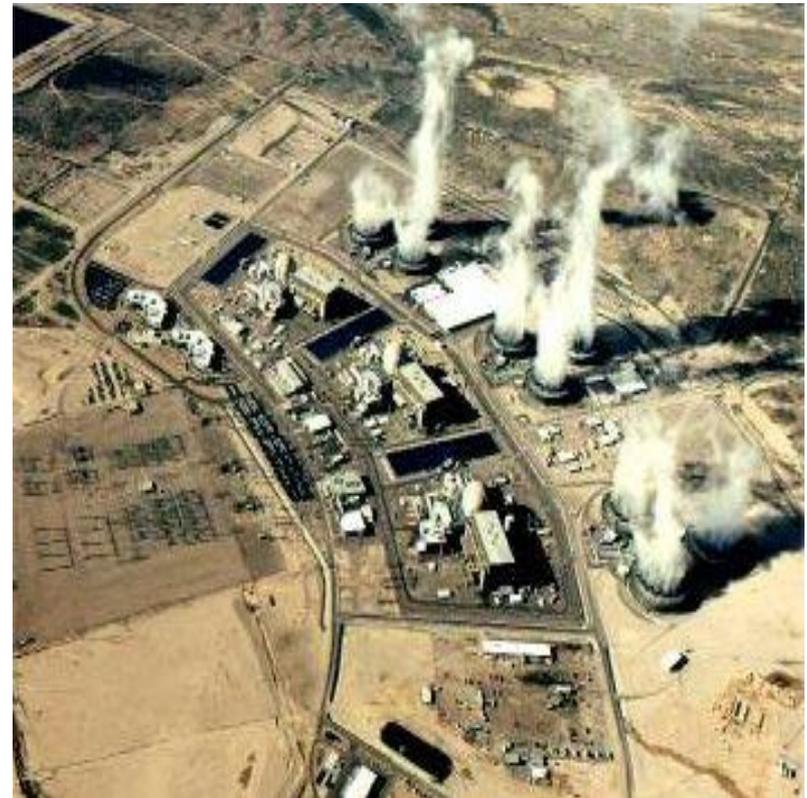
Peak Contribution of Renewable Energy

Renewable Energy Contribution - Peak Day
8/15/2015



Nuclear - Palo Verde

- Fuel sourced from multiple suppliers
- 100% of 2016 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 at 94.3% in 2015



Coal Supply

Four Corners Power Plant

- Fuel Source: Navajo Mine adjacent to plant/NTEC
- Term through 2031
- BHP is mining contractor through July 2016 (North American Coal Corp will be mining contractor)



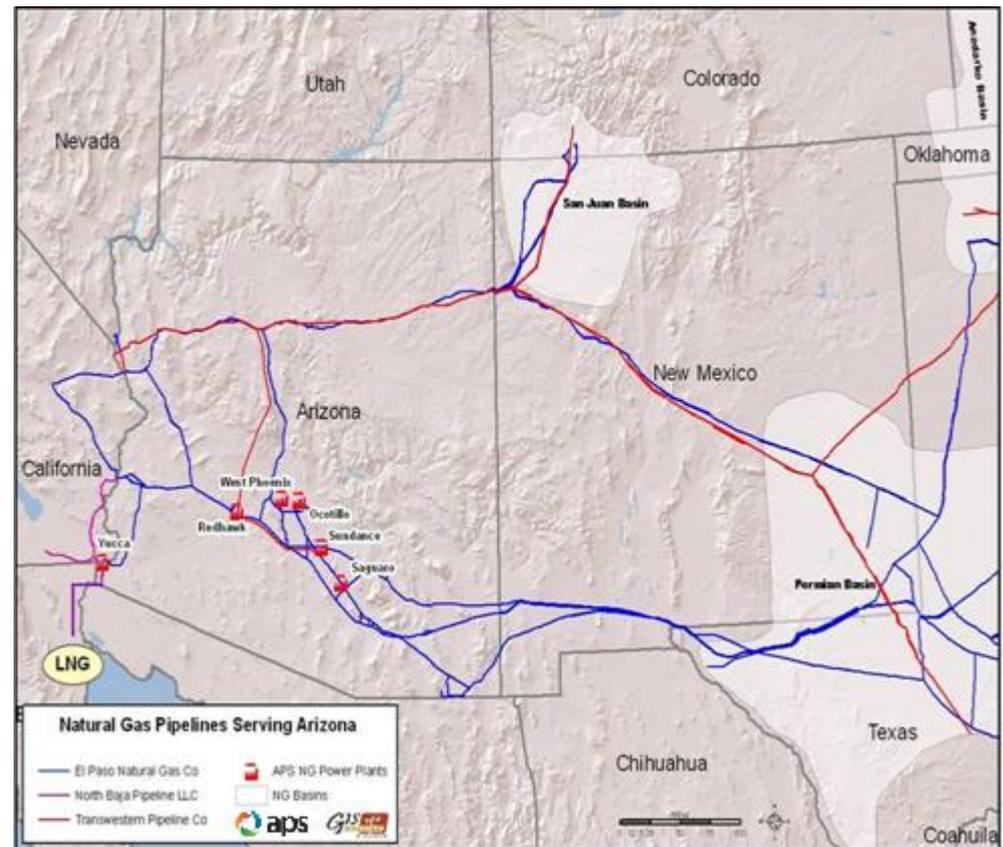
Cholla Power Plant

- Fuel Source: El Segundo mine near Grants, NM/Peabody Coal
- Term through 2024
- Coal delivered by rail



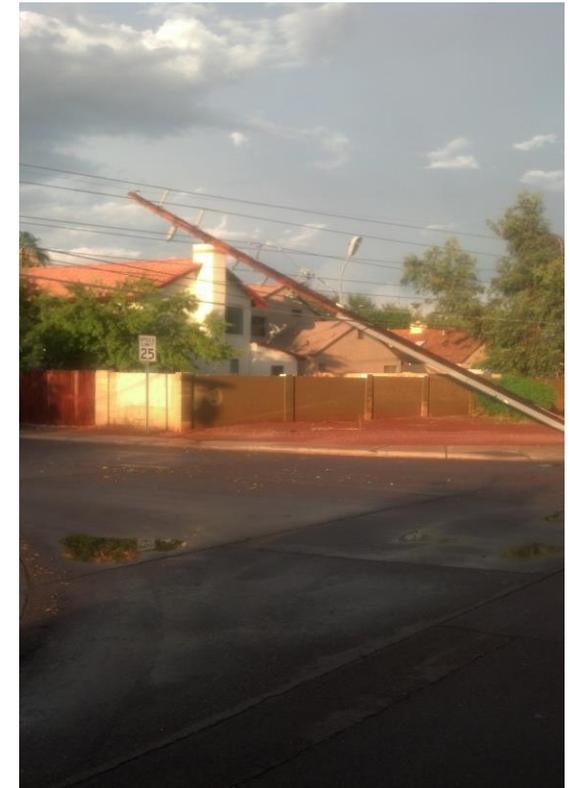
Natural Gas Supply

- APS has sufficient pipeline transportation and supply under contract to meet peak system needs
- El Paso Natural Gas supplies all APS natural gas plants
- Transwestern pipeline supplies the APS Redhawk and Sundance power plants
- North Baja pipeline supplies Yucca units 5 & 6
- Gas storage arrangement in West Texas contracted through May of 2018 connecting to both El Paso and TransWestern Pipelines



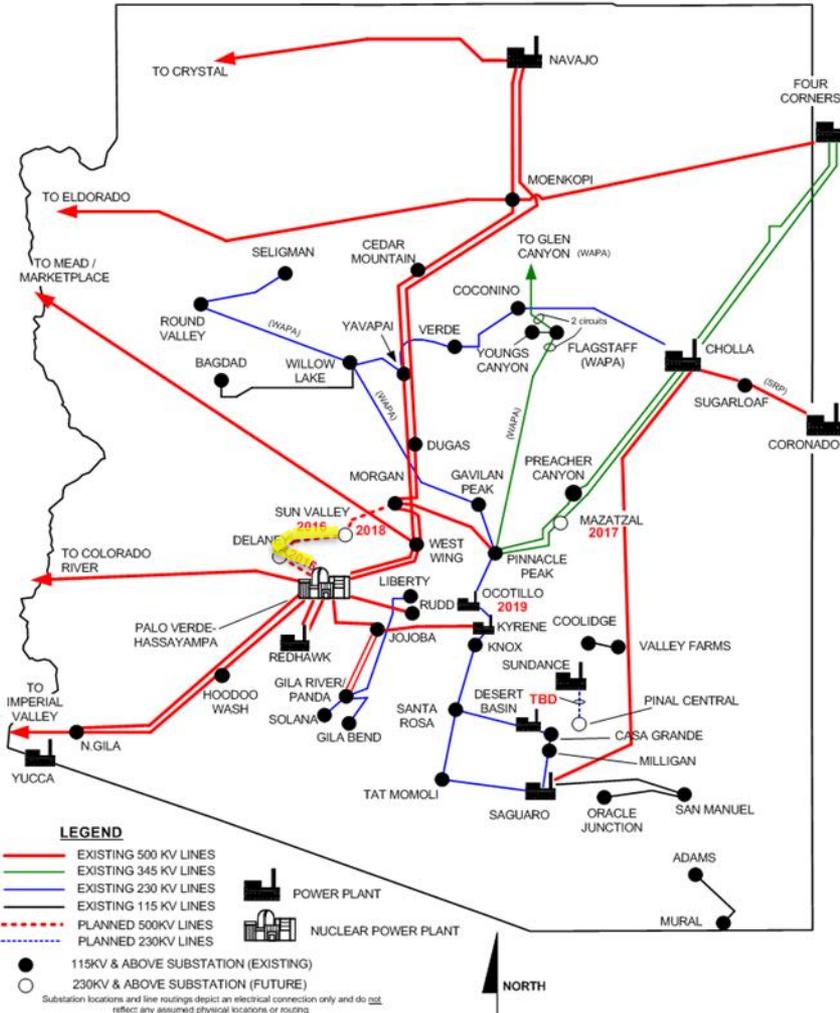
Summer Storms of 2015

- Wind, Rain, and Lightning related outages highest in 5 years
- 2nd wettest May on record, 2nd hottest August on record
- Central Phoenix and West Valley storms



Transmission System

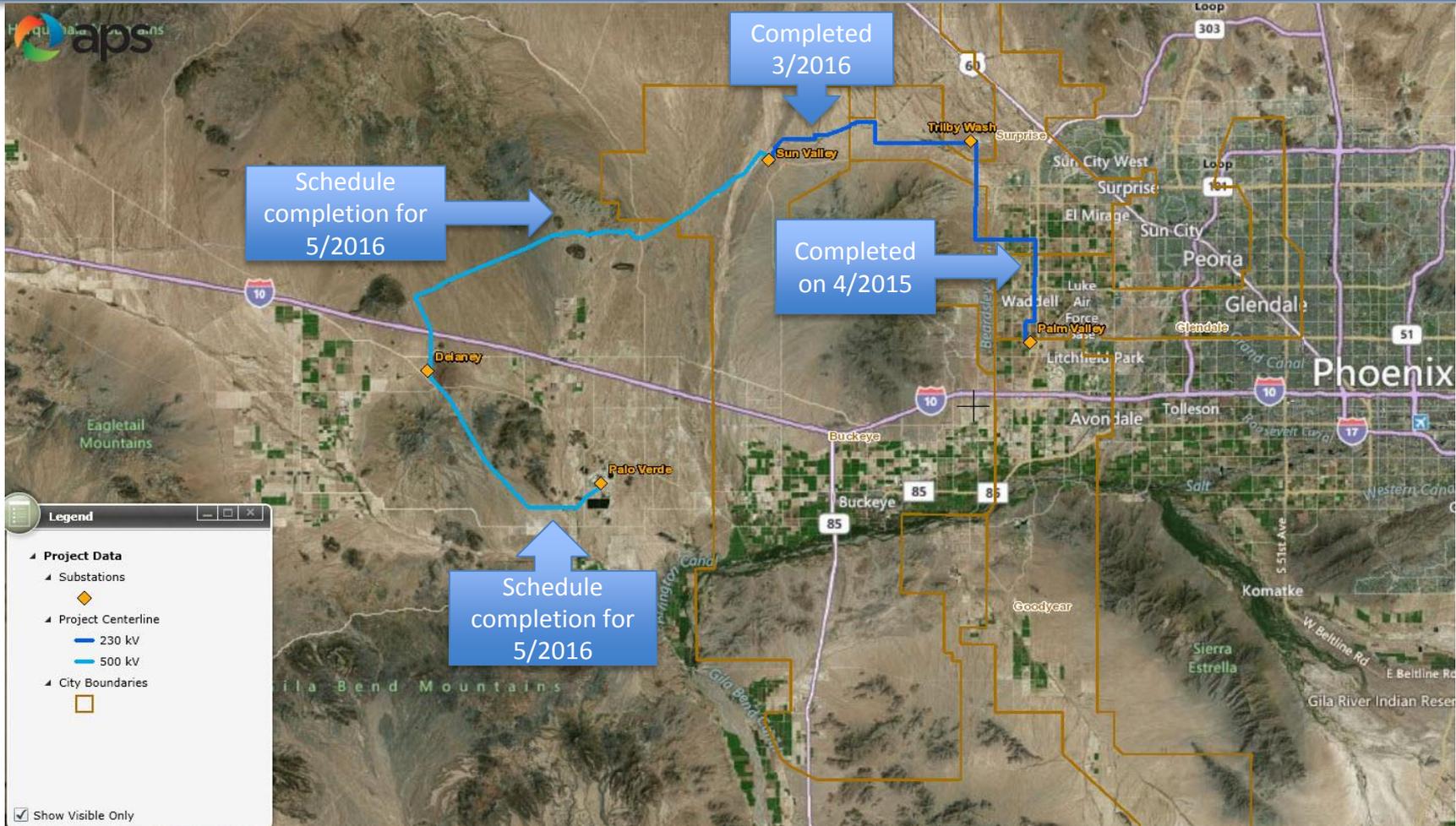
APS EHV & OUTER DIVISION 115/230 KV TRANSMISSION PLANS 2016 - 2025



- Coordination of transmission system
- Access to markets is important factor in managing supply contingencies and bringing new resources to load
- Multiple west valley projects to be energized by June 1
- Situational awareness of the transmission grid within western interconnect

Transmission Improvements

Project Locations



Reliability Activities

- Transmission/Distribution Operations & Maintenance
 - Stopper poles
 - Annual Transmission and Distribution line patrols
 - Predictive & preventative maintenance programs
 - Enhancements
 - Reliability improvement on APS systems throughout the state
 - Storm Hardening of 69kV system
 - Deployment of Smart Grid Devices
 - Substation physical and cyber security upgrades



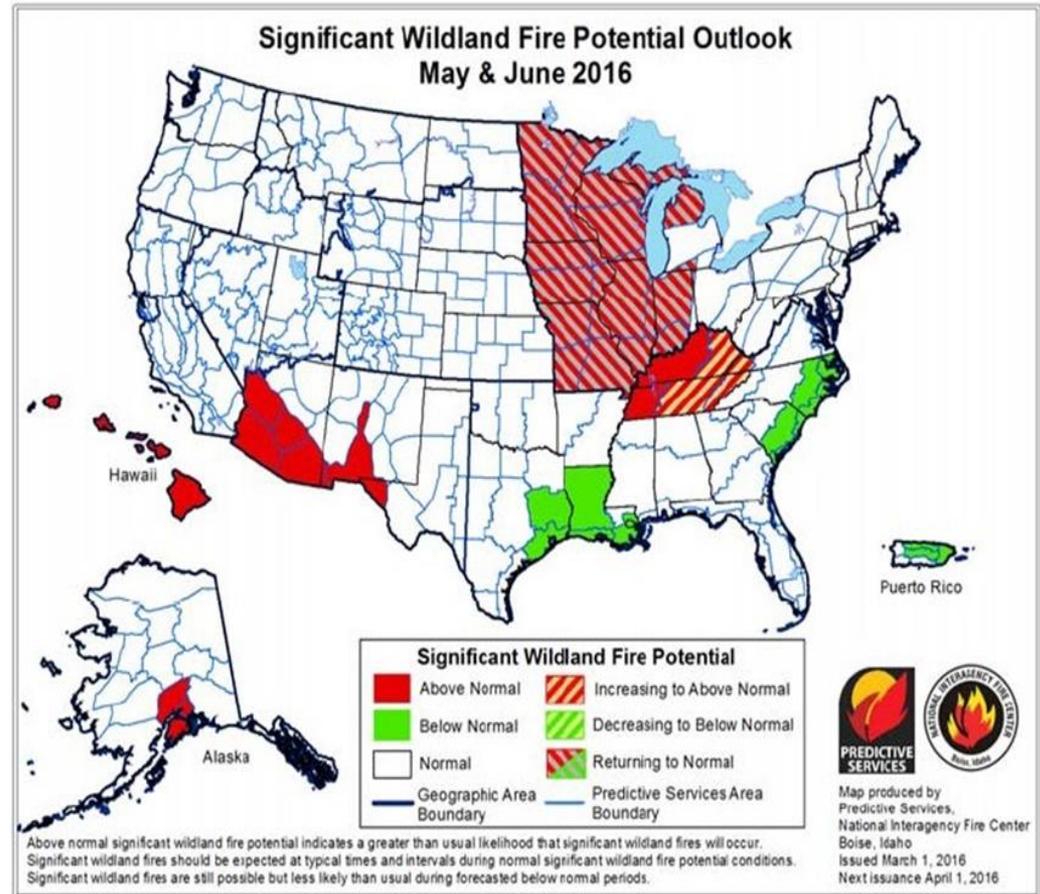
Vegetation Management

Vegetation Management & Wildfire Planning

- Pre-Wildfire season meetings with Forest Service & BLM
- Prepare APS personnel for fire season
 - Training of employees and contractors on Wildland fire & Prevention
 - Clearing vegetation around transmission and distribution lines
 - Dedicated APS Fire Mitigation Program Manager

2016 Fire Season Weather Summary

- Normal Wildland Fire potential in March and April, except locally high where winds and fine fuels align.
- May and June Above Normal Wildland Fire potential in Southern Arizona.



Emergency Preparedness & Response

- Upgraded incident command infrastructure
- Emergency Management Coordination & Communication
- Training and Exercises
- Emergency Response Planning
- 2016 Emergency Response Procedures Updated

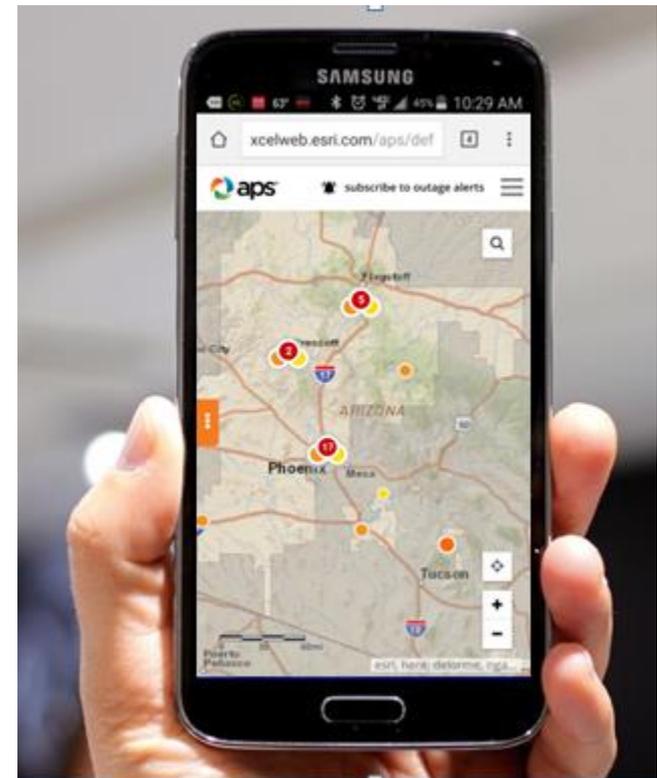


APS Customer and Agency Outreach

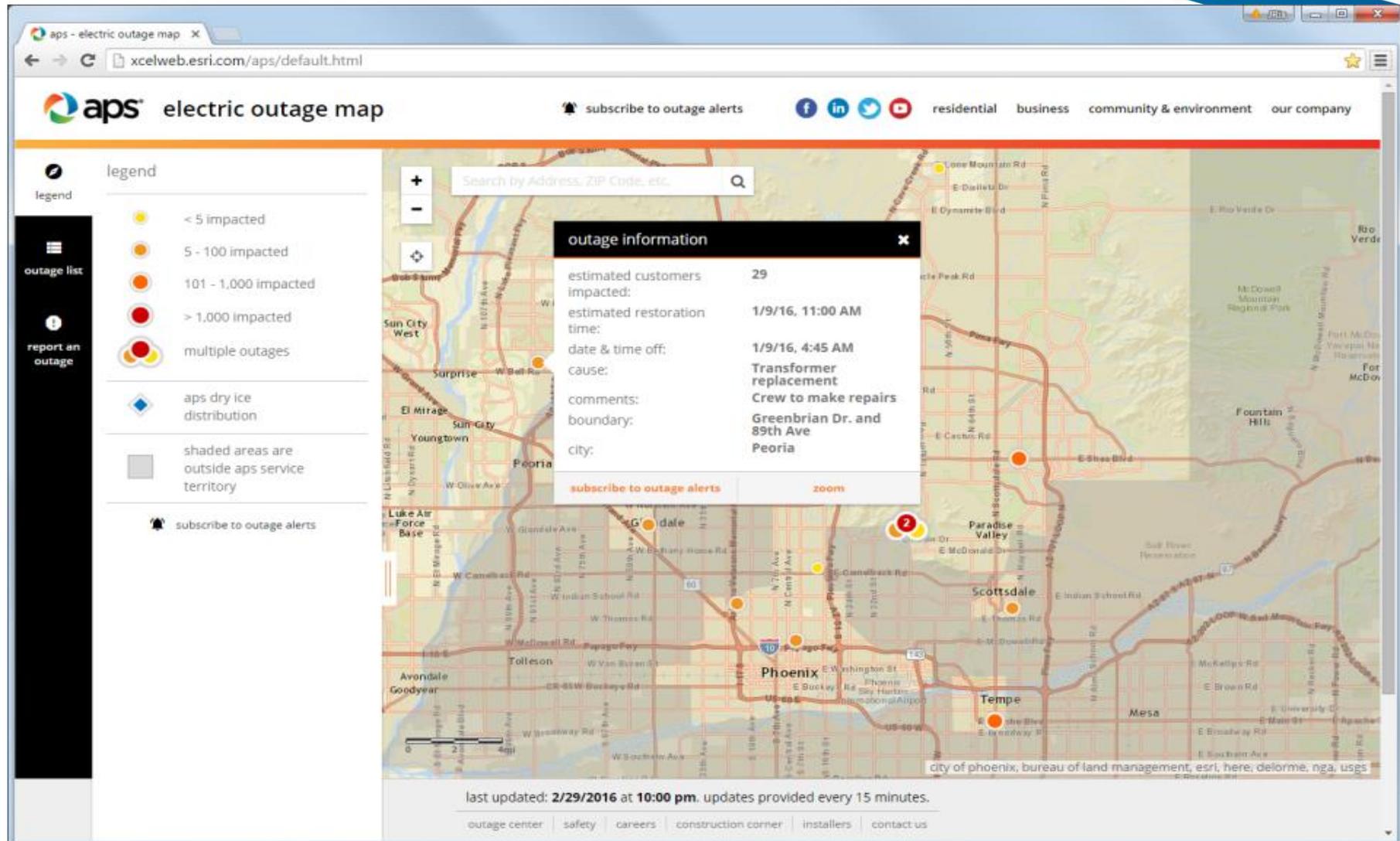
- Communications with community leaders, emergency response teams & public safety leaders
- Coordination with local emergency management organizations to establish temporary shelters and/or provide outreach for vulnerable populations
- Medical Care Preparedness Program (life support/medical monitoring)

APS Customer Notification

- 24 hours 7 days a week live call center agents
- Automated recorded outage messages updated regularly
- Customer ability to report outages via automated call system
- Doubled our at home agent staff to provide safer and faster customer service during storm season
- Capability to report & view outages on mobile website
- Launch of mobile application in 2016
- APS.COM outage map



APS.com Outage Map



The screenshot shows the APS.com electric outage map interface. The browser address bar displays 'xcelweb.esri.com/aps/default.html'. The page title is 'aps electric outage map'. The navigation menu includes 'subscribe to outage alerts', social media icons for Facebook, LinkedIn, Twitter, and YouTube, and links for 'residential', 'business', 'community & environment', and 'our company'.

The left sidebar contains a legend, an 'outage list' button, and a 'report an outage' button. The legend includes categories for the number of impacted customers (color-coded circles), 'multiple outages' (a cluster of circles), 'aps dry ice distribution' (a diamond), and 'shaded areas are outside aps service territory' (a grey square). A 'subscribe to outage alerts' button is also present in the sidebar.

The main map area shows a map of Phoenix, Arizona, with various neighborhoods labeled. A search bar at the top of the map area allows searching by address or ZIP code. A popup window titled 'outage information' is displayed over the map, providing details for a specific outage:

outage information	
estimated customers impacted:	29
estimated restoration time:	1/9/16, 11:00 AM
date & time off:	1/9/16, 4:45 AM
cause:	Transformer replacement
comments:	Crew to make repairs
boundary:	Greenbrian Dr. and 89th Ave
city:	Peoria

At the bottom of the popup, there are buttons for 'subscribe to outage alerts' and 'zoom'. The map footer includes the text 'city of phoenix, bureau of land management, esri, here, delorme, nga, usgs' and a timestamp: 'last updated: 2/29/2016 at 10:00 pm. updates provided every 15 minutes.' A navigation menu at the very bottom includes links for 'outage center', 'safety', 'careers', 'construction corner', 'installers', and 'contact us'.

Social Media

- Facebook & Twitter

- Nearly 15,000 Twitter followers and nearly 8,000 Facebook likes
- ETR's (estimated time of restoration)
- General area affected
- Outage Cause – if and when known

facebook



 **APS @apsFYI** · Mar 28
Thanks to great (and quick!) work by our crews, power has been restored to the ~5,100 customers in Phoenix.

17  24

 **APS @apsFYI** · Mar 28
We have ~5,100 customers out in Phoenix. Boundaries: University North Way - Lupine Ave, 55th Ave - 29th Ave. ETR is midnight.

11  2

Summary

- Generation resources, fuel supplies and transmission capacity in place to meet customer demand and reserve requirements
- System improvements and maintenance efforts on track
- Emergency response improvements and integration with external agencies
- New and improved customer communication channels in place