

2014 Integrated Resource Plan

Arizona Department of Environmental Quality Stakeholder Meeting

June 2, 2015

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Resource Planning**



2014 IRP Summary

- **Natural gas generation will play increasingly important role**
 - Economics
 - Operational flexibility
- **Cleaner energy mix**
 - Customer resources such as roof-top solar and energy efficiency projected to triple
 - Environmental regulations
- **Advanced technology will change the electricity grid**
 - Integration of renewable energy
 - Communication and automation



Planning Considerations

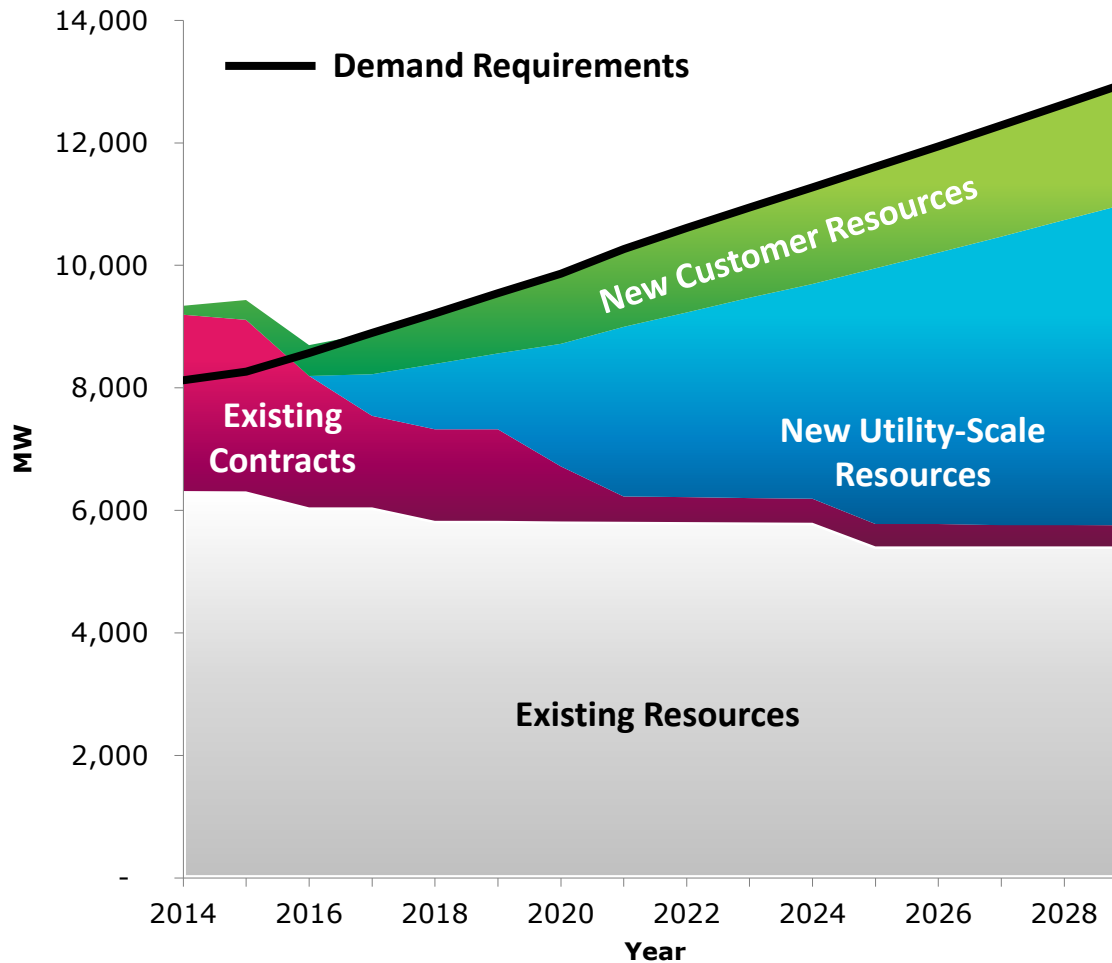


2014 IRP Filing*

- **APS filed its IRP with the ACC April 1, 2014**
- **On September 17, APS filed a supplement to its IRP**
 - Modified its chosen portfolio from the Selected Portfolio (April 2014 Selected Portfolio) to the Coal Reduction Portfolio (September 2014 Selected Portfolio)
- **The Coal Reduction Portfolio included the following modifications:**
 - Retire Unit 2 in 2016
 - Retire Units 1 and 3 in mid-2020's (at end of coal contract) or convert to natural gas
- **Modification based on economics of required environmental upgrades to comply with MATS and Regional Haze**
 - Similar to Four Corners 1-2-3, environmental upgrades cannot be supported given lack of economies of scale
- **On May 8, 2015, the ACC acknowledged APS IRP and approved the retirement of Cholla 2**

*APS's 2014 IRP and its supplemental filing may be found at www.aps.com/resources

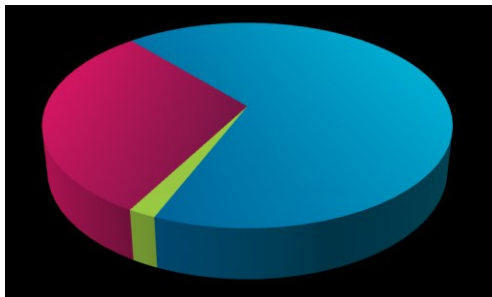
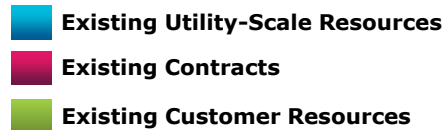
Supply-Demand Gap



- Growth in customer energy requirements expected to resume
- Customer resources expected to triple over planning horizon
- Expiring purchase contracts means APS will need additional resources by 2017
- Additional resource needs anticipated to be met by increasingly diverse and efficient technologies

Expected Future Resources

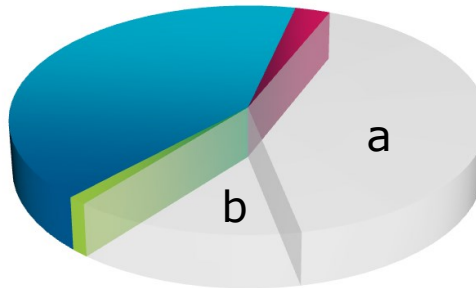
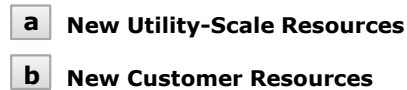
Sept 2014 Selected Portfolio



2014

8,124 MW
peak requirement

100% met with
existing resources



2029

12,982 MW
peak requirement

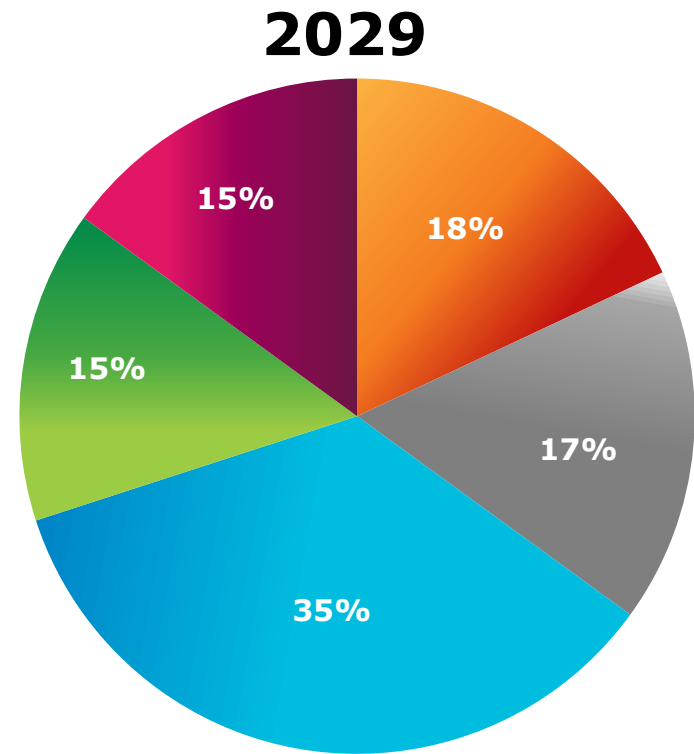
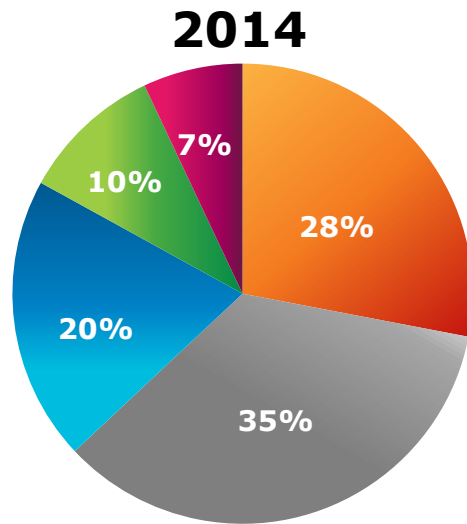
45% met with
existing resources

2014-2029 (Forecast)

Future Additional Resources
7,267 MW Expected at Peak

- a. New Utility-Scale Resources**
Natural Gas
4,817 MW
Renewable Energy
467 MW (1,018 MW nameplate capacity)
- b. New Customer Resources**
Energy Efficiency
1,447 MW
Distributed Energy
261 MW (722 MW nameplate capacity)
Demand Response
275 MW

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**



Nuclear



Coal



Natural Gas

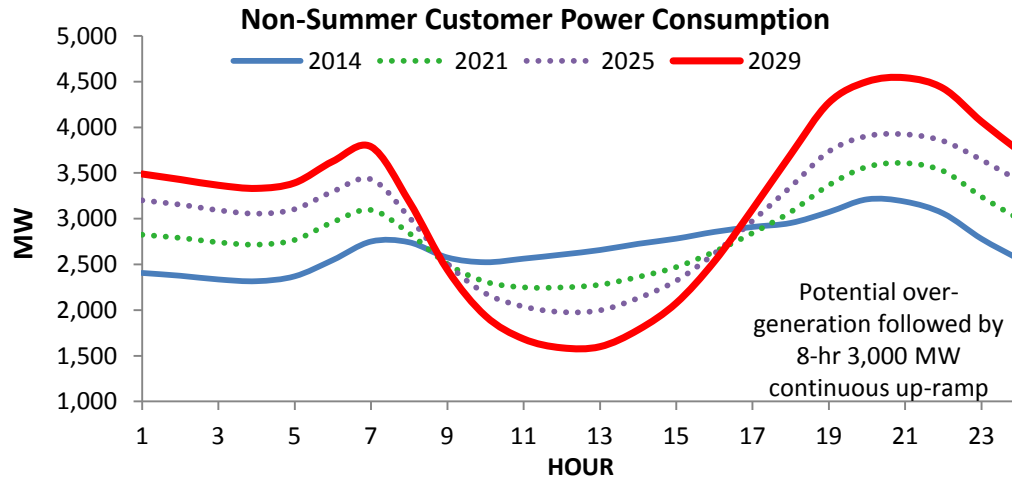


Renewable Energy

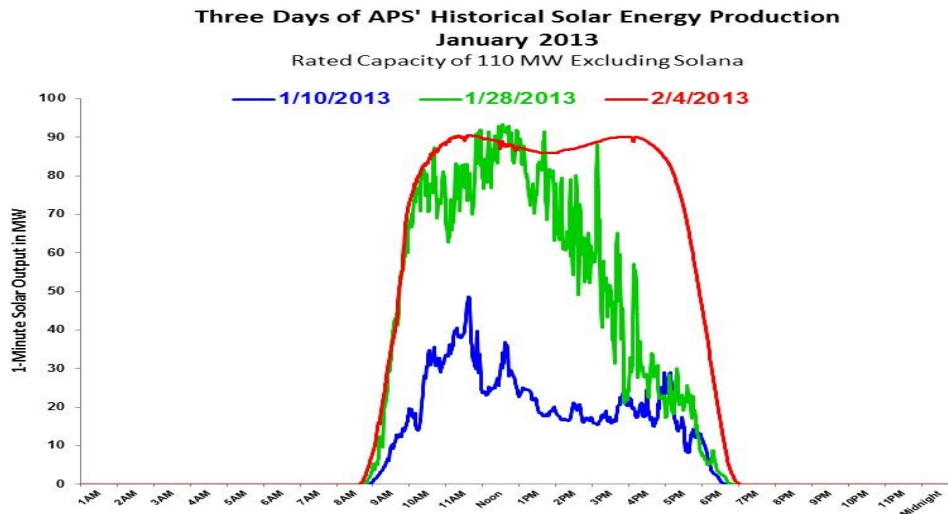


Energy Efficiency

Evolving Customer Demand



- Growth of solar PV changes customer energy consumption patterns
- Generators must be able to start and stop multiple times per day
- Fast starting and ramping capability is required in responding to intermittent output of renewable resources



Future Technology Drivers

Transition Towards Integrating Evolving Energy Resource Portfolio

- **System Drivers**

- Increasing amounts of intermittent generation
- Need for peaking resources and summer time capacity
- Cost of compliance with environmental regulations
- Stable natural gas prices

- **Potential Benefits**

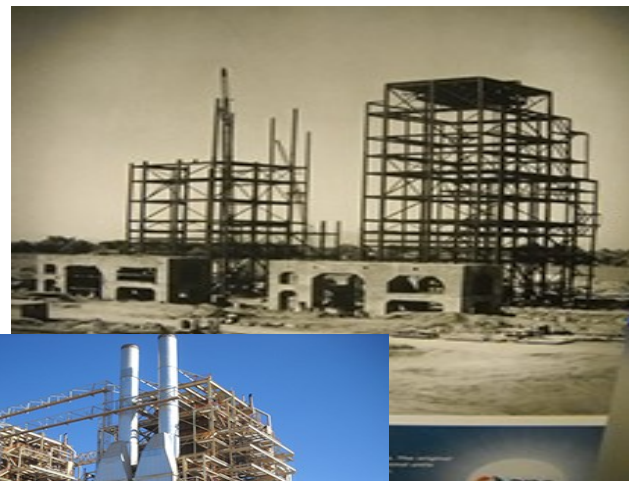
- Increased resource diversity
- Flexible gas generation meets peak needs and enables renewable energy integration
- Reduced environmental impacts

- **Potential Risks**

- Cost of resource diversity for newer technologies
- Technology maturity and uncertain reliability
- Maintaining balance between variable/inflexible resources and flexible resources

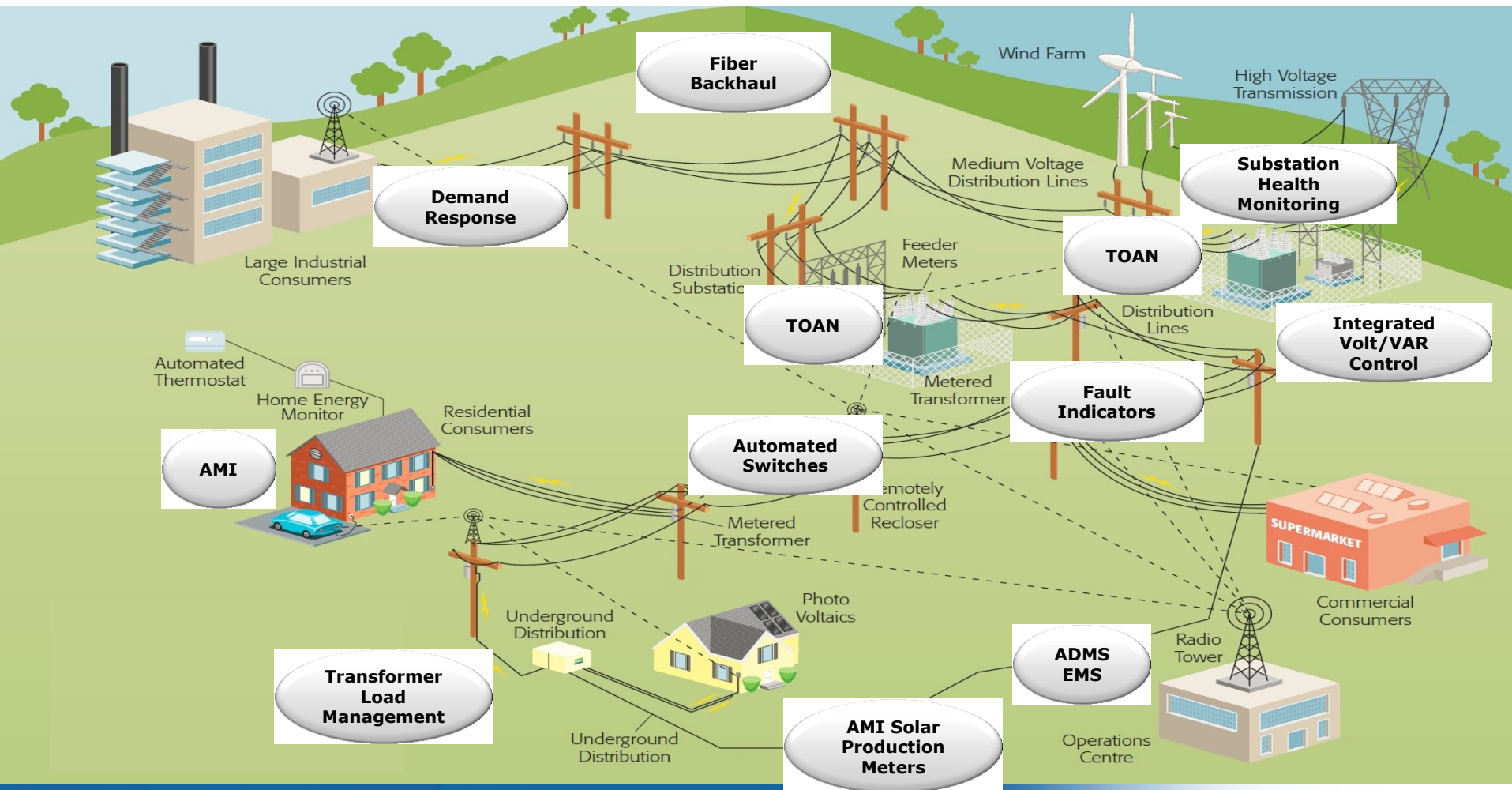
Ocotillo Modernization Project

- Retire aging, large steam units constructed in 1960
- Replace steam units with modern technology



- Maintain Valley reliability
- Responsive unit operations
- Environmental attributes
- In-service planned for summer 2018

Proliferation of Distributed Generation Demands A More Advanced Grid





www.aps.com/resources

www.azenergyfuture.com