

Gas And Electric Market Coordination

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Speaker Materials

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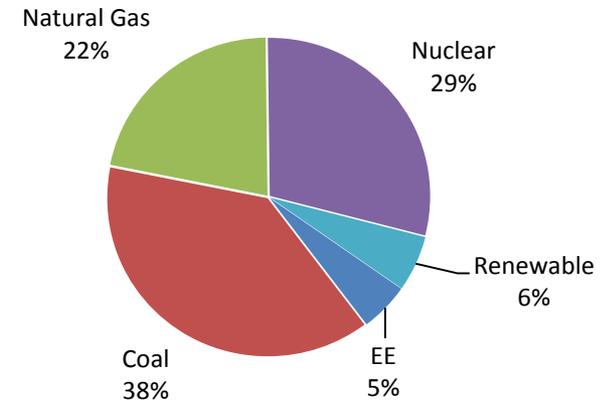
APS Overview

- Vertically integrated investor owned electric utility
- 1.1 M retail customers with obligation to serve
- 7,200 MW peak electric load
- Outside of an organized market
- Renewable energy and energy efficiency standards

APS Service Territory

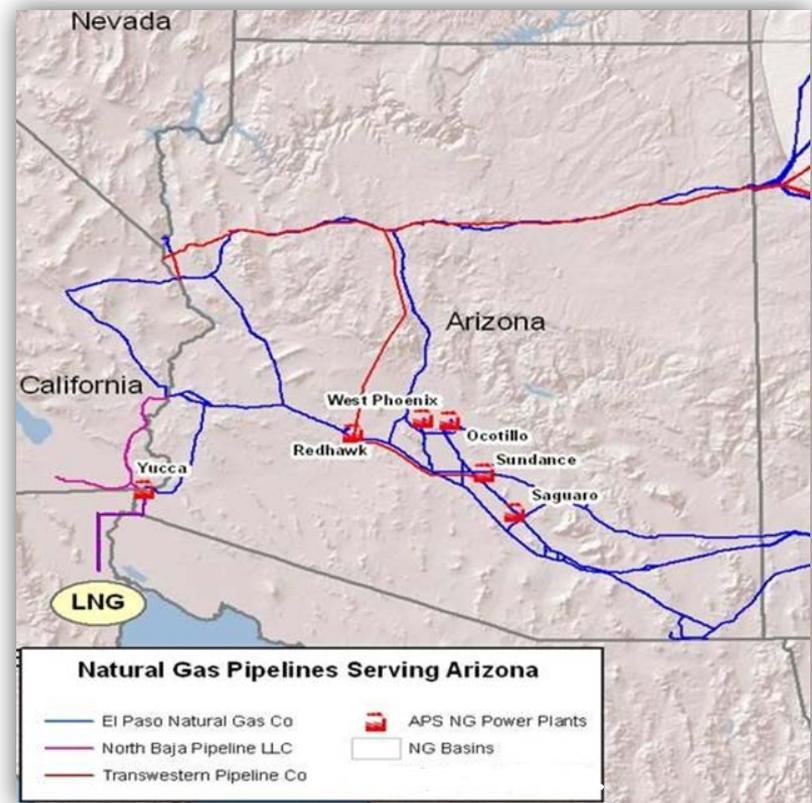


APS Resource Mix



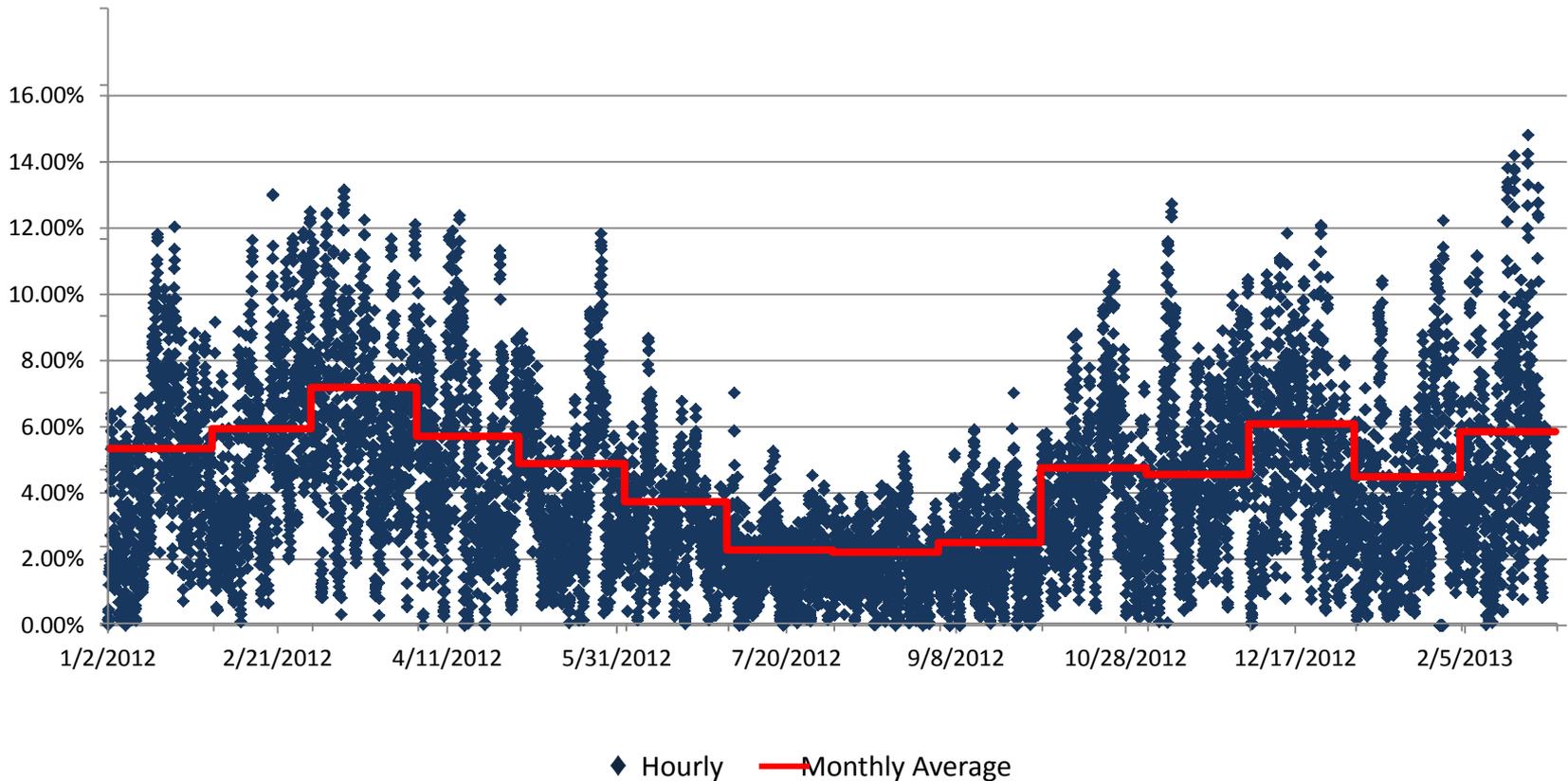
Pipeline and APS Gas Generation

- 3,371 MW of combined cycle gas generation owned or under contract
- 1,017 MW of peaking gas generation
- 80 million MMBtu annual gas burns
- No Arizona gas storage

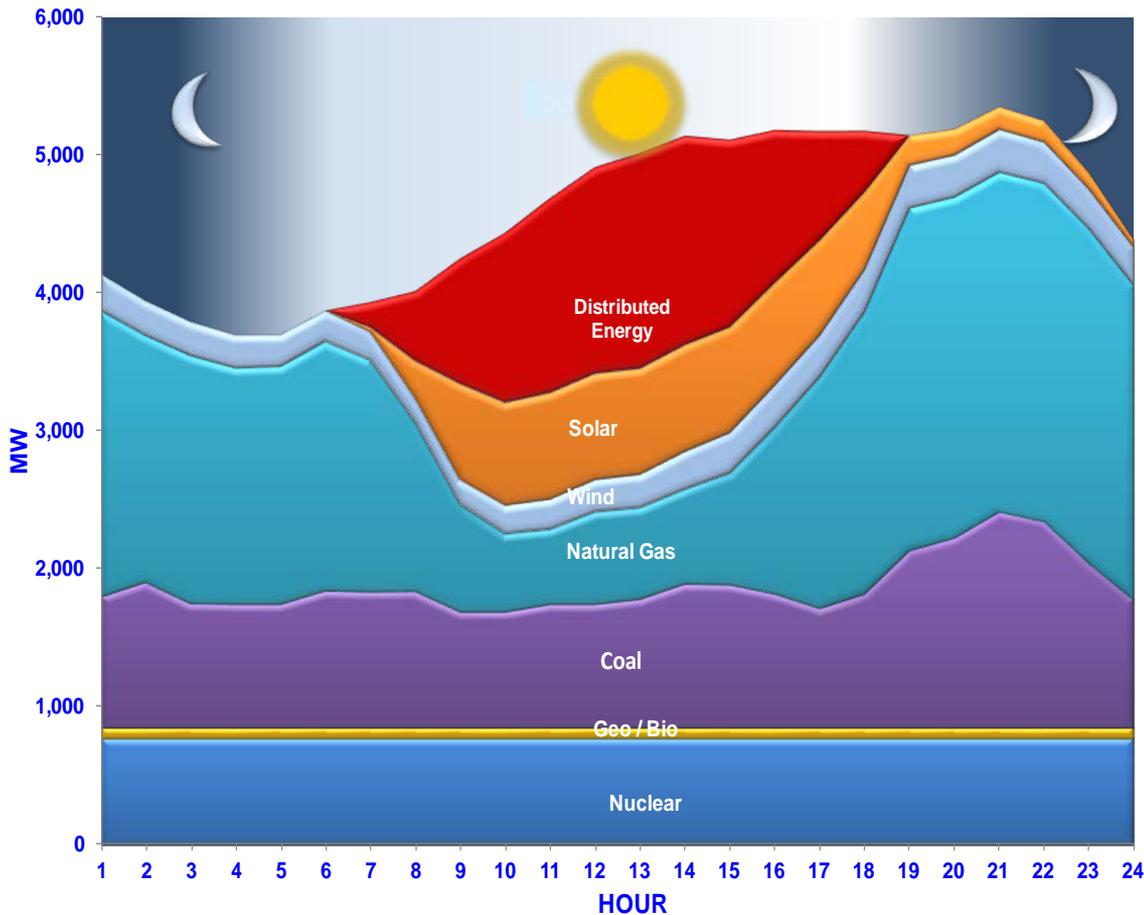


Operational Challenges

APS wind and utility-scale solar
as percentage of load



Operational Challenges

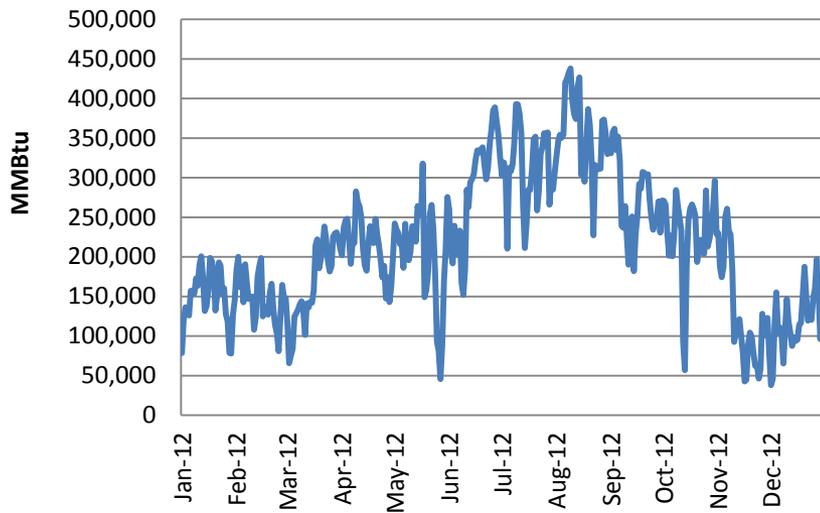


- Photovoltaic solar creates operational challenges
 - Ramp up
 - Ramp down
 - Dual peaks
 - Multiple unit starts per day
 - Intermittency
- Manage with flexible gas generation

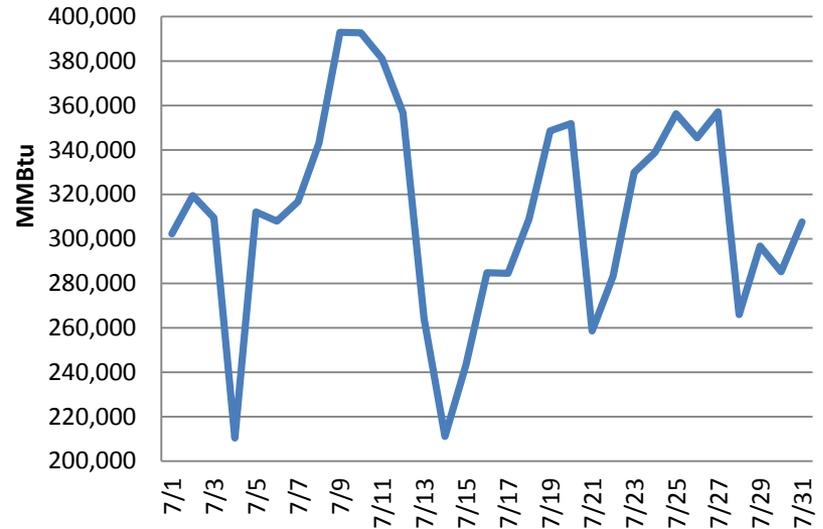
Operational Challenges

Volatility of daily natural gas burns

Daily Natural Gas Consumption



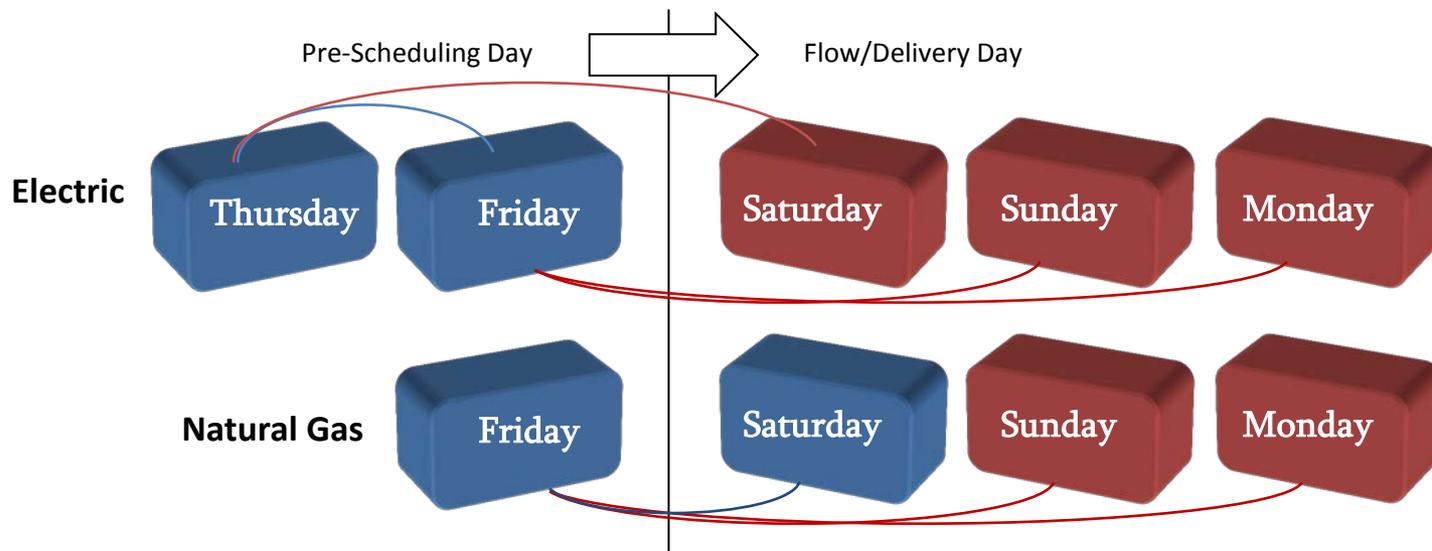
July 2012 Daily Gas Consumption



Market Conditions

- Incentives are not all aligned with long-term capacity development
 - Diminished value of primary firm gas transportation intraday
 - Long-term planning for adequacy of gas pipeline capacity may not capture electric generation in short-term or bid based markets
- Better synchronization for system reliability
 - Limited intraday gas nomination cycles
 - Electric optimizes hourly or sub-hourly
 - Gas and electric day misalignments
 - Lost firm transportation rights for contingencies
 - Misaligned, multiple day pre-schedule calendars

Market Conditions



- In a typical week, 43% of electric and 29% of gas pre-scheduling occurs more than one day in advance of delivery
 - Less reliable forecasting of load, variable energy resources, generation availability, and system conditions
- Holidays add an additional day of scheduling disconnect to the normal week
- Weekend gas offerings are not shaped to the demand for individual days without paying a premium

Recommendations

- Incentives are not aligned for long-term capacity development
 - Updated bumping rights
 - The Commission's policy can maintain balanced protections for firm and non-firm shippers while revisiting the no bump rule in light of new scheduling and notification technology
 - Long-term planning for adequacy of gas capacity in line with electric generation
 - Consider electric policies that support value of firm transportation, reducing the pipeline's risk for new infrastructure development

Recommendations

- Better synchronization for system reliability
 - Limited intraday gas nomination cycles
 - Increase the minimum number of intraday nomination cycles to include at least one additional morning and one early evening cycle
 - Gas and electric day misalignments
 - Increasing the minimum number of gas nomination cycles will support intraday adjustments due to misalignments until a long-term solution can be found
 - Lost firm transportation rights for contingencies
 - Update the Commission's policy to support users with firm obligations to serve
 - Misaligned, multiple day pre-schedule calendars
 - Modify the electric and gas pre-schedule calendars for day-ahead scheduling everyday

Recommendations

- The greatest efficiencies will be gained from evolutionary steps rather than revolutionary change to either natural gas or electric markets
- Measured steps with frequent evaluation of results will allow prudent reliability enhancements to the natural gas and electric industries