

# Gas And Electric Market Coordination

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Speaker Materials

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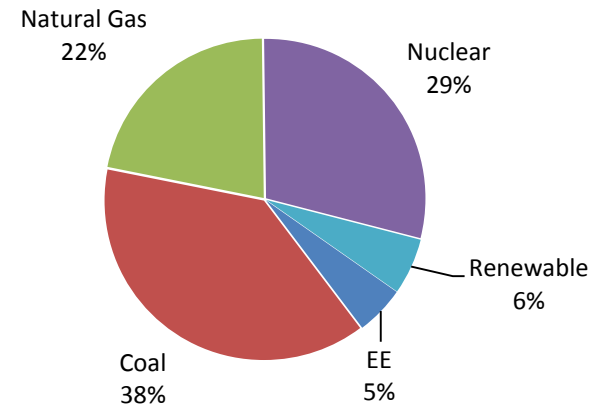
# APS Overview

- 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

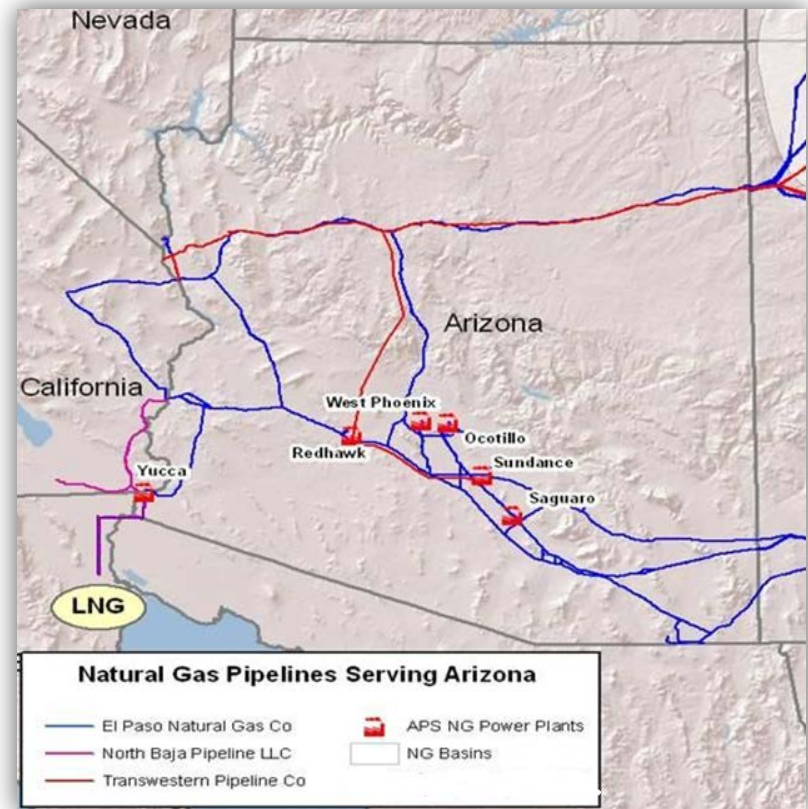


## APS Resource Mix



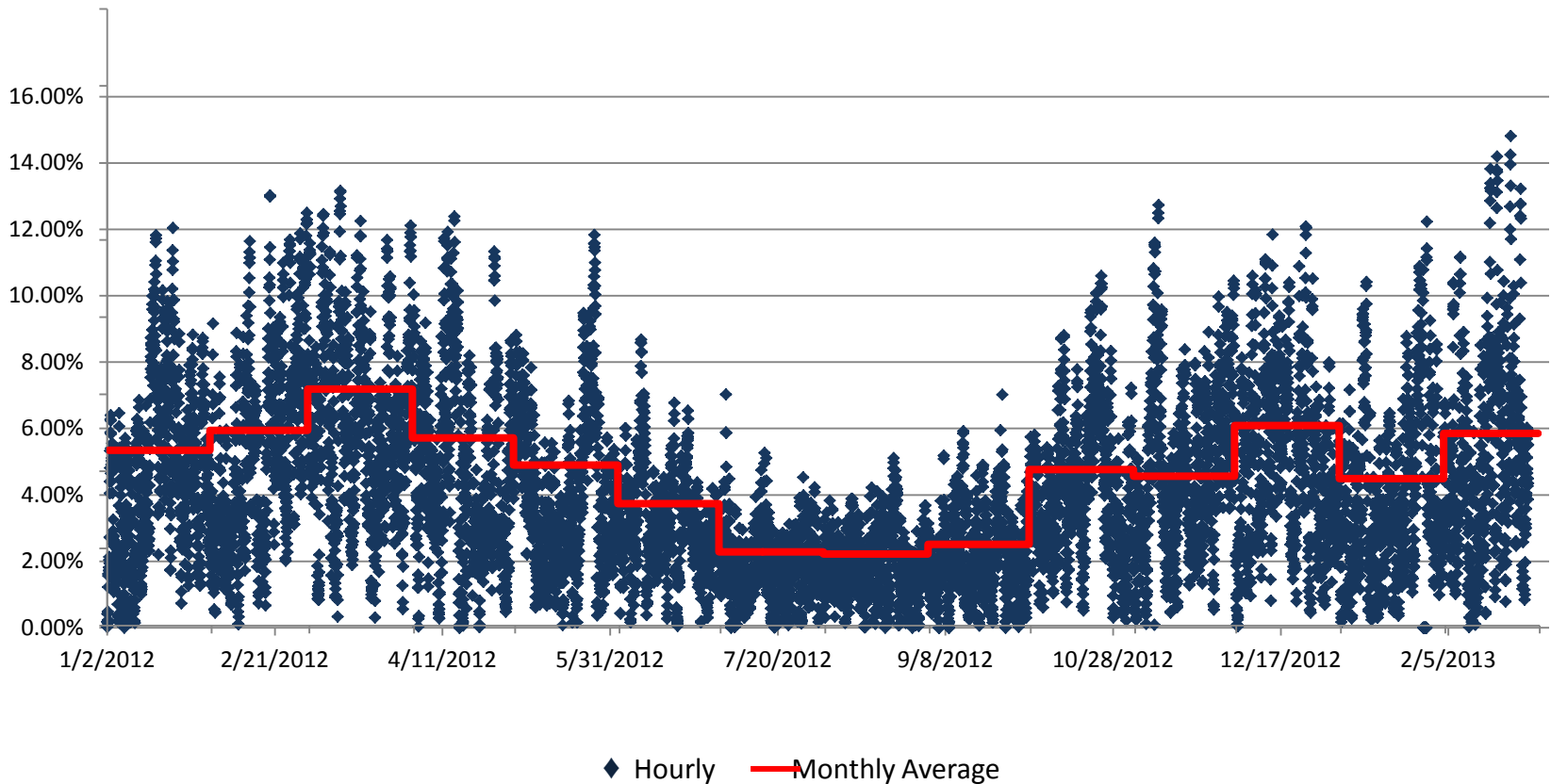
# Pipeline and APS Gas Generation

- 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

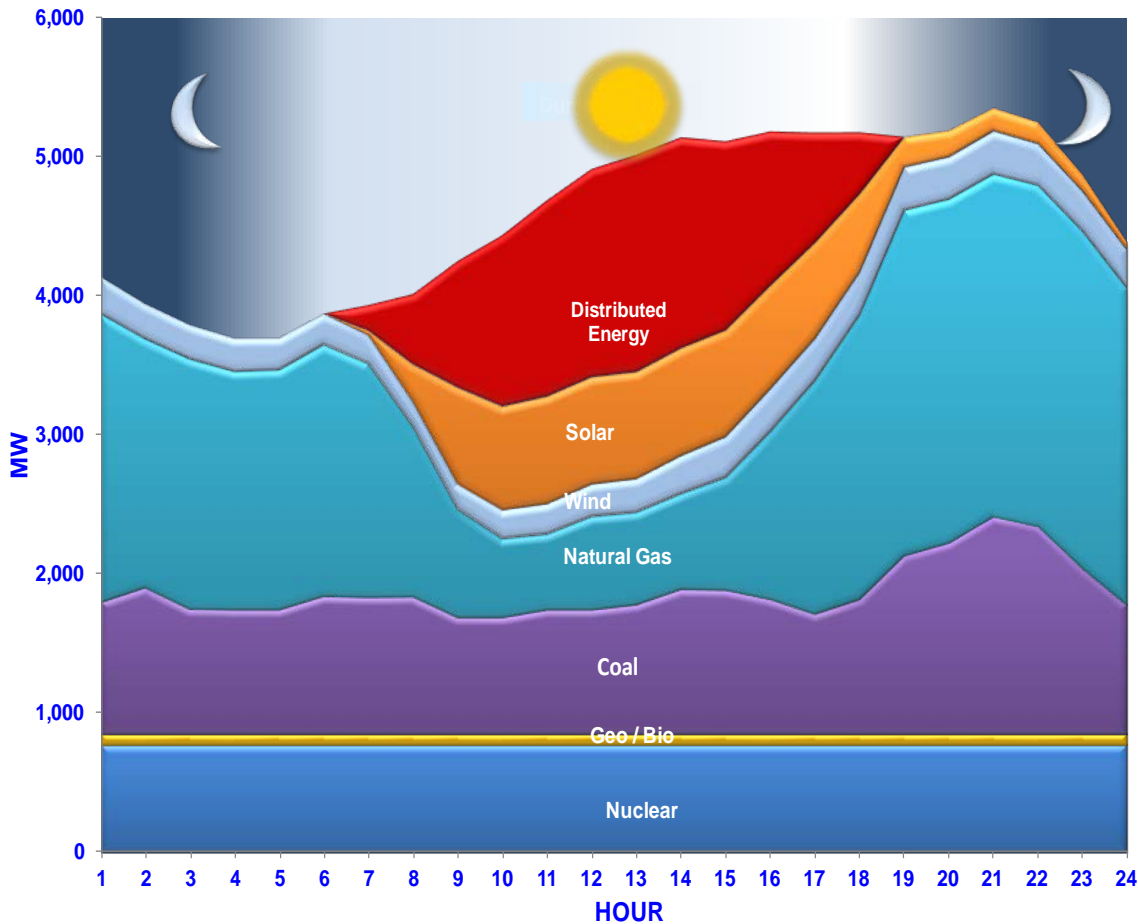


# Operational Challenges

APS wind and utility-scale solar  
as percentage of load



# Operational Challenges

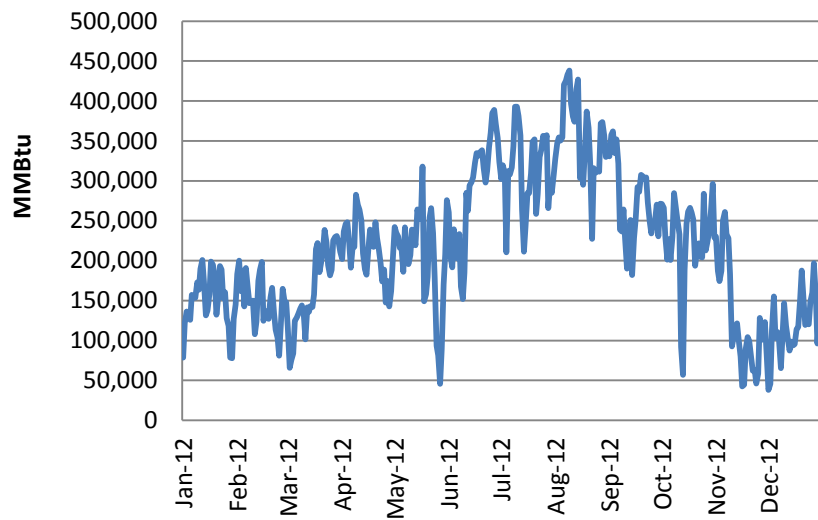


- Photovoltaic solar creates operational challenges
  - Ramp up
  - Ramp down
  - Dual peaks
  - Multiple unit starts per day
  - Intermittency
- Manage with flexible gas generation

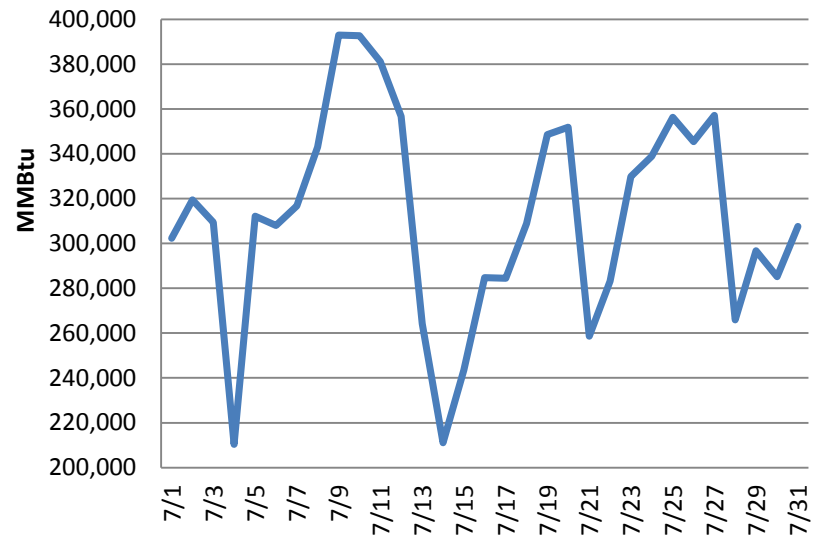
# Operational Challenges

## Volatility of daily natural gas burns

Daily Natural Gas Consumption



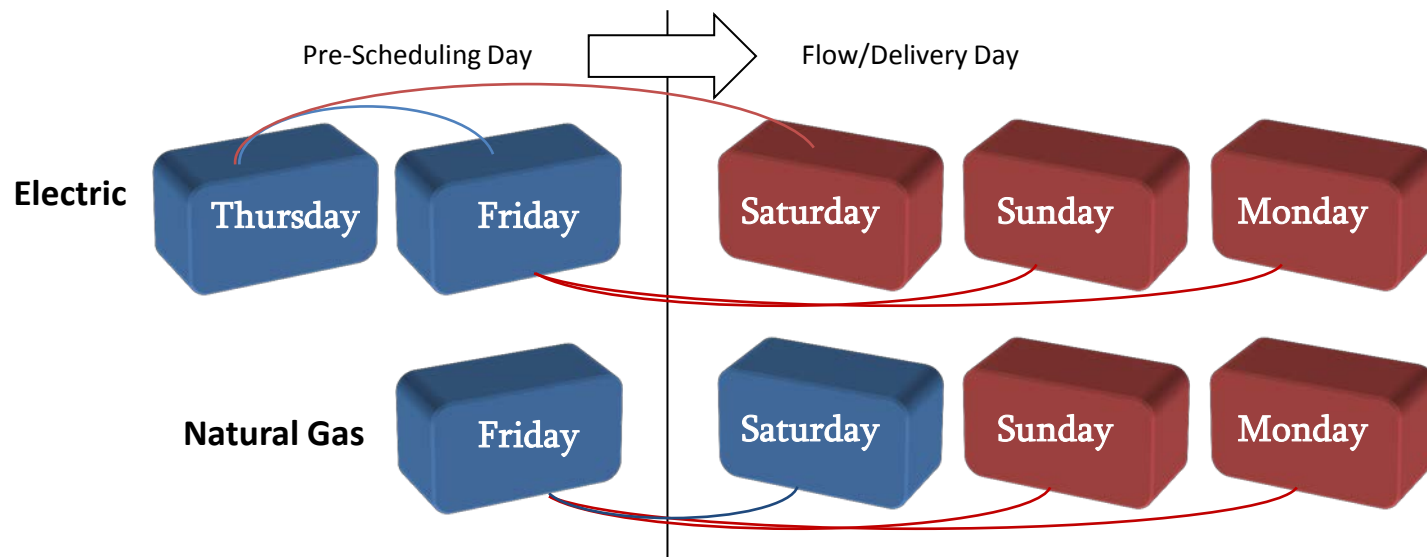
July 2012 Daily Gas Consumption



# 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