



Impact of Southern California Natural Gas Market on CAISO Power Markets

Eric Hildebrandt, Executive Director, Market Monitoring
California Independent System Operator

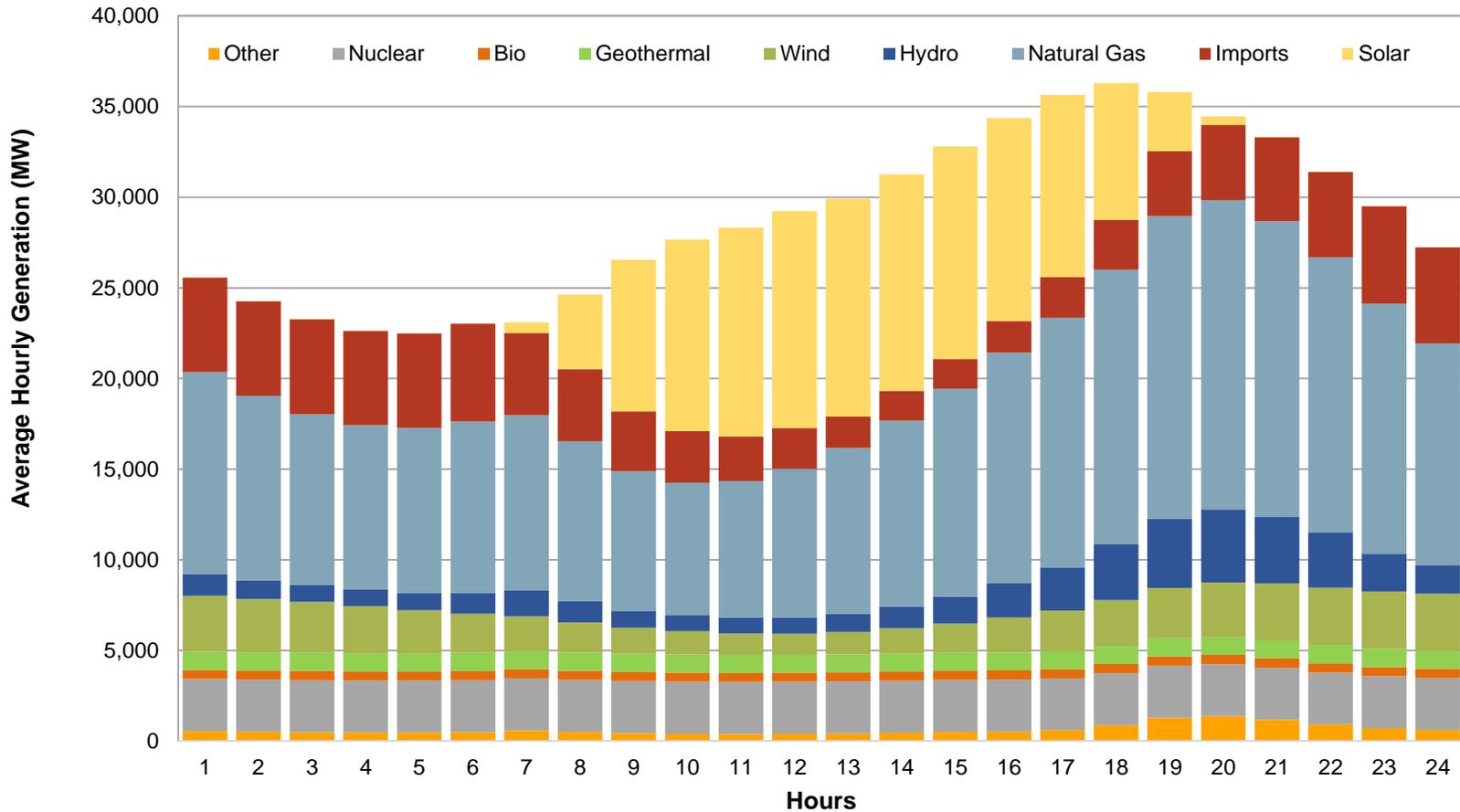
Power Association of Northern California
January 12, 2022

Gas and electric market interactions: key economic and market design issues

- Marginal generation costs and single price auction design
- Gas prices and electric market bid caps
- Gas price risk and imbalance penalties
- Administrative pricing and scarcity

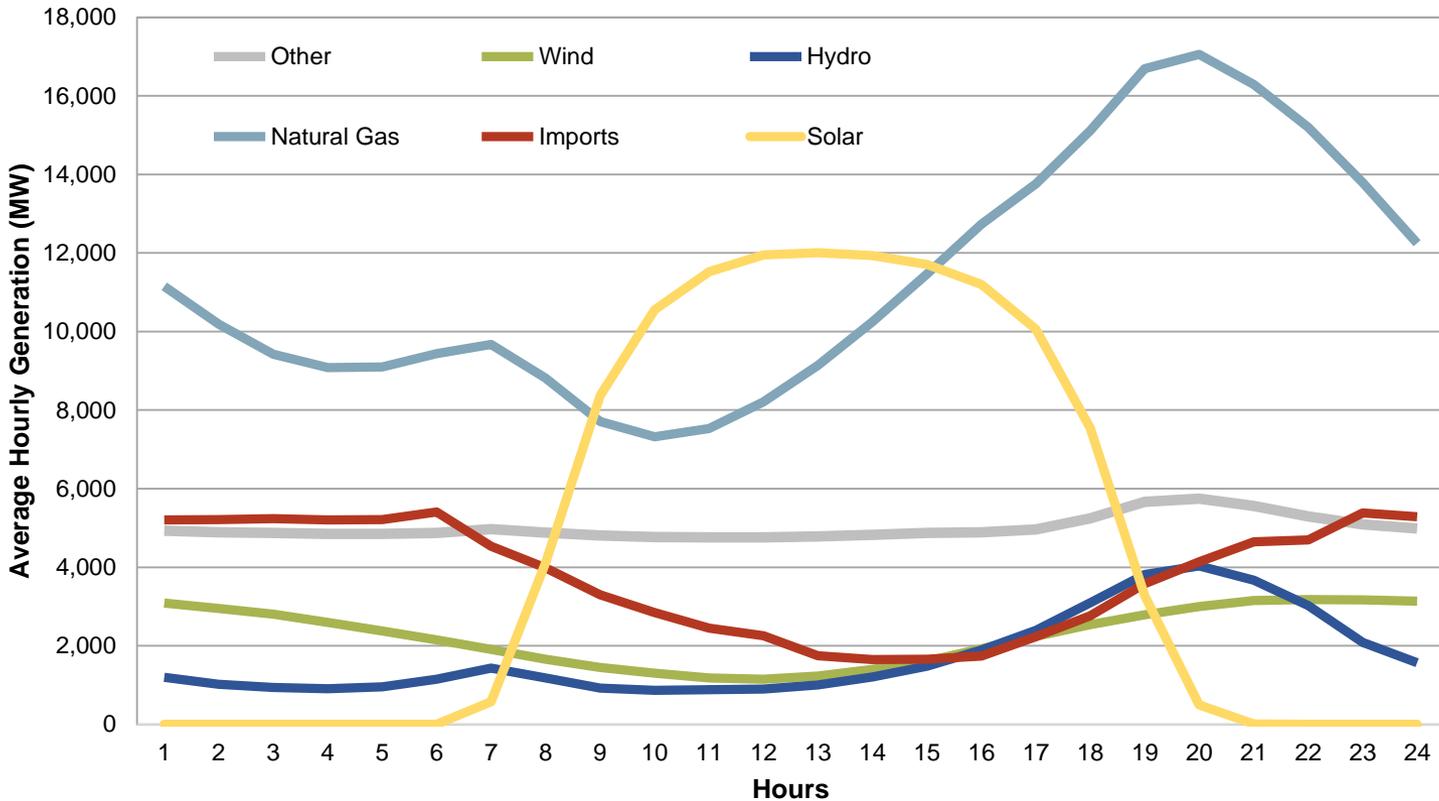
Gas fired generation still accounts for large portion of CAISO resource mix – especially in the evening hours as solar drops off

July-September 2021

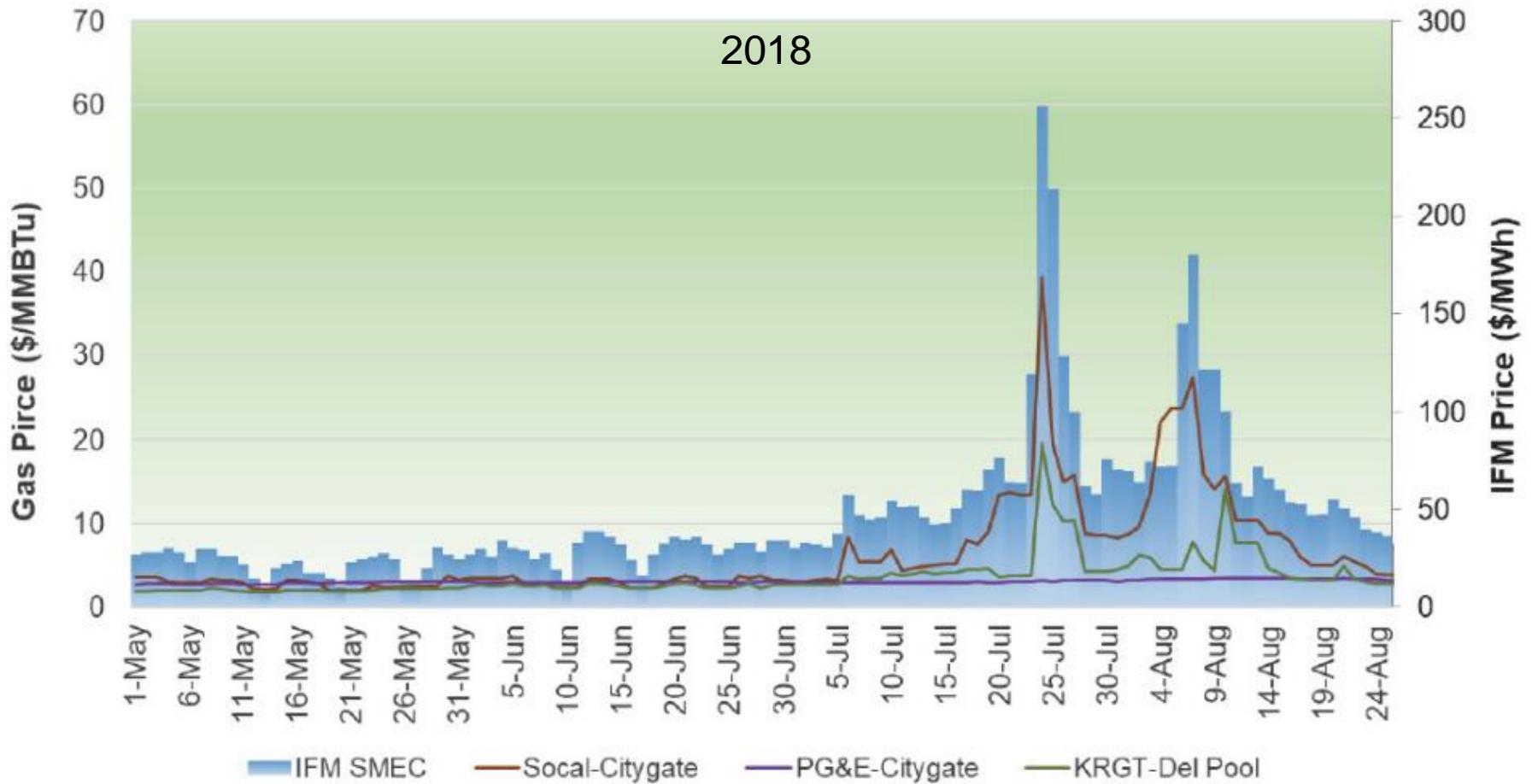


Almost all ~18,000 MW of gas fired generation needed to meet system demand during the early evening hours during high load summer days

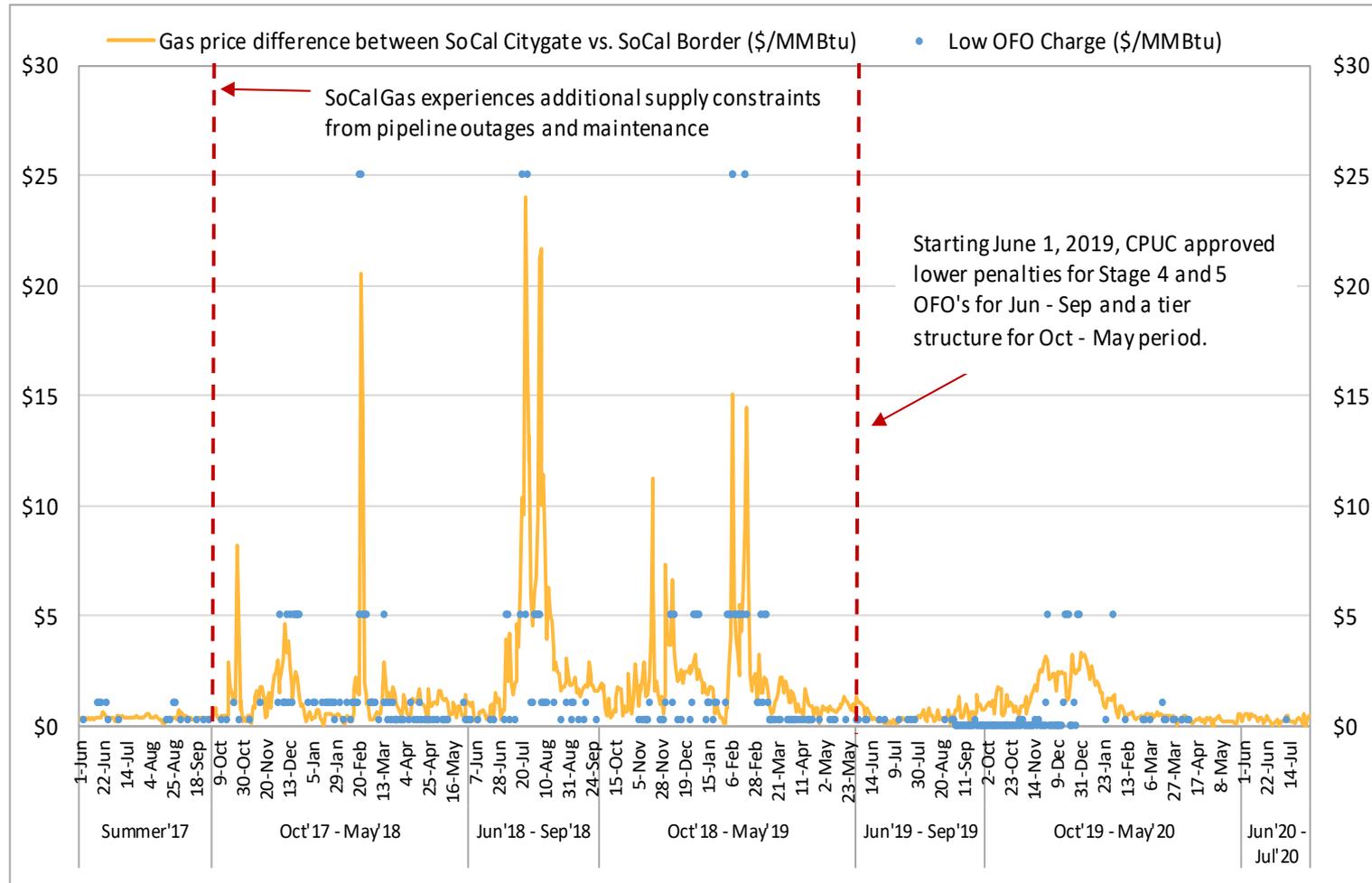
July-September 2021



SoCal Citygate prices often drive overall prices in CAISO markets (May – August 2018)



Impact of Potential OFO Noncompliance Charges on Next Day SoCal Citygate Prices



Role of gas price indices in CAISO markets

- **Local market power mitigation**
 - Bids for gas units capped at estimated marginal cost when congestion occurs into an area and the local market is structurally uncompetitive
 - Bid caps for day-ahead market updated based on next day gas trades occurring on ICE (8 to 9 am)
 - Bid caps for real-time market updated based on same day gas trades occurring on ICE (8 to 9 am)
- **Start-up and minimum load bid costs**
 - Capped at 125% of estimated costs based on gas price indices
- **System level bid cap**
 - Gas unit bids $> \$1,000/\text{MW}$ cap allowed when gas prices would result in costs $> \$1,000/\text{MW}$ (given resources heat rate)

Gas usage constraints now explicitly incorporated in CAISO market software

- New gas usage constraint (or *nomogram*) developed after Aliso Canyon storage restrictions in 2015
 - Gas usage limits for groups of units set by CAISO in conjunction with SoCal gas company
 - Gas usage of each unit modeled based on unit heat rate
 - Total gas usage by groups of units is limited by constraints in CAISO day-ahead and real-time software
 - When gas constraint becomes binding, market software dispatches higher cost generation (not subject to constraint) to meet demand
 - e.g. more imports or gas generation outside of gas constrained area
- Department of Market Monitoring recommendations
 - Set shape of gas limits over day to preserve enough gas for early evening hours
 - Develop more automated ways to adjust gas limits during the day based on actual conditions

Gas usage limits can be increased in early evening hours to allow more generation if there is sufficient gas

