

# The Importance of US Gas-Fired Electric Generation to Natural Gas Price Formation

S&P Global Platts Analytics

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November 13, 2018

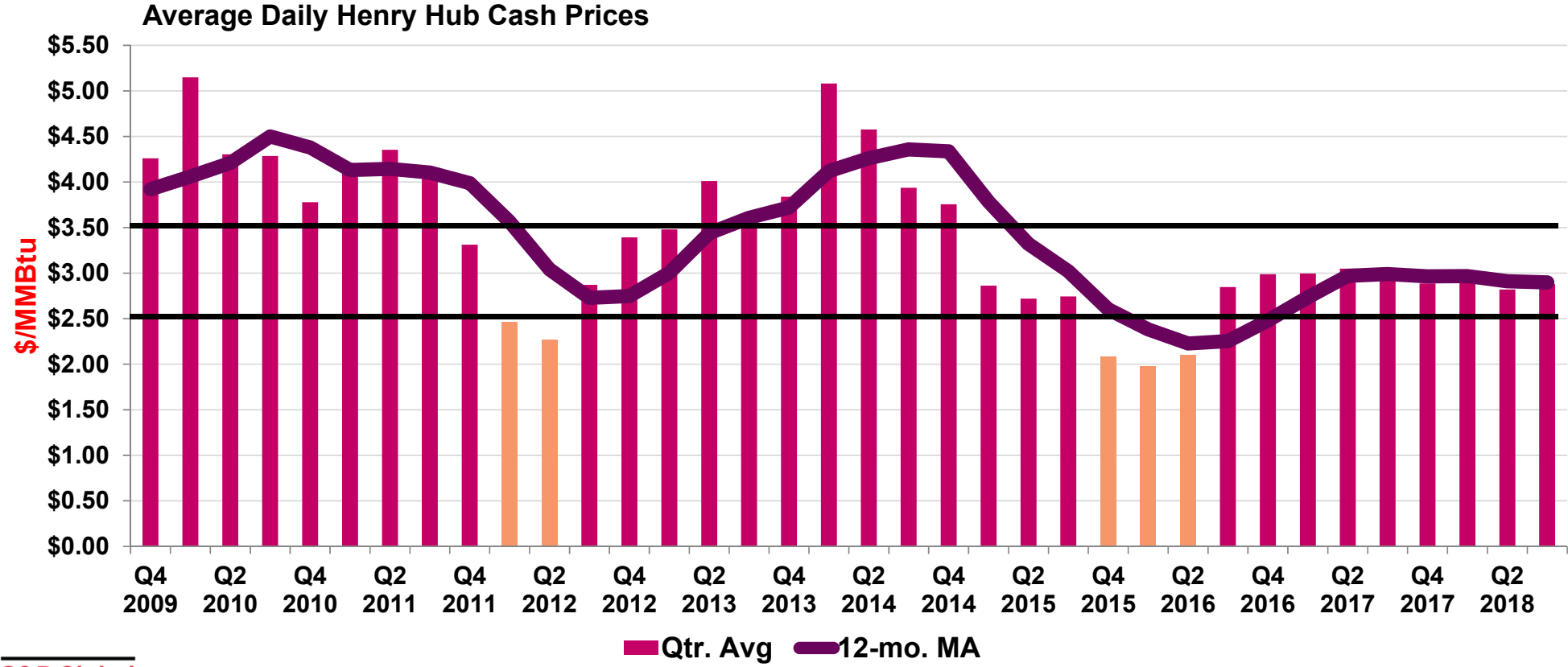
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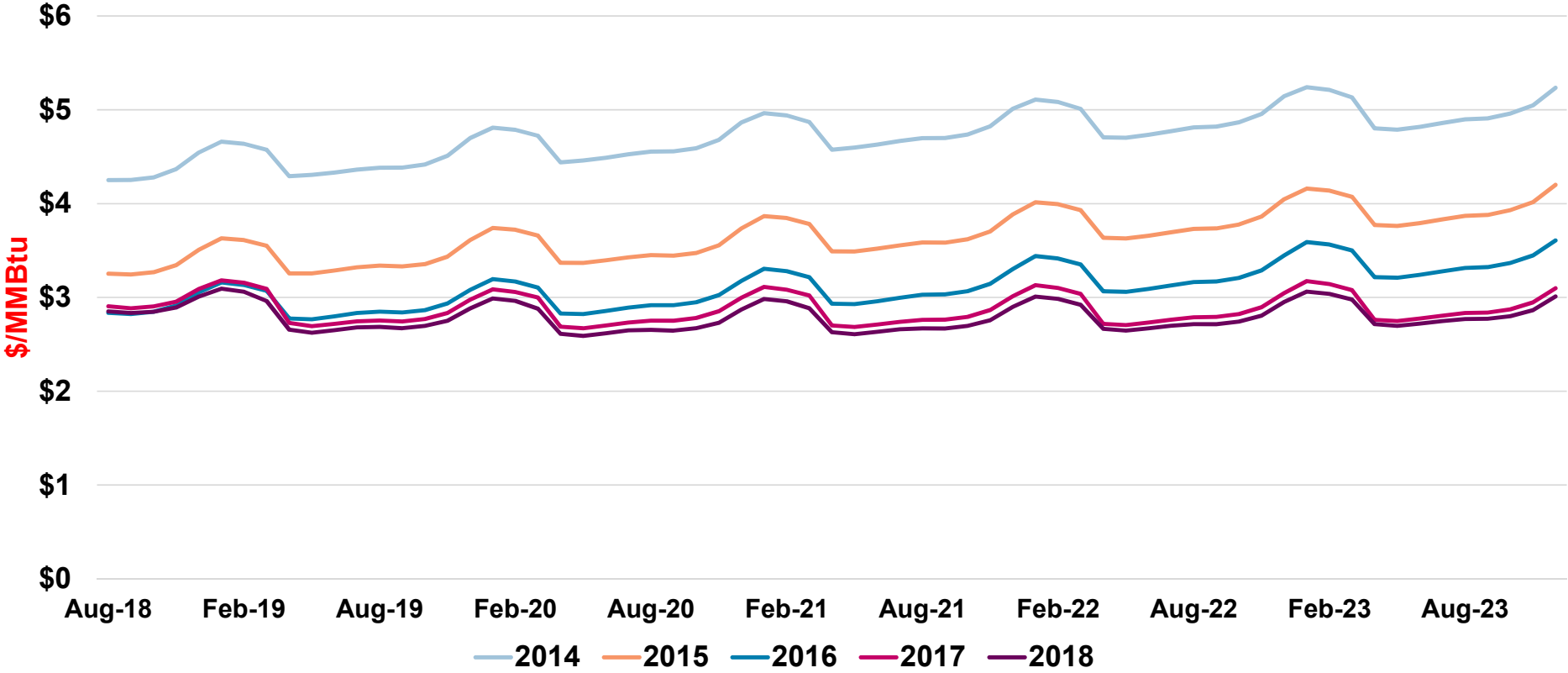
# Natural gas prices matter — for now — but how long?

- **US Gas Supply Abundance — tremendous upside potential — dependent on demand gains**
  - Opportunities exist for greater use of existing as well as new gas-fired CCGT plants, given prospect of more coal and nuclear plant retirements
- **Extent of Domestic / International Market Responsiveness Pivotal**
  - Next wave of material US demand growth hinges on gas-fired electric generation and/or LNG exports
- **Escalating Costs Threaten Timeliness of Midstream Projects, Starting with Pipelines**
  - “Temporary” versus “permanent” walling off of “cheap” supply
    - Proposition 112 in CO
- **Gulf of Mexico — Henry Hub now a “premium” price location**
  - Upside price potential “capped” by nearby dry shale play breakevens (e.g. Haynesville/Bossier), as well as extent of access to byproduct gas growth — but additional TX/LA pipe capacity will be needed
  - Regional prices, however, to remain vulnerable to more repeated episodes of relative weakness

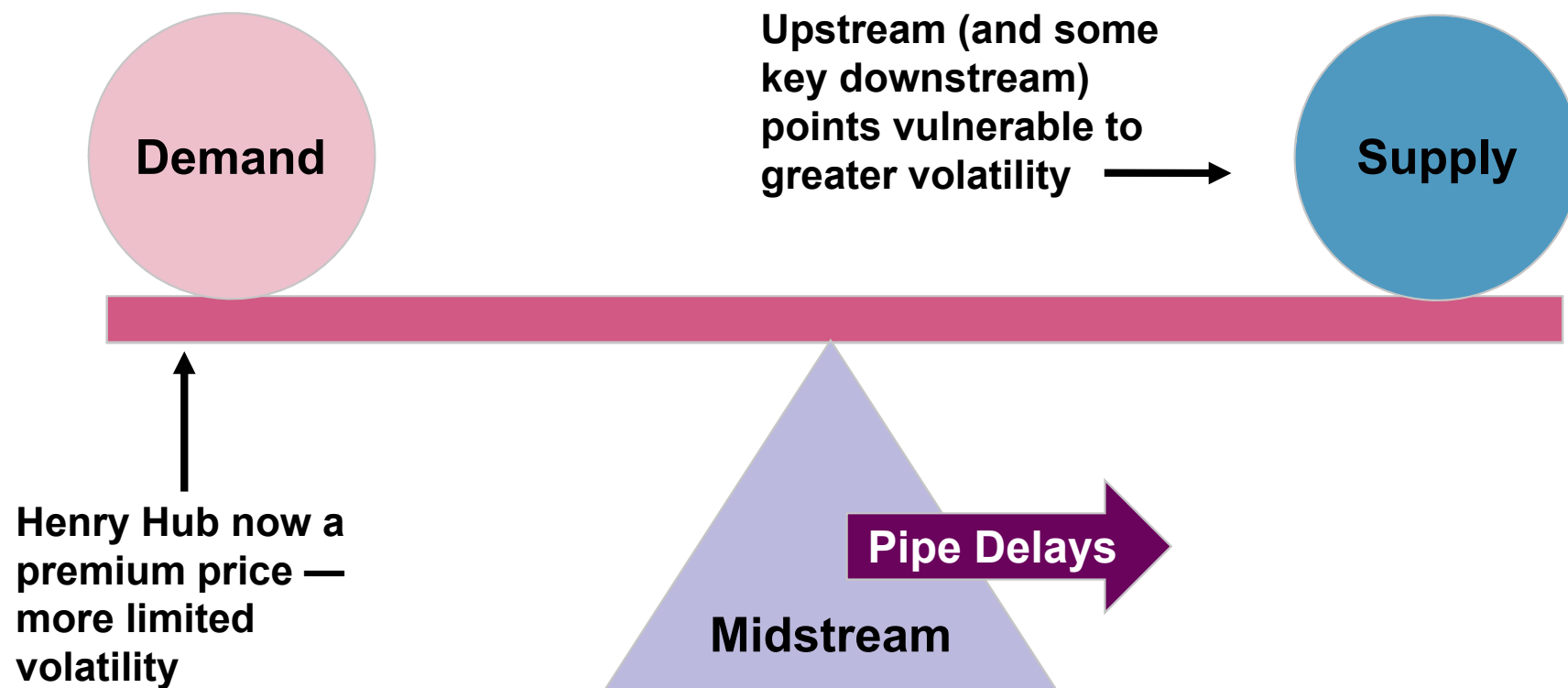
# Only warm winters have spawned sustained sub-\$2.50 Henry Hub prices — despite growing byproduct US gas production gains



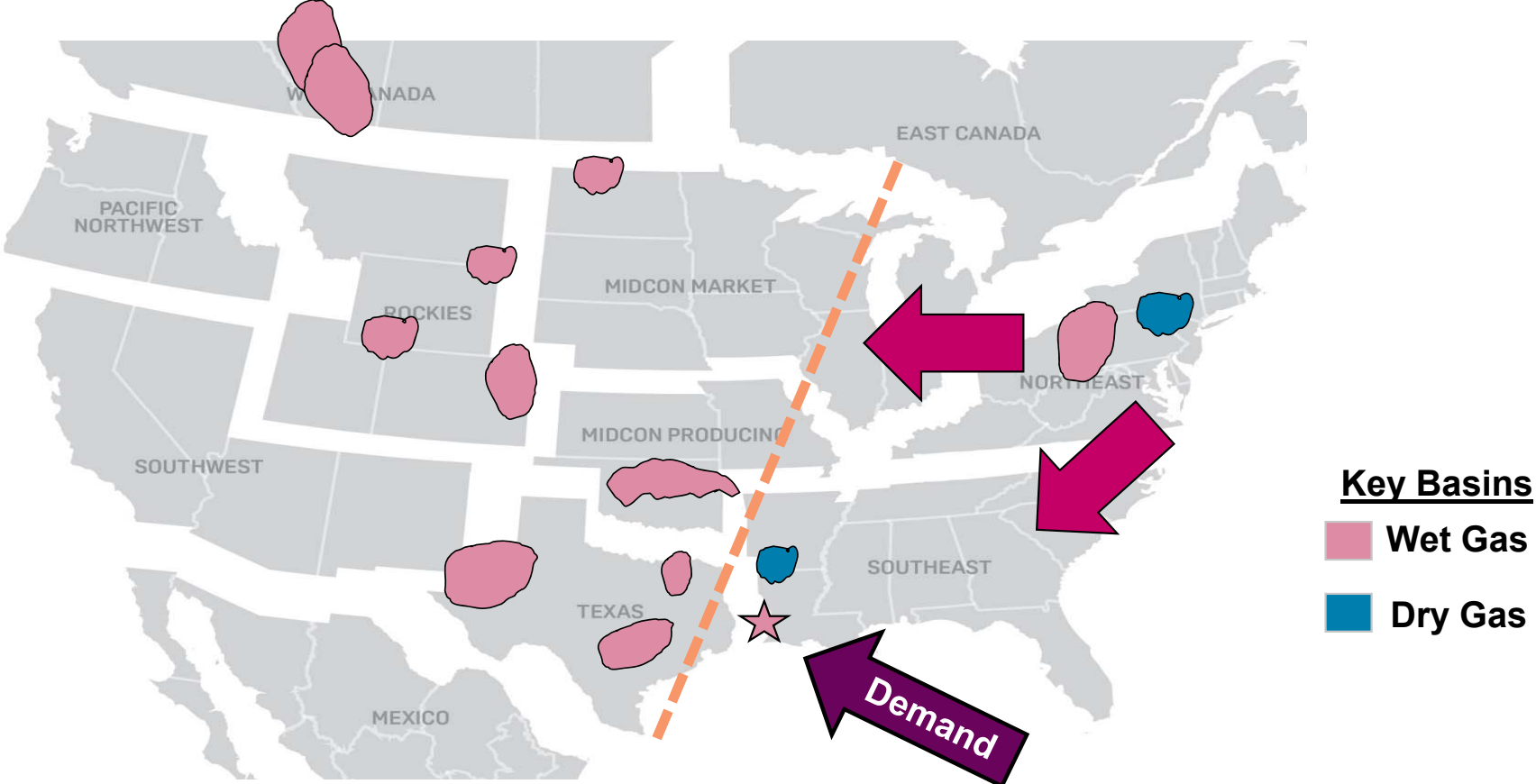
# Perceptions of low-cost US gas supply abundance underscored by extended NYMEX long-dated futures downtrend



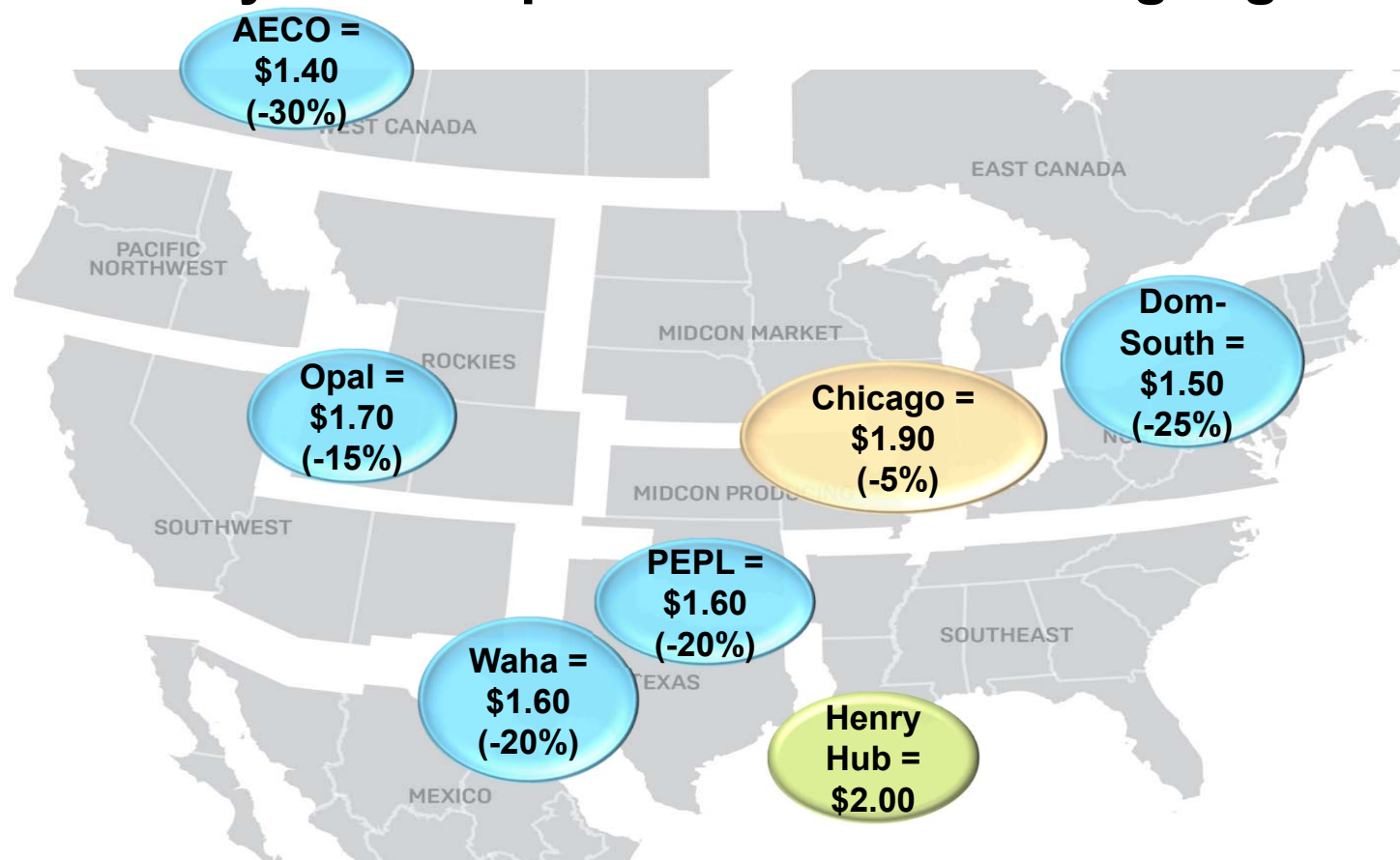
# Midstream constraints shift traditional balancing point toward supply; pipeline constraints threaten basis points vs Henry Hub



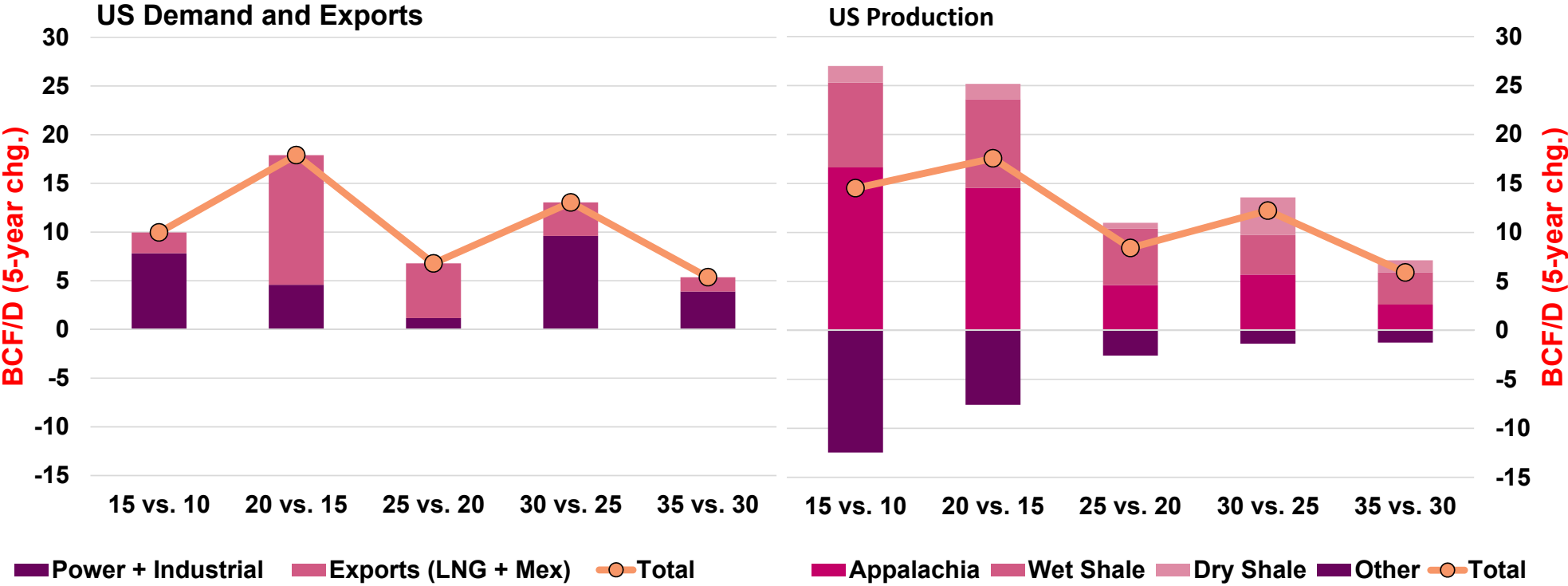
# Key challenge for US gas market is getting “cheap” gas to where its needed most — Gulf Coast (Henry Hub) — and at what cost



# Prospects surrounding sustained \$2/MMBtu Henry Hub prices conflict with likely S&D responses tied to ensuing regional prices



# Potential for more LNG and gas-fired EG — post-2023 — favors price appreciation given evolution of gas supply mix





# US gas power burns forecast to peak at ~40 BCF/D

- **Medium-Term Gas Growth Limited by Renewable Generation**

- Despite capacity additions, increases in gas burn through 2025 are limited by slow load growth and increasing renewables generation, remaining in the 25 BCF/D range.

- **Long-term Gas Growth Fueled by Retirements/Policy**

- Under Reference case assumptions for gas prices, carbon policy, renewables tax subsidies, gas-fired generation grows rapidly from the mid 2020's forward reaching 40 BCFD in 2040.

- **Growth Concentrated in Few Regions**

- Largest gains occur in regions with substantial aging coal/nuclear capacity, low gas/coal price spreads.

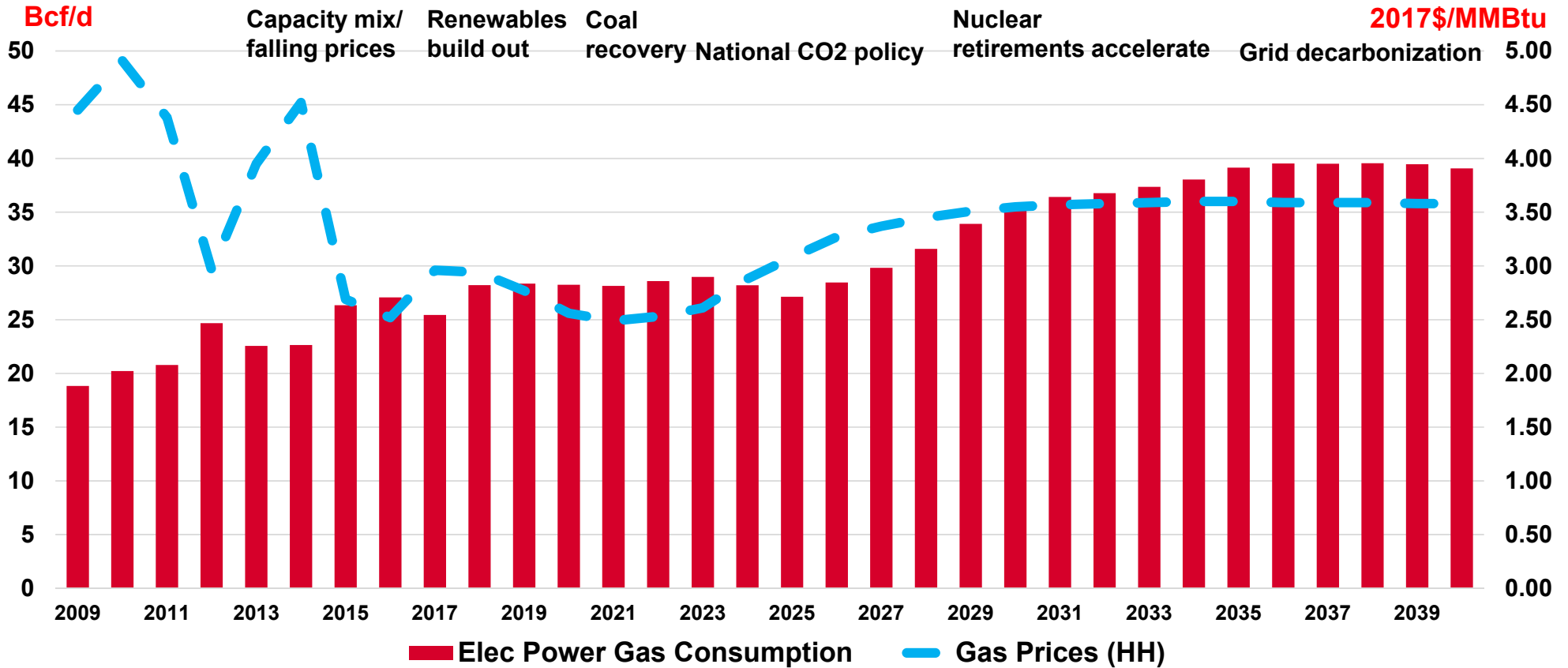
- **Downside Risks**

- Financial support for gas competitors (coal, nuclear, renewable)
- Unwillingness of states to allow massive gas additions
- Weaker loads, more BtM generation

- **Upside Risks**

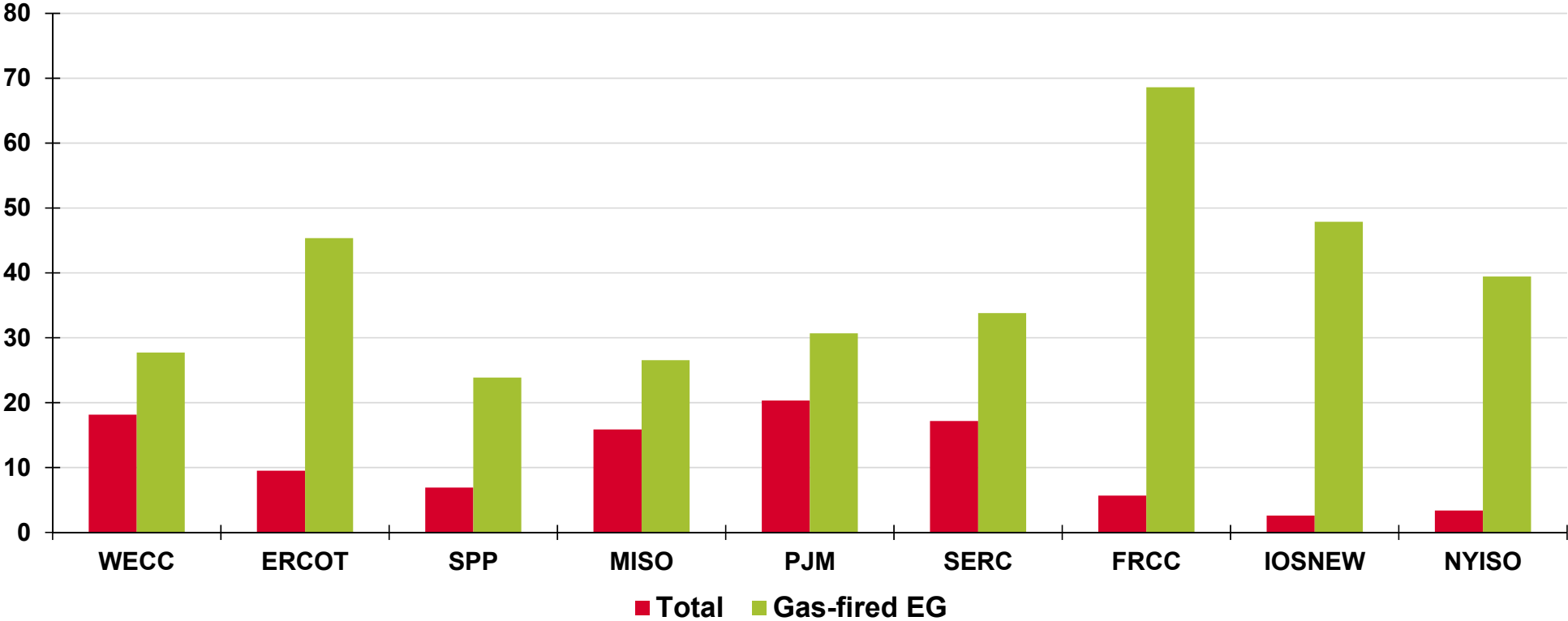
- NYMEX forwards favor larger gains for gas-fired generation

# Key phases in the outlook for US power sector gas use



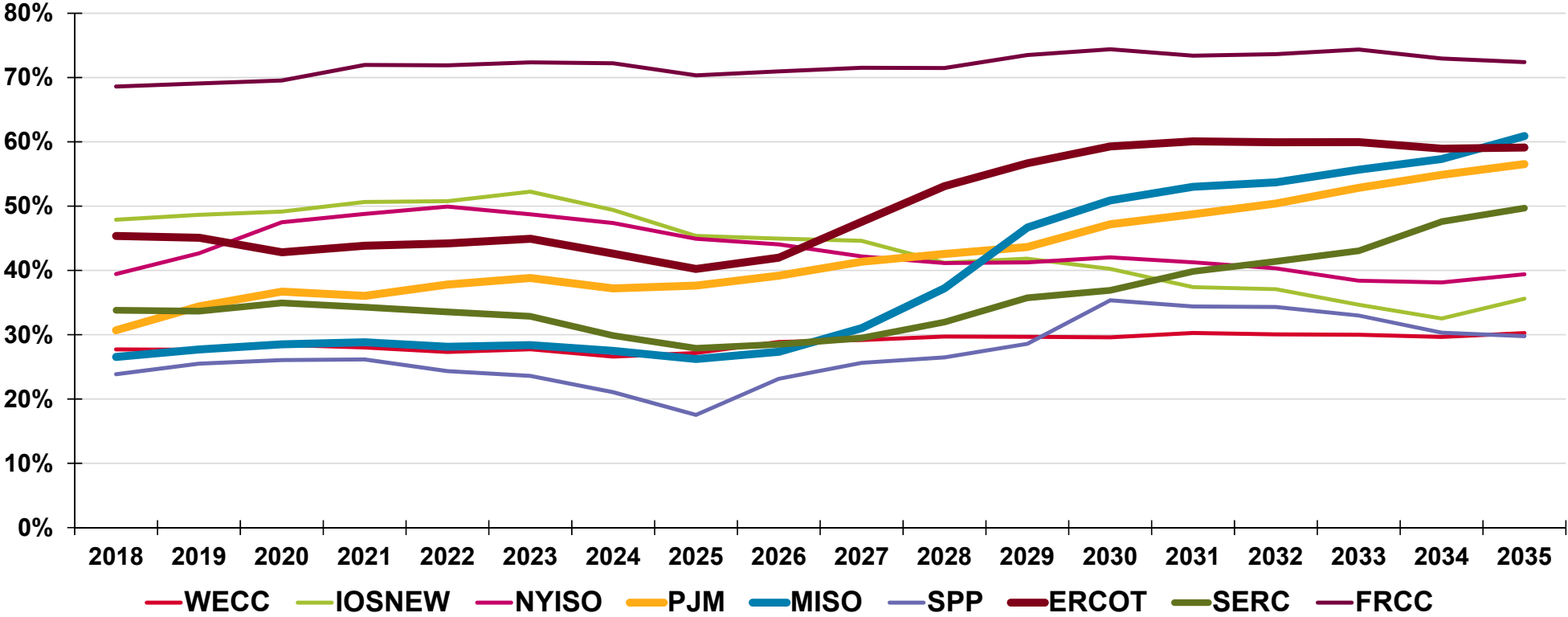
# Breakdown of US electric generation (EG) by ISO/RTO and share held by natural gas

Market Share

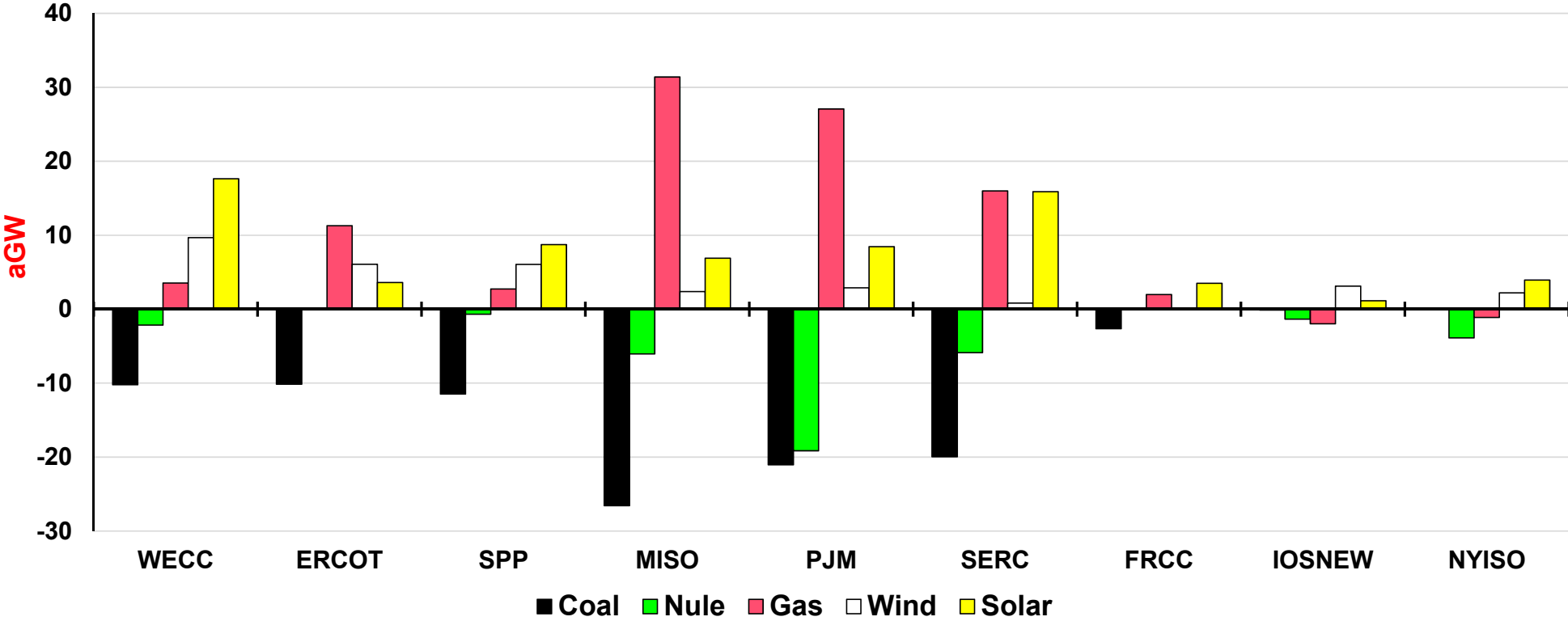


# Upside potential for material gas-fired electric generation gains limited to select ISO/RTOs – MISO, PJM, SERC and ERCOT

## Market Share

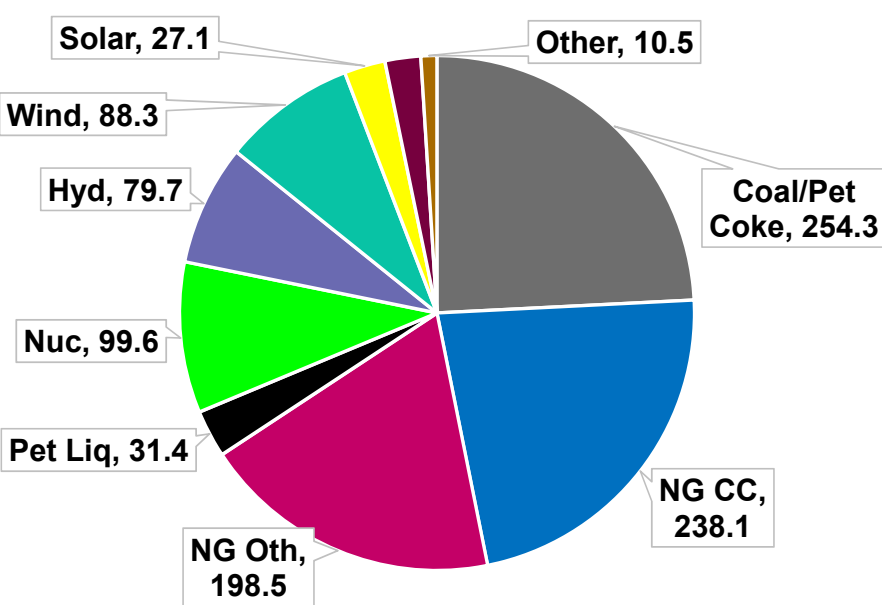


# Regional breakdown of US electric generation changes — 2040 vs 2018

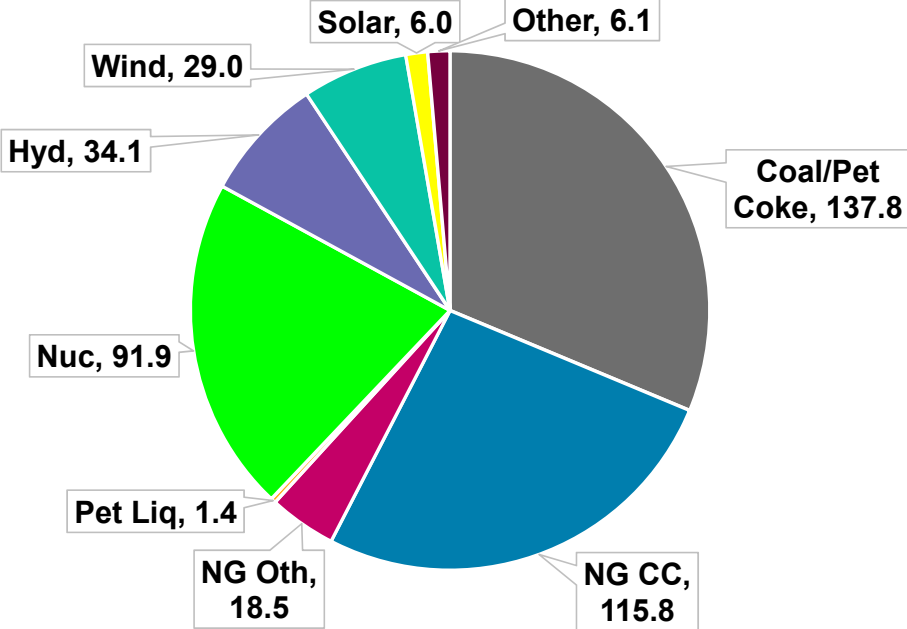


# Nuclear, coal and gas combined-cycles dominate generation, but relatively low capacity utilization shows room to gain/lose

End-2017 Capacity (GW)

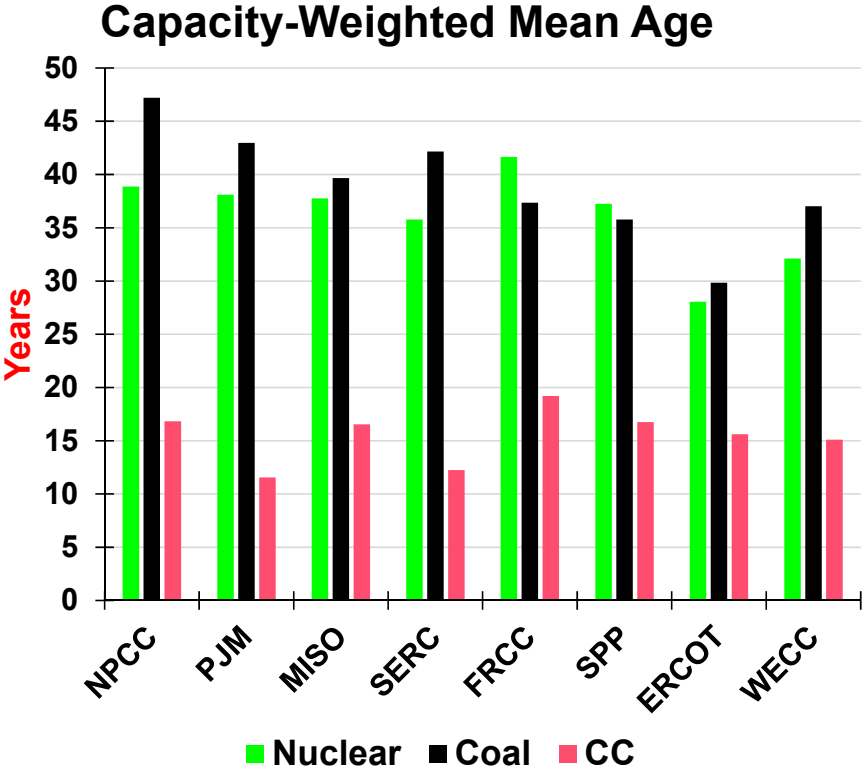
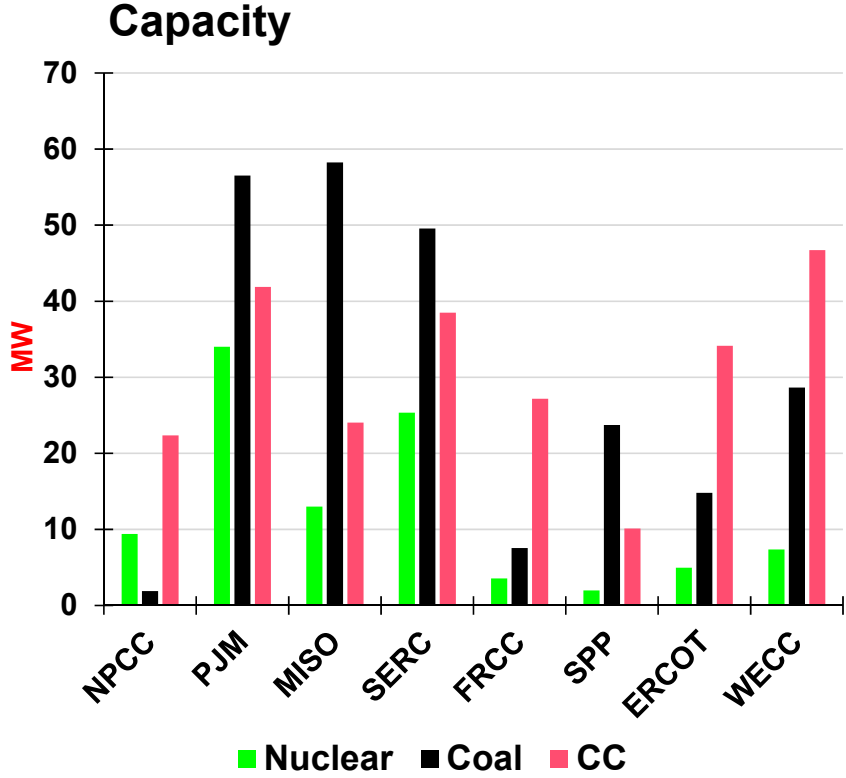


2017 Generation (aGW)

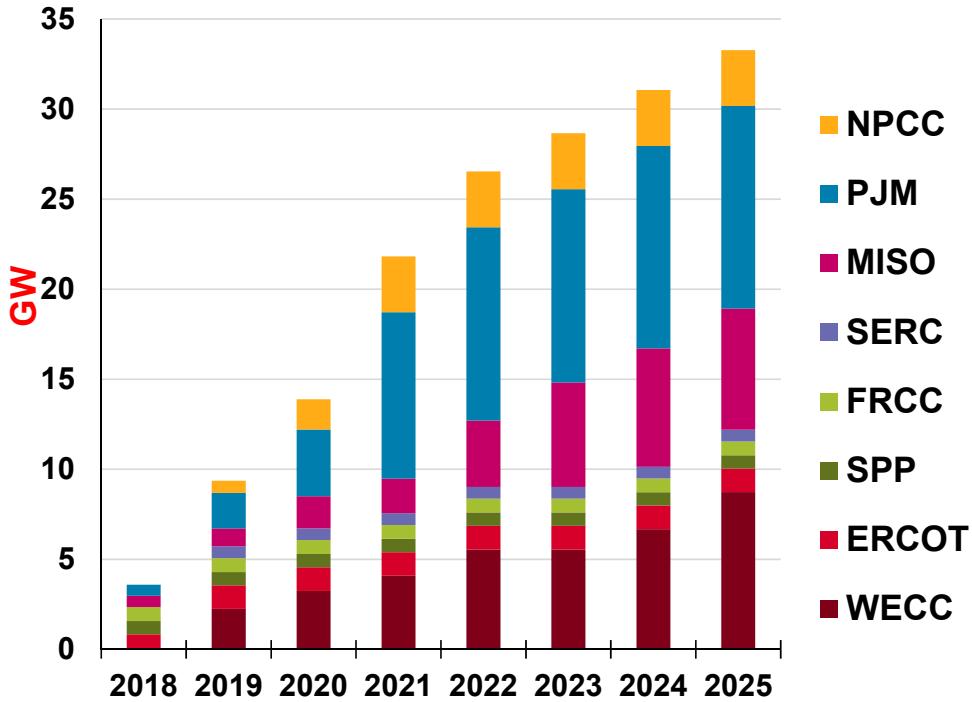
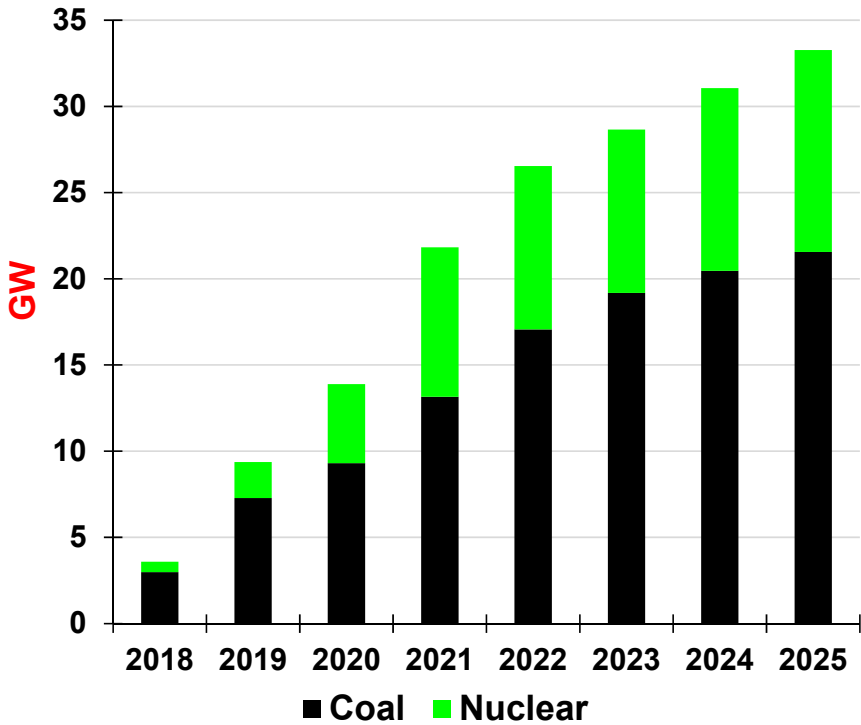


Source: EIA 860, EIA 923

# Generator demographics favor gas

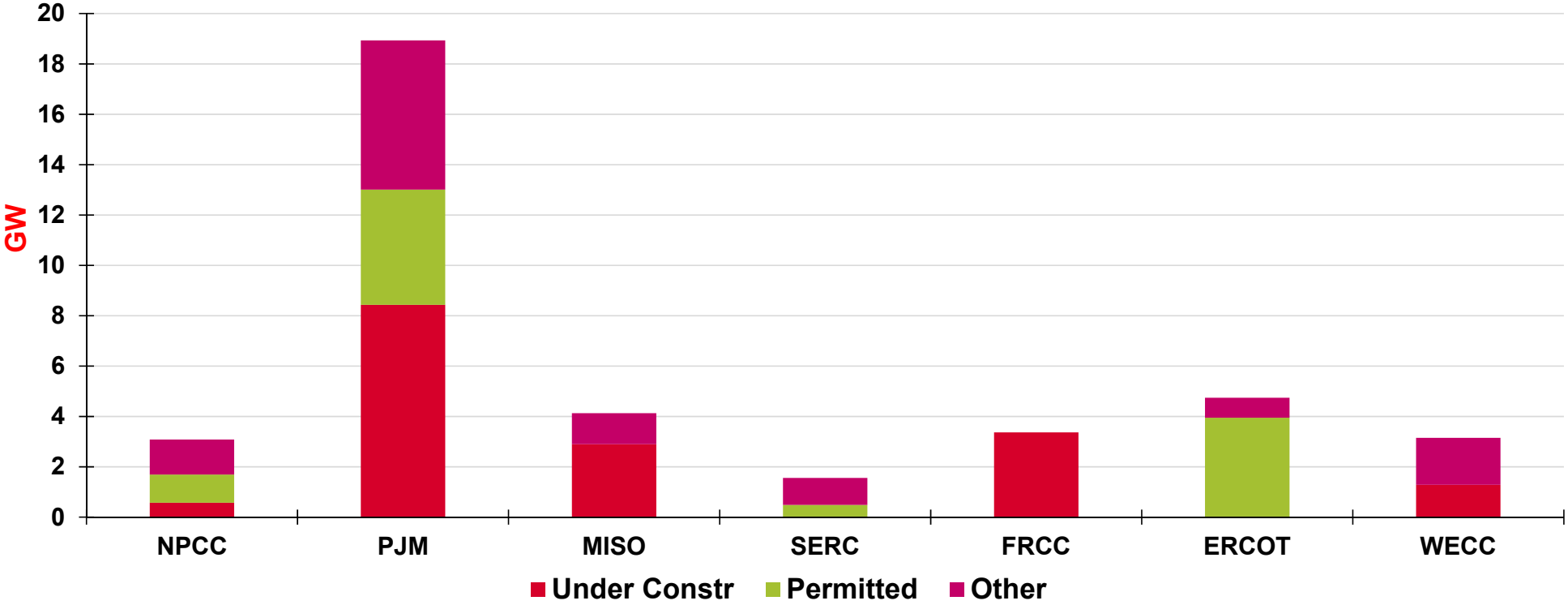


# Cumulative announced coal and nuclear retirements — but barring subsidies, additional retirements likely with <\$3 gas

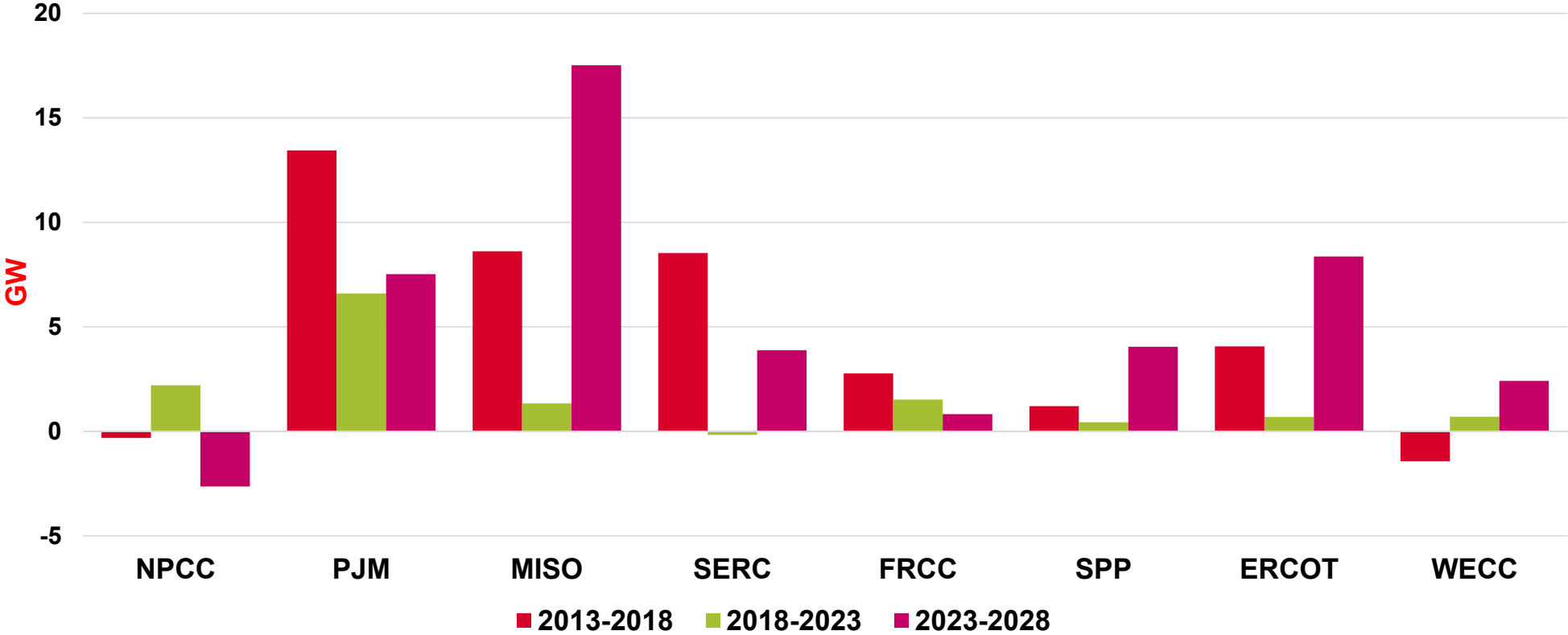




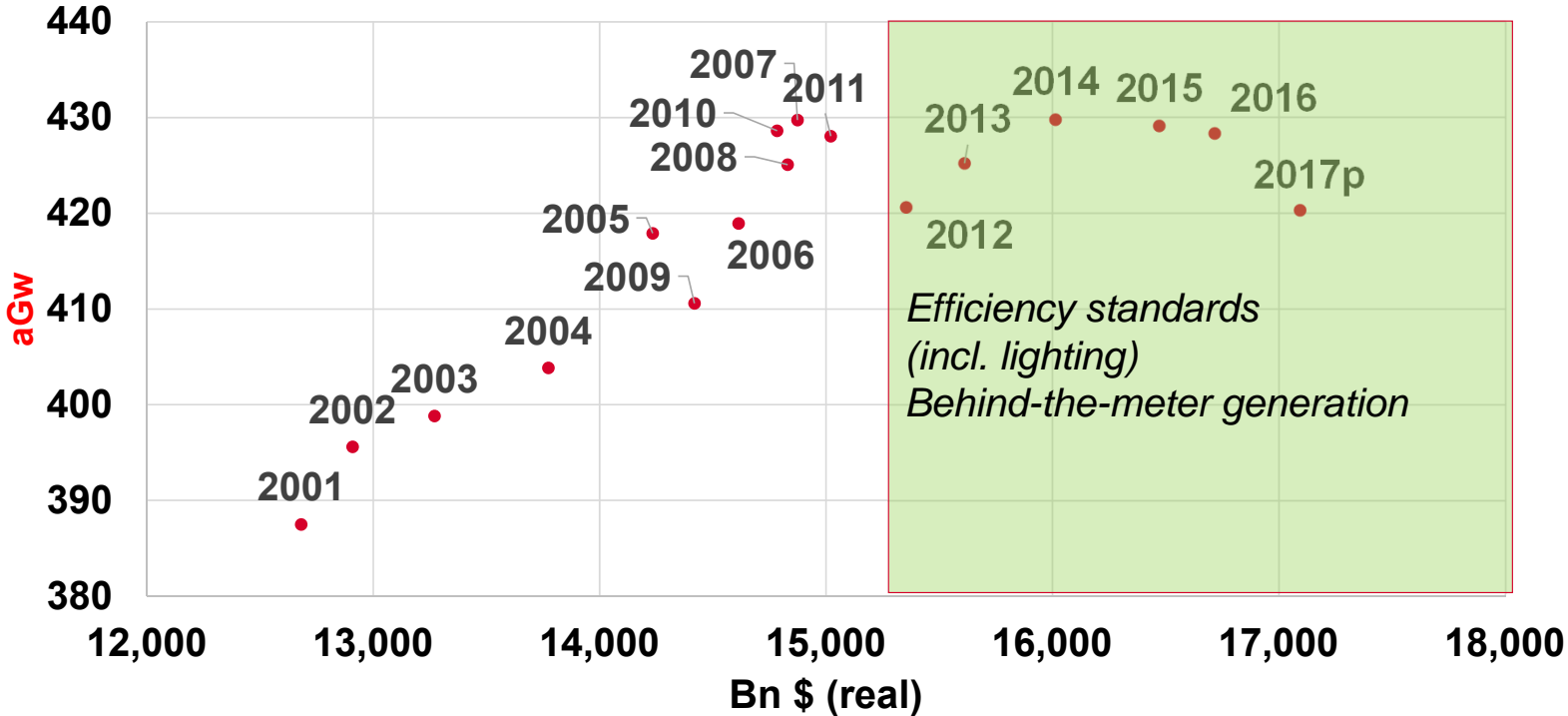
# 39 GW of combined-cycle capacity in development with nearly half in PJM



# PJM accounts for a large share of growth in gas-fired generation through 2023, but MISO to dominate thereafter



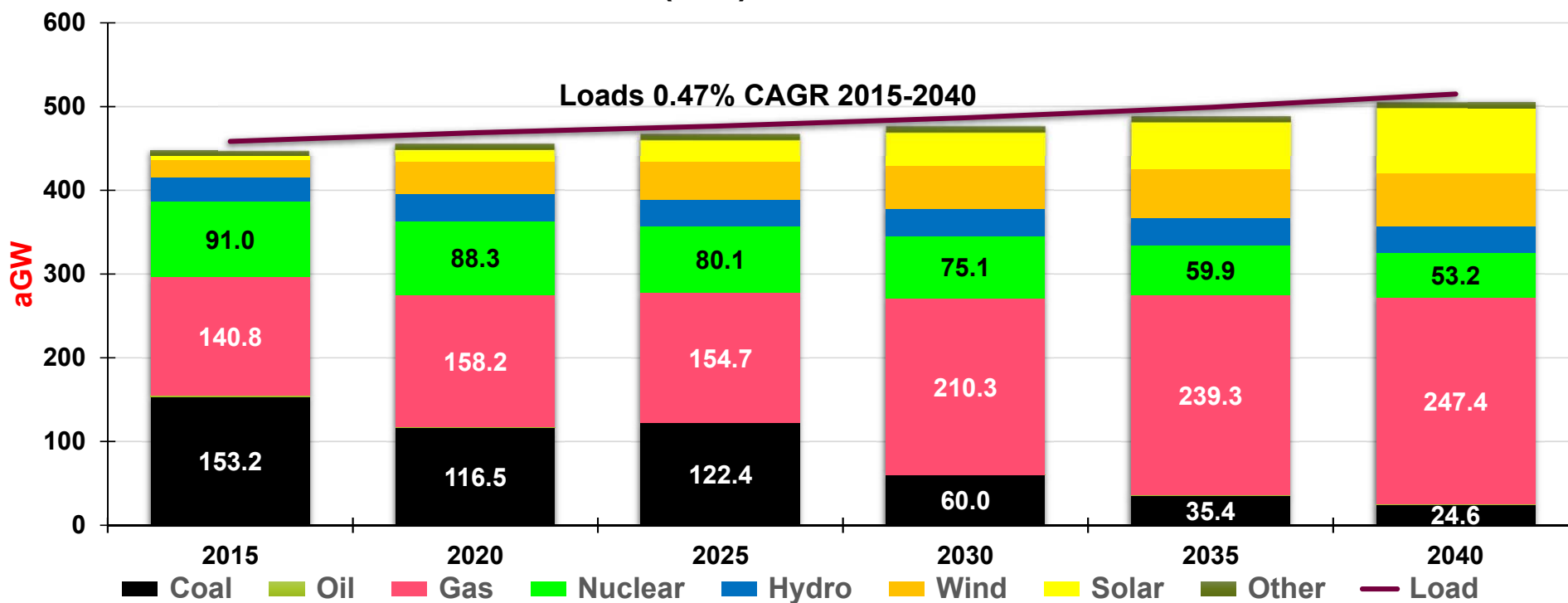
# Loads remained decoupled from economic activity through 2017



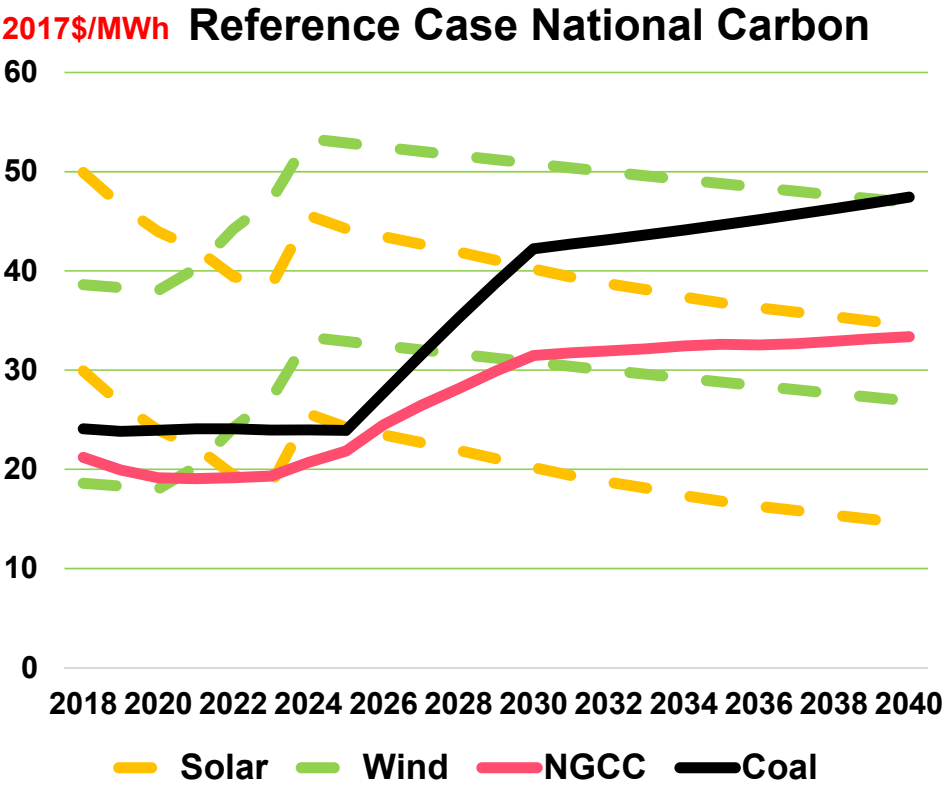
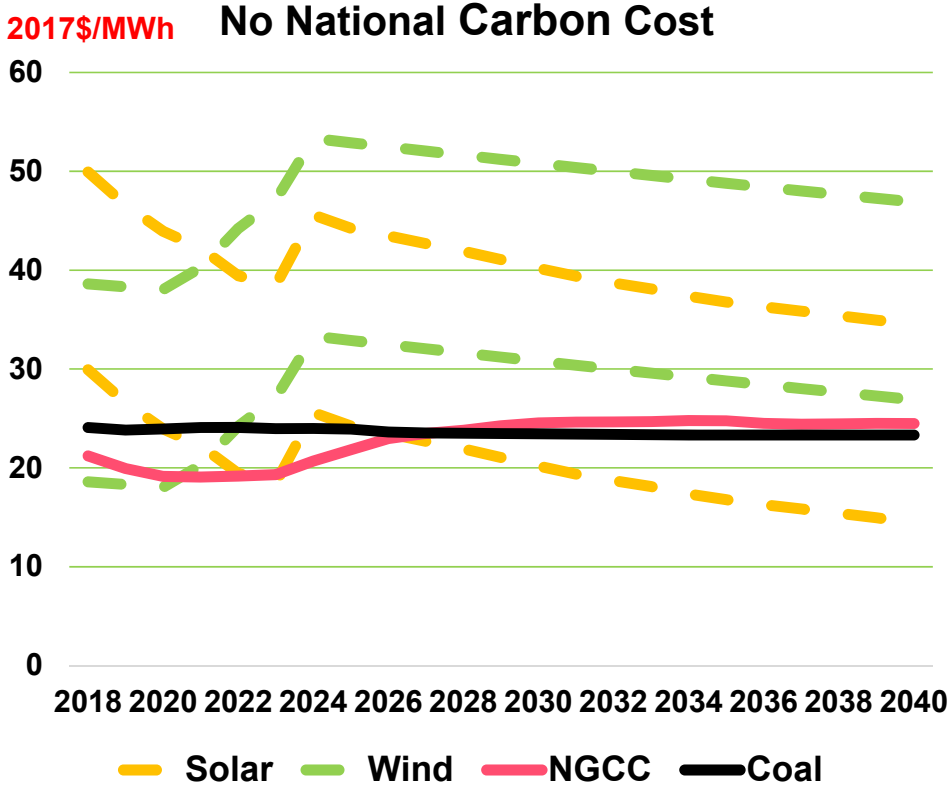
Source: BEA, Platts Analytics

# Absent policy support, coal & nuclear lose in the medium term; lower load growth and more renewables limits gas beyond

Fall (Oct) 2018 Forecast



# Carbon policy drives the next wave of coal to gas and gas to renewable switching



## Longer-term issues — gas prices (still) matter

- **US (N.A.) gas resource base more than able to support another 10+ Tcf expansion**
  - Byproduct gas growth, though, will diminish along with US onshore crude oil production gains — post-2020
- **Demand (including exports) “ready” to respond at “right” price; EG vs LNG**
  - Use of existing (and new) gas-fired electric generation (EG) capacity — at expense of coal and nuclear
  - Additional LNG export terminals — in US or elsewhere in N.A.
- **Bottlenecks due to inadequate midstream capacity and/or delayed project startups**
  - Need to overcome “last mile” hurdle to realize Henry Hub premiums
  - Upstream (and some key downstream) markets will be forced to balance supply and demand via basis weakness
- **Policy (targets, mandates, subsidies, tax policy) and technology**

**Timing critical to price formation**

# Thank You!

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