

State Level Perspectives on the Clean Power Plan

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Key Takeaways

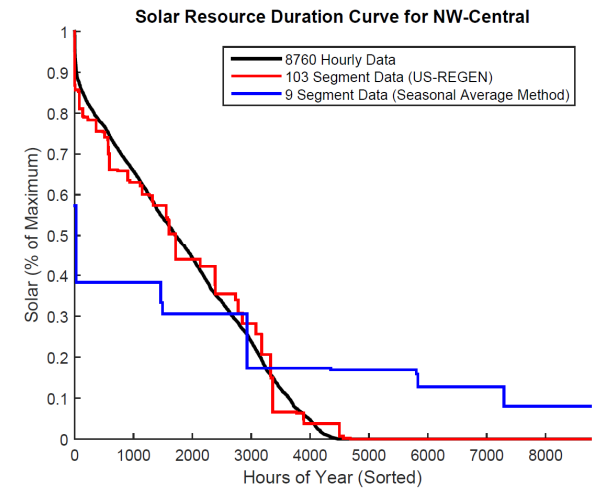
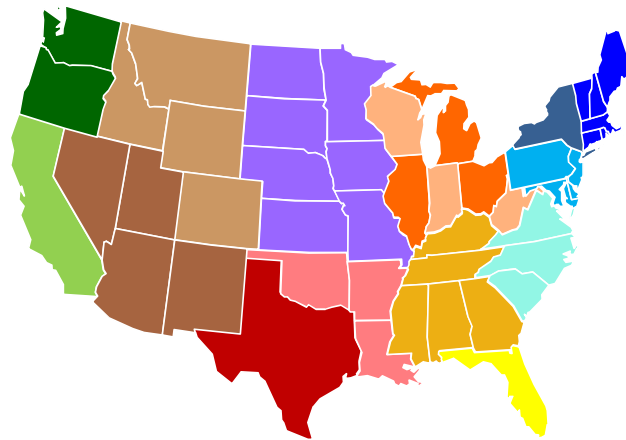
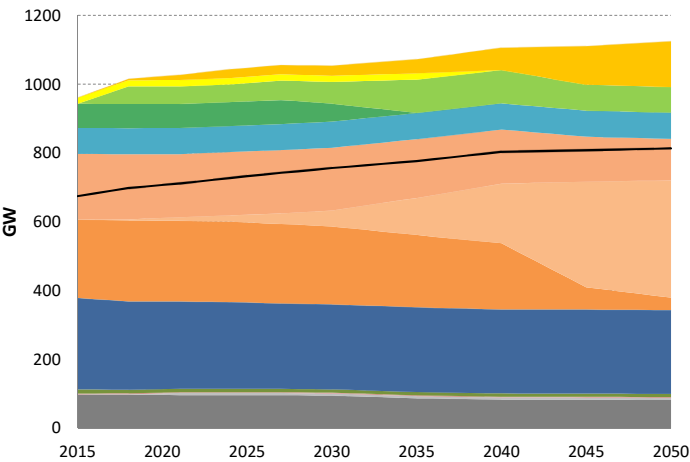
- No one CPP target is right for every state
 - Some states have a clear-cut choice, other states' choices dependent upon gas price path, planned coal retirements, other sensitivities
- Markets for allowances and ERCs could reduce compliance costs, but potential variability in prices creates risks for states' own compliance investments
- Cost of compliance highly sensitive to states' planned investments/retirements absent the CPP

US-REGEN 48 State Version: EPRI's In-House Electric Sector Model for CPP Modeling

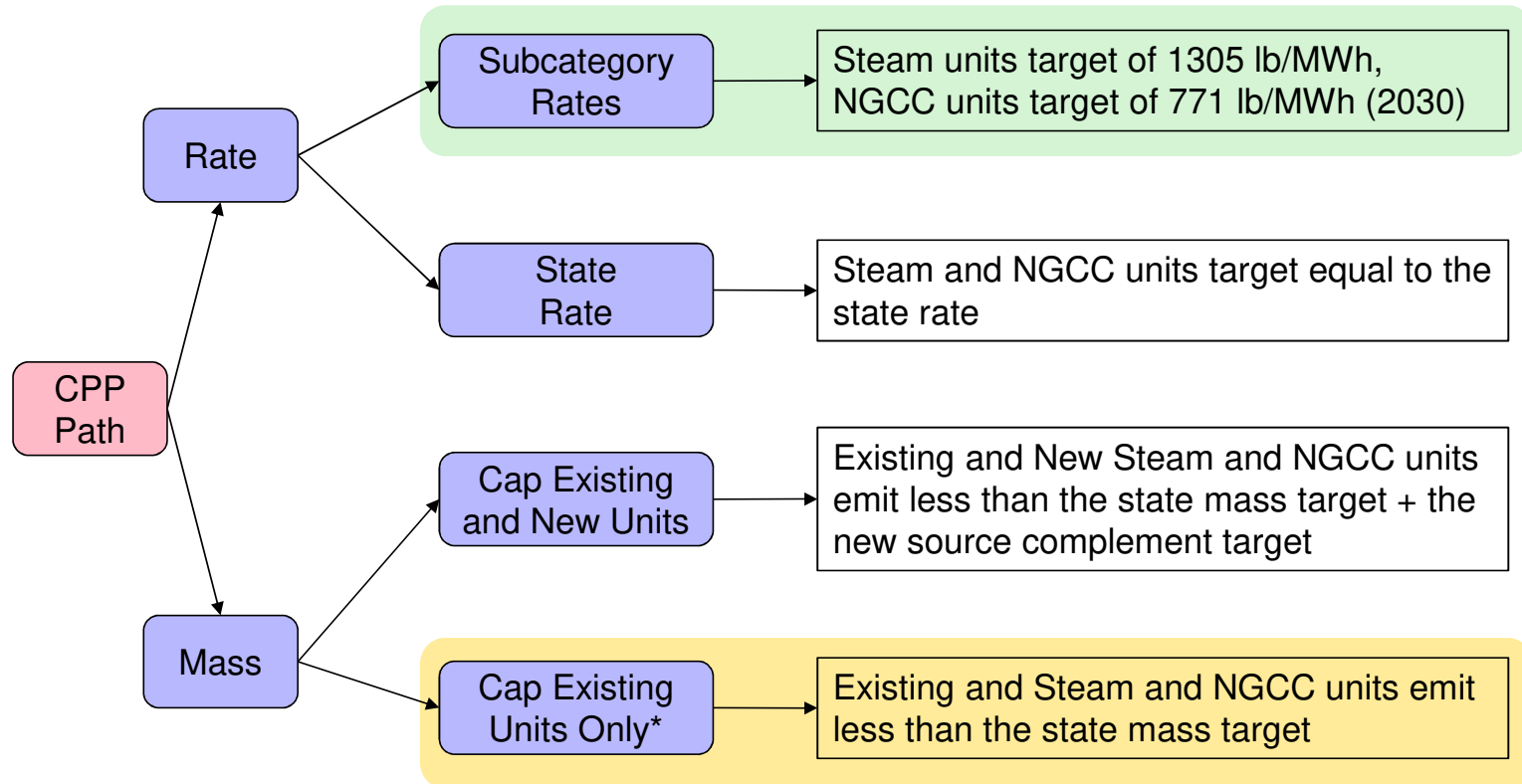
Capacity Expansion
Economic Model, Long
Horizon to 2050

State Level Resolution for
Policy and Regulation
Analysis

Innovative Algorithm to
Capture Wind, Solar, &
Load Correlations in a
Long-Horizon Model



US-REGEN Models Four Main Compliance Pathways

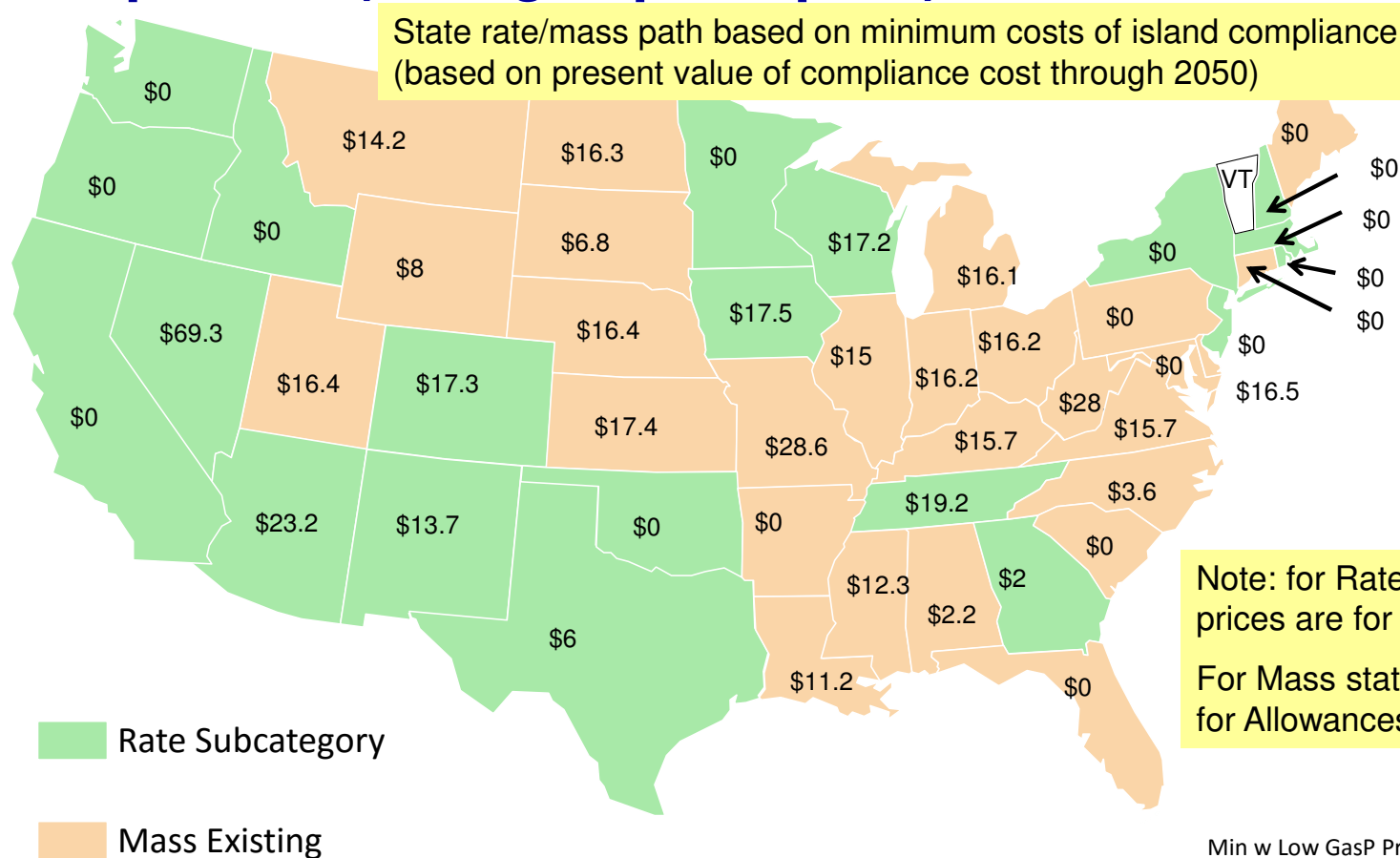


* US-REGEN modeling of existing mass target is based upon the *proposed Federal Plan*.

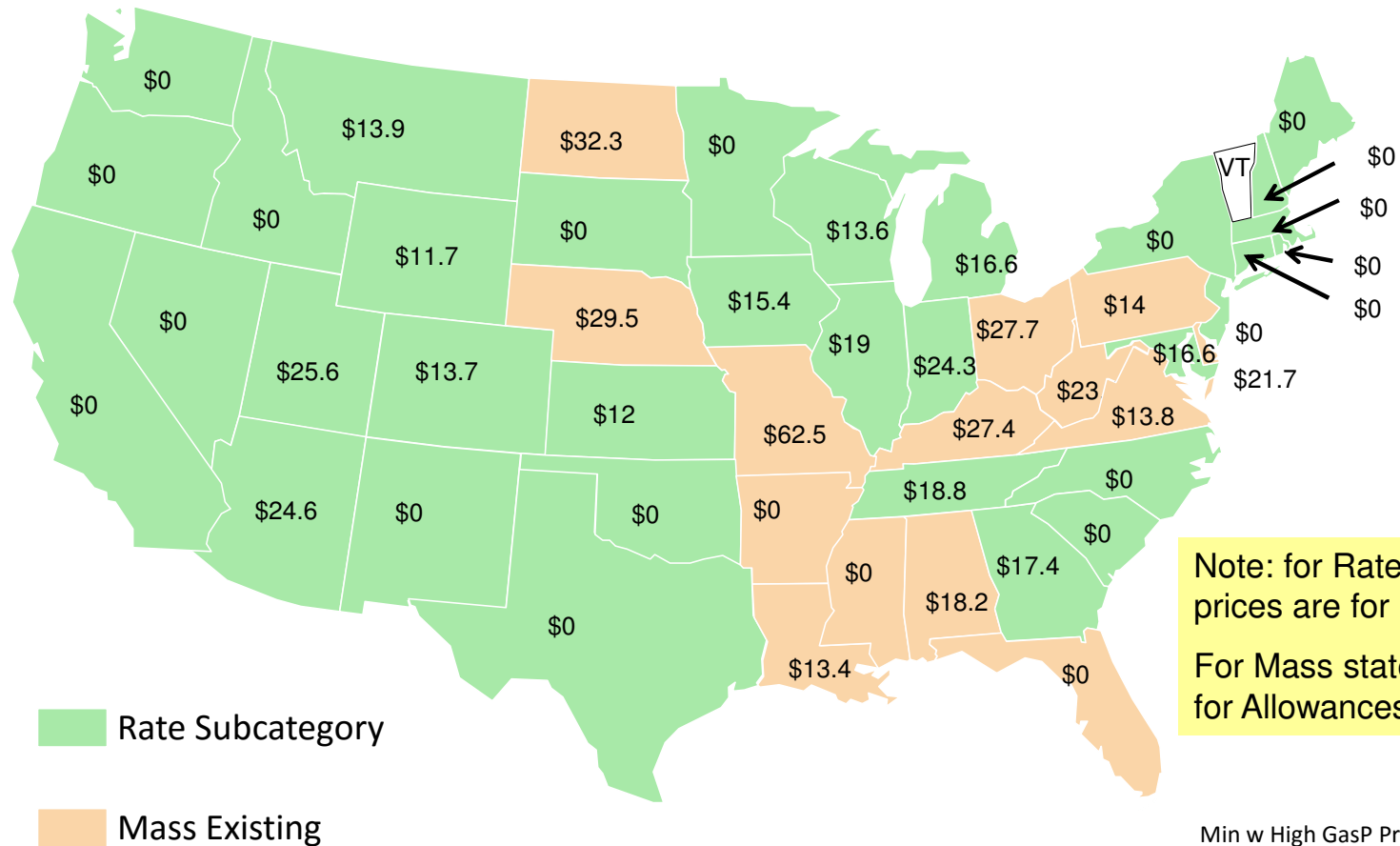
What If Each State Were An Island For CPP Compliance?

Each state must comply relying solely on resources within its own boundary; power flows limited to levels in reference case

Emission Rate Credit (ERC)/Allowance Prices for 2030 with Full Island Compliance (Low gas price path)



ERC/Allowance Prices for 2030 with Full Island Compliance (High gas price path)

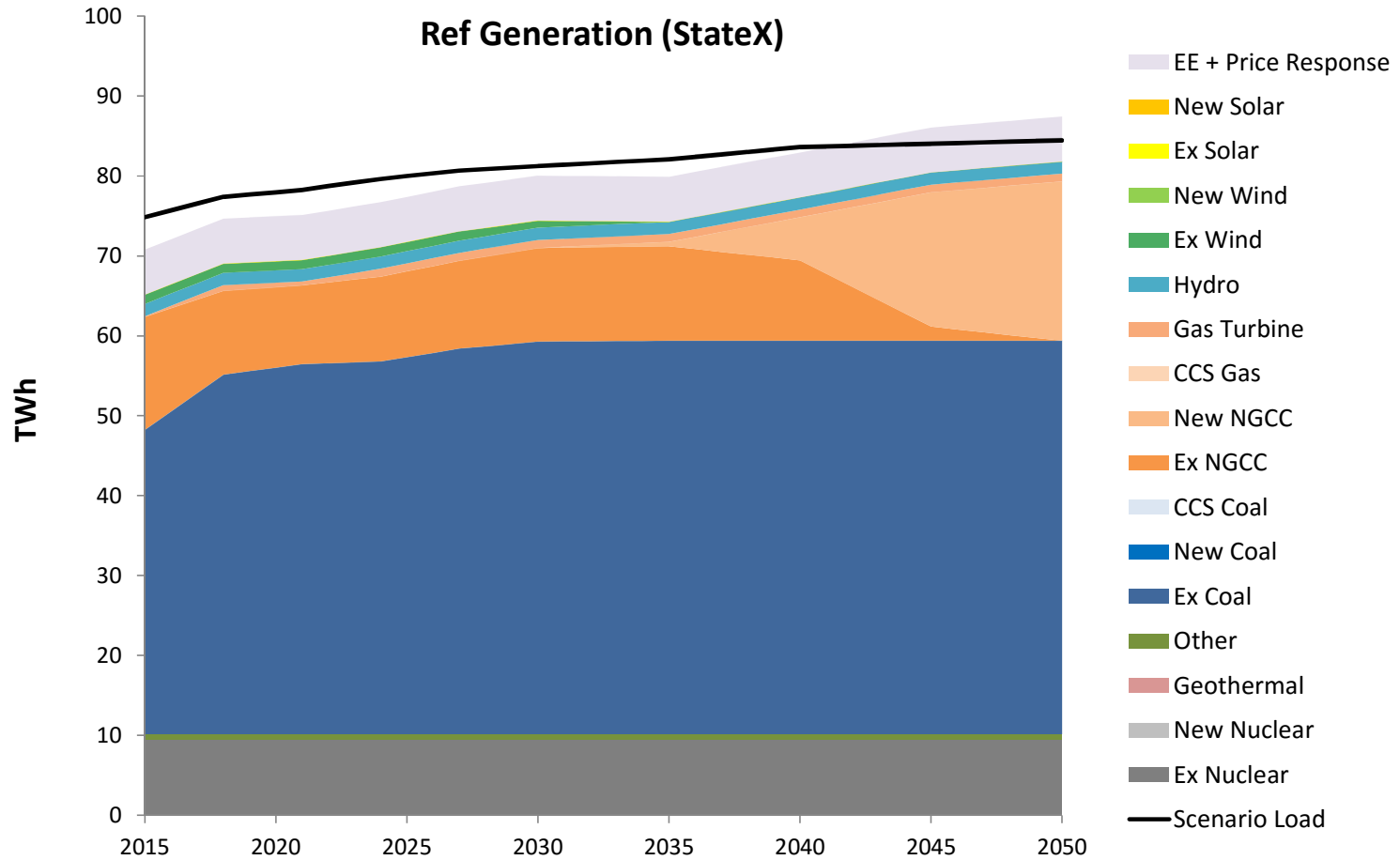


Observations

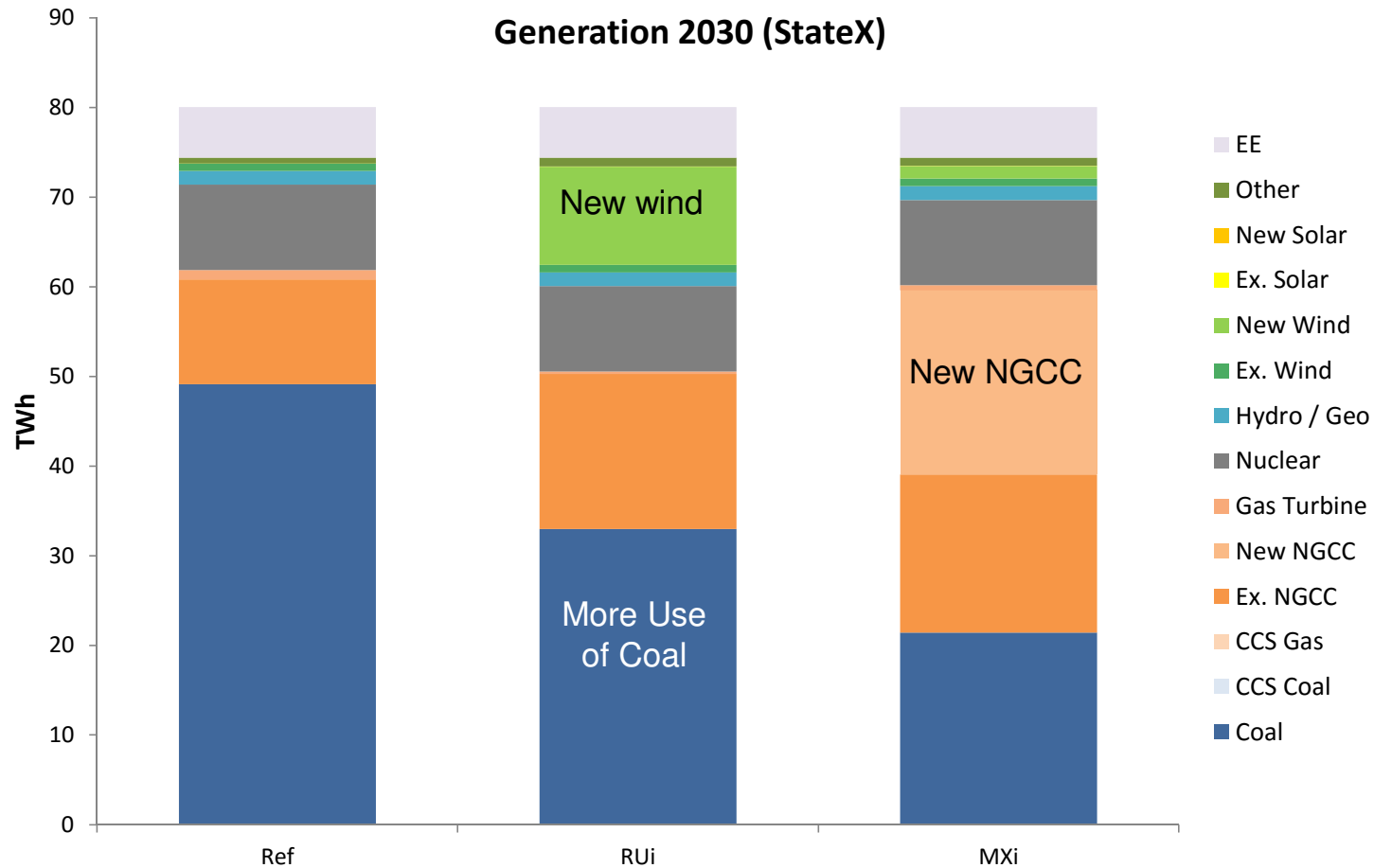
- Simple economics of rate vs mass:
 - Rate compliance achieved with investment in renewables (wind) and energy efficiency, gas re-dispatch
 - Mass compliance achieved with investment in more gas generation
- Zero prices imply states are in compliance in 2030 (though possible need some effort to comply in other time periods)
- Low prices driven by ease of compliance, in turn driven by
 - Low price of natural gas
 - Low incremental cost of wind (in high-wind states)
 - Energy efficiency credits from existing EE programs
 - Announced/expected post 2012 coal retirements
- Many states at/near compliance for both Rate and Mass paths

Example Analysis for State X

State X Reference Case Generation

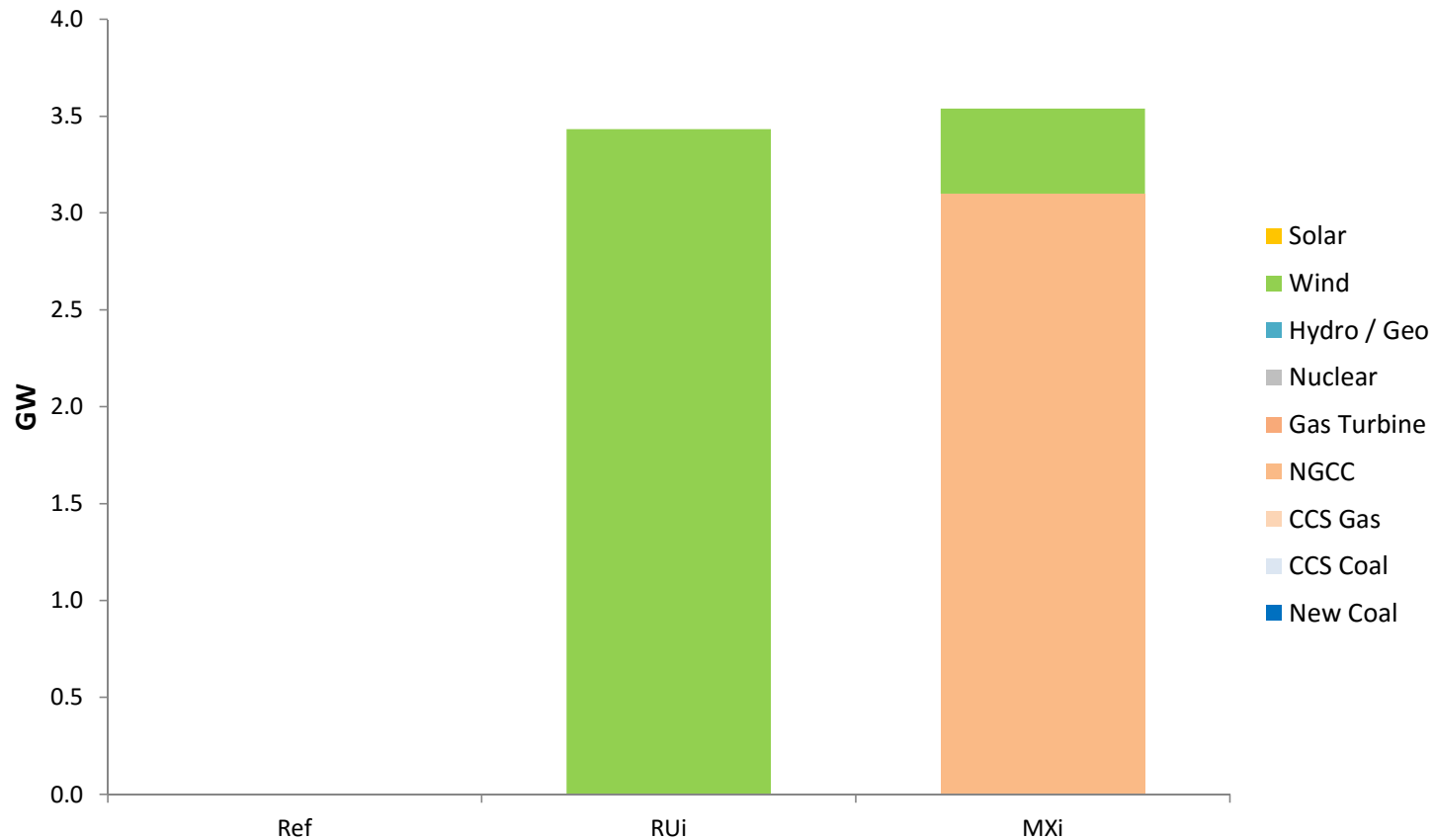


CPP Compliance as an Island Requires Overhaul of the Generation Mix for Either Rate or Mass Pathways



Island Compliance Depends on New Investment in Wind (for Rate Path) or New NGCC (for Mass Path)

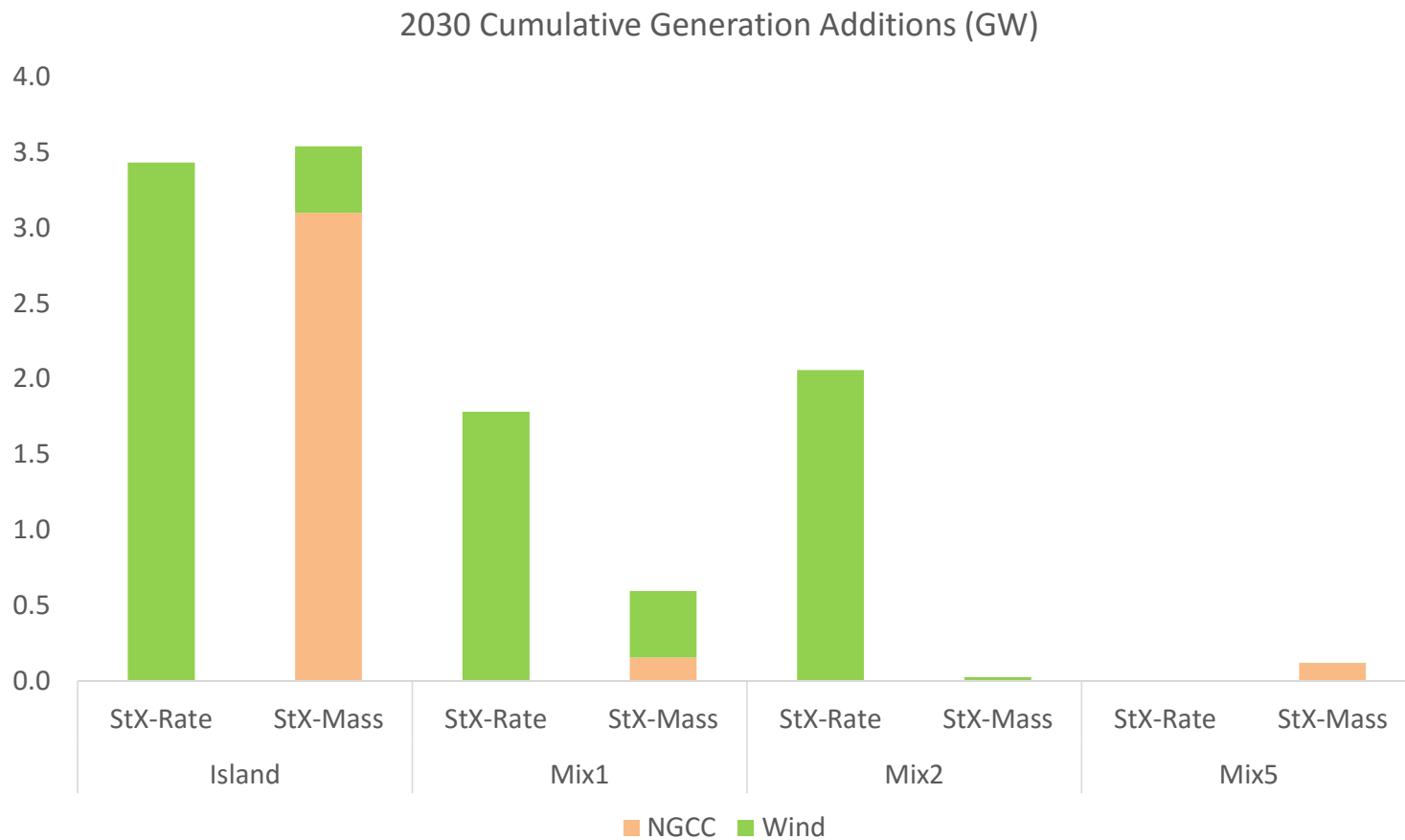
Cumulative Capacity Additions in 2030 (StateX)



Compliance with Trading

- Opportunity to reduce cost
- Trade-off is reliance on a market
 - Slow to develop?
 - Liquidity?
 - Exposure to additional external forces
 - Lower volatility?
- Different mixes of rate/mass compliance from other states will impact market prices and the value of trading for StateX

Investment Needed for Compliance



Strategic Insights

- Key decisions for states are Rate vs. Mass, but also how much to rely on participation in the market
- Some states appear to have lower costs with Rate, some for Mass, no single universal lowest-cost choice
- The future matters
 - Natural gas prices, RE and EE costs
 - Pre-CPP planned retirement/investment decisions
 - Market scope and depth
 - Supply/demand for ERCs and Allowances depends on individual state choices for Rate vs. Mass



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