



Impacts of Potential Future National Carbon Cap-and-Trade Programs

Scott Bloomberg
David Harrison
Eli Shakun

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Agenda

1. Current Status of National Regulation of Carbon
2. Background on Prior Actual and Proposed Cap-and-Trade Programs
3. Key Design Elements of Cap-and-Trade Programs
4. Historical Factors Leading to Lower Baseline GHG Emissions
5. Impacts of Three Potential Future Cap-and-Trade Programs
6. Summary

Overview of Current Status of Major Regulation of GHG Emissions

- Clean Power Plan regulating utility GHG emissions was finalized but Trump Administration has proposed to repeal
- GHG standards for MY2022-2025 for light-duty motor vehicles finalized but Trump Administration has proposed to modify (with specific proposal expected soon)
- Current GHG cap-and-trade programs in Northeast (RGGI) and California (AB 32 and AB 398)
- State standards for renewables and energy efficiency can reduce GHG emissions

History of Major Actual and Proposed GHG Cap-and-Trade Programs

- European Union Emissions Trading Scheme (EU ETS)
 - Began in 2005 and became model for GHG cap-and-trade programs

- Two major existing US regional and state programs
 - Regional Greenhouse Gas Initiative (RGGI) for Northeast States (begun in 2009)
 - California AB 32 and AB 398 cap-and-trade program (begun in 2012)

- Major Congressional proposals
 - Lieberman-Warner bill (passed by Senate Environment and Public Works Committee in December 2007)
 - Waxman-Markey bill (passed by House in June 2009)

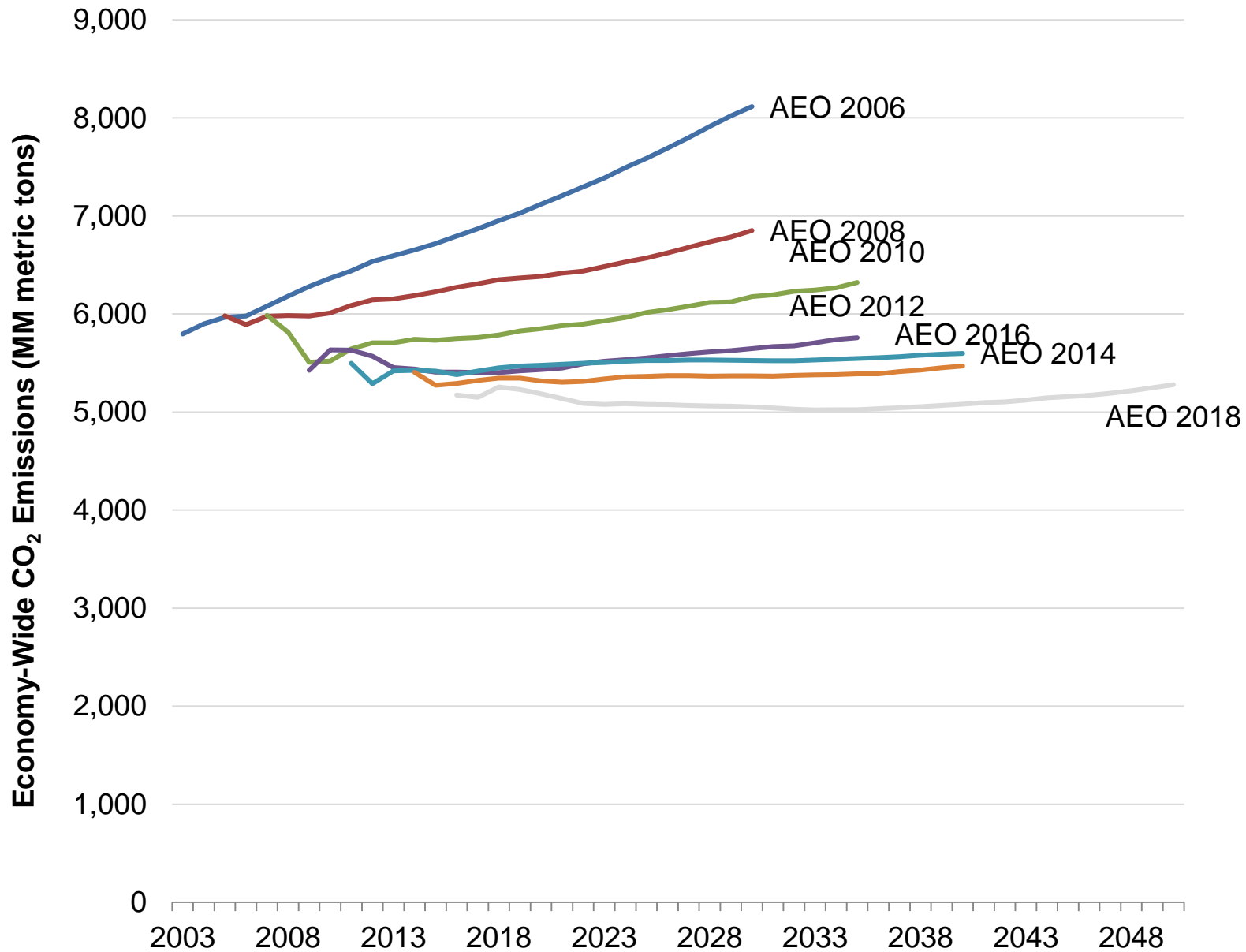
Major Advantages of Cap-and-Trade Approach

- Greater certainty and lower cost of meeting given GHG emission target
 - Various empirical studies confirm the cost-saving advantages of this “market-based” approach
- Provides mechanism to modify the distributional impacts
 - Allocation of initial allowances key mechanism
 - Prior programs have provided “free allowances” to reduce impacts on sectors as well as customer groups
 - Auction of allowances provides government revenue
- Reduced administrative costs
 - Government role limited (relative to traditional regulatory approach)

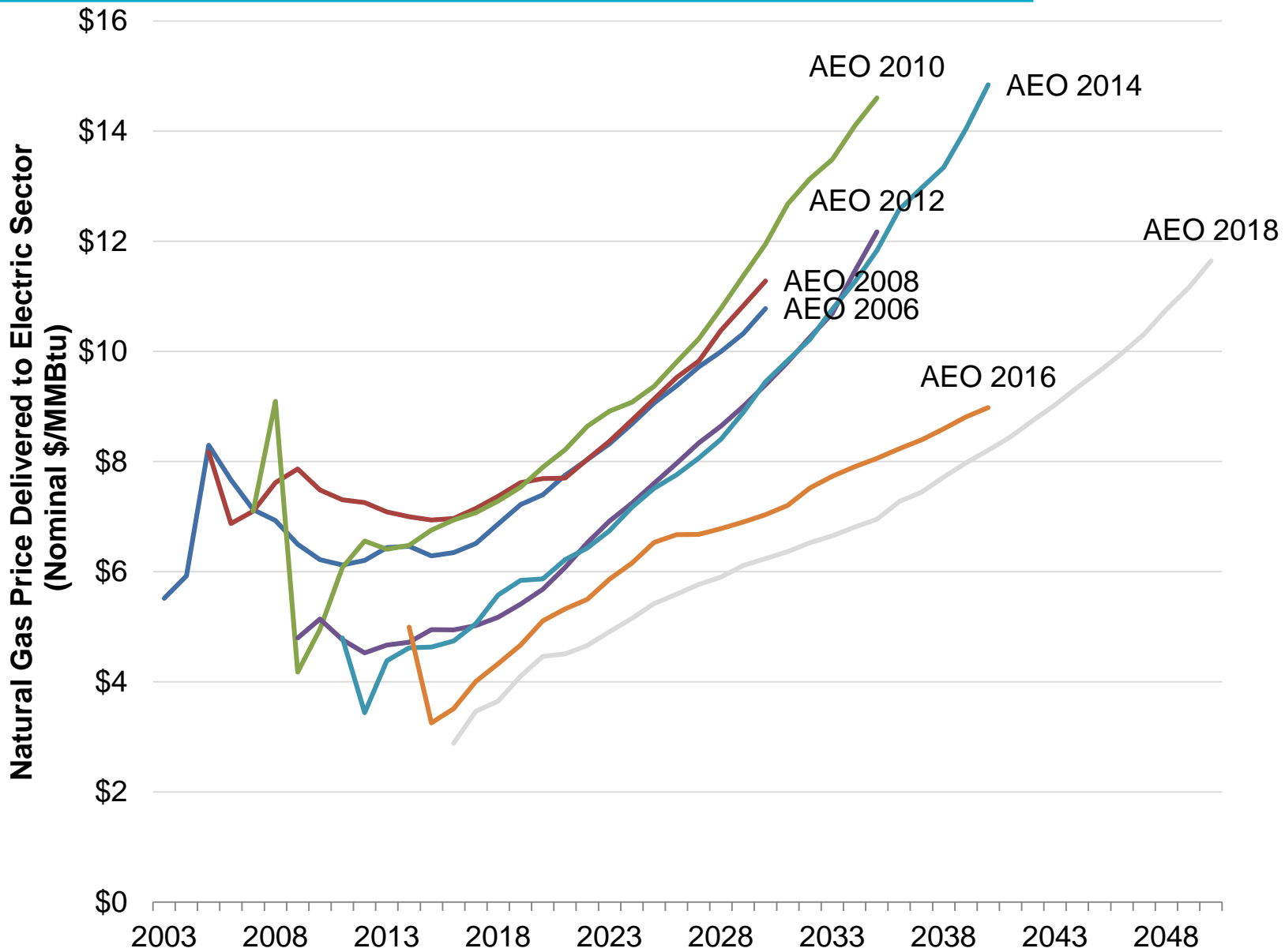
Key Design Elements of Cap-and-Trade Programs

- Coverage (sectors, sources)
- Stringency of cap (relative to baseline)
- Availability of offsets (domestic, foreign)
- Allocation of initial allowances (primarily distributional)
- “Banking” (and “borrowing”) provisions
- Price limits (floor, ceiling/safety valve) and supply adjustments to modify prices
- Linkage with other programs

Historical Context: Baseline CO₂ Emissions Declining and Now Projected to be Almost Flat

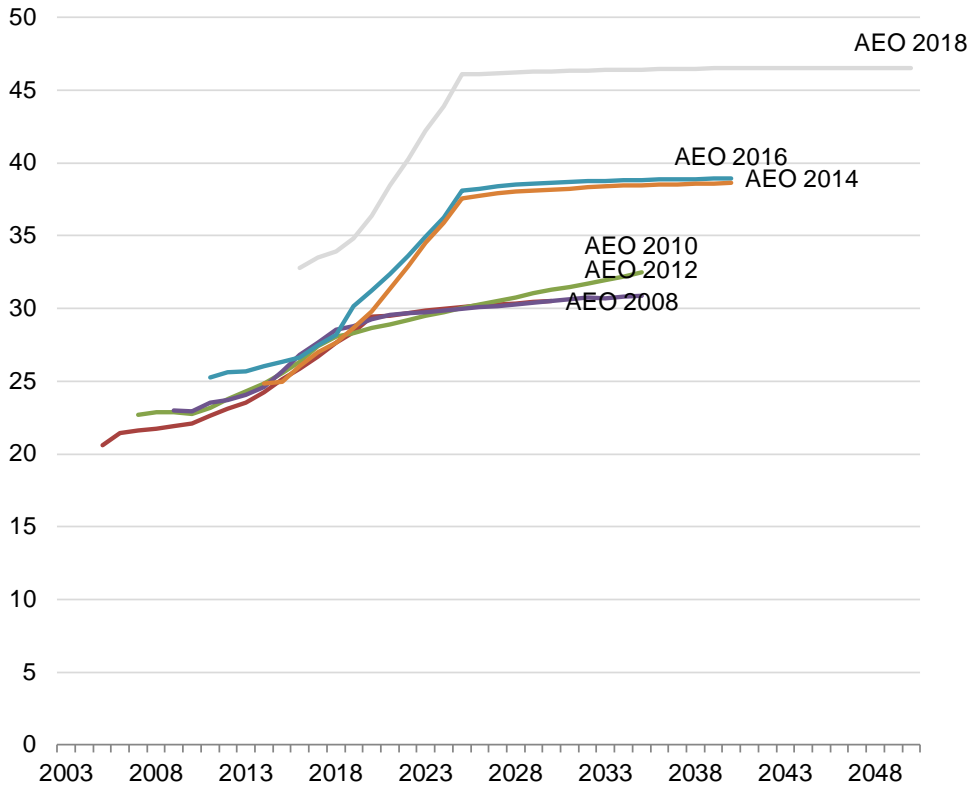


Historical Context: Natural Gas Prices Are Lower and Projected to Stay Lower (But Rise Over Time)

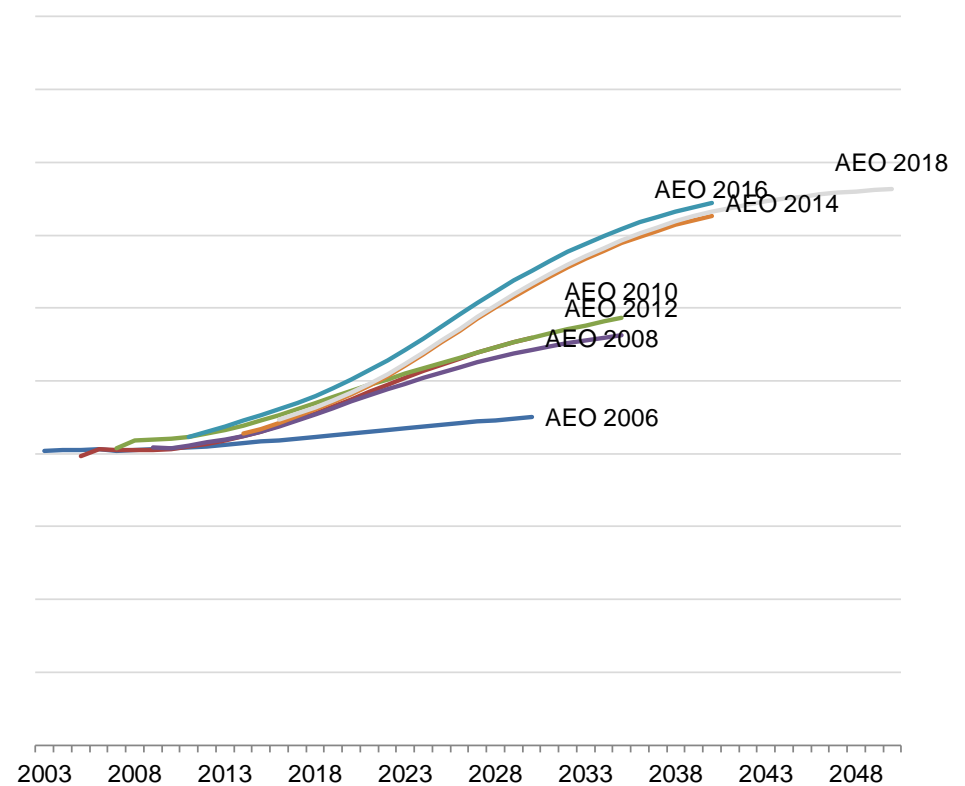


Historical Context: CAFE Standards for New Light-Duty Vehicles (MPG) Lead to More Efficient Vehicles

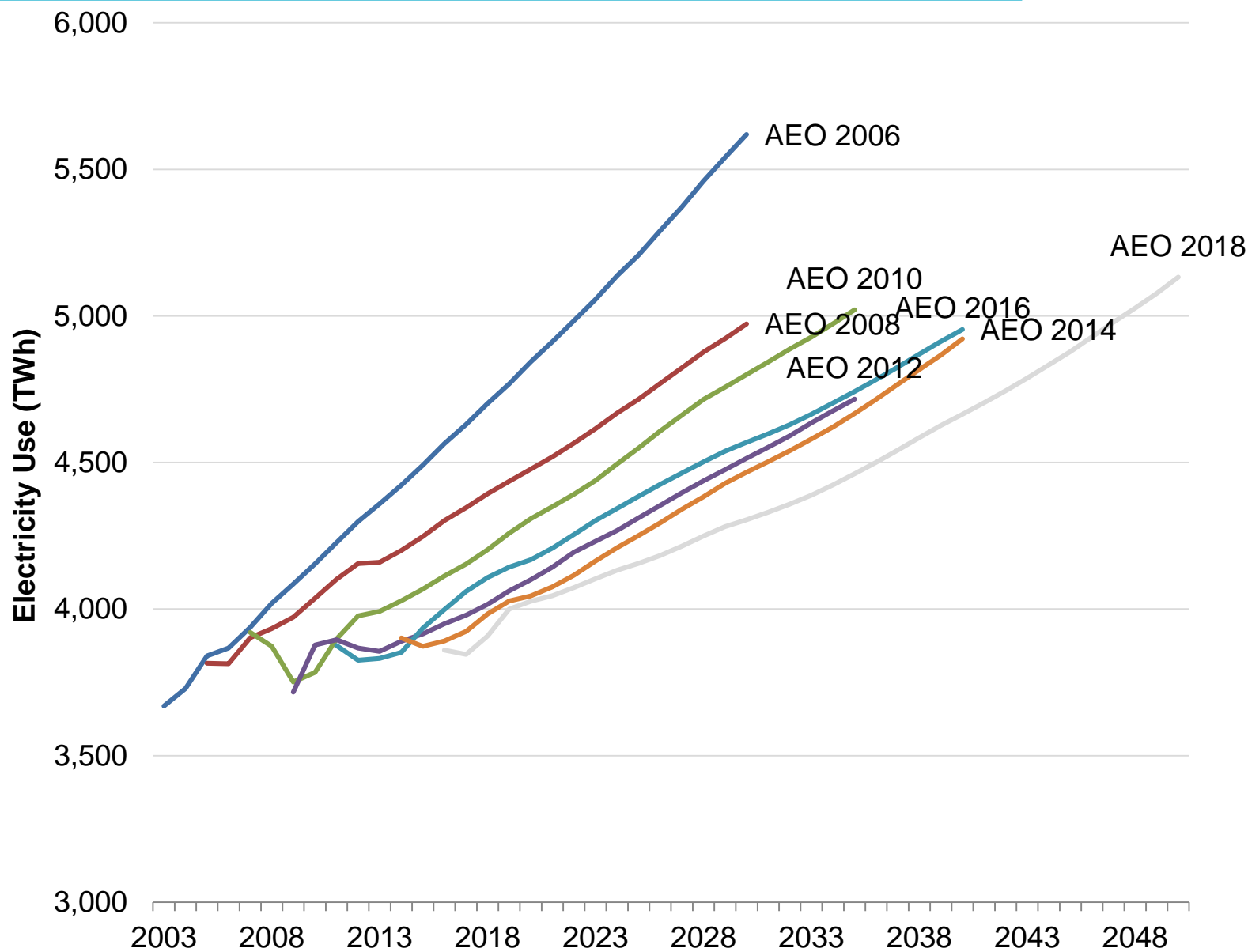
New Light Duty Vehicles (MPG) – On-Road Tested



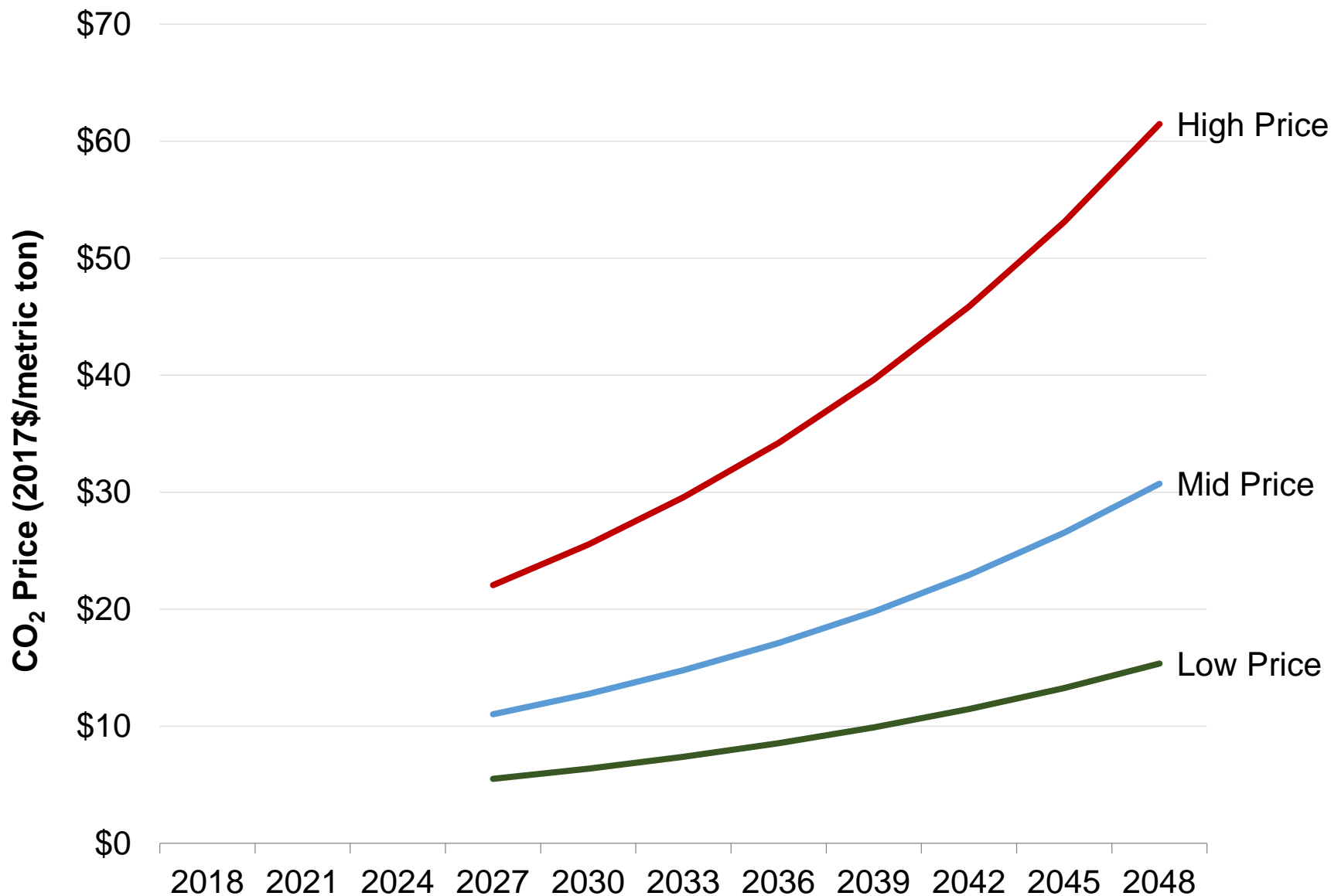
Stock Light Duty Vehicles (MPG) – On-Road Tested



Historical Context: Electricity Demand Lower

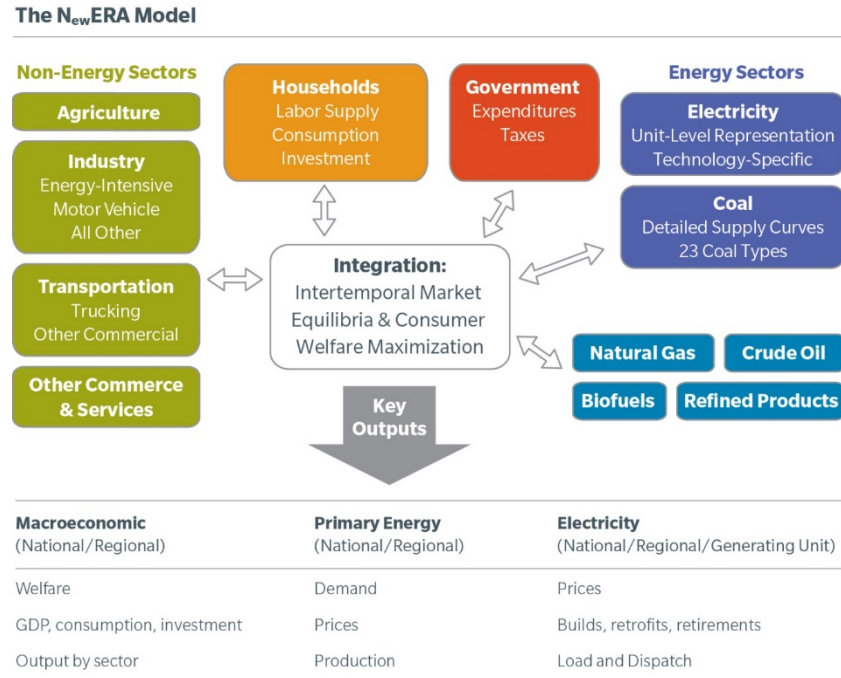


Three Potential Future Cap-and-Trade Programs Corresponding to Three CO₂ Price Trajectories

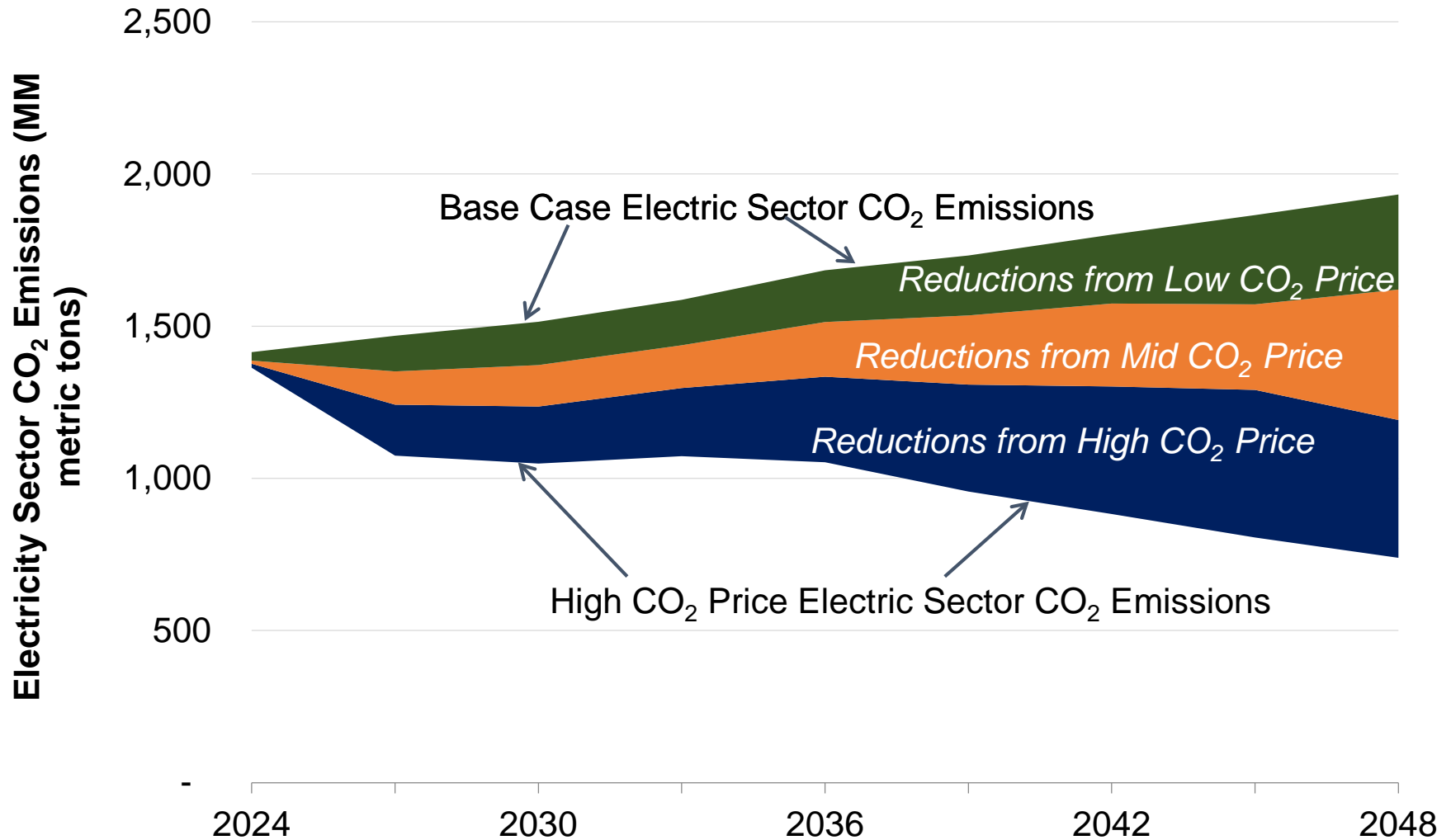


Modeling Using N_{ew}ERA Model

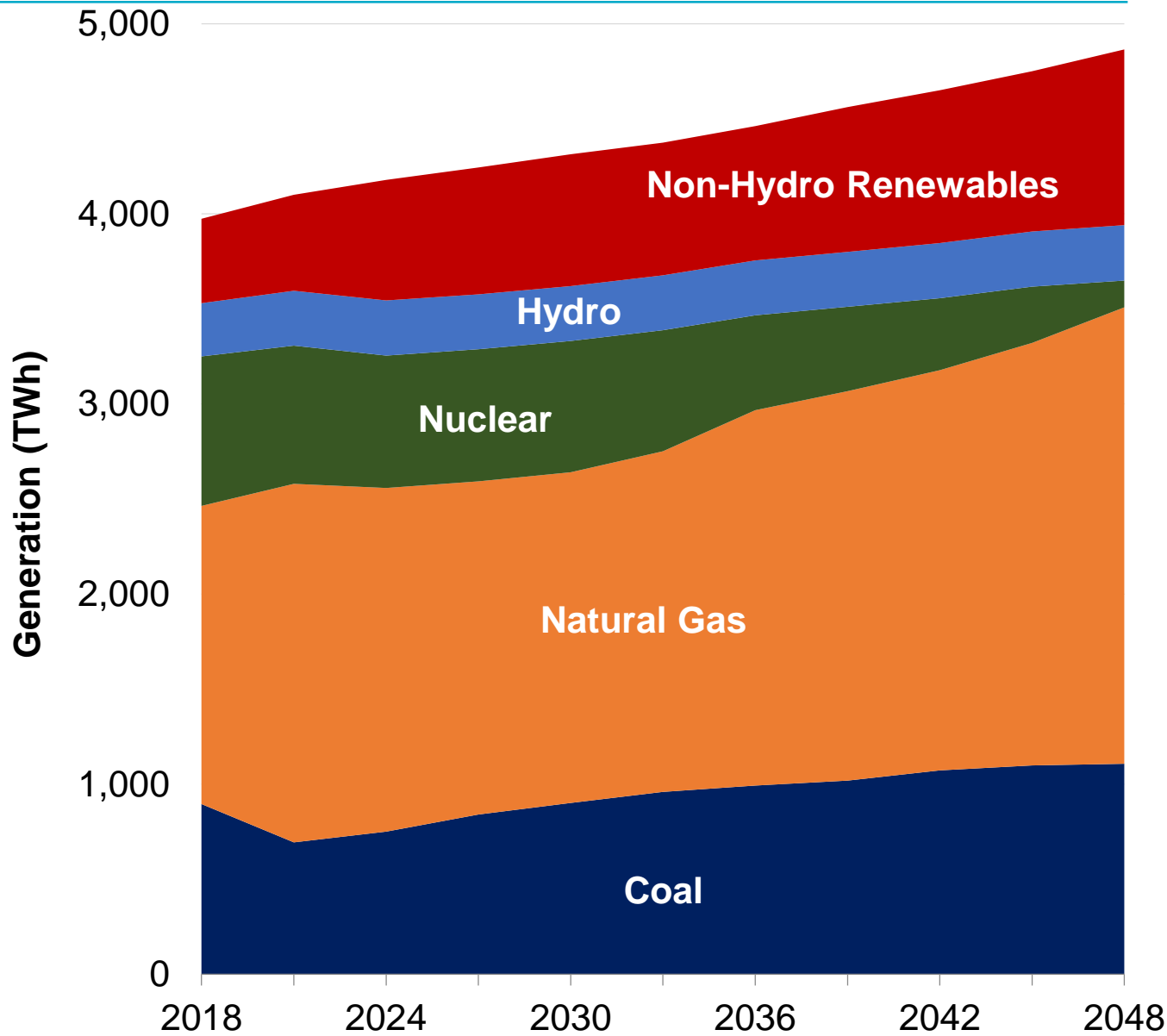
- N_{ew}ERA combines a bottom-up electricity sector model with a top-down model of the full U.S. (macro)economy
 - Electricity sector model optimizes compliance with policies and estimates electricity rate impacts and other system operational changes such as natural gas and coal usage
 - Electricity technology costs and other parameters are based upon the most recent EIA estimates (AEO 2018).
 - Macroeconomic model incorporates demand response to electricity price changes, and natural gas and coal price responses to changes in fuel usage
- Modeling of cap-and-trade programs based upon electricity sector model with adjustments to reflect non-electric sector natural gas demand



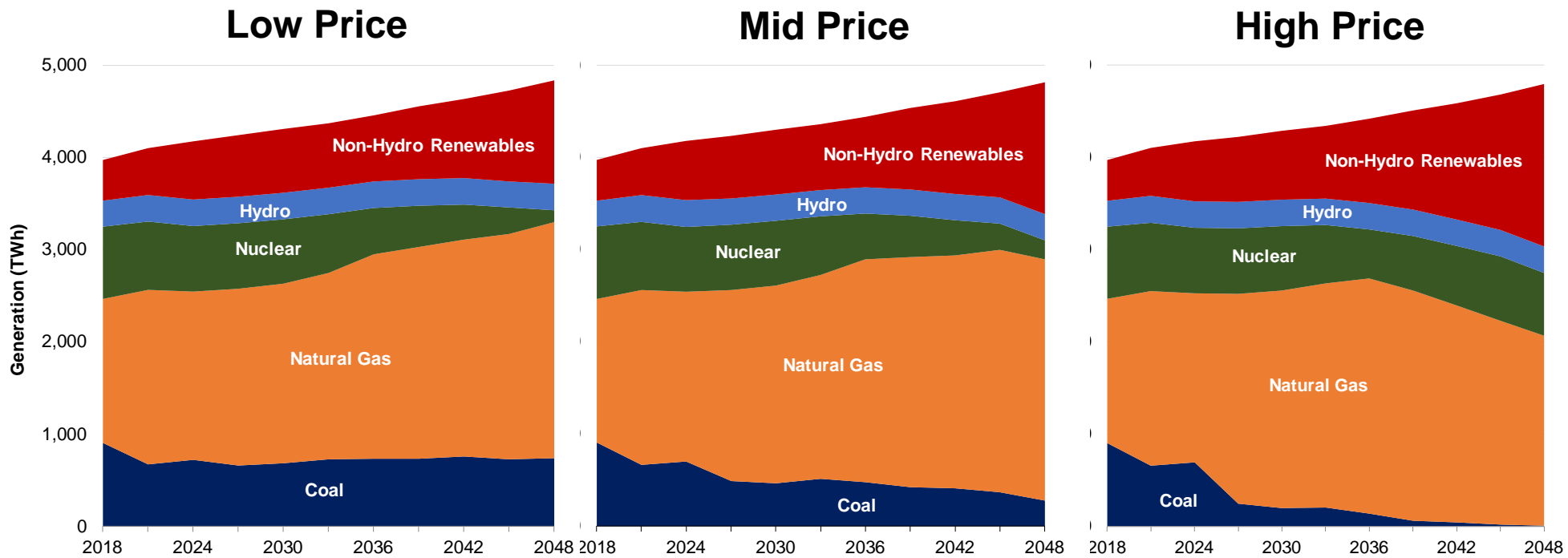
New ERA Results: Impacts on Electric Sector CO₂ Emissions



New ERA Results: Electricity Fuel Mix—Base Carbon Price Scenario

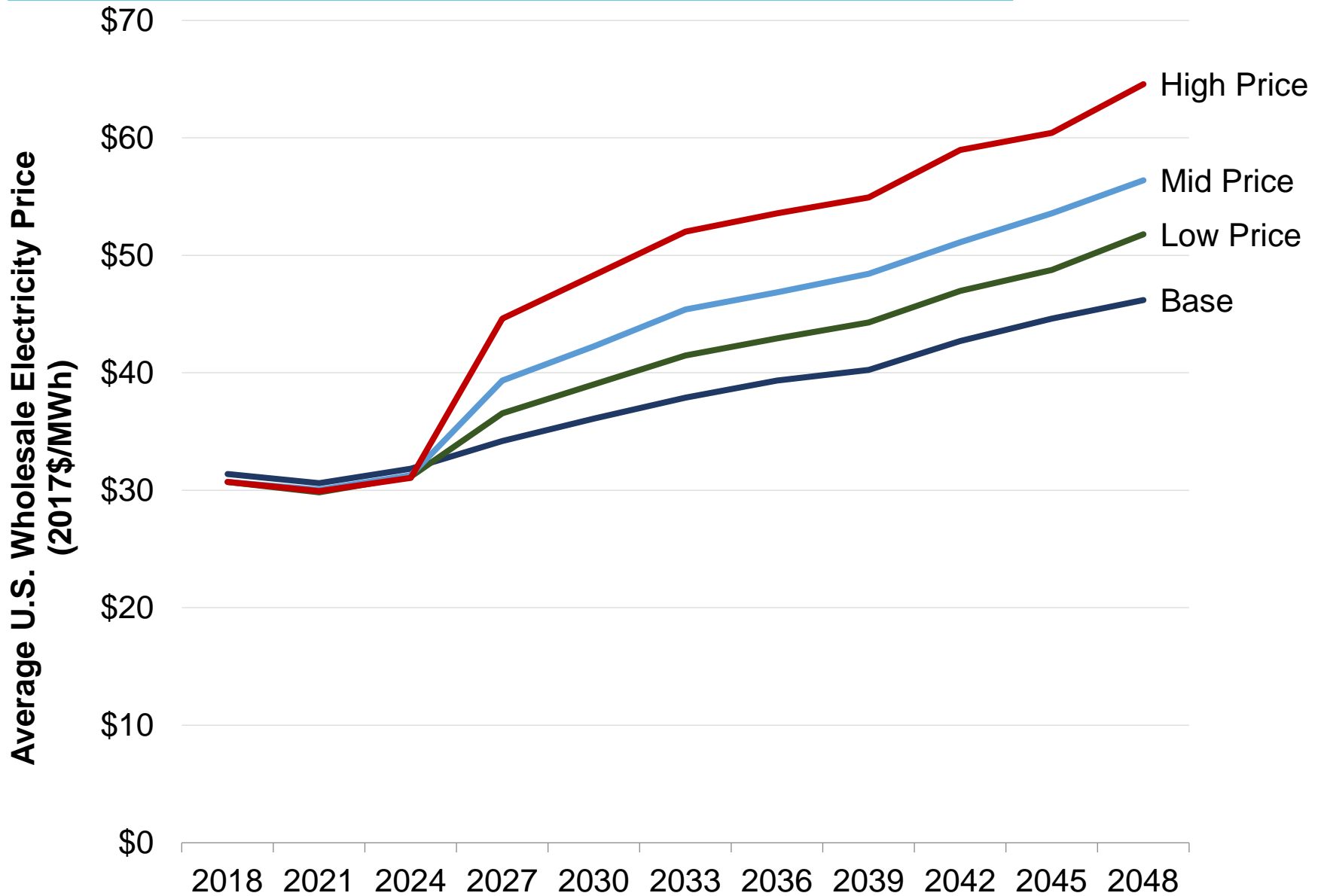


New ERA Results: Electricity Fuel Mix—Carbon Price Scenarios



- All CO₂ price cases lead to more renewables and less coal generation, with natural gas dominant in all cases
- High Price scenario provides support for added nuclear generation at the expense of natural gas

New ERA Results: Impacts on Wholesale Electricity Prices



Summary

- National GHG programs not likely to be on the agenda until at least 2021
- Changed circumstances—notably lower projected natural gas prices but also other factors—have reduced baseline GHG emissions
- Design of potential future cap-and-trade programs could take advantage of prior experience (EU ETS, RGGI, AB 32) and prior US congressional proposals
- Projected impacts—on CO₂ emissions, fuel mix, and electricity prices—vary widely due to cap stringency (as reflected in carbon price trajectories)



Thank You

Scott Bloomberg

Associate Director
NERA DC
202-466-9234
scott.bloomberg@nera.com

David Harrison, Ph.D.

Managing Director
NERA Boston
617-927-4512
david.harrison@nera.com

Eli Shakun

Associate Analyst
NERA Boston
617-927-4590
eli.shakun@nera.com