

Economic Review of the American Power Act: Summary of EPA Analysis

Prepared for:
Business Roundtable

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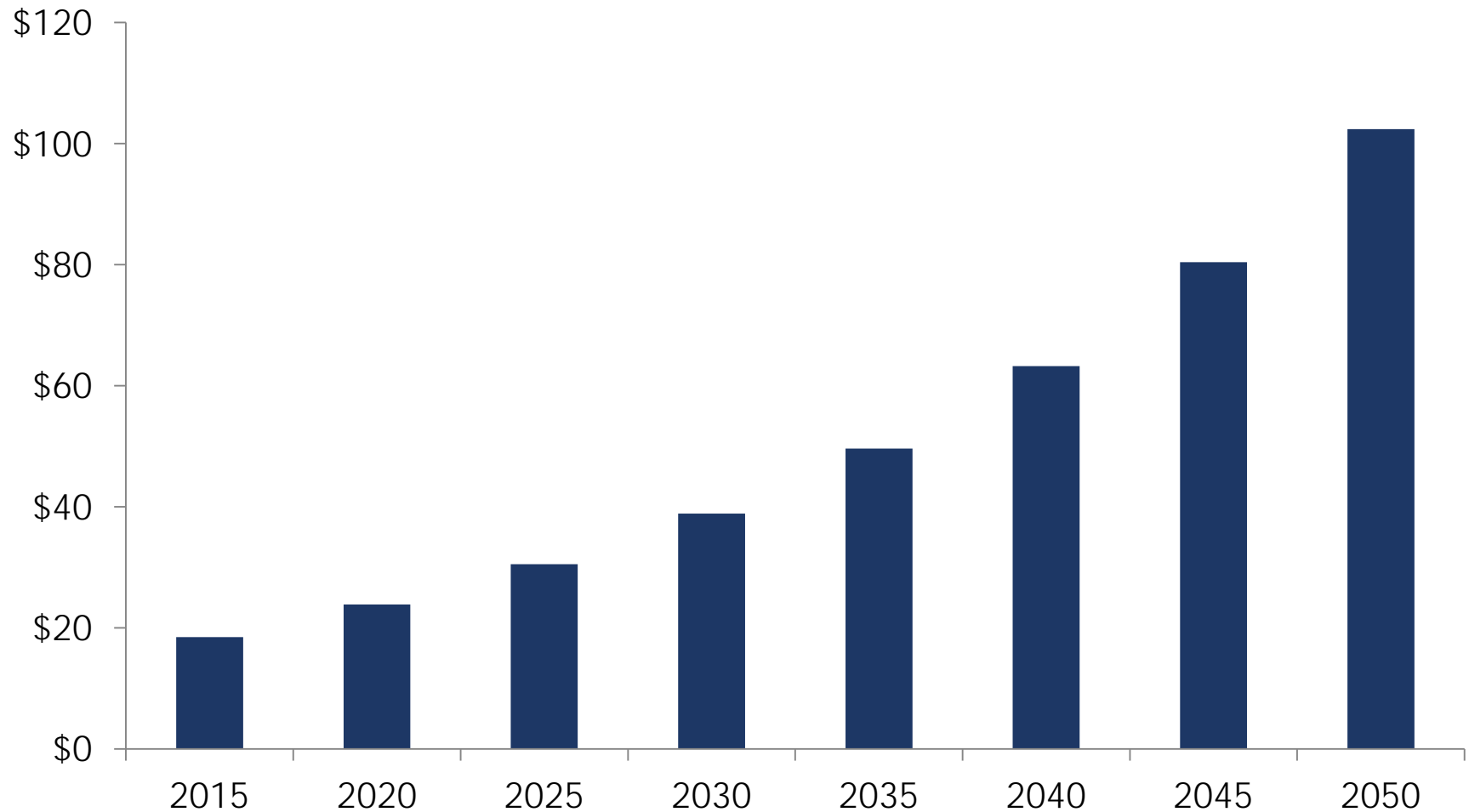
July 13, 2010

AGENDA

- (1) Review key results from the EPA's recent modeling analysis of the American Power Act ("Kerry-Lieberman").
- (2) Discuss how the legislation is likely to impact various sectors and the U.S. economy as a whole.
- (3) Identify key limitations and uncertainties associated with the EPA analysis and discuss their potential implications.

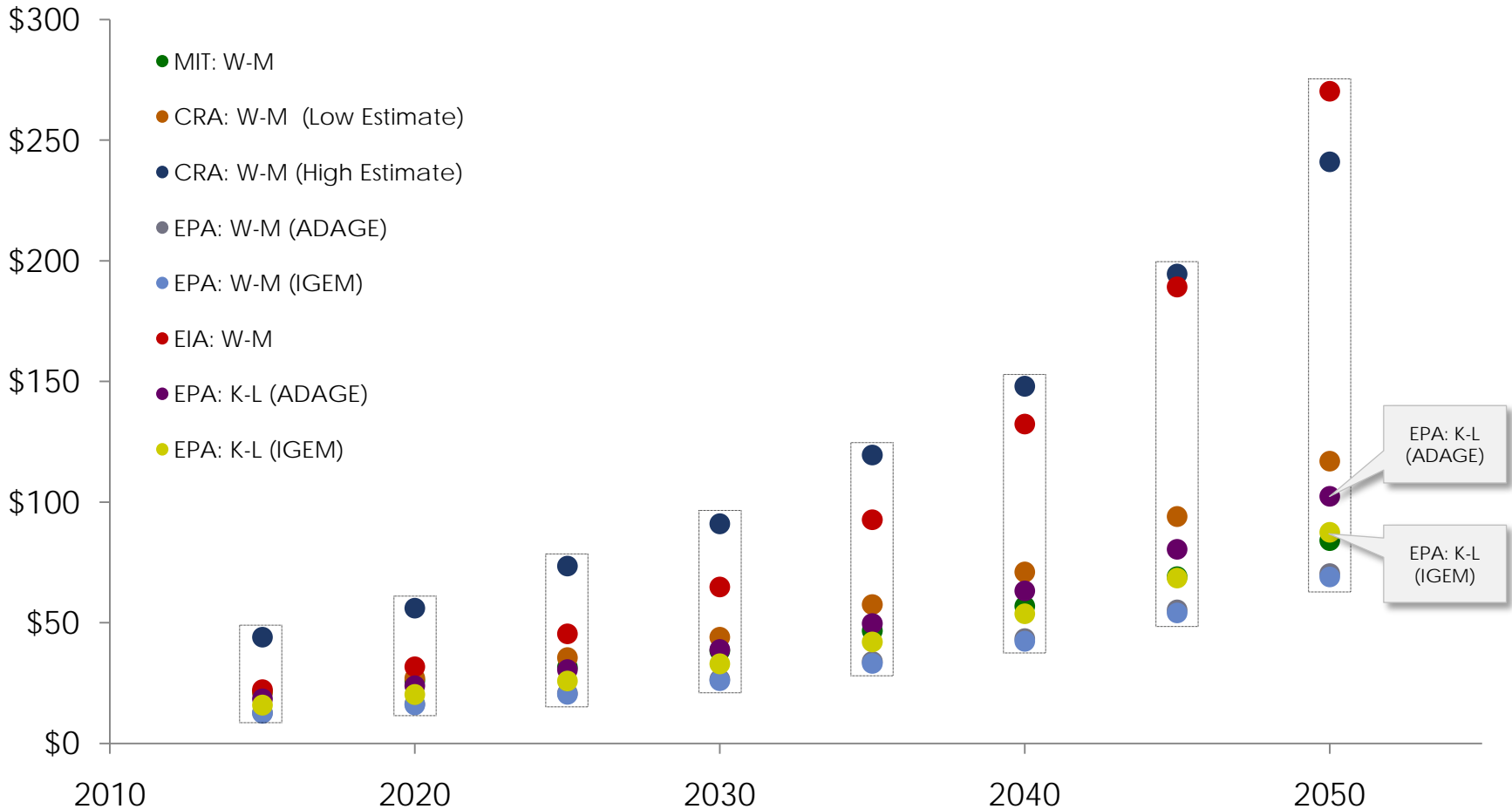
In its Core Scenario, the EPA's ADAGE model projects that allowance prices will increase from \$18 in 2015 to \$102 in 2050.

Projected Allowance Prices: Core Scenario
(\$ per Metric Ton CO₂-e)



EPA's allowance price estimates are consistent with comparable analyses, though they tend toward the lower end of the range.

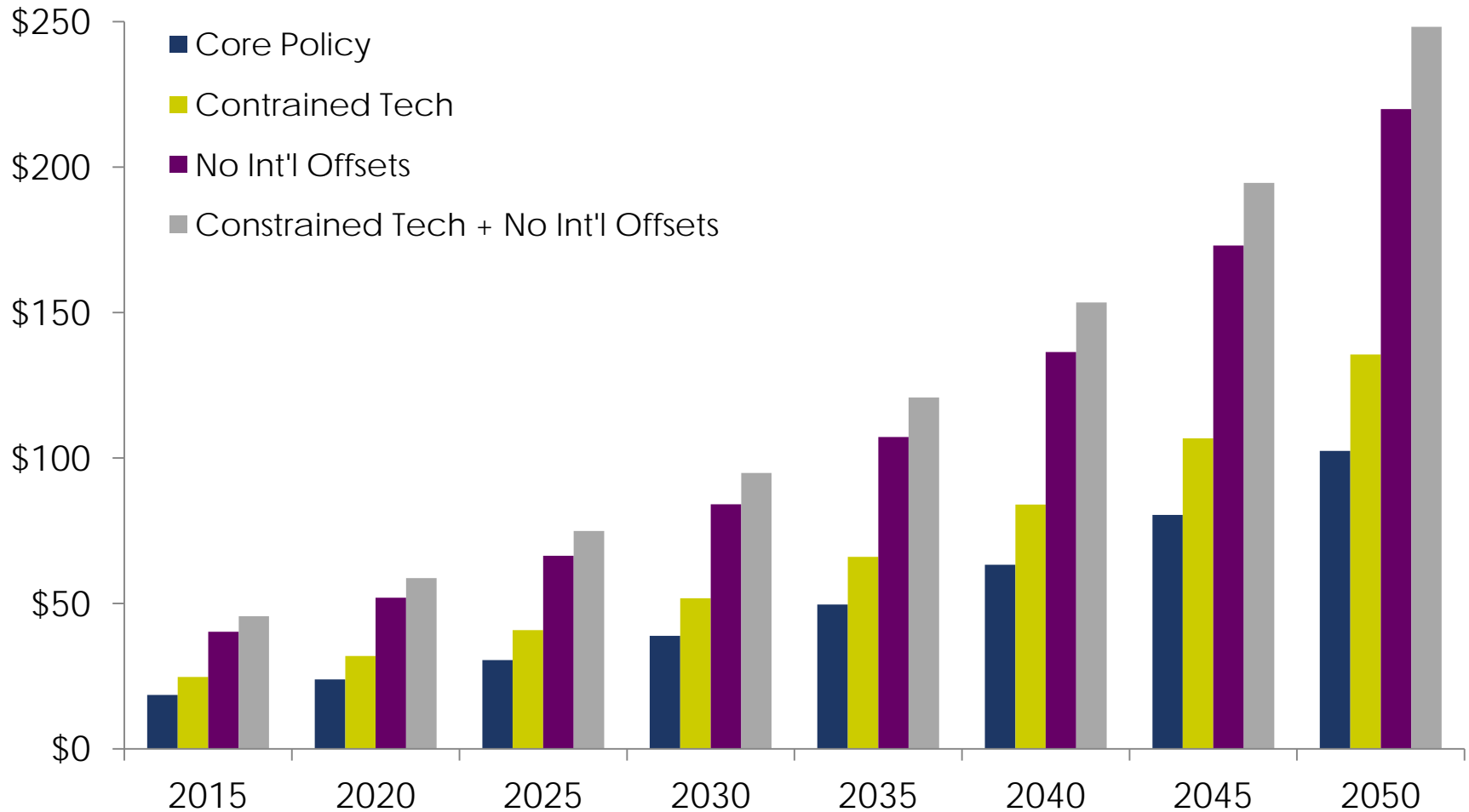
Projected Allowance Prices: Summary of Modeling Studies (\$ per Metric Ton CO₂-e)



Notes: "W-M" = Waxman-Markey; "K-L" = Kerry-Lieberman; Parentheses distinguish separate estimates from the same study, with estimates from different models distinguished by the model name and estimates from the same model distinguished by their relative magnitude.

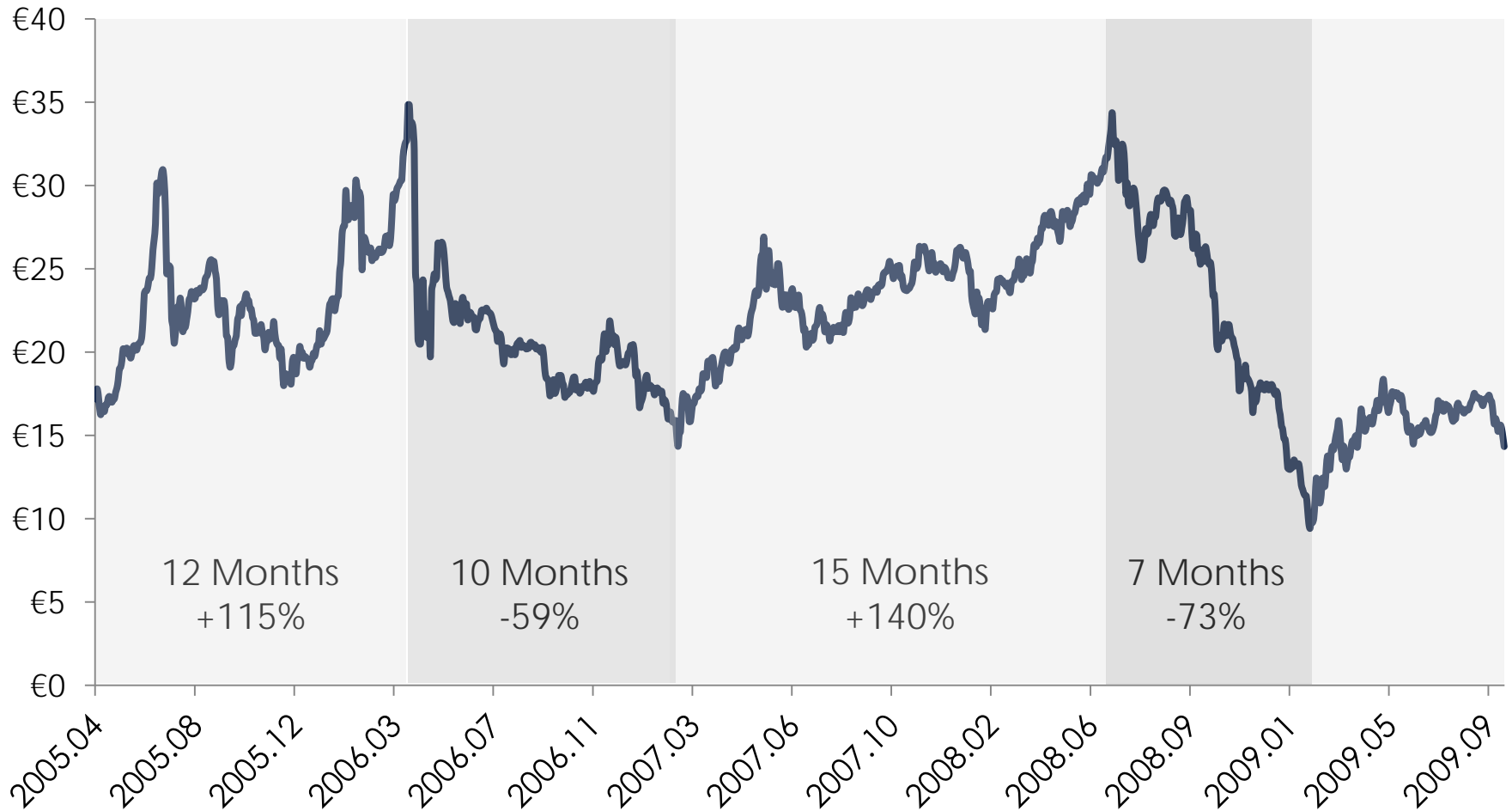
However, alternative scenarios illustrate that allowance prices are highly sensitive to assumptions about offsets and technology.

Projected Allowance Prices: Core & Alternative Scenarios
(\$ per Metric Ton CO₂-e)



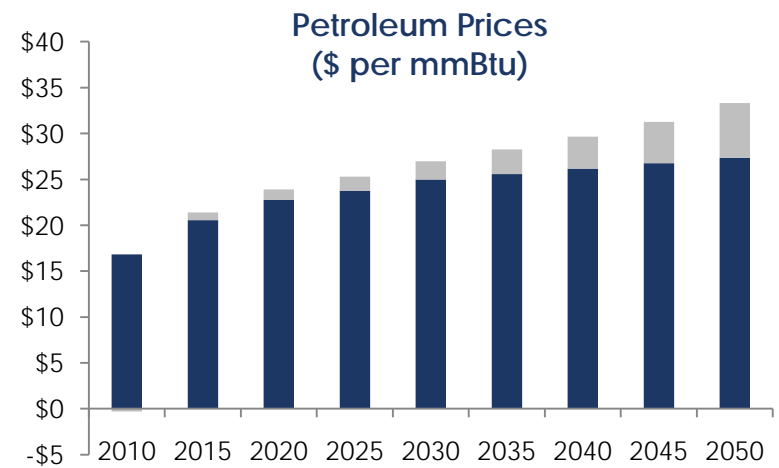
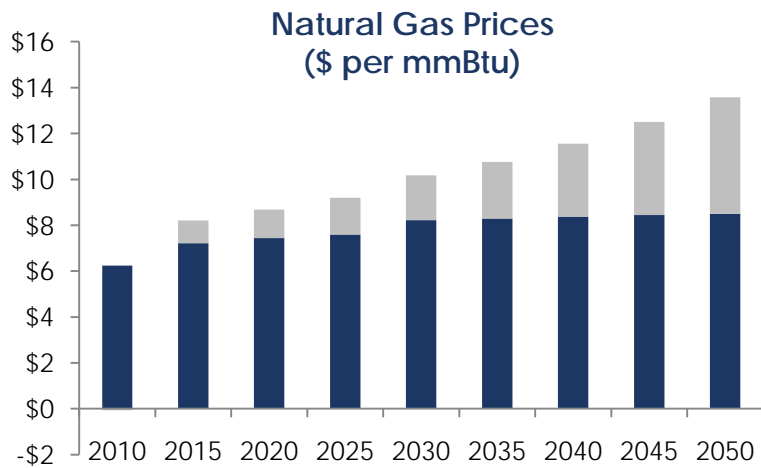
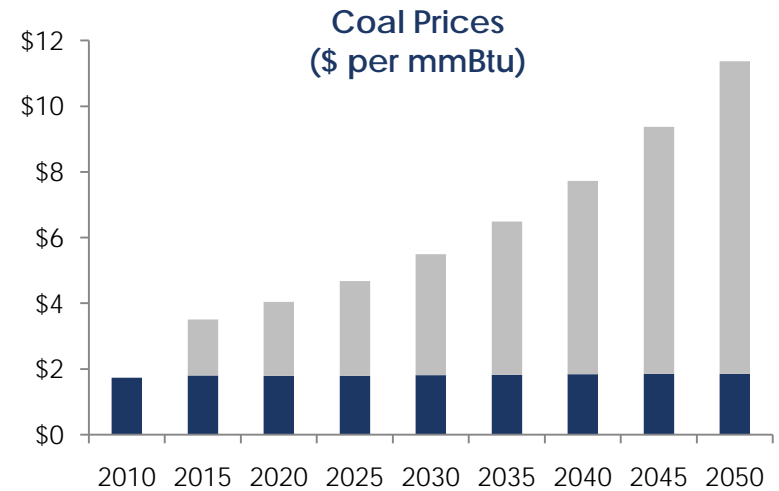
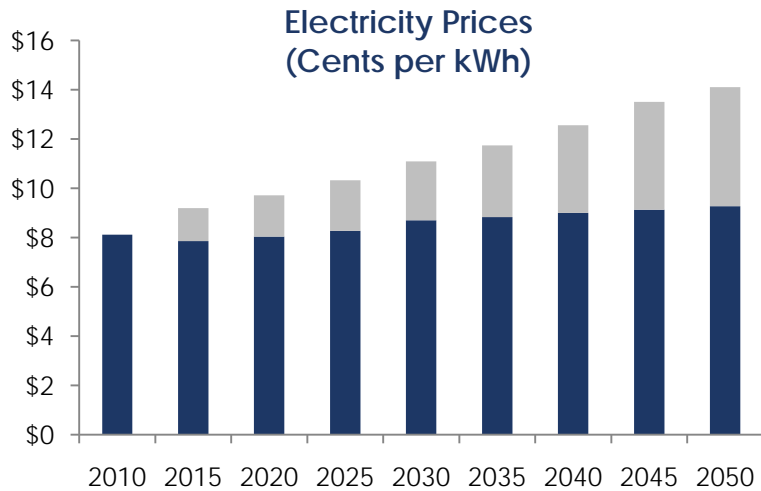
And the EU ETS experience indicates that carbon prices are unlikely to be smooth and predictable.

Carbon Prices in the EU ETS
(€ per Metric Ton CO₂, Vintage = 2012)



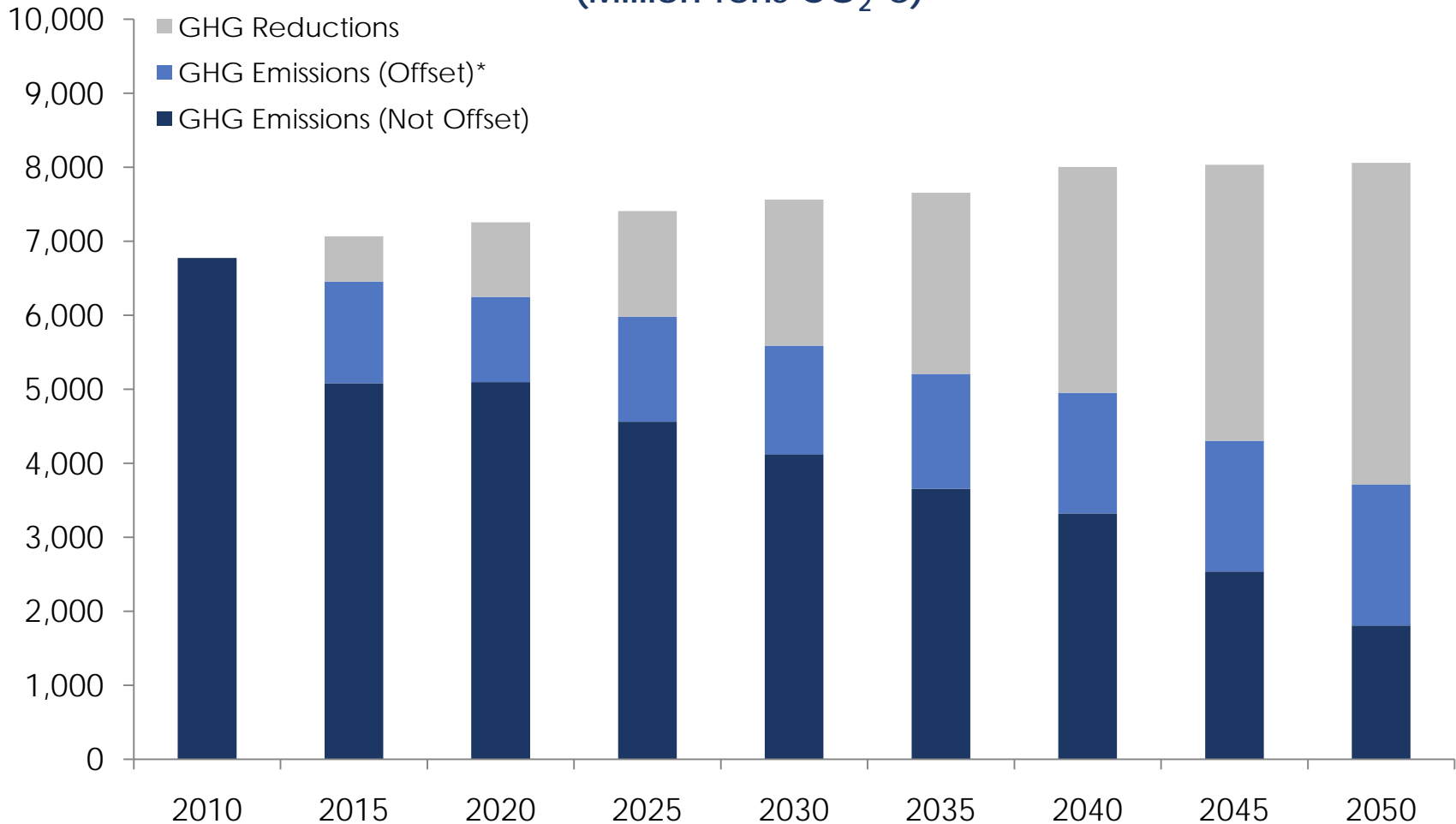
In the Core Scenario, carbon costs have a significant impact on energy prices, especially for electricity, coal, and natural gas.

Projected Energy Prices: Business-as-Usual & Core Scenarios



Higher energy prices drive GHG reductions, with emissions offsets playing a significant role in achieving the 2050 target.

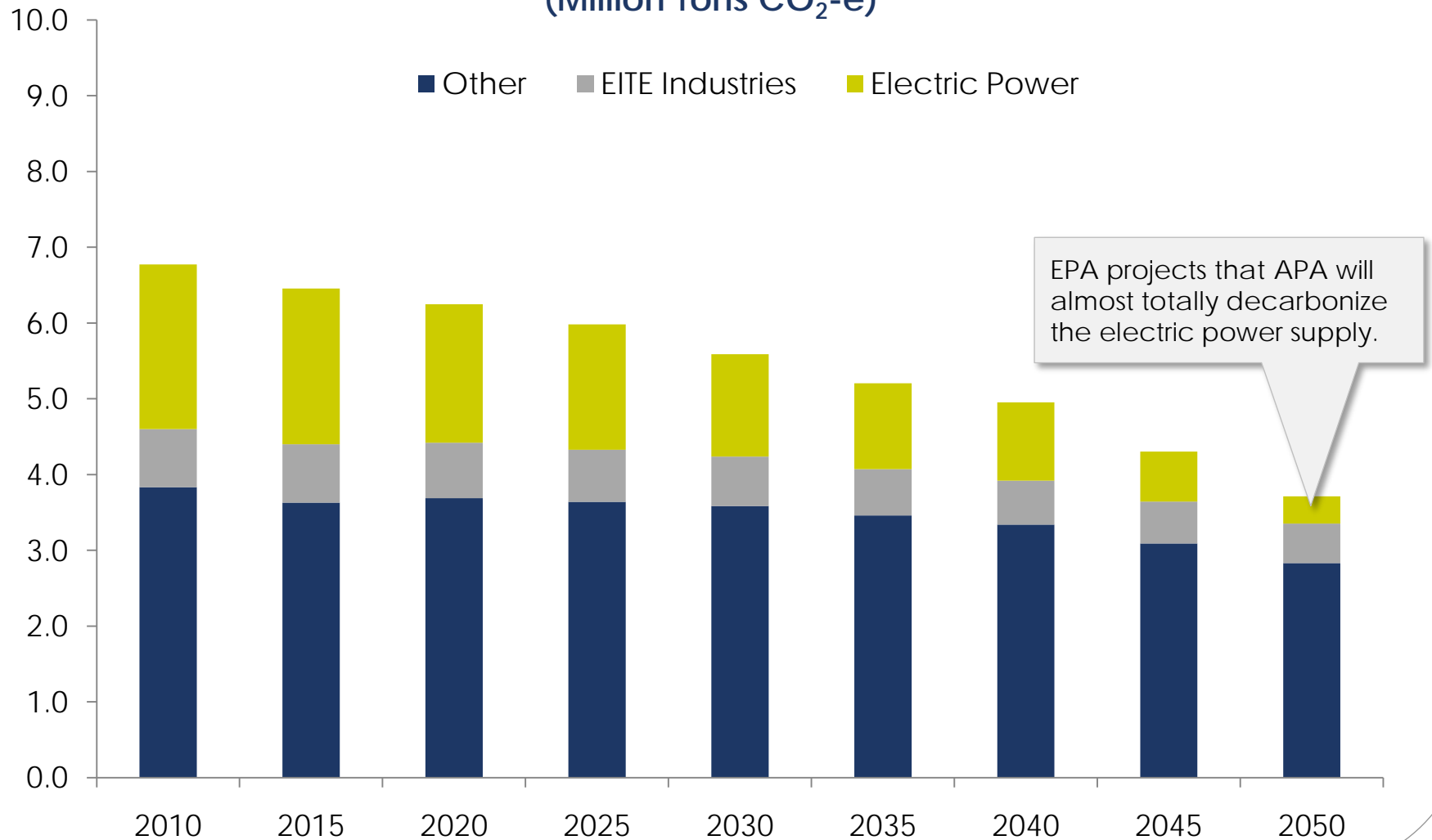
U.S. GHG Emissions (Million Tons CO₂-e)



* A portion of GHG emissions physically occur in capped sectors, but are "offset" by GHG reductions in uncapped sectors or other nations through the purchase and surrender of credits.

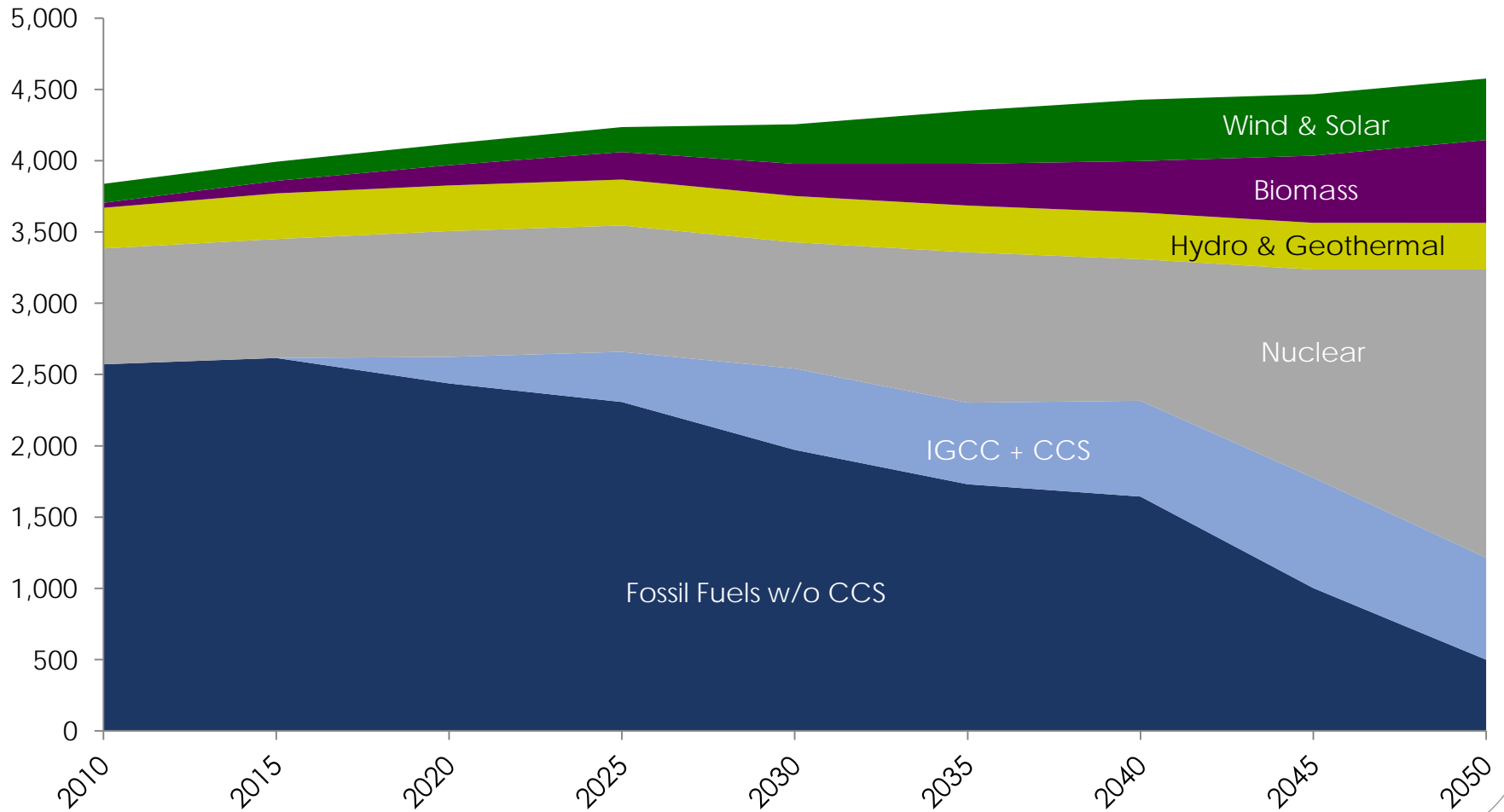
The vast majority of reductions (80%+) are expected to come from the electric power sector.

U.S. GHG Emissions by Sector (Million Tons CO₂-e)



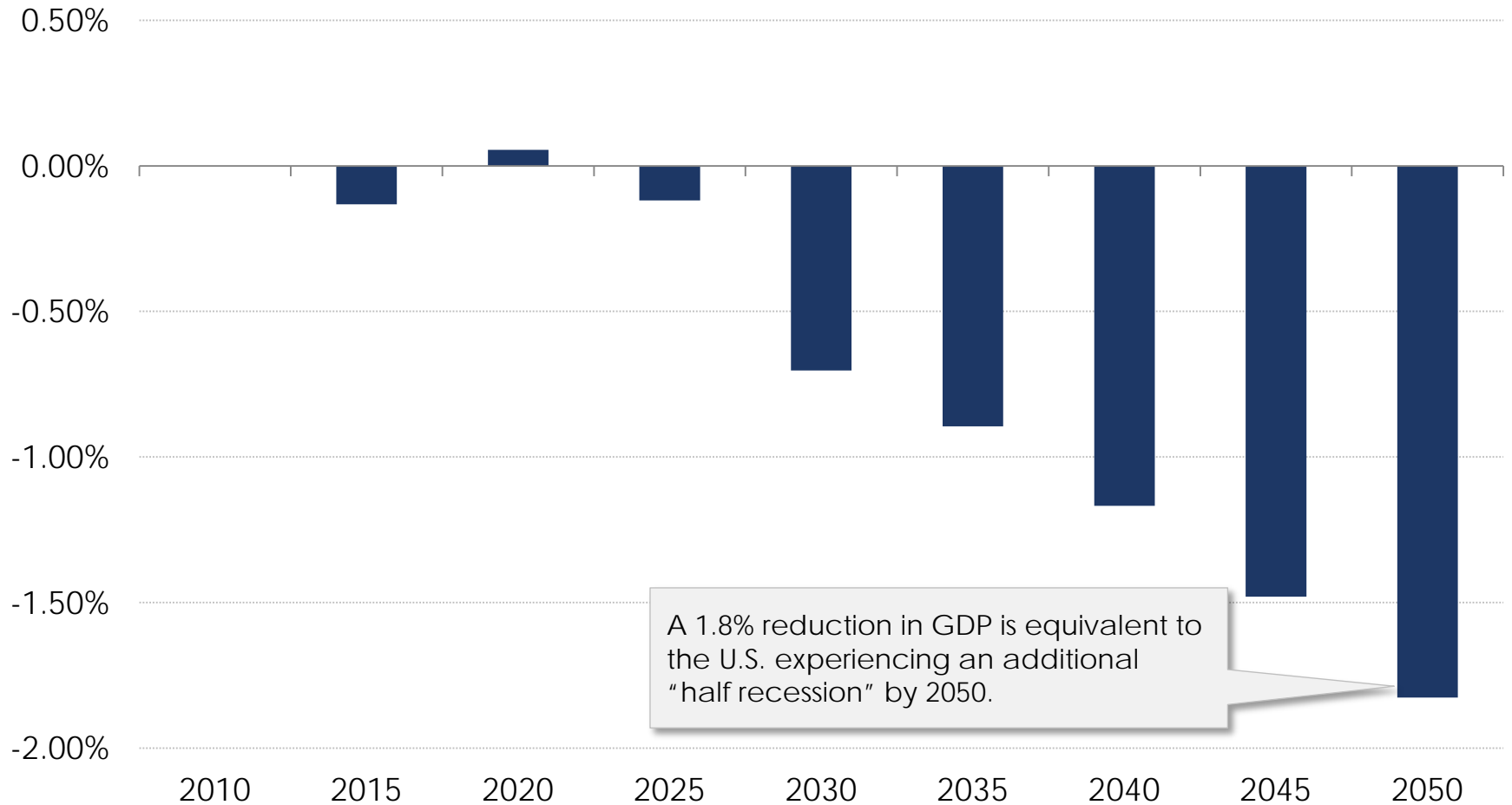
With reductions primarily driven by a transition away from fossil fuel generation (primarily coal) toward nuclear and renewable power.

Electricity Generation by Source (Billion kWh)



It is projected that the economic costs associated with this level of GHG mitigation will largely occur after 2030.

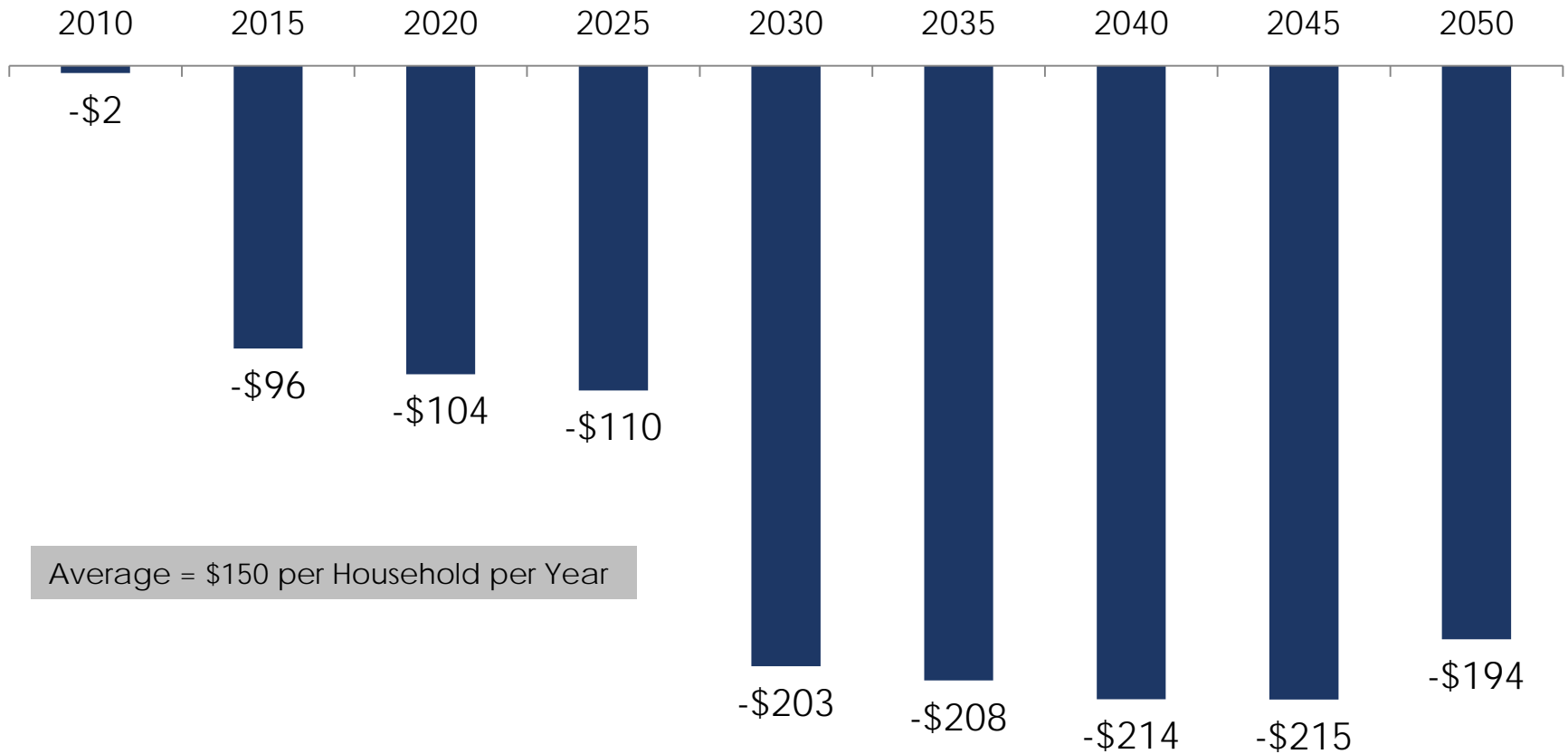
Macroeconomic Impacts (% Change in GDP Relative to BAU Scenario)



A 1.8% reduction in GDP is equivalent to the U.S. experiencing an additional "half recession" by 2050.

Ultimately, the EPA estimates that the policy will cost the average U.S. household approximately \$150 per year between 2010-2050.

Change in U.S. Consumption per Household (\$2010* Relative to BAU Scenario)



*Net decrease in consumption converted to 2010\$ using a 5% discount rate.

OBSERVATIONS & INSIGHTS: ECONOMIC IMPACTS

- The EPA's estimates of the economic impacts associated with GHG mitigation are generally consistent with a range of estimates from other credible academic, industry, and independent modeling analyses.
- The EPA's analysis does not, however, explicitly consider the importance of allowance price predictability and the role of uncertainty in making long-term investment decisions.
 - Both models used by the EPA assume that economic agents have "perfect foresight", effectively allowing them to look 40-years into the future to observe carbon prices with absolute certainty.
 - As a result, economic agents are assumed to make hyper-efficient decisions regarding capital investments and allowance banking — thereby minimizing economic costs and producing exceptionally smooth carbon price trajectories.
 - Although the "perfect foresight" assumption substantially reduces modeling complexity, it is a poor approximation of reality. Consequently, the analysis yields limited insights about the role of uncertainty in making long-term investment decisions and the effectiveness of instruments intended to enhance predictability (e.g., a price collar).
- To the extent that uncertainty about future allowance prices prevents or delays investments in GHG mitigating technology, the costs associated with the policy are likely to be significantly higher than projected by the EPA.

OBSERVATIONS & INSIGHTS: OFFSETS & COST CONTAINMENT

- As noted by the EPA and evidenced by the modeling results, allowance prices will be highly dependent on the scale and availability of international offsets.
- Furthermore, APA's reserve mechanism, which is intended to mitigate price volatility and contain policy costs, must be replenished through the purchase of international offsets.
- This approach creates two risks:
 - First, replenishing the reserve through the government purchase of international offsets restricts the supply of international offsets to covered entities — thereby driving up the price of offsets and, by extension, the price of allowances.
 - Second, replenishing the reserve through the purchase of international offsets creates the unique risk that the policy instrument will fail precisely because international offsets failed to materialize.
- As a result, the APA's reserve mechanism has the potential to mitigate price volatility and contain costs associated with some known risks (e.g., constrained deployment of key technologies), but its ability to serve as an effective insurance policy against the single greatest risk (i.e., an insufficient supply of international offsets) is questionable.
- In short, the APA reserve mechanism is not a "hard collar" in the sense that it cannot guarantee enforcement of the ceiling price under plausible scenarios in which allowance prices remain persistently high (i.e., an insufficient supply of international offsets).

OBSERVATIONS & INSIGHTS: EMISSIONS LEAKAGE

- As acknowledged by the EPA, another shortcoming of the analysis is its limited treatment of emissions leakage in energy-intensive and trade-exposed (“EITE”) industries.
- The analysis does not explicitly discuss the risk of emissions leakage at length, but refers the reader to its December 2009 analysis on the competitiveness impacts of H.R. 2454.
- The APA analysis assumes that the international community’s actions to reduce GHG emissions, including the actions of key developing nations, will be consistent with a non-binding statement by G8 nations in July 2009.
 - In that statement, G8 nations signaled their intent to reduce GHG emissions by 80% or more (relative to 2005) by 2050 as part of a strategy to reduce global emissions by 50% over the same time period.
 - Under the assumption that G8 nations will achieve their stated individual targets and the international community will achieve the desired global target, the EPA projects that developing nations will reduce GHG emissions by 23% (relative to 2005) by 2050.
- Although the EPA states that the ADAGE model reflects emissions leakage impacts (see EPA appendix, pg. 12), it did not publish detailed data for “Scenario 3” and “Scenario 4”, the latter of which is essential to assessing leakage impacts as it assumes that developing countries do not take action on climate change.
- Neither of the EPA models have the industry detail necessary to appropriately assess the impact of the policy on key EITE industries, such as cement, steel, aluminum, and paper.

Questions?