

Carbon Emission Reduction Strategy & Electrification: EPRI's Role

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Today's Topics

- U.S. Greenhouse Gas Regulations
- Electric Sector's Role in Economy-wide Emission Reduction and Electrification



Clean Power Plan Timeline

Summer
2015

- August 3, 2015 - Final Clean Power Plan

1 Year

- September 6, 2016 – States make initial submittal with extension request or submit Final Plan

3 Years

- September 6, 2018 - States with extensions submit Final Plan

7 Years

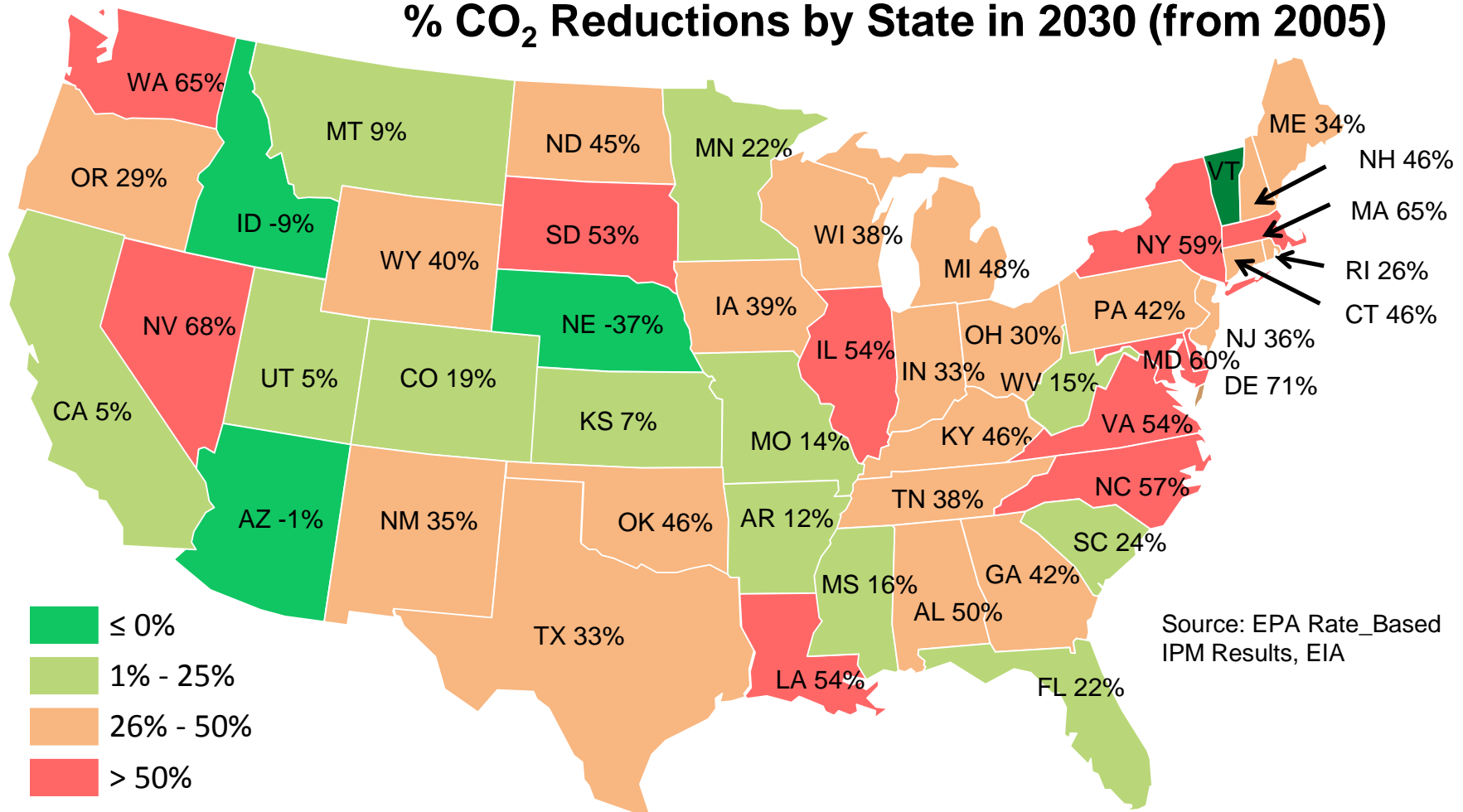
- January 1, 2022 - Compliance period begins

15 Years

- January 1, 2030 - CO₂ Emission Goals met

EPA's FINAL Proposal Will Have Varying State Impacts

% CO₂ Reductions by State in 2030 (from 2005)

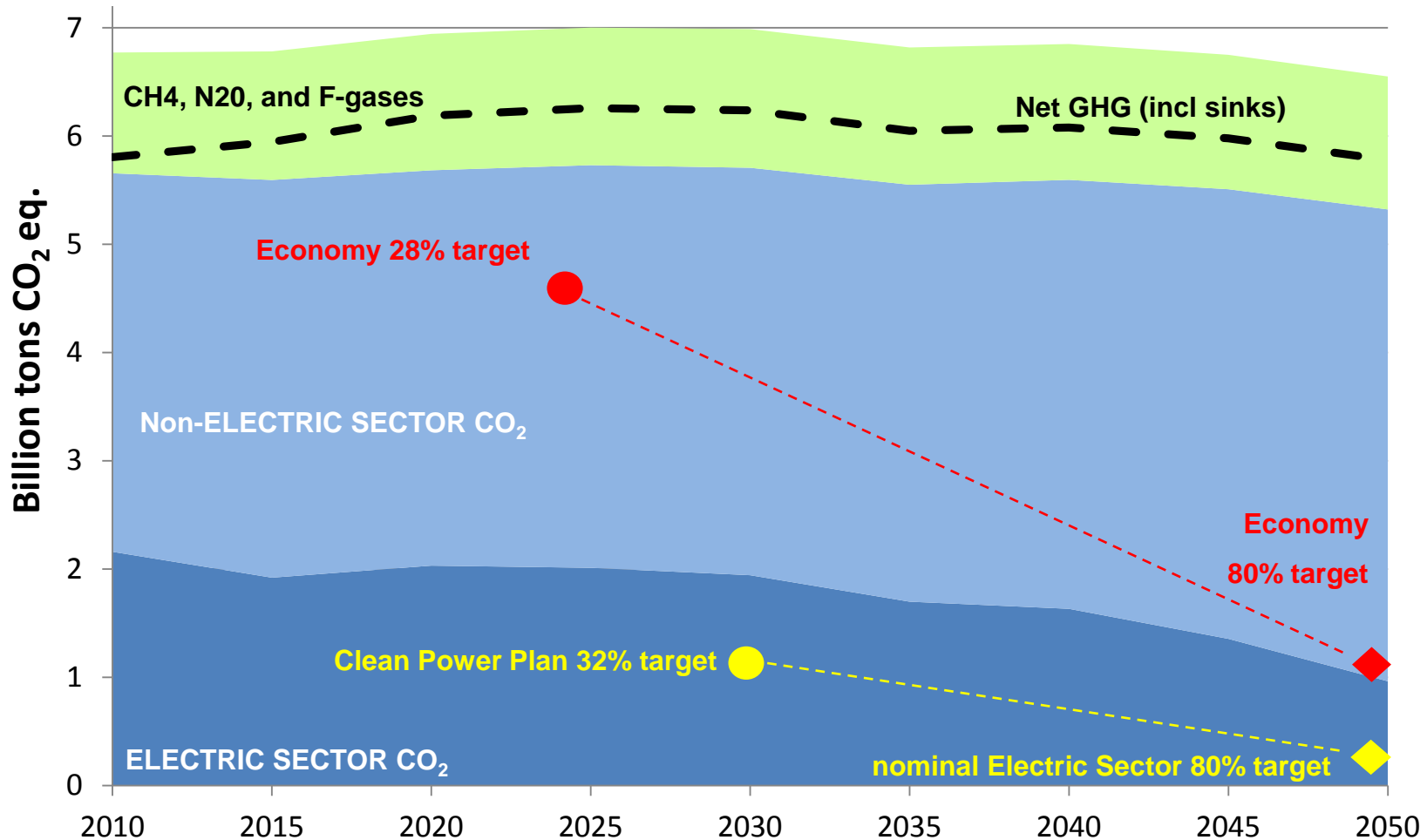


Wide range in variation, but reduced from variation in Proposed Rule



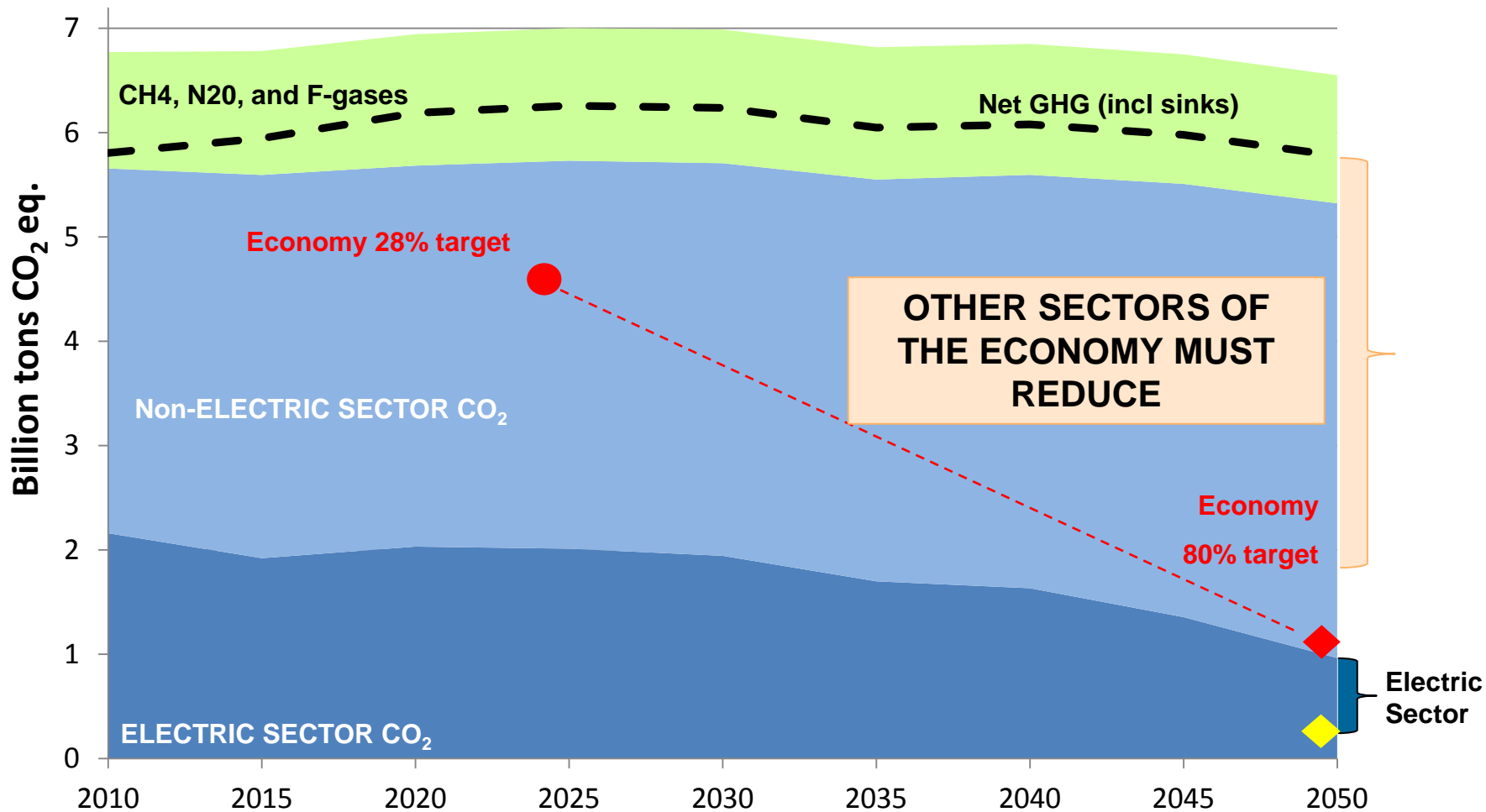
Carbon Reduction is more than the Clean Power Plan

U.S. Greenhouse Gas Reduction Pledge, 80% by 2050 Target and the CPP



Source: US-REGEN data; Energy Modeling Forum 24

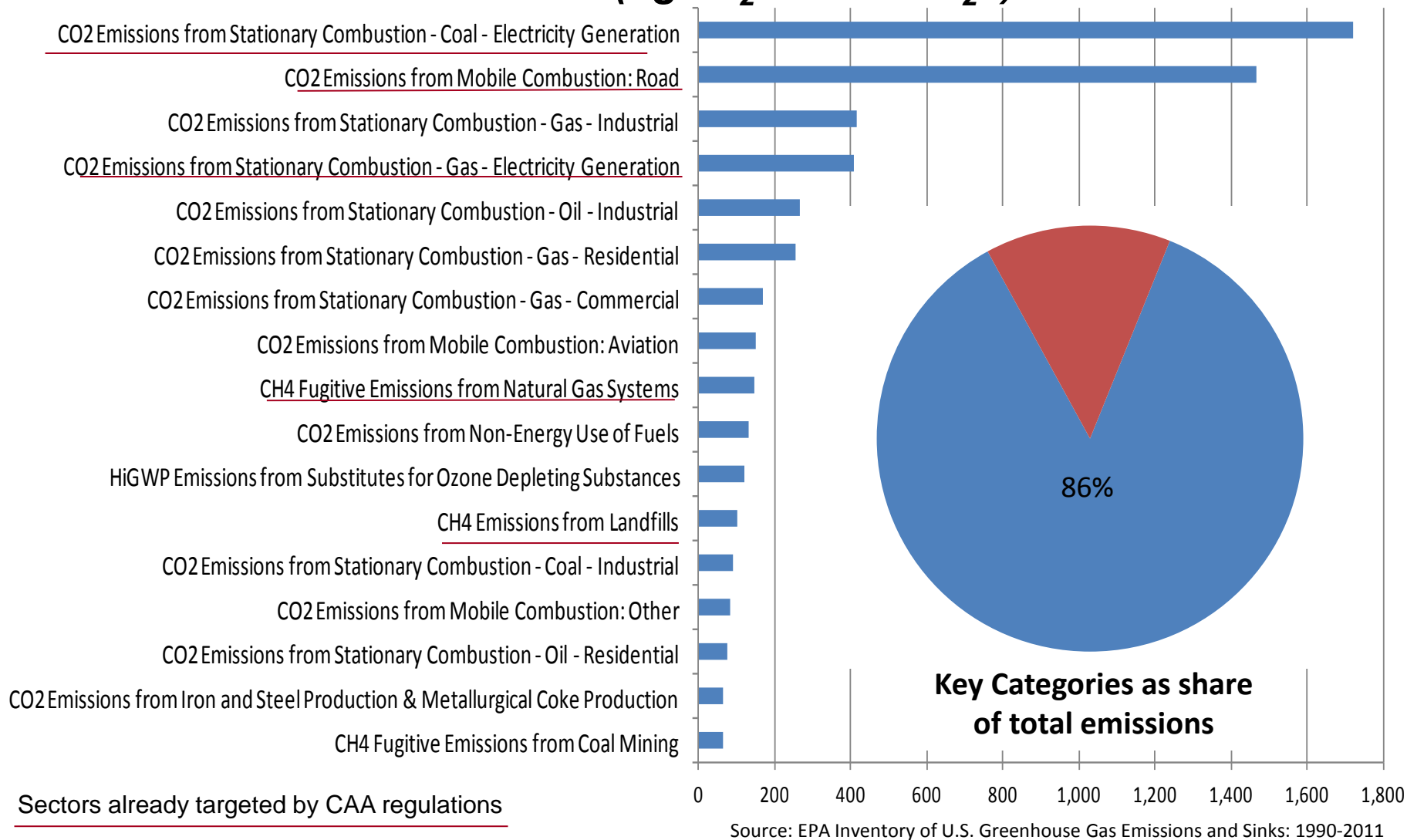
U.S. Greenhouse Gas Reduction Targets – Energy Efficiency and Electrification



Source: US-REGEN data; Energy Modeling Forum 24

Opportunities for Carbon Reductions

Key Categories from the EPA GHG Inventory by Economic Sector (TgCO₂e or MTCO₂e) in 2011

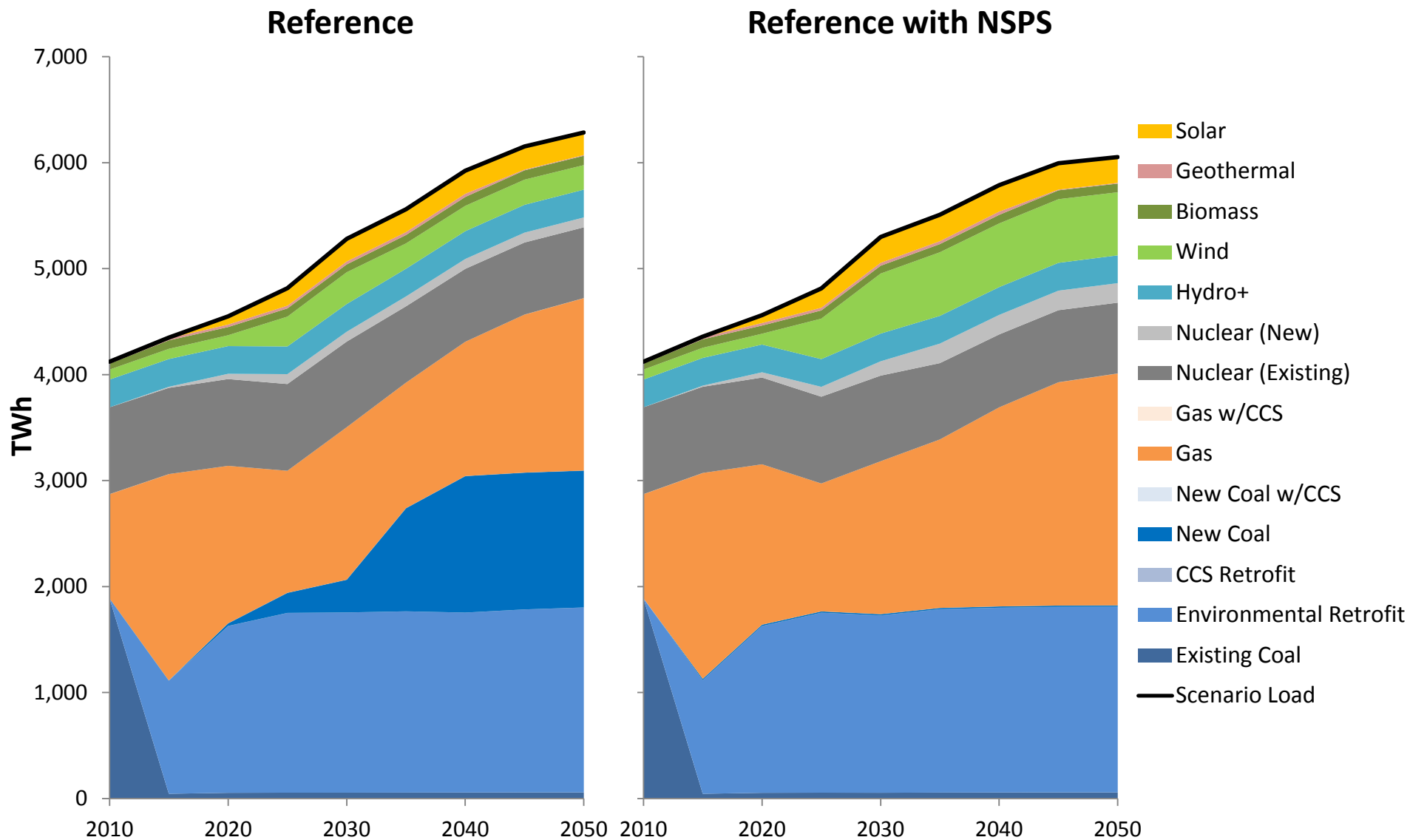


Key Research Questions

- Objective: Examine policy alternatives to the current piecemeal regulatory approach in the US
 - Assess pathways and the role of the power sector in meeting near- and long-term emissions reduction goals → **2025 INDC and 2050 Climate Action Plan targets**
 - How might technological improvements and availability influence cost, emissions, and electrification outcomes?
- Understand drivers of electrification under different policy, market, and technology settings
 - Which policy features are the most important drivers?
 - Which sectors exhibit the greatest electrification potential?
 - Prioritize future model development and structure sensitivities

E&EA Reference Comparison (with and without NSPS)

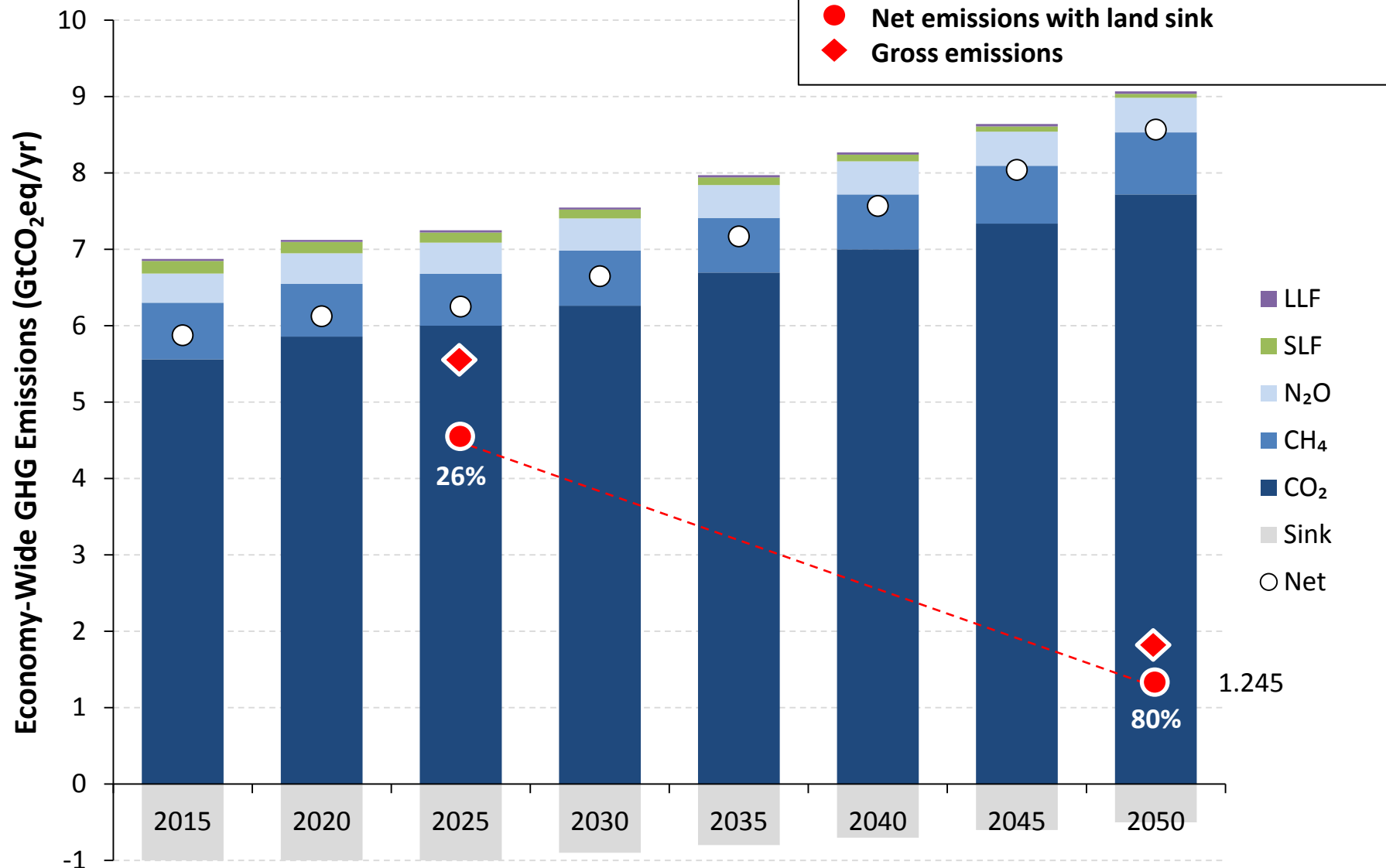
Electricity generation by technology



Economy-Wide 80% Cap Results

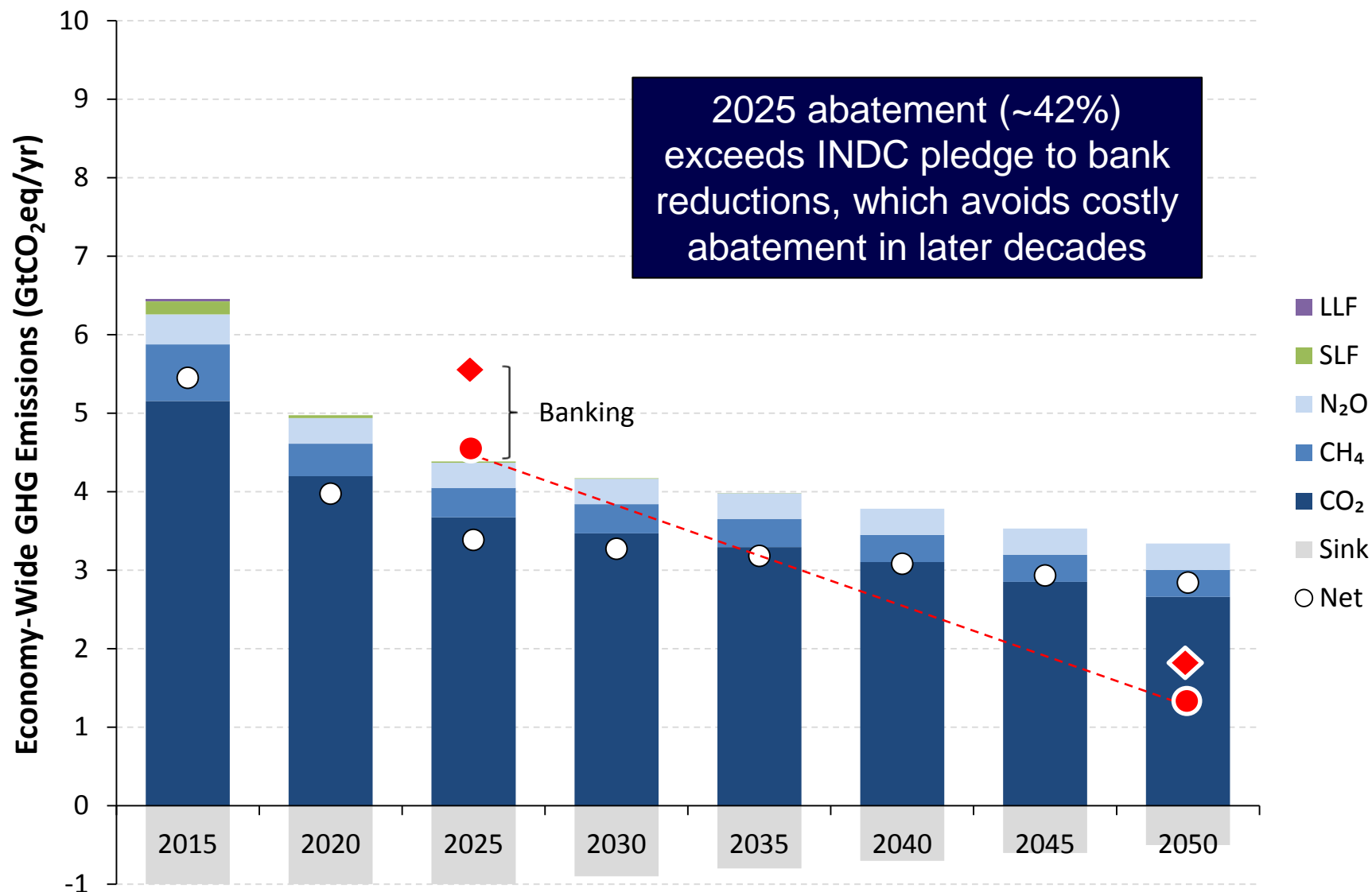
Economy-wide emissions (reference)

US-REGEN model results

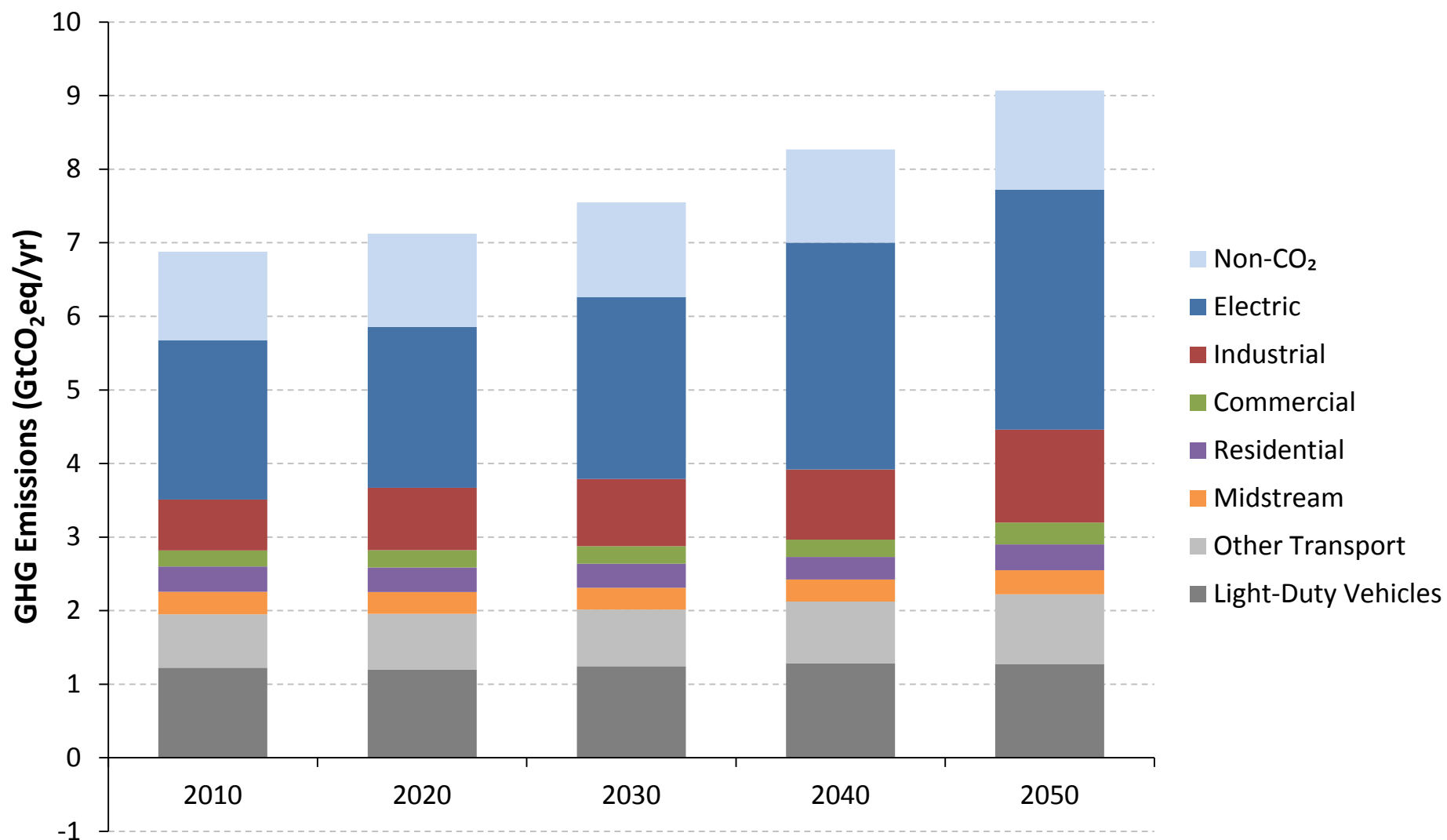


Economy-wide emissions with 80% cap

All sectors, all GHGs (with banking and borrowing)

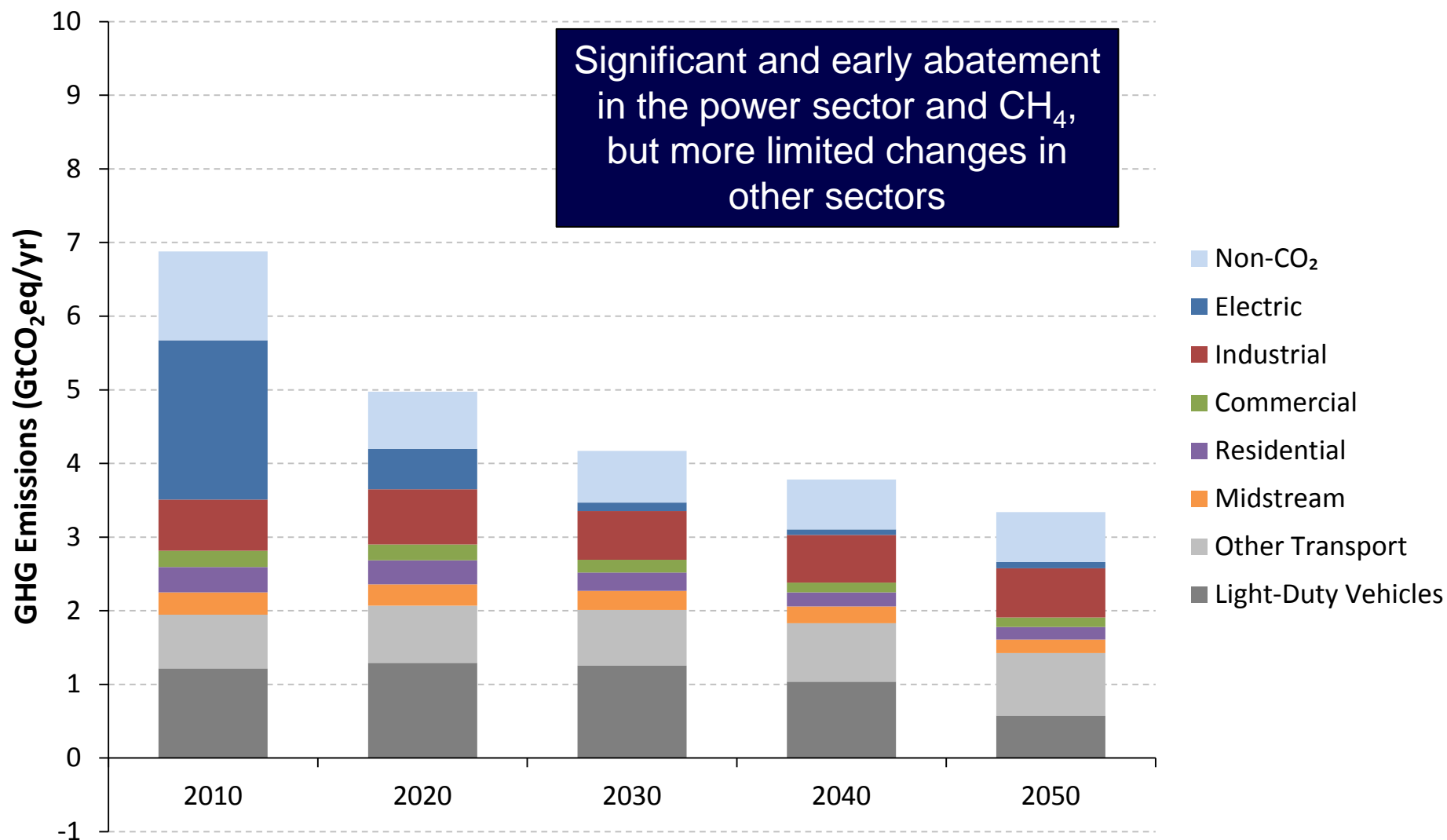


GHG emissions by sector (reference)



GHG emissions by sector (80% all GHG cap)

All sectors, all GHGs (with banking and borrowing)

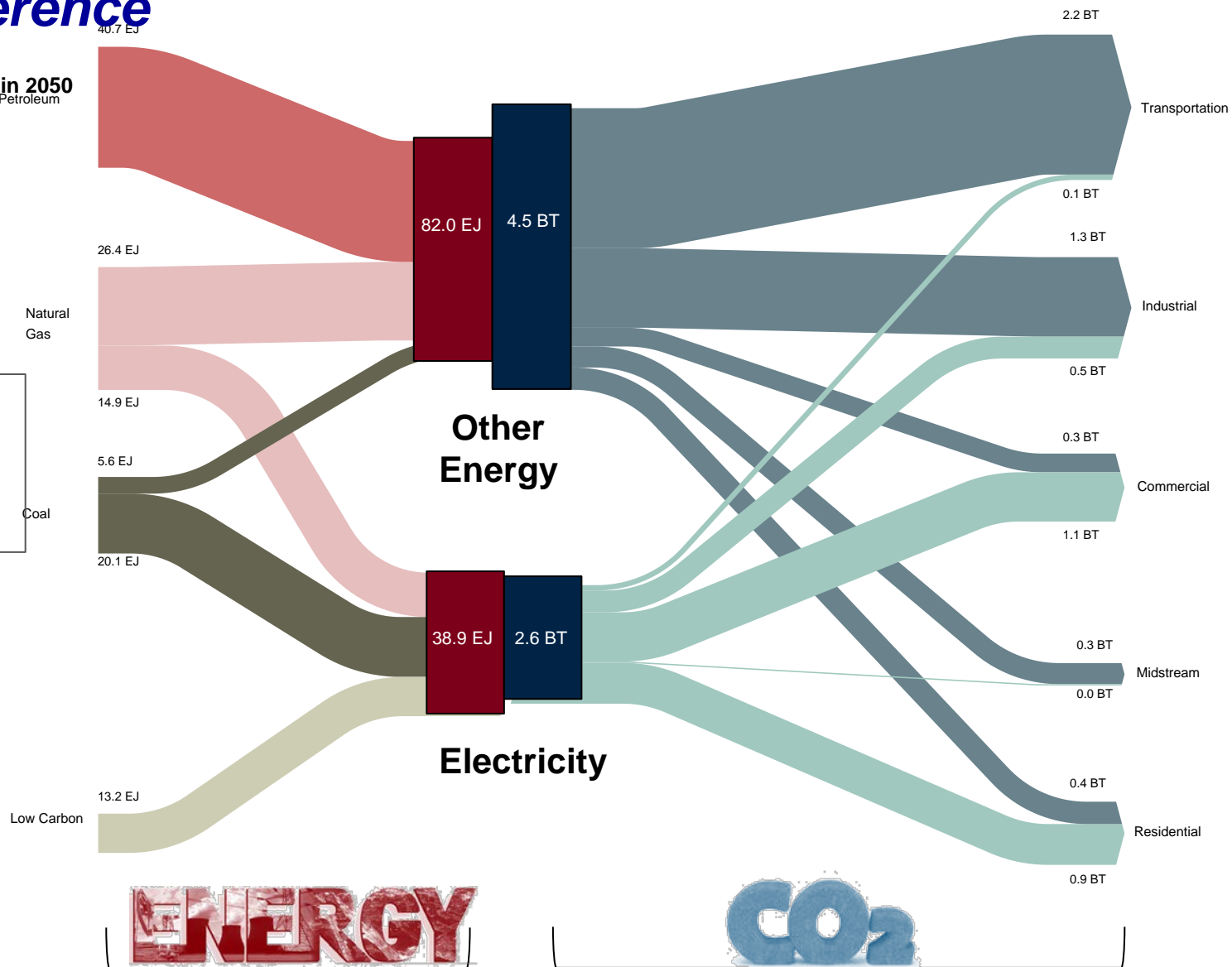


U.S. Energy – Emissions Transformation: 2050 Reference

PRELIMINARY
DATA

U.S. Energy and Emissions in 2050
Petroleum

US-REGEN Reference
AEO fuel prices thru 2040
RPS targets a/o 2015
CPP not included

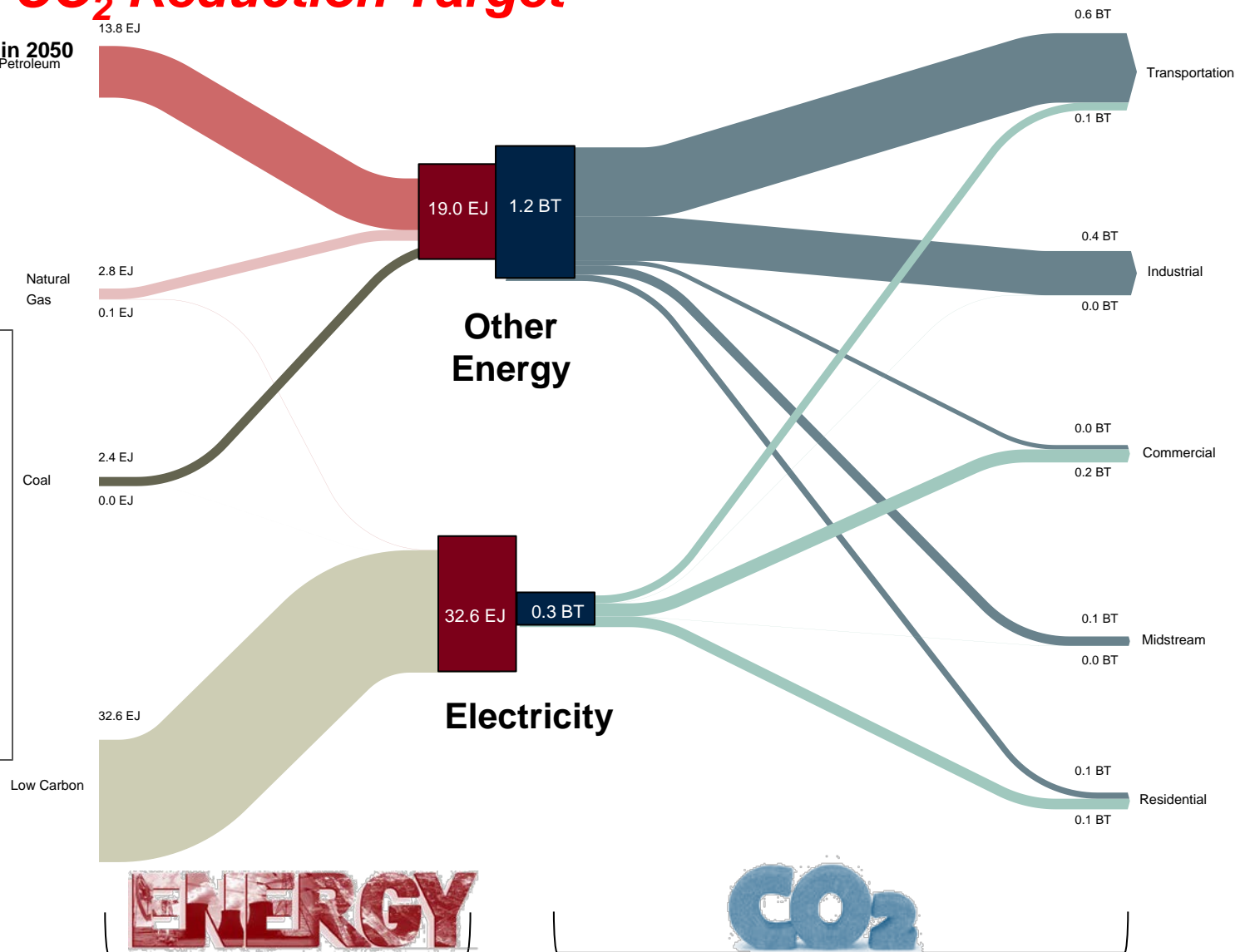


U.S. Energy – Emissions Transformation: 2050 80% CO₂ Reduction Target

PRELIMINARY
DATA

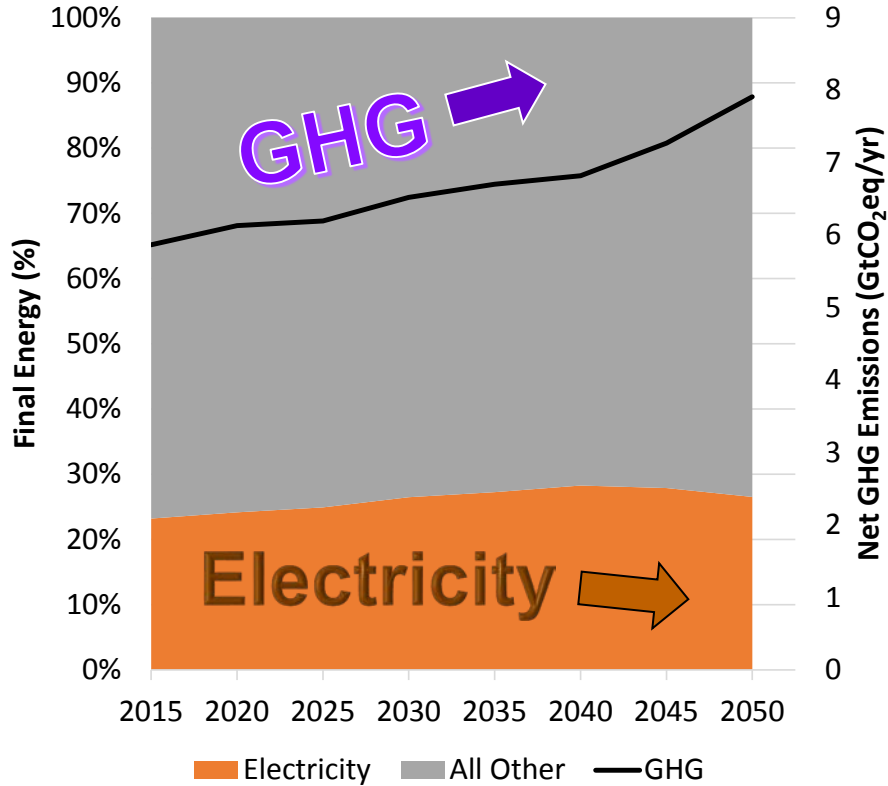
U.S. Energy and Emissions in 2050

80% reduction in economy-wide CO₂ emissions (from 2005)
No banking or borrowing
Other Energy shift to Electricity which is more efficient
Accelerated improvement of economy-wide energy intensity
Price induced energy conservation

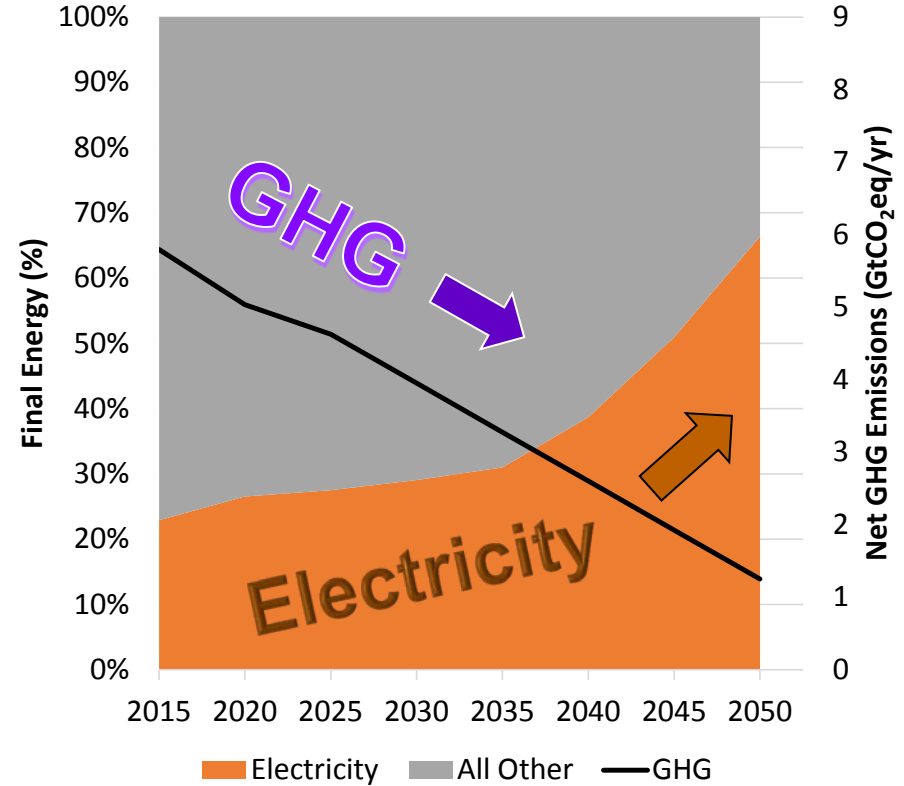


Electrification Reduces Future GHG Emissions

Reference



80% GHG Mitigation (No Banking)





Together...Shaping the Future of Electricity