

Economy-wide Greenhouse Gas Mitigation

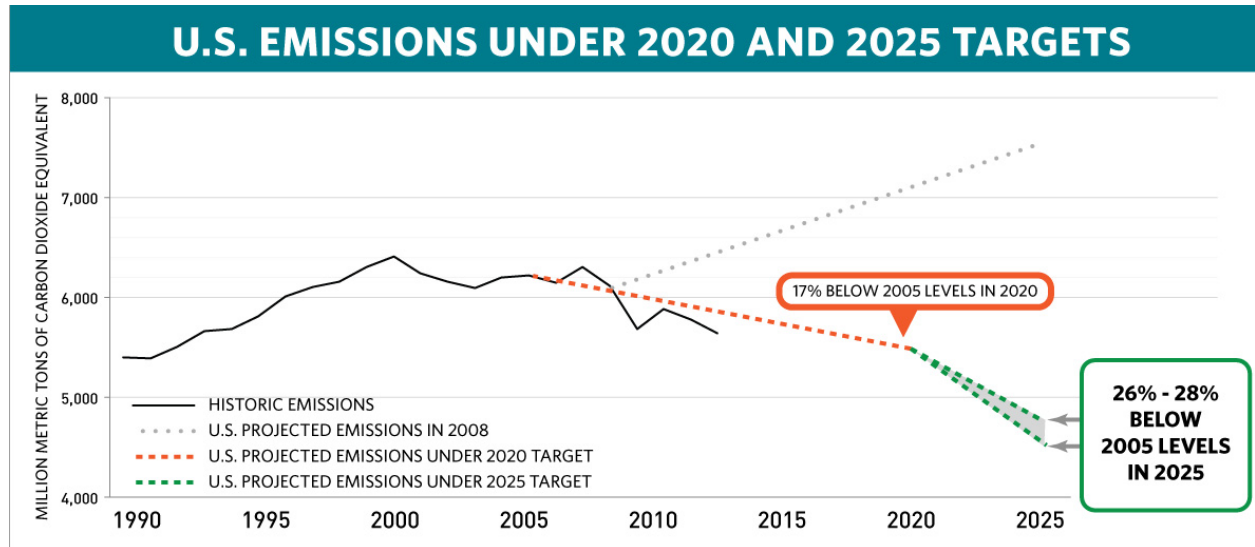
Francisco de la Chesnaye, Technical Executive

John Bistline, Project Manager

EIA Energy Conference
June 15, 2015



U.S. Intended nationally determined contribution to the UNFCCC

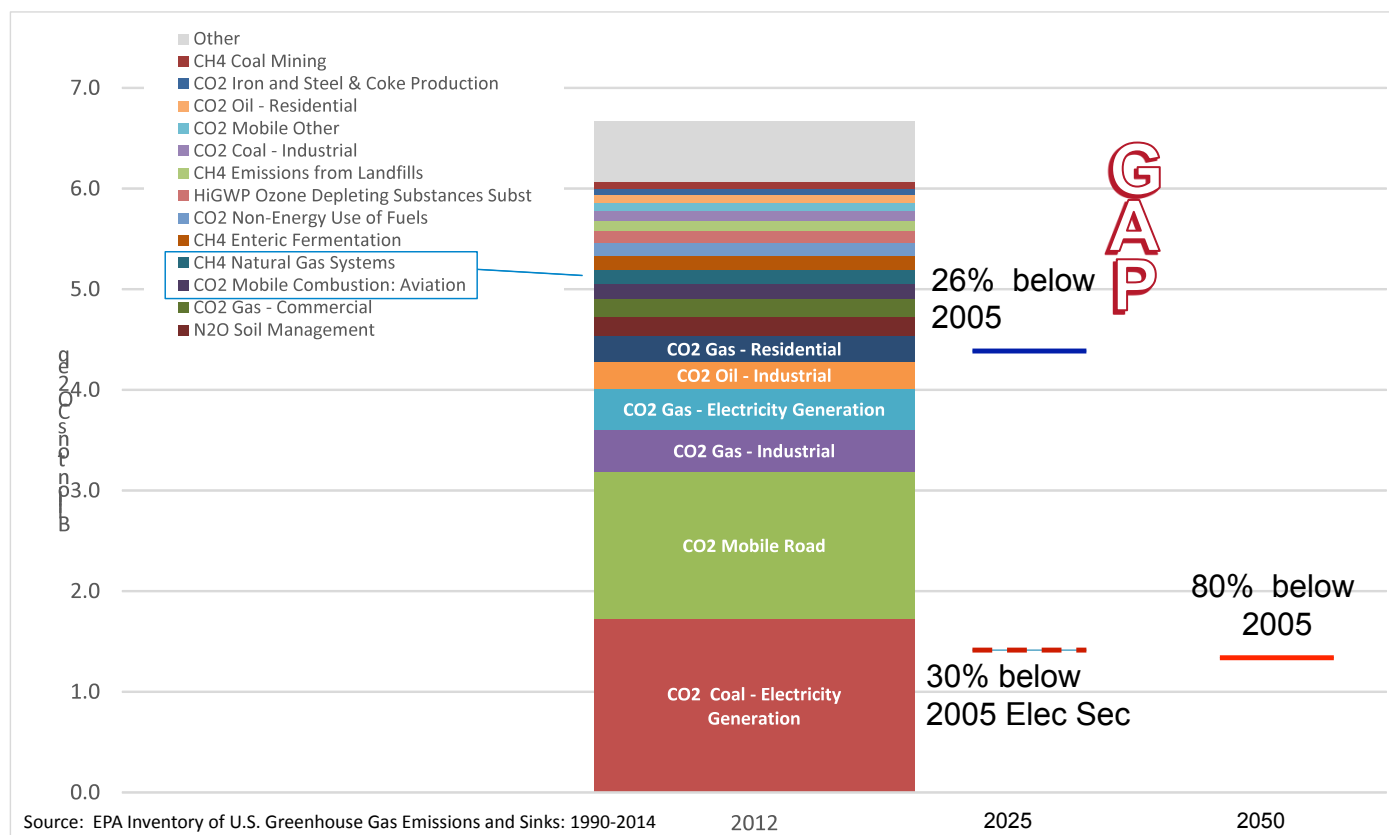


“Substantial global emission reductions are needed to keep the global temperature rise below 2 degrees Celsius, and the 2025 target is consistent with a path to deep decarbonization.

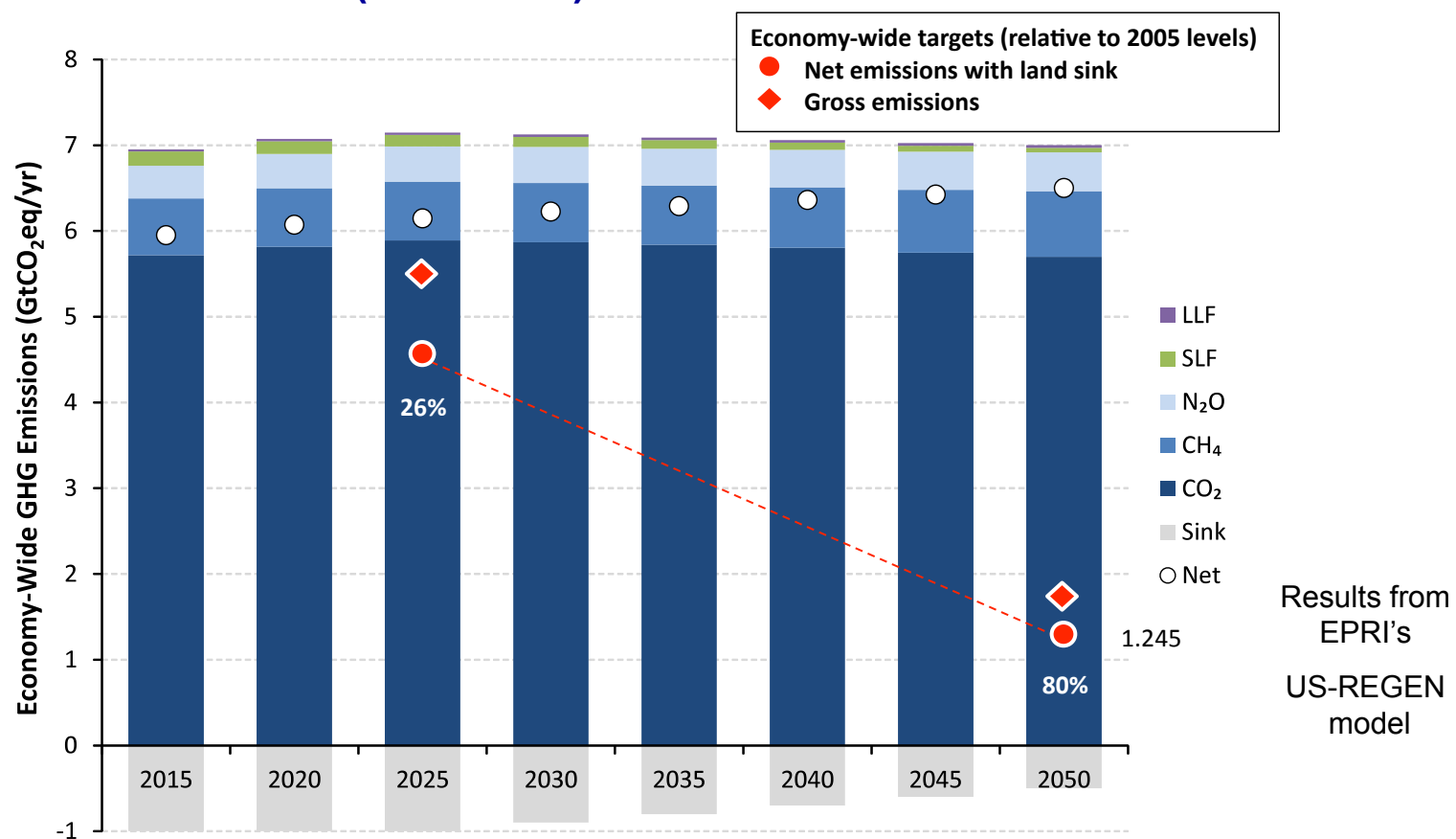
“This target is consistent with a straight line emission reduction pathway from 2020 to deep, economy-wide emission reductions of 80% or more by 2050.”

Economy-wide Greenhouse Gas Projections & Mitigation

U.S. Sectors, GHG Emissions, and Mitigation Goals

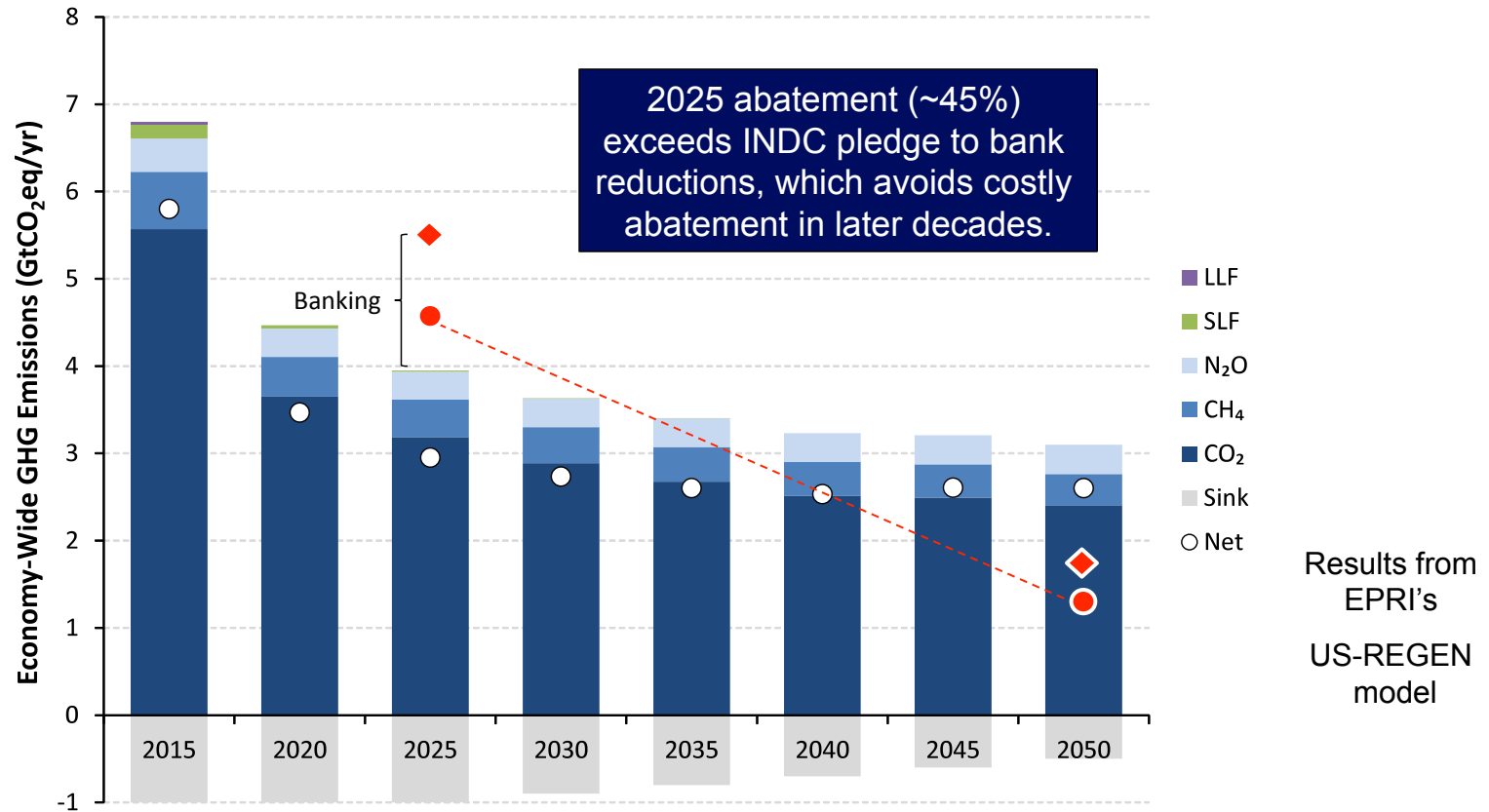


Economy-wide emissions (reference)

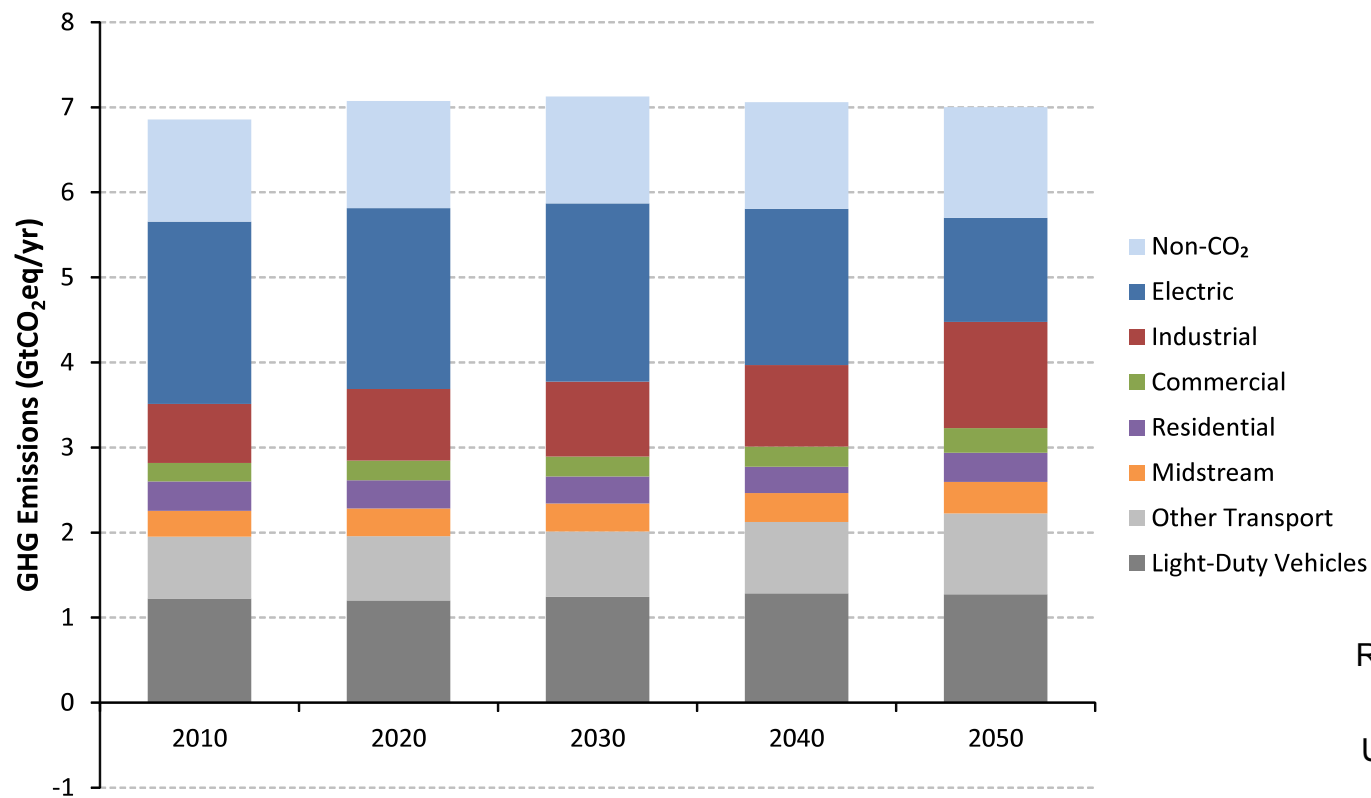


Economy-wide emissions with 80% cap

All sectors, all GHGs (with banking and borrowing)

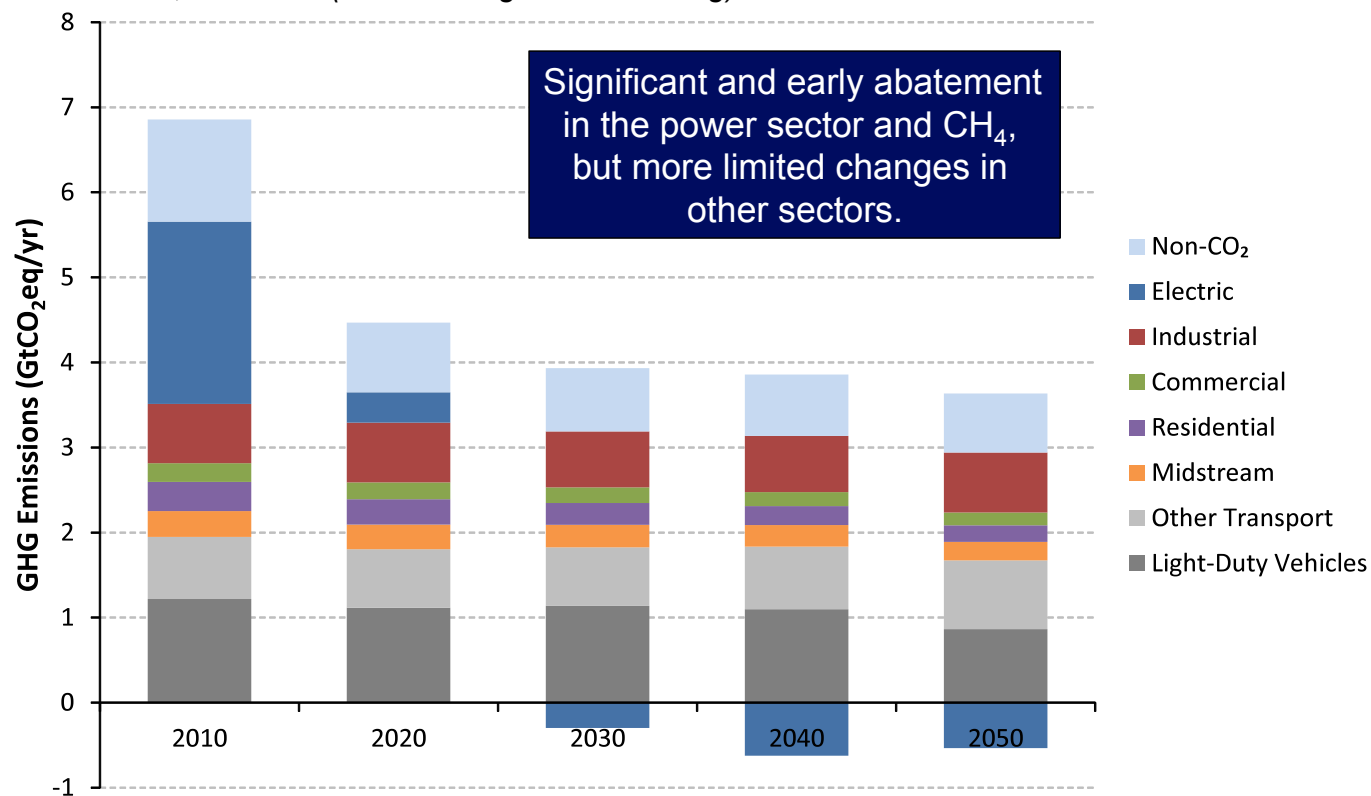


GHG emissions by sector (reference)



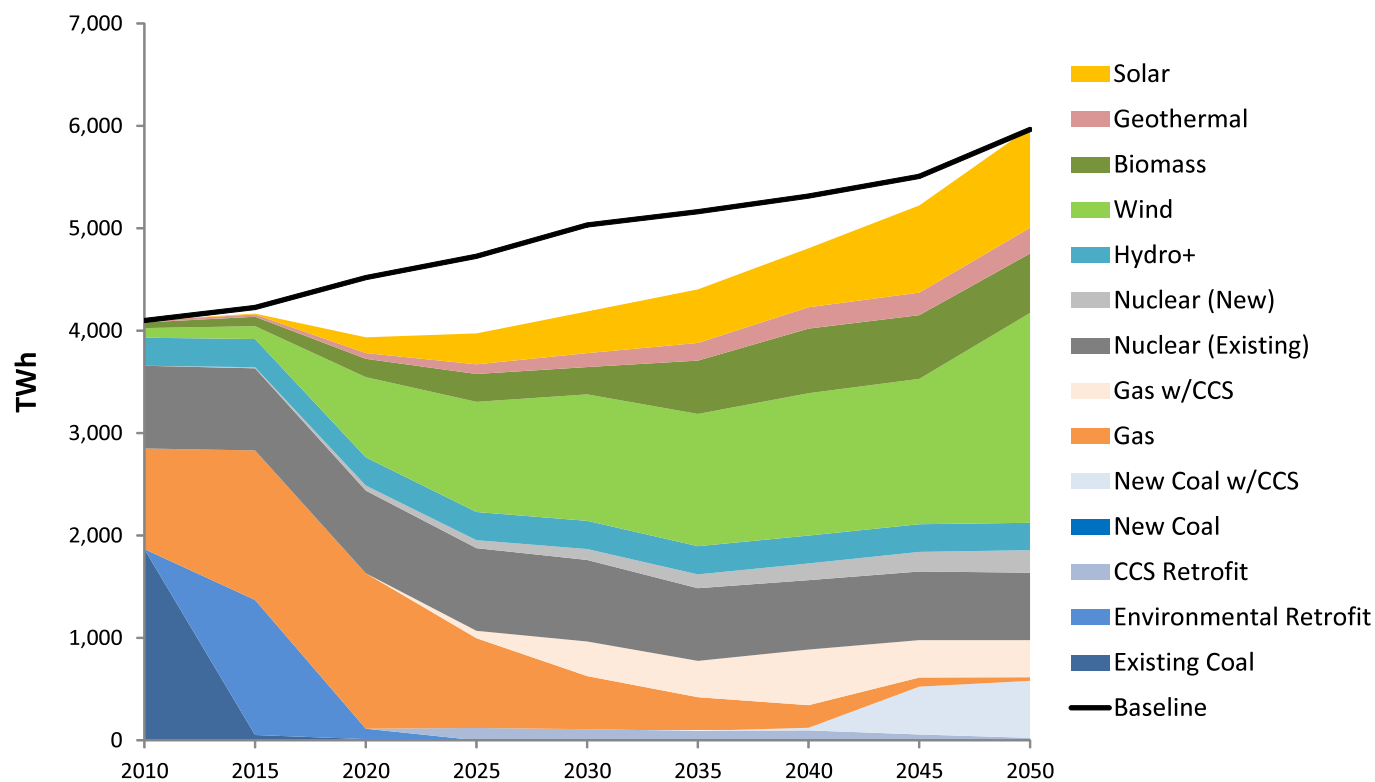
GHG emissions by sector (80% all GHG cap)

All sectors, all GHGs (with banking and borrowing)



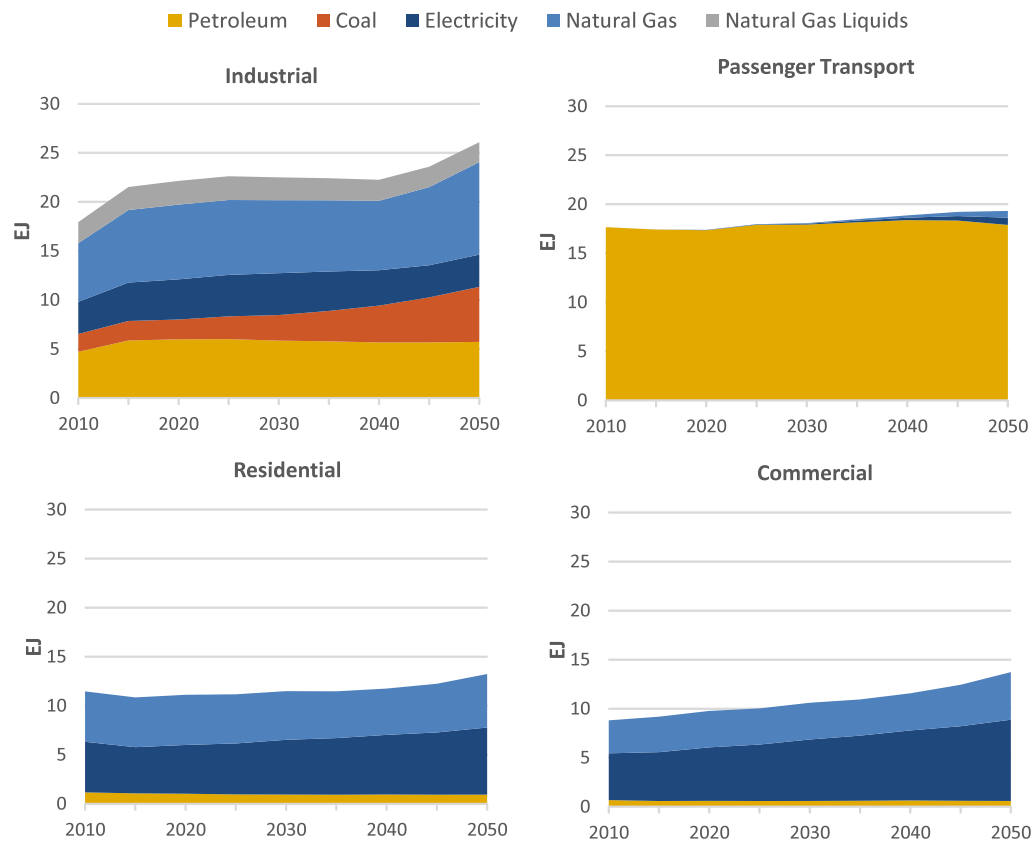
Results from
EPRI's
US-REGEN
model

Electricity generation (80% all GHG cap)

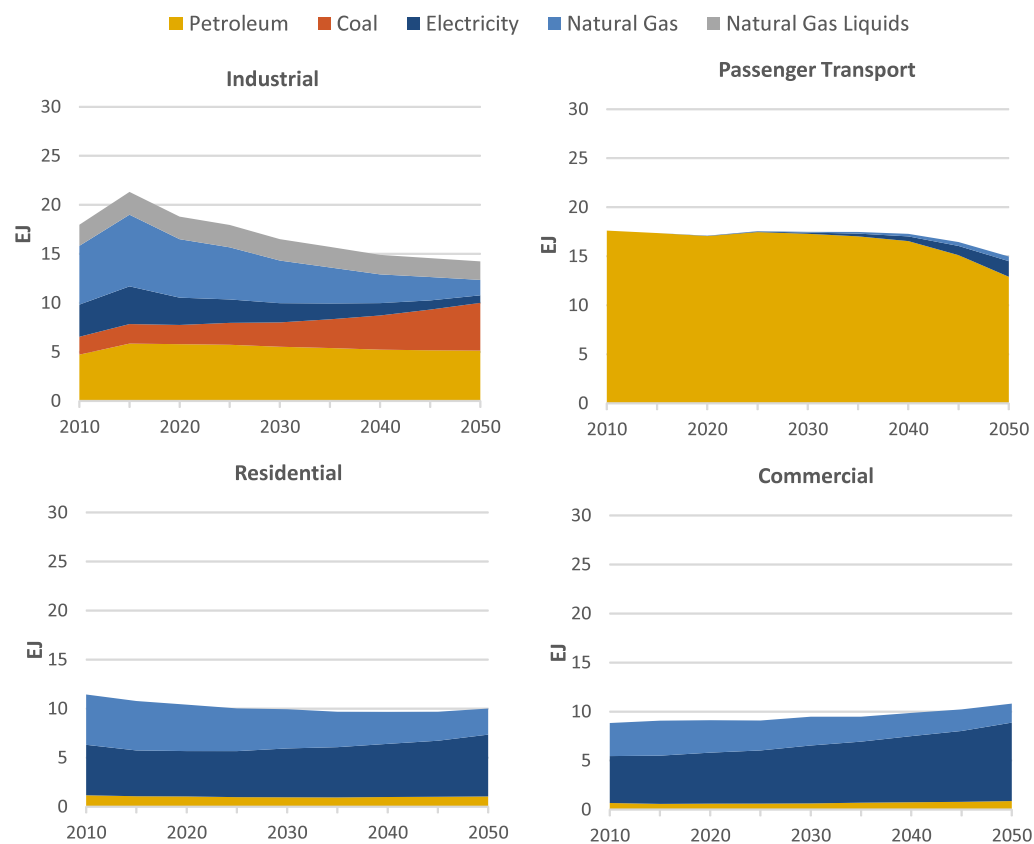


Results from
EPRI's
US-REGEN
model

Energy demand by end-use sector (reference)



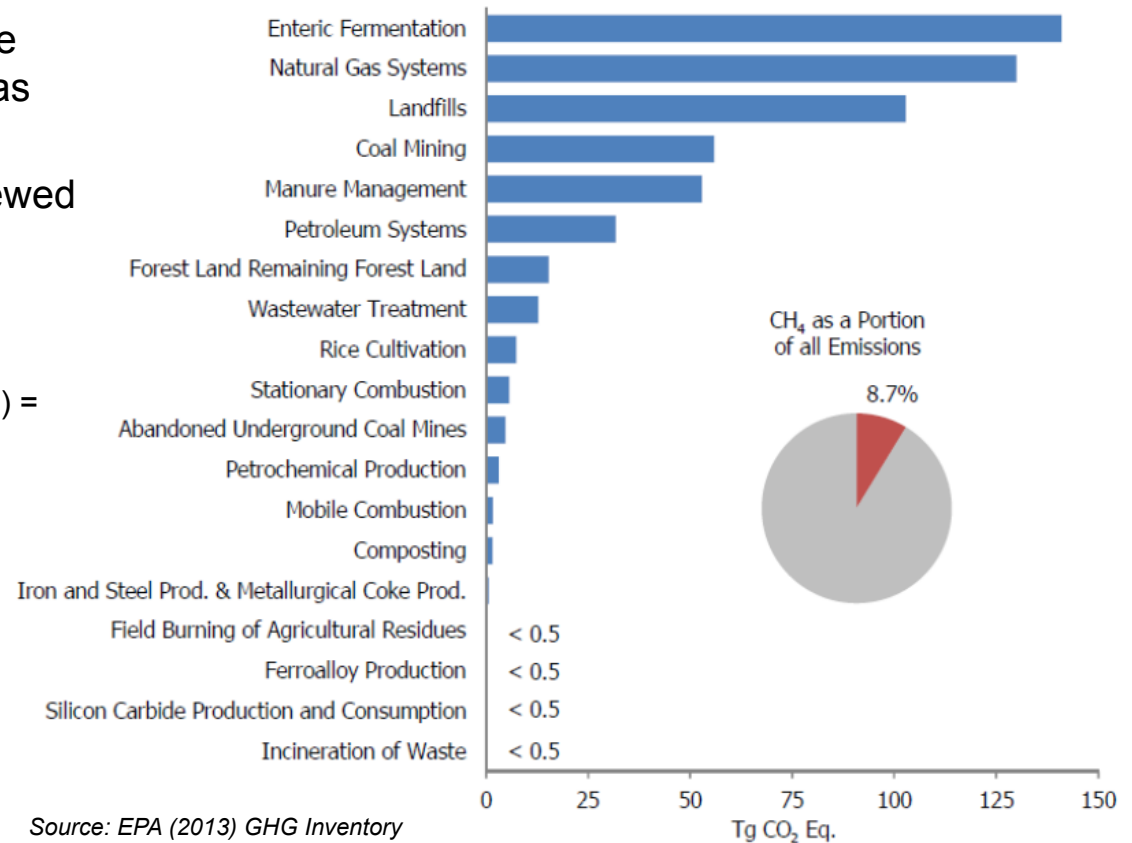
Energy demand by end-use sector (80% cap)



Energy-Related Methane Emissions

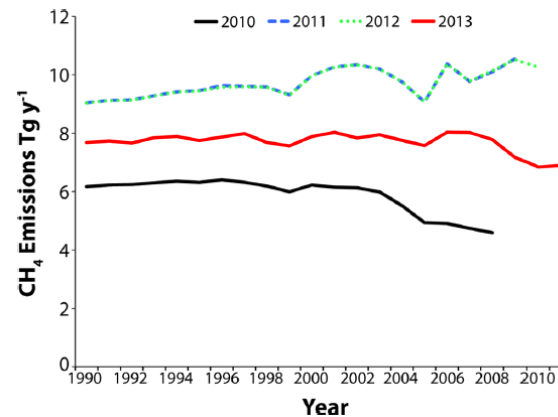
Methane emissions rates

- Uncertainty about upstream methane emissions associated with natural gas production
- Active area of research in peer-reviewed literature (Brandt, et al., 2014, EDF-sponsored papers)
- Implied leakage rates
 - 2015 EPA Inventory (based on 2013 data) = 1.44%
 - EPRI models = 1.4%



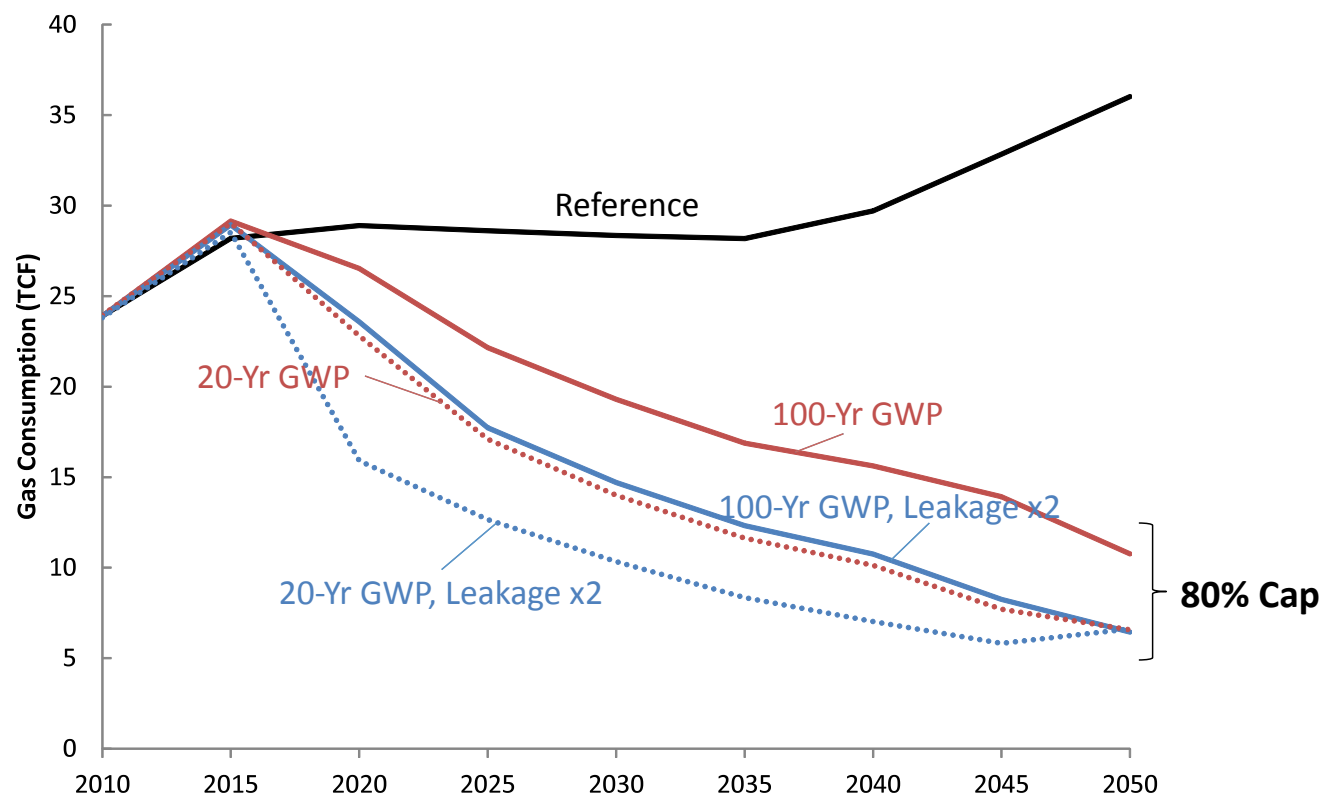
Changes in EPA data & emissions rates

- EPA inventories for gas-related CH₄ based on ~80 emissions factors from direct measurements made at ~200 sites in early 1990s; additional emissions/activity data supplied by the states and industry
- Lifecycle CH₄ leakage rate from gas production implied by EPA approach ranged from 2.8% (2011 and 2012 NI releases) to as low as 1.4% (2013)
- U.S. natural gas system CH₄ emissions for different releases of the U.S. EPA GHG National Inventory

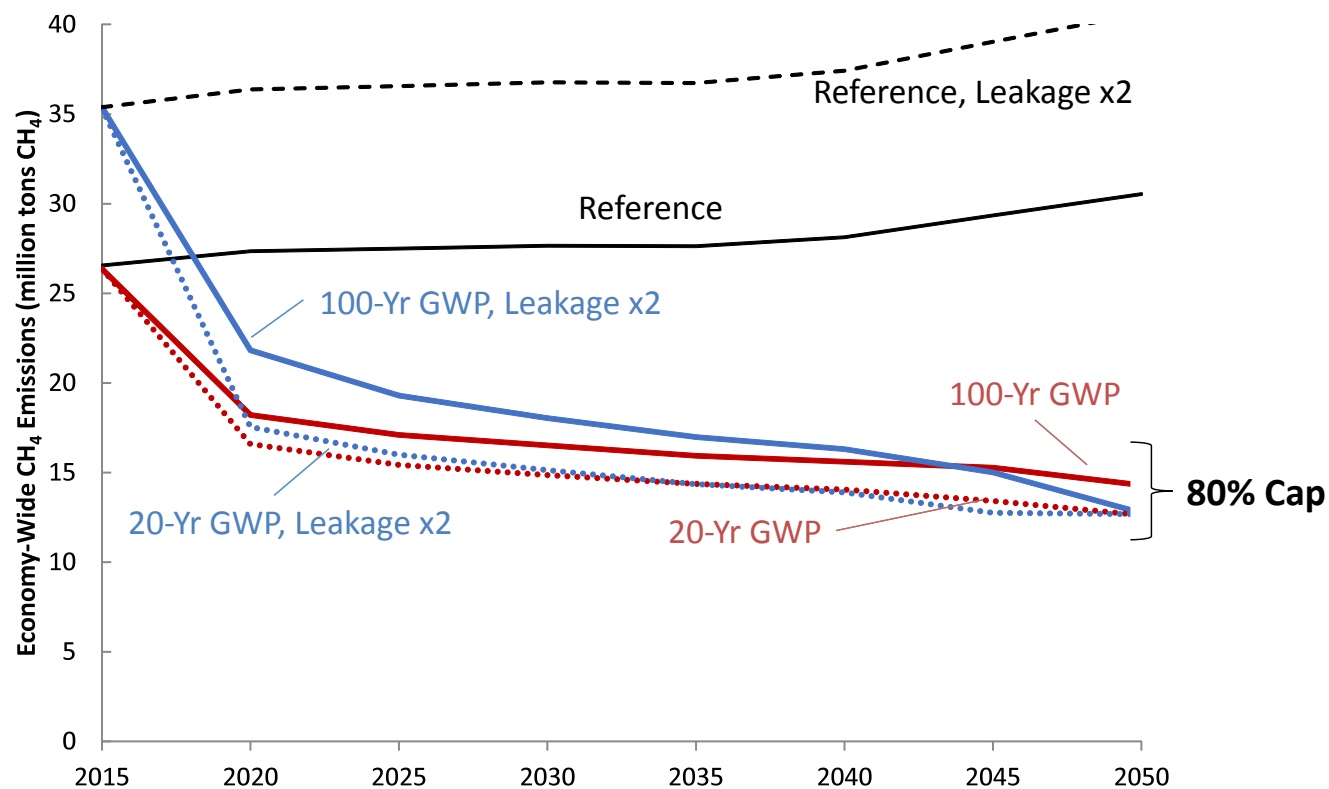


Source: Moore, et al. (2014)

Economy-wide natural gas consumption



Economy-wide CH₄ emissions



Together...Shaping the Future of Electricity



Francisco de la Chesnaye, Ph.D.

Technical Executive

Energy and Environmental Analysis Group

m: 202-230-2118; fdelachesnaye@epri.com