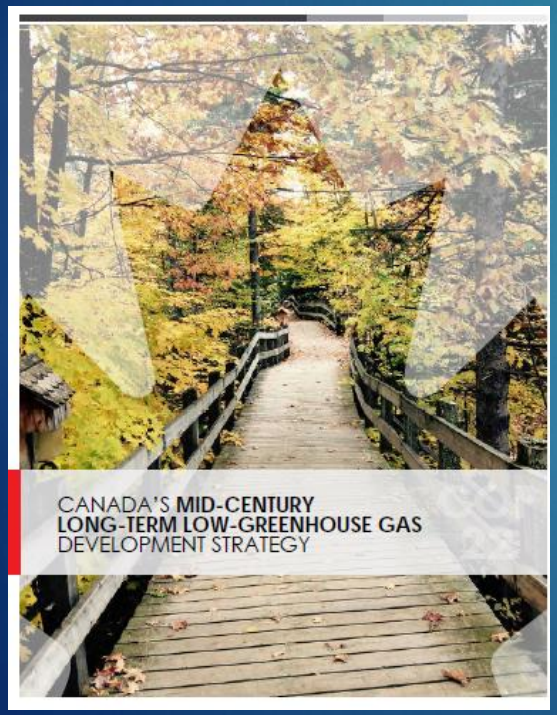
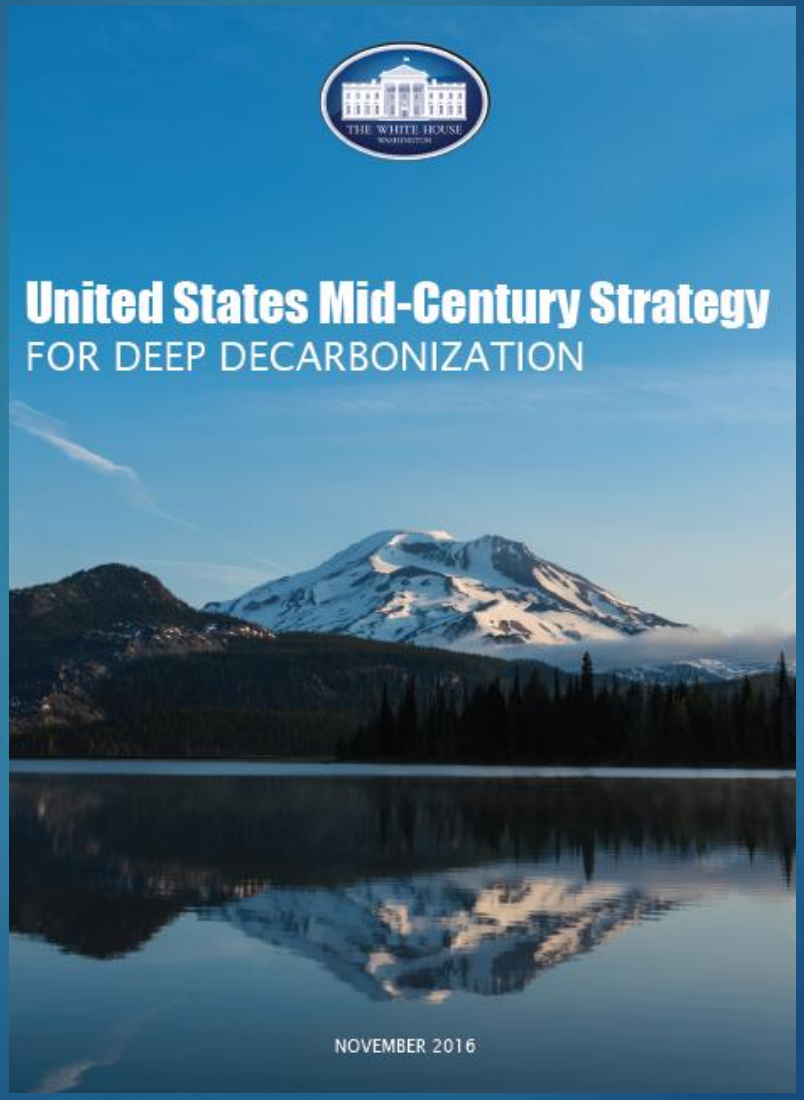
National Mid-Century Strategies



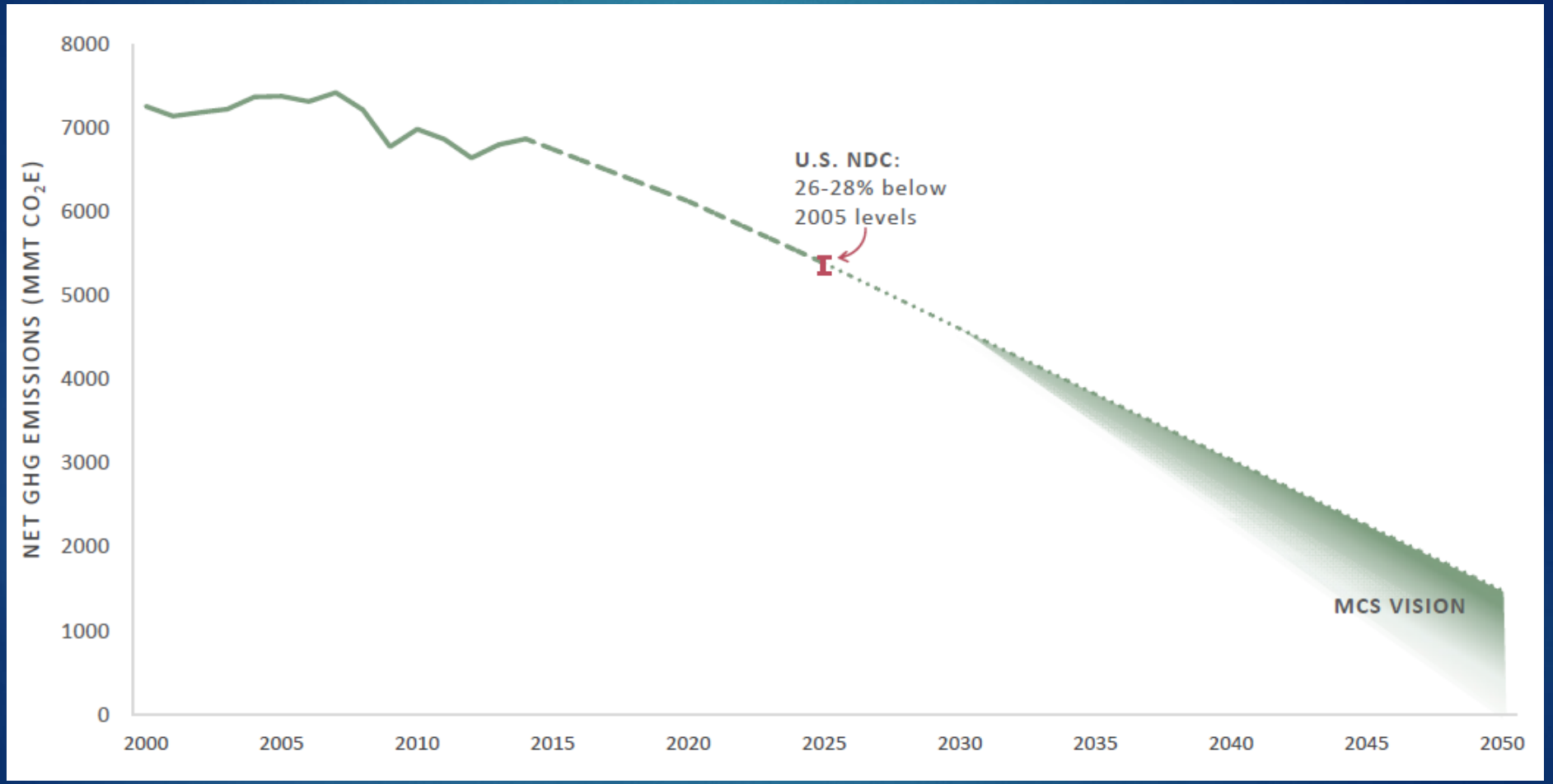


Presentation by Noah Kaufman, World Resources Institute, formerly White House CEQ

National Mid-Century Strategies

- 2015 Paris agreement:
  - Country NDC targets for 2025/2030
  - Long-term global goal of well-below 2 °C
  - "Invites Parties to communicate, by 2020, to the secretariat ***mid-century, long-term low greenhouse gas emission development strategies***"
- Mid-century strategies released to date include United States, Canada, Mexico, Germany, France
  - China, India, others have committed

U.S. Mid-Century Strategy



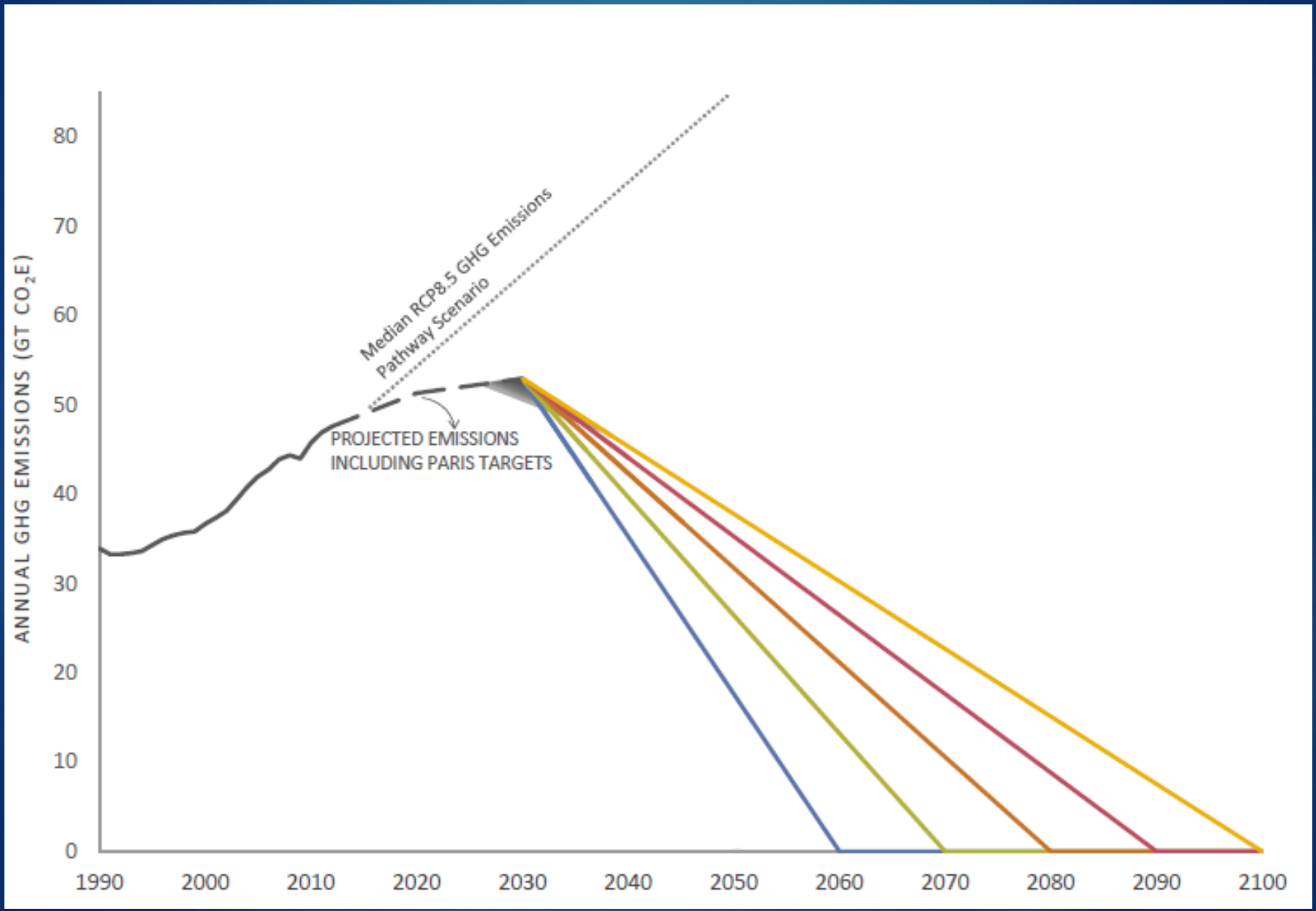
Five Takeaways from MCS

1. Current emissions trajectory is insufficient
2. Importance of economywide planning
3. Near-term pathway to 2050 target differs from near-term pathway to 2025 target
4. Outcome-based policies and broad support for innovation
5. Virtuous cycle of innovation and ambition

MCS Takeaway #1

- Current global emissions trajectory is insufficient to achieve the long-term goals of the Paris Agreement
  - Long-term strategies show need for increased ambition now

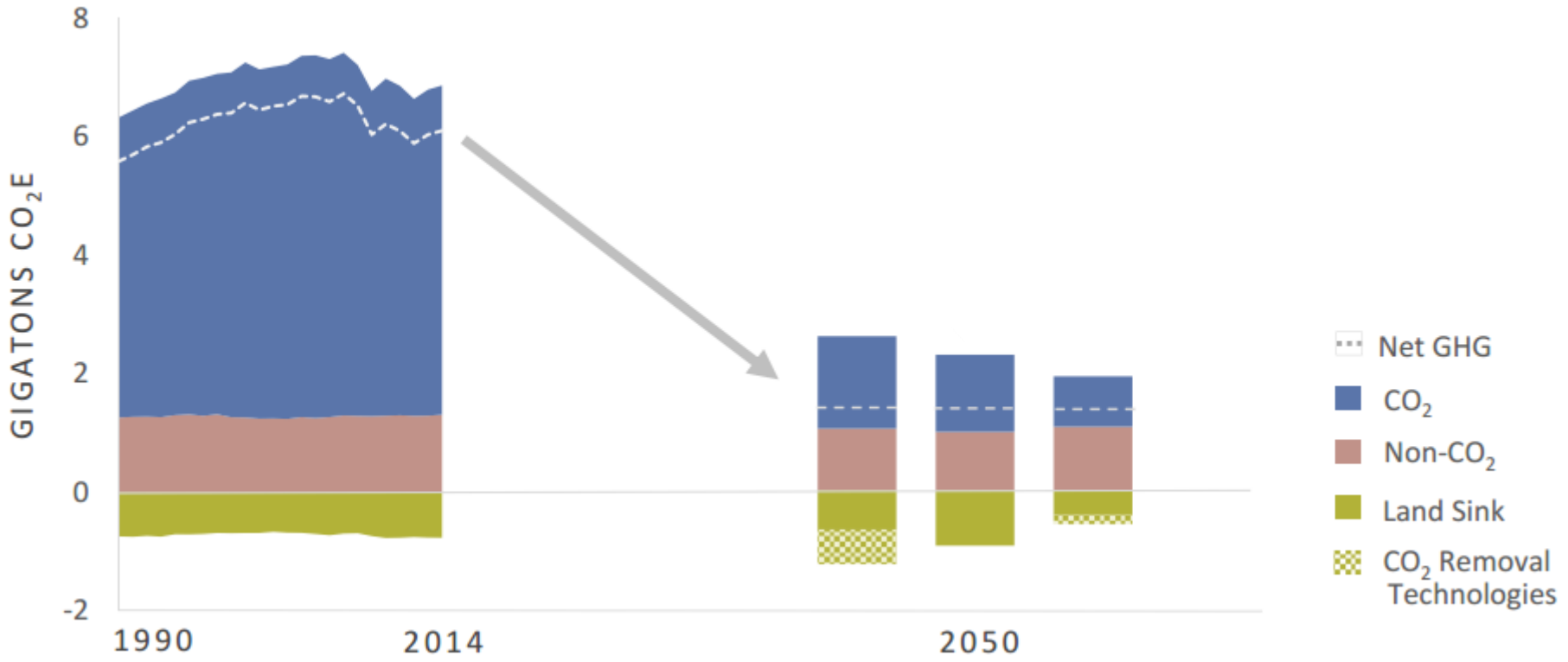
Global Emissions Pathways



MCS Takeaway #2

- Importance of comprehensive, economy-wide planning/action (i.e. not just CO_2 from energy) to reduce greenhouse gas emissions

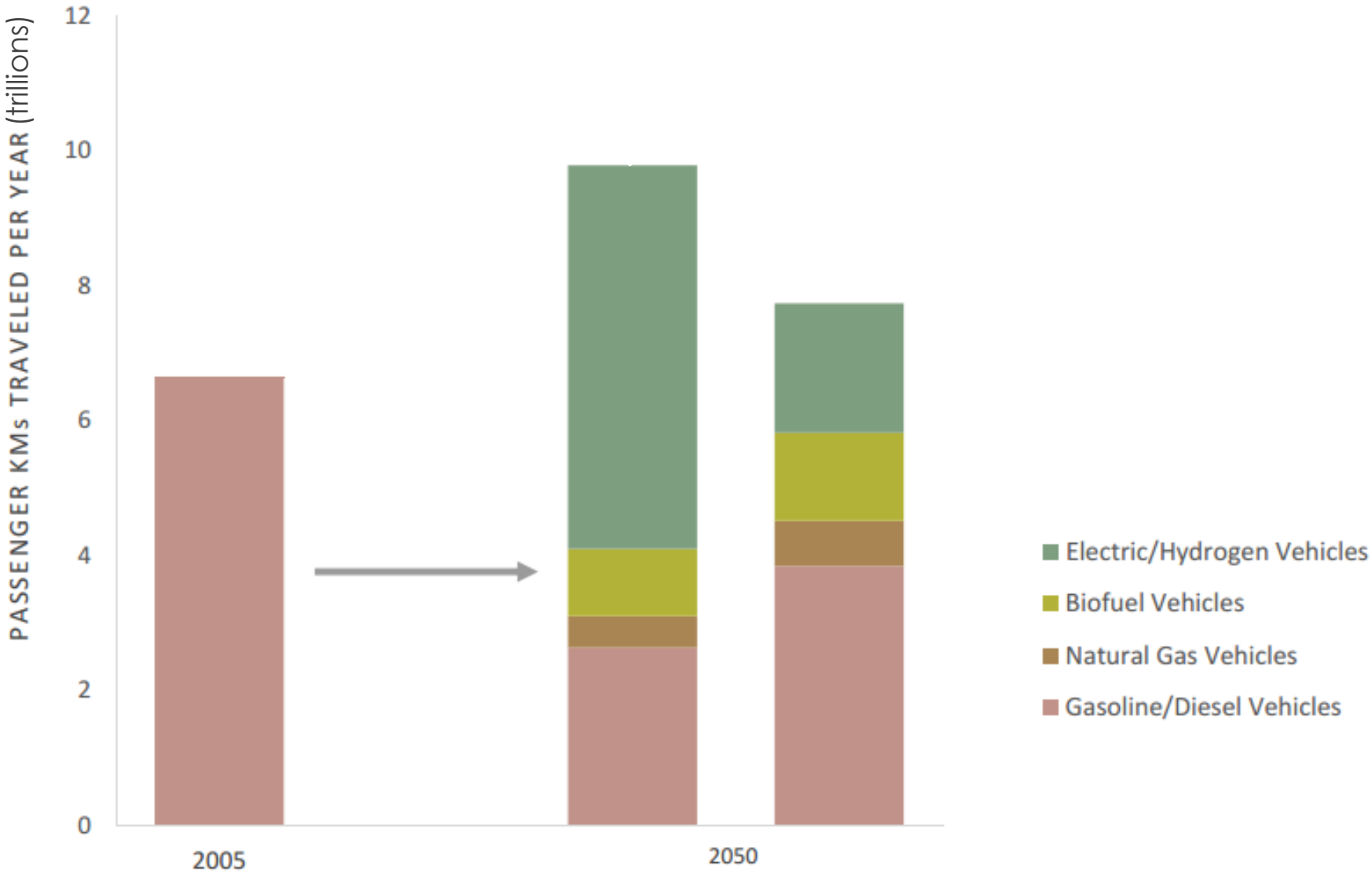
Pathways to 80% Reductions in U.S.



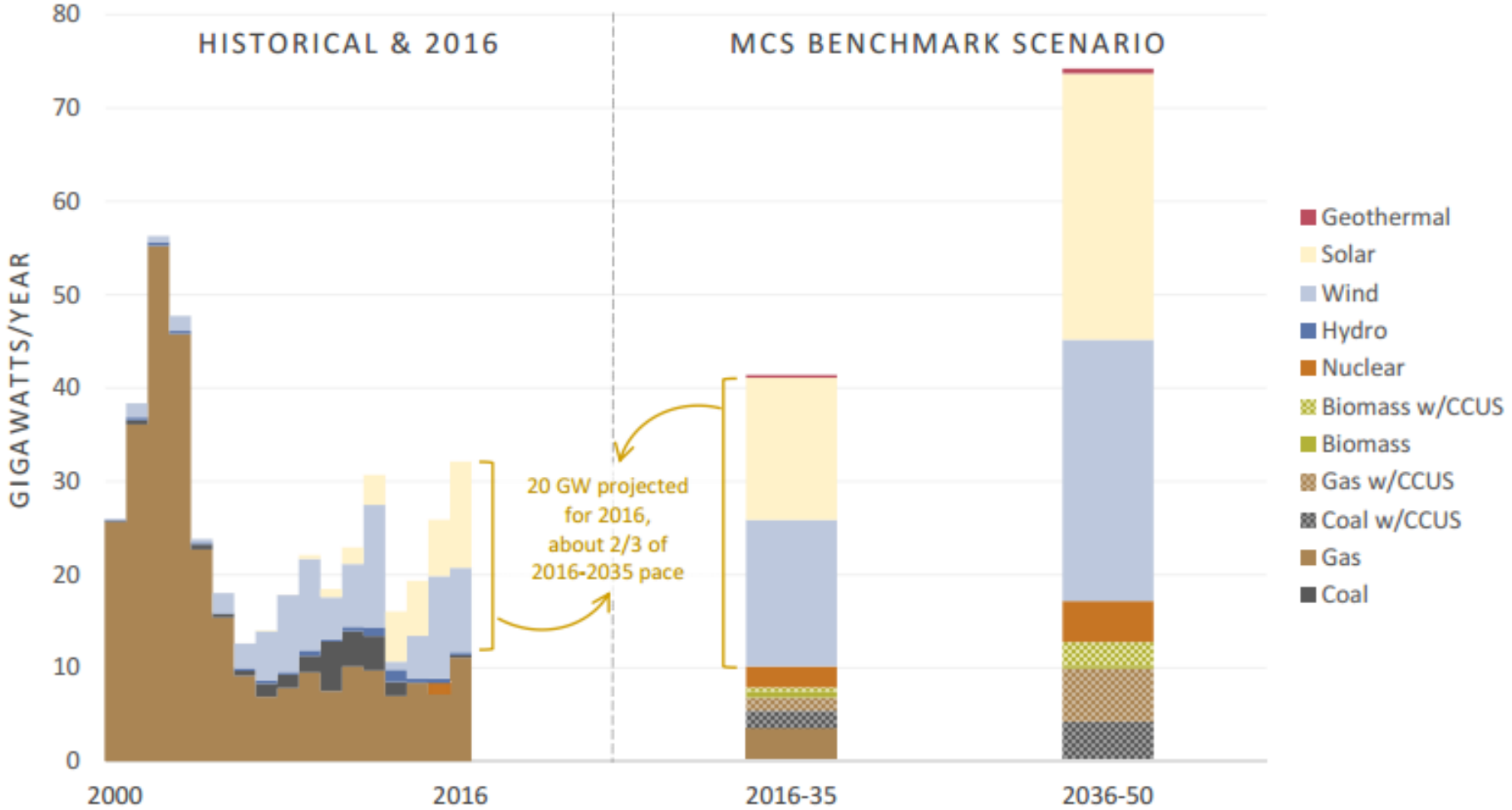
MCS Takeaway #3

- Fundamental differences between a near-term pathway to a long term (e.g. 2050) target vs a near-term pathway to short-term (e.g. 2025) target

Light Duty Vehicles Distance Traveled



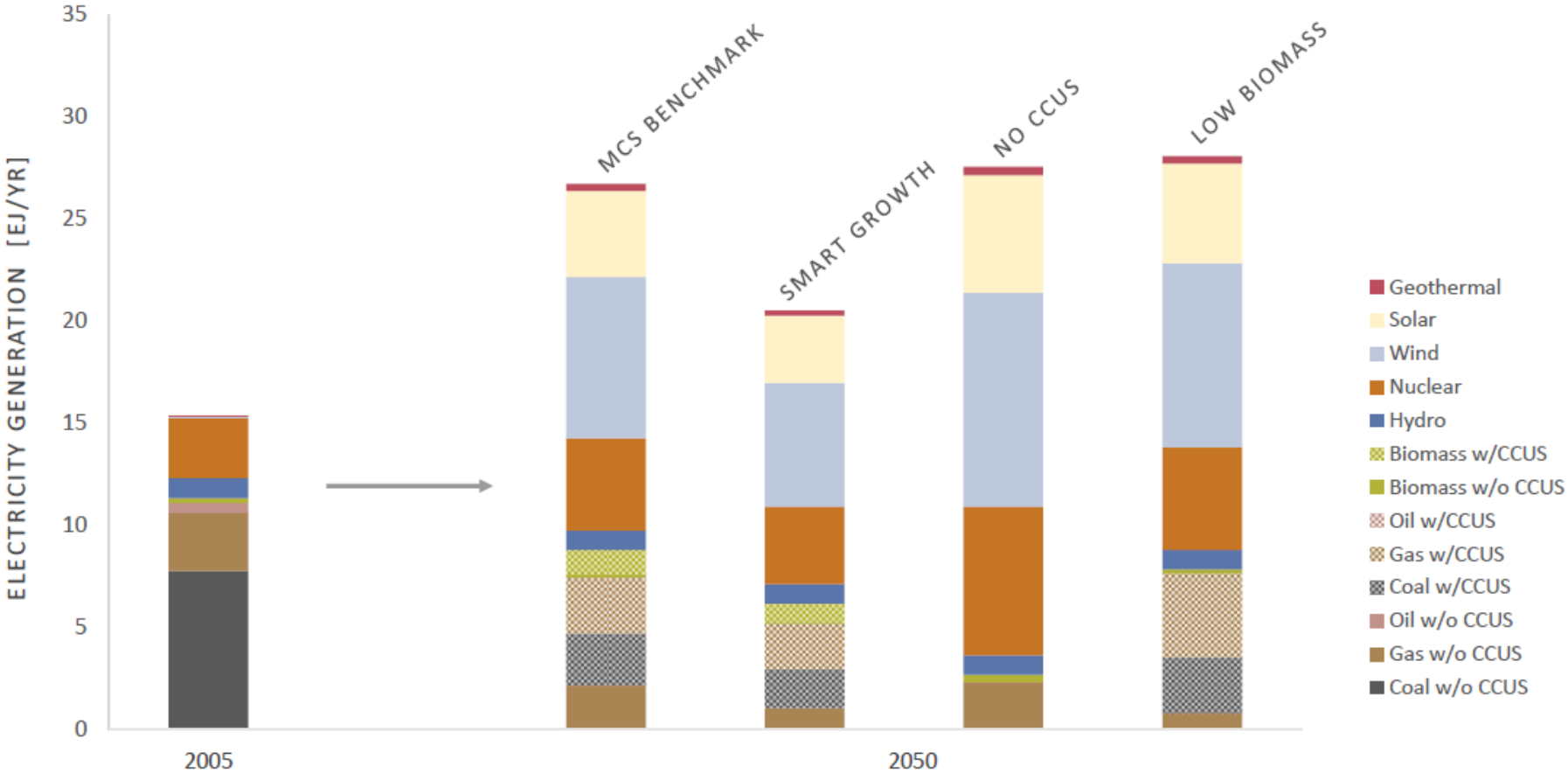
Electricity Capacity Additions



MCS Takeaway #4

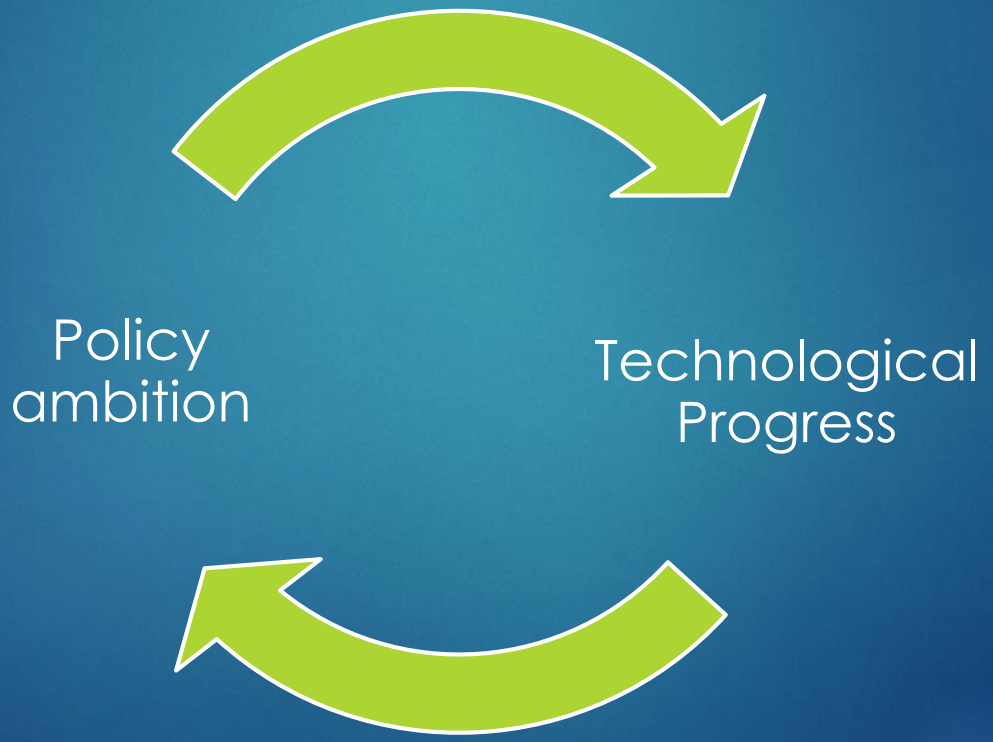
- Outcome-based policies and broad support for innovation will enable the most cost-effective low carbon technologies to emerge over time

Electricity Generation in 2050

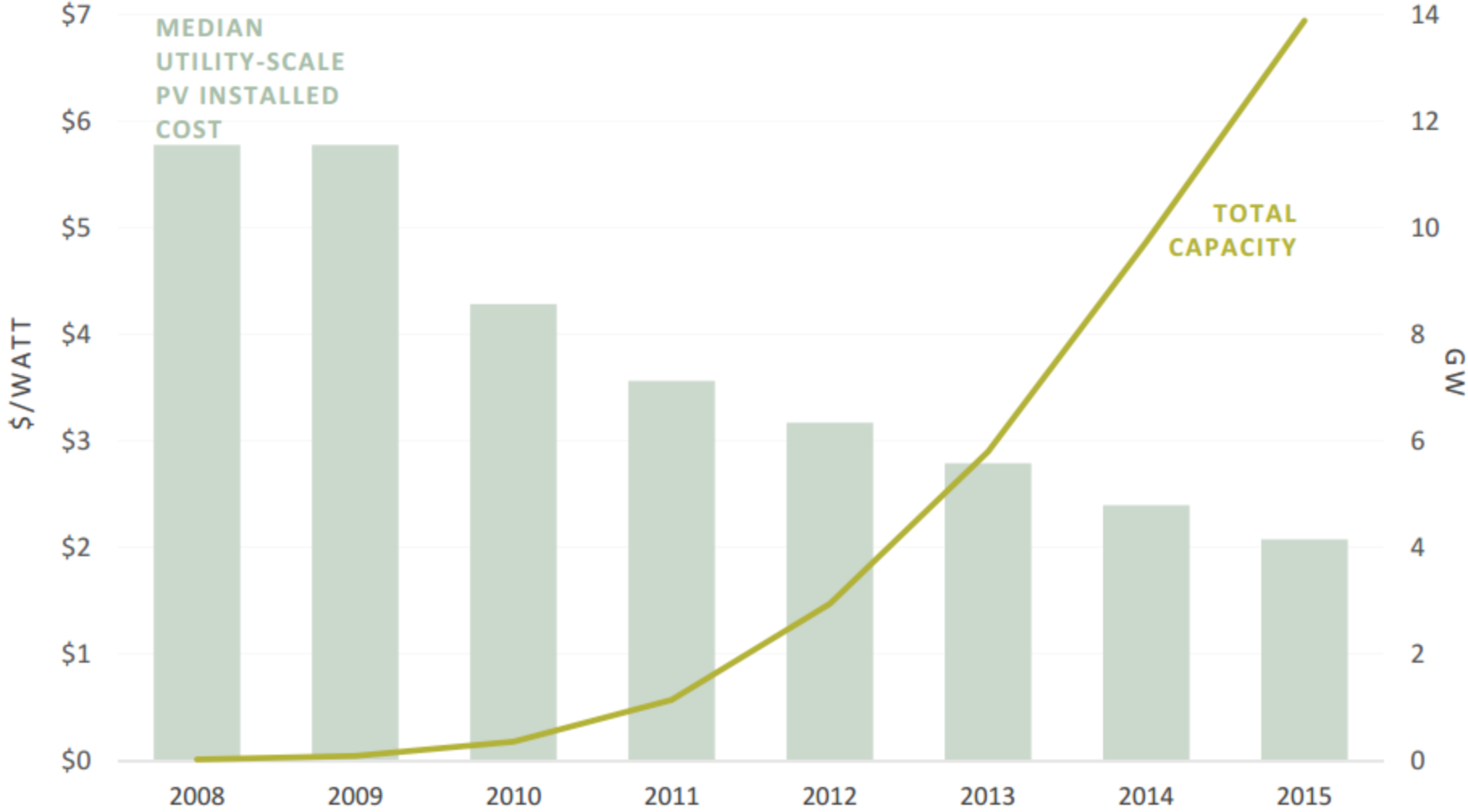


MCS Takeaway #5

- Virtuous cycle of ambition and innovation



Solar PV Cost and Deployment



Five Takeaways from MCS

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Questions?

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Reference:

Long term strategies (and data) on the UNFCCC website:
http://unfccc.int/focus/long-term_strategies/items/9971.php

U.S. MCS on Obama WH Archive:

https://obamawhitehouse.archives.gov/sites/default/files/docs/mid_century_strategy_report-final.pdf

Policy Priorities for Energy

- Clean energy innovation
  - Support energy R&D, prioritizing most difficult emissions sources to decarbonize
  - Support continued commercial deployment of emerging technologies (e.g. tax credits for solar/wind)
  - Demonstration of first-of-kind facilities (e.g. CCS, nuclear)
- Support cost-effective energy efficiency standards and programs
- Modernize electricity markets to encourage flexible, reliable, cost-effective, and clean generation
- Over time, comprehensive climate legislation is needed

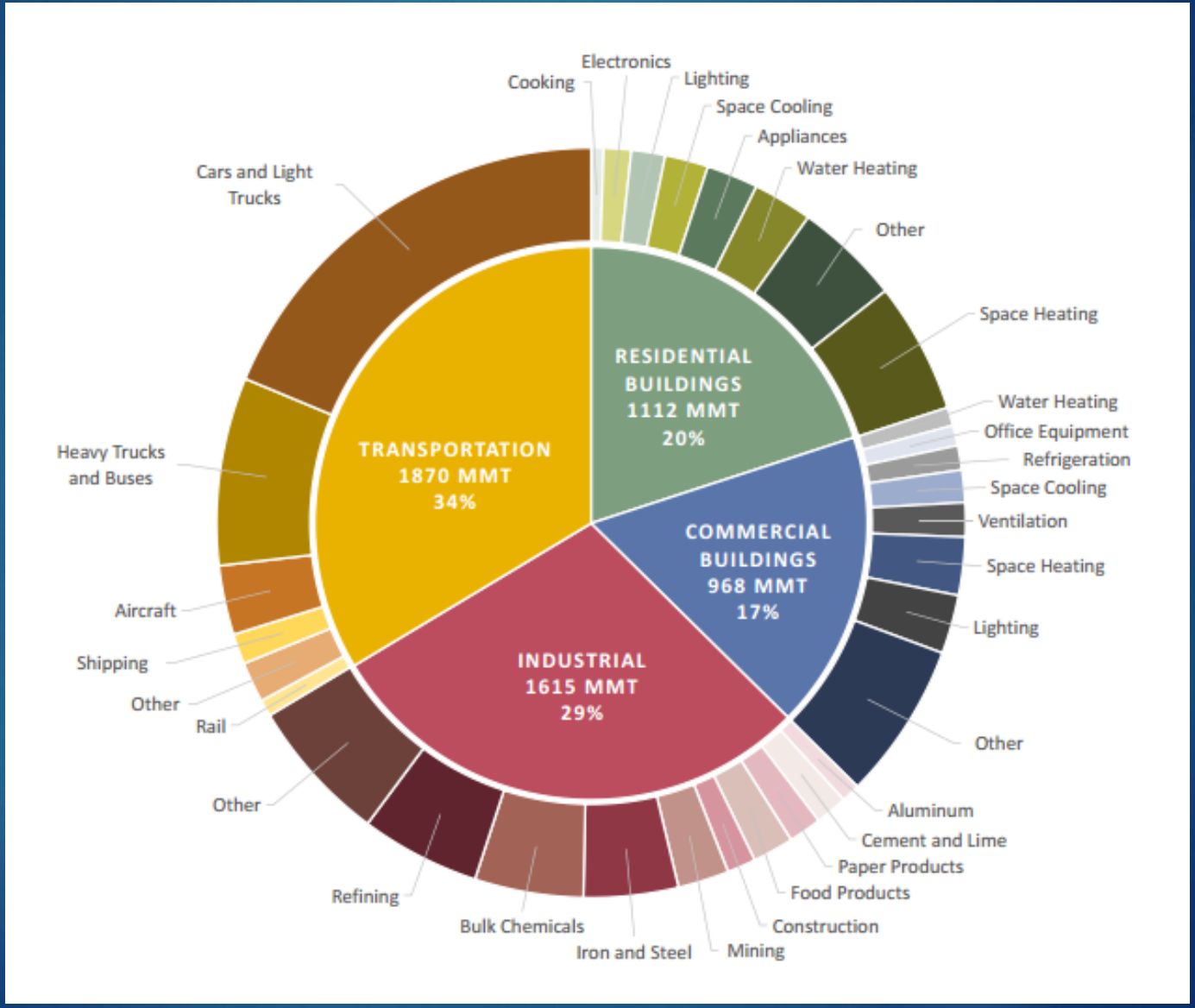
Land sector - near term priorities

- Reforestation on public lands following natural disturbance
- Support resources for U.S. lands GHG inventory work, including "next generation" of inventory capabilities with USGS satellite imagery
- Experiment with and scale conservation pay-for-performance approaches, including carbon sequestration
- Implement science-based bioenergy policy
- Support RD&D for
  - Crop productivity
  - Bioenergy crop productivity
  - Working forests productivity
  - Soil carbon opportunities – decrease costs of monitoring and verification, breakthrough concepts like ARPA-E's ROOTS and TERRA

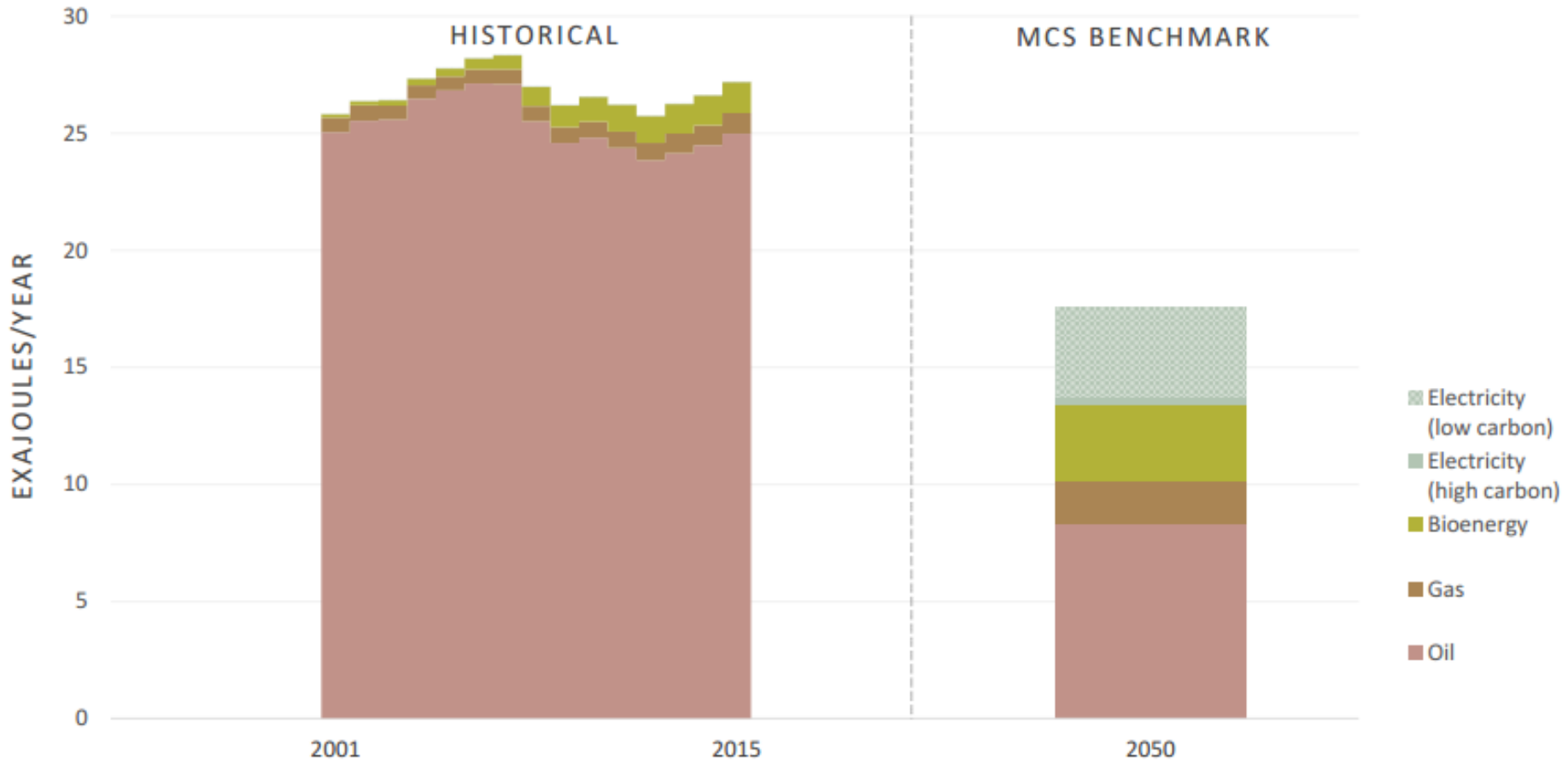
Non-CO_2 - near term priorities

- Support RD&D for
  - Measuring and monitoring diffuse/intermittent fossil fuel methane
  - Reducing nitrogen fertilizer through precision agriculture, slow-release fertilizer, and other alternatives
  - Reducing livestock methane through food additives, breeding, and other breakthroughs
  - Low-GWP HFC alternatives in cooling and refrigeration
- Continue to support incentives and technical assistance for nitrogen reduction and livestock methane reduction, in cooperation with USDA
- Implement and strengthen regulations to drive down methane emissions from oil and gas production and waste
- Continue to implement policies to phase down HFCs and properly dispose of HFC-using appliances

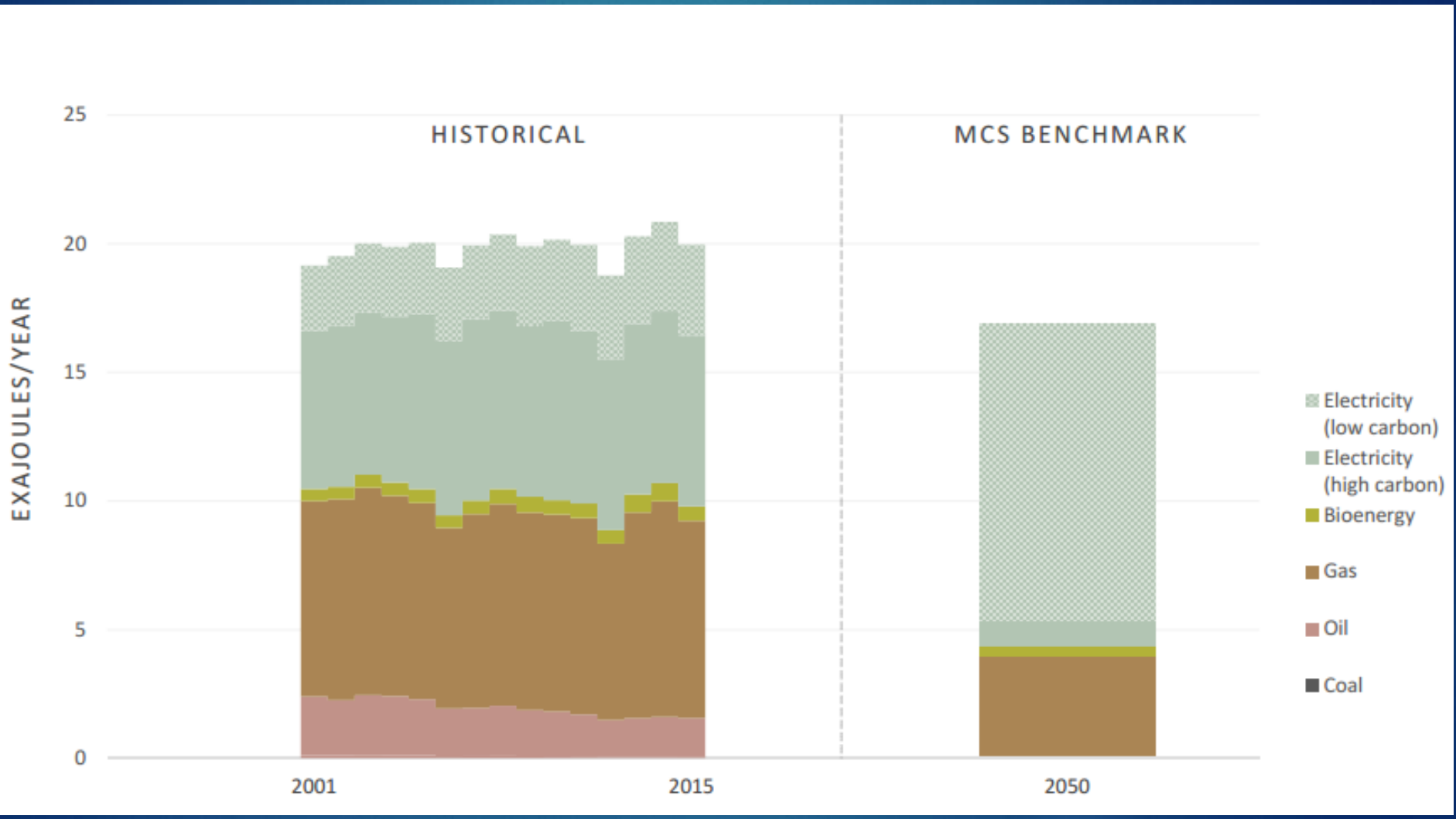
U.S. Energy Emissions



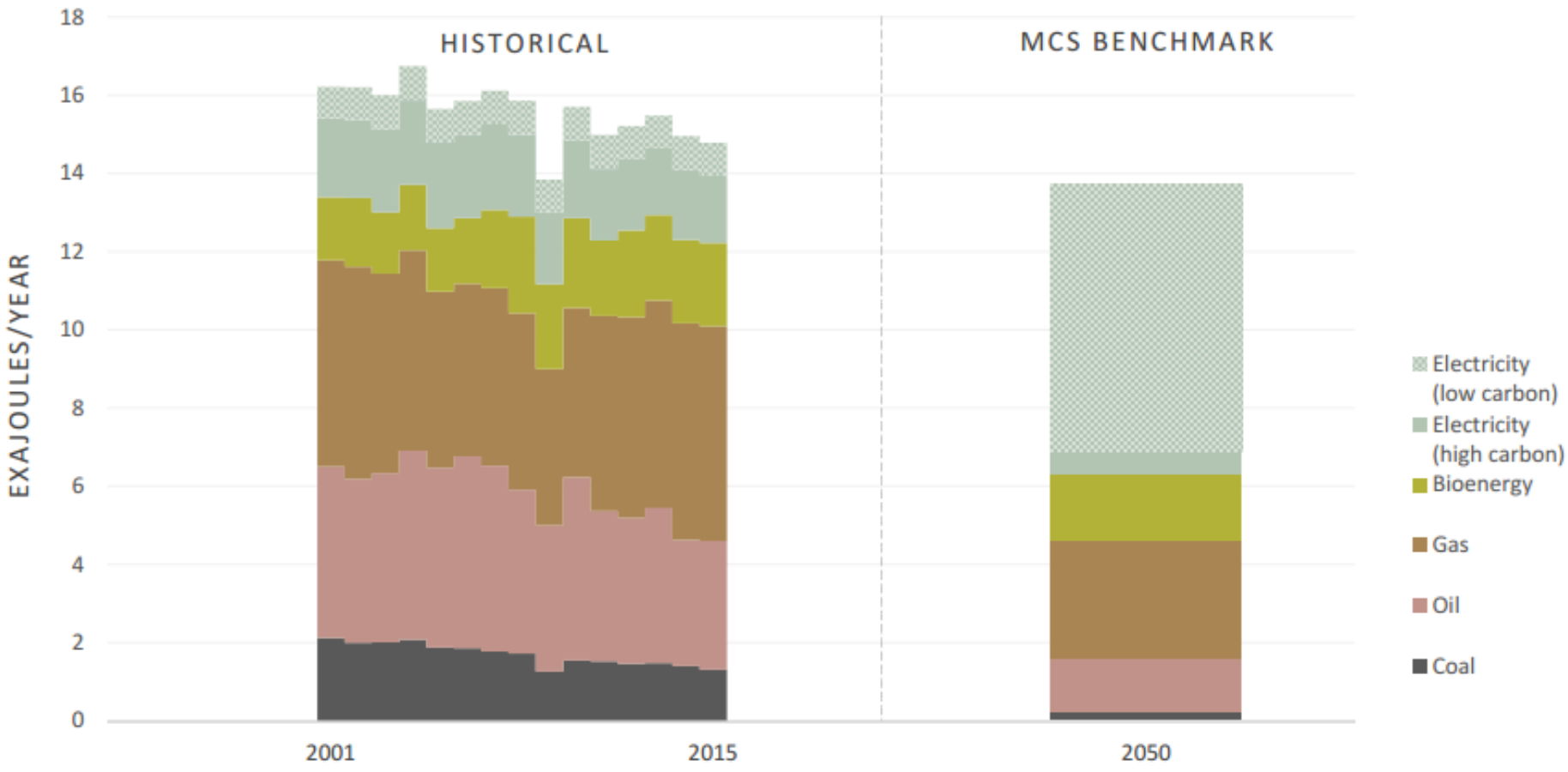
Transportation Energy Use



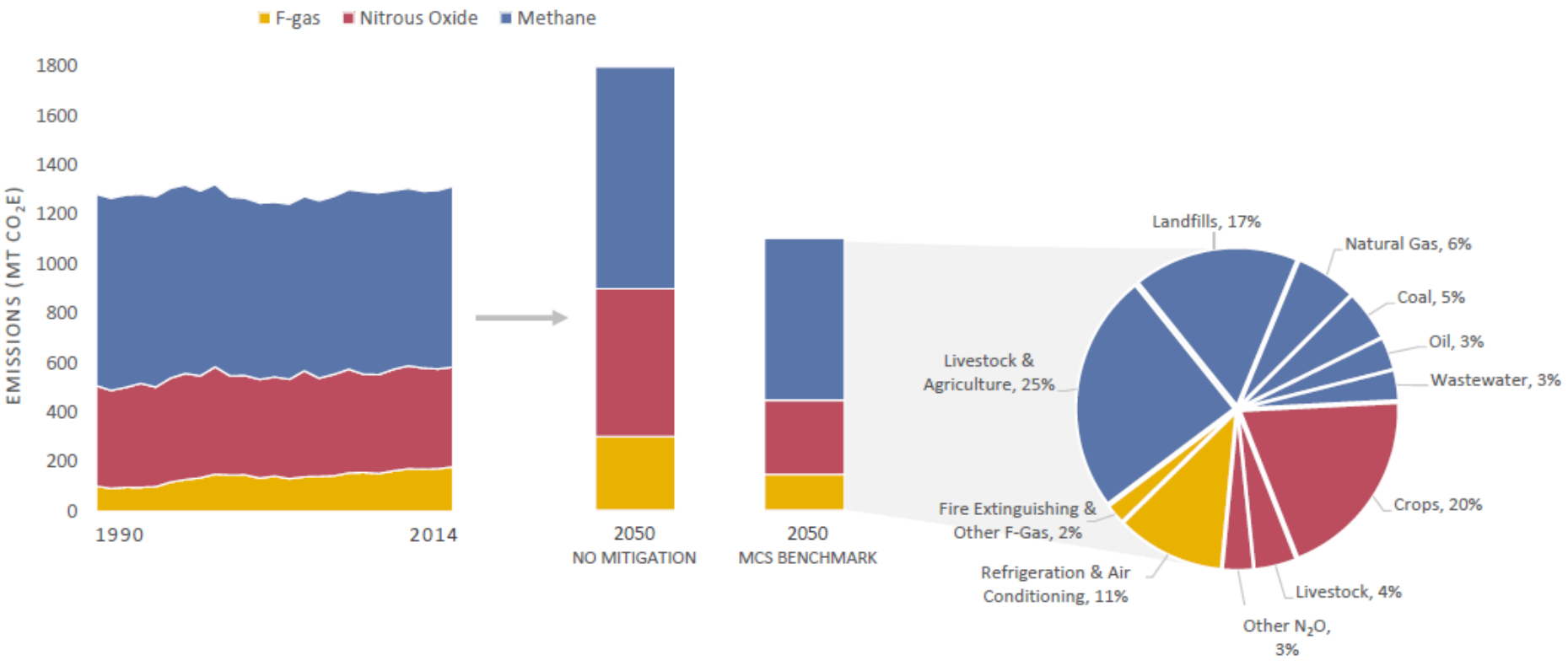
Buildings Energy Use



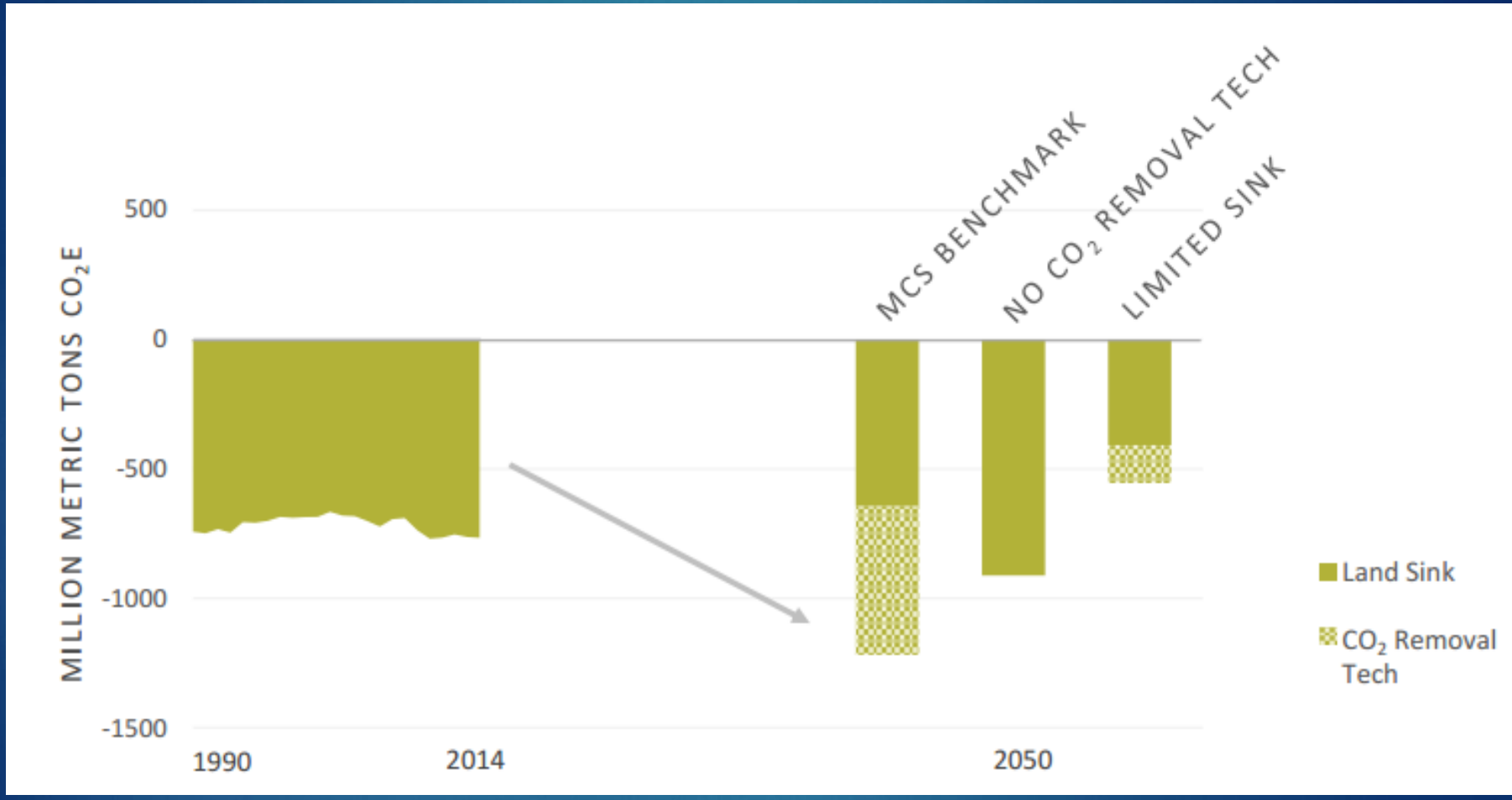
Industry Energy Use



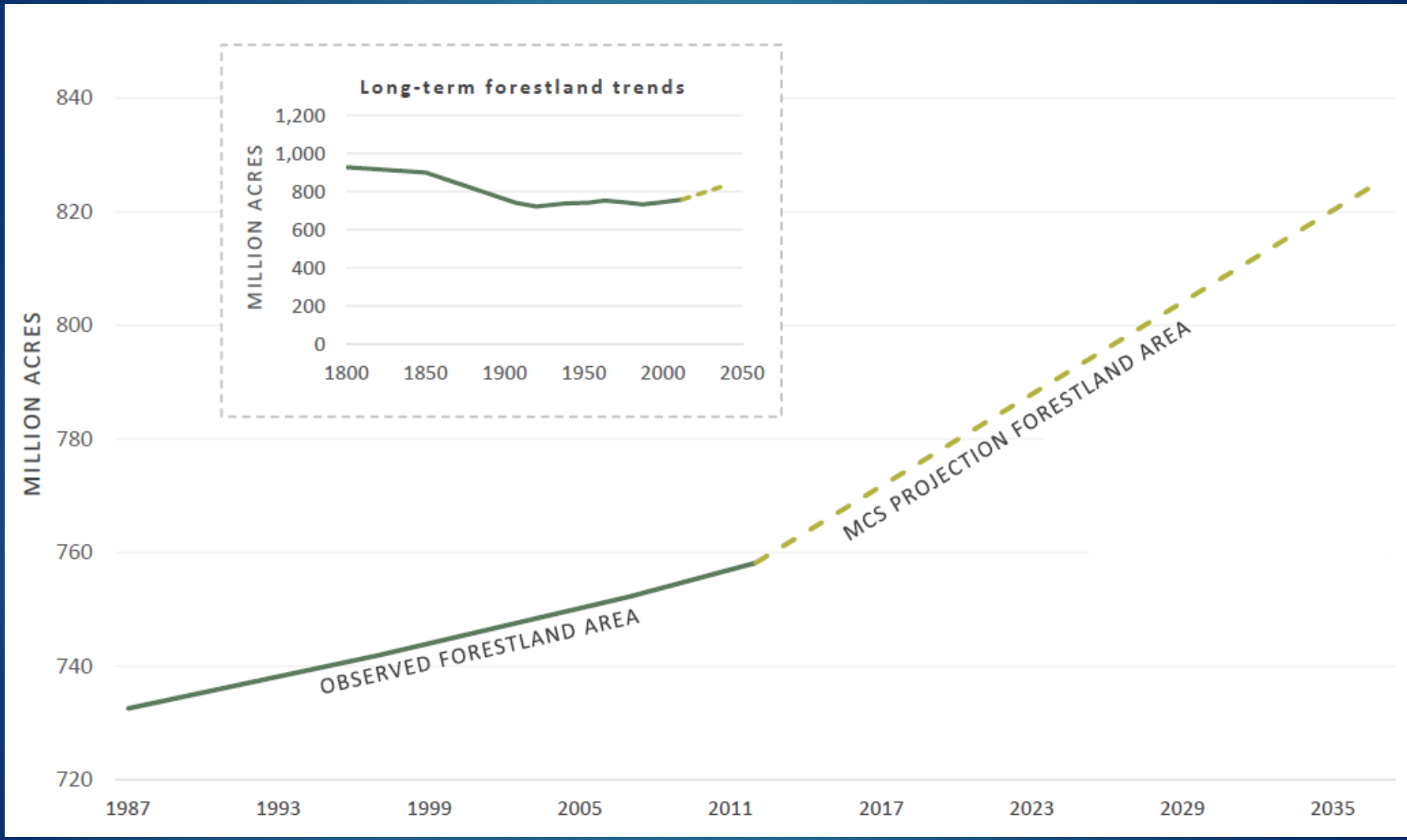
Non-CO2 GHG Emissions



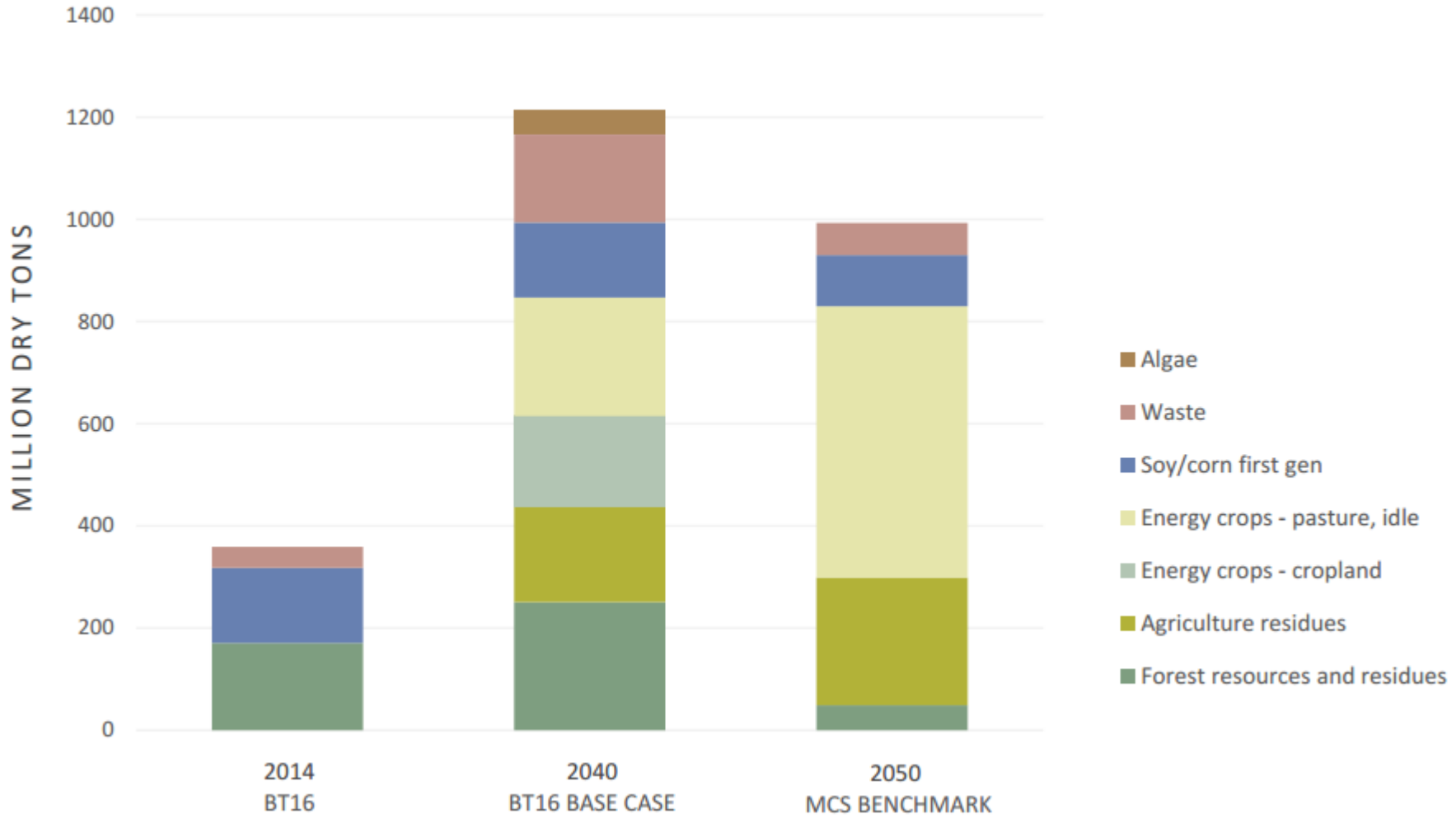
Negative Emissions Scenarios



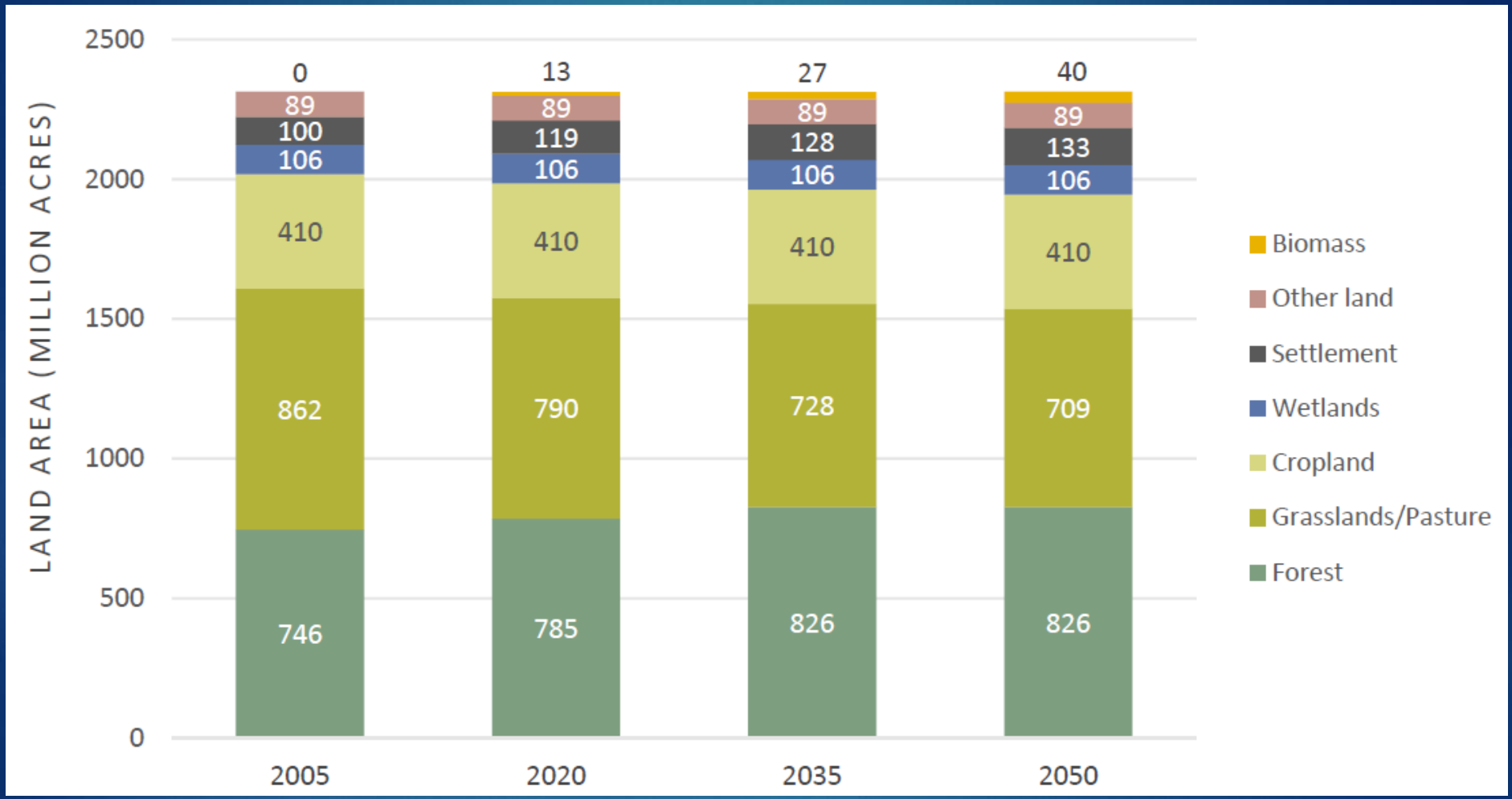
MCS forest expansion analysis



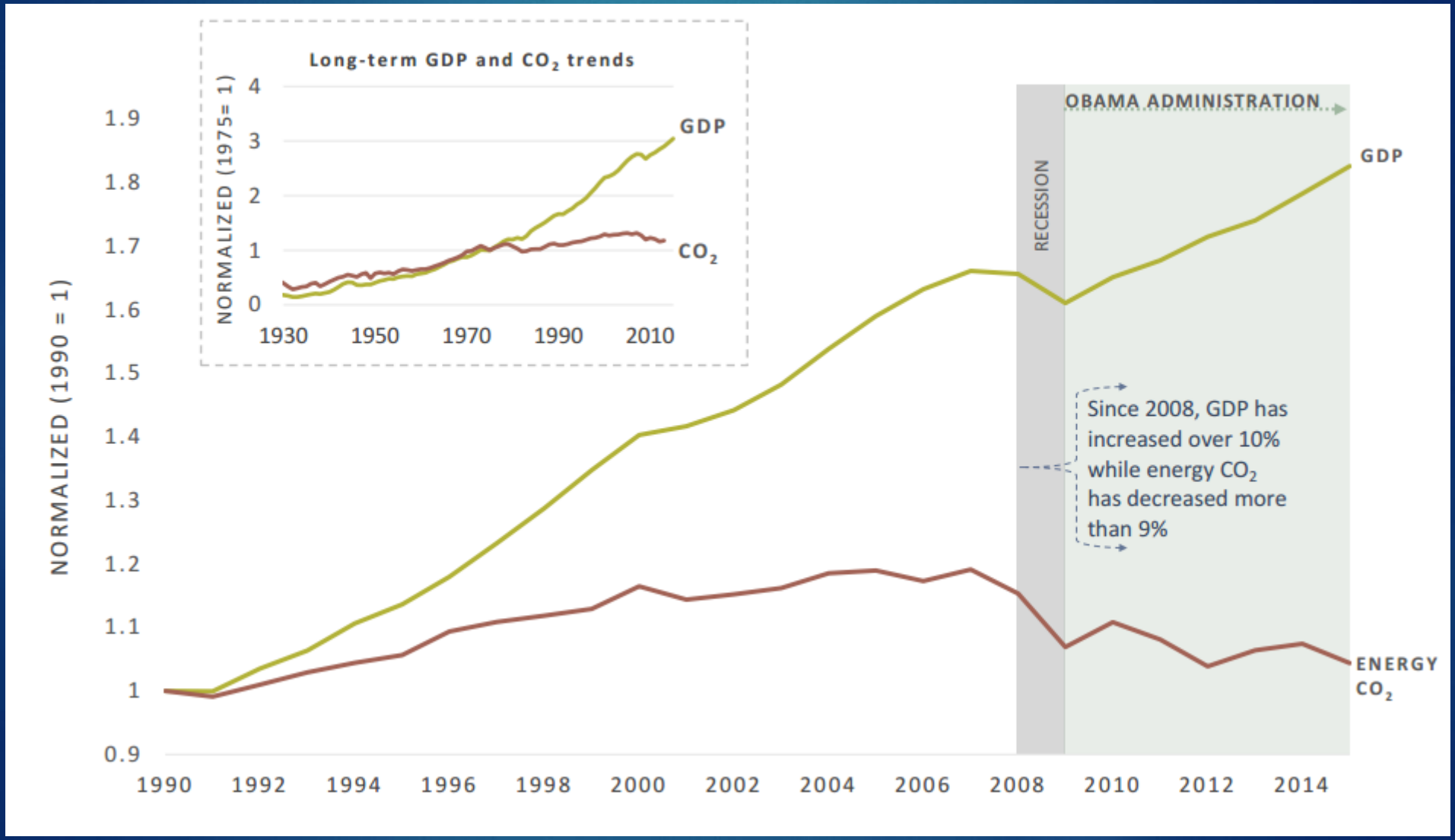
Biomass Availability



MCS potential land use change



Emissions and Economic Growth



U.S. Trading Partners