U.S. Emissions to 2050

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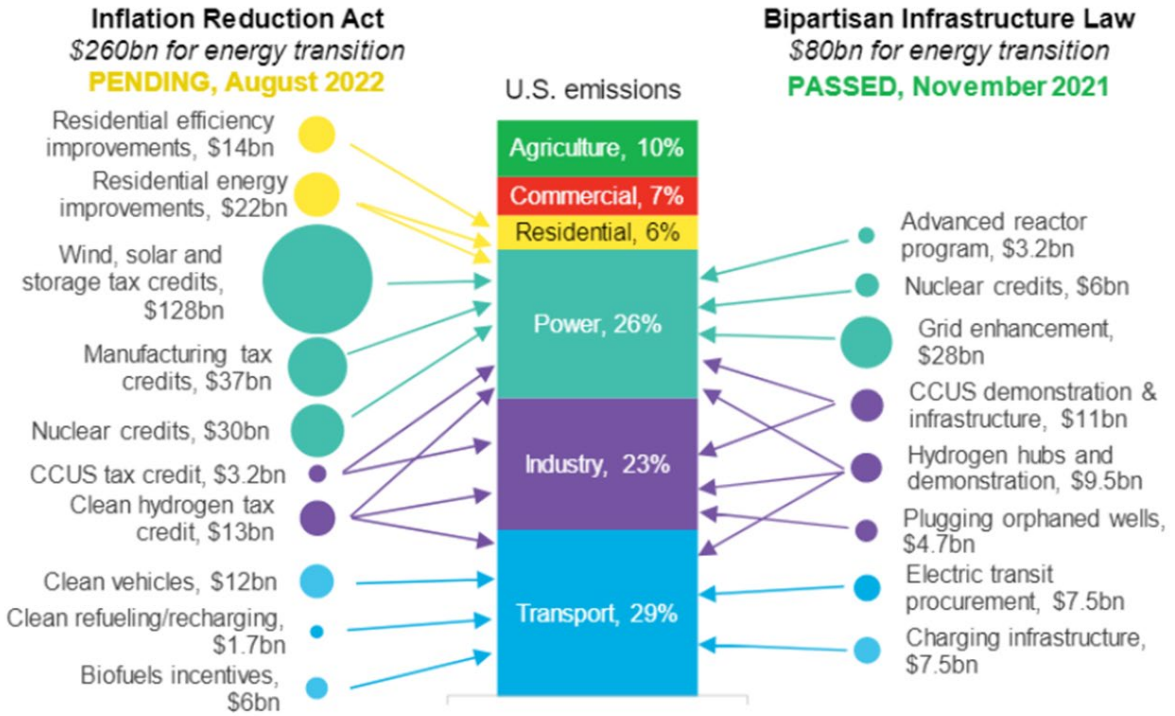
United States National Climate Policy

- The United States has committed to reduce greenhouse gas emissions by 50 to 52 percent in 2030.
- Reaching 100% carbon pollution-free electricity by 2035.
- And, Net Zero greenhouse gas emissions in 2050.
- Bipartisan Infrastructure Law (passed November 2021)
- Inflation Reduction Act (August, 2022)

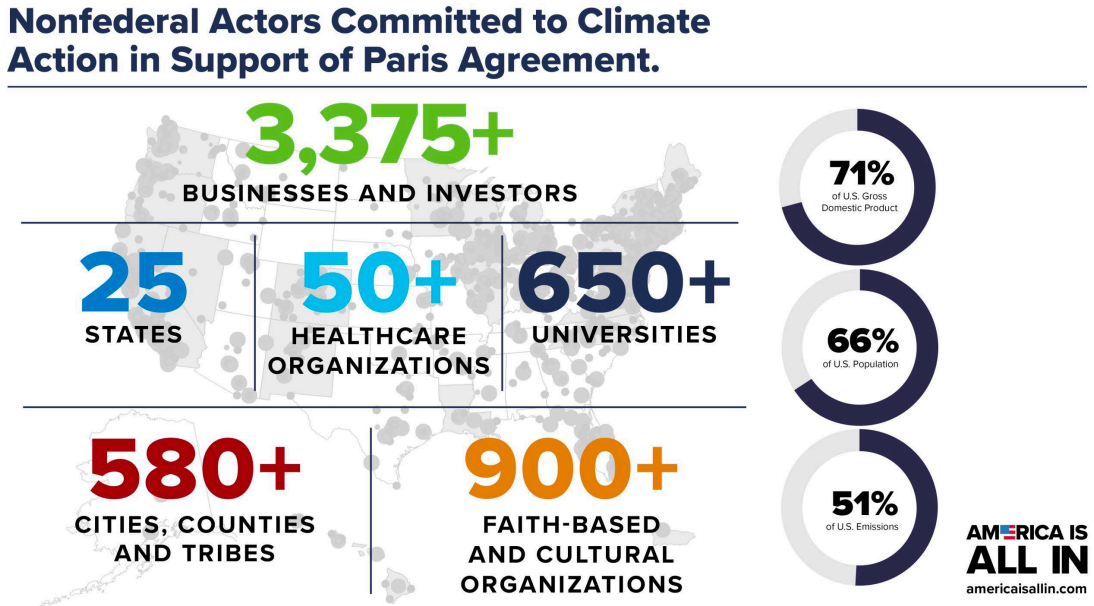
The Inflation Reduction Act (IRA) was passed in August of 2022. U.S. It is NOT a simple carbon tax! It is a challenge to model!



Source: EIA, EPA, Joint Committee on Taxation, BloombergNEF. Note: Chart only captures tax credits and incentives, not grant programs or loans. Bn is billion. CCUS is carbon capture, utilization and storage.

Assessing how the U.S. climate targets can be achieved requires insight into its multi-tiered governance structure and an all-of-society approach

- We have observed higher ambition from non-federal actors (states, cities, businesses, etc.) in diverse contexts.
- Integrating all actions enables a more robust strategy to deliver emissions reductions and provide options to go further and faster.



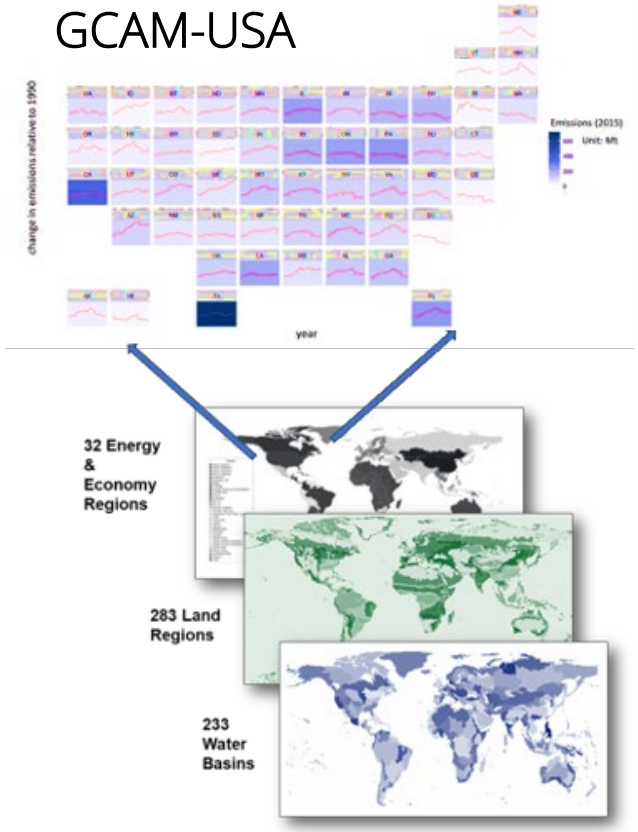
Examples of policies driven from the bottom up:

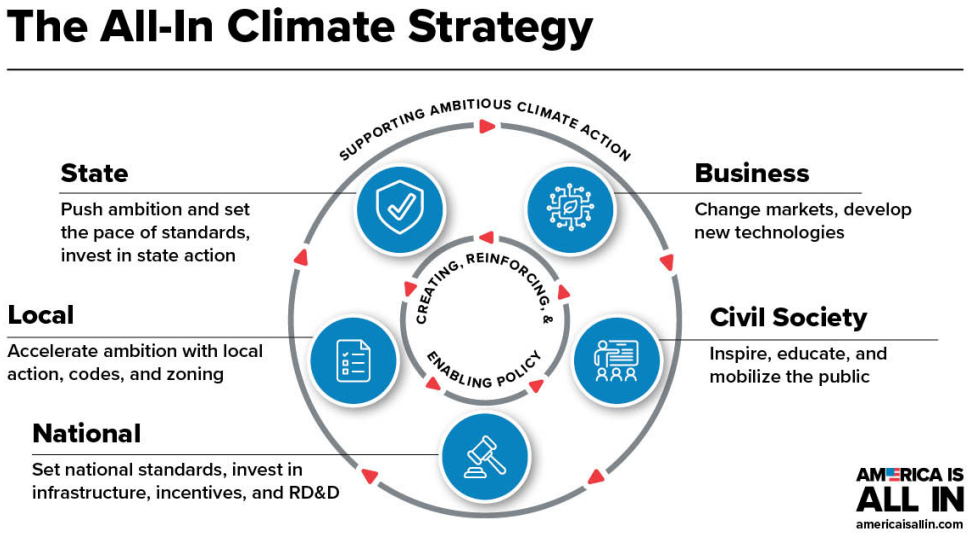
- **GHG vehicle emission standards** by California and ten other states helped set ambition for federal standards in 2009
- **State renewable standards,** public and private renewable procurement targets, and civil society pressure for coal plant retirements have driven power sector emission reductions
- **State HFC phase-down policies** led to corporate support for federal action, adopted under the AIM Act of 2020

Slide Courtesy of Ryna Cui

How do we fill the gap with continued actions from both federal and subnational levels? All-of-society strategy

Research Approach and Methodological Toolkit:
Collaborative Policy Platform Development + Scenario Construction + Emissions and Energy Transition Assessment via a Global Integrated Assessment Model (GCAM-USA-CGS)





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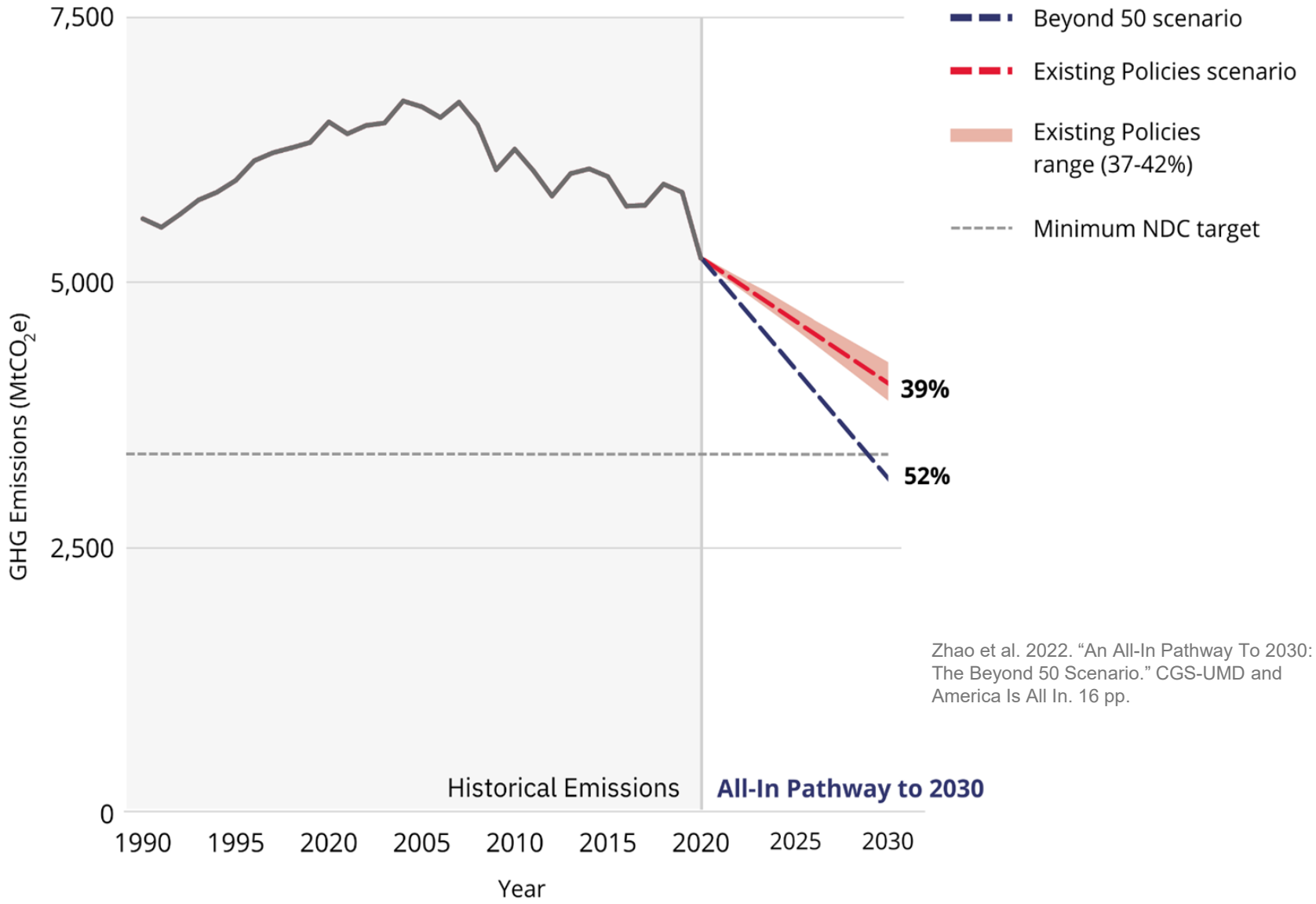
Zhao et al. 2022. "An All-In Pathway To 2030: The Beyond 50 Scenario." CGS-UMD and America Is All In. 16 pp.

Impact of the IRA and BIL

Emissions reductions under Existing Policies and Beyond 50 scenarios

The existing policies scenario can achieve 39% reductions by 2030 from 2005 levels with potential for 42% reductions with accelerated implementation.

The Beyond 50 scenario uses an all-of-society, accelerated approach to a national climate strategy and shows a pathway for the United States to **achieve 52% emissions reductions from 2005 levels by 2030.**



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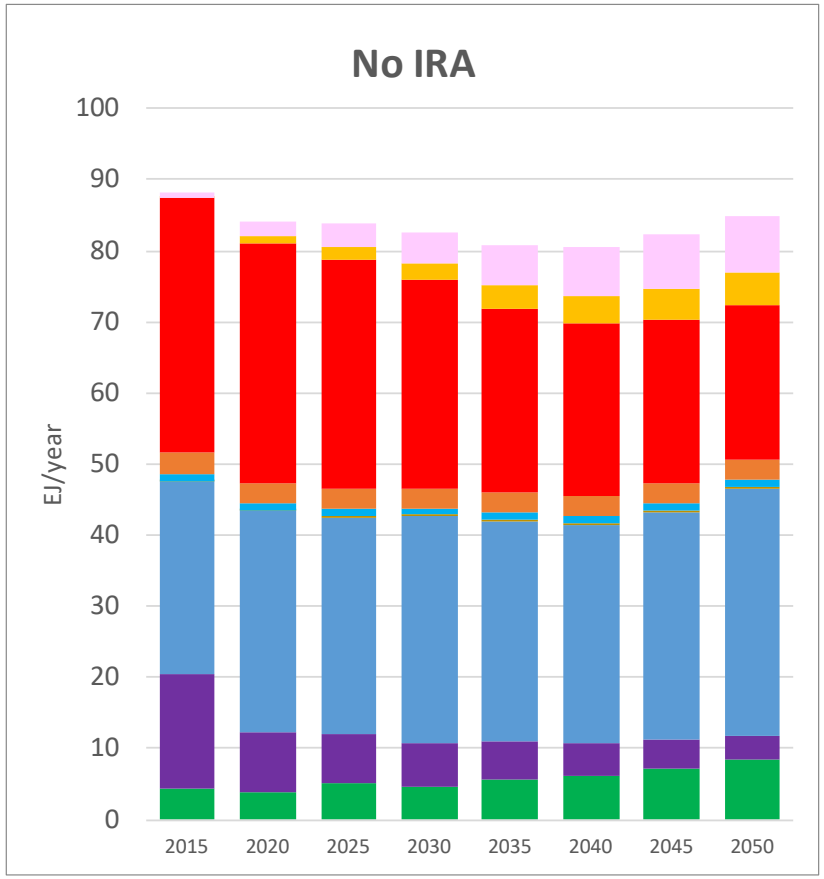
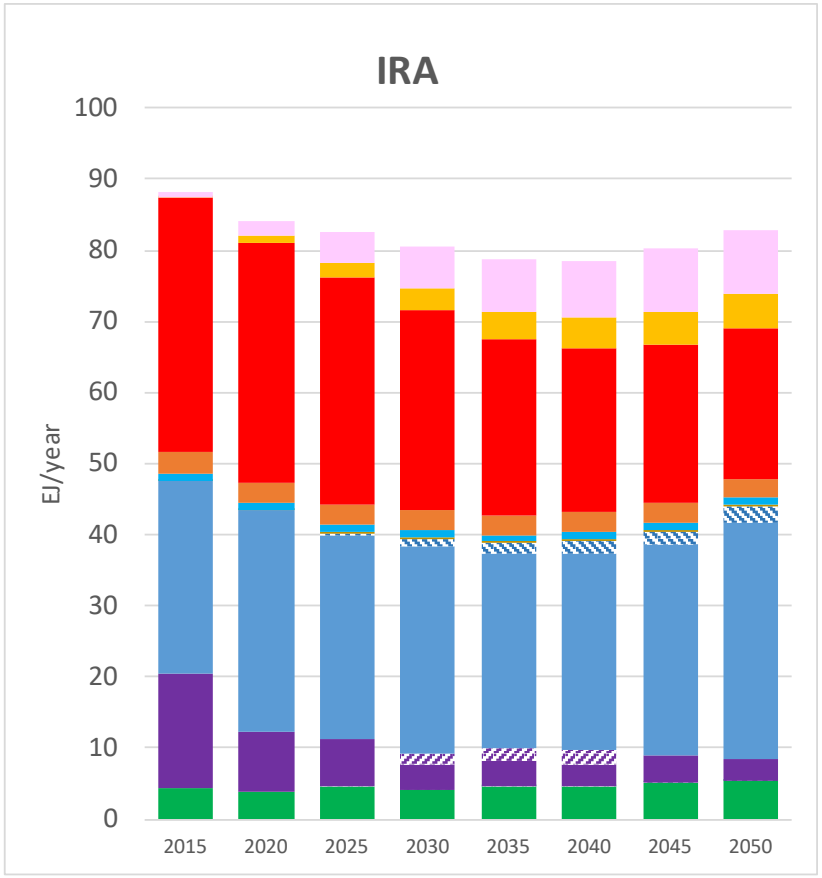
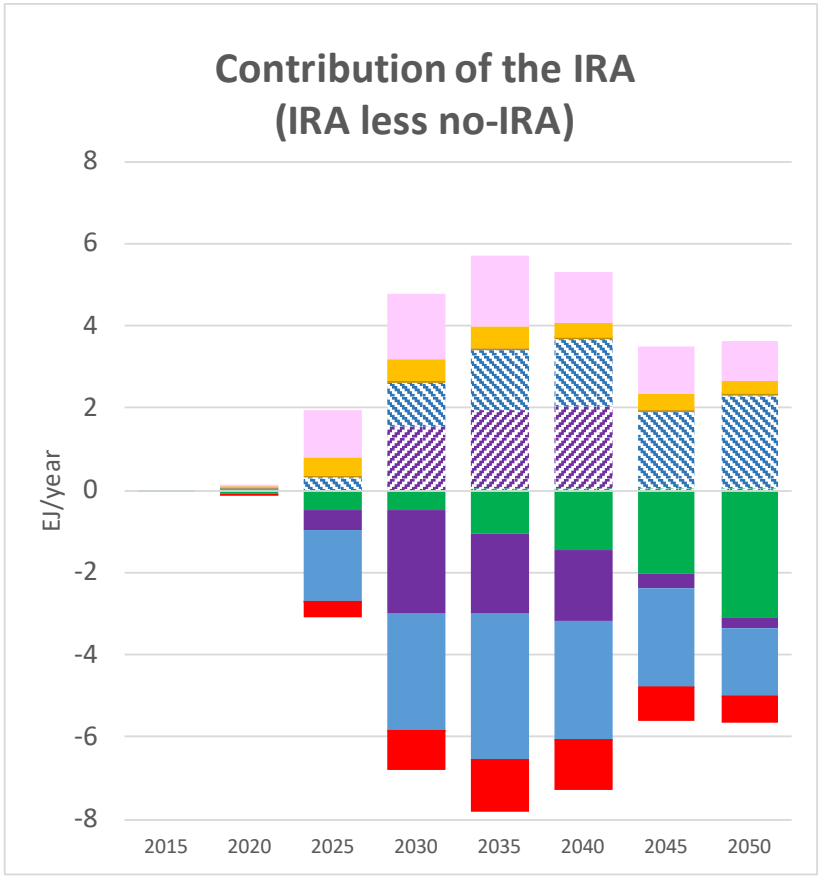
U.S. Primary Energy Mix: Impact of IRA+BIL

U.S. Primary Energy







biomass | biomass CCS | coal | coal CCS | gas | gas CCS | geothermal
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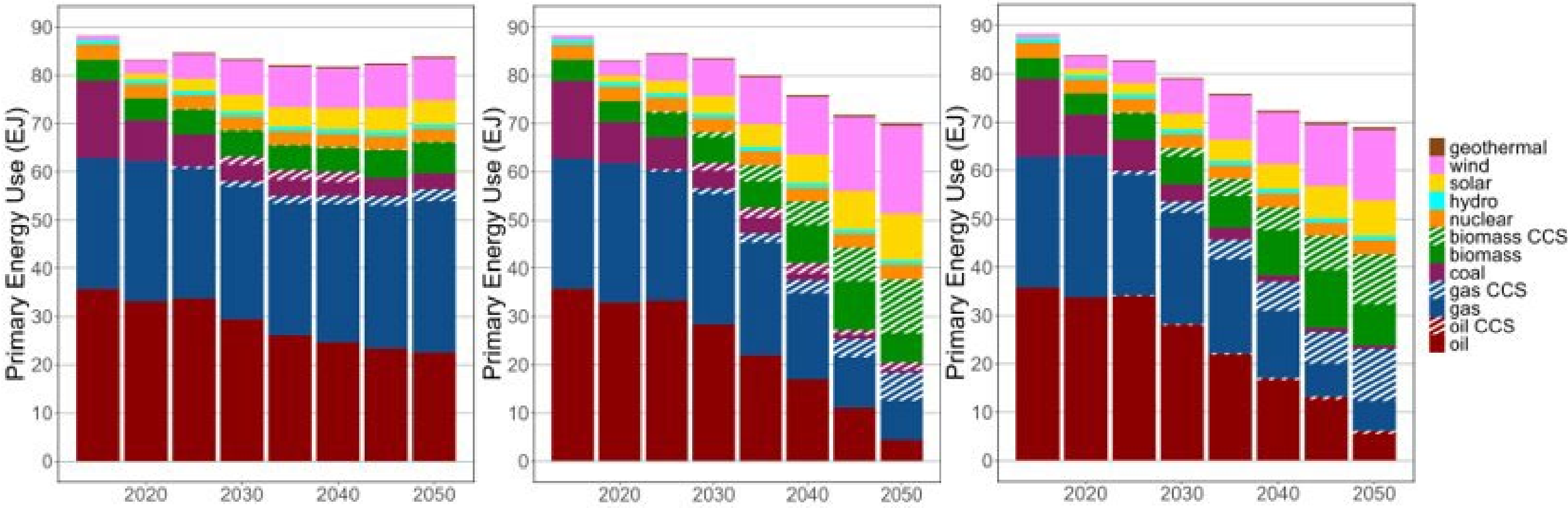
Slide Courtesy of Michael Westphal

GCAM Analysis of the IRA and BIL: U.S. Primary Energy Mix

U.S. Primary Energy



IRA+BIL with assumed expiration

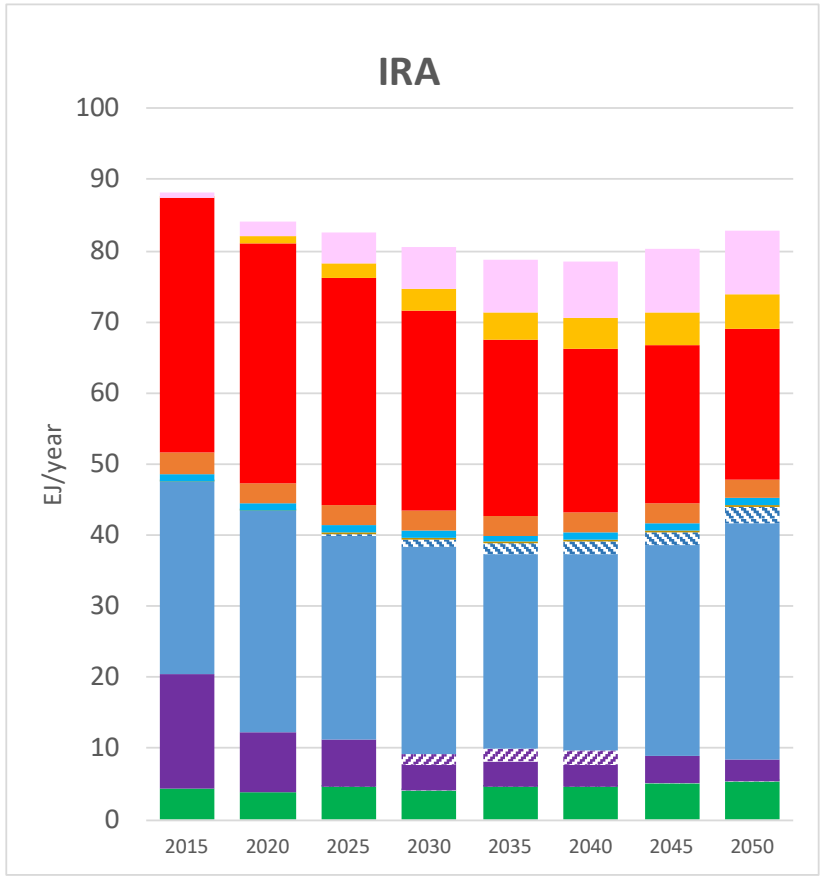
IRA+BIL with extensions to achieve the U.S. Net Zero 2050 Goal

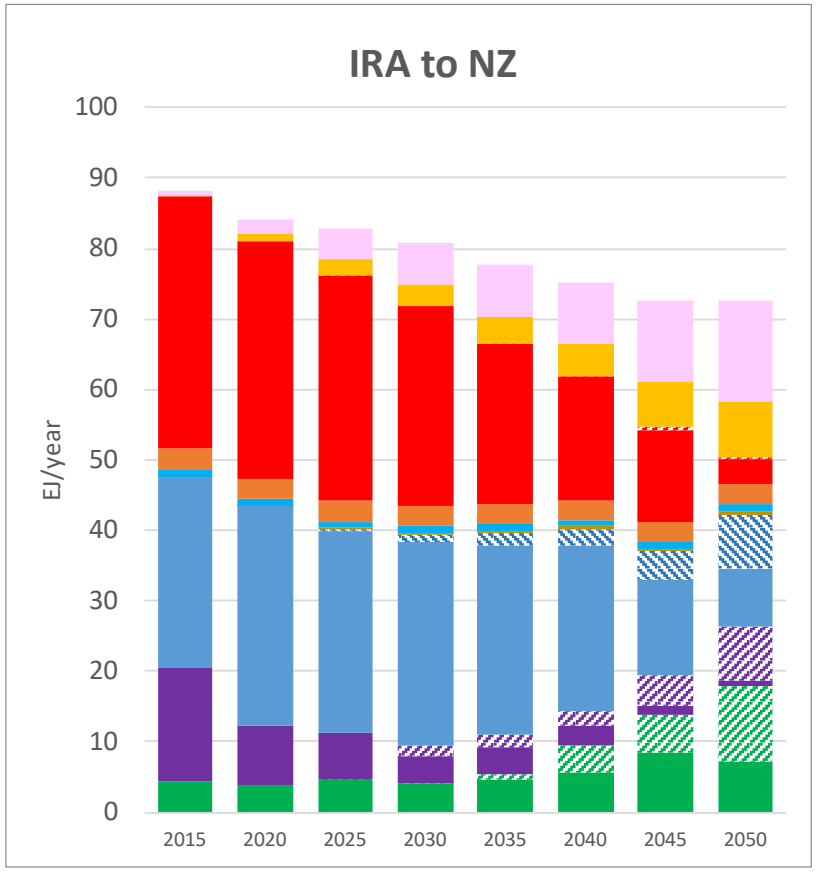
2021 Long-term Strategy Analysis—Carbon Tax to achieve U.S. Net Zero Goal

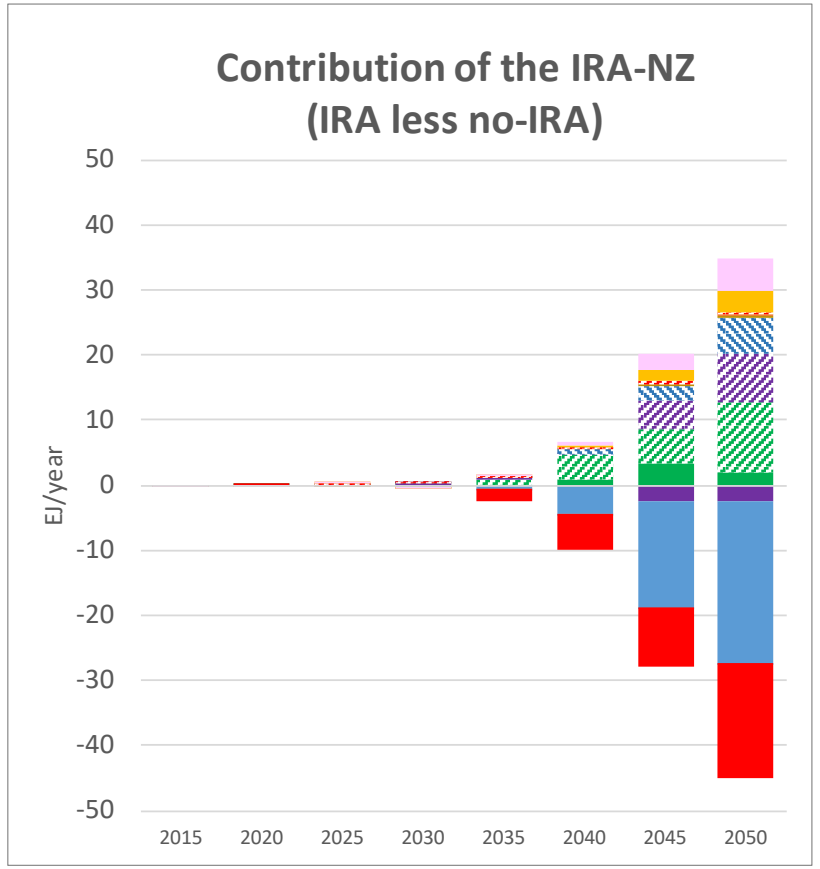
Slide Courtesy of Michael Westphal

U.S. Primary Energy Mix: IRA Alone to IRA+Net Zero Measures

U.S. Primary Energy







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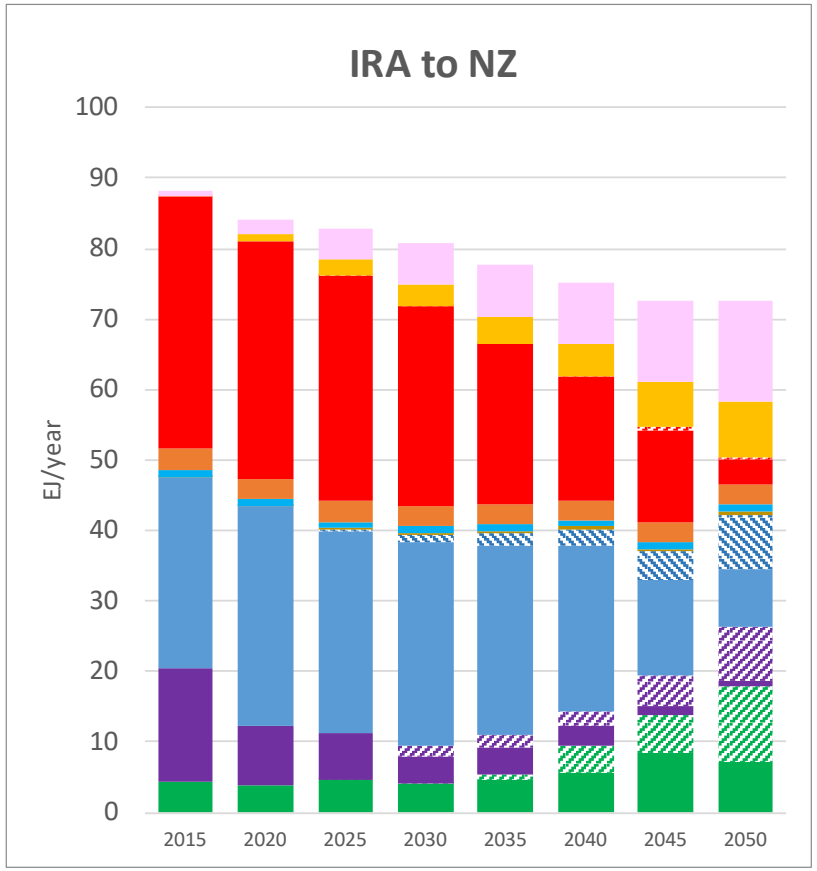
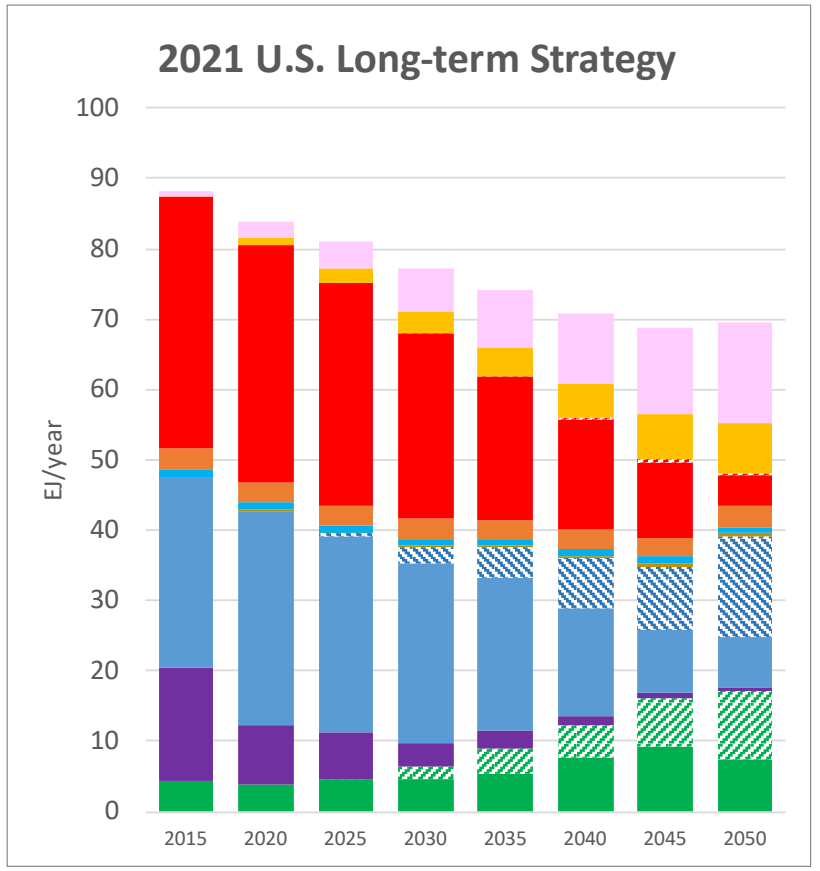
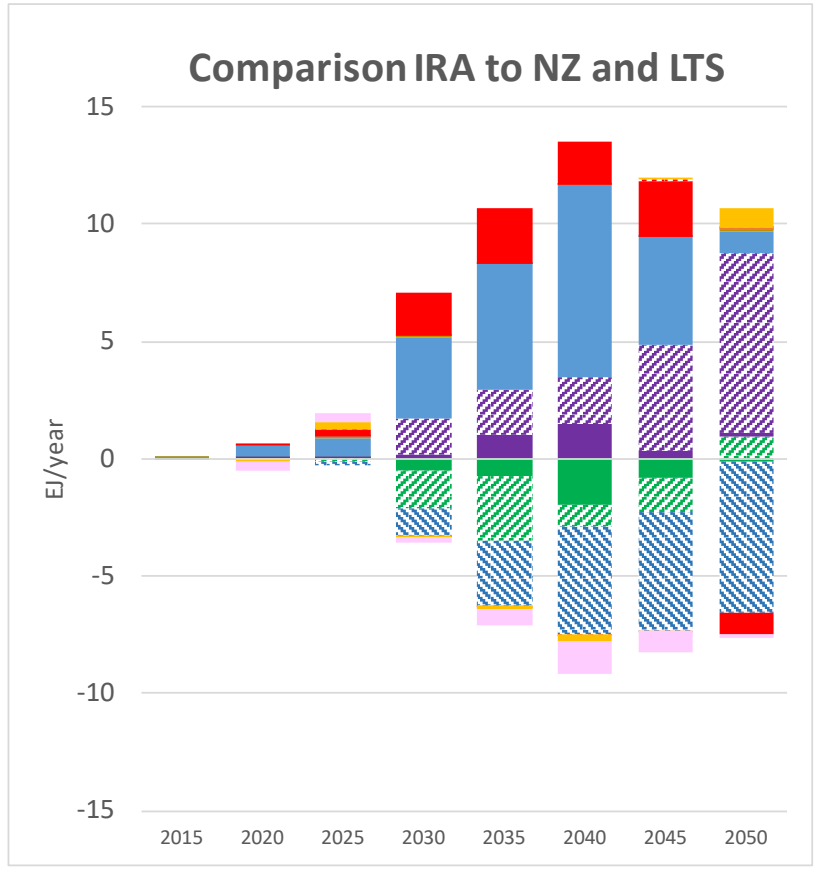
Slide Courtesy of Michael Westphal

U.S. Primary Energy Mix: IRA to Net Zero Compared to LTS

U.S. Primary Energy







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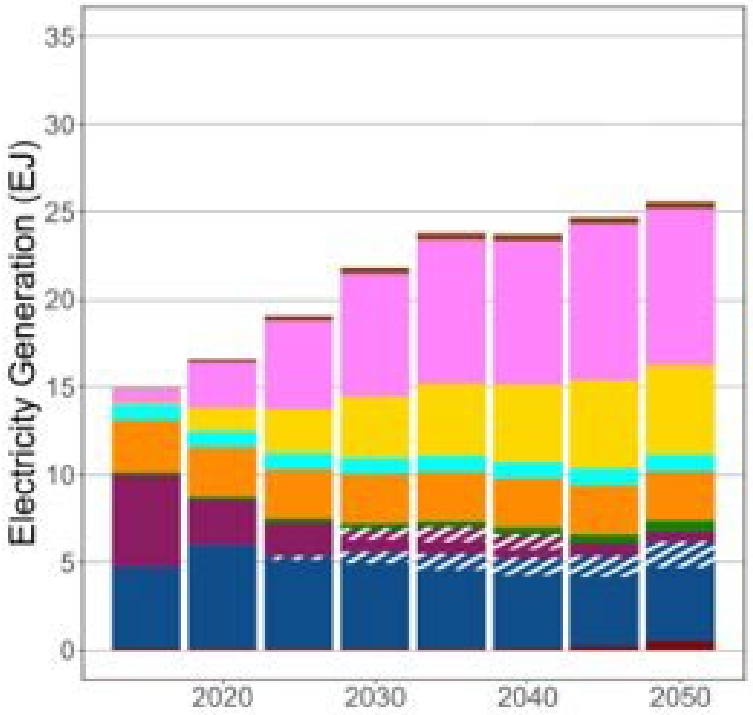
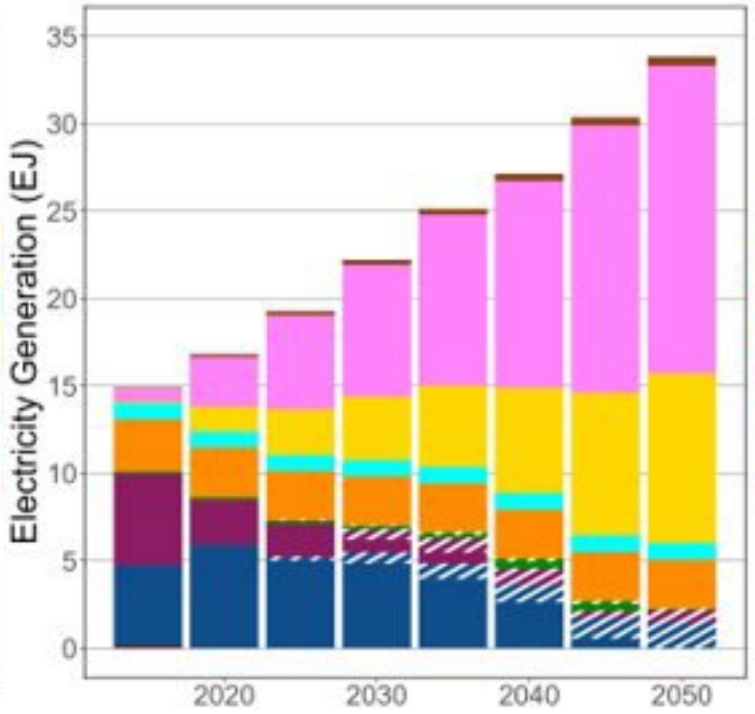
GCAM Analysis of the IRA and BIL: U.S. Power Sector

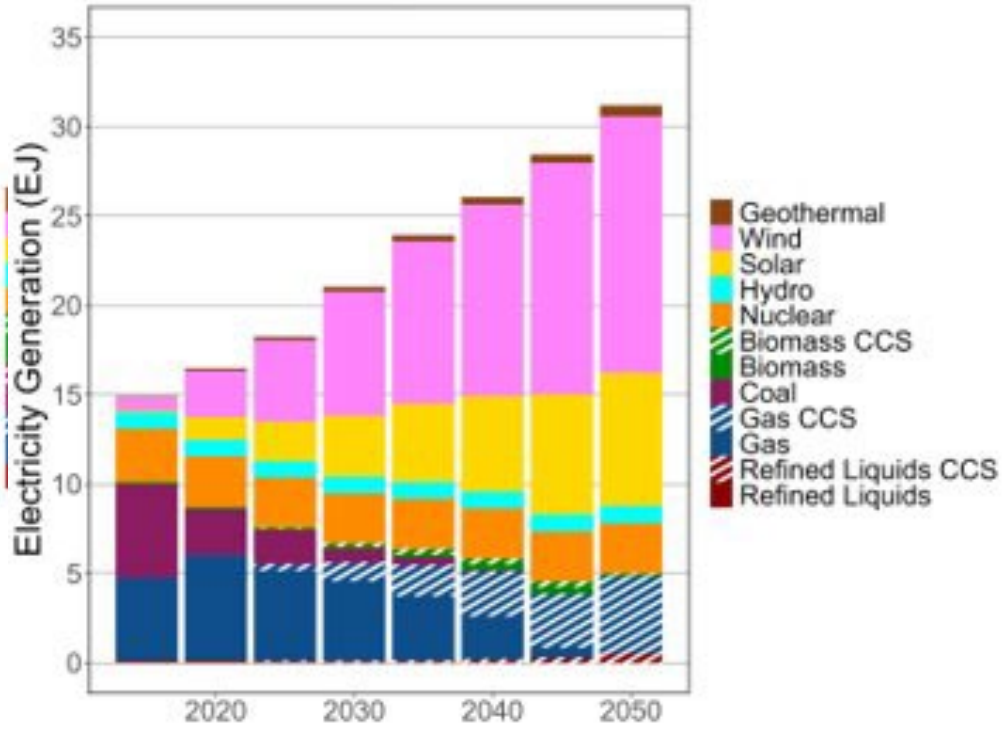
Electricity Generation



CurrPol (IRA +BIL)



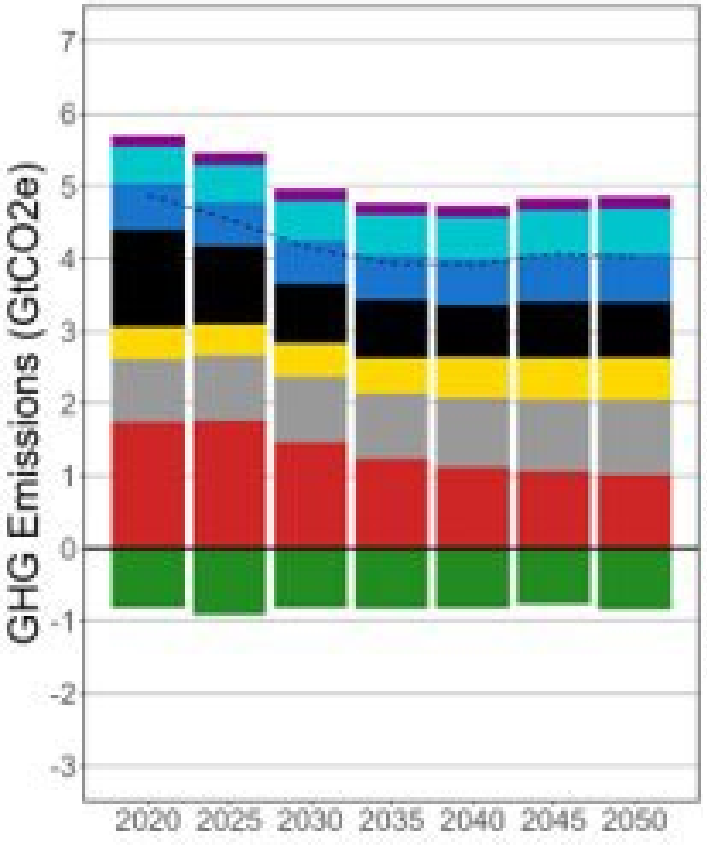
CurrPol-NZ



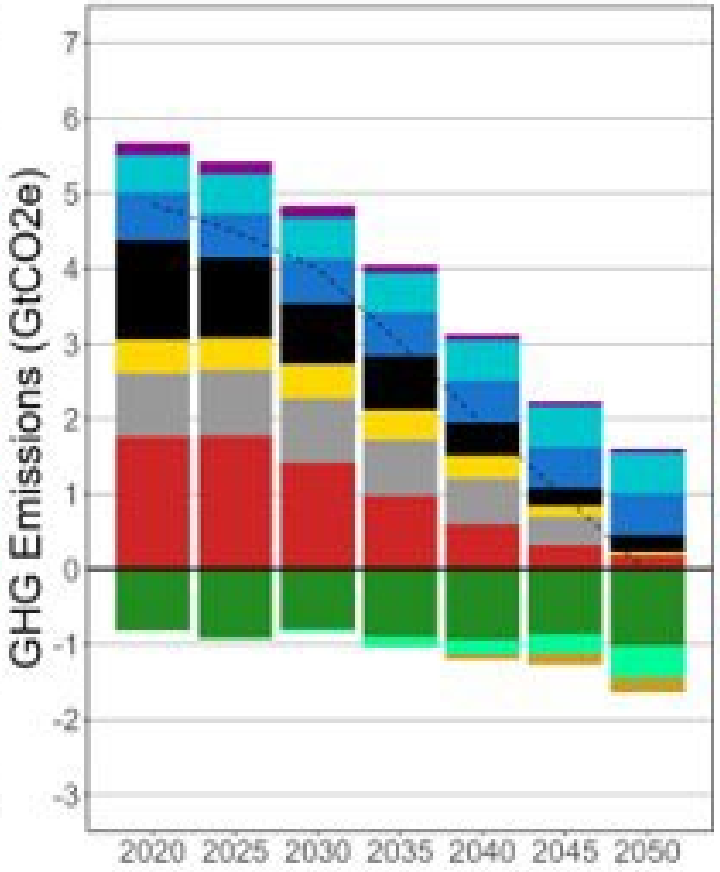
U.S. Long-term Strategy (LTS)

Slide Courtesy of Michael Westphal

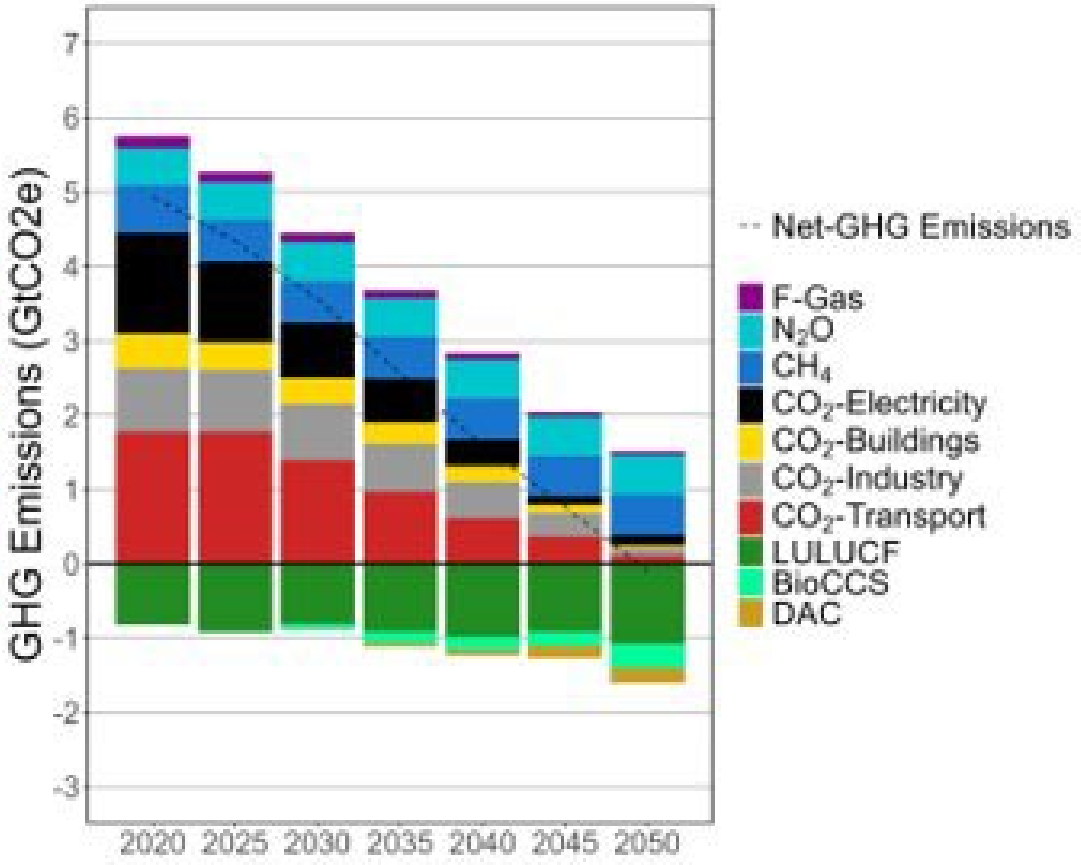
GCAM Analysis of the IRA and BIL: U.S. CO_2 Emissions



IRA +BIL with assumed expiration



IRA +BIL with extensions to achieve the U.S. Net Zero 2050 Goal



2021 Long-term Strategy Analysis—Carbon Tax to achieve U.S. Net Zero Goal

Slide Courtesy of Michael Westphal

Concluding Thoughts

- Modeling the IRA and BIL is a challenge.
- Modeling the full spectrum of U.S. policies across the entire fabric of society is an even bigger challenge.

GCAM Analysis

- The IRA and BIL reduce U.S. GHG emissions by 2030, but not enough to reach the U.S. 50-52% GHG reduction relative to 2005 goal.
- There are post-2030 emissions mitigation resulting from the IRA even after it expires.
- Additional measures are required to meet the U.S. 2030 and 2050 goals.