



Its good to be back at NIES for the 27th meeting of the AIM team...

... if only virtually.



A United States Path to 2050 Net Zero

Jae Edmonds

2021 Asia Integrated Modeling Keynote Address

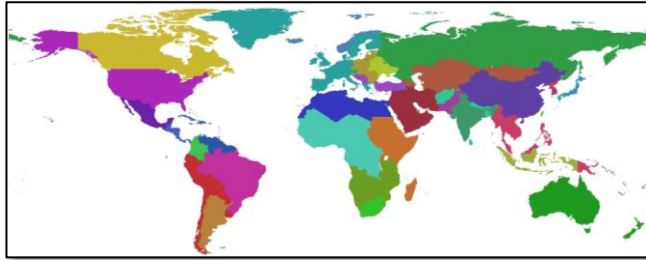
United States National Climate Policy

- **The United States has committed to reduce greenhouse gas emissions by 50 to 52 percent in 2030.**
- **Exploring a pathway to 2050 Net Zero greenhouse gas emissions in 2050.**

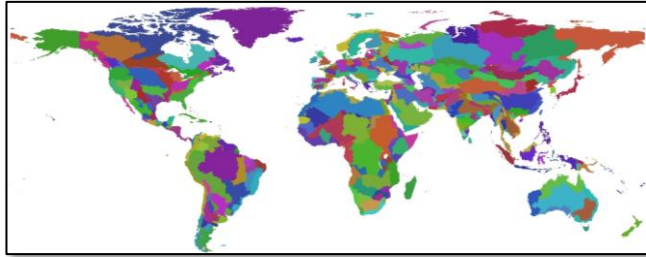


The Global Change Analysis Model (GCAM)

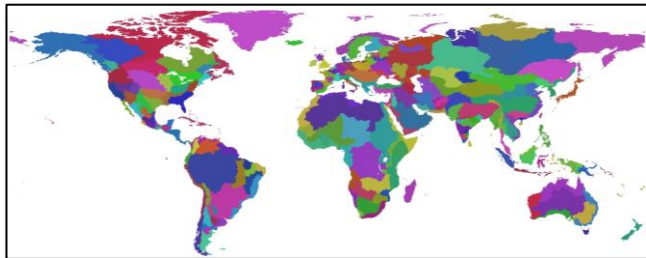
32 Energy-Economy Regions



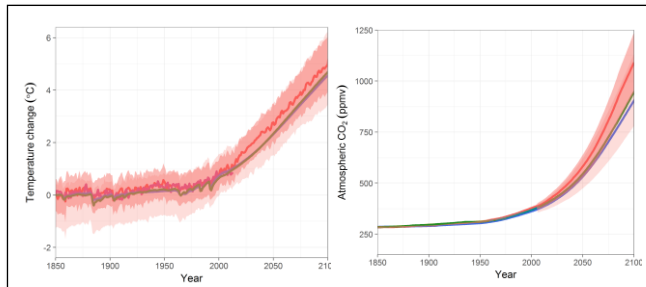
384 Land Regions



235 Water Basins



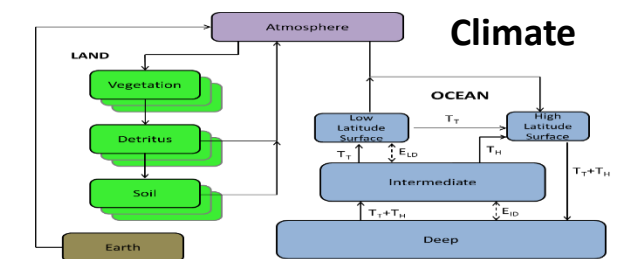
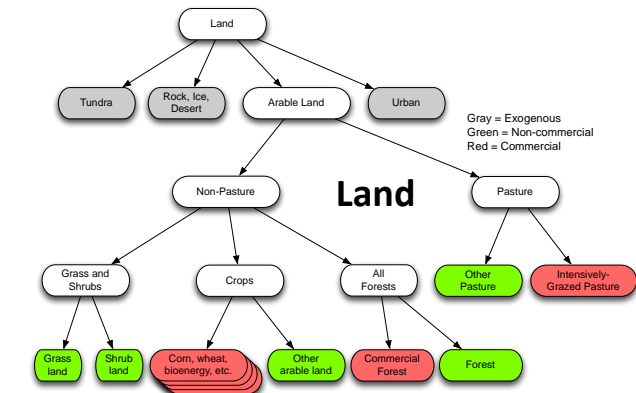
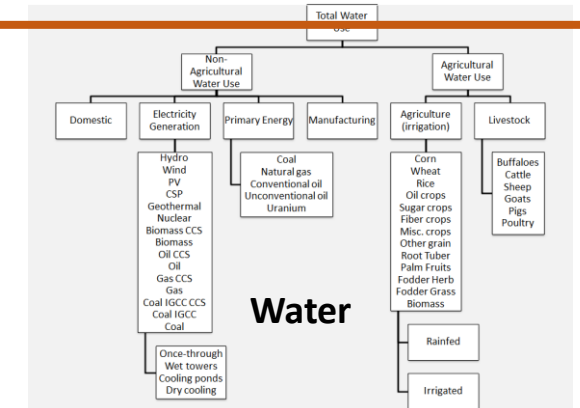
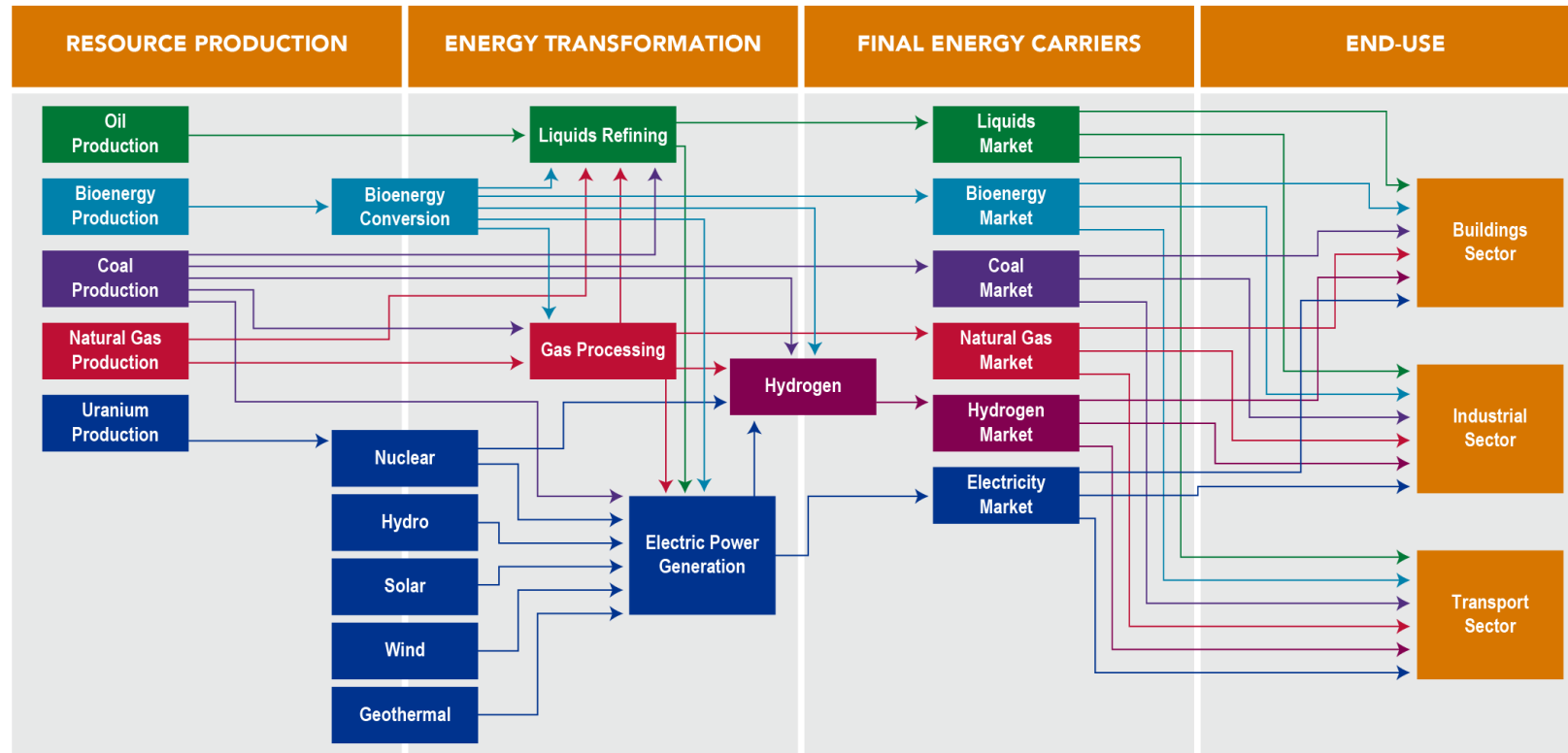
Reduced-Form Climate Model (Hector)



- Dynamic-recursive, economic market equilibrium model
- Inputs include assumptions about key drivers of future dynamics
 - Technology, national and international policies, socioeconomic development pathways, climate change
- Provides information about key outcomes
- **Five-year time steps** but can run on one-year time steps.
- **Community model** (<https://github.com/JGCRI/gcam-core/releases>)
- Regional versions are available or under construction for the U.S., India, China, Canada, and Latin America

GCAM is A SINGLE UNIFIED CODE

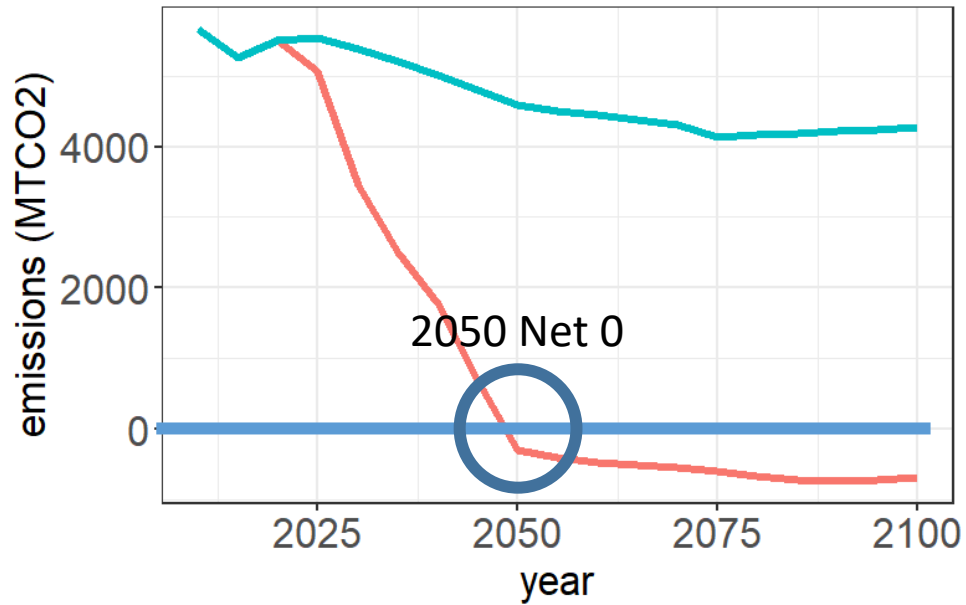
The Energy System



Tracks emissions of KP gases, aerosols and short-lived species

Net-Zero Pathway

CO2 Emissions

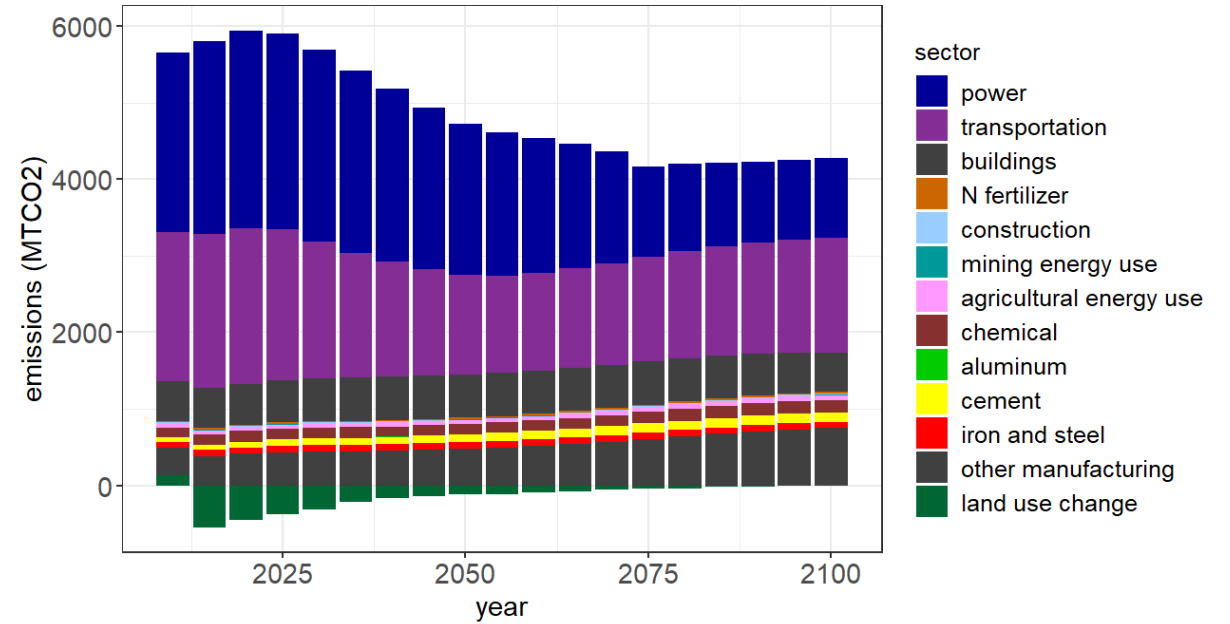


scenario

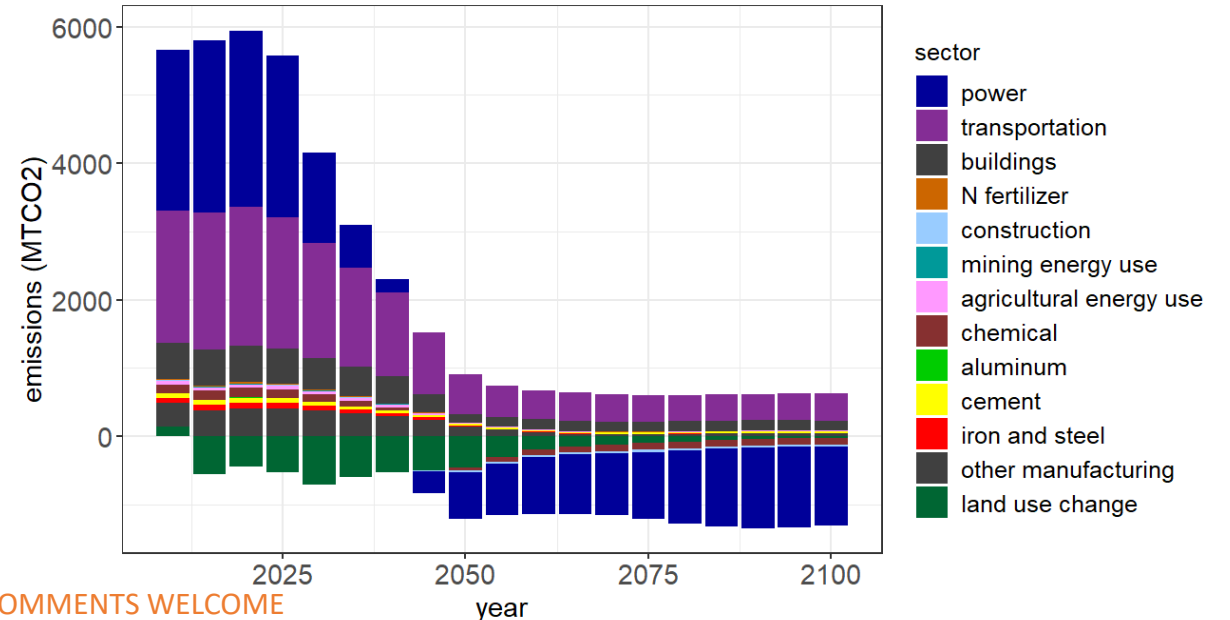
- NetZero_2050
- Reference

Note: Does not include retrofit CCS technology.

Reference.CO2 Emissions by Sector

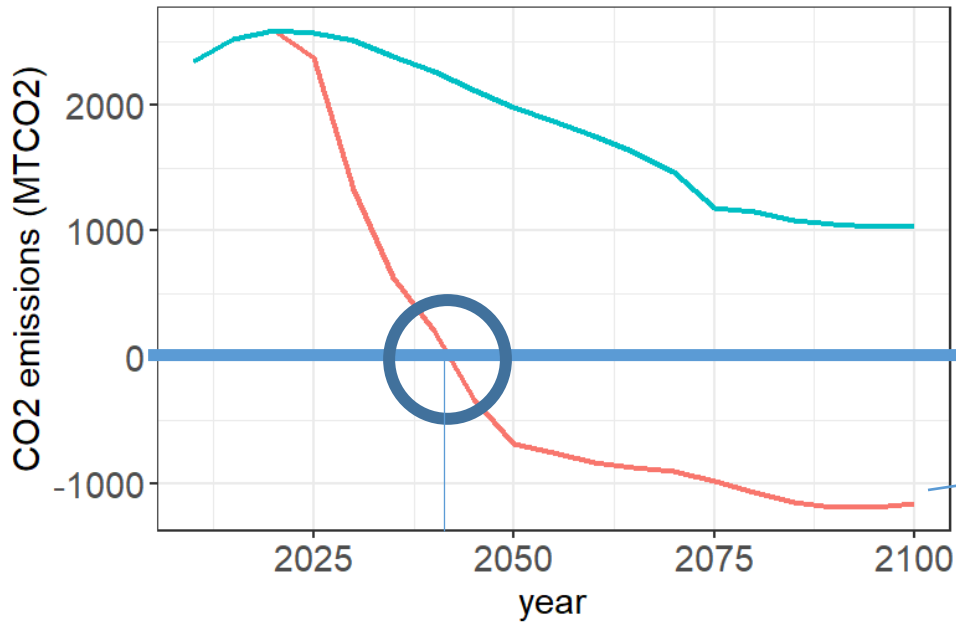


NetZero_2050.CO2 Emissions by Sector



Power Sector: emissions go negative 2040

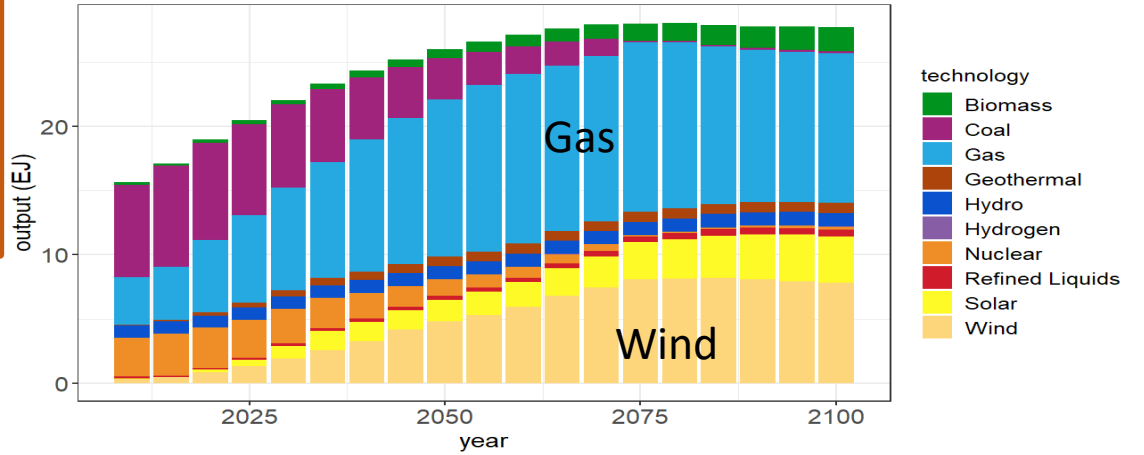
U.S. Power Sector CO2 Emissions



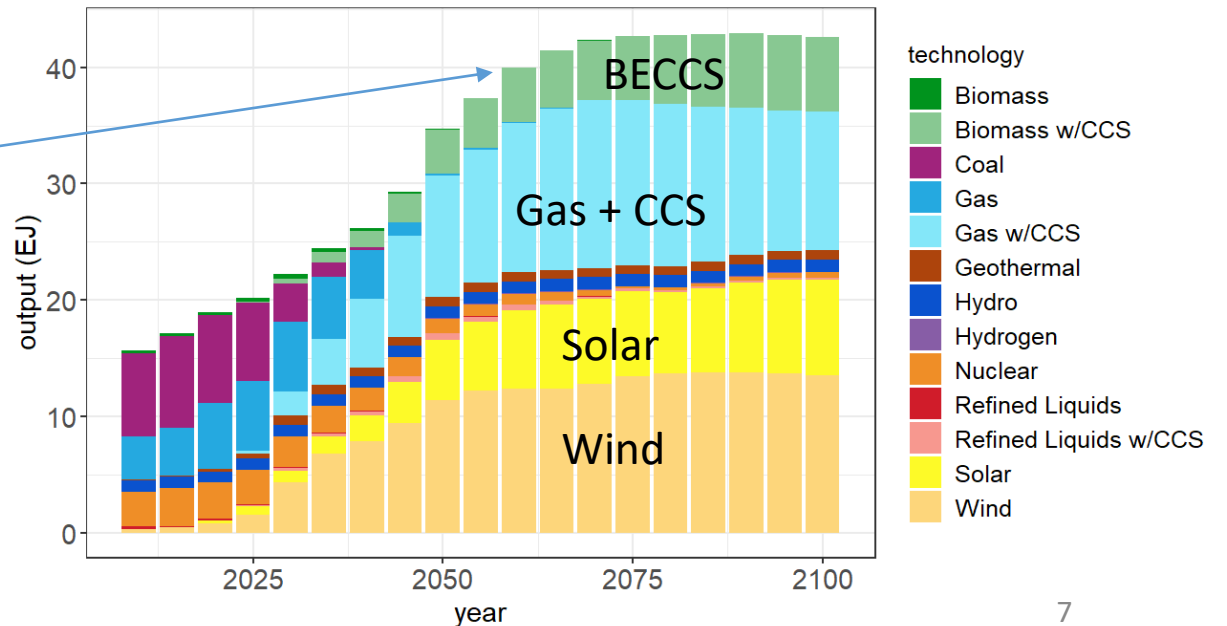
scenario
 — NetZero_2050
 — Reference

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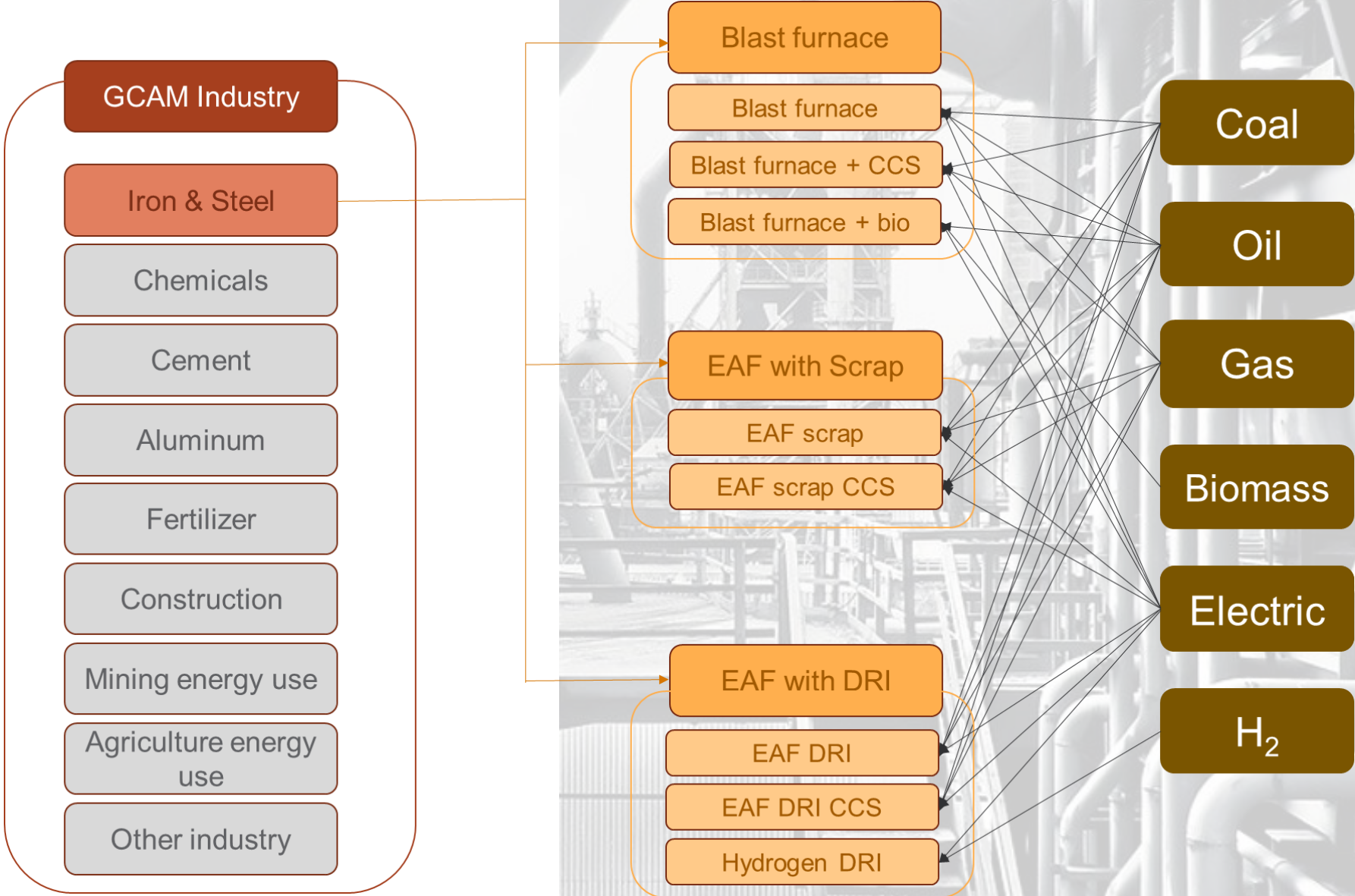
Reference.U.S. Power Sector Fuel Mix



NetZero_2050.U.S. Power Sector Fuel Mix

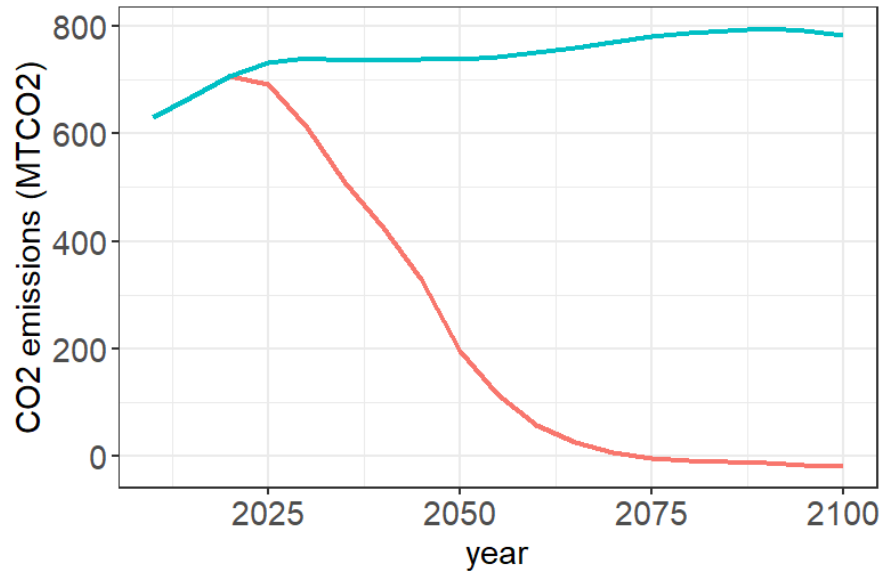


GCAM Industry



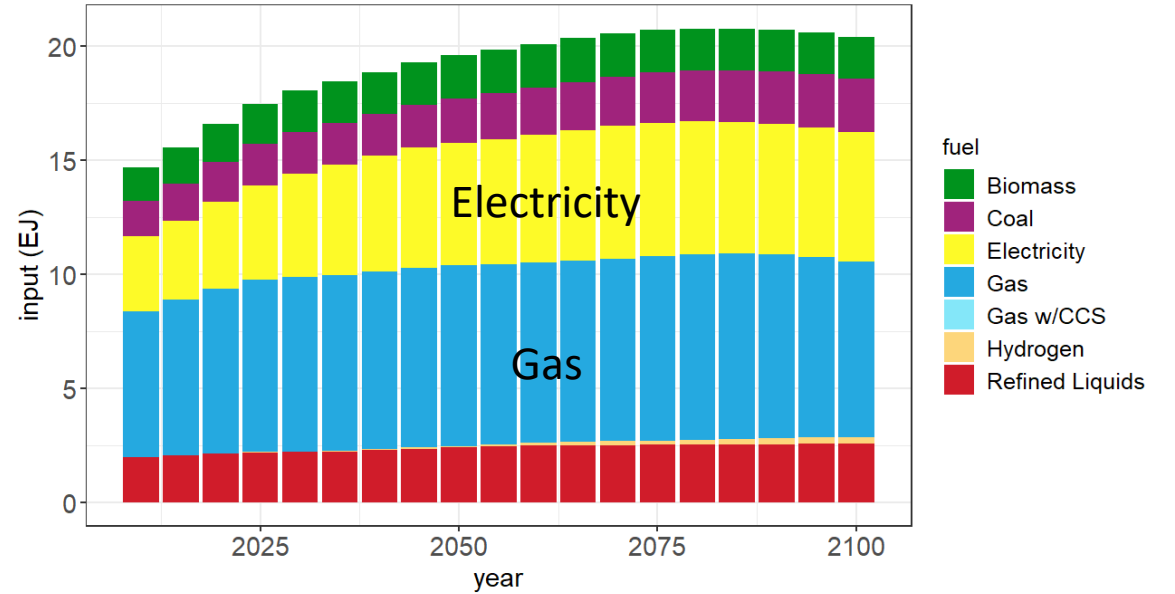
Industry Electrifies

U.S. Industry Sector CO2 Emissions

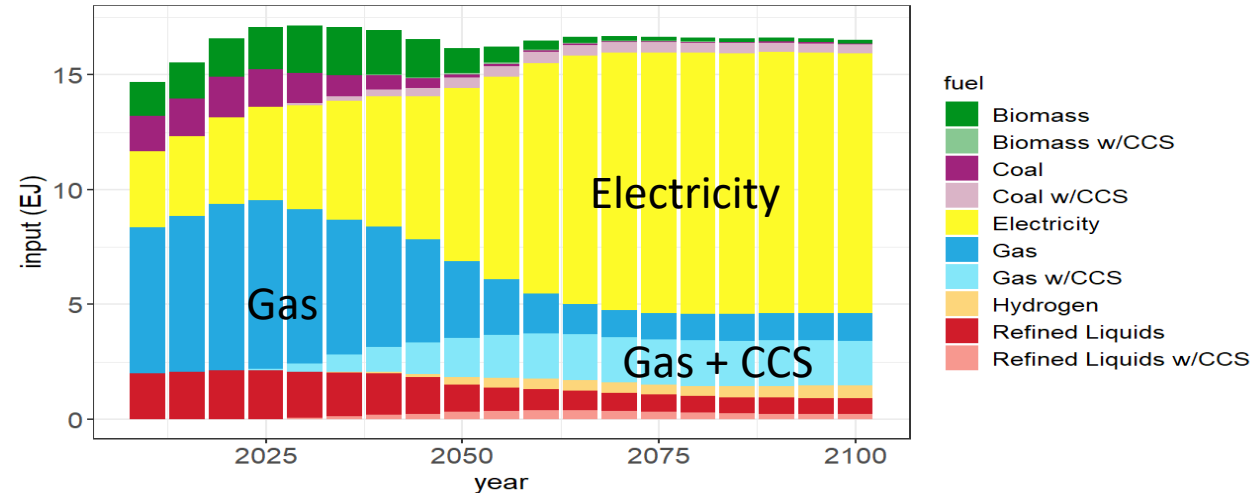


scenario
 — NetZero_2050
 — Reference

USA.Reference.U.S. Industry Sector Fuel Mix



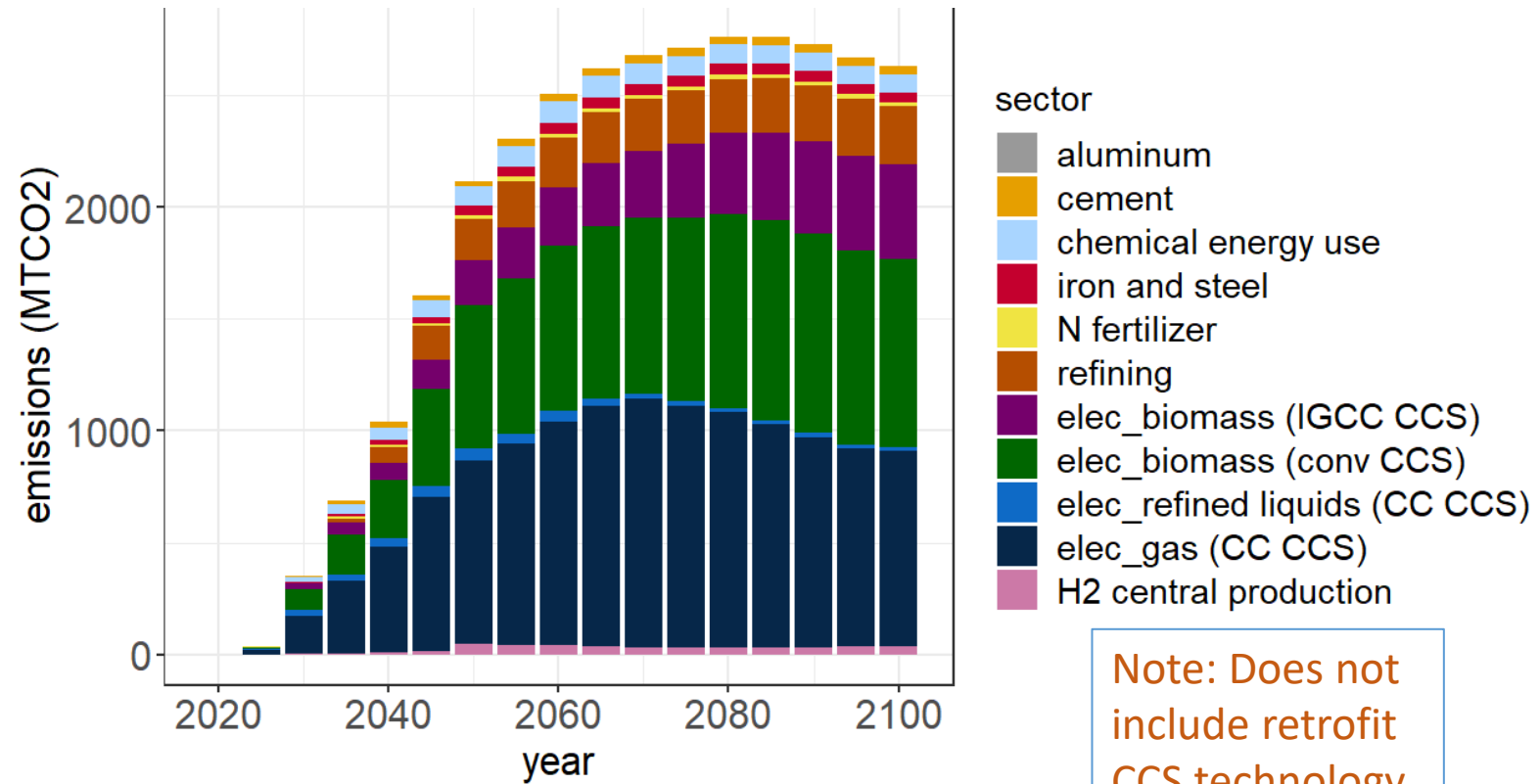
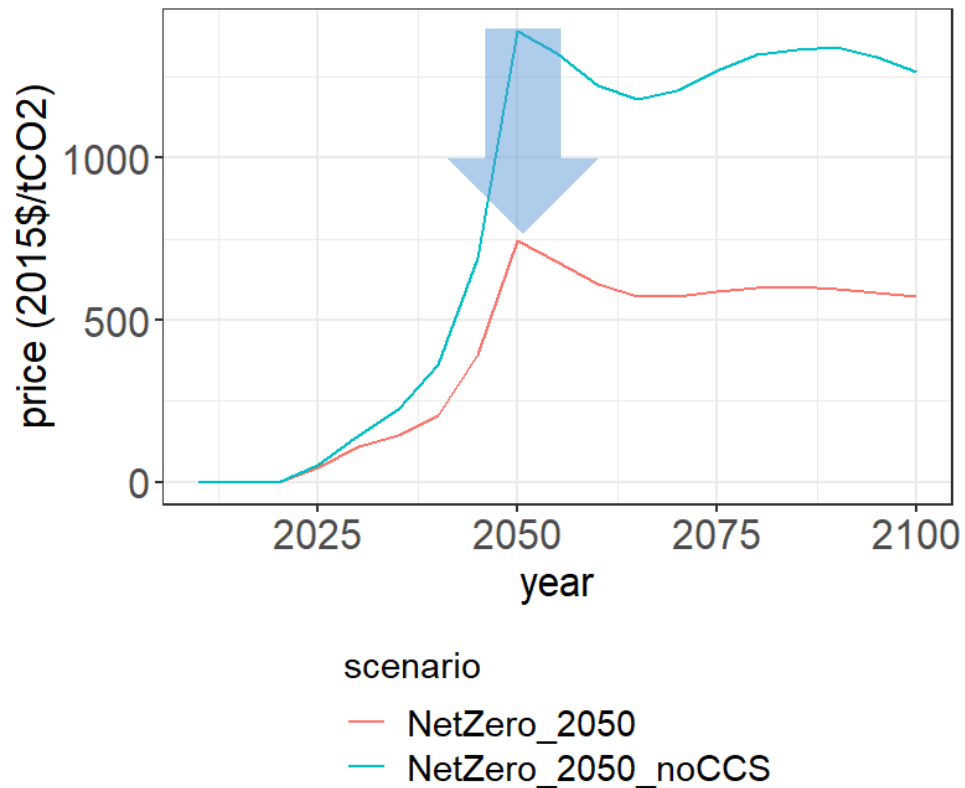
USA.NetZero_2050.U.S. Industry Sector Fuel Mix



CCS: Carbon Prices and CO₂ Capture

CO₂ Capture by Sector

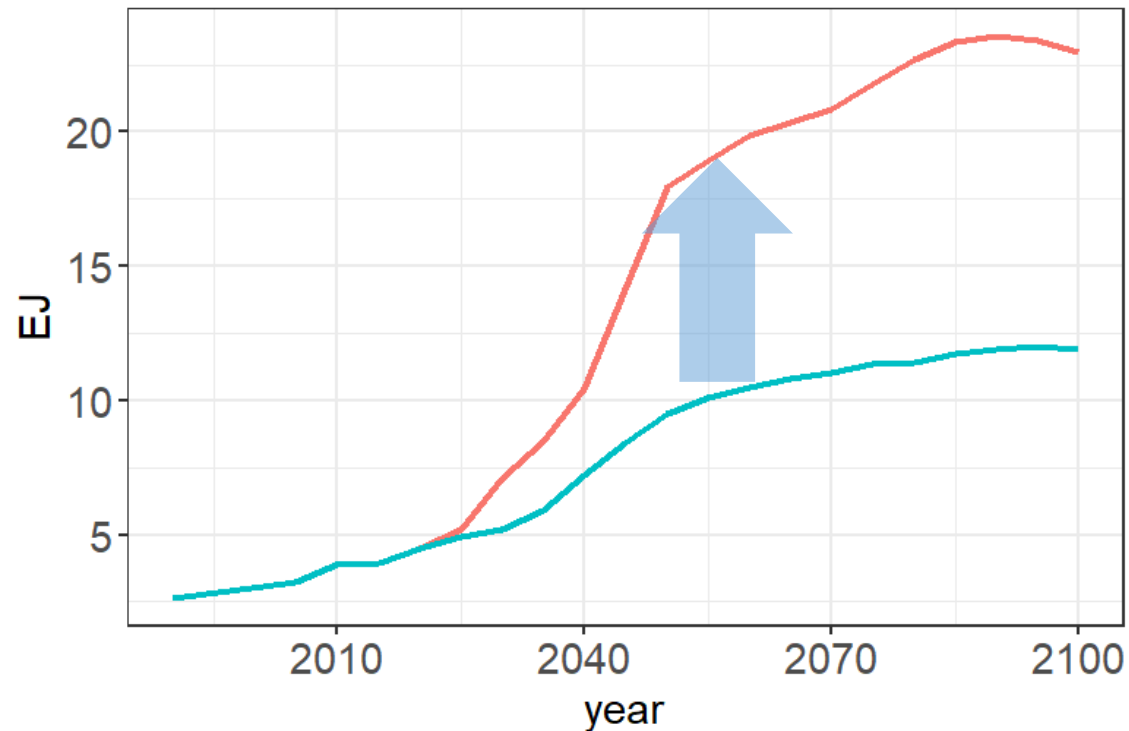
CO₂ Prices



Note: Does not include retrofit CCS technology.

Bioenergy Use in Net Zero 2050

Biofuel Consumption

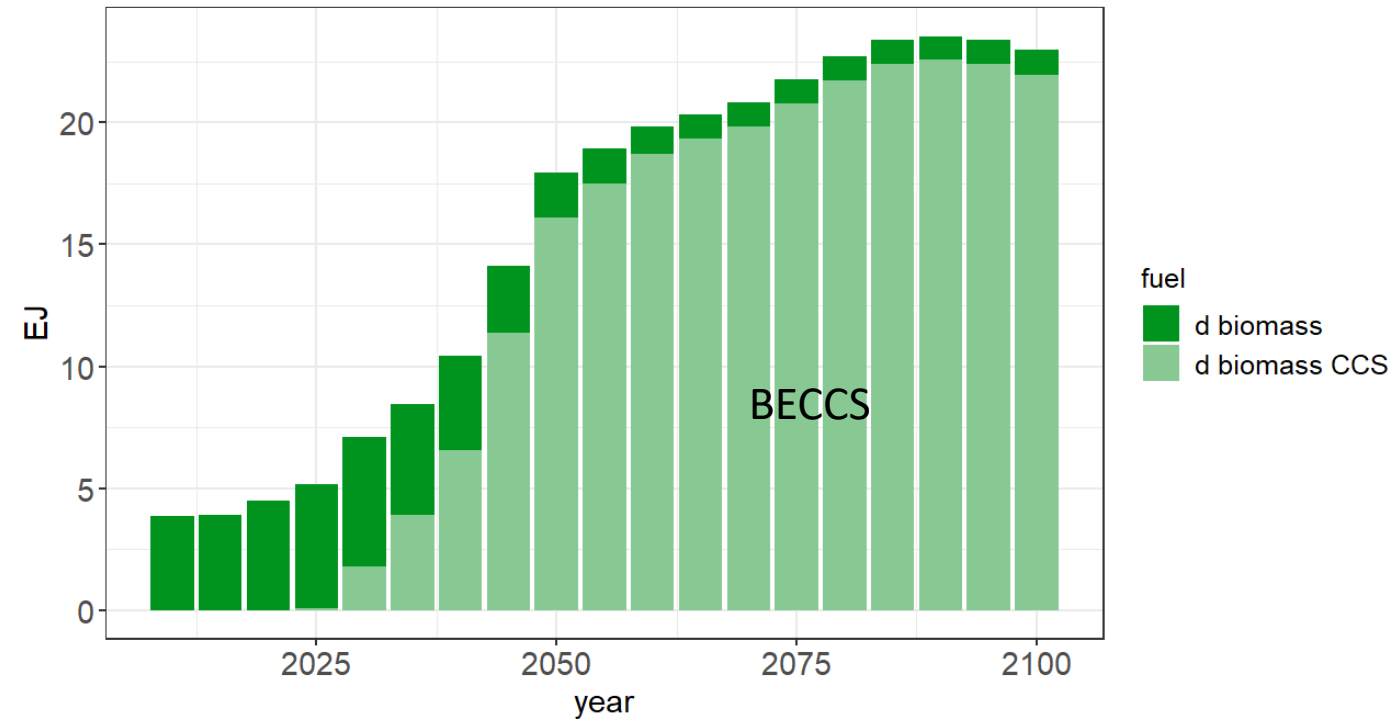


scenario

— NetZero_2050

— Reference

USA.NetZero_2050.Biofuel Consumption



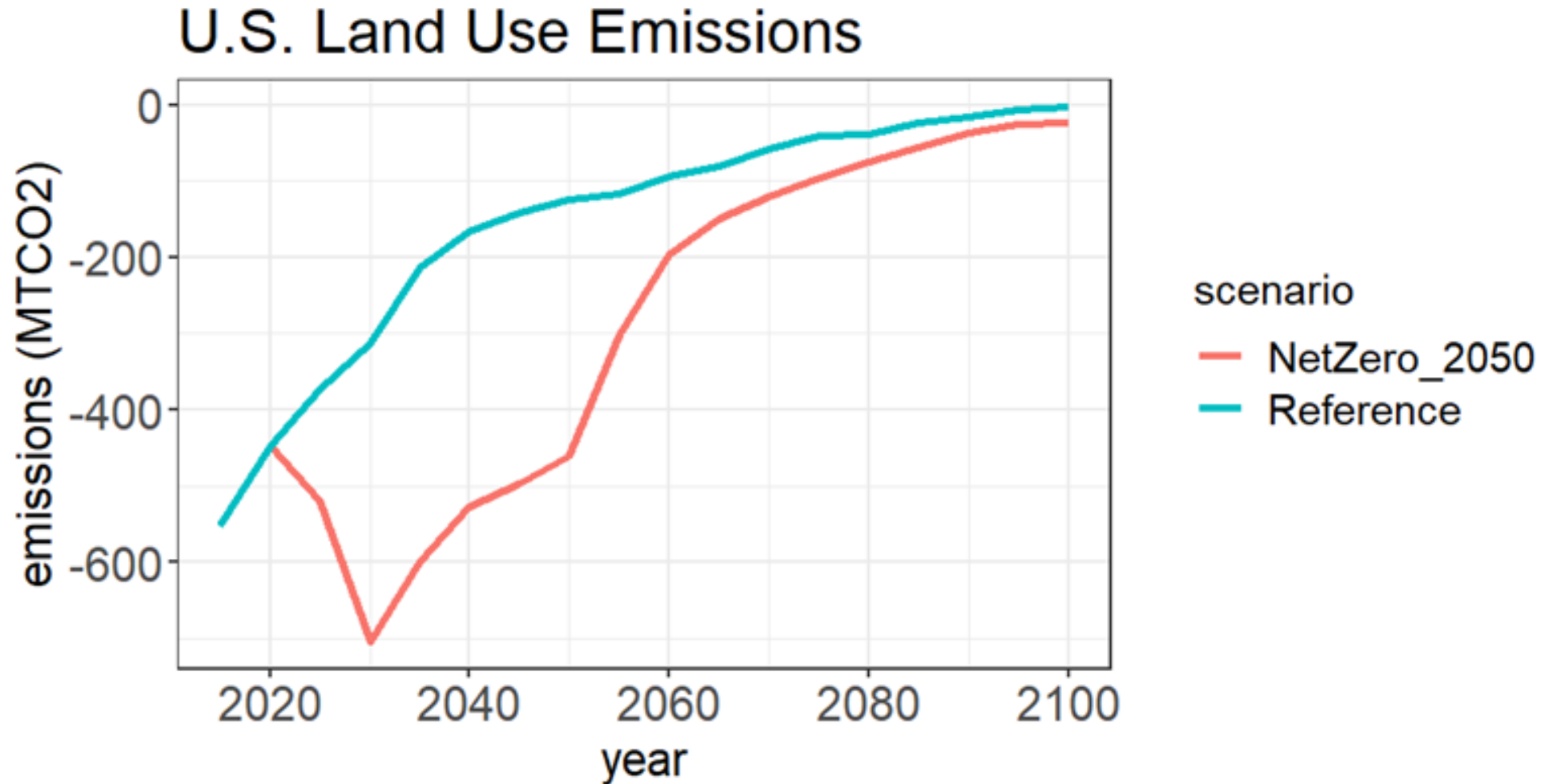
fuel

■ d biomass

■ d biomass CCS

BECCS

Land-use Change Emissions in NetZero





Together Again in 2022...Let's hope