Effectiveness of Decarbonization Pathways on Greenhouse Gas Reduction Goals in the Northeastern U.S.

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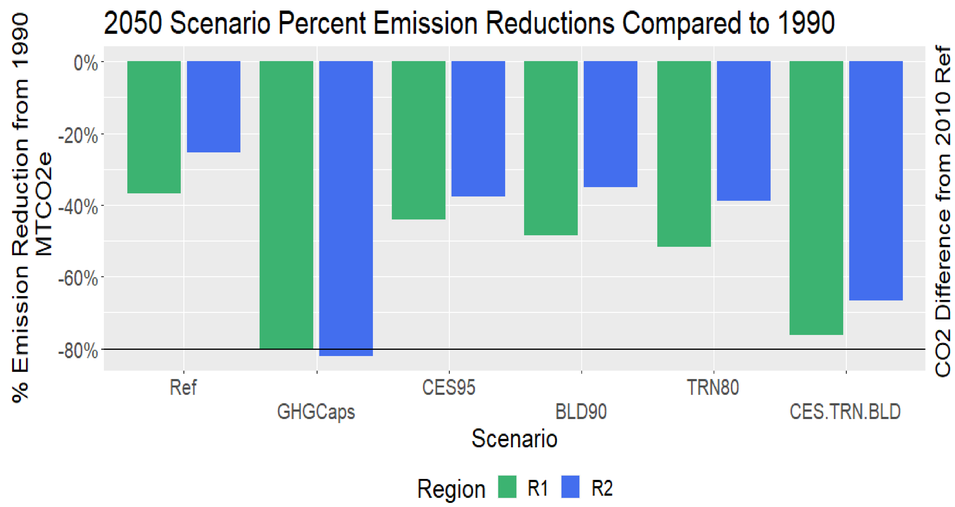
Introduction

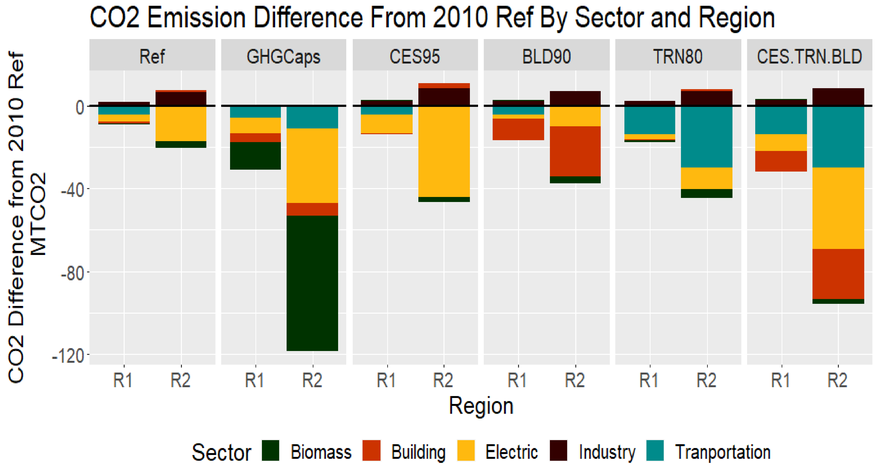
- States in the Mid-Atlantic and New England regions have developed 2050 greenhouse gas (GHG) reduction goals of 80-95% from 1990 levels by 2050.
- U.S. census Region 1 (R1) states include CT, MA, ME, NH, RI, and VT. Region 2 (R2) states include NJ, NY, and PA.
- This study examined the extent to which various GHG reduction pathways would achieve these goals in R1 and R2.

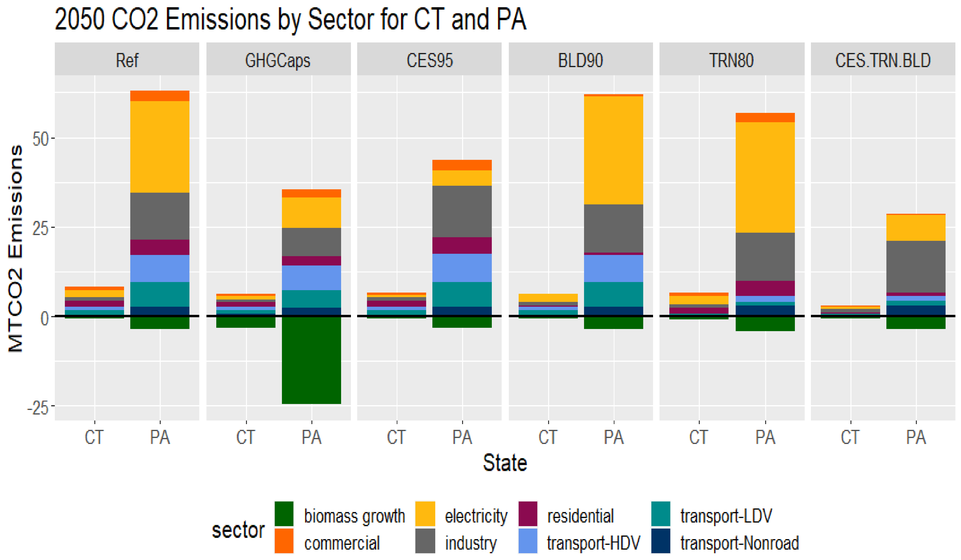
Methods and Analysis

- The Global Change Analysis Model (GCAM) is used to analyze various decarbonization pathways. GCAM is developed by the Pacific Northwest National Laboratory and simulates the evolution and interactions among the world's energy, economic, agriculture, and land use systems.
- Decarbonization pathways were applied individually and in combination, without the GHG caps, at the state level to assess the impact on GHG reductions.
- Results are presented at the aggregated regional level.

Scenario	Description
Ref	Reference Case
GHGCaps	GCAM identifies cost-effective strategies to meet GHG targets
CES95	95% of electricity must be from clean sources by 2035
BLD90	90% of building energy use is electric by 2050
TRN80	80% of transportation energy use is electric by 2050
CES.TRN.BLD	CES95, BLD90, and TRN80







Summary

- This analysis looked at decarbonization pathways that involve currently available technologies and infrastructure.
- While individual decarbonization pathways reduce emissions, applying the pathways in combination was most effective.
  - -R1: 76% CO2 reduction
  - -R2: 67% CO2 reduction
- These measures were less successful in R2 because it has greater energy use in sectors that are currently difficult to decarbonize, including industry and shipping and aviation services.
- Allowing GCAM to select the mitigation pathway (GHGCaps) resulted in much greater reliance on bio-energy. Such a solution could have environmental implications not captured in GCAM.
- The analysis illustrates the need for additional technology solutions to meet deep decarbonization goals.

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The views expressed in this presentation are those of the authors and do not necessarily represent the views or policies of the U.S. Environmental Protection Agency.

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