



Wind and Water: the Water Implications of Low-Carbon Electricity Futures in the U.S.

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Energy and Water in a Warming World (EW3)

Freshwater Use by U.S. Power Plants

Electricity's Thirst for a Precious Resource

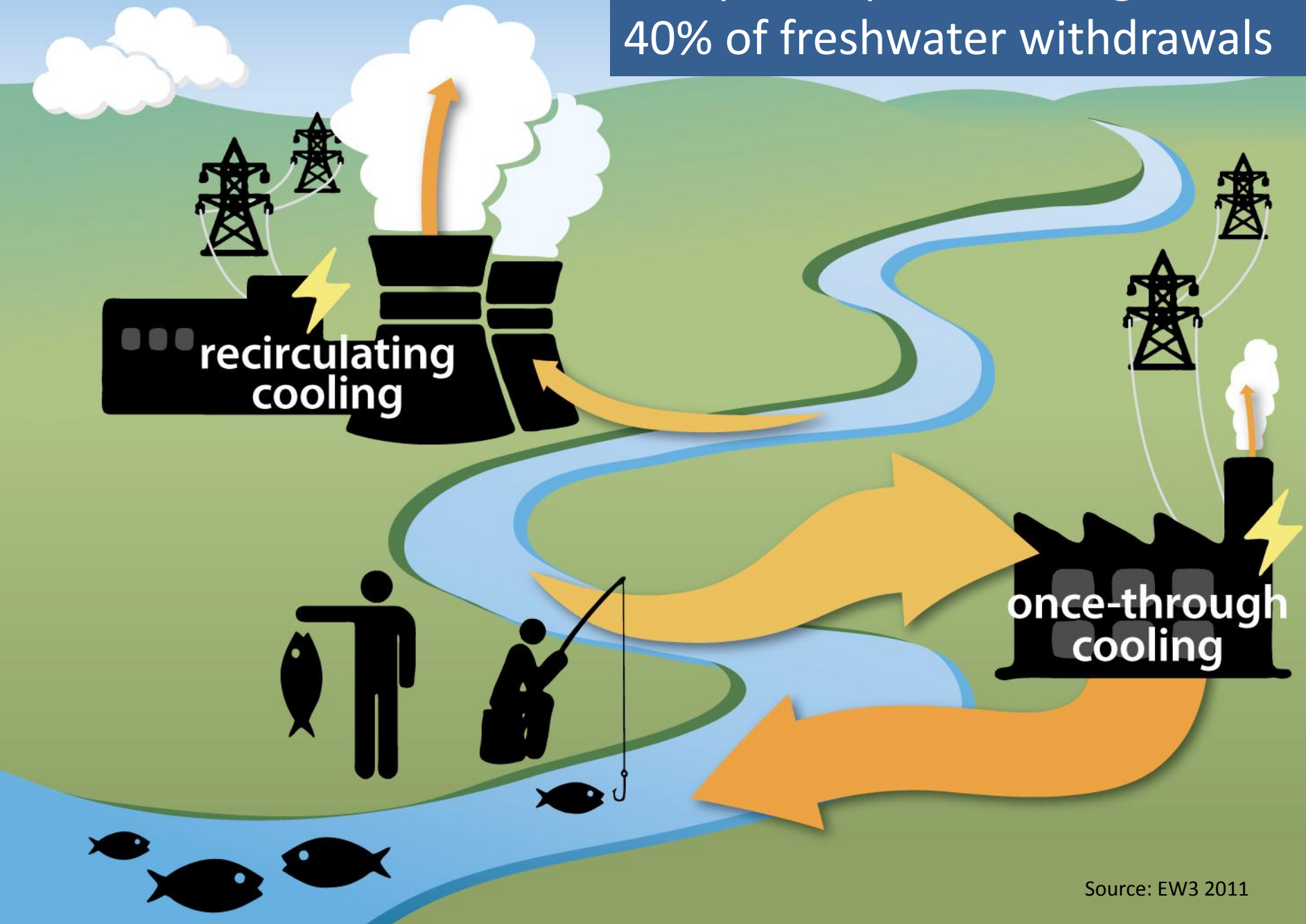
A Report of the Energy and Water in a Warming World Initiative



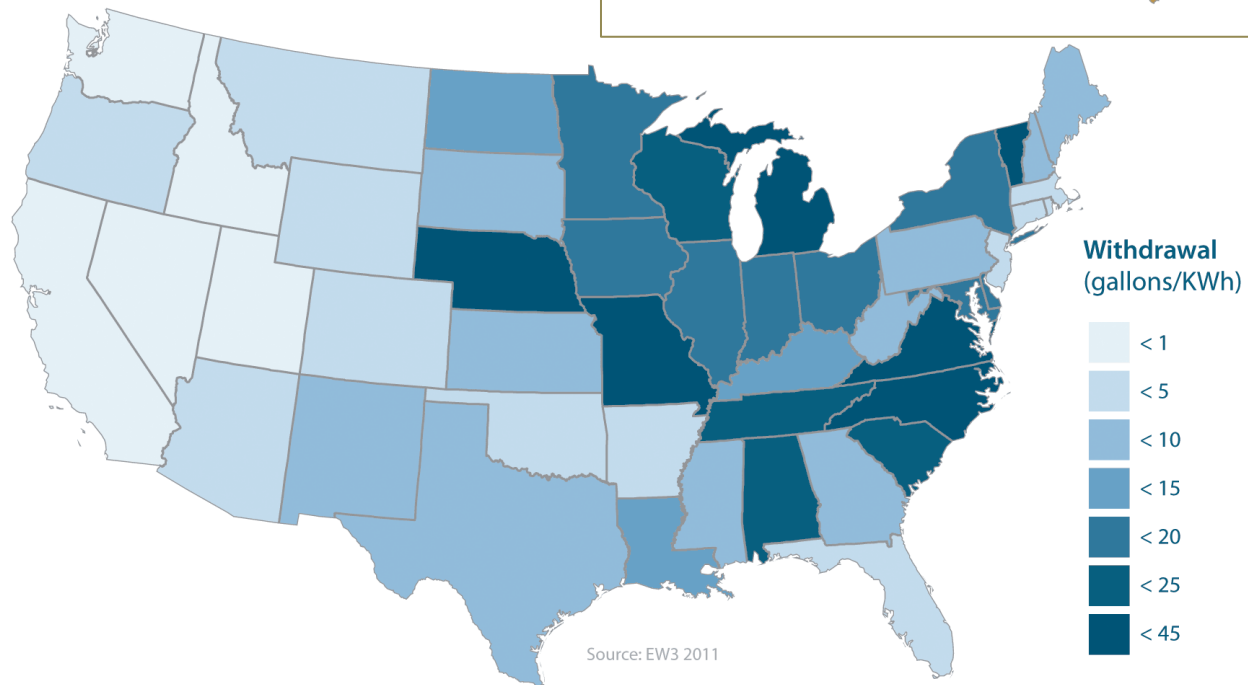
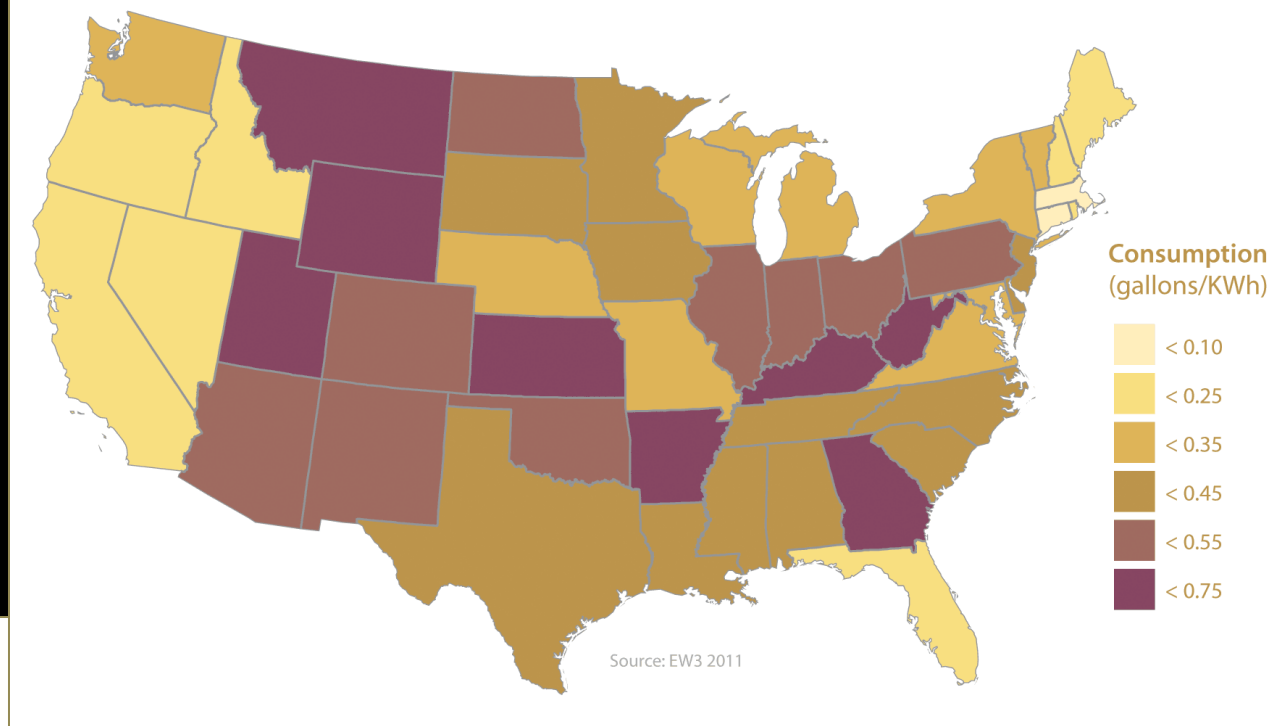
Top: iStockphoto.com/ryviro; bottom, left to right: Longview News-Journal/Kevin Green, Ecologypress.com, BrightSource Energy/Chris D'Amico

- Energy-water connection
- Baseline water use
- Water use under different energy futures

U.S. power plant cooling =
40% of freshwater withdrawals



Freshwater Intensity



Regional Energy Deployment System (ReEDS)

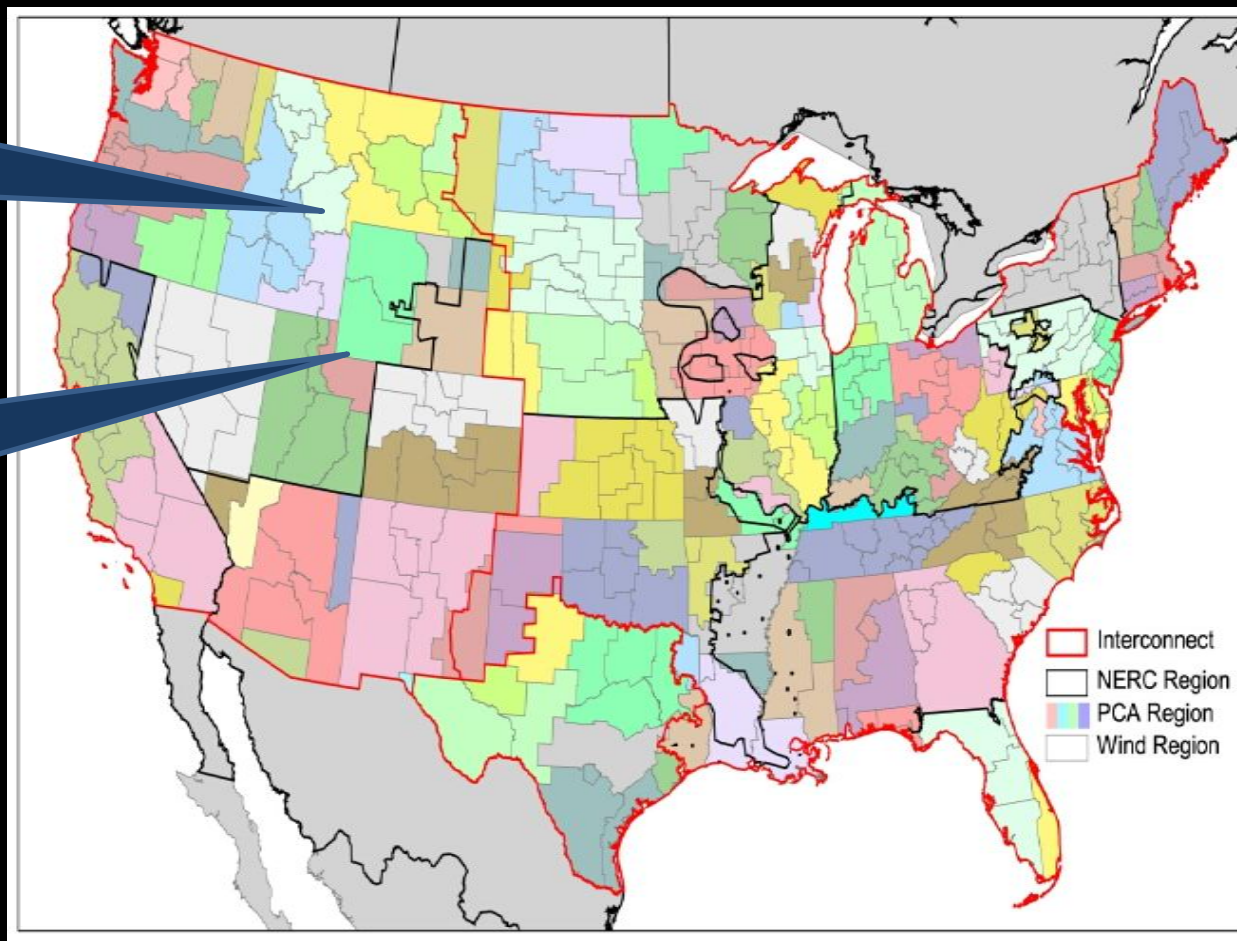


134

power control areas

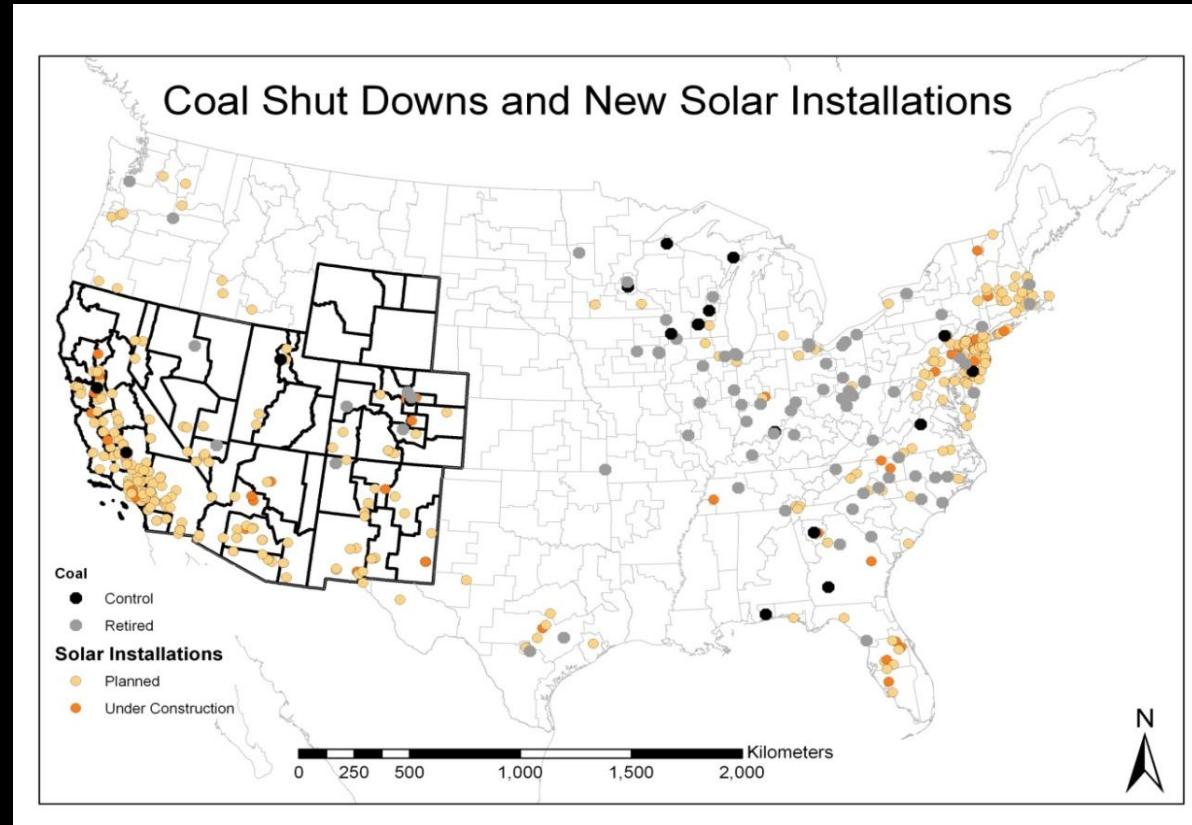
356

wind resource regions

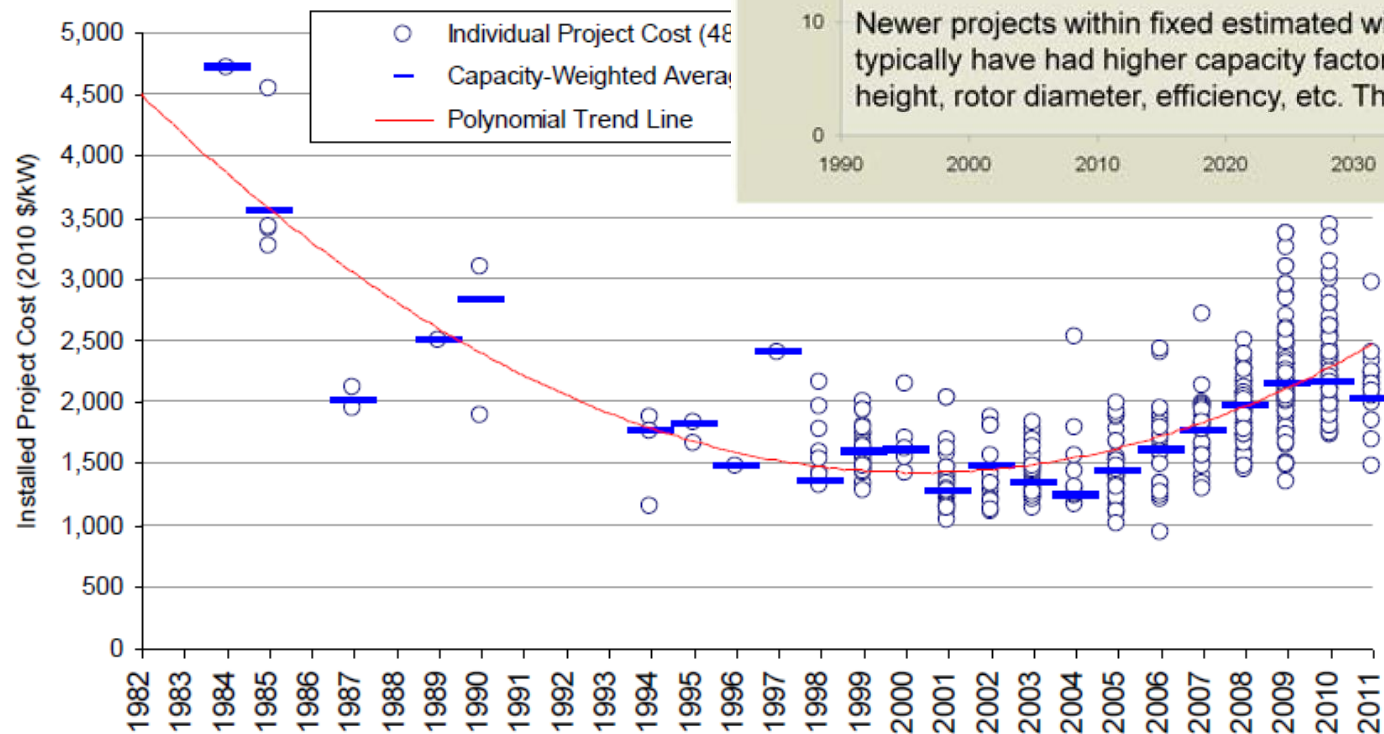


Select Assumptions

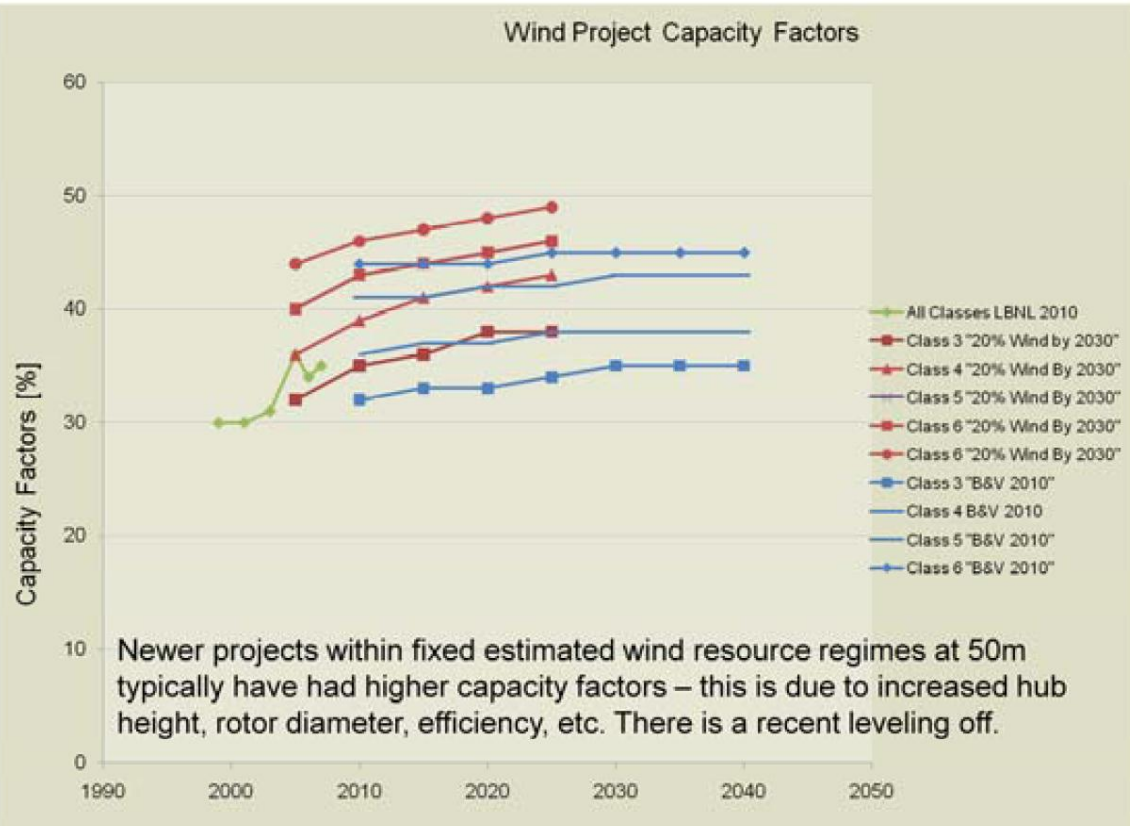
- Started with EIA AEO 2011
- Updated with project data
- Renewable potential from NREL
- Coal & nuclear retirements
- New plant builds



Wind Capital Costs

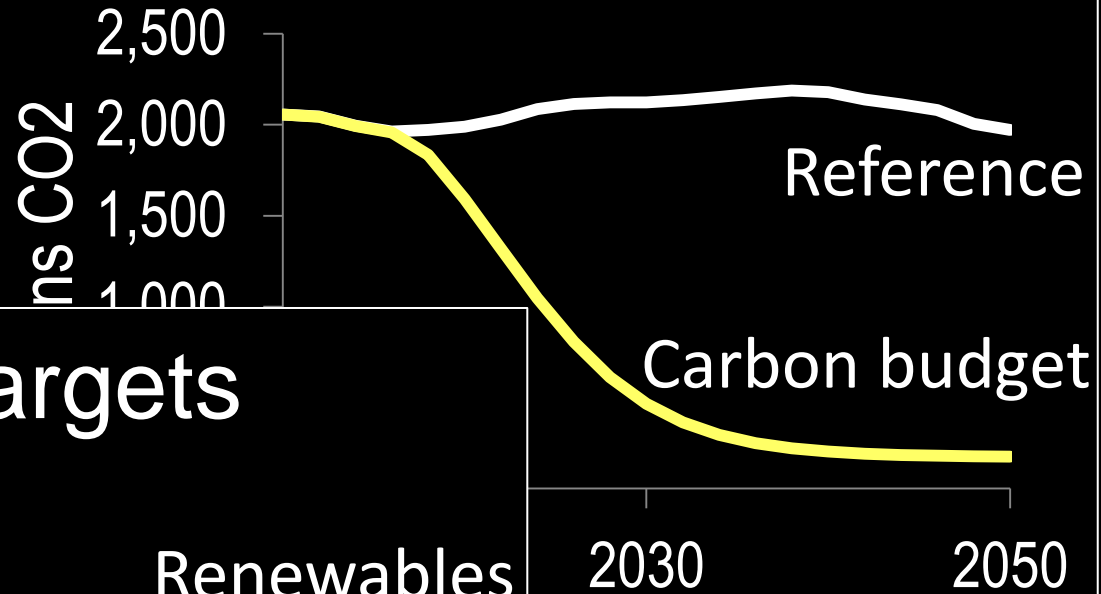


Note: 2011 sample of 17 projects totaling ~1 GW is preliminary

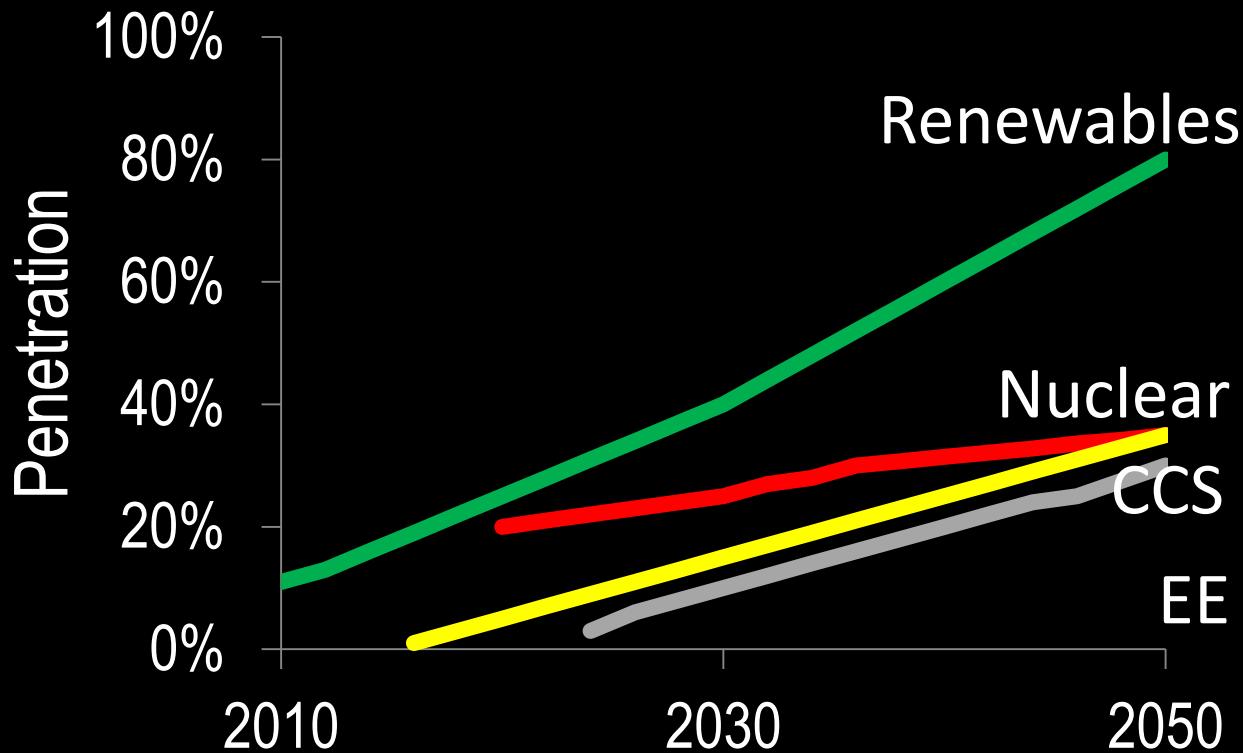


Drivers and Scenarios

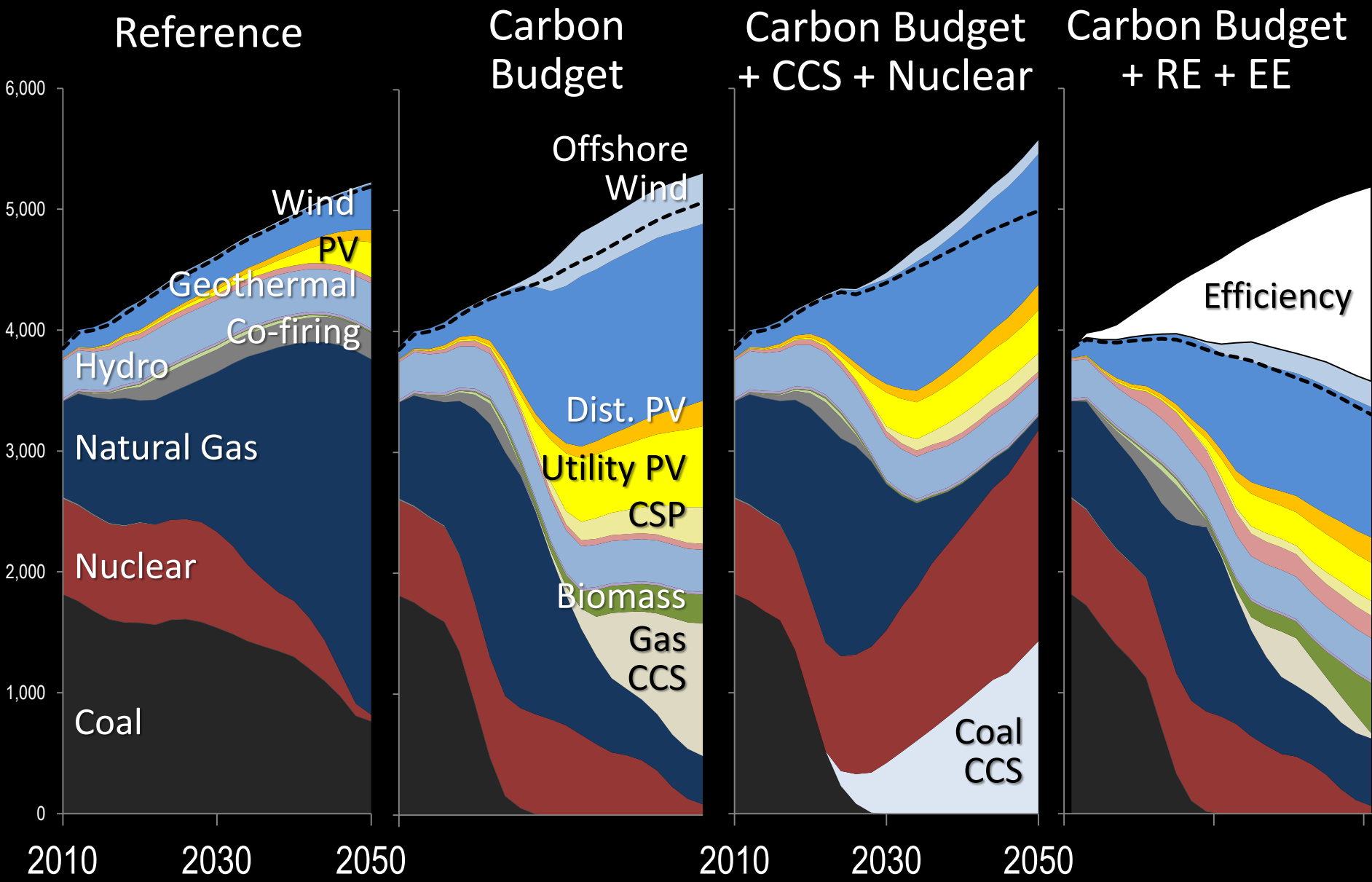
Power Sector CO₂

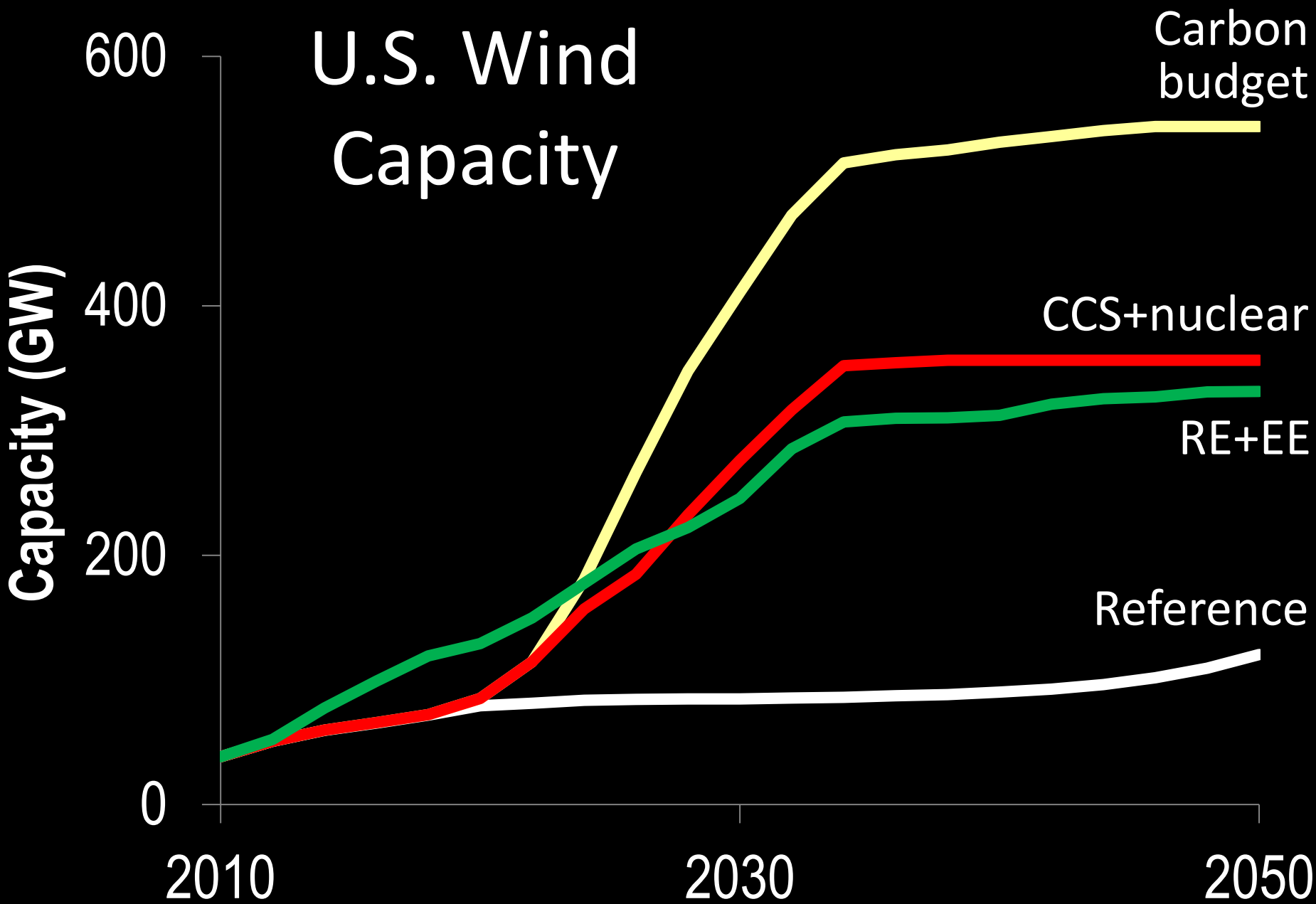


Scenario Targets



U.S. Electricity Generation Mix (TWh)

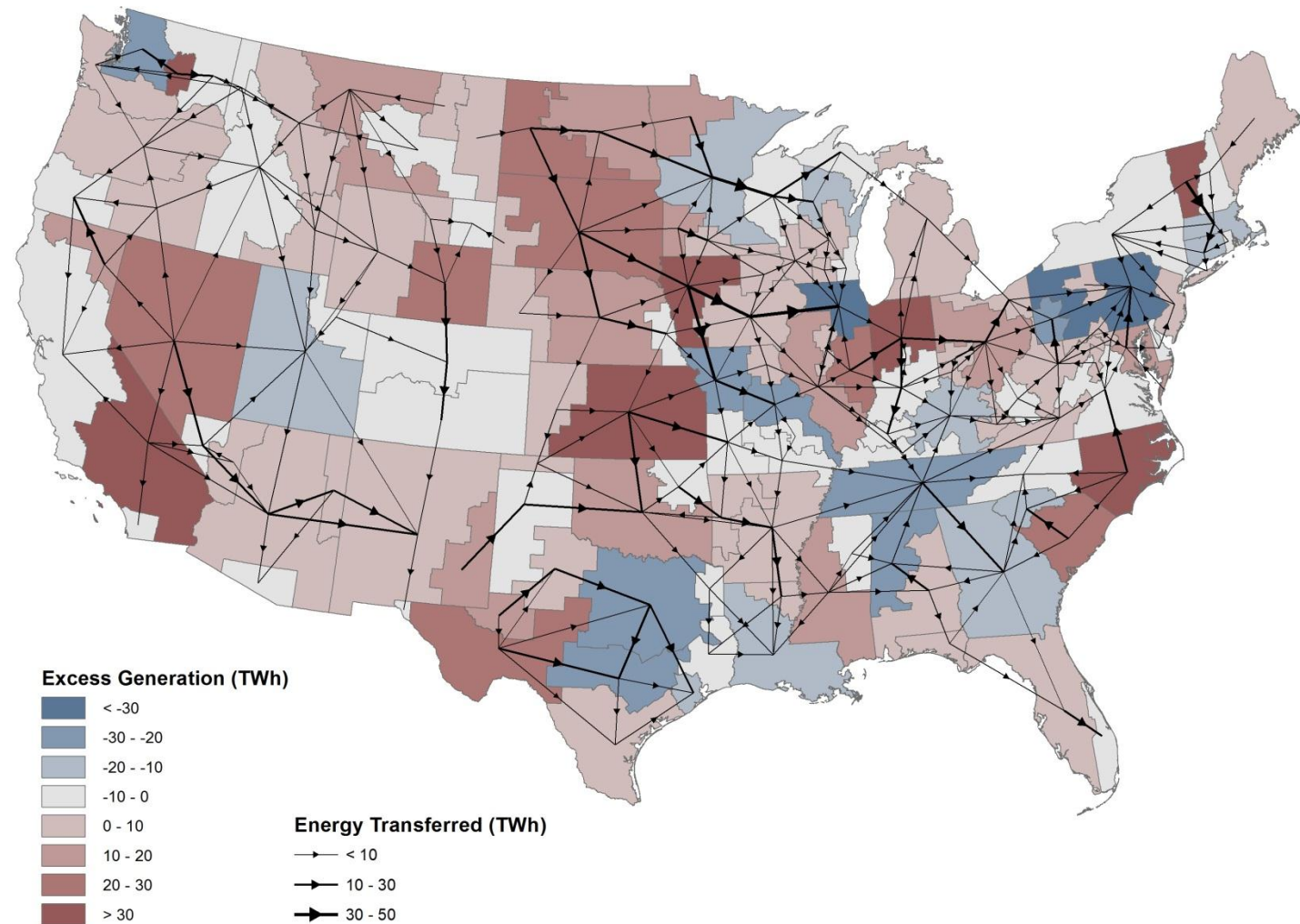




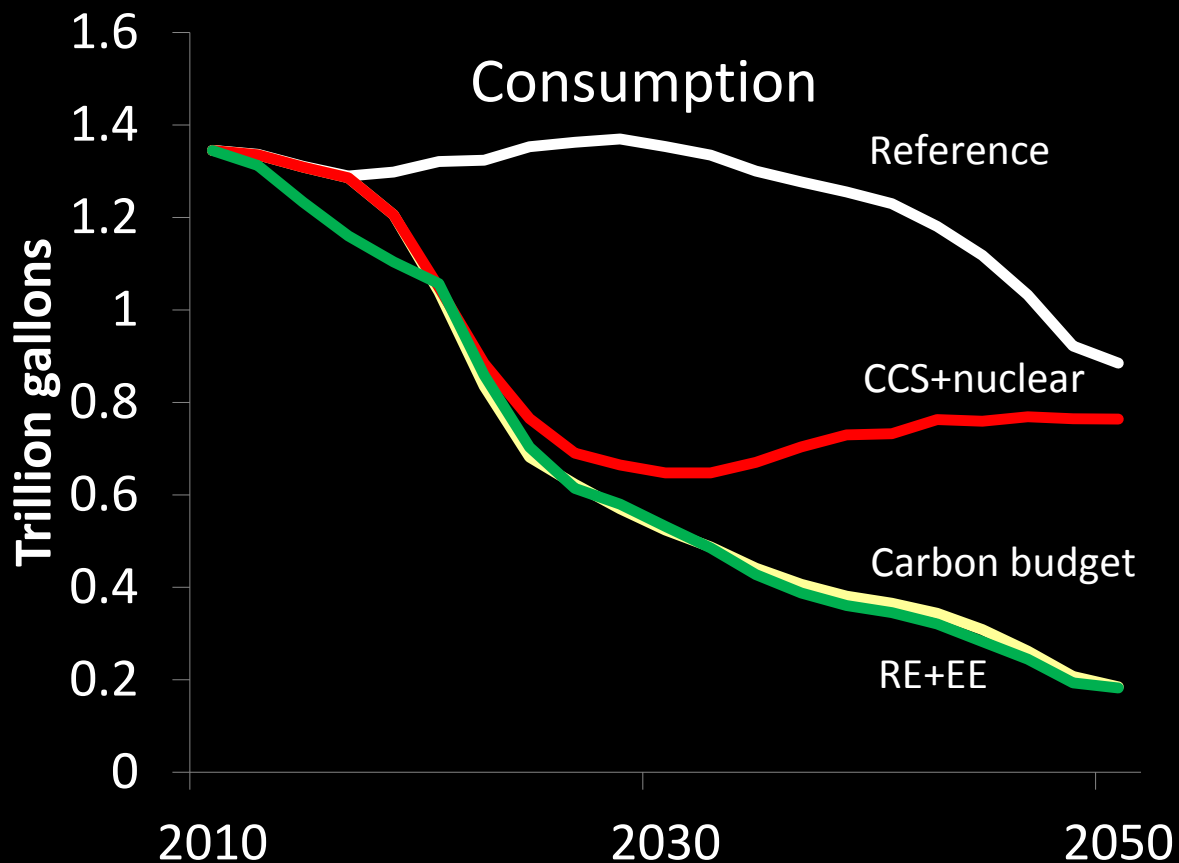
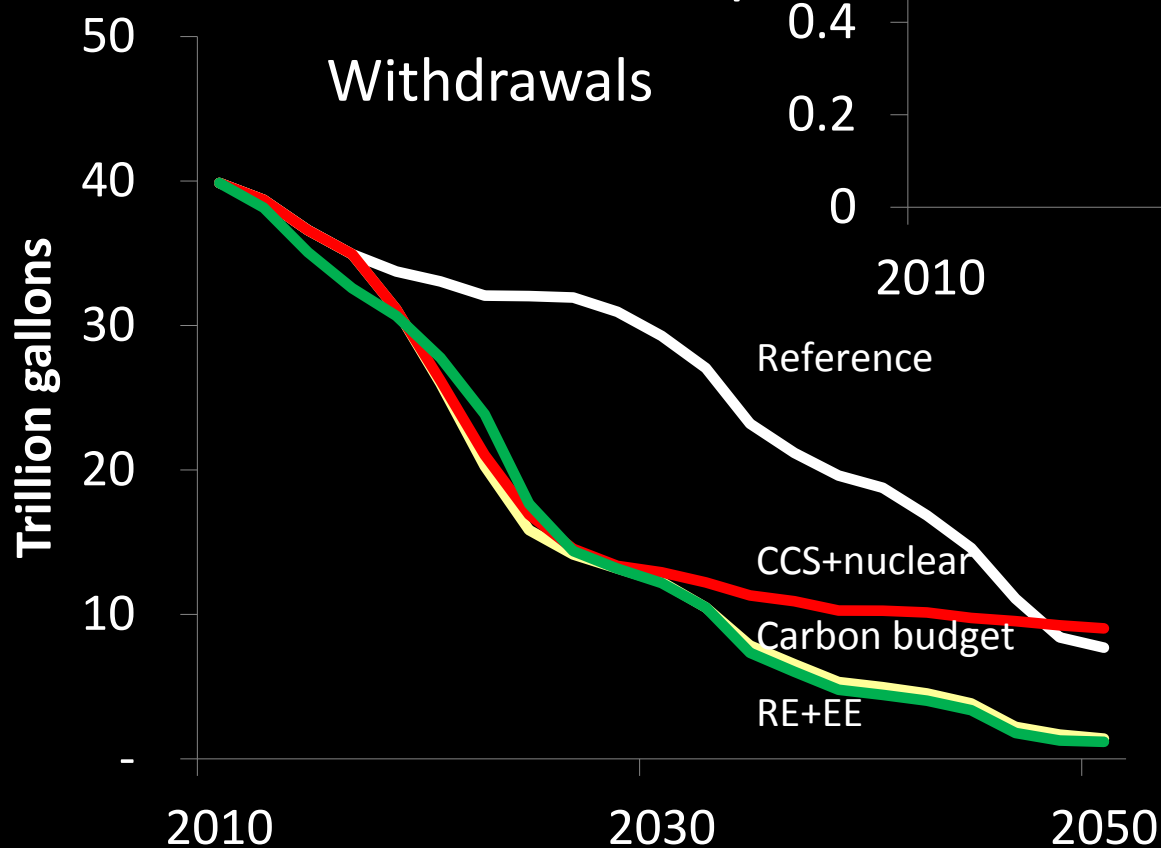
Preliminary results

Regional Power Transfers

Transmission between PCAs in 2050, RE + EE Case



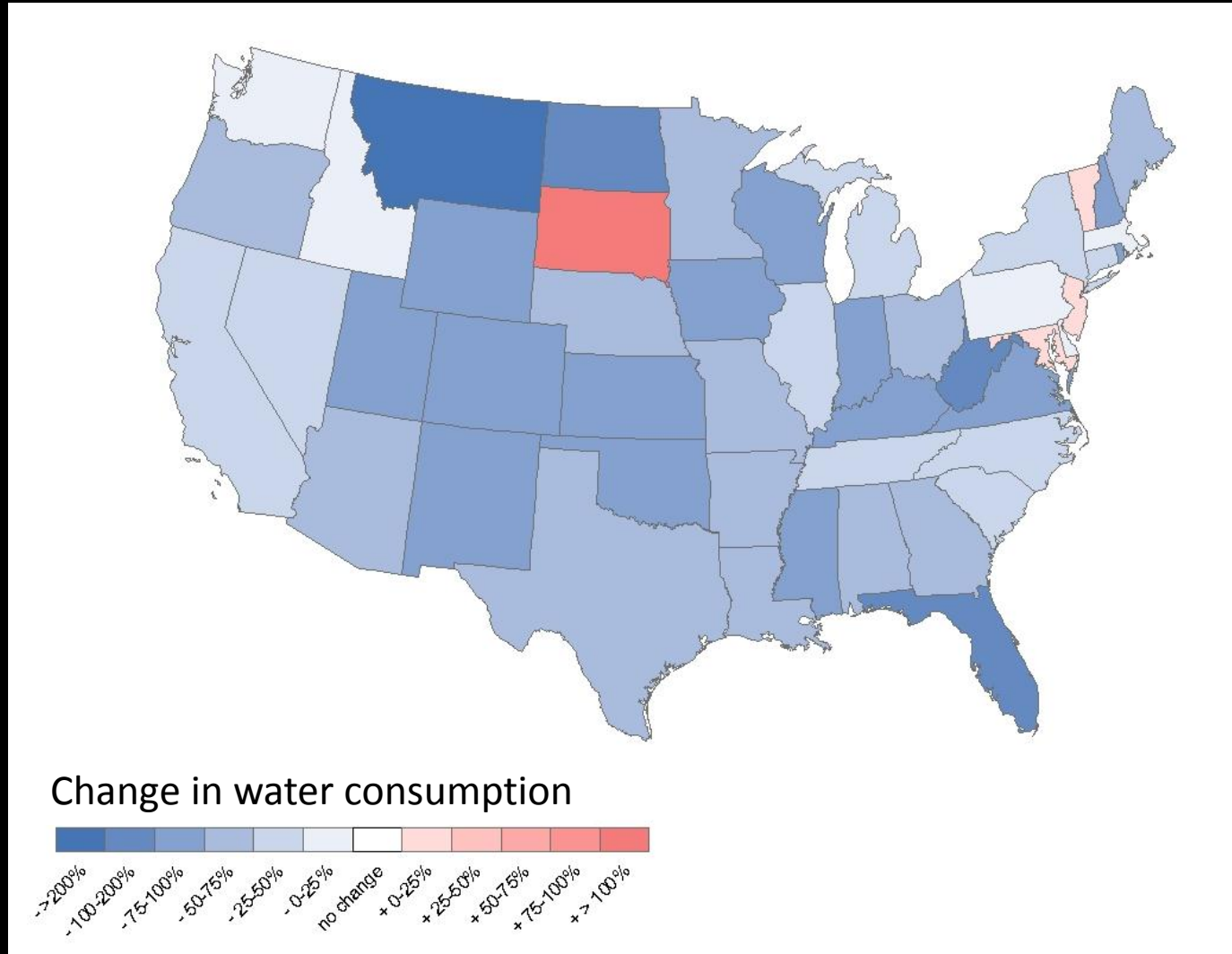
National Water Use



Preliminary results

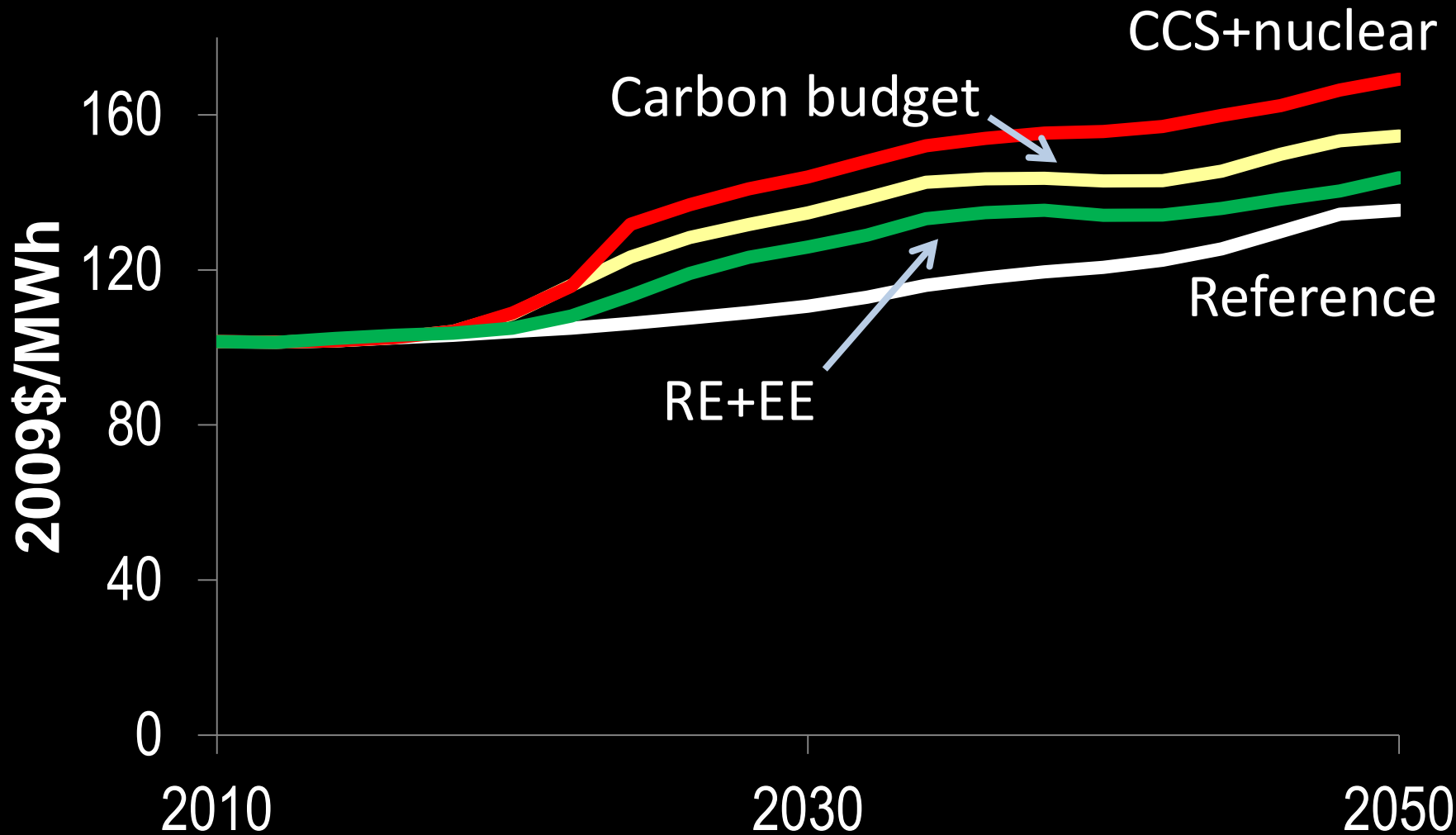
Water use by state

Change in Water Consumption in 2030, Reference Case vs. RE + EE Case

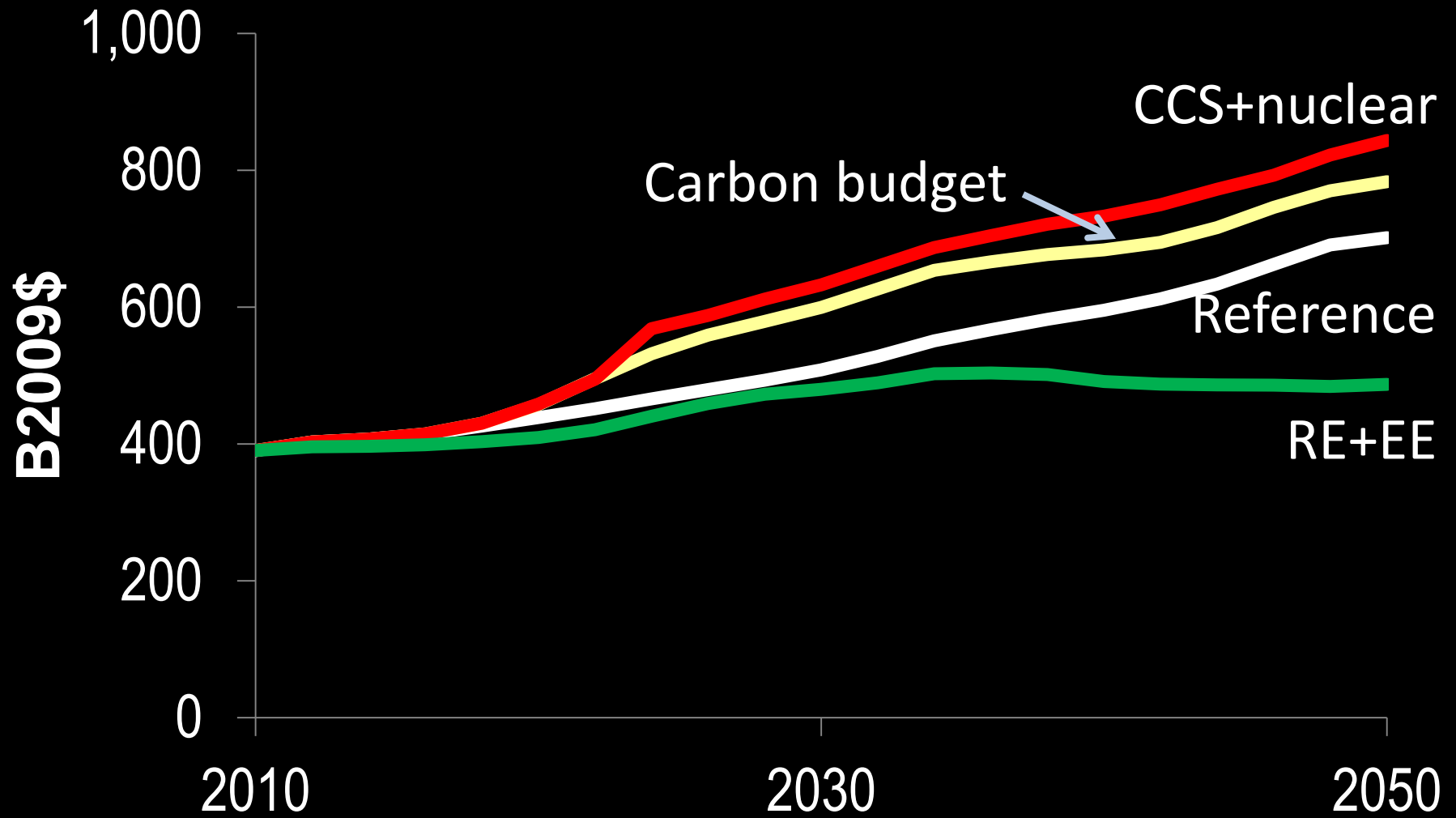


Preliminary results

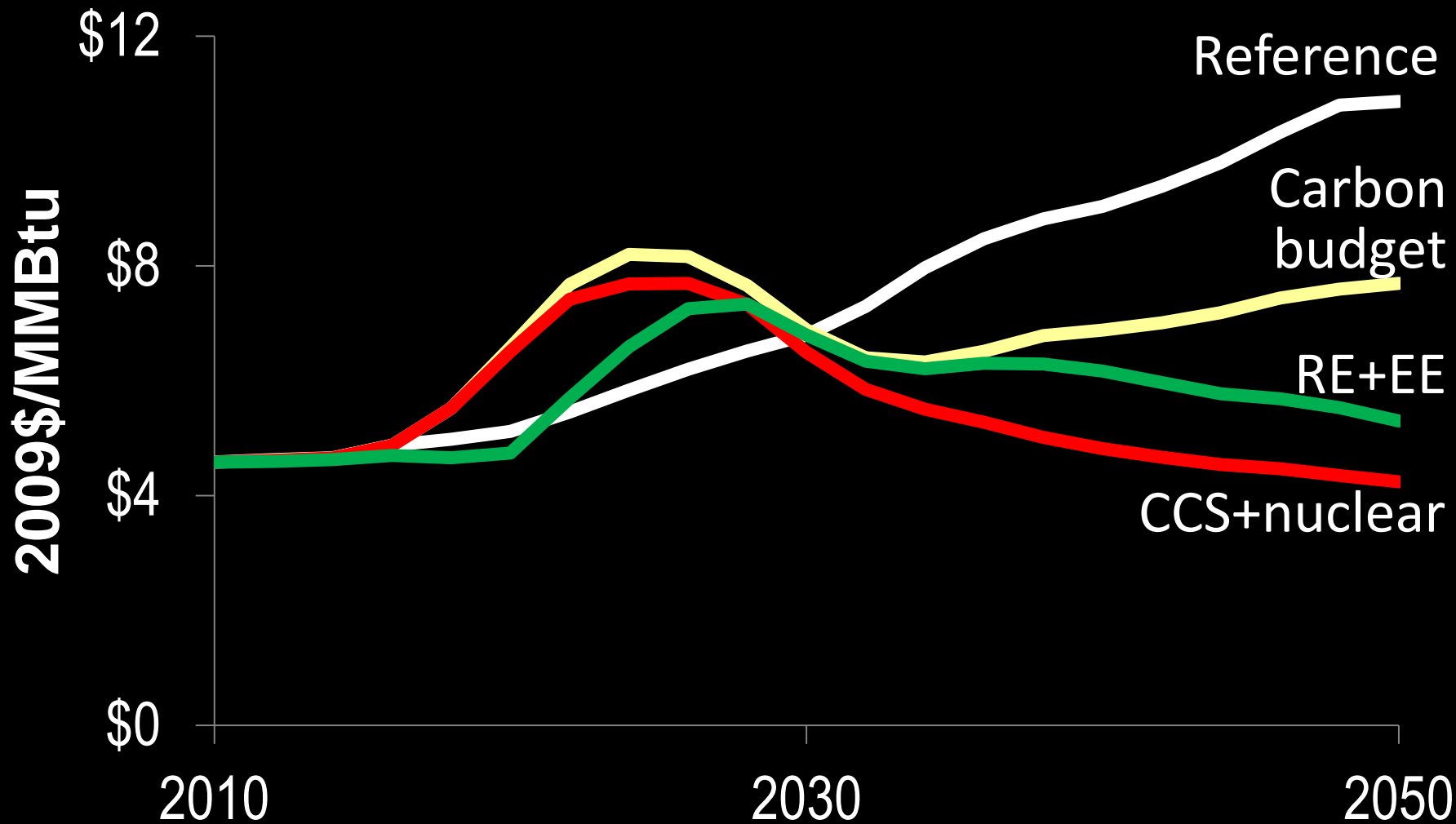
Average Electricity Price



Total Electricity Expenditures



Natural Gas Price





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Other Dimensions of Stress

