# Highlights of recent US climate policy analysis at Brookhaven National Lab:

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*ETSAP workshop*

*Delhi, India, January 22nd 2010*

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a passion for discovery

Office of Science U.S. DEPARTMENT OF ENERGY

## Overview

- Introduction
- Renewable Energy Standard (RES)
- Low Carbon Fuel Standard (LCFS)
- Cap-and-Trade program

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# Introduction

- Analysis sponsored by the Office of Policy and International Affairs
- Focused on analysis of current climate energy bills
  - Scenario based analysis of policy options
- Used BNL's 10-region US MARKAL model
  - Covers all sectors of the economy
- Reference case is calibrated to AEO 2009.
  - AEO09 technology performance and cost data
  - AEO09 economic growth and demand projections
  - AEO09 energy prices
- Also used ETP (2008 version) for analysis of the low-carbon fuel standard.





# The climate bills: Waxman-Markey and Kerry-Boxer

- The proposed legislation has four titles:
  - *Clean energy:* Promotes renewable sources of energy and carbon capture and sequestration technologies, low-carbon transportation fuels, clean electric vehicles, and the smart grid and electricity transmission
  - *Energy efficiency*: promotes energy efficiency across all sectors of the economy
  - *Global warming*: title that places limits on the emissions of Greenhouse Gases
  - *Transitioning*: is intended to protect U.S. consumers and producers and promote green jobs during the transition to a clean energy economy.

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## Renewable Electricity Standard

- Requires retail electricity suppliers to meet a certain percentage of their load with electricity generated from renewable resources, like wind, biomass, solar, and geothermal. The requirement begins at 6% in 2012 and gradually rises to 25% in 2025.
  - Up to 20% of the requirement (5% of total) may be met with efficiency.
  - Small utilities (less than 100,000 MWh annually) are exempt
  - Renewable Electricity Credits (RECs) are tradable
  - Nuclear and existing hydro are subtracted from the base amount

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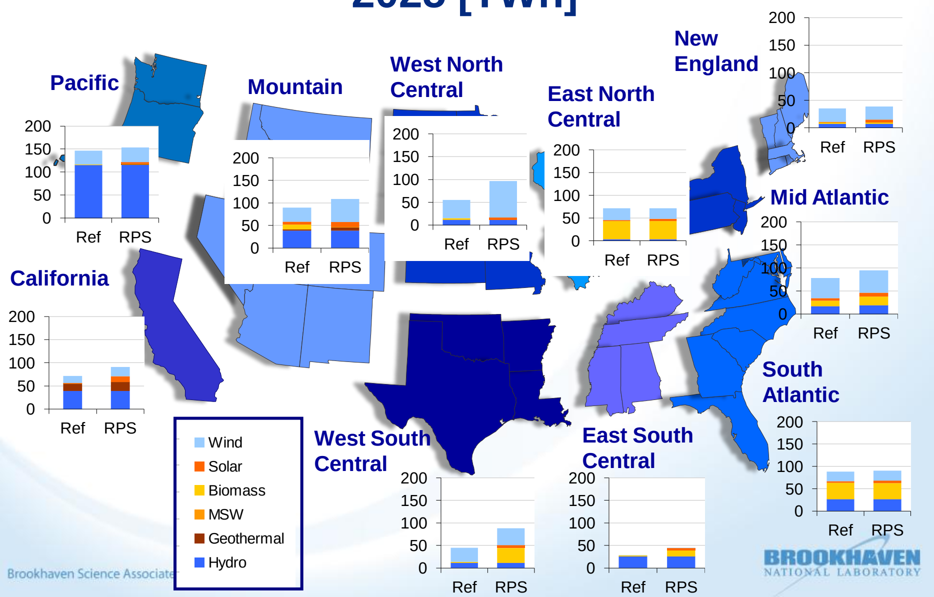
## Regional renewable electricity generation 2025 [TWh]

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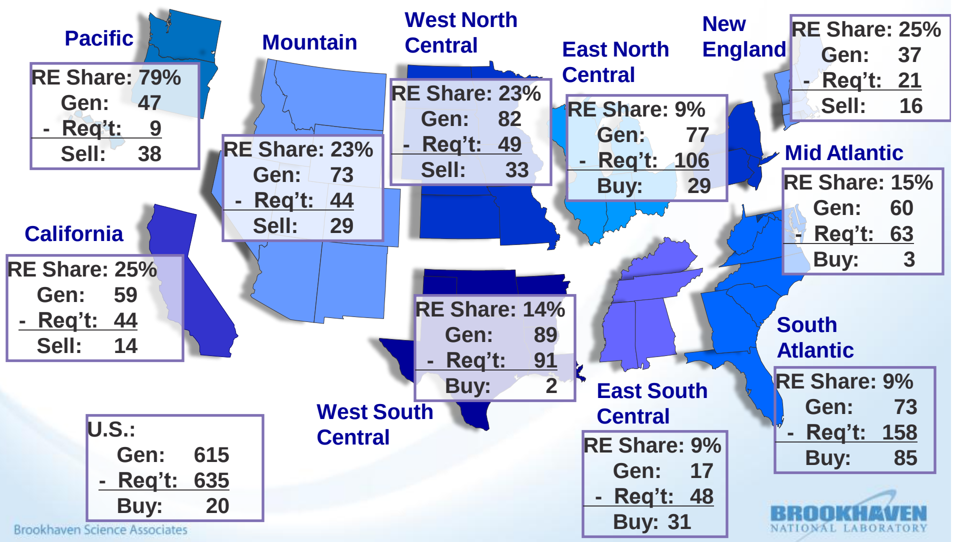
## Renewable electricity credit balances 2025 [TWh]

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## Renewable Electricity Standard

- National RES will have minor impact on electricity prices, but still leads to significant wealth transfer between regions.
  - Electricity price increases are a fraction of a cent per kWh
  - However, we estimate transfers from renewable resource poor regions to other regions and the federal government to be in the neighborhood of $6-10 billion in 2025
  - Expand standard to include other clean electricity sources?

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## Low carbon fuel standard

- A market-based program for regulating the carbon content of transport fuels
- The target is 5% reduction relative to 2005 baseline by 2025 and 10% reduction by 2030
- The aim is to encourage:
  - Biofuels production, electric and plug-in hybrid electric vehicles, improvements in refinery efficiency, the use of lower carbon refinery feedstocks
- Aims to discourage
  - The use of crude oil from oil sands and coal-to-liquids production
- Fuel marketers are the regulated parties
- Credits are tradable

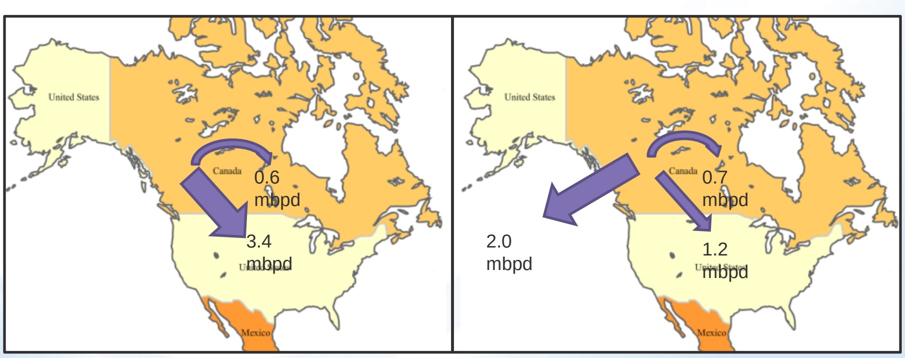




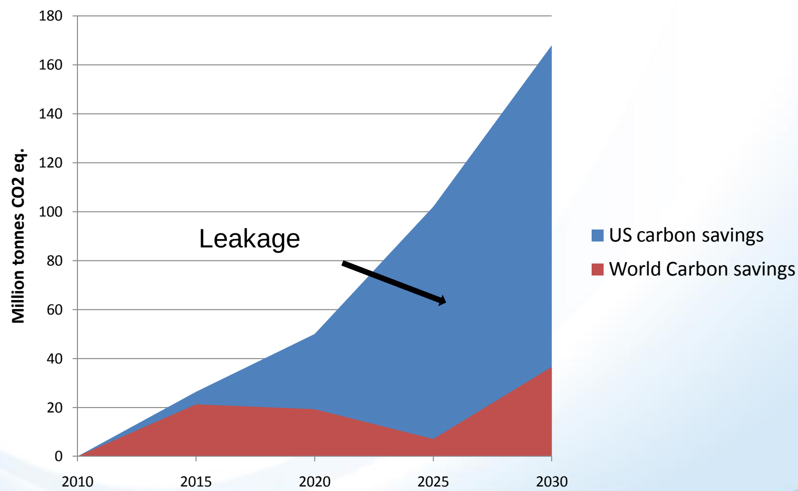
## Low Carbon Fuel Standard

- The introduction of a low carbon fuel standard does not appreciably reduce overall production of crude from oil sands. But it gets sold in other markets.

Reference case 2025 LCFS case 2025



## Low Carbon Fuel Standard

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## Low carbon fuel standard

- We have a number of concerns about this policy
  - It will be difficult to indirectly regulate upstream emissions in other countries, so there is a clear danger that emission benefits will be eroded by leakage.
  - Refiners are the regulated parties, which makes this policy inefficient in promoting plug-in hybrid and electric vehicles
  - It regulates the carbon content of the fuel rather than emissions, so it is economically inferior to a direct regulation on emissions.
  - Is detrimental to other policy goal such as energy security

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# Cap-and-trade program

- A market-based program for reducing GHG emissions
  - Covered entities must obtain tradable permits (allowances) for each ton of GHGs emitted. Allowances are auctioned by the federal government.
  - The program reduces the number of available allowances issued each year so that emissions are 3% below 2005 levels in 2012, 20% below in 2020, 42% below in 2030, and 83% below in 2050.
  - Entities that emit less than 25,000 tons per year of CO2 equivalent are not covered by this program.
  - Covered entities may increase their emissions above their allowances if they can obtain “offsetting” reductions from other sources.