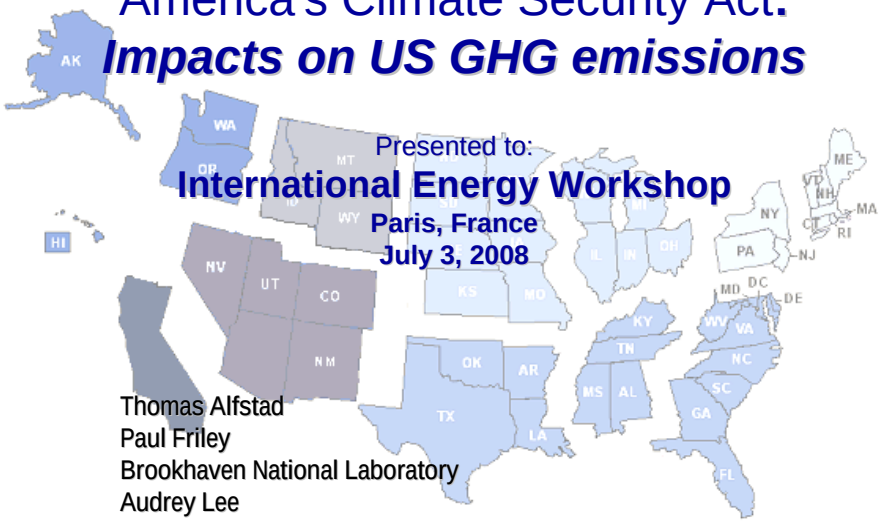
America's Climate Security Act:
Impacts on US GHG emissions



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Thomas Alfstad
Paul Friley
Brookhaven National Laboratory
Audrey Lee
US Department of Energy
talfstad@bnl.gov

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Introduction

- Both presidential candidates support US and international action on climate change.
- Wider acknowledgement of the climate change challenge and wider support for legislative action both in Congress and among the public.
- 12 different climate change bills have been introduced in the current (110th) congress. None have had much success.
- The America's Climate Security Act of 2007 (also known as the Lieberman Warner Bill) has received the most attention of late. This bill establishes a cap on emissions of greenhouse gases beginning in 2012. However, it was recently rejected in Senate.
- While debate on climate bills is likely to proceed in Congress the road to US legislation on the matter will be long and difficult.

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Climate Security Act (S. 2191)

- Establishes a cap on greenhouse gas emissions through a emission allowance program.
- Economy-wide cap: coal and process emissions at emitters; oil refiners, natural gas processors, and oil/gas importers.
- Close to 90% of greenhouse gas emissions are covered by the legislation (small emitters not covered) .
- Initially 26.5% of allowances are auctioned while the remainder is distributed for free, but over time an increasing share of allowances will be auctioned (69.5% in 2050).

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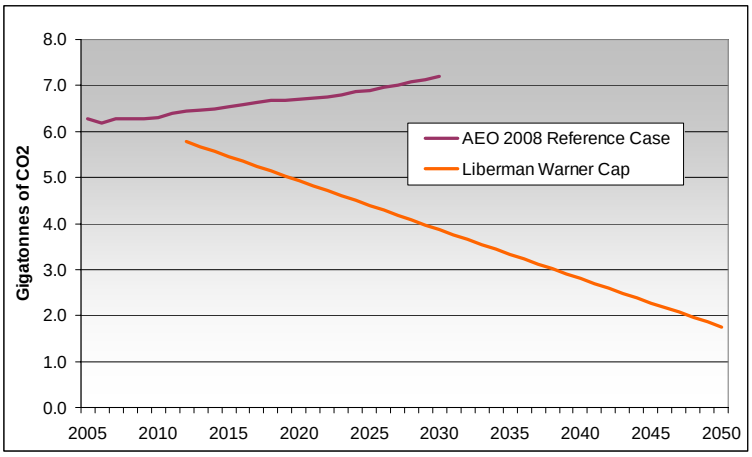
Climate Security Act: Cap



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Climate Security Act: Cost control

- Allowances are tradable
- Allowances are bankable
- Allowances can be borrowed
- Offsets
  - May be purchased from non-covered entities who reduce their emissions or capture and sequester carbon (15% max)
  - Offsets may also be purchased from an international greenhouse gas emission trading market (15% max).
- The penalty for non-compliance is the higher of $200 per tonne of CO2 equivalent or 3 times the market value of allowances.
  - For this study a relief valve of $200 per tonne has been used.

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Analysis

- 10-region US Markal model
  - Covers all sectors of the economy
- Reference case (AEO 2007 data set – also includes the major provisions of EISA 2007)
  - Climate Security Act (CSA) Base
  - Climate Security Act with no allowance banking
  - Climate Security Act with no international offsets
  - Climate Security Act no nuclear or CCS
  - Climate Security Act with advanced technology set

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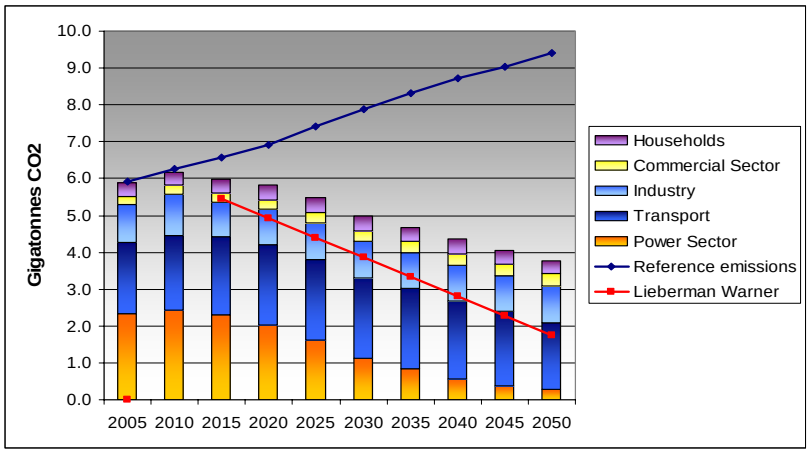
Carbon Emissions
CSA Base Case



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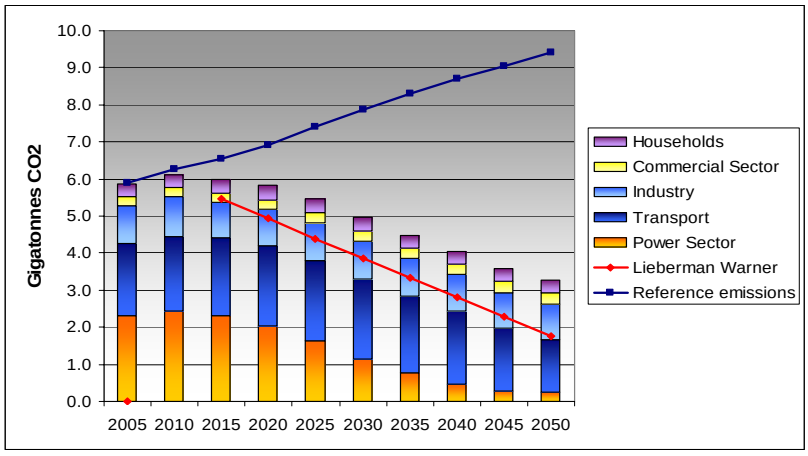
Carbon Emissions
Advanced Technology Case



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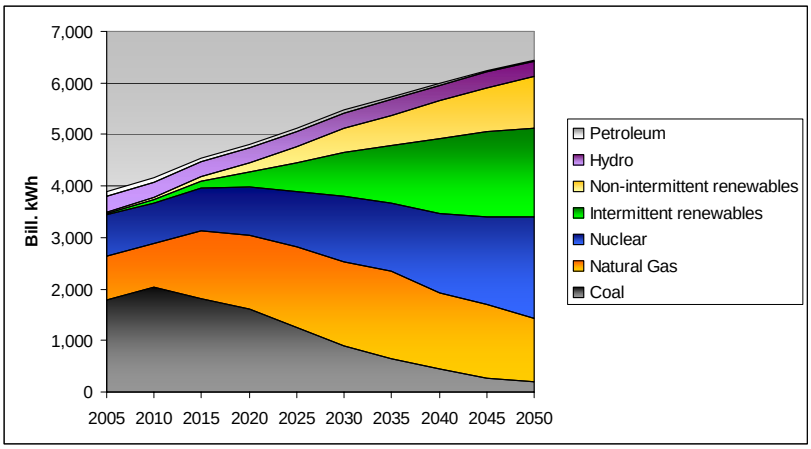
Power generation
Climate Security Act



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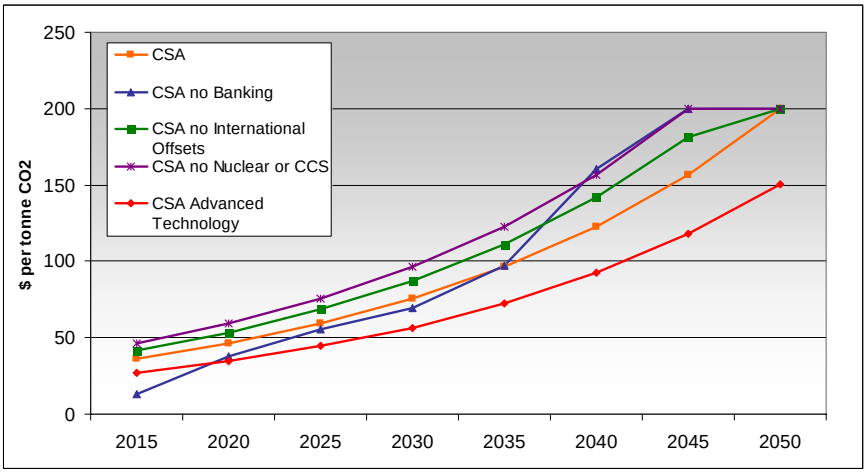
Allowance price



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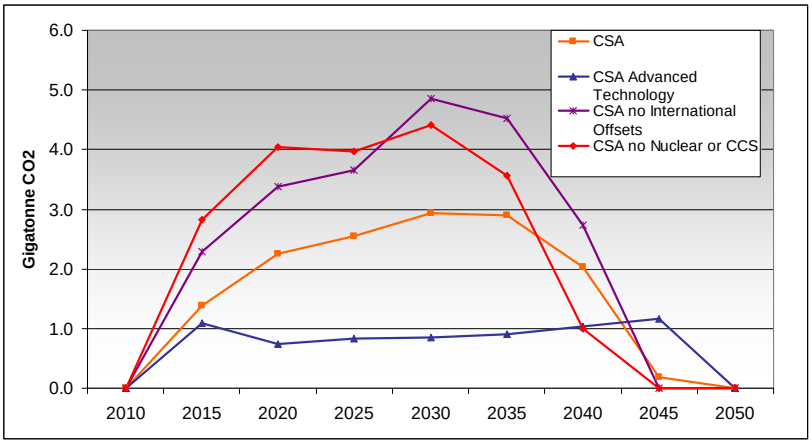
Allowance banking



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Conclusions

- The Climate Security Act leads to a clear departure from the reference case emission path and significantly lowers emission levels.
- Allowance prices increase over time as they become more scarce. This is accompanied by an increase in energy prices
- The power sector is the least costly to de-carbonize and accounts for the majority of emission reductions.
- The transport sector is the most costly to de-carbonize and emission reductions from this sector are small compared to other sectors
- Deep carbon reductions require more severe cutbacks in transport and industrial sector emission, which are difficult to achieve with the base technology set.
- The 10 region U.S. Markal model used for this analysis needs will be enhanced further to add flexibility and more advanced technology representation to model deep reduction scenarios.

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10-Region U.S. MARKAL