THE ECONOMIC, CLIMATE, FISCAL, POWER, AND DEMOGRAPHIC IMPACT OF A NATIONAL FEE-AND-DIVIDEND CARBON TAX
Study Authors

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About REMI

Regional Modeling

• Founded as an offshoot of research performed at the University of Massachusetts-Amherst in the late 1970s
• Software, data, consulting services, and issue expertise involving regional economic and demographic analysis

Clients and Research

• Public sector: 47/50 states, federal agencies, regional authorities, cities, universities, international groups
• Private sector: consultants, “Big 4” accounting firms, Fortune 500 companies, trade associations (AGA, NEA, NFIB, etc.)
• Recent projects on immigration reform and Medicaid expansion

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<www.remi.com>
Client Base

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<http://www.remi.com/clients>
Policy Design

- **Carbon tax**
  - Starts in 2016 at $10 per metric ton of CO\textsubscript{2} (and only CO\textsubscript{2})
    - Escalates at $10 per year through at least the 2030s
    - Point of extraction—the well or the mine

- **Fee-and-dividend (F&D)**
  - 100% of carbon tax revenues refunded to all American households in monthly checks or deposits
    - Refund size based on number of adults (full share) and children (under 18, half share, and a maximum of two)

- **Border adjustment**
  - Minimize carbon leakage and preserves competitiveness
    - Goods imported to the United States charged a carbon tax on the emissions during their production process overseas
      - Revenues used to compensate American exports for the higher costs

*what does REMI say?* <http://citizensclimatelobby.org/carbon-tax/>
Changing Incentives

The Sun
Capital
Light, Wind
Renewable Energy
The Earth
Fossil Fuels
Fee-and-Dividend
Households
Labor
Air Quality
Emissions
Border Adjustment
Industries

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Three Models

- **Regional Energy Deployment System (ReEDS)**
  - National Renewable Energy Laboratory (NREL)
    - Long-term capacity and generation of electrical power by technology type (coal, gas, nuclear, wind, solar, etc.)

- **Carbon Analysis Tool (CAT)**
  - Built off the Annual Energy Outlook (AEO) from EIA with adjustments based on price elasticity
    - Models carbon emissions and carbon tax revenues

- **REMI PI+**
  - Dynamic, multiregional economic and demographic model of subnational units of the United States

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Nine Regions

New England (NE)

Mid-Atlantic (MA)

South Atlantic (SA)

Mountain (MNT)

Pacific (PAC)

AK and HI are in the PAC region

West North Central (WNC)

East North Central (ENC)

East South Central (ESC)

West South Central (WSC)
The ReEDS Model

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<http://www.nrel.gov/analysis/reeds/>
Carbon Analysis Tool

- Overhaul of the CTAM model by Keibun Mori
  - Baseline comes from the AEO reference case
    - Simulations of carbon taxes make adjustments based on price elasticity
- CAT adds internal power switching (from ReEDS), NO\(_X\) and SO\(_X\), multiple regions, and integrates with REMI PI\(^+\)

Price on carbon emissions

Changes end-use energy prices

Reduces demand for energy

Change from AEO reference case

Tax revenues = price*emissions

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Model Integrations

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“Against the Baseline”

Economic or demographic indicator

Baseline | Alternative

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Results Overview

**Economic**
- Jobs and GDP
- Personal Income
- Prices
- By Region
- By Industry

**Climate**
- Carbon Emissions
- NO\textsubscript{X}, SO\textsubscript{X} Emissions
- Savings from the Baseline

**Fiscal**
- Carbon Tax Revenues
- Border Adjustment
- Size of Monthly Dividend

**Electricity**
- Generation, Capacity by Technology
- Investment in Power Technology
- By Region

**Demographic**
- Population
- Economic Migration
- Saved Premature Deaths

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National Employment

Thousands of jobs over baseline

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Gross Domestic Product

Billions of 2012 dollars

\[
\begin{array}{cccccccccccccccccc}
\text{Values} & $90 & $80 & $70 & $60 & $50 & $40 & $30 & $20 & $10 & $0 & $10 & $20 & $30 & $40 & $50 & $60 & $70 & $80 & $90 & $100 & $110 & $120 \\
\end{array}
\]
Employment (%)
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Baseline v. Alternative

GDP (USA)

GRP (WSC)

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GDP by Industry

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National level results

Billions of 2012 dollars (annual average, 2016-2035)
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GDP by MFG Industry

Motor vehicles, bodies and trailers, and parts
Food
Beverage and tobacco
Printing and related support activities
Fabricated metal
Furniture and related
Nonmetallic mineral
Wood
Machinery
Apparel; Leather and allied
Paper
Textile mills; Textile mills
Miscellaneous
Other transportation equipment
Plastics and rubber
Electrical equipment and appliance
Primary metal
Computer and electronic
Chemical
Petroleum and coals

Billions of 2012 dollars (annual average, 2016-2035)

National level results
Jobs by Industry

Thousands of jobs (annual average, 2016-2035)

-200 -100 0 100 200 300 400 500 600

Health Care and Social Assistance
Retail Trade
Other Services, except Public Administration
Accommodation and Food Services
Administrative and Waste Management Services
Construction
Finance and Insurance
Real Estate and Rental and Leasing
Educational Services
Arts, Entertainment, and Recreation
State and Local Government
Wholesale Trade
Professional, Scientific, and Technical Services
Information
Manufacturing
Transportation and Warehousing
Forestry, Fishing, and Related Activities
Management of Companies and Enterprises
Utilities
Mining

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National level results
**CO₂ Emissions**

*National level results*

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*sm*
Carbon Tax Revenues

Billions of 2012 dollars


Carbon Tax Revenues

Border Adjustment Revenues

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National level results
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Monthly Dividend

Monthly dividend for a family of four (two adults and two dependent children) in 2012 dollars

National level results
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Real Income Per Capita

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National level results
Power Generation

Baseline

Alternative

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National level results
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Air quality benefit / $6.2 million = 1 saved premature death
Regional Population

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## Results Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Economic</td>
<td>• 2.0 to 3.0 million more jobs than in the baseline</td>
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<td>• $70 to $90 billion in additional annual GDP</td>
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<td>Climate</td>
<td>• Significant reduction in carbon dioxide emissions</td>
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<td>• -33% from baseline by 2025, -52% by 2035</td>
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<td>Fiscal</td>
<td>• Up to $600 billion in revenues by the 2030s</td>
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<td>• Familial rebate of $200 per month by 2025</td>
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<td>Electricity</td>
<td>• Retirement of coal fleet by the mid-2020s</td>
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<td>• Replaced by wind, nuclear, solar, and geothermal</td>
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<tr>
<td>Demographic</td>
<td>• 11,000 to 13,000 annual saved premature deaths</td>
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<td>• Larger population, mostly in the Midwest</td>
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</tbody>
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Main Takeaways

- A strong economy and environmental quality are not mutually exclusive propositions from each other
  - In fact, when understood as tax reform, environmental policies can have positive effects on the economy
    - Removes the “infernal tradeoff” between two priorities
    - Makes actions by foreign nations less relevant—if it is good for our economy on its own, who cares about others?
- These results do not depend on a motive for why we might want to reduce carbon dioxide emissions
  - Climate policy regarded as “mundane” budget reform
    - Reducing the level of emissions is a secondary effect
- This policy makes no other changes to taxes or to spending
  - No “tax-and-spend,” no change for the general tax code, no changes to Social Security, Medicare, Medicaid, etc.
Thank you.

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