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

what does REMI say? sm

Regional Economic Models, Inc.

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About REMI

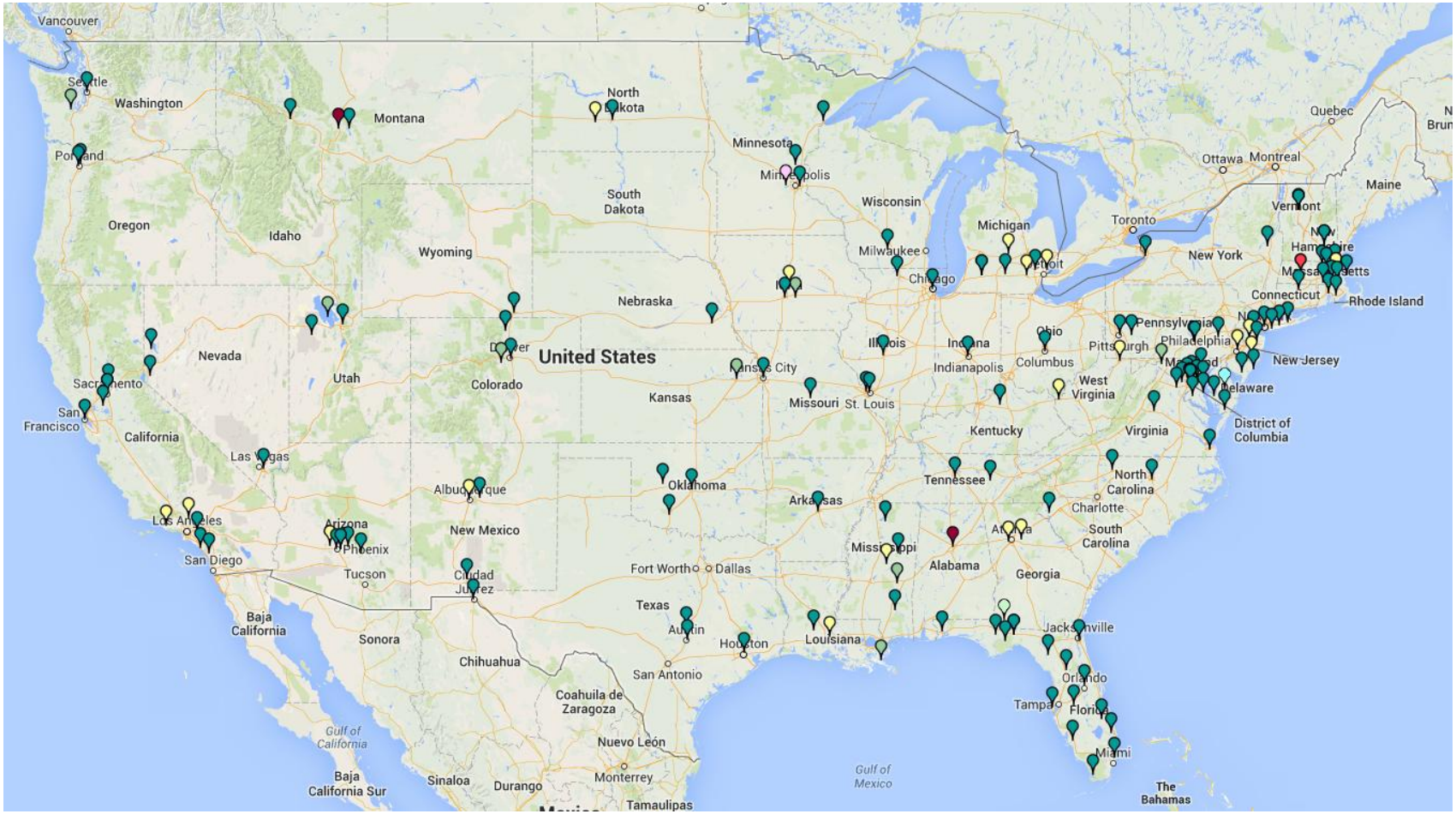
Regional Modeling

- 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

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_2 (and only CO_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

<http://citizensclimatelobby.org/carbon-tax/>

Changing Incentives


The Sun


Capital

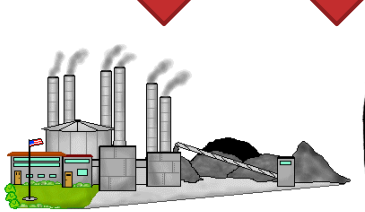

The Earth


Fossil Fuels


Fee-and-Dividend

Light, Wind


Renewable Energy


Fossil Energy


Households


Labor


Air Quality


Emissions


Border Adjustment

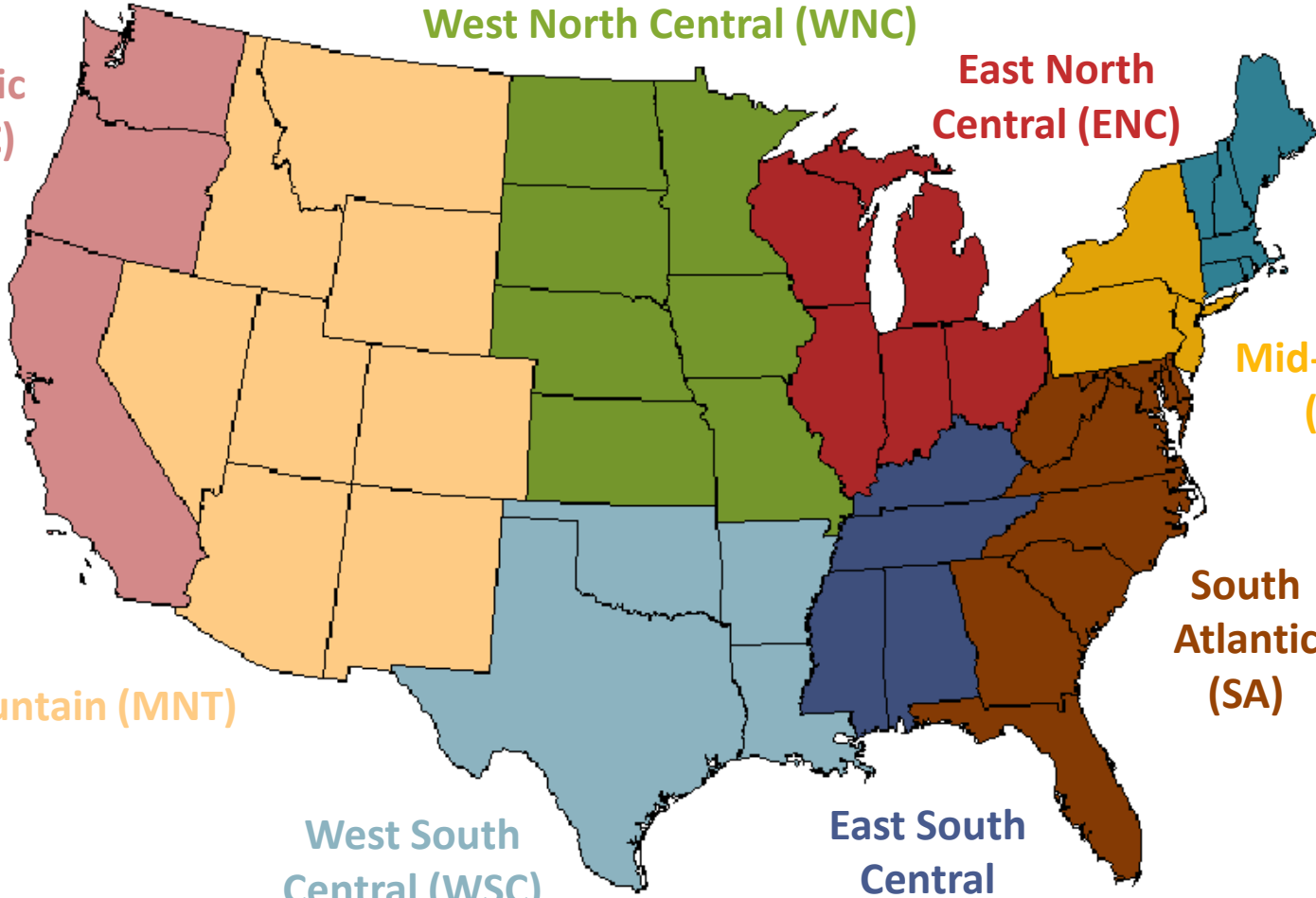

Industries

what does REMI say? [sm]

Three Models

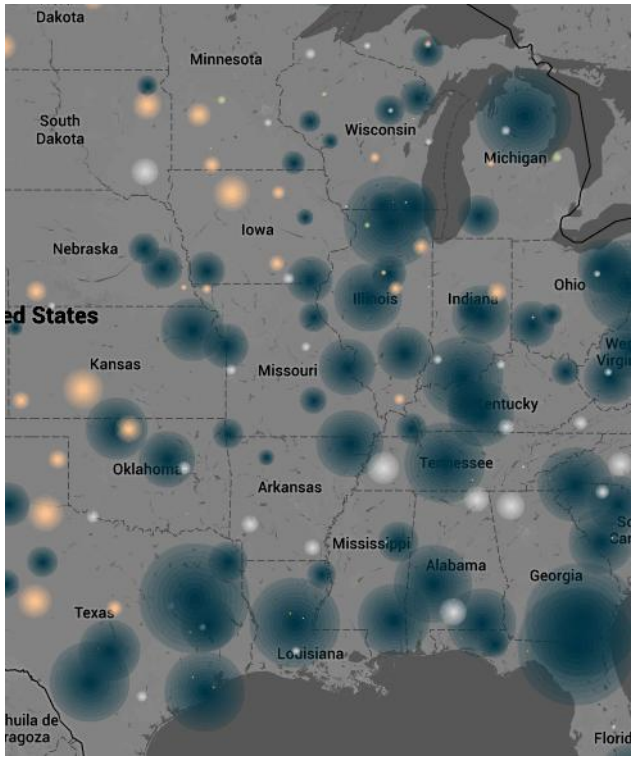
- **Regional Energy Deployment System (ReEDS)**
  - National Renewable Energy Laboratory (NREL)
    - Long-term capacity and generation of electrical power by technology type (coal, gas, nuclear, wind, solar, etc.)
- **Carbon Analysis Tool (CAT)**
  - Built off the Annual Energy Outlook (AEO) from EIA 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

Nine Regions

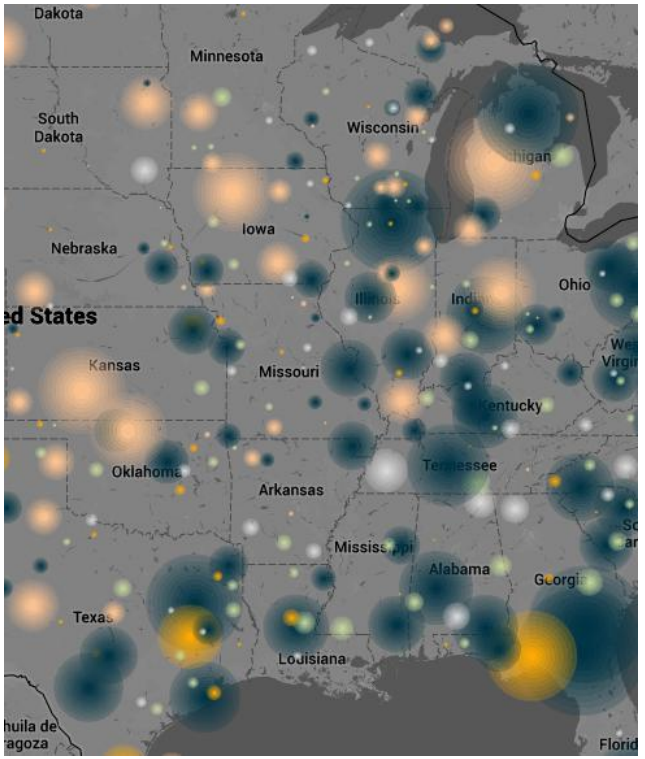


The ReEDS Model

2014



2034



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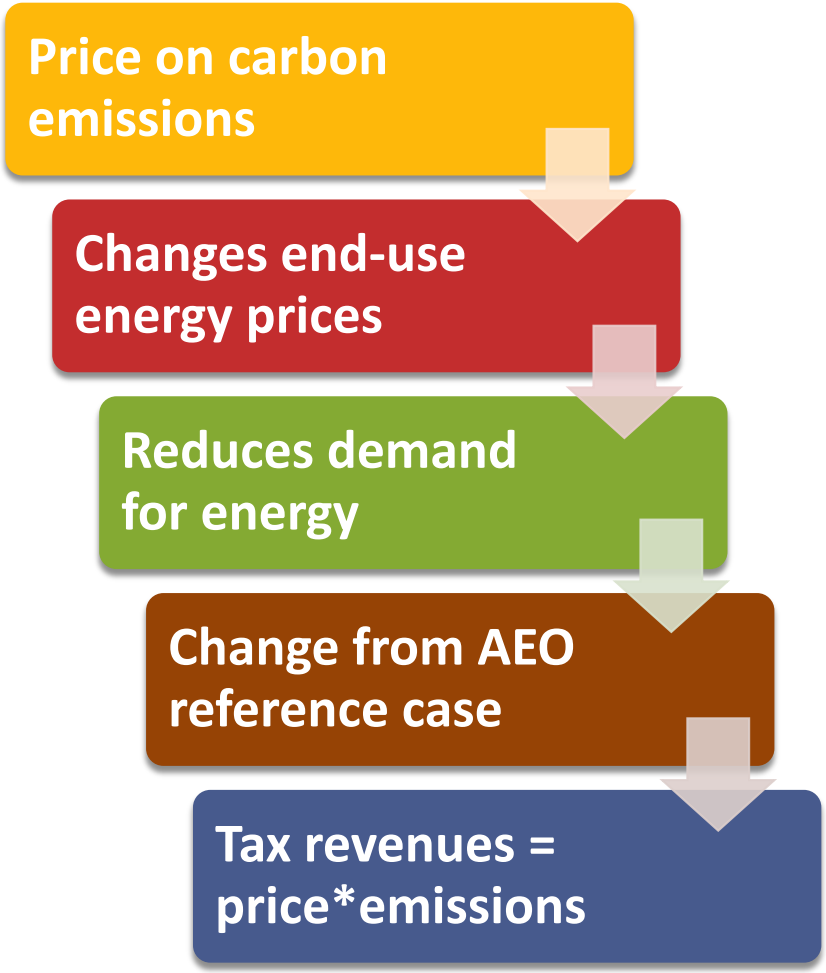
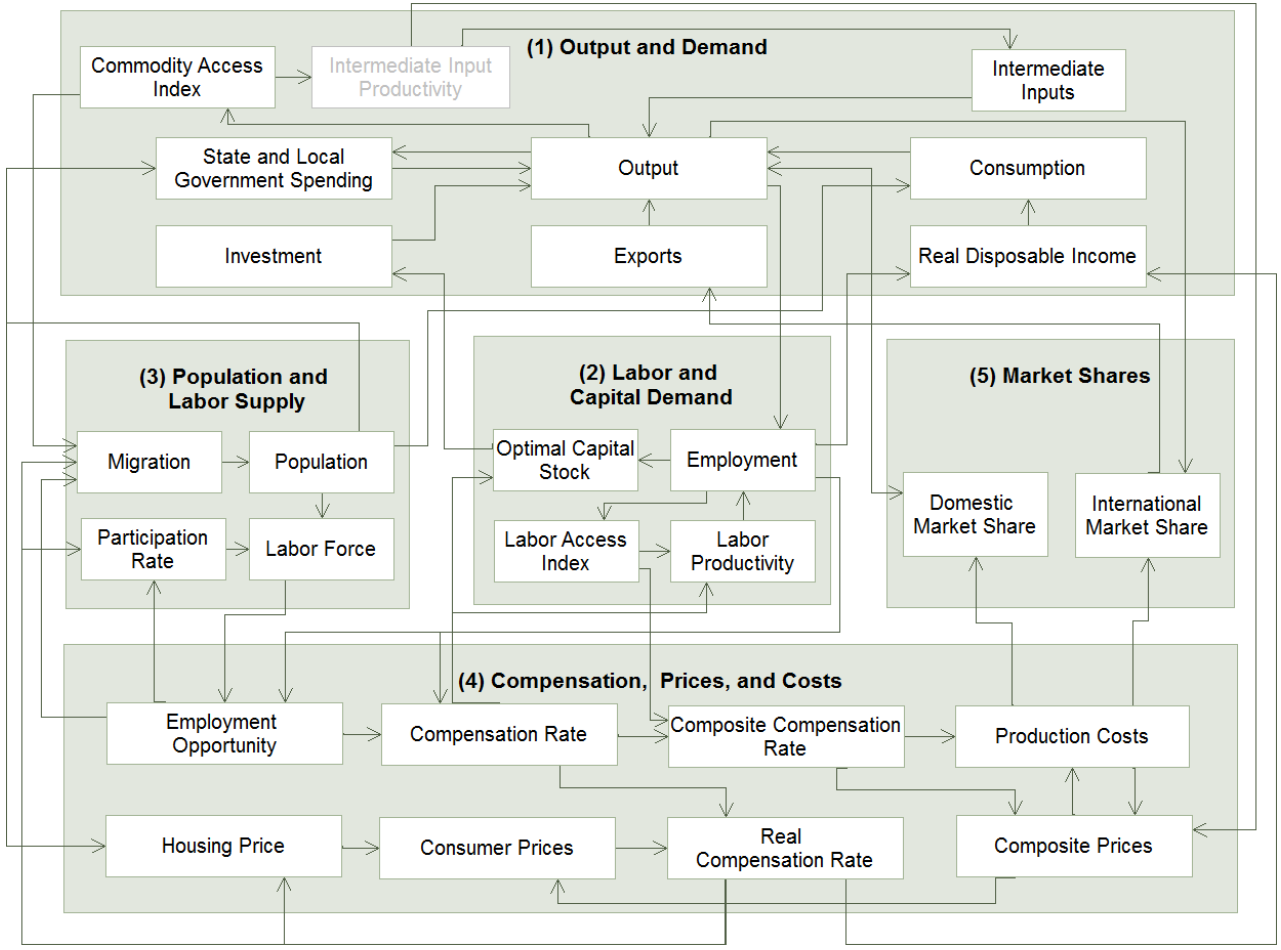
<http://www.nrel.gov/analysis/reeds/>

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+



REMI PI+



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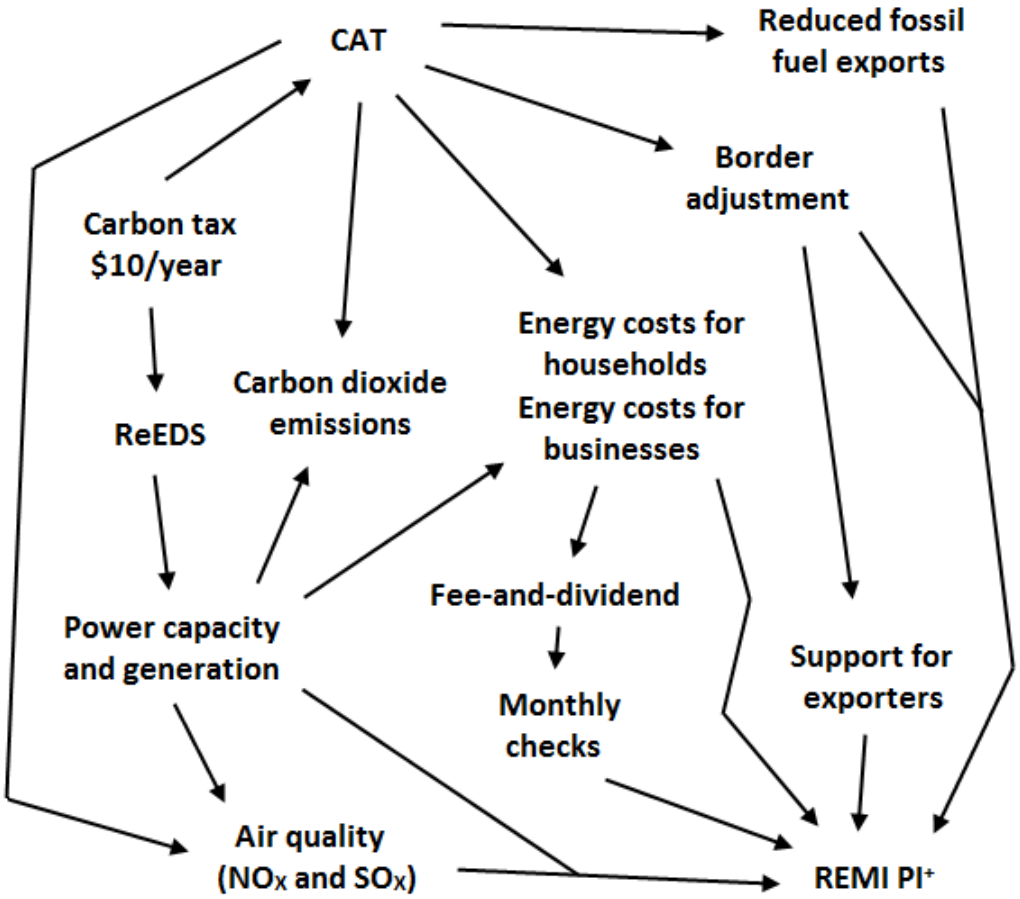
Model Integrations



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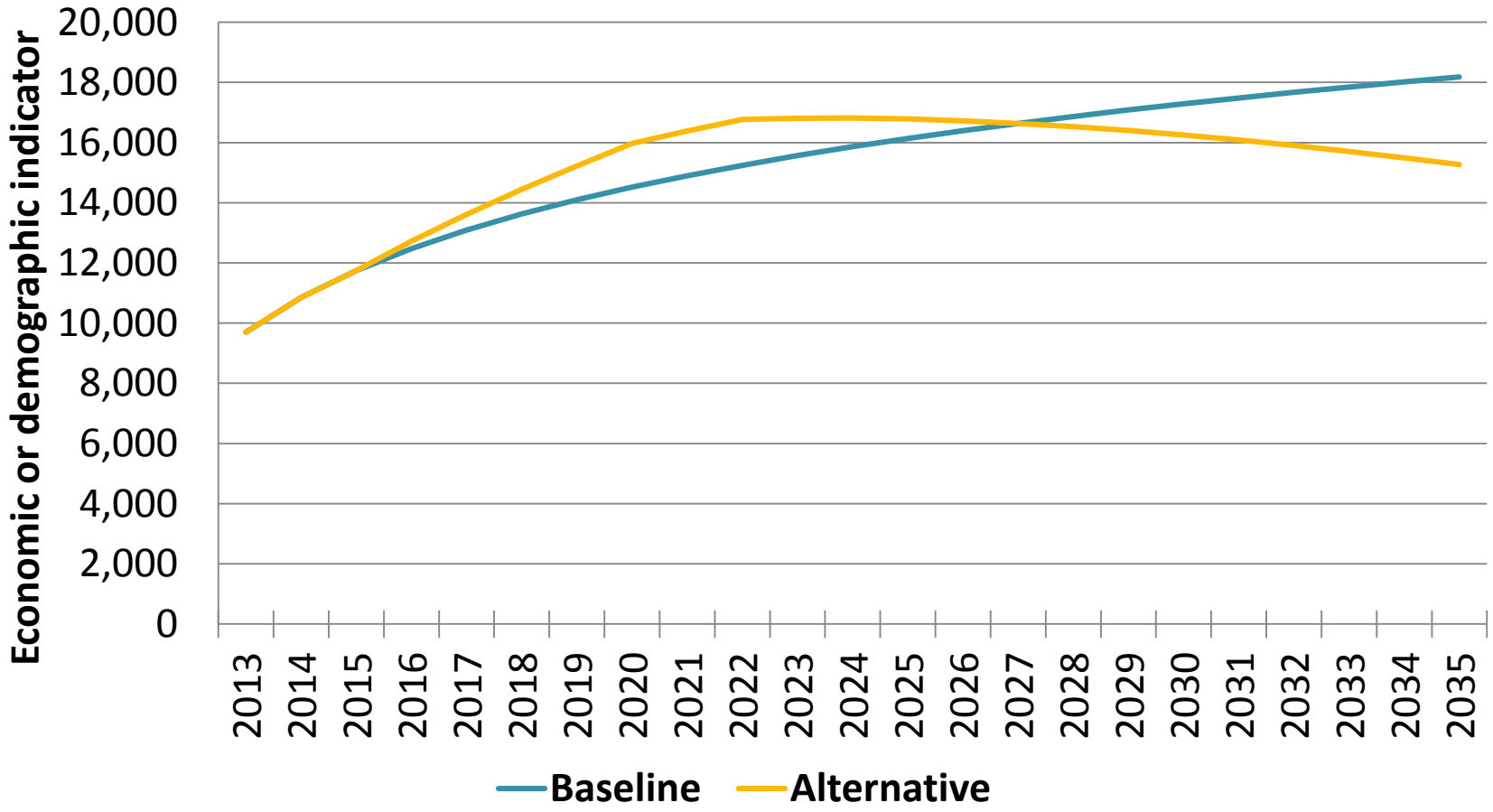
"Against the Baseline"



Results Overview





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

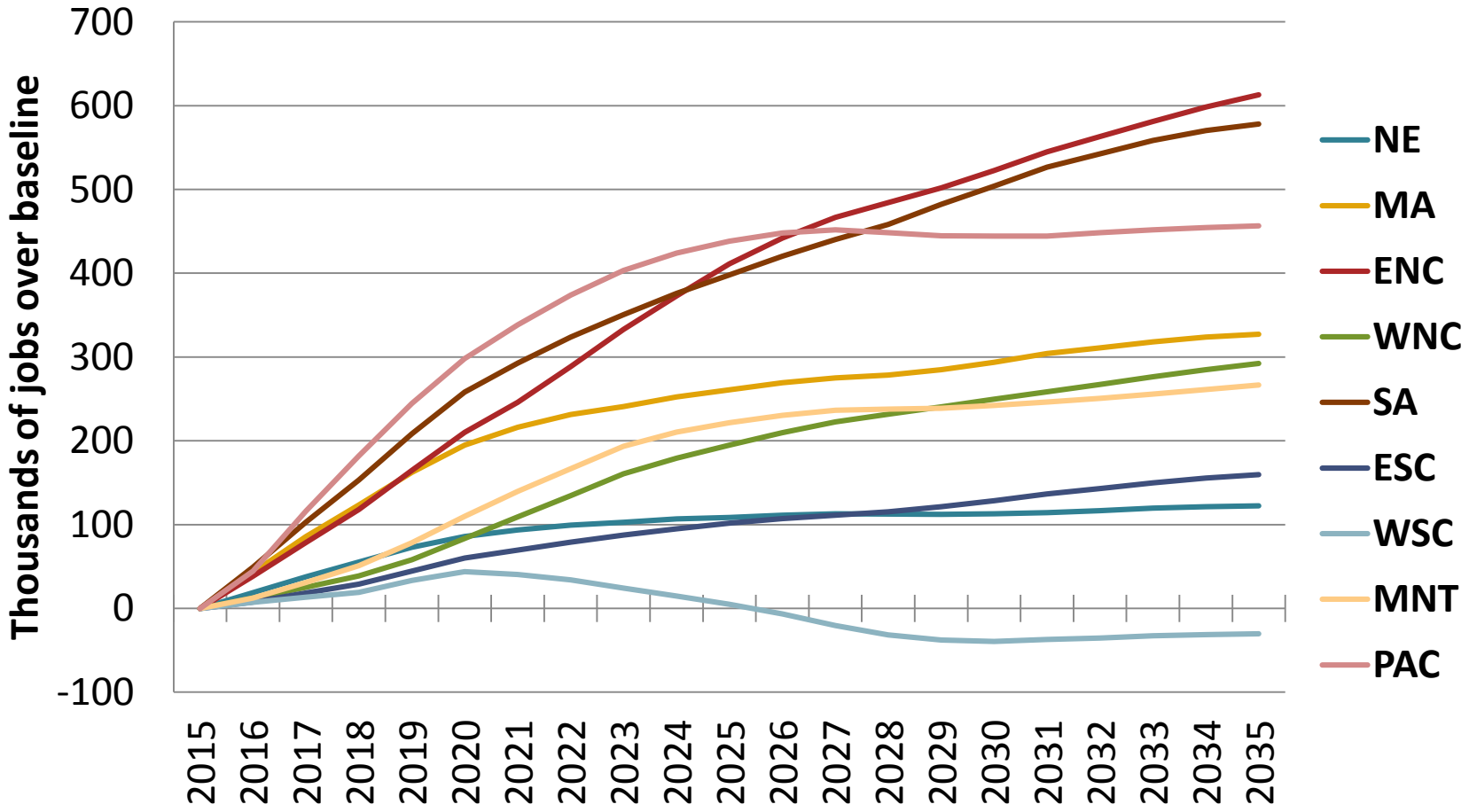
Climate
- Carbon Emissions
- NO_X, SO_X Emissions
- Savings from the Baseline

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

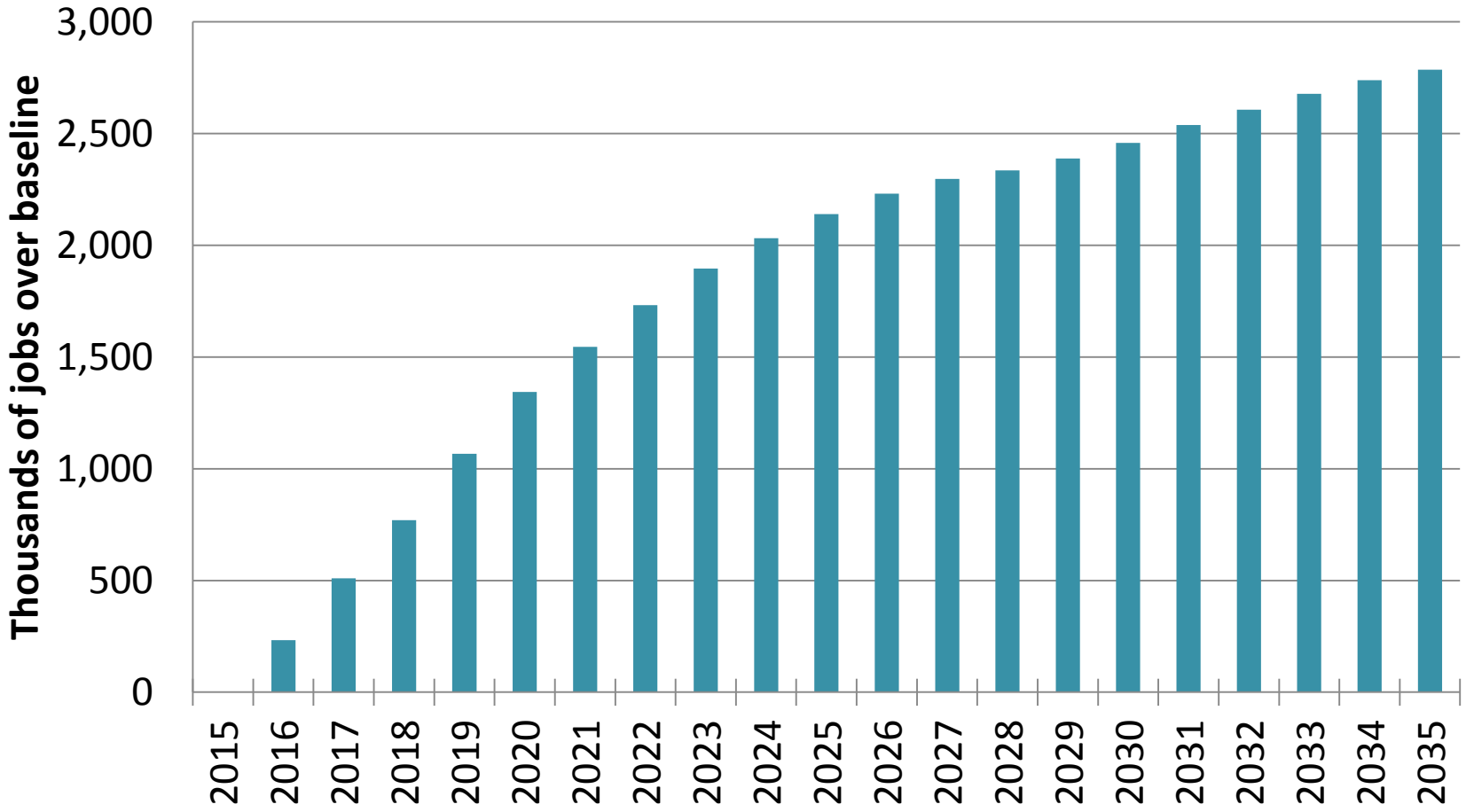
Electricity
- Generation, Capacity by Technology
- Investment in Power Technology
- By Region

Demo-graphic
- Population
- Economic Migration
- Saved Premature Deaths

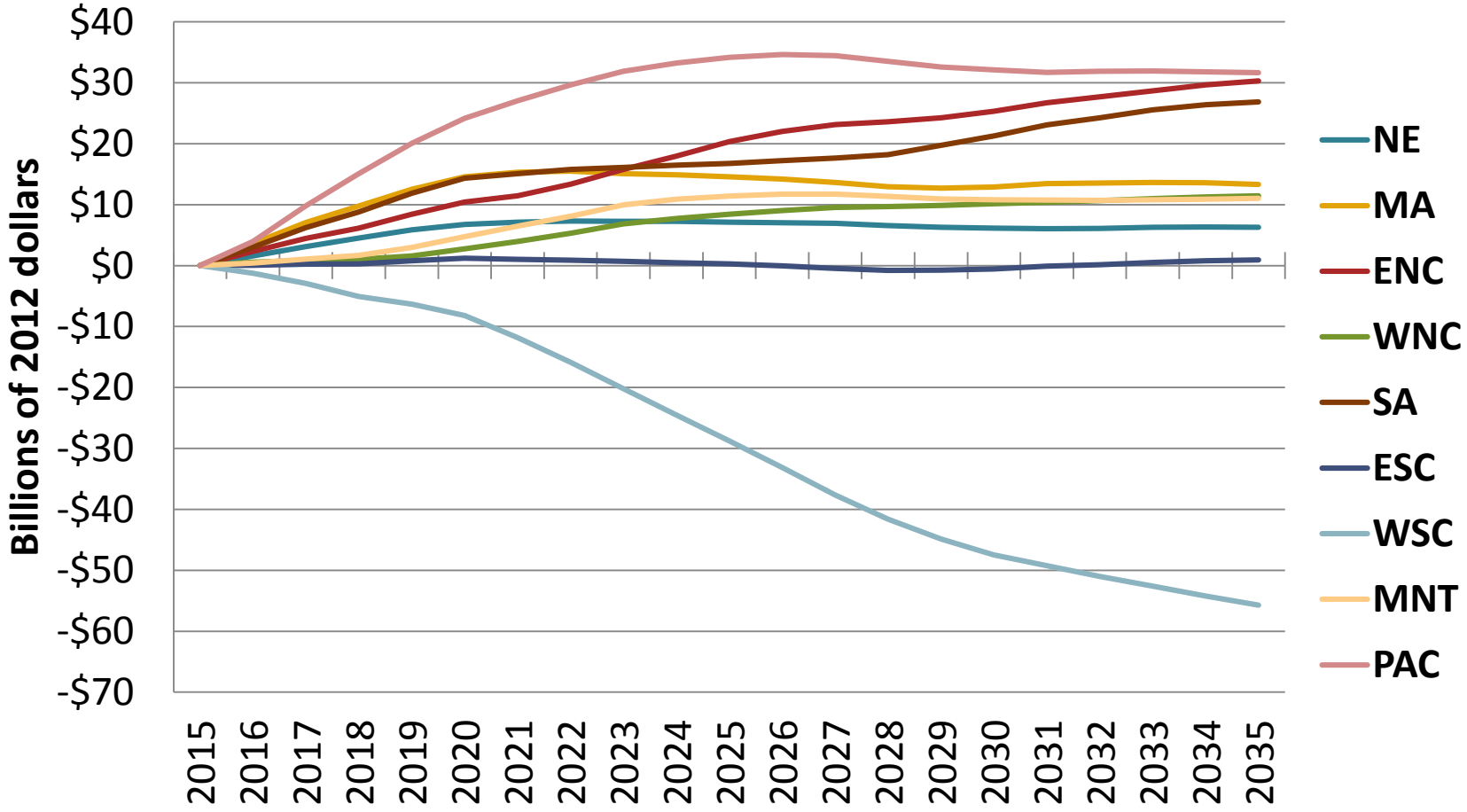
Regional Employment



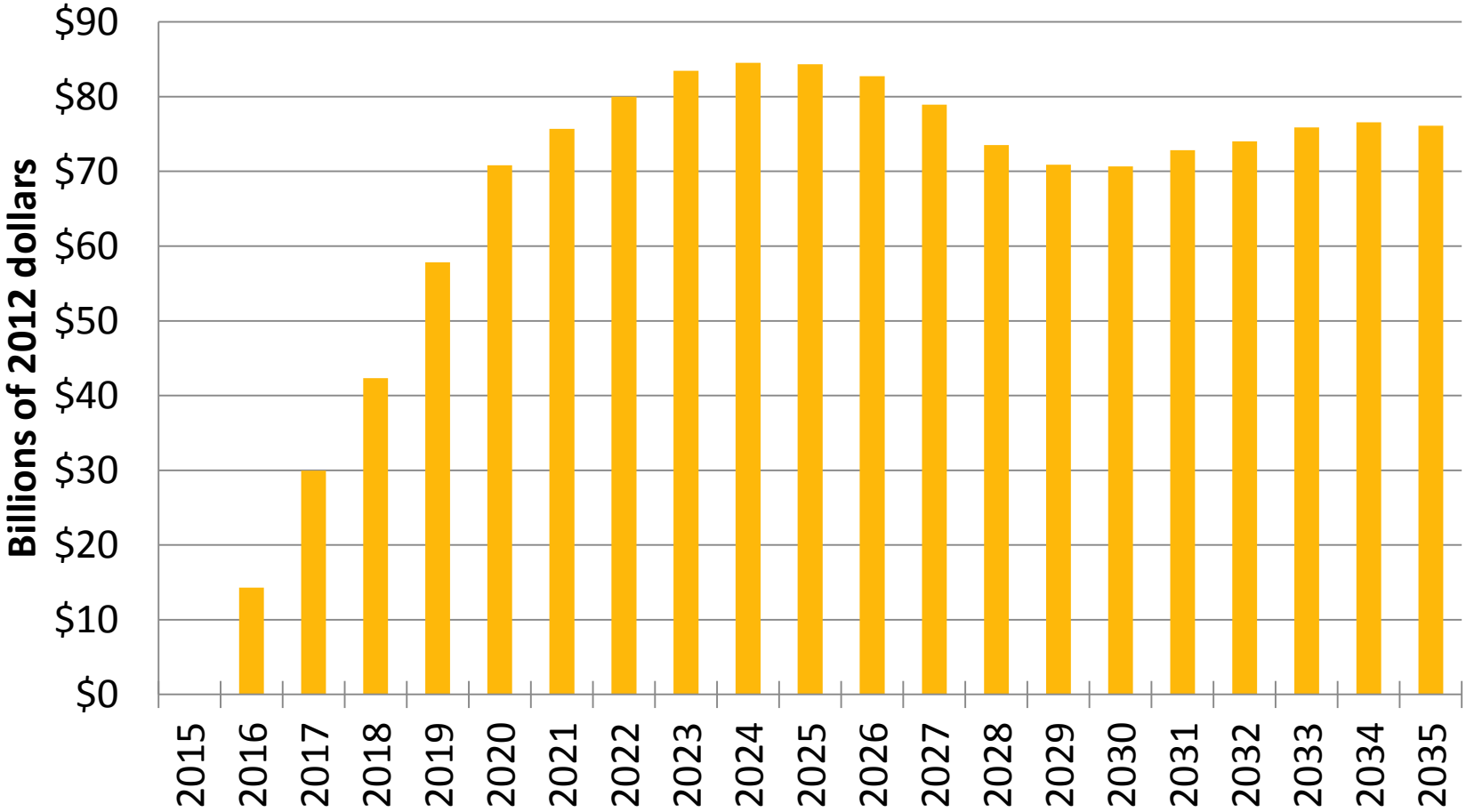
National Employment



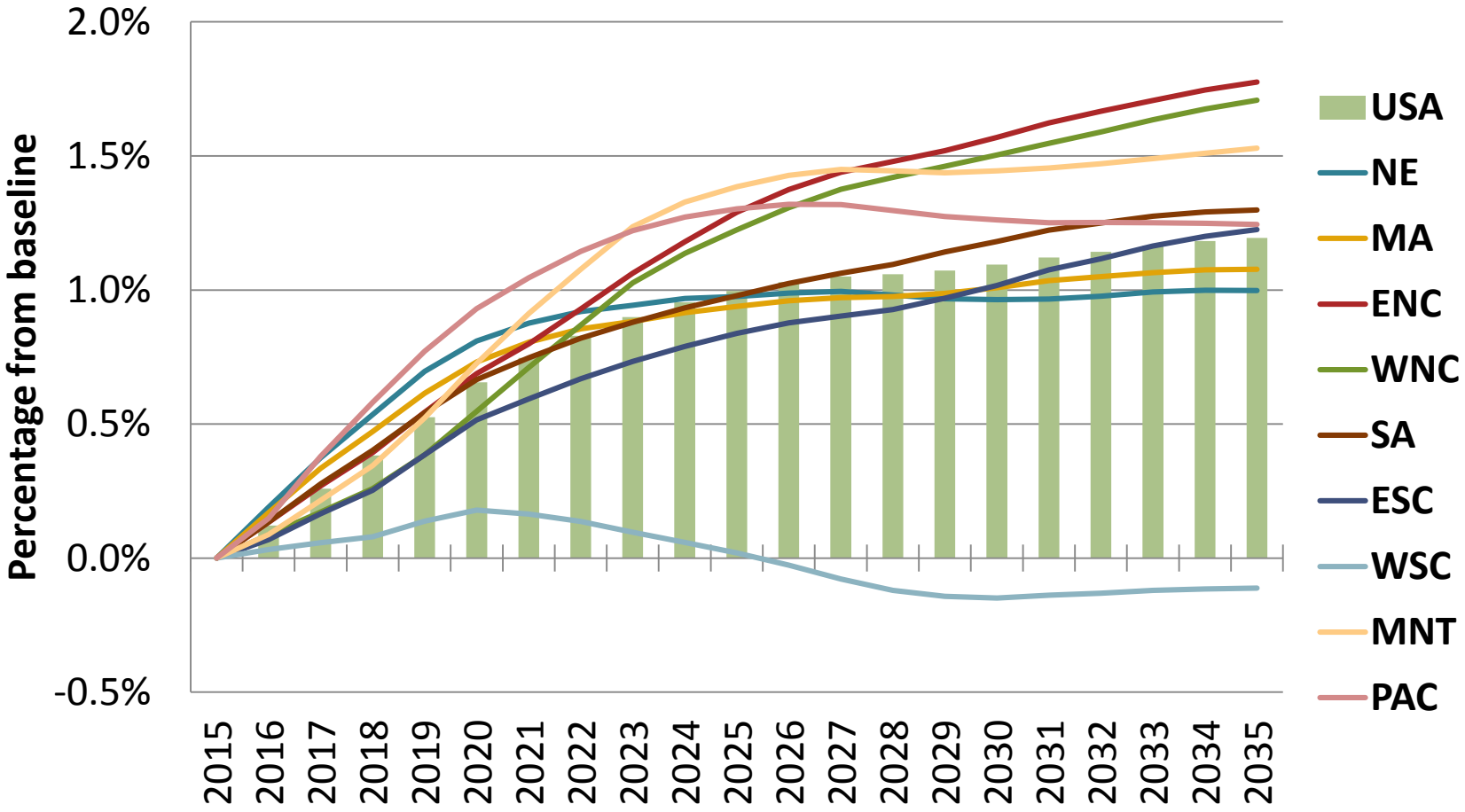
Gross Regional Product



Gross Domestic Product



Employment (%)


2.0%
1.5%
1.0%
0.5%
0.0%
-0.5%
Percentage from baseline
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
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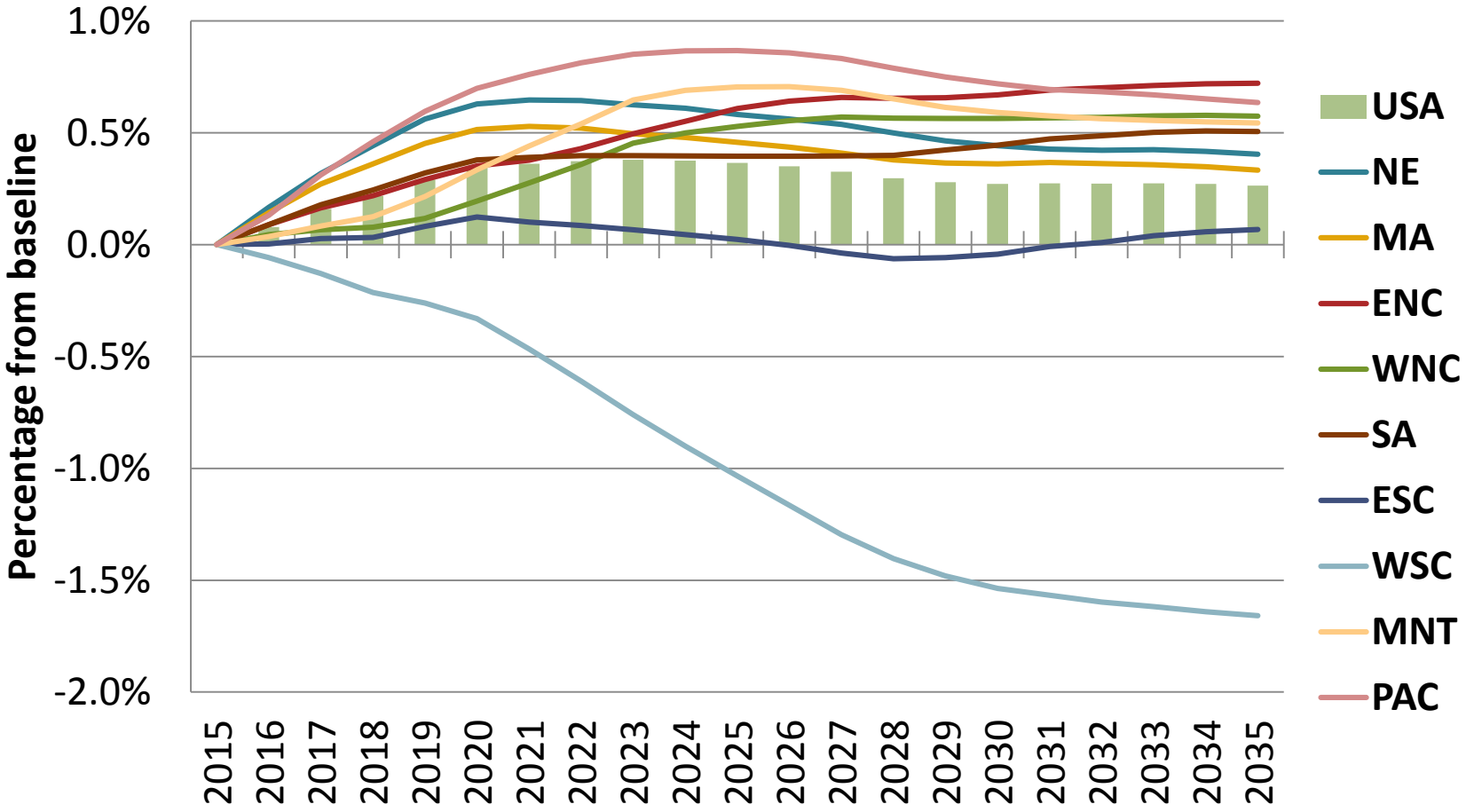
USA
NE
MA
ENC
WNC
SA
ESC
WSC
MNT
PAC

GRP and GDP (%)


1.0%
0.5%
0.0%
-0.5%
-1.0%
-1.5%
-2.0%
Percentage from baseline
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
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2034
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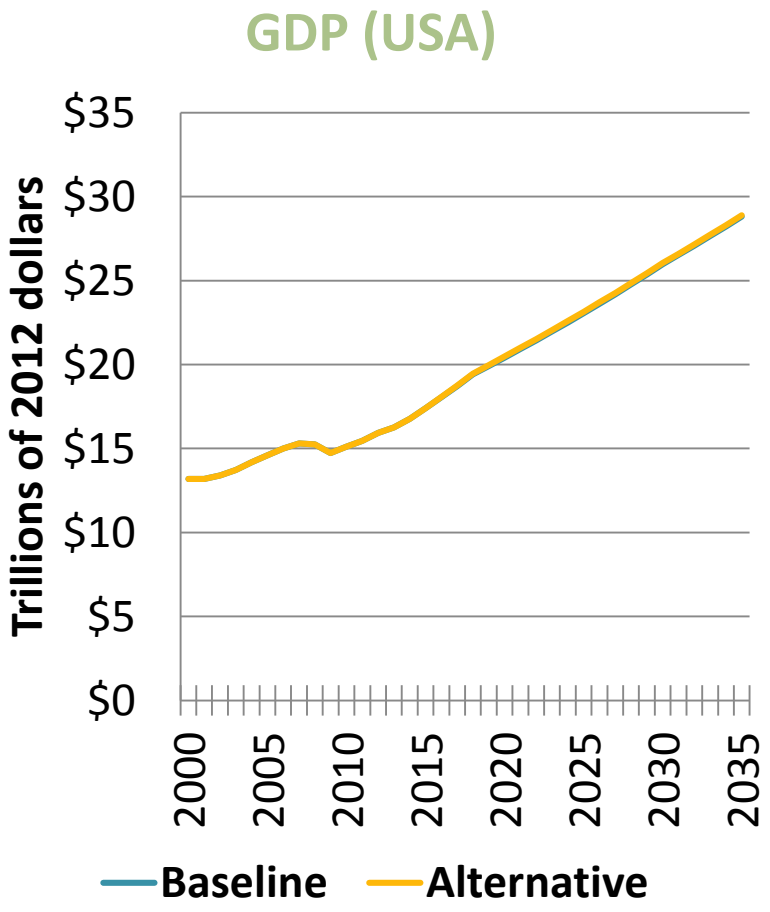
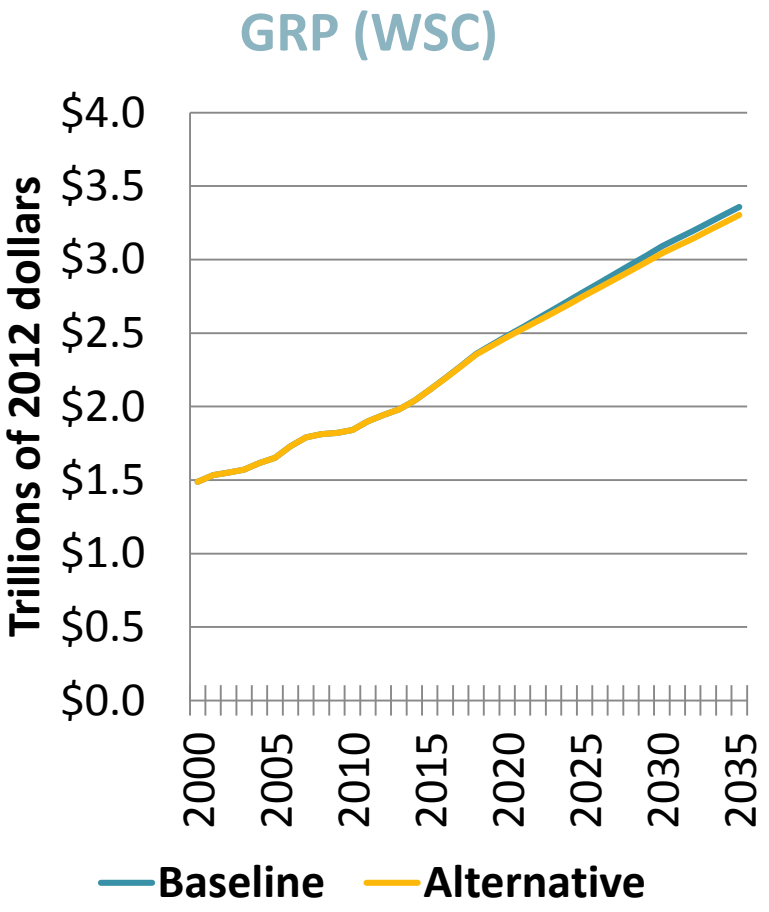
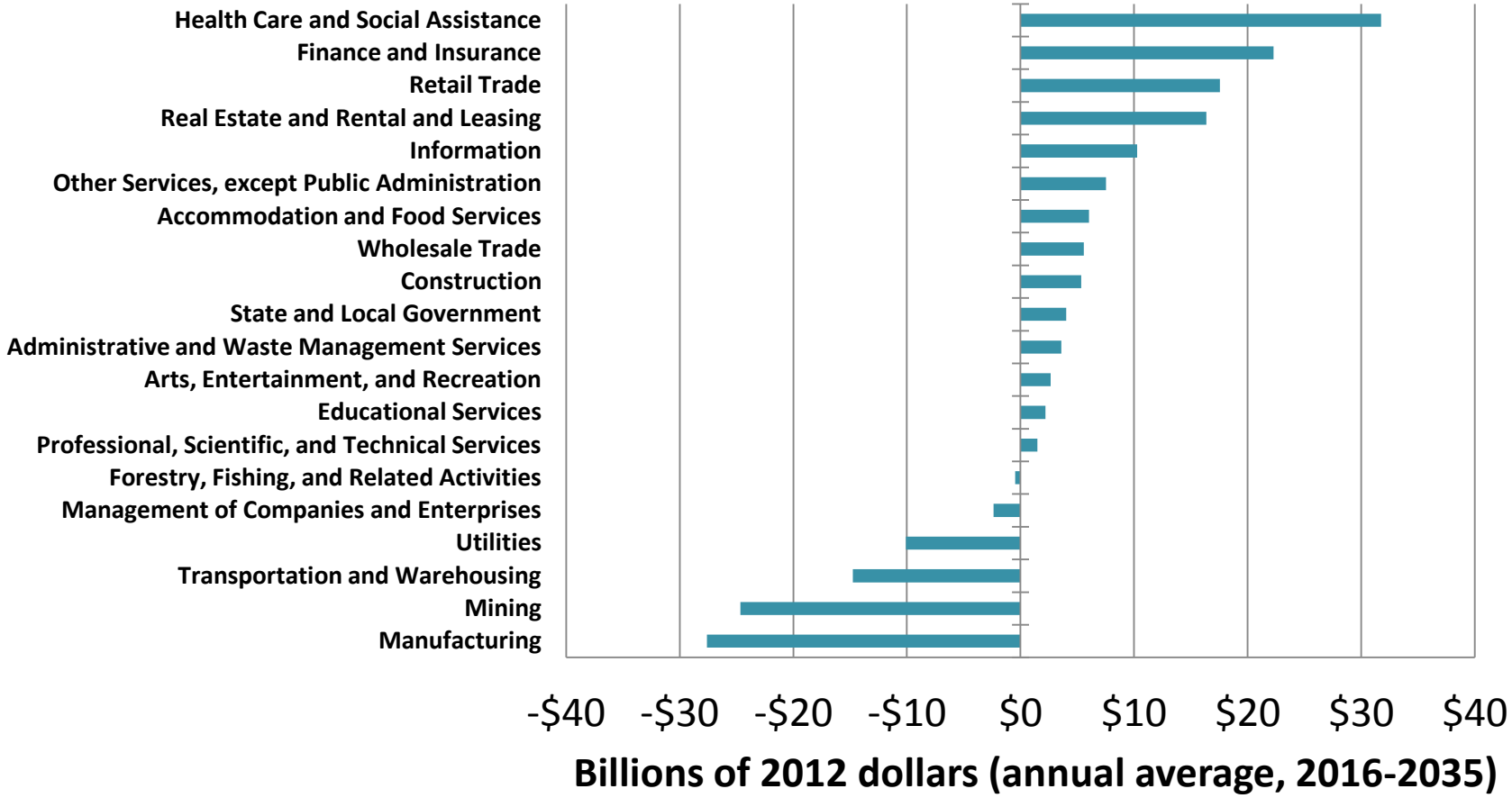
USA
NE
MA
ENC
WNC
SA
ESC
WSC
MNT
PAC

Baseline v. Alternative

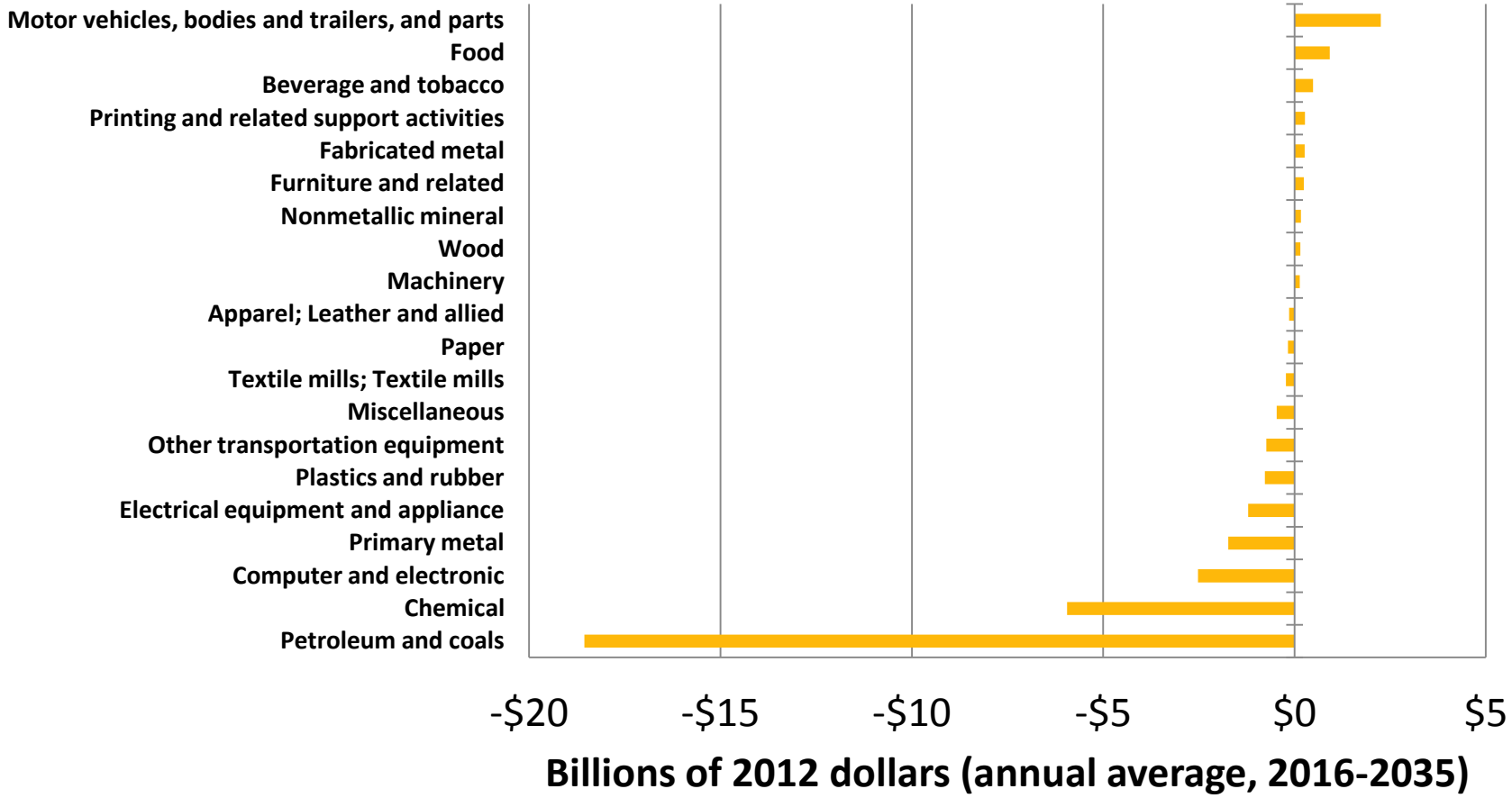




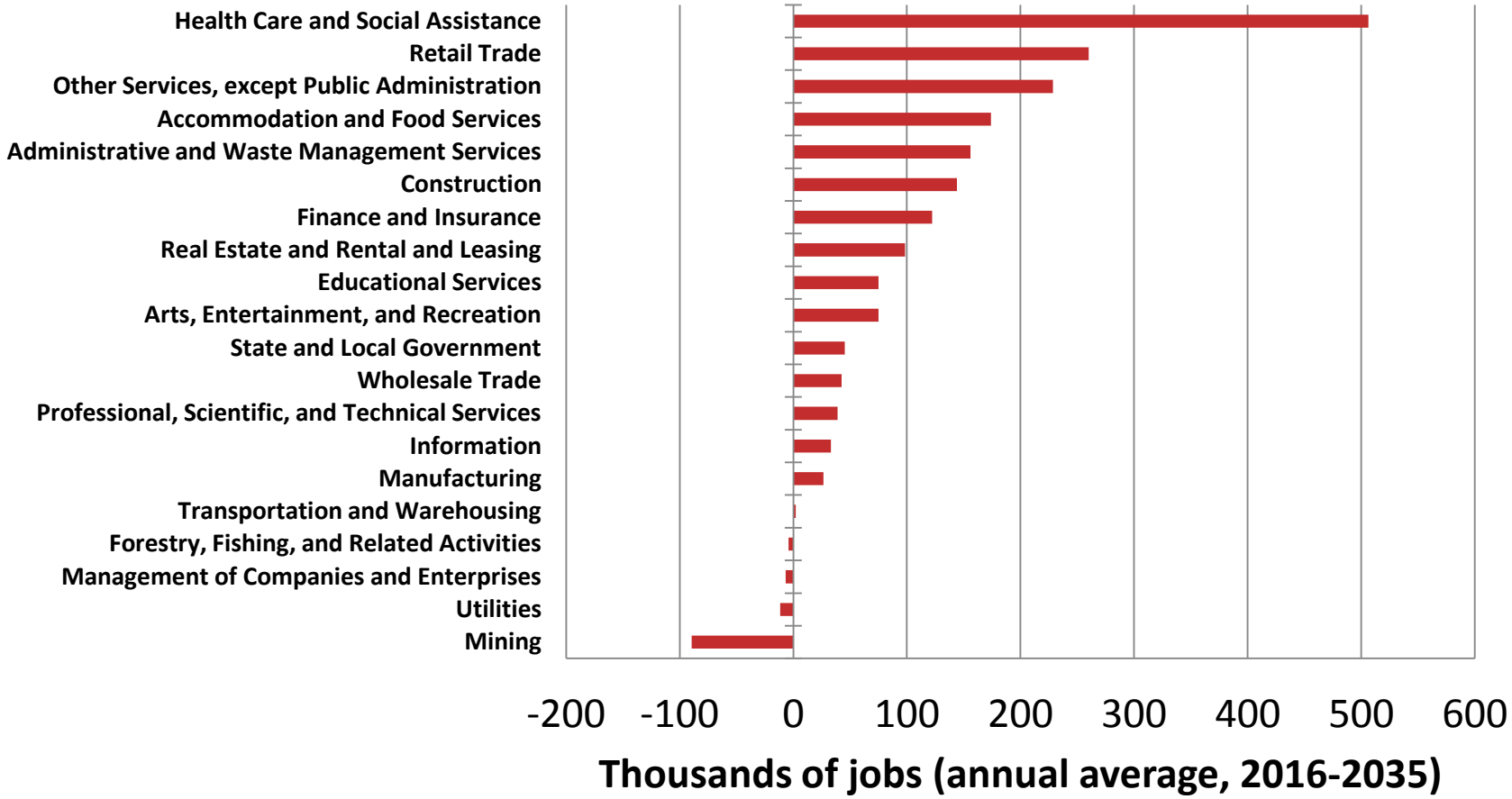
GDP by Industry



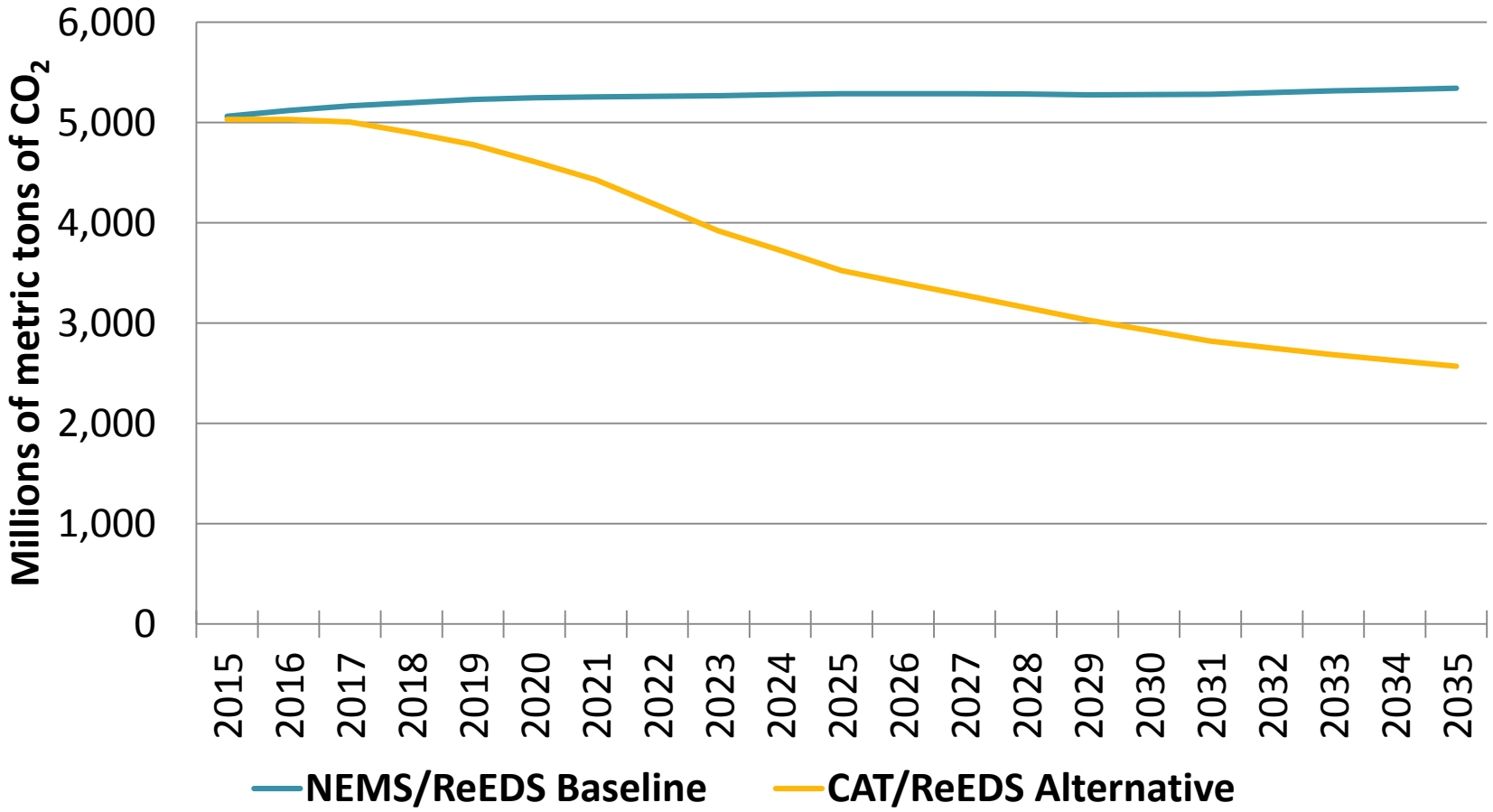
GDP by MFG Industry



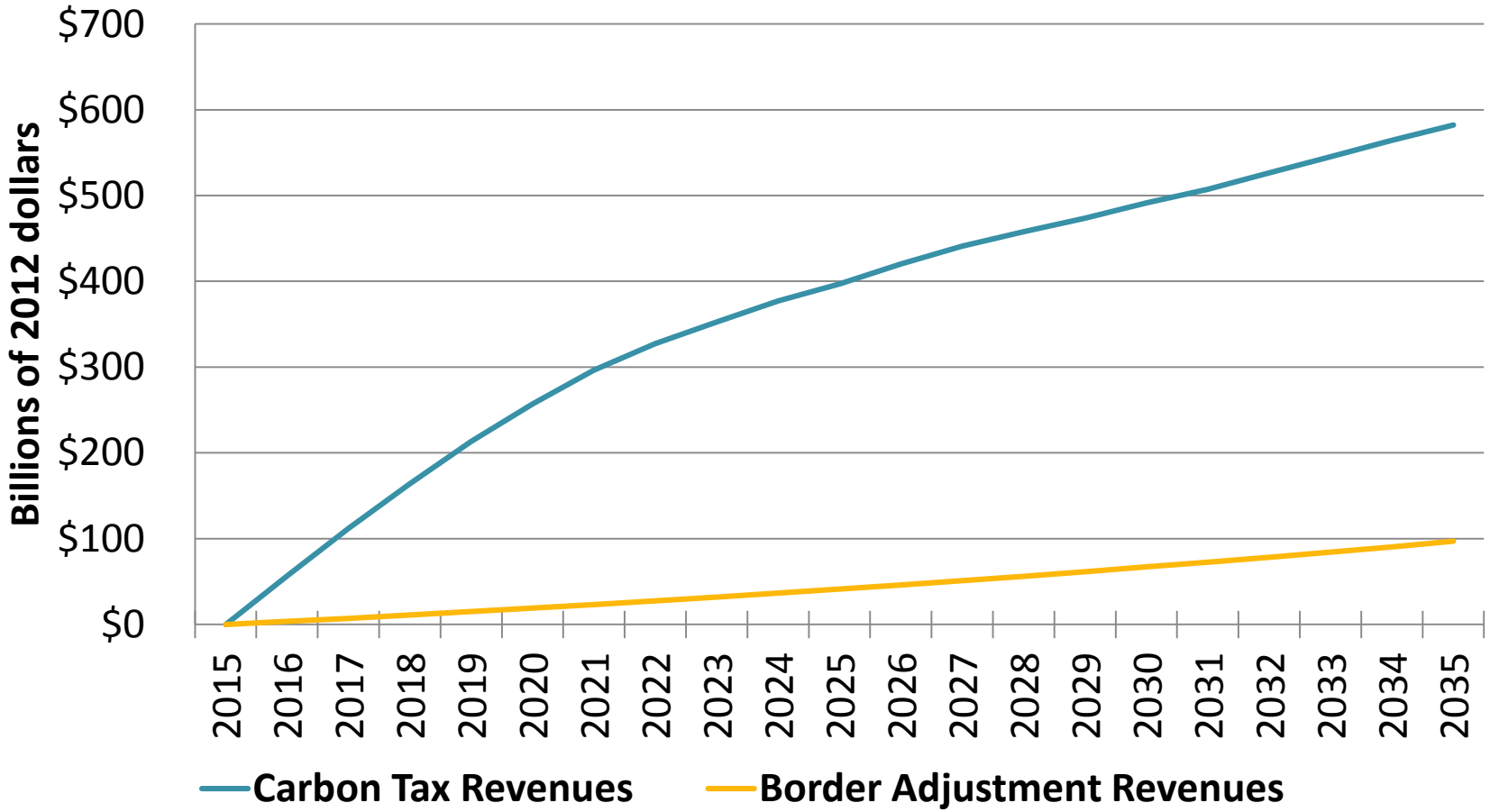
Jobs by Industry



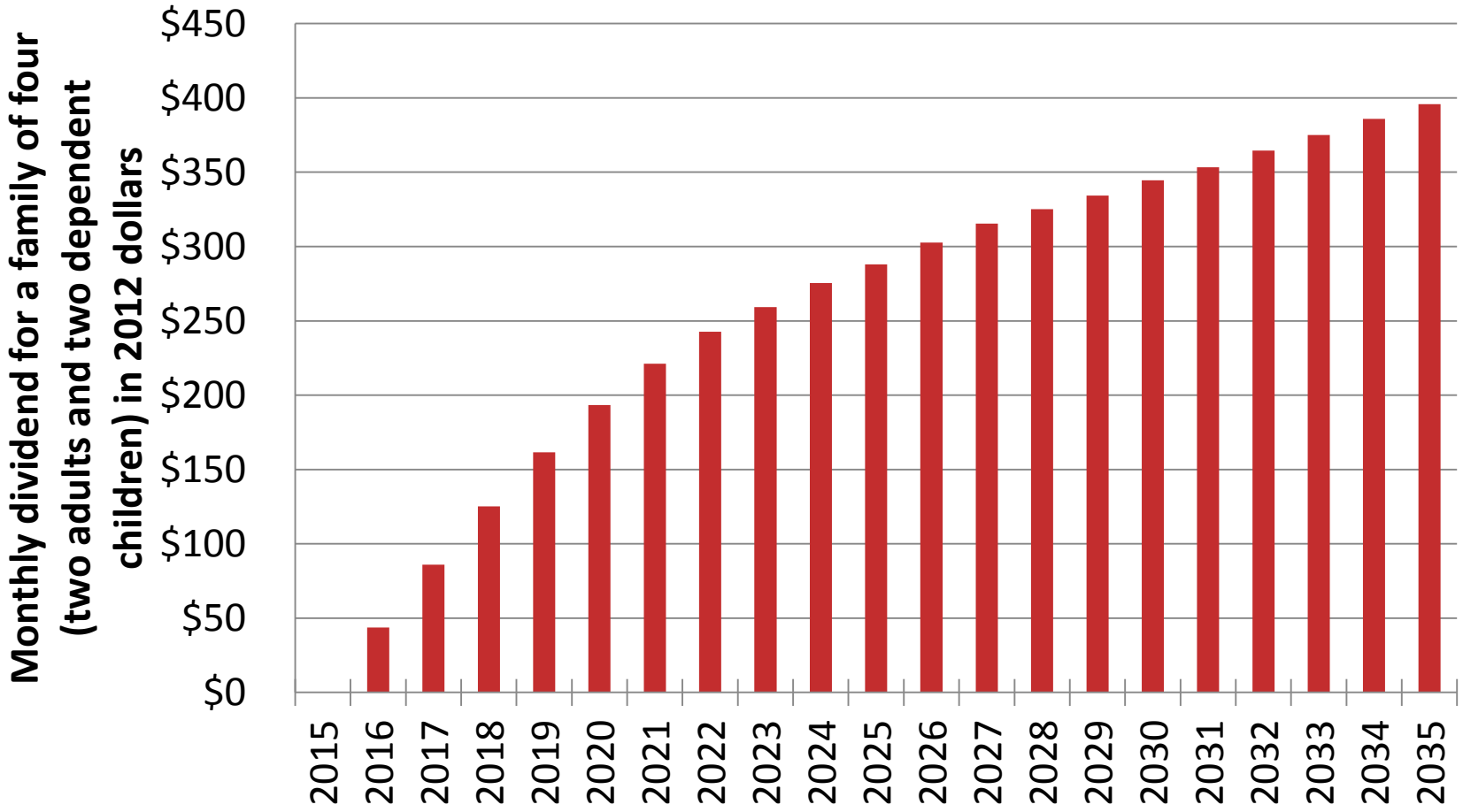
CO_2 Emissions



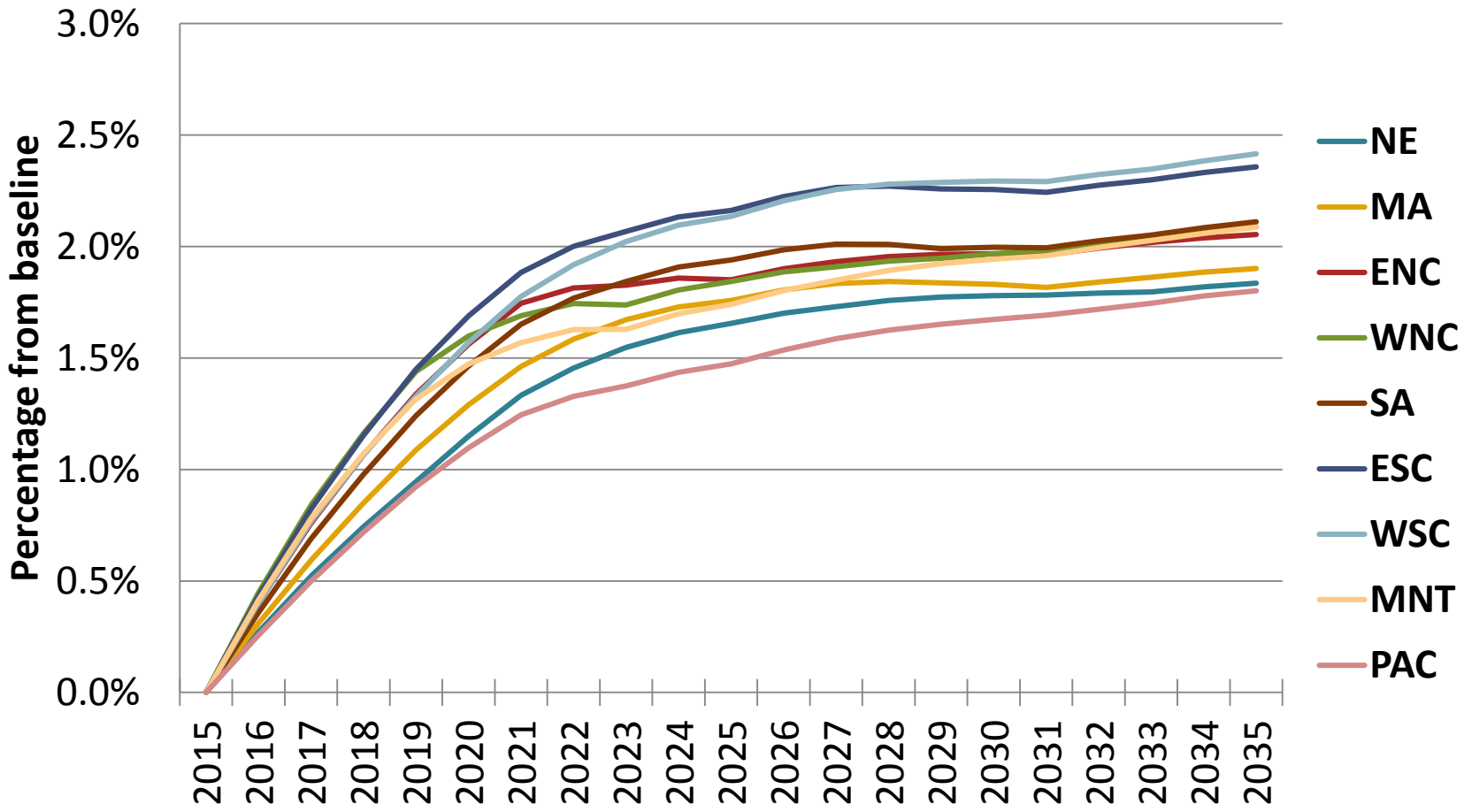
Carbon Tax Revenues



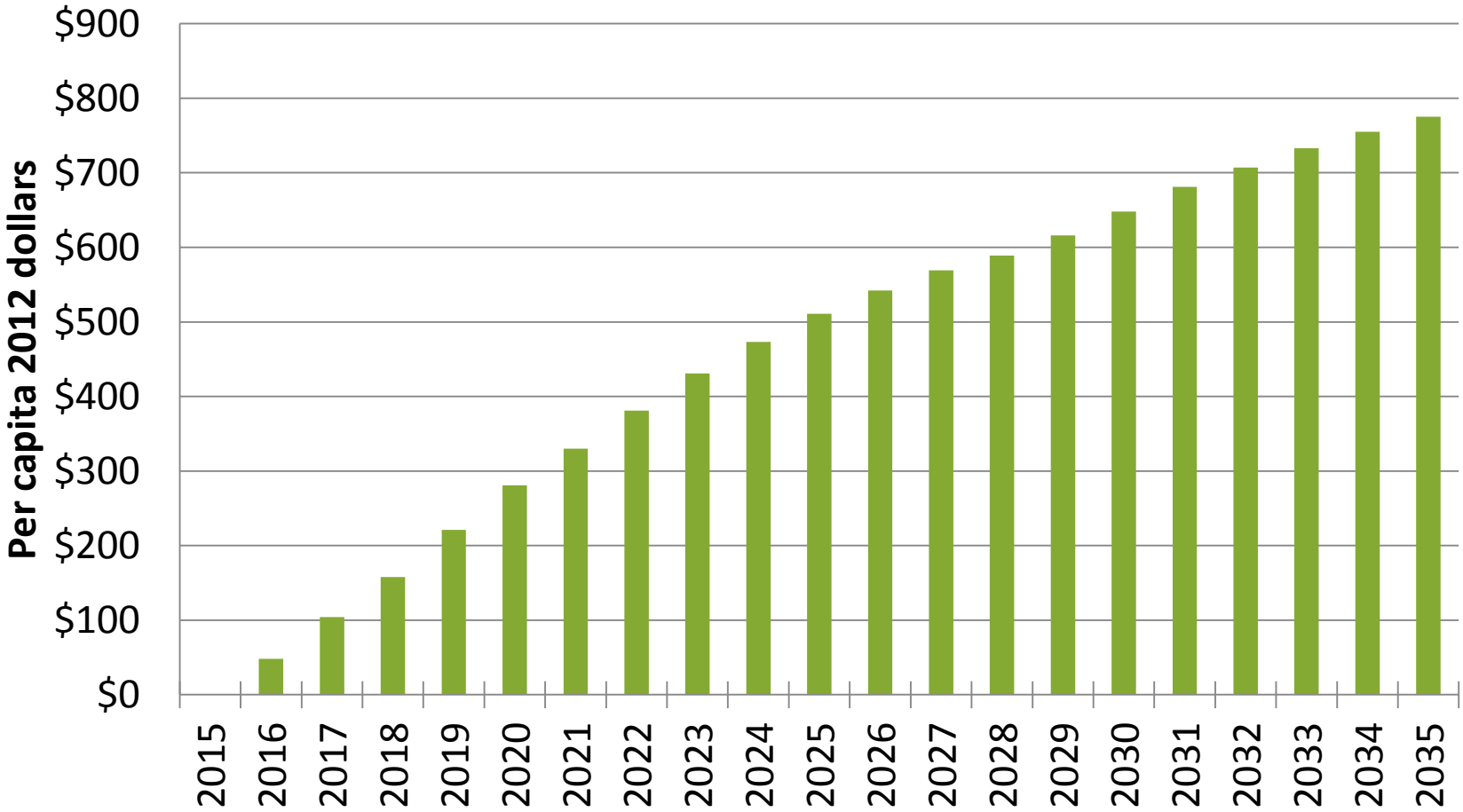
Monthly Dividend



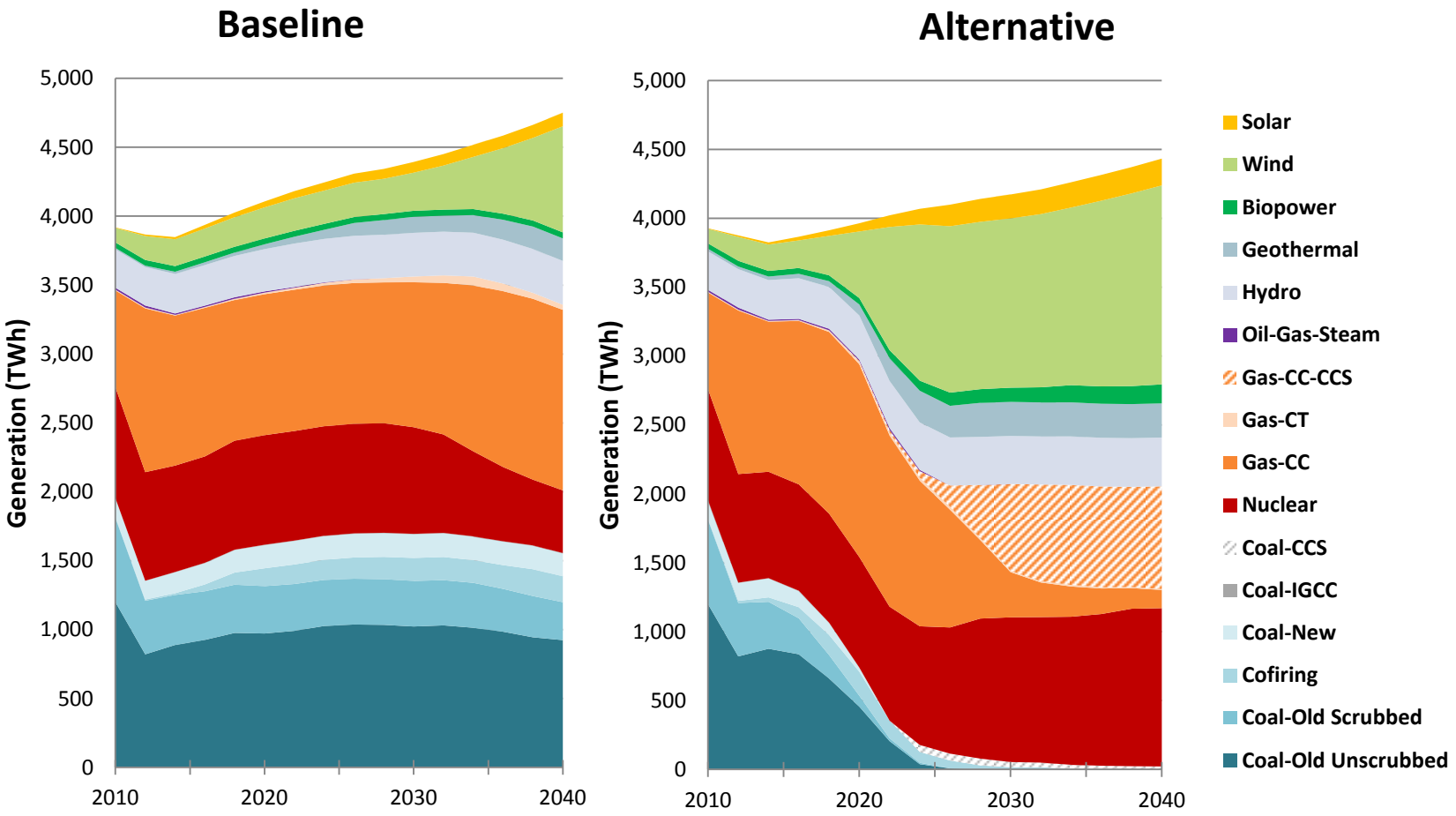
Cost of Living



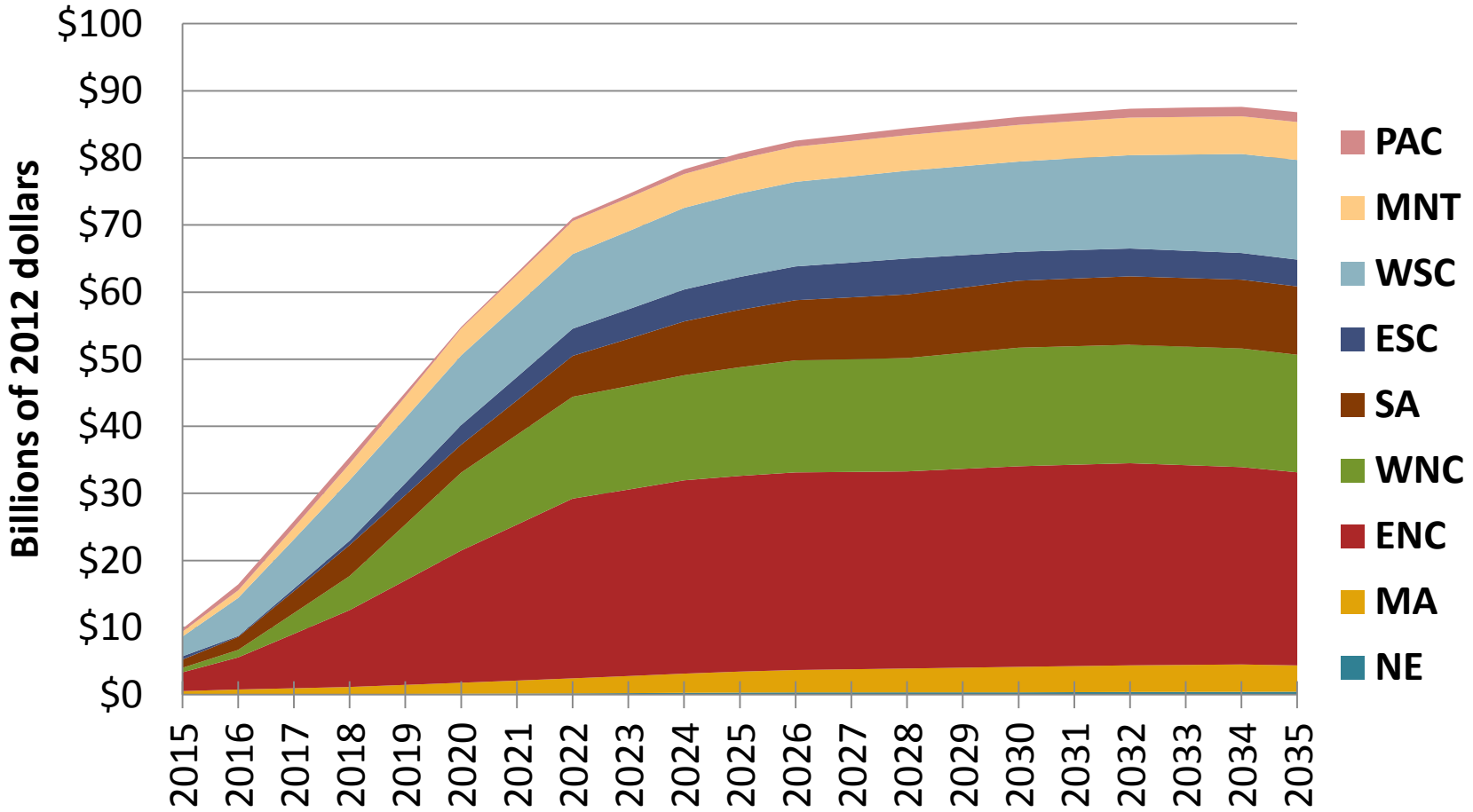
Real Income Per Capita



Power Generation



Air Quality



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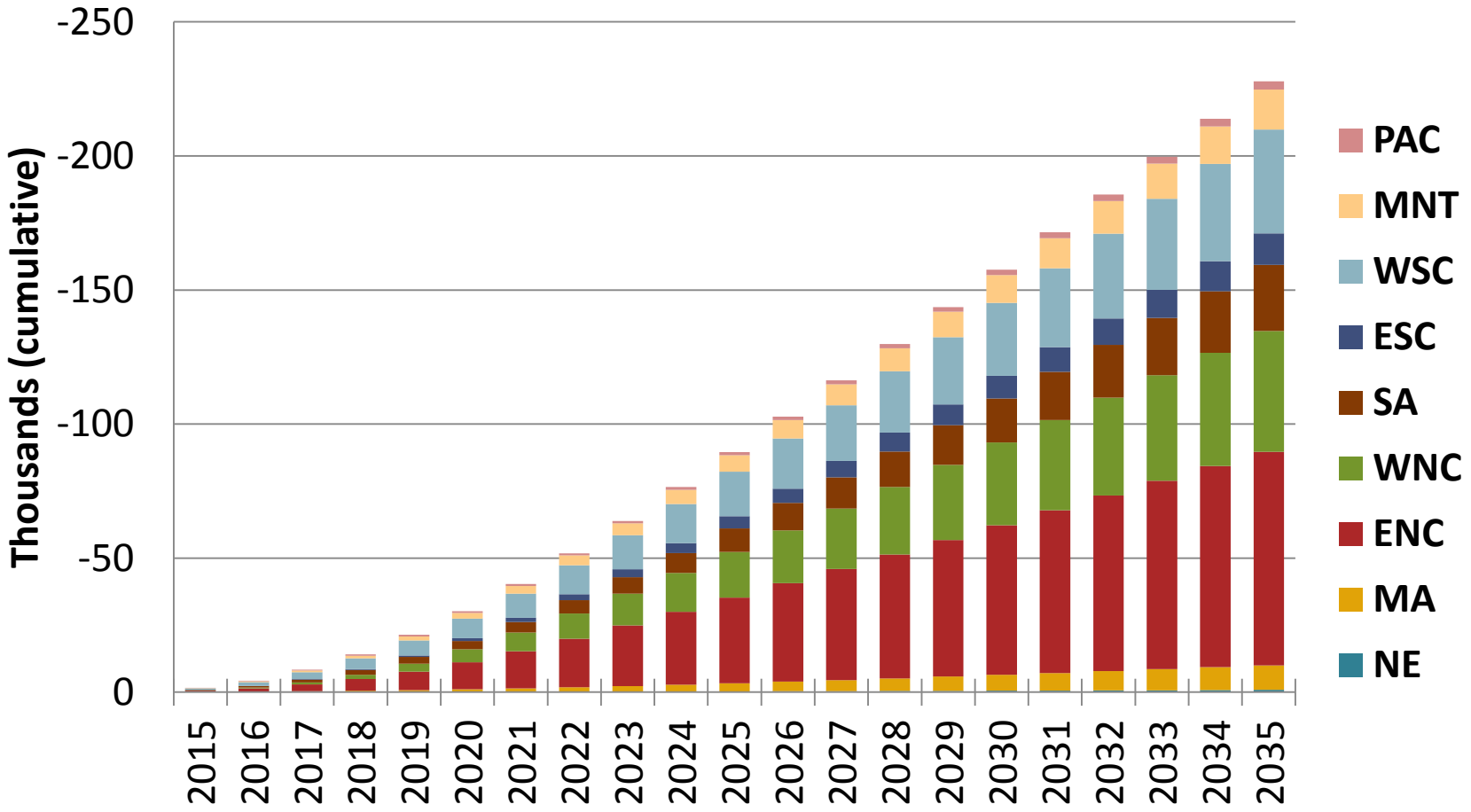
1 g of NO_X = \$0.005; 1 g of SO_X = \$0.025

Saved Premature Deaths



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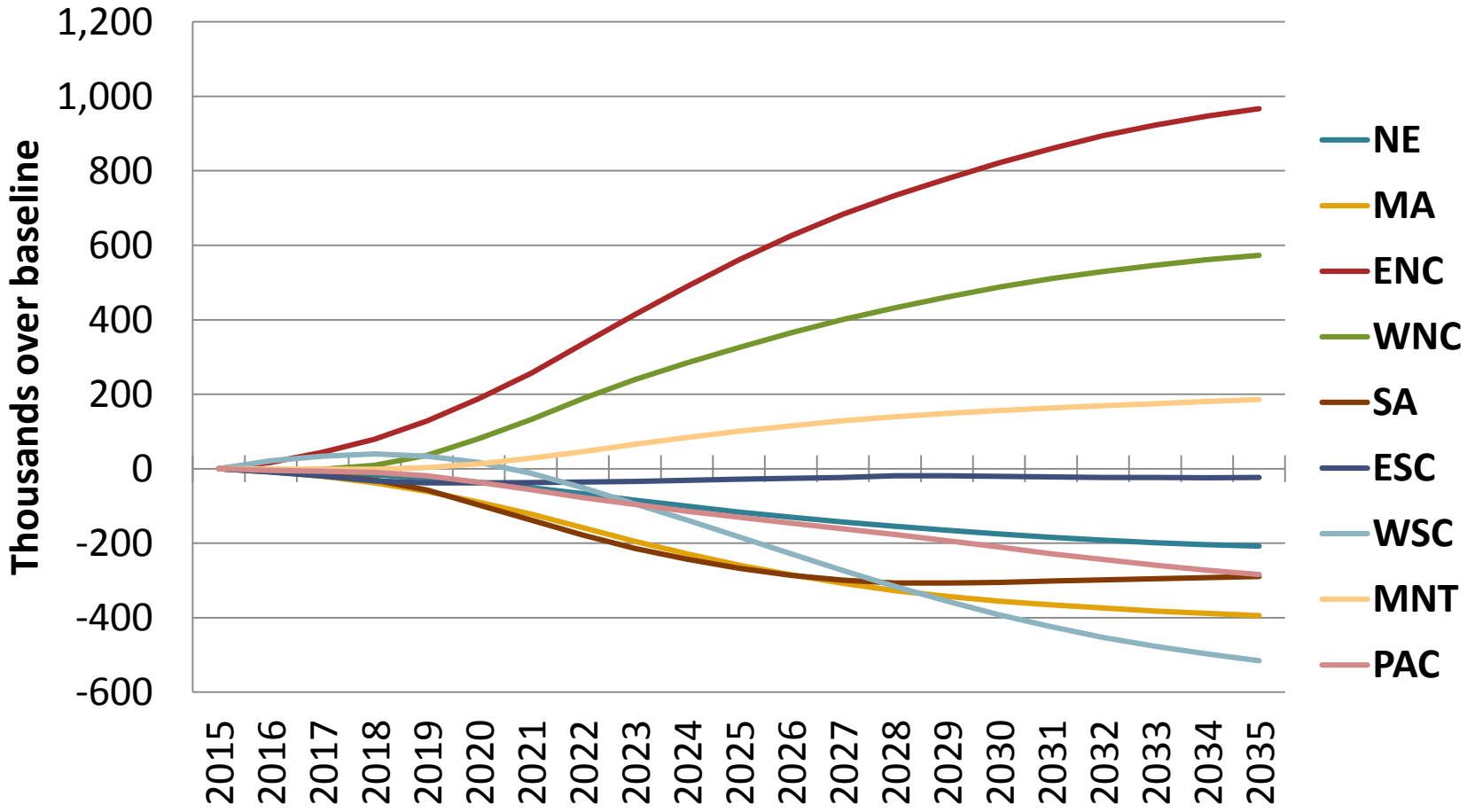
Air quality benefit / $6.2 million = 1 saved premature death

Regional Population



Results Summary

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

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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