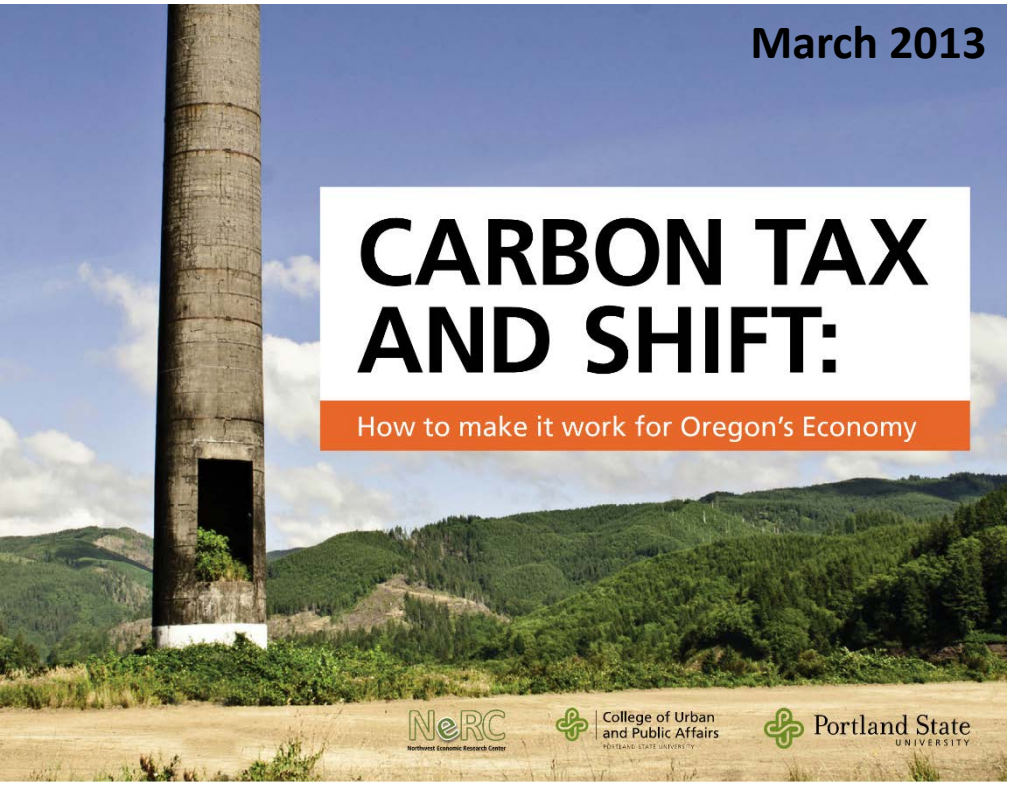
Carbon Tax in Oregon

SB306 Report Highlights

NeRC
Northwest Economic Research Center
College of Urban and Public Affairs

SB306 Clean Air Tax or Fee Final Report

Portland State
UNIVERSITY



RR #4-14 December 2014

State of Oregon **Research Report**

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Research Report #4-14 **December 2014**

Economic and Emissions Impacts of a Clean Air Tax or Fee in Oregon (SB306)

The Oregon Legislature passed Senate Bill 306 (SB306) during its 2013 Regular Session, which directed the Legislative Revenue Office (LRO) to conduct a study of the economic and greenhouse gas emissions impacts of implementing a clean air tax or fee in Oregon. After an open RFP process, LRO (with the assistance of a Technical Advisory Committee) chose and contracted Portland State University's Northwest Economic Research Center (NERC) to conduct the analysis.

The Oregon Legislative Revenue Office (LRO) also contracted with Edward Waters (local economist and consultant) to provide quality monitoring and assurance for the Study. Mazen Malik was tasked with leading the study, and other LRO staff including Christine Broniak and Vijay Satyal provided support and feedback.

LRO and the study team continued to utilize the Technical Advisory Committee to assist with methodology design and to provide feedback throughout the process. The technical advisory committee was made up of representatives from:

- Oregon Legislative Revenue Office (Paul Warner)
- Oregon Legislative Fiscal Office (Paul Siebert)
- Oregon Business Development Commission (Michael Meyers)
- Oregon Department of Revenue (Mary Fitzpatrick)
- Oregon Department of Transportation (Jack Svadlenak)
- Oregon Department of Environmental Quality (Colin McConnaha, David Collier)
- Public Utility Commission (Aster Adams, Jason Klotz)
- Oregon Department of Energy (Phil Carver, Jessica Shipley, Bill Drumheller, Julie Peacock)

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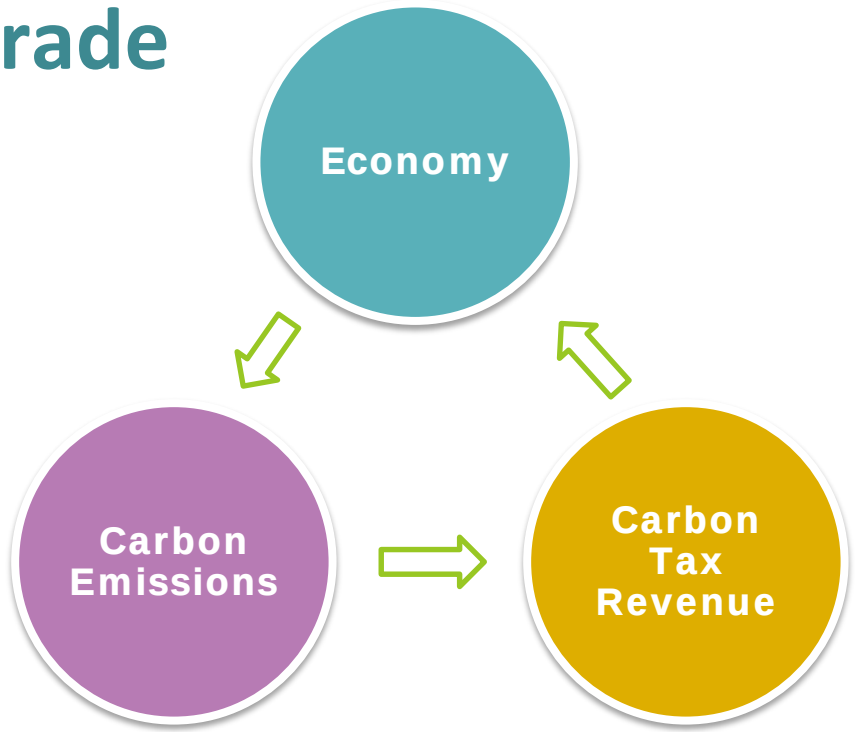
Study Objectives

1. Carbon tax level & tax base
2. Impacts on key industries & communities.
3. Impacts on other taxes &stability and other laws
4. Evaluate economic & GHG impacts
5. Equity issues

Limiting Carbon Emissions

- Regulatory controls
- Market mechanisms
  - **Carbon cap-and-trade**
  - **Carbon tax**



Methodology | Establish Baselines

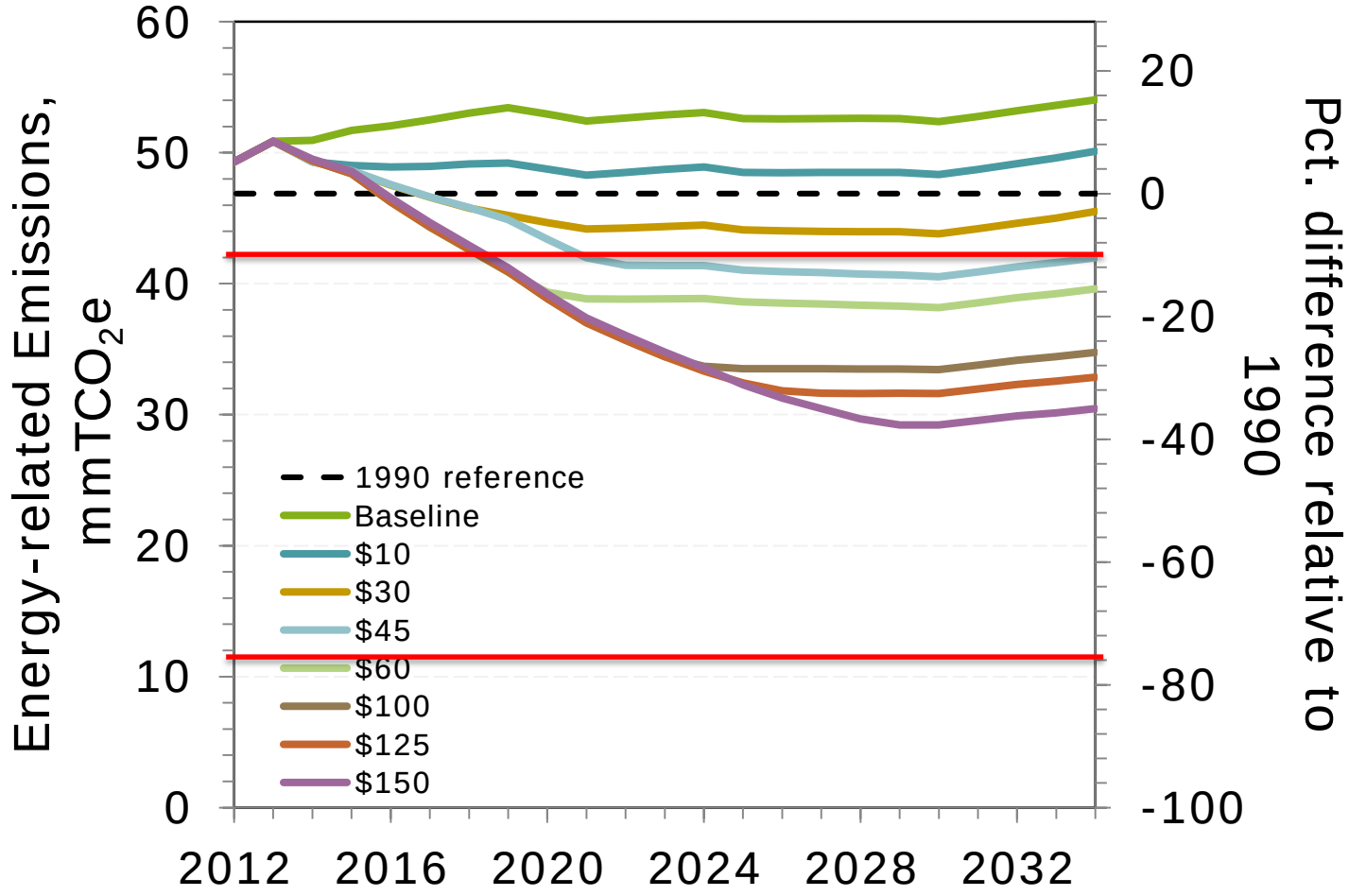
- **Economic baseline**
- **Emissions baseline**
  - **Energy-related fossil fuel combustion**
  - **Oregon Greenhouse Gas Inventory**
    - **In-boundary: natural gas & petroleum**
    - **In-boundary + Out-of-state: electricity**
  - **EIA NEMS & ODOE projected energy demand**

See Report Appendix I for detailed breakdown of methodology

Estimated Price Changes

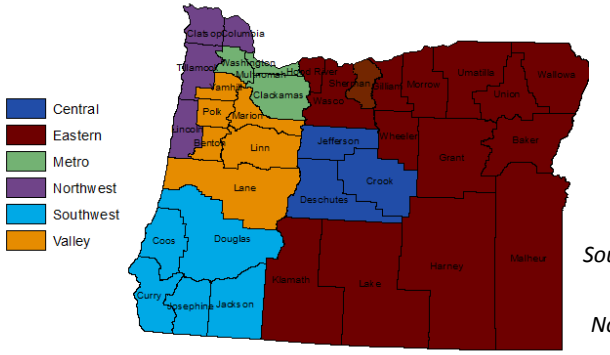
Carbon price	$10 / ton	$100 / ton
Gasoline	~$0.10/gallon	~$1.00/gallon
Natural Gas	~3% increase	~31% increase
Electricity	~1.5-5% increase	~17-51% increase

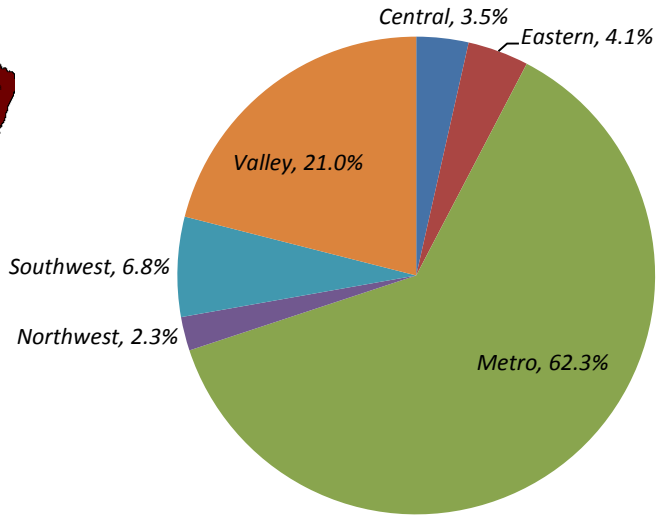
Results | GHG Emission Reductions



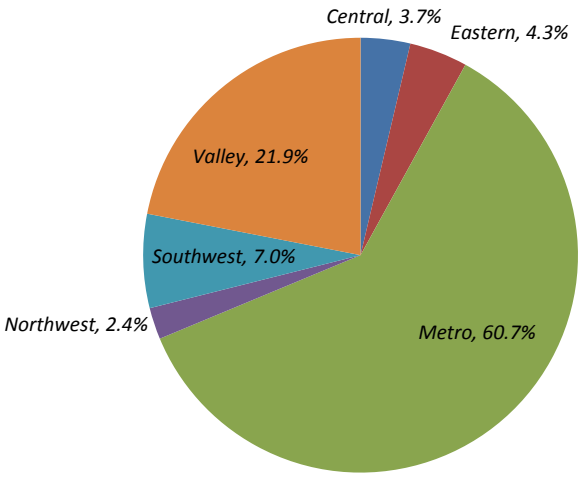
See Results: Carbon Tax Scenarios (p.23) for full breakdown of emissions results

Results | Emissions

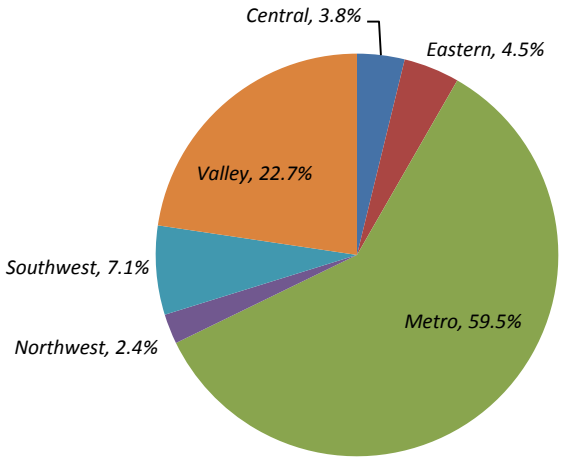




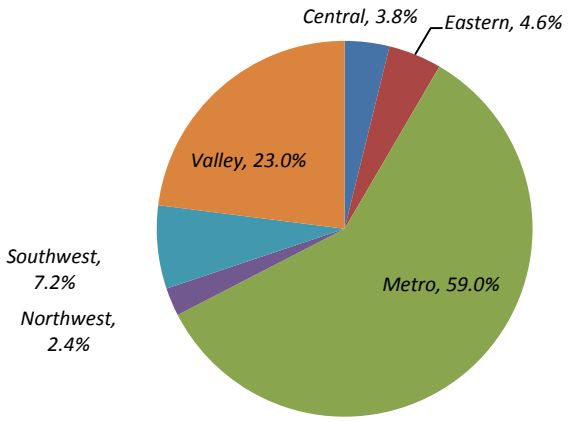
Baseline



$30/ton

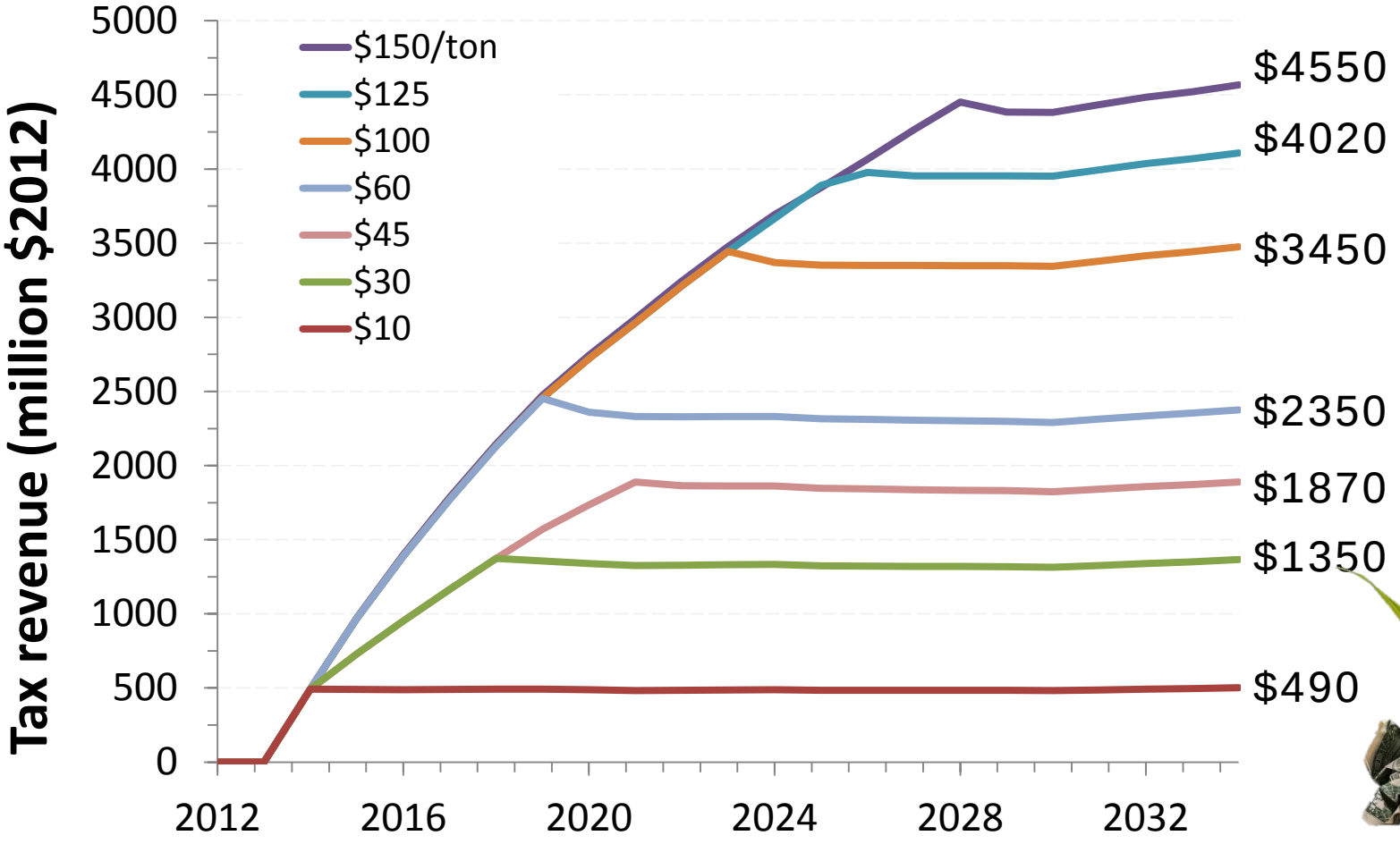


$60/ton



$100/ton

Results | Revenue Generated

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See Results: Revenue (p.29) for breakdown of revenue estimates

Revenue Repatriation and Expenditure Scenarios

- Scenario A – No repatriation
- Scenario B – Revenue Neutral
- Scenario C – Revenue Neutral (excluding Transportation)
- Scenario D – Public Investment and Expenditure
- Scenario E – Alternative Transportation-Related Revenue Disbursement

- Low-income considerations

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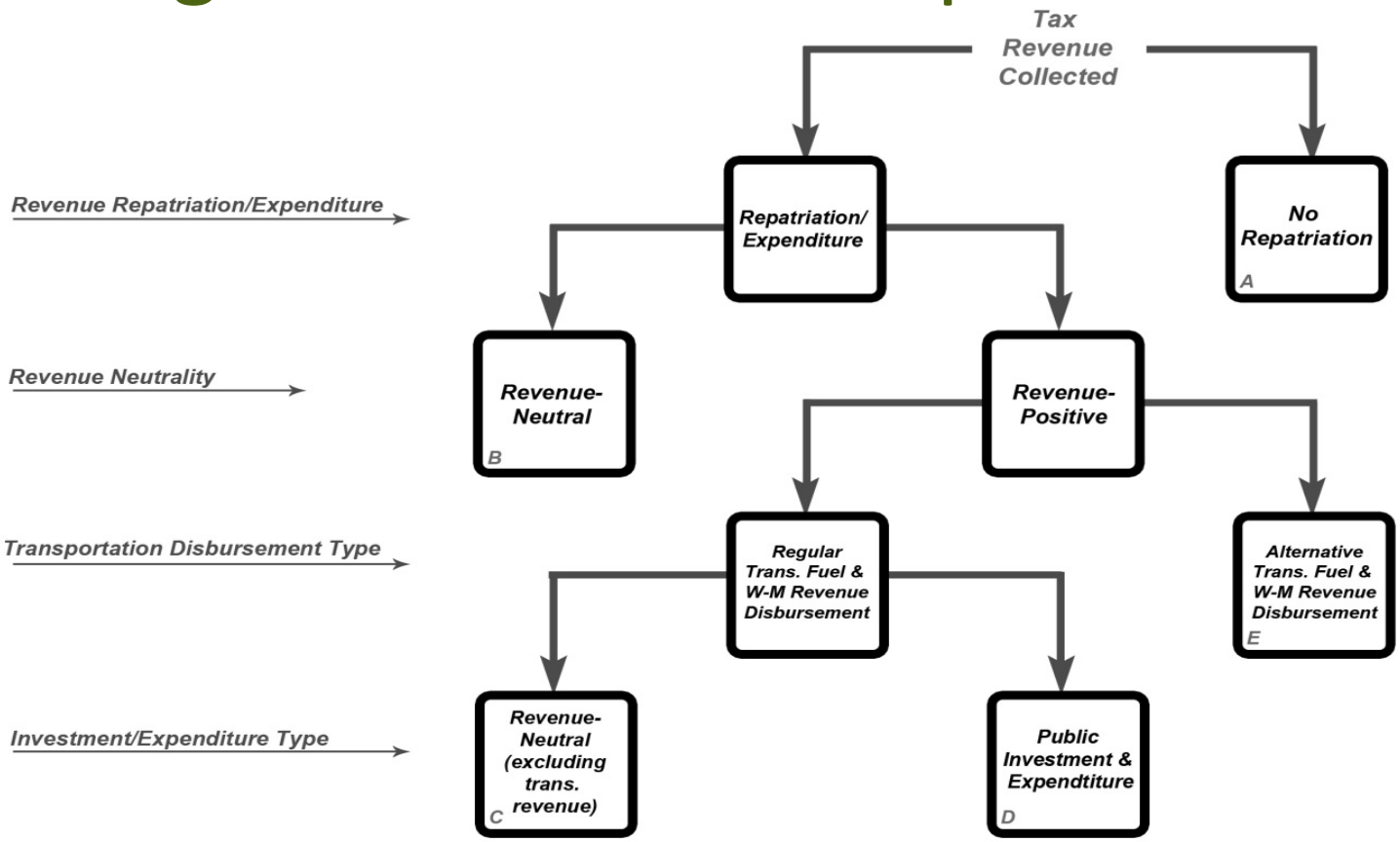
Methodology | Revenue Repatriation & Usage Scenario Development



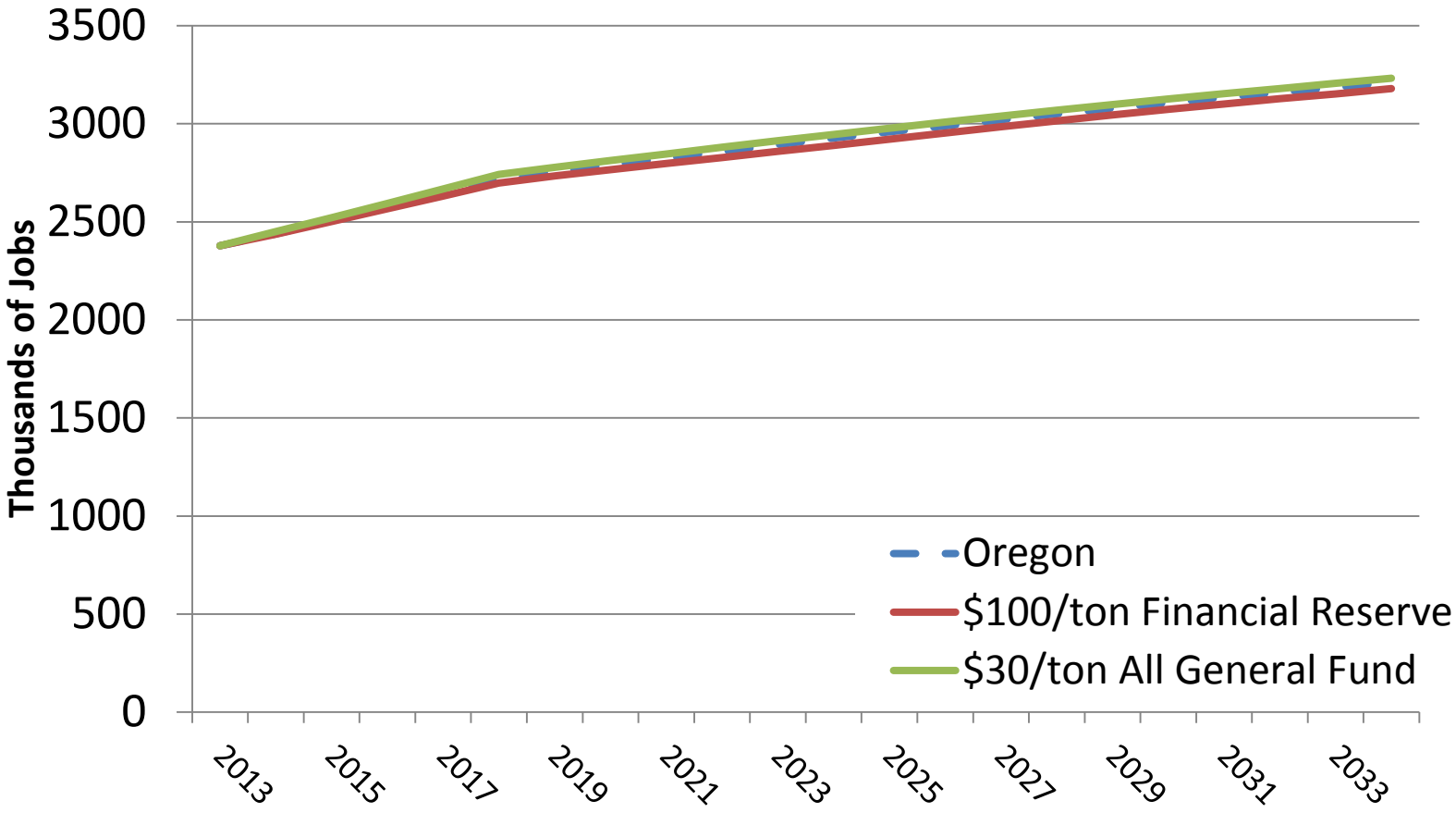
See Report Appendix II for more detail on scenario schematic

Results | Overview

			Maximum Level of Carbon Tax (per $mTCO_2e$)				
			$10	$30	$60	$100	$150
Emissions Impact			–7%	–15%	–26%	–35%	–43%
Tax Revenue[3]			$490M	$1,350M	$2,350M	$3,450M	$4,550M
Revenue Usage Scenarios	A	Employment		-15K to 25K	-27K	-37K	
		Output		-0.6% to -0.4%	-1.1%	-1.35%	
	B	Employment	-1.1K	-4K	-8K	-9K	-14.5K
		Output	-0.05%	-0.2%	-0.5%	-0.5%	-0.7%
	C	Employment	0	+4K	+7K	+5.5K	+2K
		Output	-0.02%	-0.05%	-0.3%	-0.3%	-0.7%
	D	Employment		+5K	-13K to -9K		
		Output		-0.3%	-0.5%		
	E	Employment		0	-5K		
		Output		-0.3%	-0.5%		

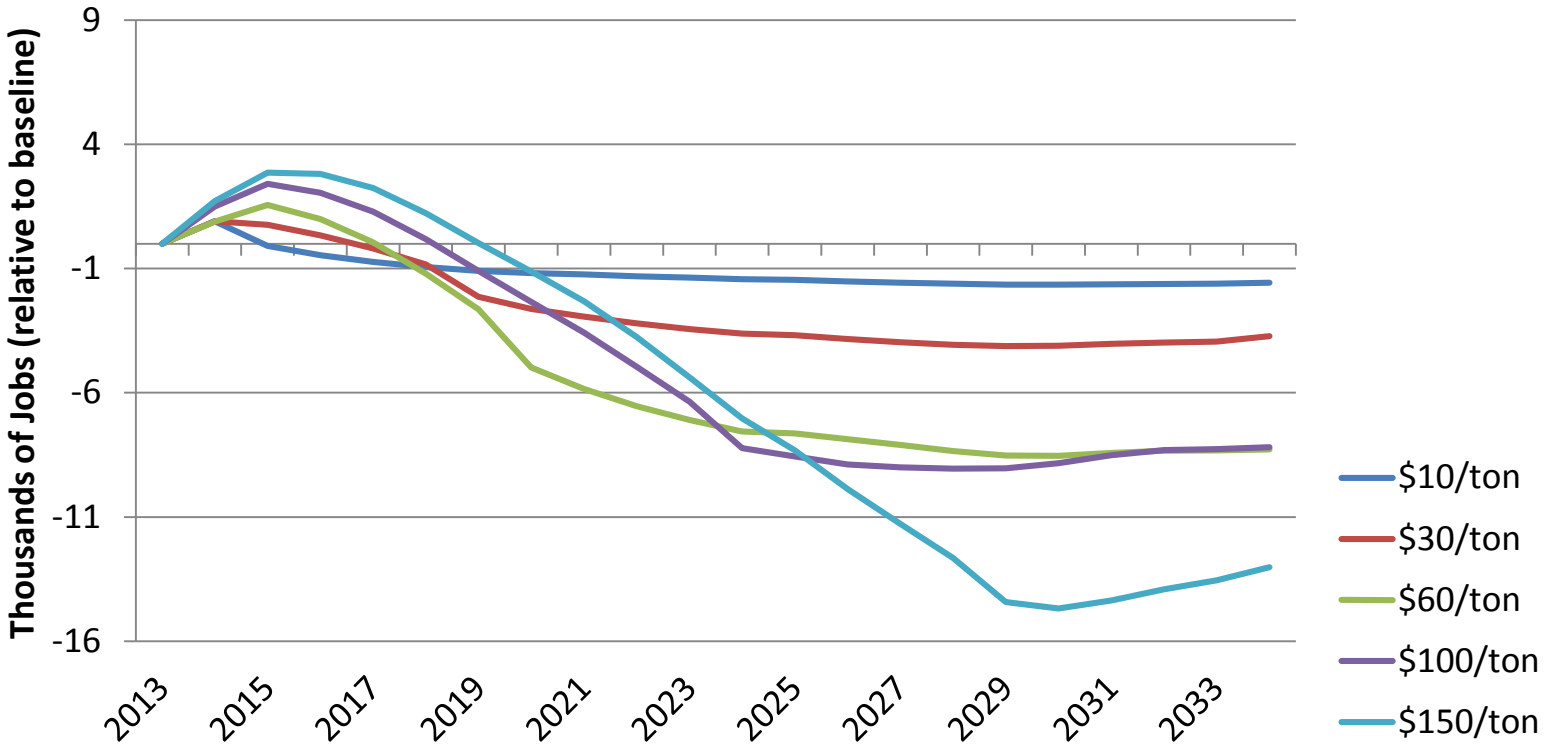
See Revenue Repatriation and Expenditure Scenario Results for economic impacts

Results | Employment Impacts



Results | Scenario B.2

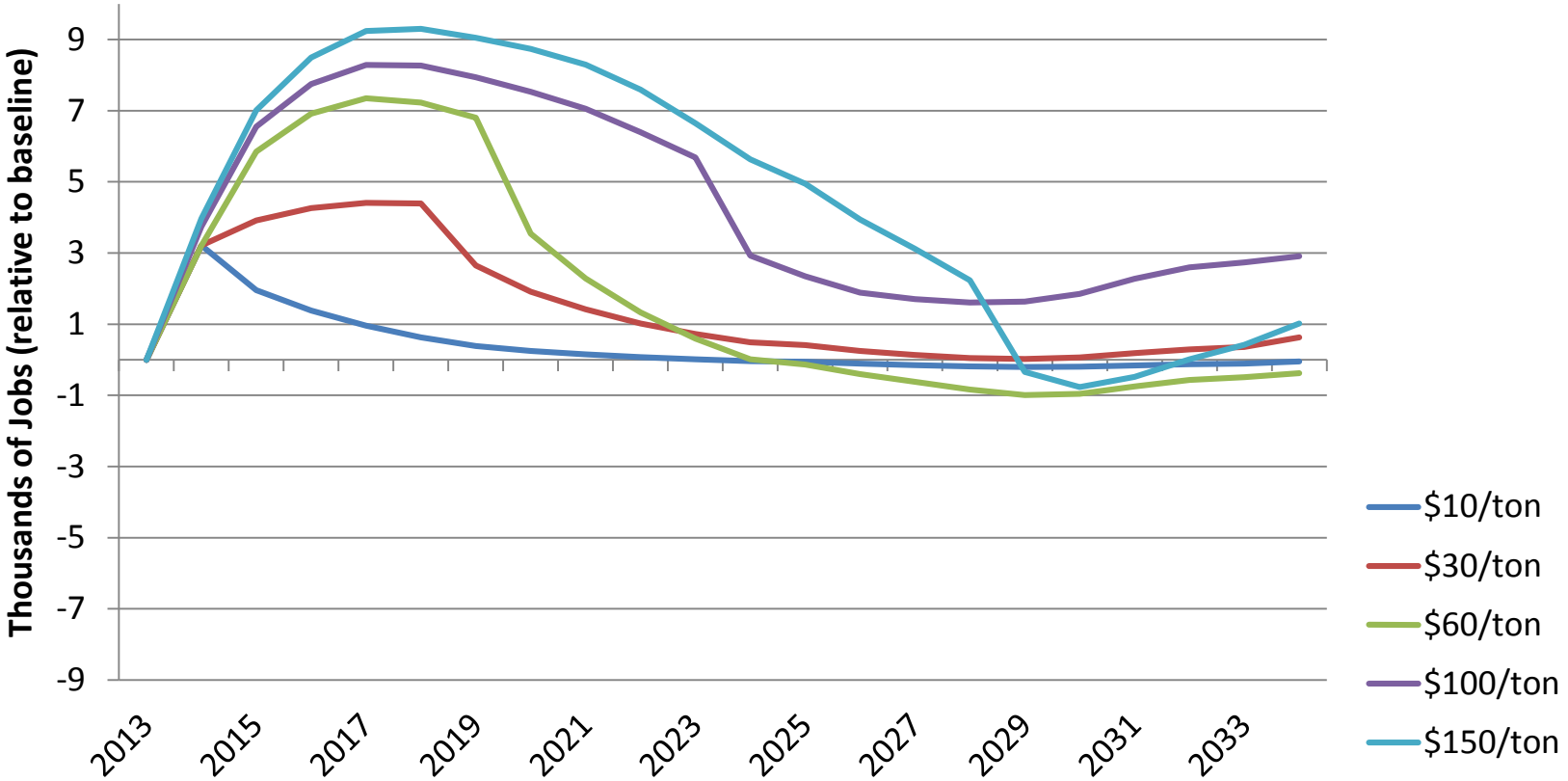
Revenue Neutral: Reduction in Personal and Corporate Income Tax Rate, and Transportation Taxes and Fees



See Report Appendix II (p.108) for detailed breakdown of scenario economic impacts

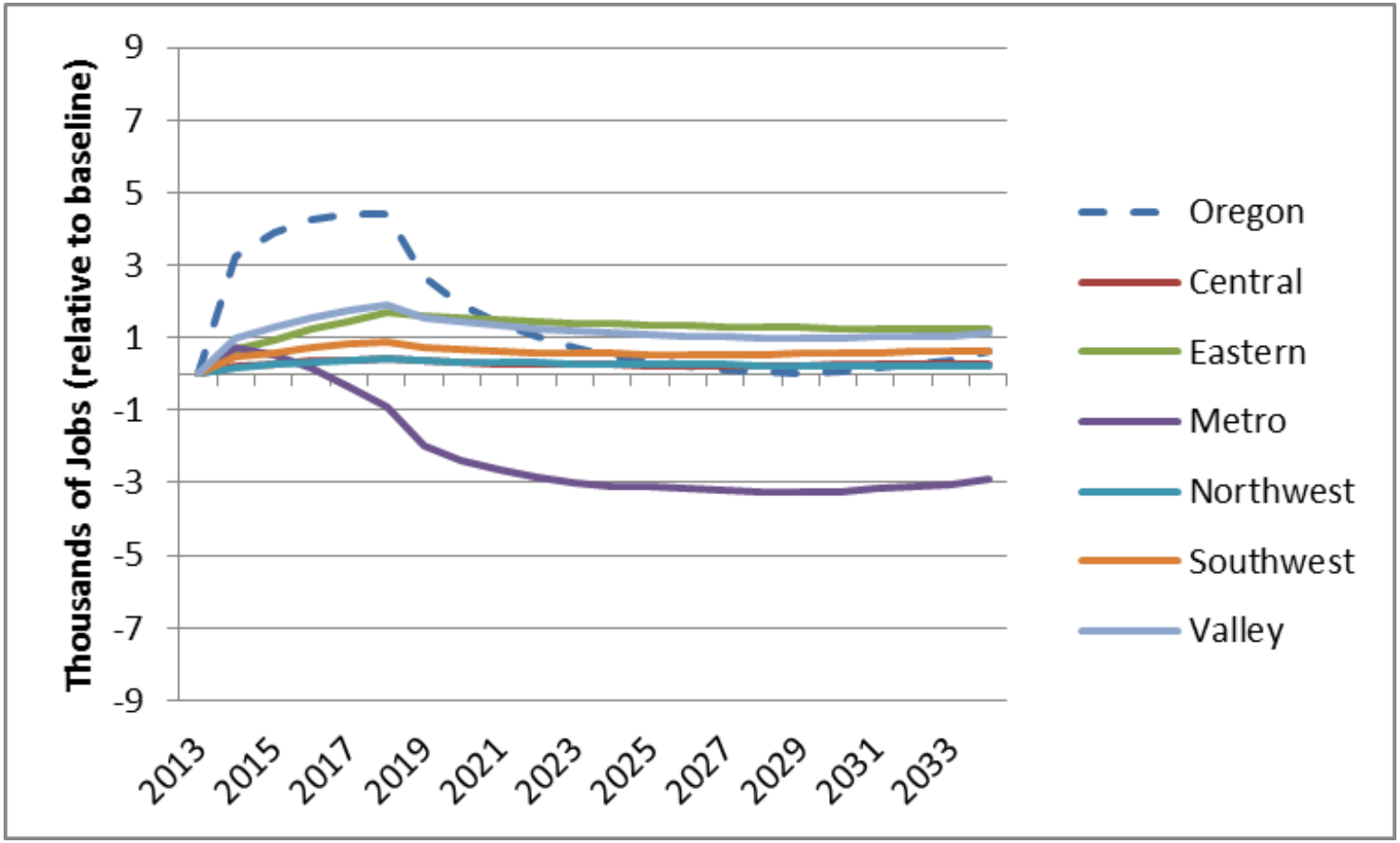
Results | Scenario C.4

Revenue Neutral (excluding Transportation): Reduction in Personal and Corporate Income Tax Rates, and Increase in Highway Trust Fund



Results | Scenario C.4 by Region

Revenue Neutral (excluding Transportation): Reduction in Personal and Corporate Income Tax Rates, and Increase in Highway Trust Fund



Conclusions

- Significant GHG emissions reduction
- Revenue generation potential
- Economic impacts are small relative to broader economy
  - Differ by region, income, and industry
- Possible to offset negative impacts with targeted expenditure or investment or economic development incentives

STATE OF OREGON
LEGISLATIVE REVENUE OFFICE

NeRC

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Results | Oregon Economy Basics

2013

Employment = 1,679,377

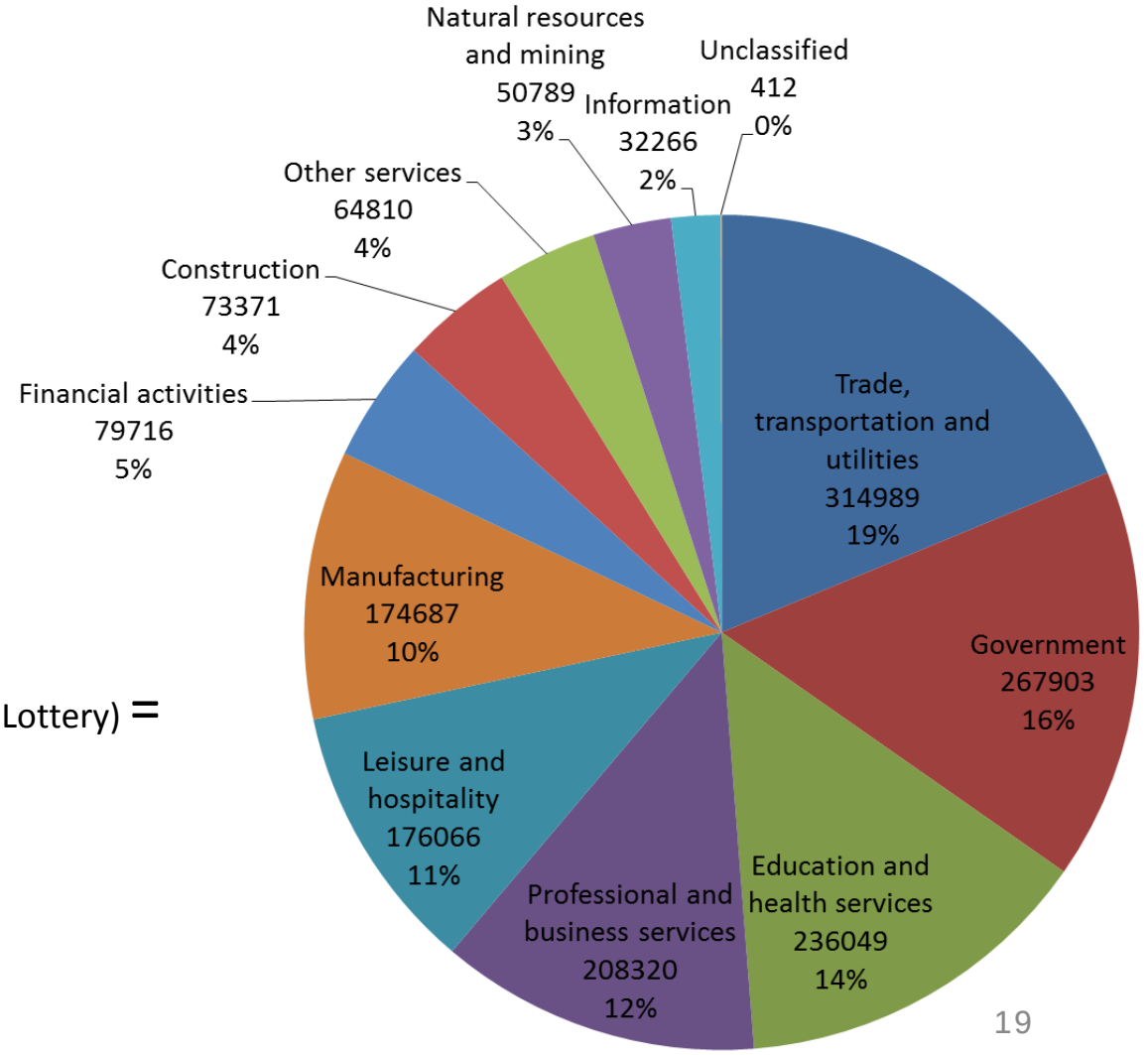
GDP = $219,590,000,000

Real GDP growth = 4.4%

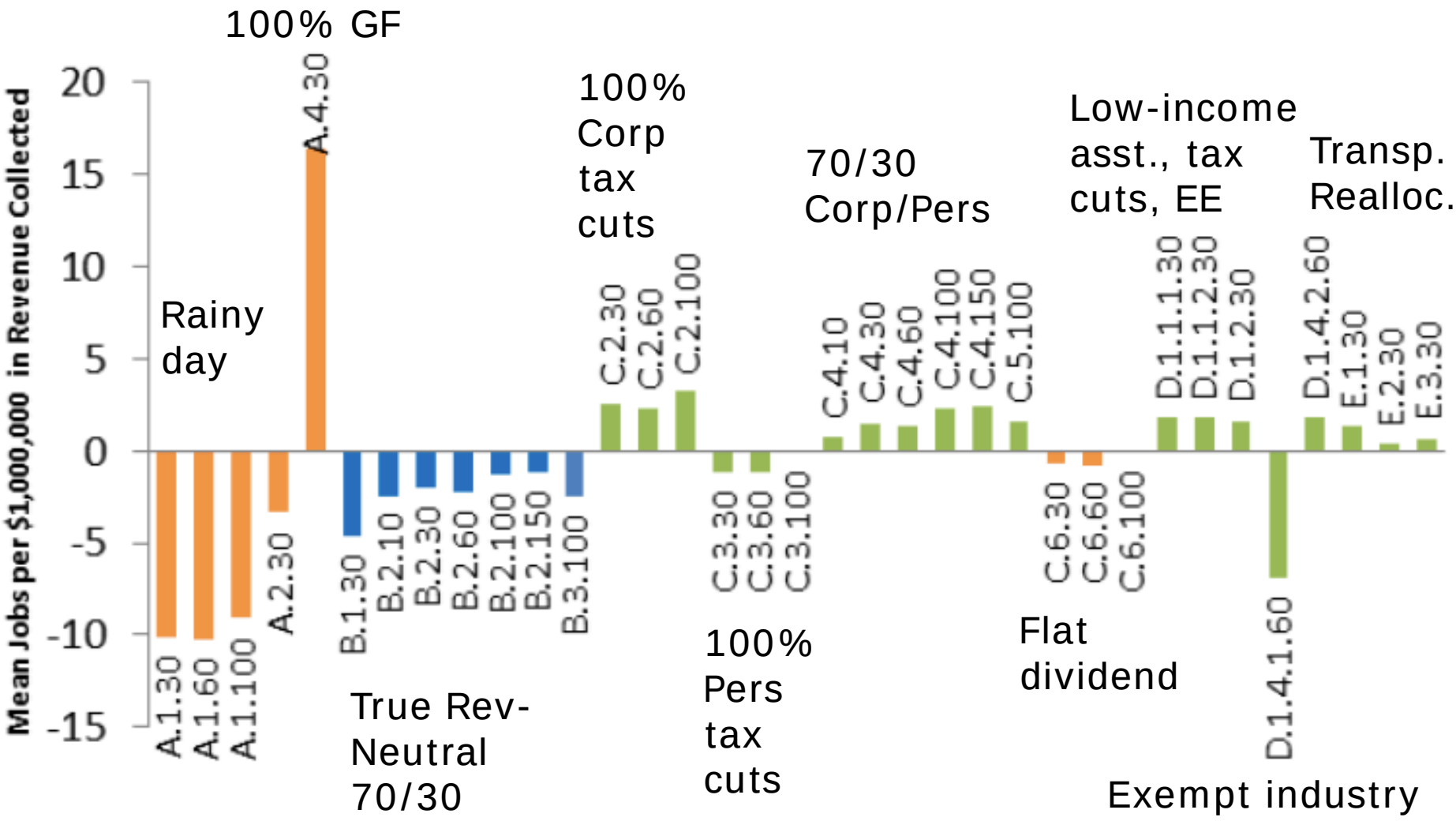
Total Compensation = $97,755,000,000

Population = 3,930,065

Annual State Budget (General + Lottery) = $8.2 billion



Results | Jobs Index



Other Considerations

- Border Tariffs
- Non-Combustion Emissions
- Impact on Tourism
- Impact on Government

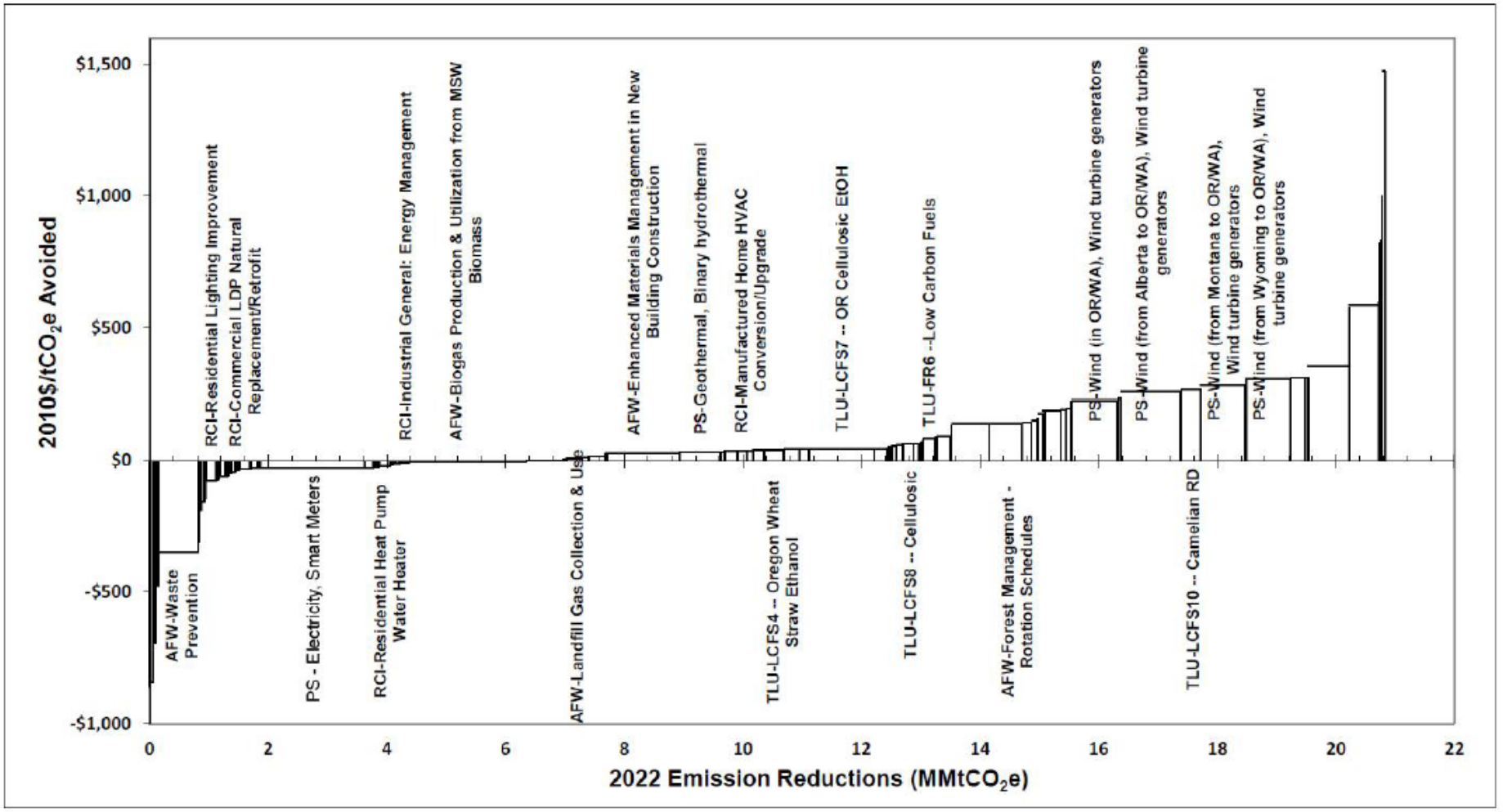
Further Research

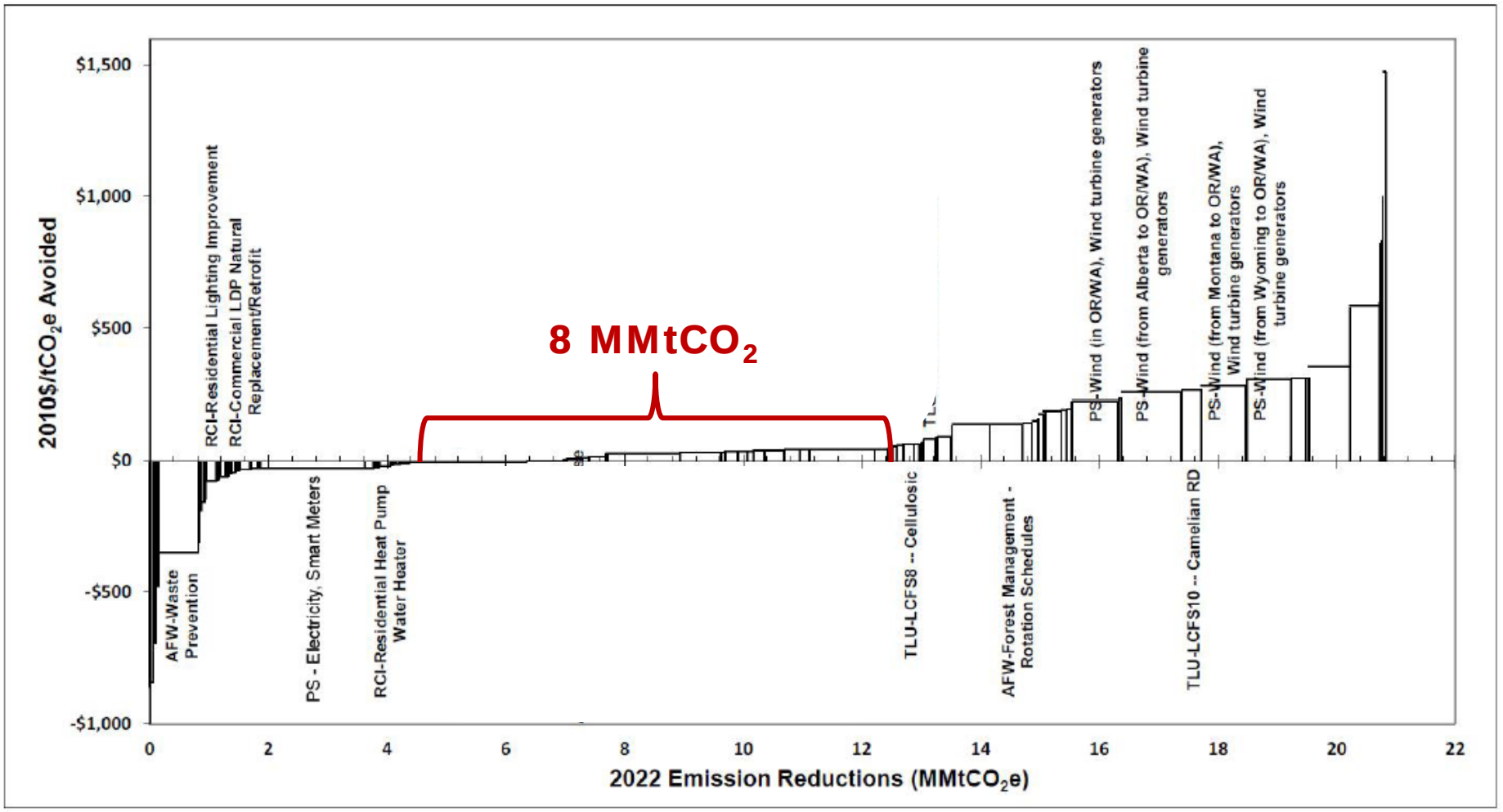
- Energy efficiency feedback
- Increase data detail
- Implementation
- Health impacts
- Emissions feedbacks

See Further Research and Applications

Carbon Tax and Existing Oregon Laws

- **Section J**: SB 306 required that we "*Evaluate the costs and benefits of [the carbon tax]…relative to existing laws and statutes*"
- Four major programs
  - Oregon's Renewable Portfolio Standard (RPS)
  - Clean Fuels Program (LCFS)
  - Renewable Fuels Standards (RFS)
  - Electric Utility Facility Standards


2010$/tCO2e Avoided
$1,500
$1,000
$500
$0
-$500
-$1,000
0
2
4
6
8
10
12
14
16
18
20
22
2022 Emission Reductions (MMtCO2e)
AFW-Waste Prevention
RCI-Residential Lighting Improvement
RCI-Commercial LDP Natural Replacement/Retrofit
PS - Electricity, Smart Meters
RCI-Residential Heat Pump Water Heater
RCI-Industrial General: Energy Management
AFW-Biogas Production & Utilization from MSW Biomass
AFW-Landfill Gas Collection & Use
AFW-Enhanced Materials Management in New Building Construction
PS-Geothermal, Binary hydrothermal
RCI-Manufactured Home HVAC Conversion/Upgrade
TLU-LCFS4 -- Oregon Wheat Straw Ethanol
TLU-LCFS7 -- OR Cellulosic EtOH
TLU-LCFS8 -- Cellulosic
TLU-FR6 --Low Carbon Fuels
AFW-Forest Management - Rotation Schedules
PS-Wind (in OR/WA), Wind turbine generators
PS-Wind (from Alberta to OR/WA), Wind turbine generators
TLU-LCFS10 -- Camelian RD
PS-Wind (from Montana to OR/WA), Wind turbine generators
PS-Wind (from Wyoming to OR/WA), Wind turbine generators


$1,500
$1,000
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2010$/tCO2e Avoided
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2022 Emission Reductions (MMtCO2e)
8 MMtCO2
AFW-Waste Prevention
RCI-Residential Lighting Improvement
RCI-Commercial LDP Natural Replacement/Retrofit
PS - Electricity, Smart Meters
RCI-Residential Heat Pump Water Heater
TLU-LCFS8 -- Cellulosic
AFW-Forest Management - Rotation Schedules
TLU-LCFS10 -- Camelian RD
PS-Wind (in OR/WA), Wind turbine generators
PS-Wind (from Alberta to OR/WA), Wind turbine generators
PS-Wind (from Montana to OR/WA), Wind turbine generators
PS-Wind (from Wyoming to OR/WA), Wind turbine generators

Carbon Tax and Existing Oregon Laws

- **Cost-Effectiveness**
  - Carbon tax → *effective* in GHG reductions
  - Implicit ⇔ Explicit incremental (marginal) costs
  - Example:
    - Carbon tax = $30/ton → Revenue = $490 million
    - Revenue repatriation → cost *shift*
    - 0.05% lower statewide economic output than BAU

Carbon Tax and Existing Oregon Laws

- **Interactions: the tax in context**
  - How would a carbon tax affect (or be affected by) these measures?
  - Generally speaking, the tax would be complementary and compatible with other programs

Carbon Tax and Existing Oregon Laws

- **Renewable Portfolio Standard (RPS):**
  - 25% of electric power portfolios from renewable sources by 2025 (lower for small utilities)
- **Oregon Clean Fuels (LCFS)**
  - Reduce life-cycle carbon content of transportation fuels by 10% by 2025
- **Renewable Fuels Standard (RFS)**
  - minimum 10% ethanol content in retail gasoline and 5% biodiesel in diesel.
- **Electricity Facility Standards ("EFSC" Standards)**
  - 0.675 lbs/kWh carbon emission cap for baseload and non-baseload gas plants
  - 1100 lbs/MWh for all generation

Carbon Tax and Existing Oregon Laws

- **Carbon Tax**
  - Maximizes flexibility
  - Some uncertainty
  - Applies to entire economy
  - **Target**
    - **GHG Emissions**

- **Existing Measures**
  - Guarantee efficacy
  - Some efficiency loss
  - Apply to specific sectors
  - **Target:**
    - **Renewable capacity (RPS)**
    - **Carbon intensity (LCFS)**
    - **Specific content standards (RFS)**
    - **Power plant emissions (EFSC)**

Usage of collected funds

- **Carbon tax**: Collected revenues may be repatriated to firms and households*
- **Existing Measures**
  - **RPS**: Alternative compliance fees accrue to interest-bearing accounts and can be used to finance renewable capacity building
  - **LCFS / RFS**: No current fund collection
  - **Electricity Facility Standards**: Collected funds are disbursed to qualifying organizations for offset projects