

NeRC

Northwest Economic Research Center
College of Urban and Public Affairs



Carbon Tax Analysis for Oregon
March 2013



Background

- Tax intended to decrease negative externalities and correct market failure by adding social cost to fossil fuel prices
 - Economic Efficiency
 - “Double Dividend”
- Incentivizes shift towards less fossil-fuel intensive methods and practices
 - OR Goal: 10% percent reduction below 1990 levels by 2020.
- Creates revenue opportunities

Revenue Repatriation and Tax Design

- Revenue repatriation offsets competitiveness burden
 - Low-energy intensive industries become more competitive
- Address competitiveness issues by applying tax to fossil fuels burned in Oregon. Exported fuel is not subject to tax.
- Investment allows for targeted industry support
- Funds used to offset burden on low-income households
- Impact on Traded Sector and Agriculture

BC Carbon Tax

- Key part of larger GHG strategy
- Started in 2008. Currently capped at \$30/ton
- 2010/2011 Revenue: \$741M
 - \$1,172M projected for 2012/2013
- In first three years of tax:
 - 9.9% decrease in emissions
 - BC's economy shrank, but at a slower rate than the rest of Canada. Faster Growth than Canada in 2011.
- Initial research finds little-to-no extra burden on rural residents
- Current effort to raise cap

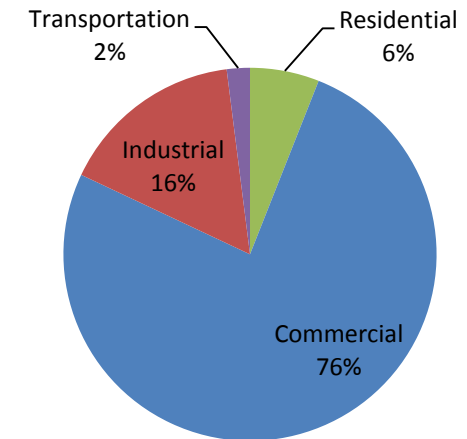
Modeling

- Key Assumptions
 - “Extended Policy” Baseline
 - Start year for carbon tax: 2013
- C-TAM
 - Residential
 - Industrial
 - Commercial
 - Transportation
- IMPLAN

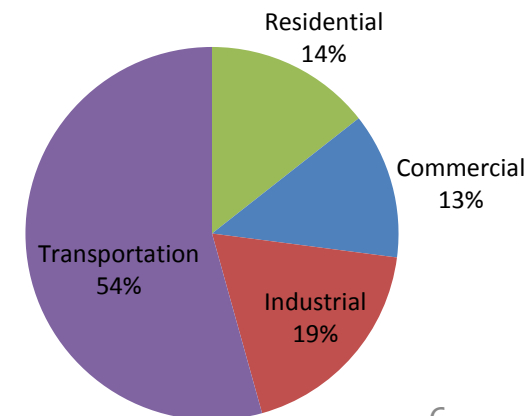
Sectors

<p>Residential</p>	<ul style="list-style-type: none"> • Home Energy Use • Residential Construction • Some Building and Apartment Management
<p>Industrial</p>	<ul style="list-style-type: none"> • Manufacturers • Agricultural Activity • Natural Resources
<p>Commercial</p>	<ul style="list-style-type: none"> • Catch-All Category • Includes Retail, Services, Etc.
<p>Transportation</p>	<ul style="list-style-type: none"> • Motor Vehicle Transportation • Shipping and Transport by all Means

Oregon Employment

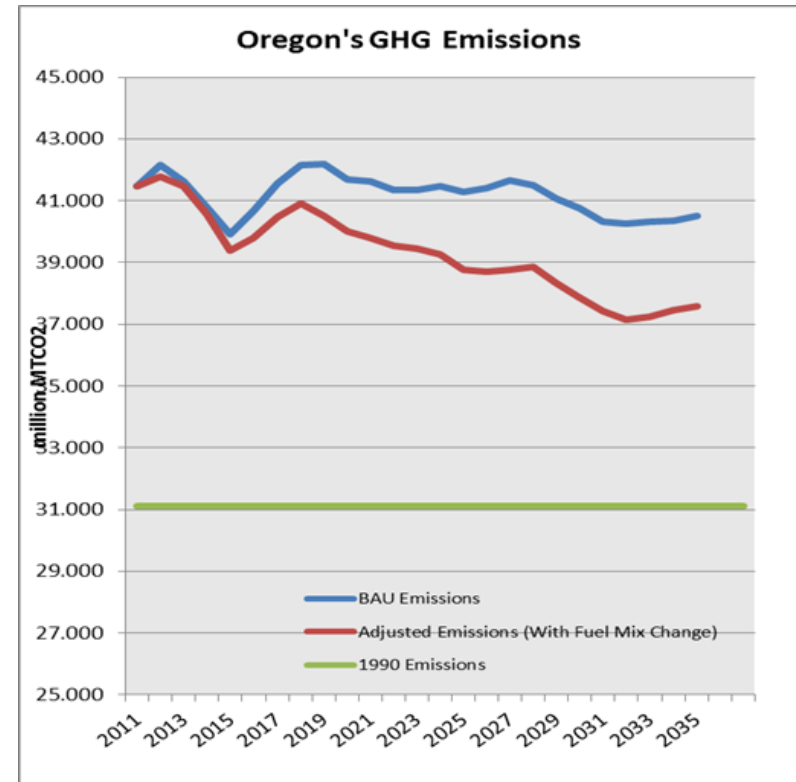


Oregon CO2e Emissions



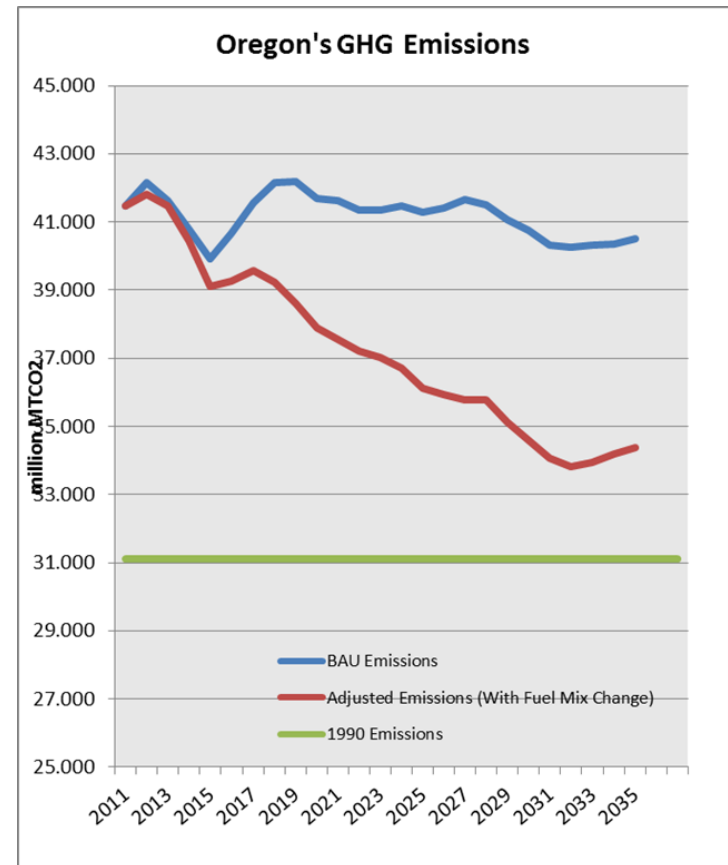
\$30 Maximum- \$5 Annual Increase (Annual Revenues)

	2015	2025	2035
Carbon Price/ton	\$20	\$30	\$30
GHG Change from Baseline Forecast			
Residential	-3.8%	-10.8%	-13.3%
Commercial	-4.9%	-14.0%	-16.8%
Industrial	-3.0%	-10.5%	-13.0%
Transportation	-2.6%	-1.9%	-3.0%
Total	-1.3%	-6.1%	-7.3%
GHG Change from 1990 Levels			
	26.7%	24.7%	20.8%
Carbon Tax Revenues (million)			
Residential	\$101	\$145	\$138
Commercial	\$89	\$138	\$147
Industrial	\$198	\$293	\$269
Transportation	\$400	\$579	\$546
(Individual)	\$360	\$486	\$429
(Business)	\$428	\$669	\$671
Total	\$788	\$1,155	\$1,101



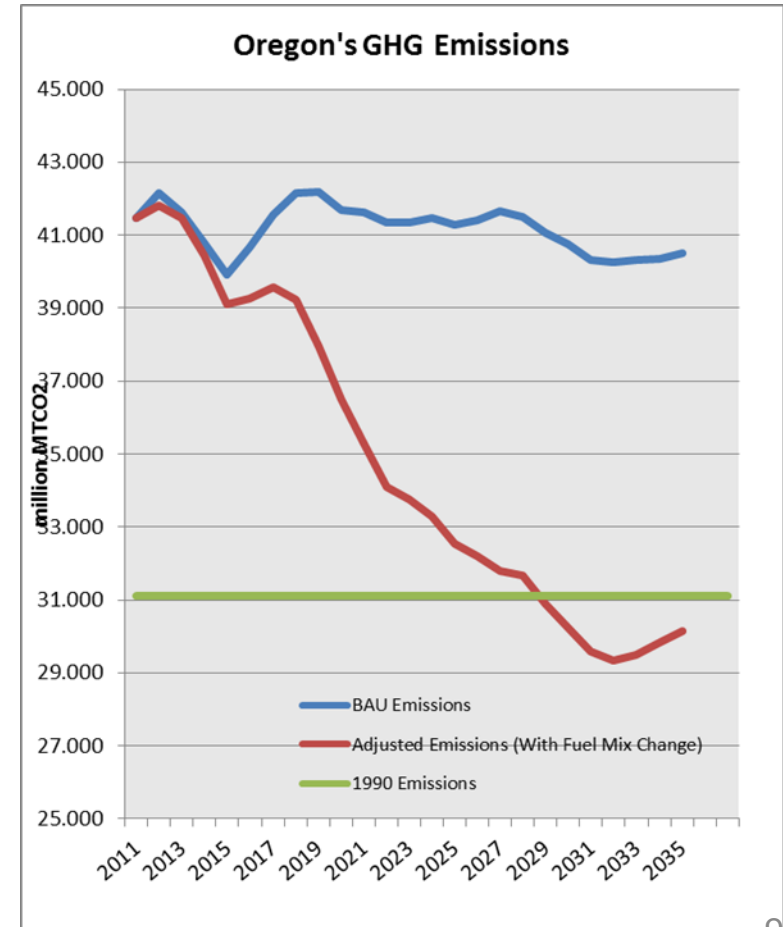
\$60 Maximum- \$10 Annual Increase (Annual Revenues)

	2015	2025	2035
Carbon Price/ton	\$30	\$60	\$60
GHG Change from Baseline Forecast			
Residential	-4.7%	-20.3%	-25.6%
Commercial	-6.1%	-26.0%	-32.2%
Industrial	-4.0%	-20.3%	-25.5%
Transportation	-3.0%	-5.2%	-6.0%
Total	-2.0%	-12.5%	-15.1%
GHG Change from 1990 Levels			
	25.7%	16.1%	10.6%
Carbon Tax Revenues (million)			
Residential	\$150	\$259	\$237
Commercial	\$132	\$237	\$240
Industrial	\$295	\$548	\$494
Transportation	\$597	\$1,113	\$1,052
(Individual)	\$535	\$913	\$796
(Business)	\$638	\$1,244	\$1,227
Total	\$1,173	\$2,157	\$2,023



\$100 Maximum- \$10 Annual Increase (Annual Revenues)

	2015	2025	2035
Carbon Price/ton	\$30	\$100	\$100
GHG Change from Baseline Forecast			
Residential	-4.7%	-32.9%	-42.1%
Commercial	-6.1%	-41.9%	-52.7%
Industrial	-4.0%	-33.3%	-42.1%
Transportation	-3.0%	-9.6%	-10.1%
Total	-2.0%	-21.2%	-25.6%
GHG Change from 1990 Levels	25.7%	4.7%	-3.1%
Carbon Tax Revenues (million)			
Residential	\$150	\$364	\$307
Commercial	\$132	\$311	\$280
Industrial	\$295	\$825	\$724
Transportation	\$597	\$1,755	\$1,665
(Individual)	\$535	\$1,388	\$1,189
(Business)	\$638	\$1,867	\$1,788
Total	\$1,173	\$3,255	\$2,976



Revenue Repatriation Scenarios

- Scenario 1 - Boundaries
 - 1.1 - 100% Corporate Income Tax Cuts
 - 1.2 - 100% Personal Income Tax Cuts
 - 1.3 - With low-income relief
- Scenario 2 – Revenue set aside for specific reinvestment purposes
 - 2.1 - 10% Reinvestment Set Aside
 - 2.2 - 25% Reinvestment Set Aside

Revenue Repatriation Scenario Setup

- \$60 Maximum Price- \$10 Annual Increase
- Tax Revenue
 - In 2015: \$1,173M (15% of Annual General Fund and Lottery Revenues)
 - In 2025: \$2,157M (29% of Annual General Fund and Lottery Revenues)
- Emission Reduction Below Baseline Forecast
 - In 2015: -2.0%
 - In 2025: -12.5%

Boundary Scenarios

- 100% Corporate Income Tax Cuts
 - Largest Job Increase
 - Extremely Regressive
- 100% Personal Income Tax Cuts
 - Job Losses
- 100% PITC with Low-Income Relief
 - Increase Positive Economic Impact
 - Still Net Job Losses

Scenario 2.1- 10% Reinvestment

- 70% of Revenue for Corporate Income Tax Cut
 - Would replace 82% of CIT revenue forecast for 2025
- 20% of Revenue for Personal Income Tax Cut (with low-income relief)
 - Would replace 2% of PIT revenue forecast for 2025
- 10% of Revenue for Energy Efficiency Projects

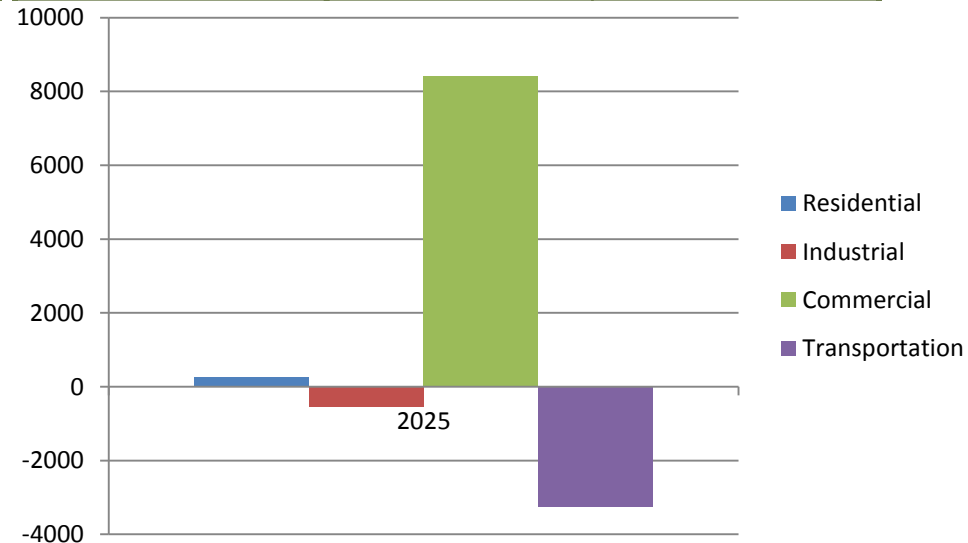
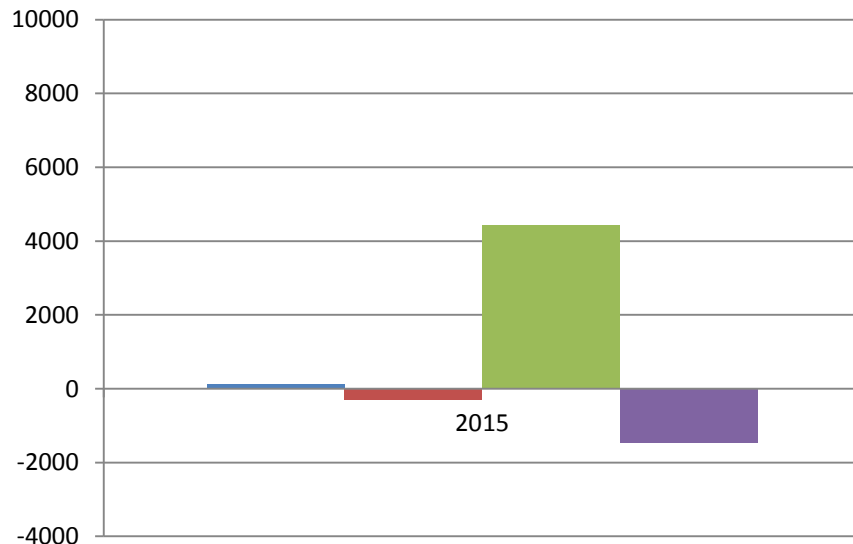
Scenario 2.1 - 10% Reinvestment

2015 (Carbon Tax = \$30/ton)

2025 (Carbon Tax = \$60/ton)

Impact Type	Employment	Labor Income (Millions \$)
Direct Effect	3,464	152.9
Indirect Effect	763	34.1
Induced Effect	-1,439	-66.0
Total Effect	2,787	121.0

Impact Type	Employment	Labor Income (Millions \$)
Direct Effect	5,852	254.9
Indirect Effect	1,154	51.0
Induced Effect	-2,161	-99.1
Total Effect	4,845	206.9



Scenario 2.2- 25% Reinvestment

- 50% of Revenue for Corporate Income Tax Cut
 - Would replace 59% of CIT revenue forecast for 2025
- 25% of Revenue for Personal Income Tax Cut (with low-income relief)
 - Would replace 2% of PIT revenue forecast for 2025
- 25% of Revenue for Energy Efficiency Projects
 - 25% Home Energy Efficiency
 - 25% Industrial Energy Efficiency
 - 50% Transportation Infrastructure

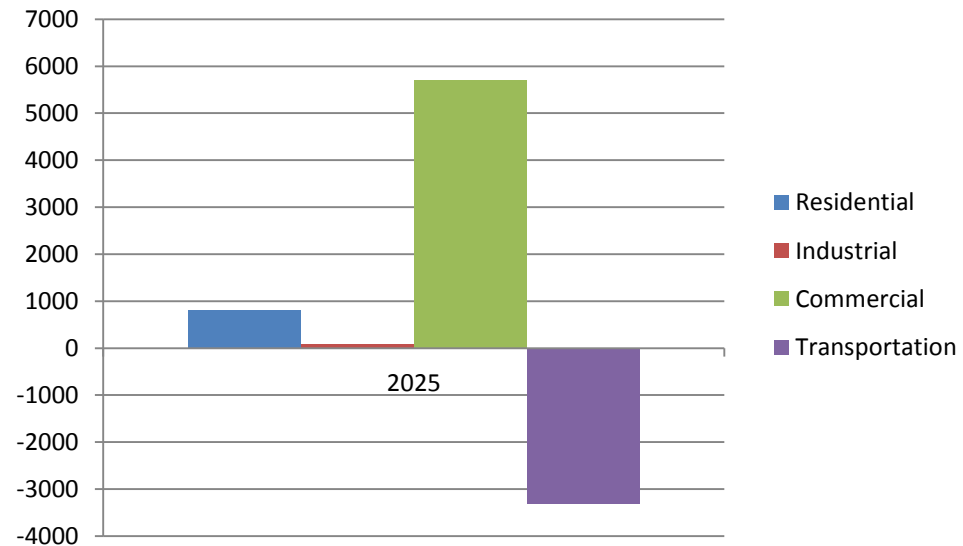
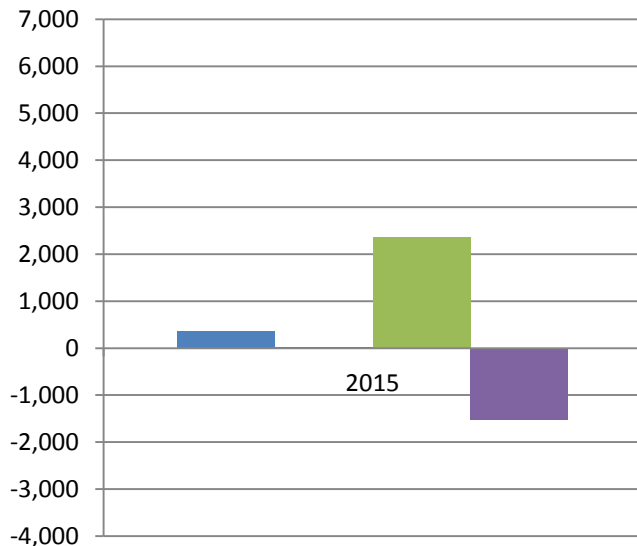
Scenario 2.2 - 25% Reinvestment

2015 (Carbon Tax = \$30/ton)

2025 (Carbon Tax = \$60/ton)

Impact Type	Employment	Labor Income (Millions \$)
Direct Effect	2,191.2	93.4
Indirect Effect	537.8	25.4
Induced Effect	-1,497.9	-71.5
Total Effect	1,231.1	47.3

Impact Type	Employment	Labor Income (Millions \$)
Direct Effect	3,503.1	176.1
Indirect Effect	736.1	41.8
Induced Effect	-969.7	-56.7
Total Effect	3,269.5	161.2



Conclusions

- Possible to reduce carbon emissions while potentially helping Oregon economy
- Significant Revenue Generating Potential
 - Reinvestment in large public works can be part of successful plan.
 - Investing in Clean Energy projects will increase speed of transition to less fossil fuel use.
- Low-Income support and targeted repatriation are fair and have positive economic benefits
- The Commercial sector will be receive largest positive impact, while Transportation will receive largest negative impact. Industrial and Residential depend on repatriation method.
- Corporate income tax cuts are important. Personal income tax cuts do not generate enough economic activity on their own.

Further Research

- Dynamic Feedback
- More Industry Sectors
 - Particular Focus on Traded Sector
- Project Adjustments in Industry Interaction Coefficients
- Design of Import Duties
- Further Look at Transportation-Specific Effects



NeRC

<http://www.pdx.edu/NERC>

nerc@pdx.edu

@nercpdx

503-725-8167