NeRC

Northwest Economic Research Center
College of Urban and Public Affairs

Carbon Tax Analysis for Oregon

March 2013

Portland State UNIVERSITY

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

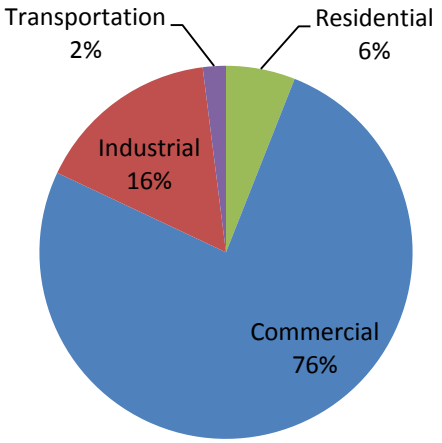
Modeling

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

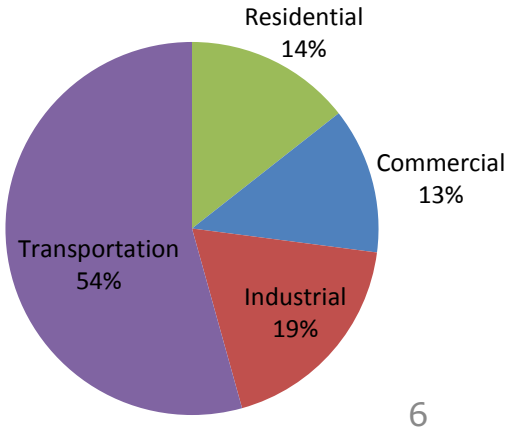
Sectors

Residential	• Home Energy Use • Residential Construction • Some Building and Apartment Management
Industrial	• Manufacturers • Agricultural Activity • Natural Resources
Commercial	• Catch-All Category • Includes Retail, Services, Etc.
Transportation	• Motor Vehicle Transportation • Shipping and Transport by all Means

Oregon Employment

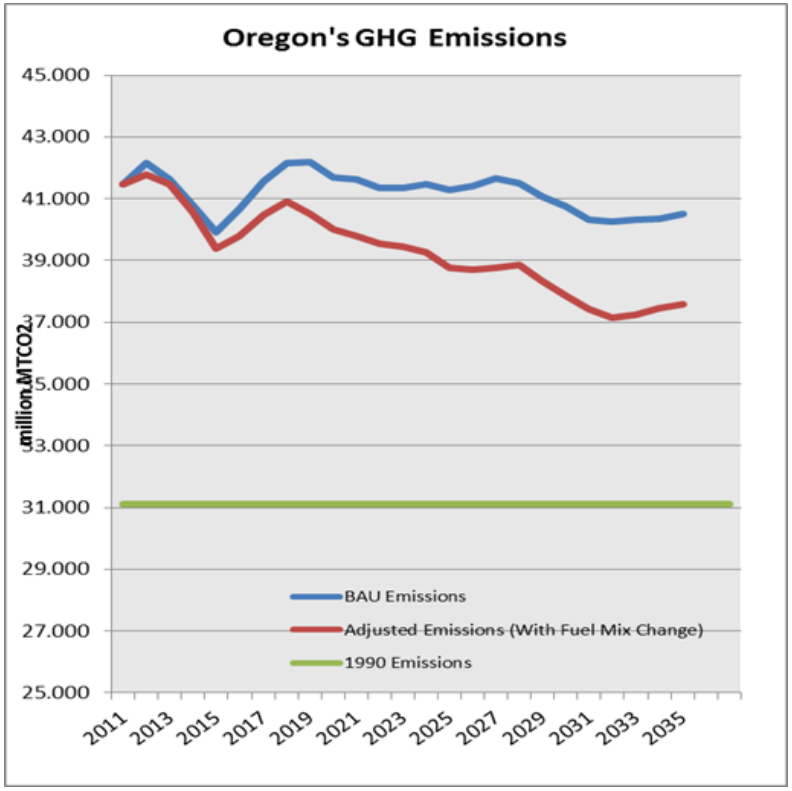


Oregon CO2e Emissions



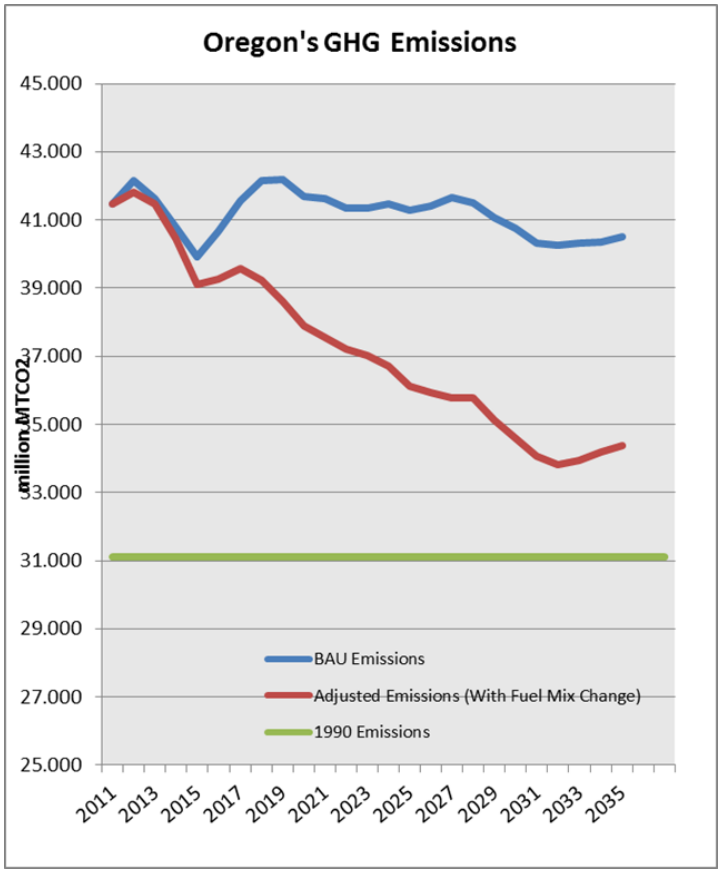
$30 Maximum- $5 Annual Increase (Annual Revenues)

	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



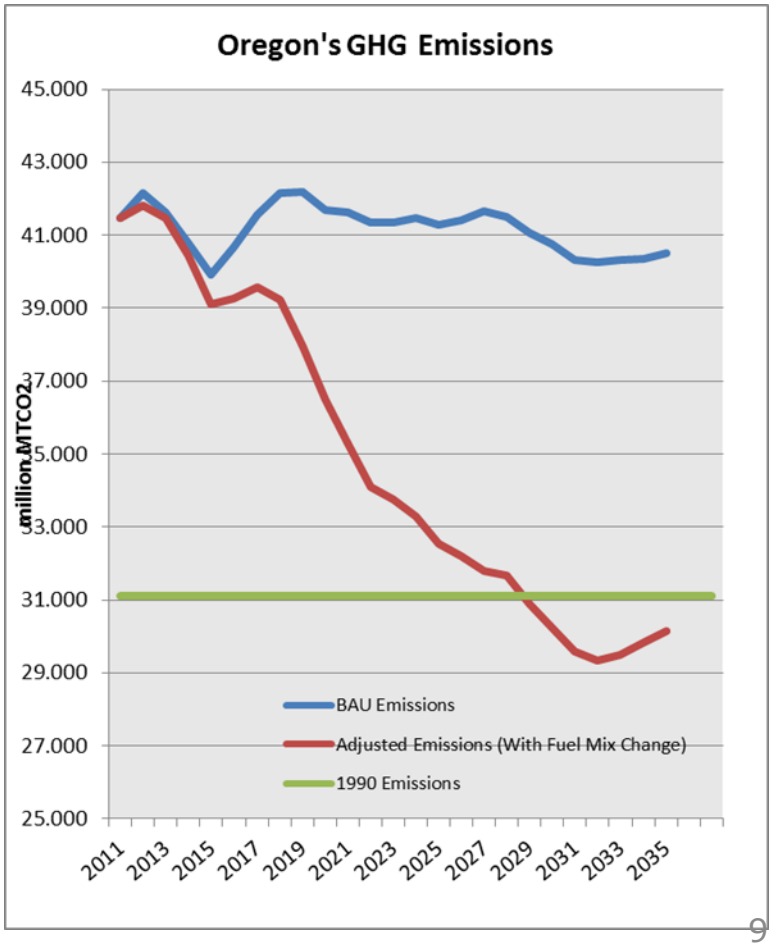
$60 Maximum- $10 Annual Increase (Annual Revenues)

	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

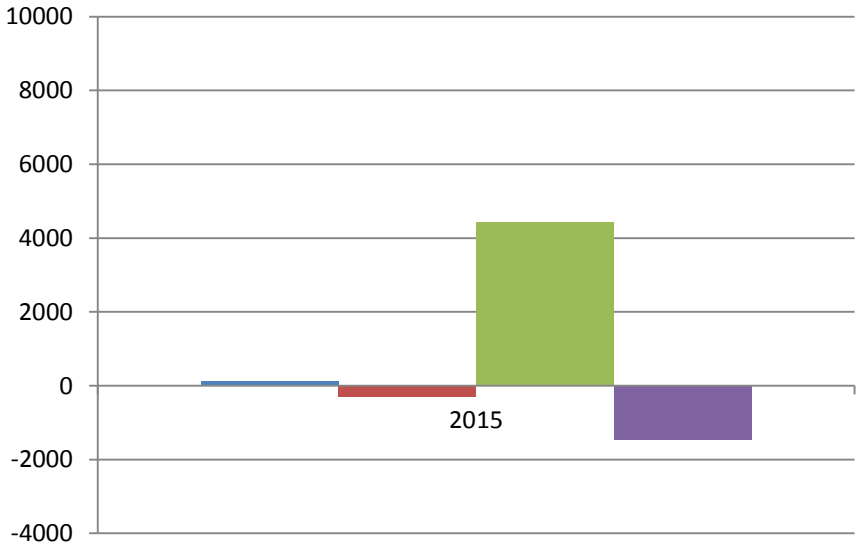
Scenario 2.1 - 10% Reinvestment

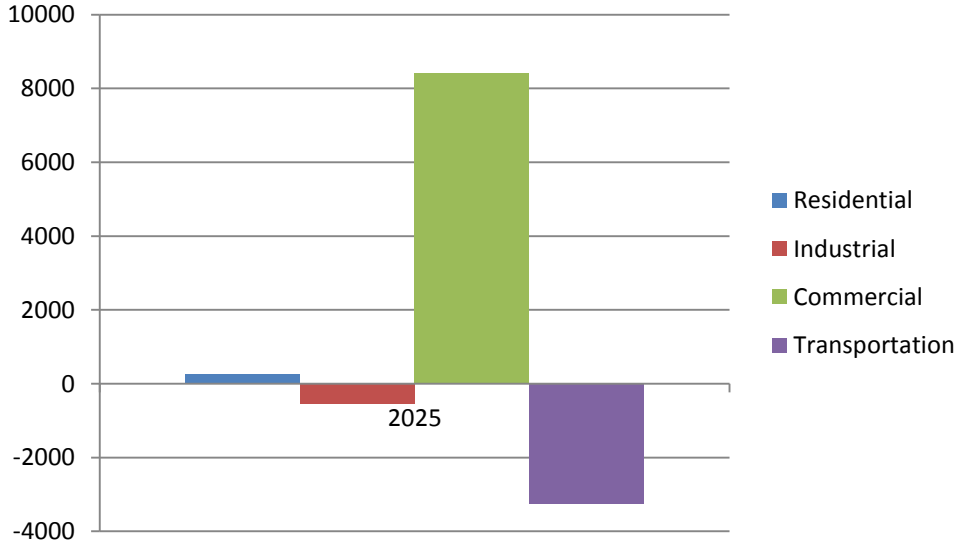
2015 (Carbon Tax = $30/ton)

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

2025 (Carbon Tax = $60/ton)

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

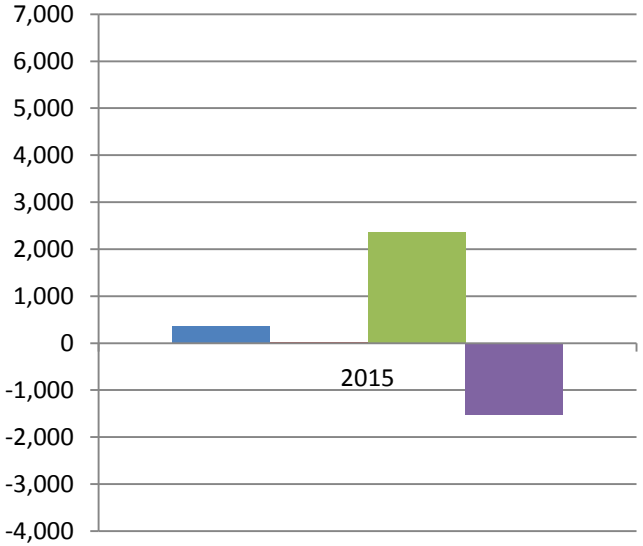
Scenario 2.2 - 25% Reinvestment

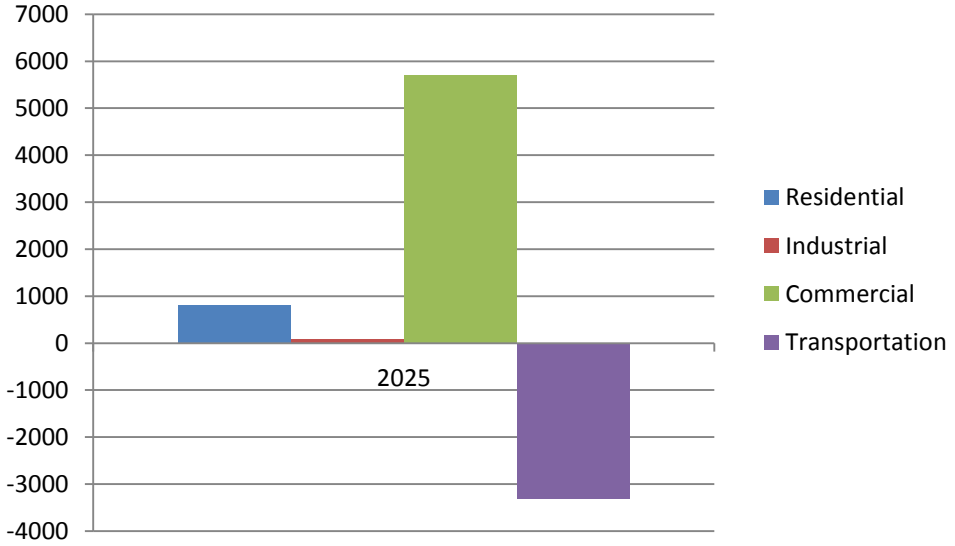
2015 (Carbon Tax = $30/ton)

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

2025 (Carbon Tax = $60/ton)

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