

Economic Analysis of a Carbon Pollution Charge

Overview of Findings of the OFM Office of Forecasting and Research

December 23, 2014

Summary

The economic impacts of a carbon charge on Washington's income, employment and output are negligible, with most measures showing slight improvement over time. This is mostly due to reinvestment of the charge and the relatively small size of the program compared to the overall state economy.

Fuel and energy prices could increase due to a carbon charge, assuming the carbon charge is passed on to retail consumers. The estimated gas price changes are smaller than historic price volatility, and the potential increases in fuel costs do not affect the overall net positive effect of the program on the statewide economy.

The economic analysis did not quantify future benefits of the proposed policy and investments related to transportation, education, and working families, and did not address avoided costs related to the impacts of climate change.

Introduction

The Governor's Carbon Pollution Accountability Act will establish a market based program to reduce carbon pollution in Washington. Beginning in 2016, the Department of Ecology will set an annual limit for carbon emissions to meet the statutory limits in 2020 and 2035. Major emitters of carbon dioxide will be required to submit to the state "allowances" equal to their annual emissions levels. The state will make allowances for sale available through quarterly auctions and will gradually reduce the number of allowances available so that statewide emissions decline in time to reach the statutory limits.

The Washington State Office of Financial Management (OFM) modelled the impact of a carbon price on inflation-adjusted personal income, job growth, gross state product and energy prices. The modeling also considered the impact of re-investing proceeds generated through the auctions back into the economy, as specified in the proposed legislation.

The benefits of the proposed policy and the Governor's proposed investment, including specific jobs resulting from transportation investments, improved education outcomes, and support for working families, are not summarized here. In addition, the economic models did not allow for consideration of the costs related to impacts of climate change (e.g., water supply, forest fires, shoreline and flooding damage and public health) that could be avoided over the long term.

Analysis Methods

OFM selected two models, which, when combined, can characterize the effects of a carbon price on the broader economy. The 2016 price was set at \$12.94 a metric ton and escalated yearly by \$.60 through 2020 and \$2 yearly through 2035. The models selected are the most current tools available to characterize the dynamic relationships between energy costs and the economy in a way that is sensitive to the particular dynamics of Washington's economy.

The model included reinvestment of the funds generated through auctions back into the economy. The assumptions for use of these funds were based on the revenue use priorities in the proposed legislation, and the Governor's proposed biennial budget. The following reinvestment assumptions were included in the modeling:

- 40% for transportation
- 40% for education
- 10% for working families tax rebate
- 3% for affordable housing
- 3% for manufacturing support
- 3% for forestry and rural community support
- 1% for administration and other uses

Additional details on the models and the assumptions used by OFM are available in the following slide presentation: <http://governor.wa.gov/documents/CarbonPricingPowerpoint12-23-2014.pdf>.

Key Findings and Observations:

1. The net statewide economic effects are extremely small in relation to the state economy. Employment, output, income and inflation-adjusted income are essentially unchanged under the carbon charge policy. Most of these measures show slight improvement over 20 years. A very small decline in inflation-adjusted income is extremely sensitive to inflation assumptions over the study period.
 - Economy-wide job gains are small; though some sectors could gain jobs and other sectors could lose jobs. All gains and losses, including at the detailed sector level, are small relative to the overall changes in job growth predicted under a "business as usual" baseline scenario.
 - Sectors that could gain jobs include industries such as construction (4774 jobs/1.21% in 2035), health practitioners (370 jobs/0.23%), engineering services (231 jobs/0.29%), forestry/fishing (121 jobs/2.79%), and cement/concrete production (79 jobs/0.88%).
 - Sectors that could lose jobs include truck transportation (227 jobs/0.58% by 2035), aerospace manufacturing (57 jobs/0.08%), electric power generation (38

jobs/1.51%), natural gas distribution (8 jobs/2.27%) and petroleum/coal manufacturing (8 jobs/0.37%).

- Gross state product rises steadily through the study period even as the carbon price is increased. Disposal personal income also rises through the study period, though the baseline and the policy cases are nearly identical if income is adjusted for inflation.

2. Inflation-adjusted fuel and energy prices could increase due to a carbon charge, compared to a “business as usual” baseline, as follows:

	Gasoline	Natural Gas	Electricity
2016	3.5% (12 cents/gallon)	8.9% (7 cents/therm)	8.2% (0.59 cents/kilowatt hr)
2020	3.9% (13 cents/gallon)	8.8% (8 cents/therm)	8.2% (0.56 cents/kwh)
2025	5.9% (21 cents/gallon)	13.2% (12 cents/therm)	10.4% (0.69 cents/kwh)
2035	10% (41 cents/gallon)	21.3% (24 cents/therm)	15.1% (1.05 cents/kwh)

- For purposes of modeling, the full carbon charge is assumed to be passed on to retail consumers.
- The estimated gas price changes are smaller than historic price volatility.
- Gas prices per gallon do not directly reflect changes in monthly or annual costs of transportation for households or businesses due to changes in fuel efficiency, new vehicle technology, improved alternatives for transportation, and the potential for declining fossil fuel demand over time.
- The potential increases in fuel costs do not affect the overall net positive effect of the program on the statewide economy, mostly because fuel costs are a relatively small portion of average household and business expenditures. These positive changes to the economy result primarily from reinvestment of the program funds.