

Evaluating the Impacts of a Proposed Carbon Tax, and Other Policies, in Washington State.

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Overview

In December 2015 a revenue neutral carbon tax initiative (I-732) was submitted to the Washington State legislature.¹ If approved by either the Legislature, or at the ballot box, it would be the first economy-wide carbon tax in the United States. I-732 is similar to the 2008 British Columbia (BC) Carbon Tax Act, the first economy-wide carbon tax policy in North America that was focused on reducing carbon dioxide (CO₂) emissions. However, the Washington carbon tax is economically broader based and more aggressive than the BC carbon tax: it would start at \$15 dollars per metric ton (MT) in 2017, increase to \$25 in 2018, and then increase 3.5 percent per year in real terms thereafter.

This paper evaluates the impact of the proposed Washington State carbon tax, and several alternative scenarios, on energy prices, consumption, and CO₂ emissions using the updated Carbon Tax Analysis Model (CTAM).²

Methods

Washington State developed CTAM in 2011 to forecast the impact of various proposed tax policies on state and national carbon dioxide (CO₂) emissions from carbon-based fuel combustion. CTAM is a straightforward spreadsheet based model that estimates the impact of carbon taxes on retail energy prices, energy demand, CO₂ emissions, and state revenues by applying long-term price elasticities of demand. The key inputs to CTAM are the price elasticity of demand table, long-term energy price and consumption forecasts derived from the U.S. Energy Information Administration's (EIA) Annual Energy Outlook publication,³ historical EIA state sector level energy consumption and electric power sales⁴ by fuel type.

Using CTAM we developed and evaluated four emission reduction scenarios: the proposed Washington State I-732 carbon tax scenario, and three alternative scenarios that included the proposed carbon tax plus an increasing number of exogenous complementary CO₂ emission reduction policies.

Results

For the proposed I-732 carbon tax only scenario, energy related CO₂ emissions are forecast to fall by 3.6 percent in 2020 and 10.3 percent in 2035 relative to the states business as usual (BAU) forecast.

For the first alternative scenario, carbon tax + 2 policies, CTAM was run with the proposed carbon tax and two current complementary policies: the early retirement of a large out-of-state coal plant⁵ and a cumulative reduction of 5 percent by 2035 in residential and commercial sector electric and natural gas consumption via additional efficiency acquisition. For the carbon tax + 2 policies scenario we find that state CO₂ emissions decrease by 6.1 percent in 2020 and 14.7 percent in 2035 relative to the BAU case. Adding the two complementary carbon policies reduces carbon tax revenues by 2.7 percent and 5.2 percent in 2020 and 2035 respectively relative to the carbon tax only case.

In the second alternative scenario, **carbon tax + 5 policies**, we added three additional complementary policies to the first scenario: policies promoting additional electric vehicle purchases that displace 10 percent of gasoline demand

¹ If the Washington legislature fails to act on I-732 it will be sent to the voters in November 2016.

² This paper is not meant to be an endorsement of the carbon tax initiative (I-732).

³ CTAM is currently loaded with Annual Energy Outlook 2015 Pacific region energy price and demand forecasts.

⁴ CTAM outputs are sensitive to whether a carbon tax is applied to in-state electric generation or sales.

⁵ 50 percent of plant generation to be replaced with renewable energy and 50 percent with natural gas generation.

by 2035, a biofuel policy that displaces 5 percent of distillate fuel emissions by 2035, and an increase in the road maintenance fuel tax⁶ resulting in a \$0.25 per gallon higher gasoline and diesel prices in constant dollars by 2035. For the carbon tax + 5 policies scenario we find that state emissions decrease by 6.6 percent in 2020 and 18.5 percent in 2035 relative to the BAU case. Adding the five complementary carbon policies would reduce carbon tax revenues by 3.4 percent and 8.7 percent in 2020 and 2035 respectively relative to the carbon tax only case.

In the third alternative scenario, **carbon tax + 6 policies**, we add an additional policy directed at industrial process emissions: Elimination of 90 percent of greenhouse gas (GHG) emissions caused by leakage of ozone depleting substitute (ODS) refrigerants and propellants. This is a non-energy GHG emission reduction policy and requires use of a different baseline and emission targets. Adding the six complementary carbon policies would reduce state GHG emissions by 6.9 percent and 21.5 percent in 2020 and 2035 respectively relative to the BAU case. The revenues changes are the same as for the previous scenario.

Conclusions

Washington State has set emission reduction targets, relative to the forecast BAU case, of 11 percent in 2020 and 31 percent in 2035. Our analysis using CTAM reveals that the proposed carbon tax by itself will reduce CO₂ emissions 3.6 percent in 2020 and 10.3 percent in 2035 relative to the BAU case, which will not be sufficient for the state to achieve its 2020 and 2035 emission targets. As expected, the addition of complementary carbon emission reduction policies will bring Washington State much closer to achieving the emission targets. The **carbon tax + 6 policies** would reduce state GHG emissions by 6.9 percent and 21.5 percent in 2020 and 2035 respectively - within about 10 percent of the 2035 target. Current smaller scale state emission reduction programs, not considered in this analysis, in the farm, forestry and waste sectors will bring Washington State even closer to the 2035 emission target. In addition, the federal Clean Power Plan (CPP), if implemented, will lower CO₂ emission rates associated with utility purchases from the wholesale electric power market, which will also close the gap to the 2035 emission target. However, it is likely that additional policy measures or technology advancements will be required for Washington State to meet its 2035 emission target.

⁶ The fuel tax on gasoline and diesel used for road maintenance and construction.