

Assessing Value of Adding Flexibility to the “Cap and Invest” Proposal of Washington State¹

As part of the Washington Climate Commitment Act, the State’s Senate Bill SB 5126 would establish a greenhouse gas (GHG) cap and invest program to be implemented by the Washington State Department of Ecology. The bill is currently under review and consideration in the Washington State legislature. The Western States Petroleum Association (WSPA) retained NERA Economic Consulting to develop a model that represents the Washington state economy using its *N_{ew}ERA* modeling system and to use it to develop estimates of the economic impact benefits of adding provisions for greater flexibility into the bill. This document presents preliminary results for one specific form of such flexibility: allowing for linkage between Washington’s and Western Climate Initiative’s (WCI) climate program.

Since the provisions and details of the bill are continuing to evolve, this research study represents an initial analysis of the targets and some of the proposed measures in the bill. The measures accounted for in this preliminary analysis include the imposition of an emission cap with tradeable allowances, no-cost allowance allocations, building efficiency, offsets credits, and allowances set aside in containment reserves. Some of the key research insights and results are presented below:

- The economic costs to Washington households are projected to be about one and a half times greater under the unlinked program than under the linked program. The average annual costs per household in Washington is projected to be about \$1,400 with linkage and \$1,960 without linkage over the 2024 to 2030 time period.²
- In an unlinked program, the allowance prices are projected to increase to about \$240 and \$320 in 2024 and 2030, respectively, to achieve the state's emissions goals. When the two programs are linked, Washington's allowance prices are projected to approach California's allowance ceiling prices of about \$75 in 2024 and \$100 in 2030. This result is due to the relative stringency of Washington's program and the additional demand for allowances from the WCI allowance market. If Washington links to the WCI program, it is projected to be a net importer of permits within the linked program.
- The average cost of compliance for motor gasoline and diesel with linkage to the WCI program is projected to be about \$0.66 and \$0.75 per gallon respectively over the 2024 to 2030 time period. The average cost of compliance for motor gasoline and diesel respectively without linkage is projected to be about \$2.11 and \$2.41 per gallon over the 2024 to 2030 time period.

	With WCI Linkage				Without WCI Linkage			
	2024	2027	2030	Average Annual (2024 - 2030)	2024	2027	2030	Average Annual (2024 - 2030)
Loss in Annual Consumption per Household (\$/HH)	\$1,280	\$1,460	\$1,450	\$1,400	\$1,930	\$1,910	\$2,050	\$1,960
Cost of Compliance of Motor Gasoline (\$/gal)	\$0.57	\$0.65	\$0.75	\$0.66	\$1.81	\$2.10	\$2.41	\$2.11
Cost of Compliance of Diesel (\$/gal)	\$0.65	\$0.75	\$0.86	\$0.75	\$2.07	\$2.40	\$2.75	\$2.41
Loss in Output of Energy-Intensive Sectors	-10%	-12%	-14%	-12%	-23%	-25%	-29%	-26%
Allowance Price (\$/MT CO ₂)	\$75	\$87	\$101		\$240	\$280	\$322	
Allowance Floor Price (\$/MT CO ₂) [*]	\$24	\$29	\$34		\$24	\$29	\$34	

*Fiscal Note (5 Apr 2021) p.60-61.

¹ These preliminary research insights reflect the research, opinions, and conclusions of the study author (Dr. Sugandha Tuladhar, Ph.D., Associate Director, NERA Economic Consulting) and does not necessarily reflect those of NERA Economic Consulting, its affiliated companies, or any other organization.

² All values are denominated in 2021 dollars.

Overview of Study Methodology and Modeling Assumptions

The N_{ew}ERA model is a U.S. regional economy-wide integrated energy and economic modeling framework that integrates a capacity and dispatch model of the U.S. electricity sector with a dynamic computable general equilibrium model of the U.S. economy that accounts for production, consumption, and investment decisions across regions and economic sectors. The model includes household decisions that affect overall energy use and related emissions from combustion of fossil fuels and industrial process emissions.

The N_{ew}ERA modeling system includes 14 types of existing electric generating technologies. New technology types that the model can build, in addition to existing types, include advanced coal with carbon capture and storage (CCS), natural gas combined cycle with CCS, offshore wind, onshore wind with storage, and photovoltaic solar with storage. The model includes two different types of vehicles - internal combustion engine vehicles (ICEs) and battery-operated Electric vehicles (BEVs) as well as biofuel representation for the gasoline and the diesel markets. The modeling framework assesses the economic impacts from policies by accounting for important sectoral and regional interactions that take place in the economy in addition to the direct costs or other effects of the policy.

The N_{ew}ERA model used for this study represents Washington and California as separate regions, this disaggregation allows the model to simulate region specific policies, especially when modeling the WCI program. Quebec's program is represented by a marginal abatement cost curve in the model. The model includes five energy (coal, natural gas, crude oil, petroleum products, and electric) sectors and seven non-energy (agriculture, , energy-intensive sectors, services, motor vehicle manufacturing, other manufacturing, commercial trucking, and commercial transportation) sectors.³ The analysis baseline was calibrated to the projections published by the Energy Information Administration (EIA) as defined in its Annual Energy Outlook 2021 Reference Case.

For this work, two scenarios were simulated – a scenario that links Washington's program with the WCI program, and a scenario in which there is no linkage. Washington's emission cap was set at the total allowance budget level specified in the 2SSB 5126 Revenue Estimates for the Forward Flexible Account and Climate Investment Account spreadsheet. Offset credit allowances and containment reserves were developed based on the information specified in the Fiscal Note⁴. The value of the direct allowances which are allocated to the electric utilities at no cost are rebated back to the rate payers. Allowances are assumed to be purchased at the model's projected allowance price rather than at the floor price specified in the Fiscal Note. Given the current uncertainty around the bill with respect to the use of the auction revenues, we assumed that the net revenues from the auctioned allowances would be given back to the Washington economy without any new distortions. For California and Quebec, the joint cap modeled follows the trajectories specified in the AB 398 and SB 32 bills.⁵ Revenues collected from the sale of allowances consistent with each region's cap-and-trade program are assumed to be returned in a lumpsum manner to the region's representative households. Under the linked scenario, permit trading is allowed among California, Quebec, and Washington; whereas in the unlinked scenario, trading is prohibited between the WCI jurisdictions and Washington. The model assumes transfer of permit revenues between regions. In both scenarios, California's program also includes the current Low Carbon Fuels Standard, Renewable Portfolio Standard, energy efficiency programs as well as existing electric vehicle mandates.⁶

³ The model treats biomass as a carbon-neutral fuel source. It additionally does not include net-zero emission technologies which if deployed would likely reduce the projected impacts.

⁴ <https://fnspublic.ofm.wa.gov/FNSPublicSearch/GetPDF?packageID=63129>

⁵ The emission goal in Washington declines by about 6.1% per year for the first 4 years of the program compared to California's rate of decline at 1.7% for its first 8 years.

⁶ A more detailed description of the model and assumptions will be provided as an addendum to this research summary.