

## 1. Executive Summary

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The Washington State Climate Legislative and Executive Workgroup (CLEW), through the Office of Financial Management (OFM), selected Leidos (formerly Science Applications International Corporation or SAIC) to prepare an evaluation of approaches to reduce greenhouse gas (GHG) emissions in Washington State. The CLEW members include Governor Jay Inslee, Senator Doug Ericksen (42<sup>nd</sup> District), Senator Kevin Ranker (40<sup>th</sup> District), Representative Joe Fitzgibbon (34<sup>th</sup> District), and Representative Shelly Short (7<sup>th</sup> District). The purpose of the CLEW, as defined by Senate Bill 5802, is to recommend a State program of actions and policies to reduce GHG emissions, that if implemented would ensure achievement of the state's emissions targets set in RCW 70.235.020. The recommendations must be prioritized to ensure the greatest amount of environmental benefit for each dollar spent and based on measures of environmental effectiveness, including consideration of current best science, the effectiveness of the program and policies in terms of costs, benefits, and results, and how best to administer the program and policies.

The purpose of this project is to evaluate approaches to reduce GHG emissions and achieve the State's emission targets set in statute (RCW 70.235.020). This project is required under Engrossed Second Substitute Senate Bill 5802, Chapter 6, Laws of 2013. This Final Report summarizes the results of the evaluation of GHG emission reduction programs adopted in other jurisdictions, including reduction strategies being implemented in the Pacific Northwest, on the West Coast, in neighboring provinces in Canada, and in other regions of the country. The evaluation also analyzes Washington State's emissions and related energy consumption and current GHG reduction policies adopted by the State, and summarizes local government initiatives. In addition, this report also includes a summary of federal policies and the modeling results of their contributions to Washington's GHG emission reduction targets.

The Washington State Legislature in 2008, through E2SSHB 2815, adopted targets requiring the State to limit GHG emissions to achieve the following reductions (RCW 70.235.020):

- By 2020, reduce overall emissions of GHGs in the State to 1990 levels;
- By 2035, reduce overall emissions of GHGs in the State to 25% below 1990 levels;
- By 2050, reduce overall emissions to 50% below 1990 levels, or 70% below the State's expected emissions that year.

### ***Key Findings***

The results of this project indicate that the State will not meet its statutory reductions for 2020, 2035 and 2050 with current state and federal policies. However, the State can meet its statutory 2020 target if near-term action is taken to implement a new comprehensive emission reduction

program. In 2020, for example, it is likely that Washington would meet its target if a new cap and trade policy is implemented. The evaluation found, however, that any combination of the policies summarized in this report, *at the implementation levels evaluated*, will likely be insufficient to meet Washington’s targets in 2035 and 2050. However, decisive actions taken today can set Washington squarely on a long-term path that can be strengthened and modified in the coming years to achieve the emission reductions required for 2035 and 2050.

### ***Progress Through Existing Policy***

Washington’s GHG emissions are dominated by three sectors. In 2010, transportation contributed 44 percent of emissions, electricity was responsible for 22 percent of emissions, and the residential, commercial and industrial sector accounted for 21 percent of emissions.<sup>1</sup> To date, Washington has implemented a variety of policies that reduce emissions in these sectors. In addition, out of the many existing federal policies evaluated, there is one that is expected to contribute additional<sup>2</sup> reductions toward Washington’s GHG targets.

**Table 1: Summary of Existing Washington State and Federal Policies**

Existing Policy	GHG Emission Reductions (MMTCO <sub>2</sub> e)			Sector Addressed
	2020	2035	2050	
State Renewable Fuel Standard	0.03	0.04	0.05	Transportation
Washington State Energy Code	0.9	5.1	11.0	Electricity, RCI
GHG Emissions Performance Standards	0.0	2.9	2.9	Electricity
Energy Independence Act (I-937)	7.9	10.9	10.9	Electricity
Energy Efficiency and Energy Consumption Programs for Public Buildings	0.03	0.04	0.04	Electricity, RCI
Conversion of Public Fleet to Clean Fuels	0.03	0.04	0.05	Transportation
Purchasing of Clean Cars	5.5	10.0	11.7	Transportation
Growth Management Act	1.6	2.4	2.6	Transportation
Federal RFS	1.4	1.6	1.6	Transportation
<b>Interactive Sum of Reductions from Existing policies</b>	<b>17.2</b>	<b>30.6</b>	<b>38.1</b>	

<sup>1</sup> The State GHG inventory followed the consumption-based approach for accounting for GHG emissions from the electricity sector. The rationale for using the consumption-based approach is that it better reflects the emissions (and emissions reductions) associated with activities occurring in the state, and it is particularly useful for policy-makers seeking to evaluate the impacts of state-based policy actions on overall GHG emissions. The goal of this effort has been to evaluate how the State can or will meet statutory targets in light of existing and potential policies, as measured by the State’s emissions inventory. Leidos evaluated policies using a framework consistent with the approach used for calculating Washington’s statutory baseline inventory (1990) and subsequent inventories.

<sup>2</sup> Additional reductions after accounting for overlap and interactions with existing State policies.

Reductions from these existing state policies, as well as the federal renewable fuel standard, are summarized in Table 1. Together, these policies are estimated to reduce Washington’s emissions by 17.2, 30.6, and 38.1 million metric tons carbon dioxide equivalent (MMTCO<sub>2e</sub>) in 2020, 2035, and 2050, respectively.

***Washington GHG Goals and the Challenge Ahead***

Despite Washington’s significant progress in reducing GHG emissions and establishing policies to generate future emission reductions, meeting the statutory emission targets are projected to require additional action. At the completion of the policy evaluations and the baseline projection, the results show that even with the significant contributions of existing state and federal policies, Washington is projected to fall short of meeting its statutory targets, as illustrated in Table 2.

**Table 2. Washington’s Baseline Emissions, Reductions from Existing Policies, Emission Targets, and Target Year Gaps**

	GHG Emissions (MMTCO <sub>2e</sub> )		
	2020	2035	2050
Projected GHG emissions <i>without</i> federal and state policy (BAU)	115.1	128.1	138.2
Estimated reductions from existing state policies <sup>a</sup>	-15.8	-29.0	-36.5
Estimated reductions from existing federal policies <sup>a</sup>	-1.4	-1.6	-1.6
Projected GHG emissions <i>with</i> federal and state policy	97.9	97.5	100.1
GHG emissions target	88.4	66.3	44.2
<b>Additional reductions required to meet target (Gap)</b>	<b>9.5</b>	<b>31.2</b>	<b>55.9</b>

<sup>a</sup> Accounts for interactions between policies (e.g., where policies target the same sources and reductions overlap)

To fill this gap, Washington will need to pursue a combination of additional policies to reduce GHGs, and strengthening existing policies to attain greater GHG reduction benefits. These additional policies may range from economy-wide cap and trade or carbon tax regimes, to targeted programs focusing on portions of the transportation or electricity sectors. Out of a large pool of potential policies nine new policies were selected for analysis and quantification,<sup>3</sup> based on criteria such as applicability, cost effectiveness, and potential magnitude of GHG impacts. Washington may consider these potential policies in isolation or in combination. Table 3 presents

<sup>3</sup> As a result of the bounds of Tasks 1, 2, and 3 of this project, not all programs with GHG reduction benefits currently underway in Washington are presented within this report. This project’s Statement of Work (SOW) specified the existing state and federal policies to be evaluated, in Task 1 and Task 3, respectively. In addition to the existing policies evaluated, there are many other programs planned or underway within the State, from transportation pricing to urban composting, which are generating emission reductions, but were not identified in the SOW and therefore not evaluated as an *existing* policy. The evaluation of policies *outside of Washington*, which was executed under Task 2, focused on comprehensive emission reduction strategies that do not exist or are substantially different than programs already underway in Washington. Consistent with the Task 2 SOW, a list of potential programs was run through a technical screen to determine the final list of programs to analyze.

these nine policies, their emission reductions, and the cost effectiveness associated with each. Additionally, Table 3 provides a sum of the reductions, accounting for interactions between policies. The interactive sum represents what would be expected from a State strategy with either cap and trade or a carbon tax as its centerpiece and the implementation of all seven of the additional policies.

**Table 3. Summary of Potential GHG Emission Reduction Policies in Washington**

Policy	Potential GHG Reductions (MMtCO <sub>2e</sub> )			Cost Effectiveness (\$/mtCO <sub>2e</sub> ) <sup>a</sup>	Sector Addressed
	2020	2035	2050		
Cap and Trade	12.1	22.1	35.9	Not quantified	Electricity, RCI, Transportation
Carbon Tax	0.4 – 1.7	0.6 – 5.0	Not quantified	\$5 – \$23	Electricity, RCI, Transportation
Low Carbon Fuel Standard	1.0	3.9	4.0	\$103 – \$131	Transportation
Zero Emissions Vehicle Mandate	0.1	2.0	2.6	(\$70) – \$70	Transportation
5% Renewable Fuel Standard <sup>b</sup>	0.2	0.4	0.4	Not quantified	Transportation
Public Benefit Fund <sup>c</sup>	0.6	2.9	Not quantified	\$(103) – \$146	Electricity, RCI
Property Assessed Clean Energy <sup>d</sup>	0.02	0.05	0.6	\$(171)	Electricity, RCI
Appliance Standards <sup>e</sup>	0.4	0.6	0.6	Not quantified	Electricity, RCI
Feed-in-Tariff, 375 MW Cap <sup>f</sup>	0.5	0.5	0.5	\$30 – \$500	Electricity
<b>Interactive Sum of Reductions with Cap and Trade</b>	<b>12.1</b>	<b>22.1</b>	<b>35.9</b>		
<b>Interactive Sum of Reductions with Carbon Tax</b>	<b>3.3</b>	<b>8.8</b>	<b>9.5</b>		

<sup>a</sup> NPV 2013 of emission reductions through 2035, 5 percent discount rate

<sup>b</sup> Evaluated as an existing state policy in Task 1, found to be unenforceable. Estimates presented here represent the net gain in emission reductions of a 5 percent RFS relative to Washington’s current 0.5 percent RFS attainment

<sup>c</sup> Assumes extending I-937 utility requirements to utilities under 25,000 customers. Two additional options were considered in the analysis as well. Results are highly dependent on funding levels.

<sup>d</sup> Based on assumed PACE funding of \$50 million over 5 years. Results are scalable.

<sup>e</sup> Evaluated as an existing state policy in Task 1, found to be subsumed by federal appliance standards. Estimates presented here as quantified under Task 1 and reflect potential additional appliance standards not yet covered by existing state or federal standards.

<sup>f</sup> All Feed-in-Tariff reductions would contribute to I-937 goals.

The results illustrated in Figure 1 below, show Washington’s projected emissions without state or federal policy, the projected contributions to future emission reductions attributed to existing state and federal policy, and the reductions estimated for the suite of potential policies with either cap and trade or a carbon tax at the center. The implementation levels modeled reflect the relative stringency of these policies as they have been implemented in other jurisdictions and do not consider continued strengthening or other changes. As such, the emission reductions flatten out after approximately 2025, at which point most modeled policies are fully implemented. The modeling for this analysis assumed new policy start dates ranging from 2016 to 2018 based on estimated time needed to pass and implement new legislation. Slower or more rapid adoption and implementation of these policies would result in achieving fewer or greater emission reductions in earlier years as these programs ramp up. Therefore, the scale of the policies as implemented and the timeline until the policies are implemented are two factors that will significantly affect Washington’s attainment of its goals. In summary, the policy *mechanisms* analyzed in this report may be sufficient to achieve future targets, but the success will be dependent on design and implementation of compliance parameters.

**Figure 1. Emission Reductions from Potential Policies Relative to Washington’s Projected Emissions**

