Hammerschlag LLC

Study Report:

Washington State Laws Affecting Greenhouse Gas Emissions

Prepared for Washington Office of Financial Management

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Executive Summary

Washington's Climate Commitment Act (RCW 70A.65.200(10)) requires the Washington state Office of Financial Management to submit a report to the Legislature summarizing two categories of state laws: laws that regulate greenhouse gas emissions from stationary sources and laws whose implementation may effectuate reductions in greenhouse gas emissions from stationary sources.

Utilizing a methodology developed by the University of Pennsylvania's *Program on Regulation* we screened 19 candidate chapters of Washington state code to assess their regulatory relationship to greenhouse gases. We found six chapters of Washington state code, including the Climate Commitment Act itself, to regulate greenhouse gas emissions; 10 chapters to effectuate reductions in greenhouse gases; and three chapters to fall out of this study's scope.

Chapters that regulate greenhouse gases in addition to the Climate Commitment Act are:

- Chapter 19.285 RCW, Energy Independence Act;
- Chapter 19.405 RCW, Clean Energy Transformation Act;
- Chapter 70A.60 RCW, Hydrofluorocarbons;
- Chapter 80.70 RCW, Carbon Dioxide Mitigation Plans; and
- Chapter 80.80 RCW, Baseload Electric Generation Performance Standard.

We have quantified the contribution that each of these laws continues to make in the present regulatory context that includes the Climate Commitment Act.

We find that the Energy Independence Act has played an important role in kick-starting Washington state's GHG reductions, though the relative strength of its contribution will diminish quickly in the near future. The Clean Energy Transformation Act, in contrast, will remain a strong influence on electric sector emissions into the 2040s. The Energy Independence Act and the Clean Energy Transformation Act regulate entities that are also covered by the Climate Commitment Act. The Climate Commitment Act supports emission allowance trading among covered entities irrespective of their economic sectors. Future electric sector emission reductions driven by the Energy Independence Act or the Clean Energy Transformation Act may not lower statewide greenhouse gas emissions, but instead will ease compliance with the Climate Commitment Act in other sectors through increasing the pool of tradable allowances.

The Hydrofluorocarbons Law is providing modest but fully additional GHG reductions that lie outside the domain of the Climate Commitment Act.

The CO_2 Mitigation Plans Law has had a very small impact on statewide GHG emissions over the past, and will have no further impact on GHG emissions in the future.

The Baseload Electric Generation Performance Standard is almost entirely eclipsed by the actions of other laws.

For each of the 10 laws that may effectuate reductions in GHGs, we review their overall purpose, specific GHG reduction mechanism, potential for GHG reduction, overlap with the Climate Commitment Act, and relationship to other GHG laws. Of the 10 laws, we found five to have the potential to moderately or substantially impact GHG emissions.

Authority

The Climate Commitment Act, at RCW 70A.65.200(10) (herein after "Subsection 10"), tasks the Office of Financial Management with submitting a report to the Legislature that summarizes two categories of state laws: laws that regulate greenhouse gas emissions from stationary sources, and laws whose implementation may effectuate GHG reductions from stationary sources. For laws that regulate GHG emissions, Subsection 10 directs the OFM to estimate the GHG reductions attributable to each, relative to a "baseline" in which the CCA and all other laws remain in effect. Subsection 10 enumerates 15 laws that are the minimum domain of the analysis.

Screening

Subsection 10 enumerates 15 laws[1] relating to GHGs and requests they be separated for analysis into those that regulate emissions and those that effectuate emissions reductions. We screened the 15 laws named in Subsection 10, and identified and screened four more laws, to make a total of 19 laws screened including the CCA itself. We interpreted "laws" to mean chapters of the Revised Code of Washington. The screening process is summarized in Figure 1.

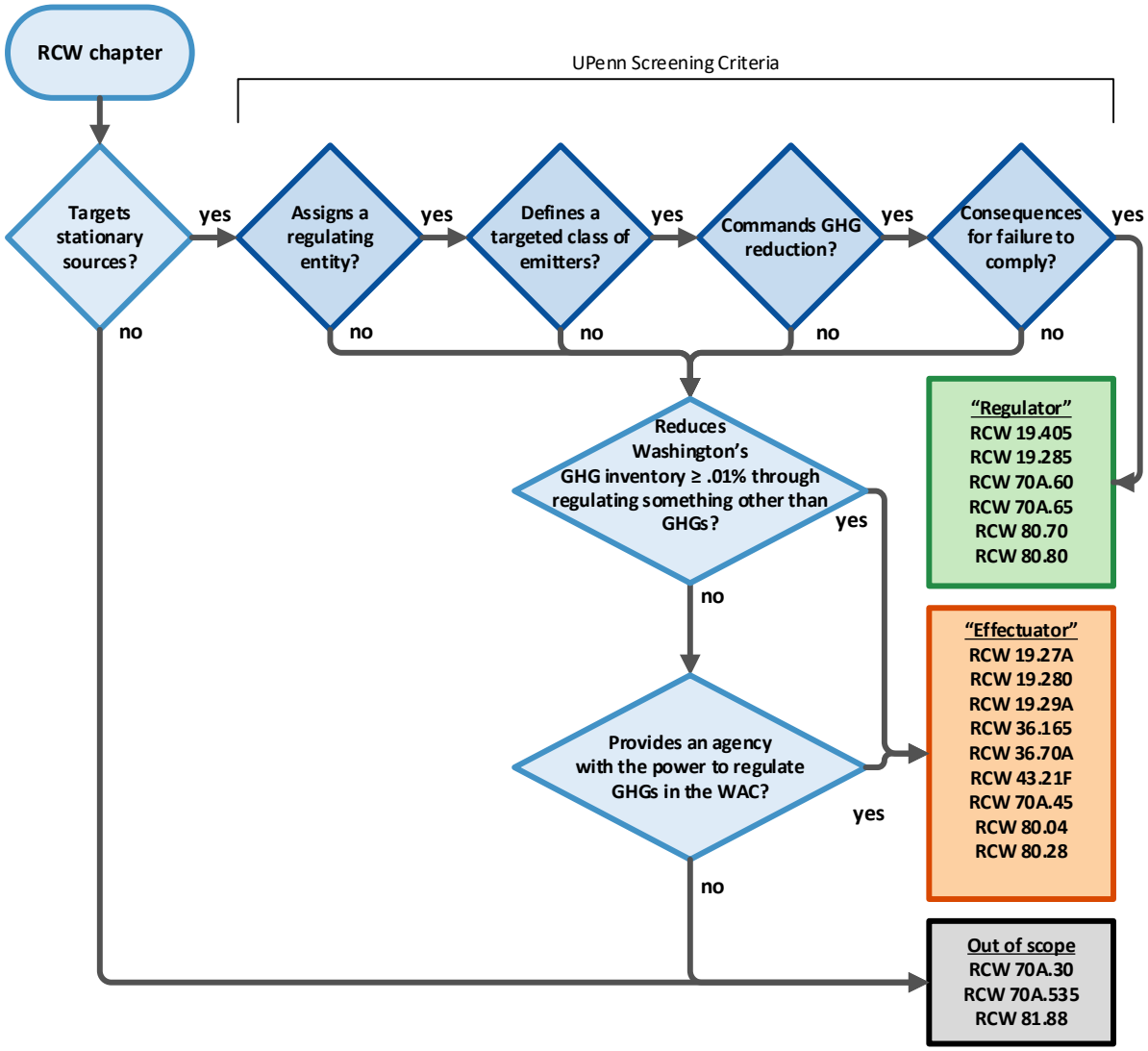

Figure 1 – Screening process to identify GHG regulators, GHG effectuators, and laws out of scope.

The first step was to determine whether a law acts on stationary sources of GHG emissions. Laws that only act on mobile sources of emissions, though important for reducing Washington's total

[1] One of the 15 laws is identified in Subsection 10 as "Chapter 70.30 RCW." Chapter 70.30 RCW regulates tuberculosis hospitals, facilities, and funding; for the purposes of this report we assume the Legislature intended Chapter 70A.30 RCW, which regulates motor vehicle emission standards.

GHG footprint, are out of scope for this analysis based on the language from Subsection 10 specifying a focus on stationary emitters.

The second step is to determine whether laws regulate GHG emissions or effectuate GHG emissions reductions. Subsection 10 does not provide definitions of "regulate" or "effectuate." To systematically separate GHG regulators from GHG effectuators, we use a simple framework presented by Dr. Cary Coglianese of the University of Pennsylvania's *Penn Program on Regulation* that specifies four requisite components of any regulation.[2] According to this framework, every regulation includes:

1. *A regulator*. This is the entity that creates and enforces the rule.
2. *A target*. This is the individual, group, or organization targeted by the regulation.
3. *A command*. In this report, a rule that directly commands GHG reductions.
4. *Consequences*. Without consequences (e.g., optional, incentive-based programs), a law cannot be a regulation.

If a law has each of these four components, it is a GHG regulator. Laws that do not have all four components of a regulation are therefore either GHG effectuators or out of scope. To separate these two from each other, we first ask:

- Does the law materially (i.e., by reducing Washington's GHG inventory by at least 0.01%)[3] influence GHG emissions by making commands that regulate something other than GHGs?

If yes, the law is a GHG effectuator. If no, we ask a final question:

- Does the law provide an agency with the power to regulate GHGs in the Washington Administrative Code?

If yes, the law is a GHG effectuator. If not, the law is out of scope.

Figure 2 summarizes how RCW chapters are classified and the variables that contributed to their classification:

[2] Coglianese, C. (2012, September 17). Regulation's Four Core Components. *The Regulatory Review*. https://www.theregreview.org/2012/09/17/regulations-four-core-components/

[3] .01% of Washington's annual GHG inventory is approximately 10,000 metric tons of carbon dioxide equivalent (10,000 tCO_2e), the threshold for mandatory reporting of GHGs to the Department of Ecology.

RCW Chapter	stationary emitter?	regulator? UPenn screen auth	target	cmd	enf.	result	effectuator? material GHGs?	auth. WAC?
19.27A State Energy Code	yes	✓	✓	×	✓	no	yes	
19.280 Integrated Resource Planning	yes	×	✓	✓	×	no	yes	
19.285 Energy Independence Act	yes	✓	✓	✓	✓	yes		
19.29A Fuel Mix Disclosure	yes	✓	✓	×	×	no	yes	
19.405 CETA	yes	✓	✓	✓	✓	yes		
36.165 CPACER	yes	✓	×	×	×	no	yes	
36.70A Growth Management Act	yes	✓	✓	×	✓	no	yes	
43.21F State Energy Strategy	yes	✓	✓	×	×	no	yes	
70A.15 Washington Clean Air Act	yes	✓	×	×	✓	no	no	yes
70A.30 Motor Vehicle Emission Standards	no							
70A.45 GHG Reduction Goals	yes	✓	✓	✓	×	no	yes	
70A.535 Clean Fuels Program	no							
70A.60 Hydrofluorocarbons	yes	✓	✓	✓	✓	yes		
70A.65 Climate Commitment Act	yes	✓	✓	✓	✓	yes		
80.040 Utility Regulation	yes	✓	✓	×	✓	no	yes	
80.280 Electric Gas & Water Regulation	yes	✓	✓	×	×	no	yes	
80.70 CO_2 Mitigation Plans	yes	✓	✓	✓	✓	yes		
80.80 Efficiency Performance Standard	yes	✓	✓	✓	✓	yes		
81.88 Gas and Hazardous Liquid Pipelines	yes	✓	✓	×	✓	no	no	no

Figure 2 – Classification Exercise Summary, represented as a sieve. This is a linear representation of the process shown in Figure 1 applied to all 19 candidate laws. From left to right, each law is tested for applicability to stationary sources as required by Subsection 10. Laws that fail this test are out of scope (gray box). Laws that pass this test continue to the UPenn screen; those that pass the screen are designated a "regulator" (green box); those that fail continue on to the right. There are two opportunities to be designated an "effectuator" (orange box) but if both of these tests fail then the law is out of scope (gray box). "CETA" means Clean Energy Transformation Act; "CPACER" means Commercial Property Assessed Clean Energy and Resiliency; "auth target cmd enf" are the four components of the UPenn regulatory screen, in the same order that they appear in Figure 1; "auth WAC" means authorizing GHG-effecting Washington Administrative Code.

The screening process found six of the 19 subject laws to be GHG regulators (one of these being the CCA itself), 10 to be GHG effectuators, and three to be out of scope. The five GHG regulators other than the CCA itself are:

- Chapter 19.285 RCW, Energy Independence Act;
- Chapter 19.405 RCW, Clean Energy Transformation Act;
- Chapter 70A.60 RCW, Hydrofluorocarbons;
- Chapter 80.70 RCW, CO_2 Mitigation Plans; and
- Chapter 80.80 RCW, Baseload Electric Generation Performance Standard.

Deregulation Methodology

Definition of "Deregulation" in This Study Report

RCW 70A.65.200(10) requires that we calculate:

> **the greenhouse gas emission reductions attributable to each chapter, relative to a baseline in which this chapter and all other state laws that regulate greenhouse gas emissions are presumed to remain in effect[.]** (RCW 70A.65.200(10)(a)(i))

Here "each chapter" means each chapter of RCW that regulates GHGs, and "this chapter" means the CCA. Subsection 10 defines GHG emissions under the regulatory status quo as a "baseline" against which the impact of each law is to be attributed. Since each chapter is already acting on the baseline by definition, we compute "reductions attributable" as the negative of the emissions increase caused by removing the chapter from the baseline.

Removal of a law is in practice deregulation, in which laws are repealed or displaced by less stringent law. Practical deregulation occurs at a unique point in time. Subsection 10 does not prescribe any unique point in time at which such deregulation would occur, so we evaluate each GHG increase as a counterfactual scenario in which the law was never passed to begin with. In this report we refer to such a counterfactual scenario as a "deregulated scenario," and in all report sections following this one "deregulation" means the modeling of a deregulated scenario unless stated otherwise.

Deregulation Scenario Calculator

We built a Microsoft Excel based Deregulation Scenario Calculator that computes the GHG impacts of five different deregulation scenarios corresponding to the five identified GHG regulators.[4] The Calculator computes the Subsection 10 "baseline" representing the anticipated, statewide GHG emissions under Washington state's regulatory status quo; and computes the GHG increase relative to this baseline due to deregulating any one of the five GHG regulators (other than the CCA). Data underlying the GHG forecast are drawn primarily from the Washington State Department of Ecology's statewide greenhouse gas inventory, and secondarily from several additional technical reports issued by Washington state's executive branch agencies. Parameters driving the baseline and each deregulation scenario are the quantitative prescriptions contained in each of the six GHG regulators (including the CCA itself).

The Calculator partially conforms to Best Practice Spreadsheet Modeling Standards version 7.1.[5] Full citations of underlying data are contained within the calculator.

One cannot assume that practical deregulation would yield the same result as a deregulation scenario computed by the calculator for this report, for two reasons. First, infrastructure and contracts responsive to the actual law would remain after its repeal. Most GHGs arise from energy generation,

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[4] Calculator is available at https://ofm.wa.gov/sites/default/files/public/publications/WA-004eGHGregulationsquantification.xlsb

[5] Spreadsheet Standards Review Board, "Best Practice Spreadsheet Modeling Standards Version 7.1" (Best Practice Modeling, 2015).

and most energy generation occurs within infrastructure that has lifetimes of at least 20 years. Power purchase agreements, the energy industry's Indigenous contractual type, feature similarly long timespans. Second, Washington state energy law cross-references itself both explicitly and implicitly. Repeal of a single law may have a second-order impact on the remaining laws that is not captured in the Calculator. For example, the CCA awards no-cost allowances to electric utilities under the presumption that the electric utilities have existing GHG reduction obligations under CETA. Repeal of CETA would likely need to induce change in, at the very least, WAC supporting the CCA.

Computing the Baseline

The screening phase described above yielded six GHG regulators, including the CCA, that regulate GHGs from stationary sources. The Calculator constructs the Subsection 10 baseline in a three-step process. First, the Calculator forecasts unrestricted GHG emissions, that is GHG emissions as if none of the GHG regulators had gone into force. Second, the reduction potential relative to unrestricted emissions is computed for each GHG regulator, in each year, in each (sub)sector, for each greenhouse gas.[6] Third, the impact of the laws working together is computed by, in each year, in each economic (sub)sector, for each greenhouse gas, returning the greatest reduction attributable to any one law.

Unrestricted Emissions

Unrestricted emissions are emissions from stationary sources reported in Washington state's GHG inventory[7] by the Department of Ecology, during the reference period Jan. 1, 2015 to Dec. 31, 2019, augmented by avoided GHGs of laws already acting on stationary sources during the reference period. The reference period is identical to the reference period defined by the CCA at RCW 70A.65.070(1)(a).[8]

The only GHG regulator acting materially on GHG emissions during the reference period was the Energy Independence Act. In 2015 the Energy Independence Act quota for eligible renewable resources was 3% and from 2016 to 2019 the quota was 9%, making the average quota during the reference period 7.8%. Of this, 1.1 percentage points already existed before the Act entering force, so 6.7% of electric generation during the reference period was from eligible resources presumably induced by the Act. (See additional discussion of the Energy Independence Act in *Deregulated Scenarios* below.) Without the Act, this 6.7% of electric consumption would have been served by unspecified power. Unspecified power is assigned an emission rate of 0.437 gCO_2e/Wh per the Clean Energy Transformation Act (RCW 19.405.070). At this emission rate, the Energy Independence Act appears to be responsible for avoiding about 2.8 million metric tons of carbon dioxide equivalent (2.8 million tCO_2e) during the reference period. The Energy Independence Act is also responsible for avoiding an additional 2.5 million tCO_2e during the reference period by

[6] In most cases, the Deregulation Scenario Calculator bundles impacts on multiple greenhouse gases together when all laws are act on the same group of greenhouse gases within any year-subsector compartment.

[7] Stacey Waterman-Hoey, "Washington State Greenhouse Gas Emissions Inventory: 1990–2019" (Washington State Department of Ecology, 2022).

[8] Outside of Subsection 10 the CCA uses the term "baseline" to mean emissions during the reference period. However, in this report we restrict our use of the term "baseline" to match the very different meaning appearing in Subsection 10.

requiring utilities to acquire cost-effective conservation. The derivation of this reference period value is discussed in more detail in *Reduction Potential of the Energy Independence Act* below.

The CO_2 Mitigation Plans Law (Chapter 80.70 RCW) requires entities applying for certification through the Energy Facility Site Evaluation Council (EFSEC) to comply with a CO_2 "Mitigation Plan" as a condition of certification. The CO_2 Mitigation Plans Law has been in force since 2004 but during the reference period only one energy facility[9] was subject to it. The facility's mitigation payments were responsible for avoiding up to 110,000 tCO_2e of GHGs per year, so this value is included in unrestricted emissions value as well.

Unrestricted emissions during the reference period are equal to 50.1 million tCO_2e reported in the Washington state GHG inventory plus 5.2 million tCO_2e avoided by the Energy Independence Act, plus 0.1 million tCO_2e avoided by the CO_2 Mitigation Plans Law, for a total of 55.3 million tCO_2e.[10] Unrestricted emissions are held constant throughout the forecast period, from 2020 through 2050.

The Baseload Electric Generation Performance Standard (Chapter 80.80 RCW) sets minimum efficiency standards for new, baseload electric generation commitments. The Performance Standard has been in force since 2008, but was not yet acting materially on GHG emissions during the reference period. The Calculator assumes the average length of power purchase agreements to be eight years, and the average lifetime of owned equipment to be 20 years. The Washington Department of Commerce issued its first downward step in the standard in March 2013 to become effective in April 2013. The Calculator applies each regulation as of Jan. 1 of the first *full* year the regulation is in force. Since the Calculator applies an eight-year delay to contract renewals or substitutions, equipment compliant with the stepped-down standard is not modeled until Jan. 1 of 2022.[11]

Reduction Potential of the Energy Independence Act

The Energy Independence Act[12] (Chapter 19.285 RCW) reduces unrestricted emissions by two mechanisms. The first is that utilities are required to achieve all cost-effective energy conservation.[13] To estimate the impact of this requirement we adopt an analysis previously conducted by the Washington State Department of Commerce.[14] The Commerce analysis provides a time series of

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[9] Grays Harbor Energy Center, in Grays Harbor County.

[10] Totals do not equal sums due to rounding errors.

[11] The law set an initial standard of 1,100 $lbCO_2e/MWh$ as of July 1, 2008. The eight-year delay on contracted electricity means the Calculator considers this initial standard to be acting on at least some delivered electricity as of 2017, within the reference period. But combined-cycle combustion turbines on the market as of 2008 easily met the initial standard, so natural gas-fired electric generation emissions from 2017 through 2021 are considered equal to those that would have occurred without the law.

[12] The Energy Independence Act began as Washington Initiative to the People I-937. The implementing RCW has since been acted upon by the Legislature. Hence the "Act" in "Energy Independence Act" should not be taken as the initial act of the people, but rather as the act of the people subsequently amended by acts of the Legislature.

[13] Energy conservation means "any reduction in electric power consumption resulting from increases in the efficiency of energy use, production, or distribution." (RCW 19.285.030(6))

[14] Tony Usibelli, "Estimated Emission Reductions from the Energy Independence Act (I-937)," memorandum, February 17, 2015.

annual GHG emissions reductions due to energy conservation achieved in response to the Energy Independence Act, from 2010 through 2030. GHG reduction in any given year is caused by all efficiency measures implemented that year, plus any unexpired efficiency measures from prior years. During the reference period, the average annual GHG reduction was 2.5 million tCO_2e. From model years 2020 through 2030, GHG impact relative to the reference period is equal to the Commerce analysis estimate minus 2.5 million tCO_2e. After 2030, the impact relative to the reference period is held constant.

The second mechanism requires a minimum quota of each utility's Washington electric load to be served by eligible renewable resources. Eligible renewable resources include facilities that commenced operation after March 31, 1999, powered by wind, solar, geothermal, landfill or sewer gas, biodiesel,[15] biomass, or water except for hydroelectric dams.[16] Biomass facilities commencing operation on an earlier date are allowed if they supply an electric utility serving more than 25,000 customers. The quota increases over time; 3% as of calendar year 2012; 9% as of calendar year 2016; and 15% as of calendar year 2020.

The Energy Independence Act entered force as of calendar year 2007. Of 88.3 TWh electricity consumed statewide that year, 0.54 TWh was powered by wind, and 0.46 TWh was powered by biomass.[17] Making the simplifying assumptions that all wind and biomass facilities contributing in 2007 were eligible facilities, and that no other facilities contributing in 2007 were eligible facilities, then 0.54+0.46 = 1.00 TWh, or 1.1% of total consumption, was already served by eligible facilities.

As of the first model year, 2020, the Energy Independence Act requires 15% of electric generation to originate from eligible renewables. Of this, 7.8% was already required on average during the reference period (see discussion in *Unrestricted Emissions* above), leaving 15% - 7.8% = 7.2% of load covered proportionally by the Act during the model years.

The computed emissions reduction due to the Energy Independence Act during each model year is equal to avoided unspecified power during the reference period, minus emissions of natural gas generation representing 7.2% of load.

Reduction Potential of the Clean Energy Transformation Act

The Clean Energy Transformation Act (Chapter 19.405 RCW) reduces unrestricted emissions through two independent mechanisms. First, electric supply from coal generation is prohibited beginning in 2026. Second, all electricity delivered in Washington is required to be GHG neutral beginning in 2030, where GHG neutral is defined to mean that the electricity originates from renewables or "nonemitting electric generation."

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[15] Qualifying biodiesel cannot be "derived from crops raised on land cleared from old growth or first-growth forests where the clearing occurred after December 7, 2006." (RCW 19.285.030(21)).

[16] Efficiency improvements to existing dams, as well as new projects in water pipes or irrigation canals, are allowed. (RCW 19.285.030(12)(a)-(c)).

[17] Austin Scharff, "Washington Electric Utility 2022 Fuel Mix Disclosure Report" (Department of Commerce, Washington State, August 15, 2023), https://www.commerce.wa.gov/growing-the-economy/energy/fuel-mix-disclosure/.

The reduction to unrestricted emissions caused by the coal ban is modeled as the negative of all electricity emissions that originate from coal generation.

The additional reduction to unrestricted emissions caused by the GHG neutrality requirement is modeled differently between 2030-2044, and from 2045 forward. From 2030 through 2044, CETA allows for up to 20% of electric deliveries to meet an "alternative compliance option" that is allowed to be a payment into a state low-income weatherization and structural rehabilitation assistance account, retiring renewable energy credits, investing in "energy transformation projects," or consuming electricity generated at certain solid waste energy recovery facilities. From 2030 to 2044 CETA is modeled to displace 80% of the remaining emitting electricity generation after the coal ban; the 20% permitted to meet "alternative compliance options" does not displace emitting electricity in the Calculator.[18] From 2045 forward, CETA is modeled to displace 100% of the remaining emitting electricity generation after the coal ban.

Reduction Potential of the Hydrofluorocarbons Law

The Hydrofluorocarbons Law (HFC Law) (Chapter 70A.60 RCW) implements the requirements of the U.S. EPA's Significant New Alternatives Policy (SNAP) program to reduce ozone-depleting substances?, as well as an additional refrigeration management program. The law furthermore instructs Ecology to pave the way for near-future legislation or rules that deploy refrigerant recovery requirements at product end-of-life. The combined GHG reductions of these three components were estimated in 2021 by Washington Ecology.[19] (Figure 3)

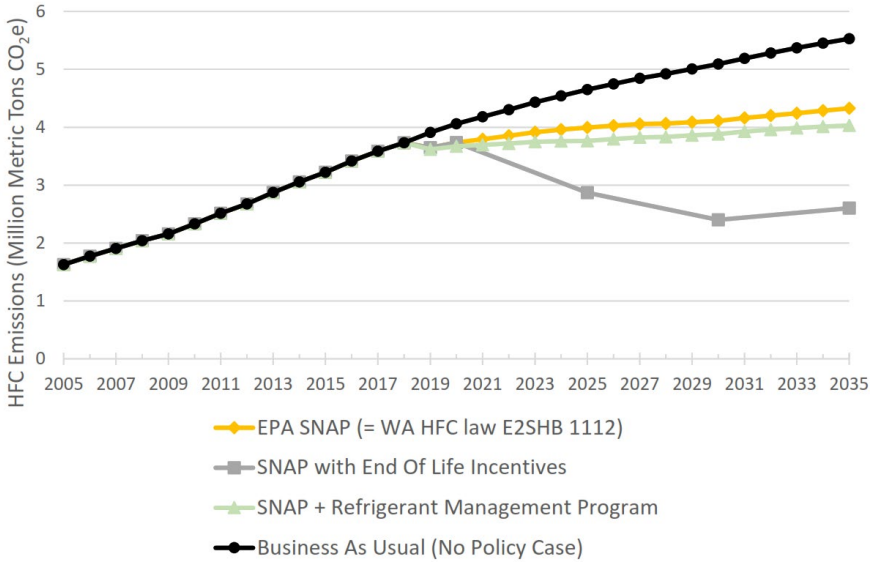

Figure 3 – Estimated GHG reductions of refrigerant management policies.[19]

[18] See additional discussion in Section *Deregulated Scenarios* at page 19.

[19] Bill Drumheller, Abbey Brown, and Emily Bruns, "Report to the Legislature The Hydrofluorocarbon Transition Background and Recommendations for Incentive-Based Policies and Programs" (Washington State Department of Ecology, January 2021).

At each year from 2020 onward, we computed an emissions scalar by dividing the Figure 3 "SNAP with End of Life Incentives" forecast (gray) by the "Business As Usual" forecast (black). This allowed us to apply the HFC emissions reductions computed in Ecology's study to our model on a proportionate basis (effectively replacing Ecology's "Business As Usual" reference with our unrestricted emissions reference). Ecology's computation of the "SNAP with End of Life Incentives" forecast excluded impacts of the proposed Refrigerant Management Program due to the complexity of computing interactions,[20] so the proportionate reductions we computed can be considered conservative.

Reduction Potential of the Climate Commitment Act

Though the CCA is not a subject of the deregulation tests reported in the next section of this Study Report, the CCA's reduction potential still needs to be quantified to compute the Subsection 10 baseline.

The CCA prescribes a GHG emissions budget to all covered entities. Covered entities are entities emitting at least 25,000 tCO_2e/yr directly, or delivering electricity responsible for at least 25,000 tCO_2e/yr of upstream emissions, or delivering fossil fuels that will generate at least 25,000 tCO_2e/yr when combusted by their end users. During the 2015-2019 baseline period covered entities emitted 68 million tCO_2e.[21]

Liquid fossil fuels covered by the CCA are consumed in large part by the transportation sector. Liquid fuels contribute 30 million tCO_2e to the CCA's 2015-2019 reference period emissions,[22] so the remainder of the CCA reference period emissions, 38 million tCO_2e, are ascribable to stationary sources.

The CCA GHG emissions budget ramps downward following a prescribed pathway beginning in 2023 and reaching its lowest value as of 2050 (Figure 4). The emissions budget in 2050 is 95.8% below the reference period emissions.[23]

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[20] Bill Drumheller, Abbey Brown, and Emily Bruns, 19.

[21] Kasia Patora, "Final Regulatory Analyses: Chapter 173-446 WAC, Climate Commitment Act Program" (Department of Ecology, Washington State, September 2022), https://apps.ecology.wa.gov/publications/SummaryPages/2202047.html Table 21, p.106.

[22] The emissions category representing liquid fuels is "other fuel supplier" which includes any fuel supplier other than natural gas. This category may include contributions from LPG ("propane"), fuel oil, coal, or other fuels typically used in stationary applications. The WA GHG inventory ascribes nearly 39 million tCO_2e/yr to use of liquid fuels for transportation during the 2015-2019 reference period, but only 12 million tCO_2e/yr to fuel oil and 0.15 million tCO_2e to coal in the residential/commercial/industrial sector. The GHG inventory demonstrates that the transportation sector's demand is plenty to absorb the 30 million tCO_2e ascribed to the "other fuel supplier" category, and that the transportation sector likely combusts a strong majority of "other fuel supplier" fuels.

[23] Approximately 0.1 million tCO_2e additional emissions will be added to the budget baseline as of January 1, 2027.

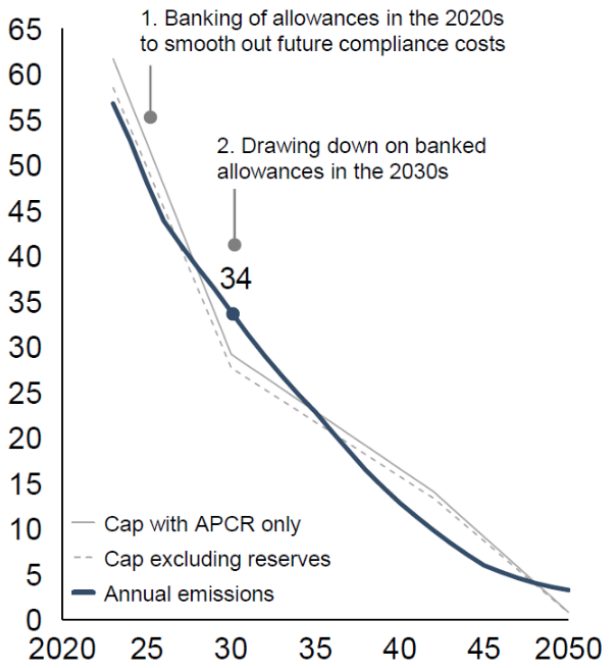

Figure 4 – Climate Commitment Act regulatory cap (gray) and projected emissions by covered entities (blue).[24]

For the purpose of letting market forces discover the most cost-effective emission reductions, all covered entities may trade allowances with each other. Covered entities deliver substantial fuel to mobile sources, but our analysis must be restricted to stationary sources. Hence, we make the simplifying assumption that mobile sources and stationary sources will each reduce their respective portions of the emissions budget at the same rate.

Reduction Potential of the CO_2 Mitigation Plans Law

The CO_2 Mitigation Plans Law requires entities applying for certification through the Energy Facility Site Evaluation Council (EFSEC) to comply with a "Mitigation Plan" as a condition of certification. The Mitigation Plan requires the applicant to mitigate 20% of CO_2 emissions induced by the project, and offers an option to do so by providing a third party $1.60 per metric ton of mitigation obligation.

During the time that the CO_2 Mitigation Plans Law has been in force it has applied to only one facility, which is Grays Harbor Energy Center. During the 15 years this facility has been under the law's jurisdiction, Grays Harbor Energy has provided a total of "more than $5.0 million"[25] in payments to the Climate Trust under the third party option provided by the law, or an average of about $330,000 per year.

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[24] Kasia Patora, "Final Regulatory Analyses: Chapter 173-446 WAC, Climate Commitment Act Program" (Department of Ecology, Washington State, September 2022), 135, https://apps.ecology.wa.gov/publications/SummaryPages/2202047.html.

[25] EFSEC Staff to EFSEC, "Grays Harbor Energy Center GHG Mitigation Plan," memo, August 5, 2022.

During the reference period, the cost of GHG offsets averaged $3.11 per metric ton of carbon dioxide equivalent.[26,27] By 2015 (the beginning of the reference period), the voluntary carbon market was relatively mature so the GHG offset price can be considered a viable indicator of the true price for offsetting GHG emissions. Climate Trust likely achieved about ½ tCO_2e per $1.60 provided, since $1.60/$3.11 = 0.51. But to compute the effect more directly, the total reduction achieved is $\frac{\$330{,}000/yr}{\$3.11/tCO_2e}$ = 106,000 tCO_2e/yr.[28]

EFSEC has ruled that Grays Harbor Energy Center's obligation to purchase allowances under the CCA displaces its obligation under the CO_2 Mitigation Plans Law as of Jan. 1, 2023.[29] Accordingly, we model payments by Grays Harbor Energy Center to continue at their historical average through 2022, but no further. Neither do we model any impact of the CO_2 Mitigation Plans Law after 2022 whatsoever. We assume that any future, EFSEC-permitted energy plant that is subject to the CCA will be granted the same exemption set by the Grays Harbor Energy Center precedent.[30]

Reduction Potential of the Baseload Electric Generation Performance Standard

The Baseload Electric Generation Performance Standard (Performance Standard) requires successive reductions in the maximum GHG emission rate allowed for baseload electric generation. More specifically, the Performance Standard controls the maximum GHG emissions rate allowed for baseload generators when utilities are entering a "long-term financial commitment." Entering a long-term financial commitment means taking an ownership interest or entering a power purchase agreement lasting five years or longer. Generators are considered baseload if they have a capacity factor of at least 60%.

The Performance Standard sets a maximum emissions rate of 1,100 $lbCO_2e$/MWh for long-term financial commitments that start July 1, 2008, or later. Every five years thereafter, the Washington Department of Commerce is to adopt by rule a new maximum emission rate that is equal to the average emission rate found during a survey of commercially available combined-cycle natural gas turbines. The first two such surveys were completed in 2013 and 2018, finding an average of 970 $lbCO_2e$/MWh in 2013 and 925 $lbCO_2e$/MWh in 2018. We estimated future outcomes from 2023 through 2048 by assuming the proportional drop from 2013 to 2018 (925/970 = 0.954) would continue through 2048. This yielded the series of outcomes shown in Table 1.

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[26] Stephen Donofrio et al., "State of the Voluntary Carbon Markets 2019: Financing Emissions Reductions for the Future" (Ecosystem Marketplace, December 2019).

[27] Stephen Donofrio et al., "Voluntary Carbon and the Post-Pandemic Recovery" (Forest Trends, September 2020).

[28] As of November 2023, Climate Trust claims a lifetime achievement of 6.75 million tCO_2e of GHG reductions with $53 million of financing, or an average abatement cost of $7.85/$tCO_2e$ (https://climatetrust.org/impact/). Climate Trust's achieved reductions may therefore be lower than computed in the text.

[29] Energy Facility Site Evaluation Council, "Resolution No.351 Grays Harbor Energy Center - Purchasing Emission Allowances under the Climate Commitment Act Will Replace Payment Obligation Under the 2003 Greenhouse Gas Mitigation Plan," Resolution (EFSEC, September 20, 2022).

[30] Energy Facility Site Evaluation Council. "The Council concludes that the CCA is the type of comprehensive greenhouse gas reduction and mitigation regulation that EFSEC anticipated in the GHG Plan's sunset provision," bottom of p.1.

first full year in effect	performance standard $lbCO_2/MWh$	method
2009	**1,100**	initial legislated
2014	**970**	actual average
2019	**925**	actual average
2024	**882**	forecast average
2029	**841**	forecast average
2034	**801**	forecast average
2039	**765**	forecast average
2044	**729**	forecast average
2049	**696**	forecast average

Table 1 – Actual and forecast emission performance standard values from initial legislation to 2050. "$lbCO_2e/MWh$" means pounds of carbon dioxide equivalent per megawatt-hour.

We assume that the average duration of Washington utilities' power purchase agreements is eight years. Accordingly, in any given year half of the portfolio of contracted generators would be operating on contracts entered eight or more years earlier. We approximate this effect by having the average emission rate of generation lag the standard by eight years. Analogously we assume the average duration of Washington utilities' ownership interests is 20 years, and that the average emission rate of owned generation lags the standard by 20 years.

The Calculator assumes that all contributions to Washington's GHG inventory assigned to natural gas-fired generation are baseload generation, and that 50% thereof is contractual and 50% from owned resources. The Calculator assumes that all contributions to Washington's GHG inventory assigned to coal generation are owned baseload generation.

The law includes special provisions for coal generation at Washington's only coal-fired power plant, located in Centralia. Each of the two boilers powering this plant are to be retired before 2021 and before 2026, respectively. We assume that each boiler is replaced by natural gas generation emitting at the emissions performance standard in effect at the time of boiler retirement.

Deploying the Performance Standard following the various assumptions outlined above produces trajectories of emissions regulated by the Performance Standard as shown in Figure 5.

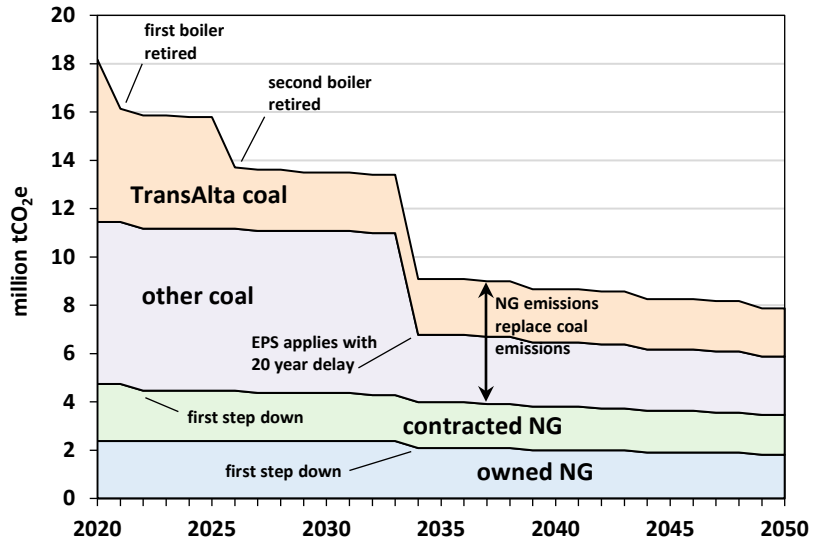

Figure 5 – GHG emissions associated with baseload electric generation that is regulated by the Performance Standard. The values are reference period emissions reduced proportionately according to provisions of the Performance Standard. "EPS" means Performance Standard, "NG" means natural gas.

As can be seen in Figure 5, the Performance Standard's strongest effects arise from disabling future commitments to coal plants, rather than from controlling the efficiency of future natural gas generation.

Baseline Result

The impact of all of the above laws working together is computed by, in each year, in each economic (sub)sector, for each GHG, returning the greatest reduction attributable to any one law.[31] This process produces the baseline shown in Figure 6.

[31] This works because the domain of each computation is sufficiently narrow. Within each year-subsector-gas domain, when an entity is complying with the most stringent law in that domain it is also complying with any less stringent laws *in that domain*. More complex interactions become visible when considering all of the year-subsector-gas domains together as described in Section *Deregulated Scenarios* below.

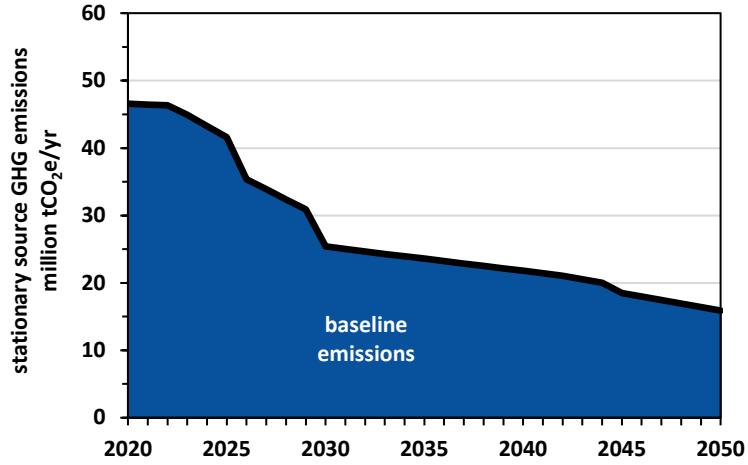

Figure 6 – Subsection 10 baseline. This is the GHG emissions trajectory computed when in each year, in each economic (sub)sector, for each GHG, the GHG reduction is equal to that induced by the law acting most strongly in that year, in that (sub)sector, on that gas. Only stationary source emissions are included (see text for detail).

Figure 6 includes all Washington state GHGs that originate from stationary sources. These are emissions from four primary categories "Electricity, net consumption-based," "Residential/Commercial/Industrial," "Fossil fuel industry," and "Industrial processes" in Washington state's GHG inventory.[32] Even though the CCA reduces emissions from covered entities 95.8% by 2050, the baseline shown in Figure 6 does not fall as far by 2050 because only 76% of stationary sources in Washington's GHG inventory are emitters of at least 25,000 tCO_2e and therefore covered by the CCA.

[32] Stacey Waterman-Hoey, "Washington State Greenhouse Gas Emissions Inventory: 1990–2019" (Washington State Department of Ecology, 2022), 19–21.

Deregulated Scenarios

Energy Independence Act

Lost GHG reductions associated with the Energy Independence Act deregulation scenario are shown in Figure 7.

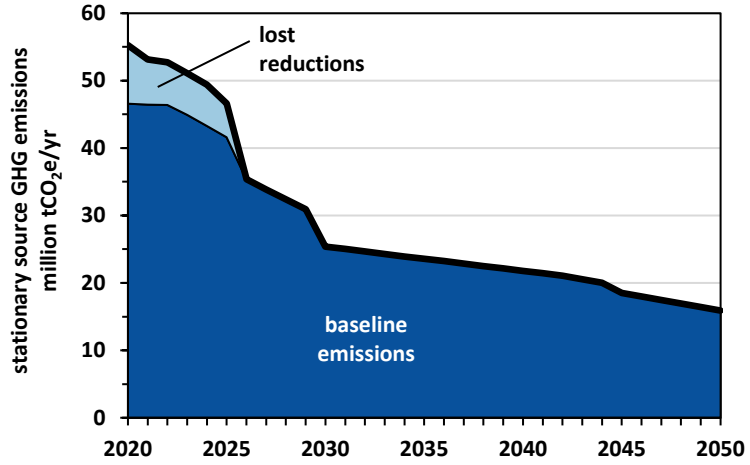

Figure 7 – Lost reductions of the Energy Independence Act deregulated scenario.

Almost the entirety of the Energy Independence Act's unique contribution to the baseline is due to its precedence in time relative to the other regulations. By the beginning of the modeling period in 2020 the Energy Independence Act was inducing roughly 8.8 million tCO_2e of annual GHG reduction, of which 5.2 million tCO_2e were due to reductions in place during the 2015-2019 reference period, with the remainder due to the increment to a 20% renewables quota beginning in that year, as well as slightly increased levels of conservation.

Lost reductions of the Energy Independence Act renewables quotas are computed in a two-stage approach (Figure 8). Reductions included in the reference period are replaced with "unspecified power" at the 0.437 gCO_2e rate established by law in RCW 19.405.070(2). Additional reductions that occur during the modeling period are ascribable to the step to a 20% quota, and these are replaced with natural gas generation at deregulation. Replacing 2020-forward lost reductions with natural gas ensures that the Calculator maintains mathematical integrity, because the state's GHG inventory divides GHG emissions by electric generator fuel; there is no "unspecified power" category available to displace.

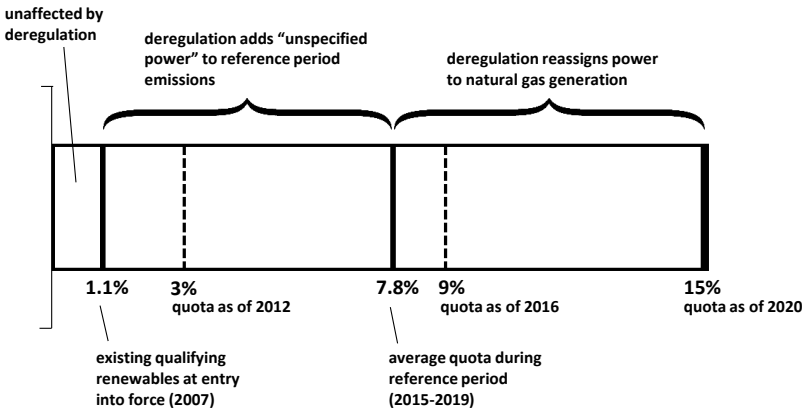

Figure 8 – Assignment of Energy Independence Act affected electric generation sources at deregulation. The "unspecified power" segment from 1.1% to 7.8% is applied to the constant, average electric consumption during the reference period. The natural gas segment from 7.8% to 15% is applied to the forecast electric consumption in each model year.

Lost reductions of the Energy Independence Act's energy conservation requirement are computed as negatives of the Commerce analysis reductions described in *Reduction Potential of the Energy Independence Act* above.

As of 2026, both CCA and CETA exert a stronger effect on electric sector emissions than the Energy Independence Act, and its deregulation no longer increments the baseline. From 2023 through 2025 CETA is not yet acting on electric utilities, but the CCA is. If electric utilities reduce GHGs so as to be exactly covered by their no-cost allowances during these years, the GHG reduction will be less than that induced by the Energy Independence Act. Hence Energy Independence Act deregulation still induces a projected (but diminishing) rise above the baseline during those years.

Clean Energy Transformation Act

Lost GHG reductions associated with removal of CETA from the baseline computation, before effects of allowance trading, are shown in Figure 9.

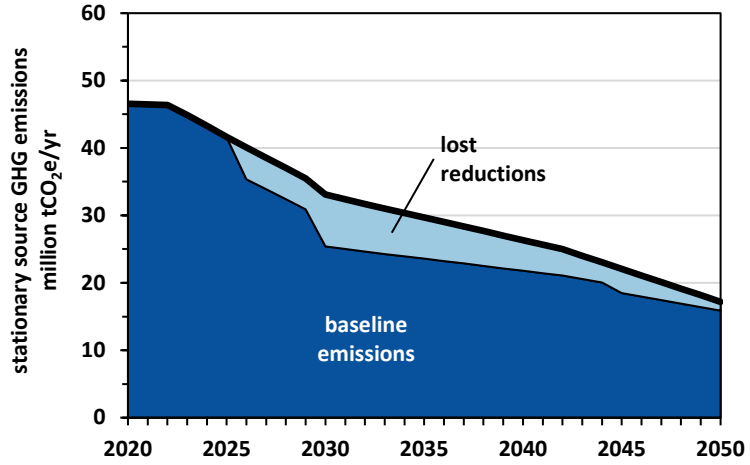

Figure 9 – Lost reductions of the CETA deregulated scenario, before effects of allowance trading.

CETA implements a coal ban as of 2026, which has a strong and relatively immediate impact on electric sector emissions (see discussion of the relative impacts of coal versus natural gas resources appearing under *Reduction Potential of the Baseload Electric Generation Performance Standard* above). This is visible as the correspondingly immediate onset in 2026 of "lost reductions" in Figure 9. As of 2030 CETA requires a minimum of 80% of electric resources to be renewable or nonemitting, which pushes electric sector emissions down more quickly than the relatively slower approach of the CCA. As of 2045 CETA requires 100% of electric resources to be renewable or nonemitting, again staying ahead of the CCA.

From years 2030 through 2044, the 20% of electric resources beyond the 80% required to be renewable or nonemitting must either be renewable or nonemitting themselves, or satisfy an alternative compliance option. Alternative compliance options are payment into a state low-income weatherization and structural rehabilitation assistance account, retirement of renewable energy credits, investment in "energy transformation projects," or consumption of electricity generated at certain solid waste energy recovery facilities. Each of these compliance options may effectuate some reductions in Washington state's stationary source GHGs, but quantification of those reductions is difficult to impossible.

It is presumed that the predominant alternative compliance option chosen by utilities will be retirement of unbundled renewable energy credits. The Washington Department of Ecology's GHG inventory computes electricity emissions according to fuel mix disclosure reports. Fuel mix disclosure reports are required to claim facilities according to their fuel, without regard to any REC purchases. However RECs can be retired on behalf of unspecified power, which may then be claimed as renewable energy.[33] Each REC that is purchased to meet the 20% quota may or may not be applied to the utility's fuel mix disclosure report, and therefore may or may not affect Washington's GHG inventory.

[33] Austin Scharff, "Washington State Fuel Mix Disclosure (FMD) Program - 2022 Utility Reporting Guidelines" (Washington State Department of Commerce, 2022).

Given that the quantitative impact of renewable energy credit retirements on Washington's GHG inventory is unforecastable, and given that the remaining alternative compliance options are likely to have relatively low impacts to Washington's GHG inventory, for the sake of modeling CETA's impact conservatively we assume that the 20% quota does not displace conventional electric resources from 2030 through 2044.

All, or nearly all, of the GHG emissions sources regulated by CETA are also CCA covered entities. Because CETA is already pushing electric sector GHGs downward at a higher rate than the CCA allowance budget moves downward, the electric sector is likely to meet its share of the CCA's GHG reduction pathway utilizing less than its proportionate share[34] of the allowances. This makes more allowances available to other regulated parties, supporting a relatively slower GHG reduction in their respective economic sectors. Note that this effect occurs not just within the collection of stationary emissions sources: allowance availability enabled by CETA may be slowing mobile source GHG reductions as well.

Hydrofluorocarbons Law

Lost GHG reductions associated with removal of the HFC Law from the baseline computation are shown in Figure 7.

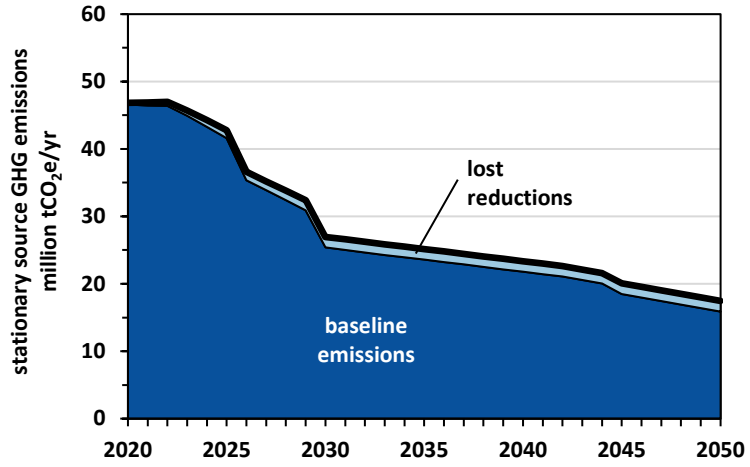

Figure 10 – Lost reductions of Hydrofluorocarbons Law deregulation.

As of 2020, of facilities regulated by the CCA only one includes HFCs among its reported GHGs (WaferTech LLC).[35] This facility emitted HFCs at a steady, average rate of 10,200 tCO_2e per year during the reference period. Meanwhile, our calculated reduction potential of the HFC Law begins at 240,000 tCO_2 in 2020 increasing to 1.5 million tCO_2 by 2030. The HFC Law acts on, and the calculated reduction potential is based on, use- and disposal-phase management of equipment accepting refrigerants. The single CCA-regulated HFC emitter is a semiconductor manufacturer;

[34] By "proportionate share" we mean a share proportional to: CCA-covered electric sector emissions during the reference period, divided by all CCA-covered emissions during the reference period.

[35] Based on facilities reporting 25,000 tCO_2e or higher to Washington's mandatory GHG reporting program. Data at https://data.wa.gov/Natural-Resources-Environment/GHG-Reporting-Program-Publication/idhm-59de/data.

hence the reported HFC emissions are almost certainly industrial process emissions that were unlikely included in the computations of the HFC Law's reduction potential. For these reasons we assume that the HFC Law's contribution to the study baseline is fully additional to the CCA itself, and deregulation would produce an increment to Washington state emissions equal to that shown in Figure 10.

CO_2 Mitigation Plans Law

From 2020 through 2022, the CO_2 Mitigation Plans Law was responsible for approximately 110,000 tCO_2e GHG reduction per year, a quantity invisible on the vertical scale of Figure 6. During those years, the Energy Independence Act was already responsible for approximately 5.5 million tCO_2e GHG reduction per year, swamping the CO_2 Mitigation Plans Law effect on GHG emissions of the electric sector.

The economics of the CO_2 Mitigation Plans Law favor third-party payments, and indeed the one party affected by the law (Grays Harbor Energy) took this path. Since the payments are applied to GHG reduction projects of the third party's discretion, it is probable that any GHG reductions due to the law are outside the electric sector and therefore additional to the Energy Independence Act effects. To the extent that the GHG reduction projects affect sources that are not CCA covered entities, CO_2 Mitigation Plans Law reductions will be additional to the CCA as well. However, the legal displacement of the CO_2 Mitigation Plans Law by the CCA makes this point moot. (See discussion in *Reduction Potential of the CO2 Mitigation Plans Law* above.)

Baseload Electric Generation Performance Standard

From 2020-2024, the Performance Standard's effect on electric sector emissions is eclipsed by the still relatively strong influence of the Energy Independence Act. From 2025 forward, the Emissions Performance Standard is eclipsed by the electric sector's proportionate share of CCA's allowance budget. Hence, deregulation of the Emissions Performance Standard is not detected by the Calculator, and does not result in a "lost reductions" wedge appearing on the baseline of Figure 6. It is worth noting that the relatively weak effect of the Emissions Performance Standard is due in part not to the quantitative values of the standard itself, but rather to the delays while awaiting renewals of power purchase agreements or investments in new equipment.

The Performance Standard also requires retirement of the two Centralia coal-fired boilers before 2021 and 2026 respectively. The same ultimate effect is achieved by CETA's outright ban on coal as of 2026. The Calculator operates by deregulating one law at a time. Since the Performance Standard and CETA have equivalent effects on in-state coal generation, the Legislature's intent with regard to in-state coal is protected by the second law when one of them is deregulated by the Calculator. If the Emissions Performance Standard and CETA were to be deregulated simultaneously, however, this would allow for continued electric generation from in-state coal, causing a significant upward excursion in electric sector GHG emissions.

In the Calculator, retirement of the first Centralia boiler between 2021 and 2026 is eclipsed by the larger reduction associated with the Energy Independence Act. This is not realistic because Energy Independence Act regulated parties are unlikely to take actions that result, in and of themselves, in

retirement of a Centralia coal plant boiler. However, we chose not to attempt to model this intermediate effect because it necessitates allocation of the CCA's effects between coal and noncoal electric resources. Neither the CCA itself, nor Ecology's computation of the CCA allowance budget, make such a distinction and doing so would invoke arbitrary assumptions about the CCA's behavior.

Summary of Effects

Each of the effects described above is summarized numerically in Table 2.

	emissions of deregulation, million tCO_2e/yr			
law	2020	2030	2040	2050
Energy Independence Act	8.7	--	--	--
CETA	--	7.7	4.5	1.3
Hydrofluorocarbons Law	0.2	1.6	1.6	1.6
CO2 Mitigation Plans	0.1	--	--	--
Emissions Performance Standard	--	--	--	--

Table 2 – Effects of deregulation scenarios, before accounting for CCA allowance trading. This table is a summary of effects described in the five previous subsections of this report. Complete results for all calendar years from 2020 through 2050 are available in the Calculator.[4]

The table tells a pretty clear story. The Energy Independence Act has played an important role in kick-starting Washington state's GHG reductions. CETA remains a strong influence on electric sector emissions (though it may be reducing the rate of GHG reduction in other CCA-regulated sectors). The HFC Law is providing modest but additional GHG reductions. The CO_2 Mitigation Plans Law has had a minor and temporary impact. The Performance Standard is eclipsed by the actions of other laws, with the exception of securing the Centralia coal plant's first boiler retirement from 2021-2025 (not visible in the table).

Laws Effectuating Greenhouse Gas Reductions

Our screening process yielded 10 GHG effectuators as follows:

- Chapter 19.27A RCW, Building Energy Code;
- Chapter 19.29A RCW, Fuel Mix Disclosure;
- Chapter 19.280 RCW, Electric Utility Resource Plans;
- Chapter 36.165 RCW, Commercial Property Assessed Clean Energy and Resiliency Program;
- Chapter 36.70A RCW, Growth Management Act;
- Chapter 43.21F RCW, State Energy Office;
- Chapter 70A.15 RCW, Washington Clean Air Act;
- Chapter 70A.45 RCW, Limiting Greenhouse Gas Emissions;
- Chapter 80.04 RCW, Utility Regulation; and
- Chapter 80.28 RCW, Gas, Electrical, and Water Companies.

The pie chart accompanying the description of each effectuator below, shows which portion of Washington's stationary source GHGs are impacted by the effectuator. The wedge labeled "industry" combines GHG inventory categories "fossil fuel industry" and "industrial processes." "RCI" means "Residential/Commercial/Industrial" and represents primarily the combustion of fossil fuels for heat.

The first four properties evaluated for each effectuator, "Regulating entity," "Target of law," "Direct GHG reduction command," and "Consequences for noncompliance" are the four elements of the UPenn regulatory screen. By definition, each effectuator will report at least one of these to be *none* or *not applicable*.

Chapter 19.27A RCW - Building Energy Code[36]

Regulating entity: local jurisdictions; Department of Commerce
Target of law: Building owners and the construction sector
Direct GHG reduction command: None
Consequences for noncompliance: Administrative penalty
Key section(s) affecting GHGs: RCW 19.27A.160; RCW 19.27A.210

Purpose: To increase the energy efficiency of new and existing building stock to "… meet rising energy needs, confront climate change, and boost [Washington's] economy" (RCW 19.27A.130).

GHG reduction mechanism: This law effectuates GHG reductions by mandating that new residential and nonresidential permitted construction in 2031 must reduce their net energy consumption by 70% relative to the 2006 baseline (RCW 19.27A.160). Additionally, the law focuses

[36] Chapter 19.27A RCW contains both the state energy code, which applies to new buildings and additions and is implemented by the State Building Code Council, and the building performance standard, which applies to large commercial buildings and is implemented by the Department of Commerce.

on reducing GHG emissions from existing commercial and publicly owned building stock by empowering Commerce to set performance standards that govern energy use intensity (RCW 19.27A.210), and early adoption is incentivized with payments from the state (RCW 19.27A.220). Also, the law mandates that Commerce develop an energy efficiency strategic plan with a target of net zero energy use in homes and buildings; this will inform regular updates to the state energy code (RCW 19.27A.150). Finally, RCW 19.27A.170 requires utilities to keep data records for the energy consumption of qualifying buildings; these data are important for benchmarking the existing GHG footprint of the affected building stock.

Potential for GHG reduction: Laws that act to effectuate emissions reductions from the residential, commercial, and industrial heating sector are impactful because the sector makes up 25% of GHG emissions.[37] Because this law acts on new and existing building stock for commercial, residential, and publicly owned buildings across the state, it *has the potential to substantially impact GHG emissions*.

Overlap with CCA: Reductions effectuated by this law act on GHGs regulated by the CCA. By promoting energy efficiency in buildings, Chapter 19.27A RCW acts indirectly on utility GHG emissions by reducing buildings' utility energy demand, and through reducing combustion of fuel oil and propane for space heating. The CCA acts directly on natural gas and electric utilities, which receive no-cost allowances. For electric utilities, these may cover up to the full amount of their emissions based on a calculated cost burden effect; for gas utilities, the allocation covers 93% of their emissions and decreases over time (RCW 70A.65.120 and RCW 70A.65.130). This law is complementary rather than duplicative with the CCA because, by prescribing efficiency in the building sector, the State is able to take greater advantage of low- and no-cost opportunities in the building sector and rely less on more expensive emissions reduction measures in other sectors.

Other cited laws related to GHG reduction: Findings and intent from Chapter 177, Laws of 2022 (see RCW 19.27A.200) indicate that energy performance standards for existing buildings are a must to meet GHG emissions limits outlined in RCW 70A.45.020. Fines for noncompliance with RCW 19.27A.210 are distributed to the low-income weatherization account (RCW 70A.35.040) where they are allocated to projects that further support statewide GHG reductions by improving residential energy efficiency.

Chapter 19.29A RCW - Fuel Mix Disclosure

Regulating entity: Department of Commerce
Target of law: Retail electricity suppliers
Direct GHG reduction command: None
Consequences for noncompliance: None
Key section(s) affecting GHGs: RCW 19.29A.050; 19.29A.060

Purpose: Each retail supplier of electricity must provide customers with an itemized accounting of its annual fuel mix (RCW 19.29A.050). Providing the consumer with detail on its percentage of coal,

[37] Waterman-Hoey, S. (2022). Washington State Greenhouse Gas Emissions Inventory: 1990–2019 (Publication 22-02-054). Washington State Department of Ecology. https://ecology.wa.gov/air-climate/reducing-greenhouse-gas-emissions/tracking-greenhouse-gases/ghg-inventories#inventory

hydroelectric, natural gas, nuclear, petroleum, solar, wind, other generation, and unspecified sources (RCW 19.29A.060) and additional information on the characteristics of their electricity that is both desirable and feasible (e.g., consumer education programs designed to promote more informed purchasing, like nutrition labeling) (RCW 19.29A.130[3]).

GHG reduction mechanism: Assuming customers demand less GHG-intensive fuels from their utility, whether due to their decreasing costs (e.g., national trends in solar affordability) or a desire to align with larger GHG reduction goals, this law has the power to indirectly affect GHG emissions by tapping into consumer sentiment and supply-side response. This assumes that there is a clear mechanism for the electricity providers to collect, understand, and respond to signals of consumer preference.

Potential for GHG reduction: Because the law depends on electricity providers responding to consumer preferences for a less GHG-intensive fuel mix—which in turn depends on their ability to collect and correctly identify those preferences—to effectuate GHG emissions reductions, the pathway is indirect and it may be difficult for suppliers to change behavior based on individual consumer sentiment. Further complicating the GHG reduction potential of the law, consumer preferences may not always represent the least GHG-intensive fuel mix (e.g., if the least-cost fuel mix and the least GHG-intensive fuel mix are not the same). The media can also play a role in shaping public opinion for changes in fuel mix by shining light on relatively carbon intense sources of power. The coverage of PSE's ownership of the Colstrip coal plant is an example of this, though separating its effect from the effect of Chapter 19.405 RCW on the eventual divestment is difficult.[38] Considering these factors, this law *has the potential to minimally impact GHG emissions*.

Overlap with CCA: Any GHG emissions reductions due to the Fuel Mix Disclosure law will overlap with GHG reductions induced by the CCA because both act on electric utility companies. This law is more duplicative than complementary with the CCA because any changes toward a cleaner fuel mix due to consumer preference would be a likely first step for utilities toward emissions reductions under CCA without signals of consumer preference. Public pressure resulting from consumers informed about the relative GHG intensity of the fuels used to generate electricity may move utilities to choose low-emissions resources favored by the public, though it is less likely to change the gross rate of GHG reduction.

Other cited laws related to GHG reduction: None.

Chapter 19.280 RCW - Electric Utility Resource Plans

Regulating entity: None
Target of law: Electric utilities
Direct GHG reduction command: Include social cost of GHGs as a "cost adder"
Consequences for noncompliance: None
Key section(s) affecting GHGs: RCW 19.280.030

[38] Brown, M. (2022, September 13). *Montana coal plant operator to buy out co-owner Puget Sound Energy.* The Olympian. https://www.theolympian.com/news/state/washington/article265742191.html

Purpose: This law requires electric utilities to engage in long-term, comprehensive resource planning to support the development of safe and clean energy sources that reliably meet demand (RCW 19.280.010). These integrated resource plans are required to consider a variety of dimensions relevant to GHG reduction, spanning utility-scale renewables, available conservation and efficiency resources, comparisons between renewable and nonrenewable sources, and more (RCW 19.280.030).

GHG reduction mechanism: A key piece of the IRP is the clean energy action plan, which has its own set of prescriptions. RCW 19.280.030(3)(a) mandates that IRPs consider the social cost of GHG emissions and include them as an additional cost in decision-support tools that inform investments, plans, and policy choices. Incorporating the cost of GHG emissions into decision-making can be expected to effectuate GHG reductions, because investments and policies that reduce GHG emissions the most will have fewer added costs of emissions or more avoided cost benefits, resulting in more favorable ratios of benefits to costs, holding constant other project characteristics.

Potential for GHG reduction: This law effectuates GHG reductions by improving the benefit-cost ratios (BCR) of GHG-reducing projects. Though it will not guarantee that the projects with the best BCRs will all be GHG-reducing projects or that all GHG-reducing projects will have more benefits than costs, this law means that these projects will have improved BCRs all things being equal. Additionally, comprehensive long- and short-term planning exercises considering renewables, conservation, and GHG reduction should be expected to produce outcomes that favor more GHG reduction over the long run. Finally, laws that act to effectuate GHG emissions reductions in the electricity sector are impactful because the sector accounts for 21% of GHG emissions in Washington.[39] Considering these factors, this law *has the potential to moderately impact GHG emissions*.

Overlap with CCA: Any GHG reductions effectuated by this law will overlap with GHG reductions induced by the CCA because both act on electric utility companies. Still, this law has some capacity to be complementary rather than duplicative with the CCA because it adjusts decision-making frameworks to be more favorable to GHG-reducing projects, rather than an end goal like the emissions cap set by the CCA.

Other cited laws related to GHG reduction: None.

Chapter 36.165 RCW – Commercial Property Assessed Clean Energy and Resiliency (C-PACER) Program

Regulating entity: county governments
Target of law: None
Direct GHG reduction command: None
Consequences for noncompliance: None
Key section(s) affecting GHGs: RCW 36.165.005

Purpose: This law allows the Department of Commerce to create a voluntary, statewide program that provides funding to commercial, industrial, agricultural, and multifamily properties that want to

[39] Waterman-Hoey, S. (2022). Washington State Greenhouse Gas Emissions Inventory: 1990–2019 (Publication 22-02-054). Washington State Department of Ecology. https://ecology.wa.gov/air-climate/reducing-greenhouse-gas-emissions/tracking-greenhouse-gases/ghg-inventories#inventory

build resilience by investing in energy efficiency, water efficiency, renewable energy, and other resilience-building projects (RCW 36.165.005). The Department has not created such a statewide program, but the law authorizes county governments to independently create such programs.

GHG reduction mechanism: The law effectuates GHG reductions by providing an alternative method of financing energy efficiency and renewable energy projects. Projects funded under C-PACER finance these improvements by voluntary assessment secured by lien, which effectively shifts the financial burden from the property owner to the county. There are no costs to the county, and the property owner incurs no personal debt obligation.

Potential for GHG reduction: To the extent that the alternative financing mechanism created by this law induces property owners to pursue GHG-reducing projects they otherwise would not have pursued with traditional financing options, it can effectuate GHG reductions. The program is voluntary: counties can choose to participate in the program. Considering these factors, this law *has potential to impact GHG emissions, though the magnitude of its impact is unclear as it depends entirely on uptake and project type.*

Overlap with CCA: GHG reductions effectuated by this law will overlap with GHG reductions induced by the CCA. Some entities regulated under the CCA will be able to pursue alternative financing under this law, and some of these may be designated as EITEs eligible to receive no-cost allowances. Financing under this program will also be available to many commercial buildings that are not CCA-regulated parties, but the associated reductions in demand for utility energy overlaps with CCA regulation of the utilities. This is the same mechanism induced by Chapter 19.27A RCW, the State Energy Code. This law is complementary rather than duplicative with the CCA because, by providing programs to increase the uptake of renewable energy and efficiency measures in the building sector, the State is able to take greater advantage of low- and no-cost opportunities, lessen the GHG reduction burden on utilities, and rely less on more expensive emissions reduction measures in other sectors.

Other cited laws related to GHG reduction: This law provides another pathway for implementing the sorts of projects that could bring properties into compliance with the energy efficiency improvements and performance standards required by Chapter 19.27A RCW.

Chapter 36.70A RCW - Growth Management Act

Regulating entity: Department of Commerce
Target of law: Cities and counties
Direct GHG reduction command: None
Consequences for noncompliance: Sanction, financial penalty
Key section(s) affecting GHGs: RCW 36.70A.070; 36.70A.635

Purpose: This law mandates that cities and counties engage in a comprehensive land use planning process to protect the public interest. Based on location, population density, and size metrics, certain cities and counties must also submit a greenhouse gas emissions reduction subelement.

GHG reduction mechanism: The law itself does not reduce GHG emissions because it is fundamentally a planning process and thus one step removed from actual projects that reduce

emissions. However, it effectuates GHG reductions through the mandatory emissions reduction subelement required of some communities. This subelement is concerned with density, which is relevant to stationary emissions reductions because it helps to "... [mitigate] climate change through the efficient use of energy resources and the corresponding decrease in greenhouse gas production" (Findings--Intent Chapter 218, Laws of 2022 from 36.70A.067). Additionally, the law acts strongly to protect forestlands and other critical areas like wetlands and fish and wildlife conservation areas which sequester significant amounts of carbon. To the extent that losing GHG sequestration capacity is the same as increasing GHG emissions, the law impacts the total GHG footprint and helps the state meet its climate goals outlined in the CCA.

Potential for GHG reduction: This law, through its GHG reduction subelement that mandates emissions reductions, is a strong effectuator. Though it does not apply to all communities, it does apply to many of the most dense and populous ones, where sprawling development would otherwise lead to increased emissions through inefficient delivery of electricity. The law also can help reduce greenhouse gas emissions from the transportation sector resulting from densification. Considering this factor and the way the law acts to protect existing carbon sinks which are not easily replaced, this law *has the potential to substantially impact GHG emissions.*

Overlap with CCA: Any GHG reductions from stationary sources effectuated by this law will overlap with GHG reductions induced by the CCA, because both act on the utility sector. Utilities regulated by the CCA can actively reduce GHG emissions by implementing changes to their fuel mix, or working with their customer base on efficiency programs or demand management strategies. Under this law, increased efficiency at the utilities is the result of density — a passive benefit, since the utility cannot directly influence the density of its customer base. In this way, this law is complementary rather than duplicative with the CCA because it acts indirectly on utility emissions, providing another pathway for implementing emissions reductions.

Other cited laws related to GHG reduction: The emissions reduction subelement must be consistent with the guidelines outlined in RCW 70A.45.120 that support GHG reduction through urban density. One additional cited law relevant to GHG reduction is Chapter 47.80 RCW; the law makes a point to highlight how comprehensive plans should work together with regional transit planning efforts to install EV infrastructure. EVs are mobile and replace mobile emitters and are outside the scope of this analysis; EV infrastructure is nonmobile and has implications for utility emissions depending on fuel mix used to operate it.

Chapter 43.21F RCW - State Energy Office

Regulating entity: None
Target of law: Department of Commerce
Direct GHG reduction command: None
Consequences for noncompliance: not applicable
Key section(s) affecting GHGs: RCW 43.21F.088

Purpose: This law establishes the State Energy Office within the Department of Commerce, and directs the Department of Commerce to develop a State Energy Strategy and enters the State into the western interstate nuclear compact. The law prescribes principles to guide the State Energy

Strategy, and points to clean energy, energy efficiency, reducing fossil fuel dependence, and conservation, et al. (RCW 43.21F.088).

GHG reduction mechanism: The law itself does not reduce GHG emissions, but the development of the State Energy Strategy that it mandates is a key planning step that helps guide GHG reduction efforts in the public and private sectors across the state. Because of the role the State Energy Strategy plays in identifying opportunities for projects and policies that reduce GHG emissions in a tangible way, Chapter 43.21F RCW is deemed to effectuate emissions reductions.

Potential for GHG reduction: It is difficult to overstate the importance of the State Energy Strategy in guiding GHG emissions reduction efforts by the public and private sectors across the state. However, because the State Energy Strategy is itself a planning exercise, and the primary feature of this law is to mandate the planning exercise, it is difficult to assess its impact on GHG reductions. One the one hand, it is removed from actual projects that tangibly reduce emissions; on the other hand, most GHG reduction projects could trace their origins in part back to the State Energy Strategy required by Chapter 43.21F RCW. Considering these factors, this law *has potential to impact GHG emissions, though the magnitude of its impact is not possible to assess*.

Overlap with CCA: Any GHG reductions effectuated through the State Energy Strategy established by this law will overlap with GHG reductions induced by the CCA as both are intended, in part, to reduce the total GHG emissions in the state. The most recent revision of the State Energy Strategy focuses on meeting statewide GHG emissions targets, which are also the structural foundation of the CCA. This law is complementary rather than duplicative with the CCA because it prescribes intentional, strategic planning to achieve those emissions reduction goals. While CCA provides the command — an emissions cap — Chapter 43.21F RCW provides a strategic planning process for achieving GHG reductions that helps to make reductions targets under CCA achievable.

Other cited laws related to GHG reduction: None.

Chapter 70A.15 RCW - Washington Clean Air Act

Regulating entity: Department of Ecology
Target of law: None
Direct GHG reduction command: None
Consequences for noncompliance: Penalties and fines
Key section(s) affecting GHGs: RCW 70A.15.3000

Purpose: This law gives the Department of Ecology the power to regulate any contaminants which cause air pollution through the creation of air quality and emissions standards (RCW 70A.15.3000). This law was first inaugurated in the 1960s and was initially focused on contaminants like dust, smoke, and particulate matter, but it has since expanded to include GHGs.

GHG reduction mechanism: The law itself does not effectuate GHG emissions reductions, but rather grants authority to the Department of Ecology to make rules that do (e.g., Chapter 173-441 WAC Reporting of Greenhouse Gases, Chapter 173-443 WAC Hydrofluorocarbons, Chapter 173-446 WAC CCA program rule). One key section from the law (RCW 70A.15.2200) mandates that Ecology adopt rules that require reporting of GHGs—a key step to generate the data necessary

for understanding baseline emissions conditions. These data are a key precursor to any emissions regulations issued by Ecology and described in the Washington Administrative Code, and in this way the law is deemed to effectuate emissions reductions.

Potential for GHG reduction: Rulemaking on air quality and emissions standards from both stationary and mobile sources of GHGs is due to the powers and duties granted by this law. Because of the quantity of rules and standards issued by Ecology that derive their authority from it, and from the baseline data generated by its reporting requirements, this law has the potential to *substantially impact GHG emissions.*

Overlap with CCA: GHG reductions effectuated through air quality and emissions standards in WAC authorized by this chapter, may overlap with GHG reductions induced by the CCA. However, these laws complement each other because prescriptions outlined in Chapter 70A.15 RCW and in any authorized WAC can act on sources of emissions not regulated by the CCA, often in the residential sector by outlining appropriate technologies and limits on solid fuel burning devices, woodstoves, boilers, outdoor burning, and more. These laws are also complementary because of their relative specificity: the CCA limits GHGs generally (weighted by their CO_2e global warming potentials), whereas the WAC authorized by Chapter 70A.15 RCW often targets specific, potent pollutants like HFCs, or classes of smaller emitters not covered by the CCA.[40] This law also goes beyond the scope of the CCA to focus on air quality more broadly, effectively regulating particulate matter and devices that burn solid fuels (e.g., Chapter 173-433 WAC) while also helping to constrain statewide GHG emissions in sectors not covered by the CCA (e.g., Chapter 173-443 WAC).

Other cited laws related to GHG reduction: None.

Chapter 70A.45 RCW - Limiting Greenhouse Gas Emissions

Regulating entity: None
Target of law: State agencies
Direct GHG reduction command: Scheduled GHG reductions
Consequences for noncompliance: None
Key section(s) affecting GHGs: RCW 70A.45.020; 70A.45.050

Purpose: This law establishes statewide and agency-specific GHG emissions limits through 2050, relative to 1990 levels. It also requires certain agencies to develop GHG inventories, and to consider when weighing bids for competitive economic development and infrastructure projects whether the entity that would receive funds has policies in place to reduce GHG emissions (RCW 70A.45.070).

GHG reduction mechanism: The law itself does not effectuate GHG emissions reductions; the emissions reductions schedule described by the law does not outline how these will be achieved. RCW 70A.45.030 comes the closest to providing a mechanism, requiring the State to design a GHG market, which now exists as the cap-and-invest program of the CCA.

[40] The CCA requires the Department of Ecology to monitor, review, and reduce criteria air pollutants in overburdened communities (RCW 70A.65.020). This requirement does increase the potential overlap between Chapter 70A.15 RCW and the CCA.

Potential for GHG reduction: The emissions reductions schedule outlined in this law has no enforcement mechanisms or consequences associated with it. RCW 70A.45.070, which would be expected to steer more state funds toward entities with GHG reduction strategies, has the greatest reduction potential of any section. Precisely how this question is weighted in evaluating competitive bids is not clear, and so this law has the potential to *minimally impact GHG emissions*. That said, the statewide targets offered by the law have been used by the state as the underlying framework for the State Energy Strategy and for the CCA's allowance budgets; while local governments and other entities have used them to drive their own GHG reduction policies. Though on its own meris this law impacts GHG emissions minimally, the straightforward statement of statewide targets has functioned as a profound anchor for statewide GHG policy.

Overlap with CCA: This law establishes the statutory basis for the CCA and produces important enabling data and procedures for it, including where to set the cap. One key section (RCW 70A.45.020) charges the Department of Ecology with developing and implementing a system for GHG monitoring and reporting statewide — a key step toward generating the data necessary to understand baseline emissions conditions and track progress toward the State's climate goals. RCW 70A.45.040 requires consultation with the University of Washington's Climate Impacts Group to review the state of global climate science and whether Ecology should recommend updates to the emission limits.

Other cited laws related to GHG reduction: This law uses the same reporting requirements in 70A.15.2200.

Chapter 80.04 RCW - Utility Regulation

Regulating entity: Utilities and Transportation Commission
Target of law: Electric companies
Direct GHG reduction command: None
Consequences for noncompliance: petition rejection
Key section(s) affecting GHGs:[41] RCW 80.04.570

Purpose: This law broadly describes regulations for public utilities: electric, natural gas, water, and telecommunications companies.

GHG reduction mechanism: RCW 80.04.570 relates to the transition away from coal-generated electricity. It provides a mechanism for approval of "coal transition power" power purchase agreements. Coal transition power was an outcome of negotiations to secure a date certain for closure of TransAlta's Centralia Coal Plant. Coal transition power – electricity generated by the Centralia Coal Plant after 2011 – was exempted from meeting certain air pollution standards in exchange for agreement to retire the plant's two coal-fired boilers by 2020 and 2025 respectively. This law authorizes UTC to approve or reject a utility petition to recover costs associated with any proposed power purchase agreement for coal transition power.

[41] RCW chapters 80.04 and 80.28, and the chapters between them, work very closely together such that it is counterintuitive to treat them as separate "laws." We discuss Chapter 80.04 RCW and Chapter 80.28 RCW as separate laws regardless, in order to maintain consistency with the rest of the report.

Potential for GHG reduction: While CETA and the Performance Standard are explicit about when the transition to coal-free electricity must be completed, this law provides a smoothing mechanism for the period before the deadline to make the transition easier for utilities and their customers. By easing the financial burden of the transition, this law helped make way for the eventual elimination of coal from the electricity generating fuel mix. Considering these factors, this law has the potential to *moderately impact GHG emissions*.

Overlap with CCA: Because this law expires in 2025, it overlaps for a short time with the GHG emissions regulated by the CCA. To the extent that electric utilities in 2023, 2024, and 2025 still contain coal in their fuel mix, emissions over 25,000 tCO_2e will be regulated by the CCA. Under the CCA, electric utilities may receive no-cost allowances that can cover up to the full amount of their emissions based on a calculated cost burden effect (RCW 70A.65.120). This means that this law, and especially when considered together with related laws Chapter 19.405 RCW and Chapter 80.80 RCW, are complementary rather than duplicative with the CCA because they act early to remove coal—one of the most GHG-intensive fuels—from the fuel mix. In effect, this law reduces the magnitude of the coal-fired resources that would be covered by no-cost allowances under the CCA, helping the State accelerate progress toward its climate goals by eliminating fuels with a significant impact on the statewide GHG portfolio early in the cap-and-invest program.

Other cited laws related to GHG reduction: This law is related to RCW 19.405.030, which mandates that electric utilities must remove coal-fired resources from their fuel mix. This requirement comes into effect by the end of 2025, the same time that RCW 80.04.570 is set to expire. This law is also closely related to Chapter 80.80 RCW which concerns utilities and baseload electric generation.

Chapter 80.28 RCW - Gas, Electrical, and Water Companies

Regulating entity: Utilities and Transportation Commission
Target of law: Electric and gas utilities
Direct GHG reduction command: None
Consequences for noncompliance: Penalties; certificate revocation.
Key section(s) affecting GHGs:[41] RCW 80.28.065; 80.28.260

Purpose: This law broadly describes regulations for electric, natural gas, and water utility companies.

GHG reduction mechanism: Sections of the law relevant to effectuating GHG emission reductions are concerned with efficiency at natural gas and electric companies, renewable resources (RCW 80.28.025), and including the cost of GHG emissions in analysis of the cost-effectiveness of investment alternatives (RCW 80.28.395). One example of an efficiency program is outlined in RCW 80.28.260, which allows utilities to earn higher rates of return on designated types of energy efficiency projects. Another mechanism is RCW 80.28.065, which allows utilities to recoup the cost of efficiency and conservation programs through special tariffs with the affected customers, that can persist after changes of property ownership.

Potential for GHG reduction: Using financial incentives and allowing utilities to recoup the costs of efficiency programs is likely to have spurred additional investments in these programs beyond what would have existed without this law in place. Though it is not possible to determine which

programs exist due solely to this law, these plausible mechanisms for effectuating reductions make it so the law at least has the potential to *minimally impact GHG emissions*.

Overlap with CCA: Emissions reductions effectuated by this law act on GHGs regulated by the CCA. By promoting energy efficiency programs, Chapter 80.28 RCW acts indirectly on utility GHG emissions by reducing energy demand from utility customers. The CCA acts directly on the same natural gas and electric utilities, which receive no-cost allowances. For electric utilities, these may cover up to the full amount of their emissions based on a calculated cost burden effect; for gas utilities, the allocation covers 93% of their emissions and decreases over time (RCW 70A.65.120 and RCW 70A.65.130). This law is complementary rather than duplicative with the CCA because, by promoting efficiency programs and making it easier for utilities to implement them, the State is able to take greater advantage of low- and no-cost opportunities to reduce GHG emissions from the utility sector and rely less on more expensive emissions reduction measures in other sectors.

Other cited laws related to GHG reduction: None.

Initialisms, Abbreviations, and Definitions

"**baseline**" means the anticipated, statewide GHG emissions under Washington state's regulatory status quo.

"**Calculator**" means Deregulation Scenario Calculator, the Microsoft Excel based tool built to support this report.

"**CCA**" means Chapter 70A.65 RCW, the Climate Commitment Act.

"**CETA**" means Chapter 19.405 RCW, the Clean Energy Transformation Act.

"**CO_2**" means carbon dioxide.

"**deregulation scenario**" means a counterfactual past and future in which a given law never existed.

"**effectuator**" means a law that effectuates GHG reductions in the sense intended by Subsection 10.

"**EFSEC**" means Energy Facility Site Evaluation Council.

"**GHG**" means greenhouse gas.

"**HFC**" means hydrofluorocarbon.

"**law**" means one chapter of RCW.

"**model**" means the theoretical logic underlying the Calculator.

"**model period**" means Jan. 1, 2020 through Dec. 31, 2050.

"**MWh**" means megawatt-hour, equal to 1,000 kilowatt-hours.

"**Performance Standard**" means Chapter 80.80 RCW, the Baseload Electric Generation Performance Standard.

"**RCW**" means Revised Code of Washington.

"**regulator**" means a law that regulates GHG emissions in the sense intended by Subsection 10.

"**reference emissions**" means the actual, annual average, statewide GHG emissions during the reference period.

"**reference period**" means Jan. 1, 2015 through Dec. 31, 2019.

"**SNAP**" means Significant New Alternatives Policy, a U.S. EPA program promoting substitutes for ozone-depleting substances.

"**Subsection 10**" means RCW 70A.65.200(10), the subsection of the Climate Commitment Act authorizing this report.

"**tCO_2e**" means metric ton of carbon dioxide equivalent.

"**TWh**" means terawatt-hour, equal to 1 million MWh.

"**unrestricted emissions**" means the anticipated, statewide GHG emissions if none of the GHG regulators had gone into force.

"**WAC**" means Washington Administrative Code.