



STATE OF WASHINGTON
UTILITIES AND TRANSPORTATION COMMISSION

621 Woodland Square Loop S.E. • Lacey, Washington 98503

P.O. Box 47250 • Olympia, Washington 98504-7250

(360) 664-1160 • TTY (360) 586-8203

Dec. 20, 2019

Governor Jay Inslee
Office of the Governor
P.O. Box 40002
Olympia, WA 98504-0002

RE: Report on gas companies' greenhouse gas emissions

Dear Governor Inslee,

The Utilities and Transportation Commission (UTC) developed the following report to assess whether gas companies are on track to meet the state's greenhouse gas emissions reductions goal, as directed under Section 16 of Engrossed Third Substitute House Bill 1257 (Laws of 2019, Chapter 285). This report provides a retrospective overview of data and analysis related to greenhouse gas (GHG) emissions from natural gas delivered by gas companies to their customers in Washington. In drafting the report, the UTC encountered the following issues related to data:

- The 1990 gas usage for each individual gas company is not publicly available, which prevents the UTC from identifying a 2020 emission reduction target for each company.
- The gas usage data relied on for this report does not separate renewable natural gas usage from overall natural gas usage because injections of renewable natural gas mix with existing natural gas in the pipeline.
- There is little reporting and available data describing renewable natural gas injection into the underground natural gas pipeline system.
- The EPA data referred to in the statute is not useful for tracking utility progress toward the goal because it does not cover the same time period, does not include the same companies, and does not match the data used by the Department of Ecology in establishing the 1990 baseline.

In future reports, the UTC will request that each gas company submit 1990 gas usage data. The UTC will also reach out to unregulated companies for information about renewable natural gas generation. Anecdotally, the majority of renewable natural gas

injected into the existing system is marketed to California under the renewable fuel standard. Because the associated renewable identification number is not retired in Washington, renewable natural gas is not counted or reported as part of the Washington system.

The gas companies' proportionate share of the 2020 state GHG emissions reduction goal is 8.6 million metric tons of carbon dioxide-equivalents (CO₂e). The combined gas companies' estimated emissions for 2018 are 11.9 million metric tons CO₂e. The gas companies do not appear to be on track to meet the 2020 goal.

Sincerely,

Mark L. Johnson, Executive Director and Secretary

Assessment of Washington State Natural Gas Company Greenhouse Gas (GHG) Emissions

INTRODUCTION

Legislative Guidance on GHG Emissions Reductions

Section 16 of E3SHB 1257, codified as [RCW 80.28.400](#), includes the following reporting requirement for the UTC:

“The commission must monitor the greenhouse gas emissions resulting from natural gas and renewable natural gas delivered by each gas company to its customers, relative to a proportionate share of the state's greenhouse gas emissions reduction goal. The commission must report to the governor by January 1, 2020, and every three years thereafter, an assessment of whether the gas companies are on track to meet a proportionate share of the state's greenhouse gas emissions reduction goal. The commission may rely on reports submitted by gas companies to the United States environmental protection agency or other governmental agencies in complying with this section.”

The greenhouse gas emissions reduction goals are codified in [RCW 70.235.020](#)(1)(a):

- Reduce overall emissions of greenhouse gases in the state to 1990 levels by 2020;
- Reduce overall emissions of greenhouse gases in the state to 25% below 1990 levels by 2035; and
- Reduce overall emissions to 50% below 1990 levels, or 70% below the state's expected emissions, by 2050.

Ecology and the Department of Commerce must report total GHG emissions and GHG totals for each major source and sector to the Legislature every two years.¹

ASSUMPTIONS, DATA, AND METHODS

The UTC compared estimated figures for 2005, 2015, and 2018 against the overall 2020 emissions reduction goal of 8.6 million metric tons CO₂e.^{2,3} This analysis relied on the following assumptions and findings:

¹ Section 3, E2SHB 2815 (Laws of 2008, Chapter 14), codified as [RCW 70.235.020](#)(2).

² Washington State Department of Ecology, Report to the Legislature, *Washington State Greenhouse Gas Emissions Inventory: 1990-2015*, Published December 2018, page 6. (Ecology GHG emissions inventory) Available at this site: <https://fortress.wa.gov/ecy/publications/documents/1802043.pdf>

³ Ecology's GHG emissions inventory presents GHG emissions data calculated by three different methods. For consistency, the UTC used the emissions data calculated with the AR4 method. (For an explanation of the methods, see page 5 of Ecology's report.) The available years were 1990, 2005, 2012, 2013, 2014, and 2015. The UTC calculated values for 2005, 2015, and 2018, comparing 2005 and 2015 calculated values to the Ecology values.

1. The UTC assumes it should track GHG emissions in carbon dioxide-equivalents (CO₂e).⁴
2. The UTC assumes “gas delivered to its [companies’] customers” is the same as the residential, commercial, and industrial sector described on page 2 of the Ecology GHG emissions inventory.⁵
3. The UTC assumes “each gas company” includes investor-owned gas local distribution companies (LDCs), the municipalities of Enumclaw and Wenatchee, and Northwest Pipeline. This assumption is consistent with the definition of gas company in [RCW 80.04.010](#).⁶ Further, including these entities is consistent with Ecology’s approach in its GHG emissions inventory.
4. The UTC assumes the “state’s GHG emissions reduction goal” in [RCW 80.28.400](#) refers to the limits for statewide greenhouse gas emissions identified in [RCW 70.235.020](#). The first limit identified in the statute is to reduce GHG emissions to 1990 levels by 2020.
5. The Ecology GHG emissions inventory identifies the gas companies’ proportionate share of 1990 emissions as 8.6 million metric tons CO₂e.⁷ The UTC therefore assumes the gas companies’ 2020 emissions reduction goal is 8.6 million metric tons CO₂e.
6. Using standards in federal and state rules, the UTC calculated that the combustion of one thousand cubic feet of gas produces 0.0545 metric tons of CO₂e.⁸

The statute allows the UTC to rely on reports submitted by gas companies to the U.S. Environmental Protection Agency (EPA) or other governmental agencies in complying with this section.⁹ The UTC considered a variety of sources before completing the analysis, specifically:

- Ecology Report to the Legislature, *Washington State Greenhouse Gas Emissions Inventory: 1990-2015*¹⁰

⁴ Ecology GHG emissions inventory, page 3.

⁵ The Ecology data includes end-use industrial sources of GHG emissions. The UTC analysis does not separately track these industrial GHG emissions. Comparison of the UTC analysis with the Ecology approach could result in double-counting of GHG emissions.

⁶ [RCW 80.04.010](#)(14) "Gas company" includes every corporation, company, association, joint stock association, partnership and person, their lessees, trustees or receiver appointed by any court whatsoever, and every city or town, owning, controlling, operating or managing any gas plant within this state.

⁷ Ecology GHG emissions inventory, page 6.

⁸ See Appendix A.

⁹ [RCW 80.28.400](#) does not limit the commission to a particular data source.

¹⁰ Ecology develops an inventory of Washington’s greenhouse gas emissions using a set of generally accepted principles and then adjusts as needed to apply to Washington data. The inventory aggregates data for each sector and does not present facility-specific emissions. The data to develop this inventory is provided by the EPA’s State

- EIA *Natural Gas Annual Respondent Query System Form 176 Usage Data (1997-2018)*¹¹
- EIA *Washington State Carbon Dioxide Emissions from Fossil Fuel Consumption (1980-2016)*^{12, 13}
- EPA Greenhouse Gas Reporting Program (GHGRP) data (2011-2018)¹⁴

The best available data sources for evaluating progress toward the emissions reduction goal are Ecology's GHG emissions inventory and the EIA gas usage data.¹⁵

The UTC verified that the gas companies included in the Ecology GHG emissions data were consistent with the gas companies included in the EIA gas usage data through a three-step process. First, the UTC multiplied the EIA gas usage data by the gas CO₂e factor to develop an EIA emissions estimate. Then, the UTC compared its calculated EIA emissions estimate to the EIA gas emissions data. The two sets of data varied by an average of 1%. Finally, the UTC compared the source and sector results in the Ecology GHG emissions inventory to the sources and sectors in the EIA gas usage data, and found that the values were nearly identical for the relevant sector. These comparisons verified the data used to develop the UTC's analysis.

The legislation requiring this report suggests the EPA as a source of data. The UTC could not use the data submitted to the EPA in the Greenhouse Gas Reporting Program (GHGRP)¹⁶ for three reasons:

Inventory and Projection Tool (SIT). This greenhouse gas emissions tool has sector modules that are updated and released periodically throughout the year. In addition to EPA's SIT tool, the Washington State Department of Commerce annually provides greenhouse gas emissions for electricity calculated from fuel mix disclosure data. Each utility is required to report to the Department of Commerce the fuel mix that generates their electricity. Commerce then uses this information to determine an aggregated fuel mix for the entire state.

¹¹ U.S. Energy Information Administration, *Natural Gas Annual Respondent Query System Form 176 Usage Data, 1997-2018*. (EIA gas usage data) Downloaded Nov. 2019. The EIA collects gas usage data from every gas company through an annual survey, referred to as Form EIA-176. EIA gas usage data is available for download from the EIA website. <https://www.eia.gov/naturalgas/ngqs/#?year1=1997&year2=2018&company=Name>

¹² U.S. Energy Information Administration, *Washington State Carbon Dioxide Emissions from Fossil Fuel Consumption 1980-2016*. (EIA emissions data) Downloaded Nov. 2019. <https://www.eia.gov/environment/emissions/state/excel/washington.xlsx>

¹³ EIA converts gas usage to emissions data by multiplying state-level energy consumption levels (measured in British thermal units, or Btu) by the EIA's national-level carbon emission factors (national emissions estimates measured in kilograms of CO₂ per million Btu). No adjustment is made to national carbon dioxide emission factors by state. <https://www.eia.gov/environment/emissions/state/pdf/statemethod.pdf>.

¹⁴ U.S. Environmental Protection Agency, *Greenhouse Gas Reporting Program Data, 2011-2018*. (GHGRP emissions data) Downloaded Nov. 2019. https://www.epa.gov/sites/production/files/2019-10/2018_data_summary_spreadsheets.zip

¹⁵ EIA gas usage data.

¹⁶ In 2009, the EPA published its rule for reporting of GHG from sources that emit 25,000 metric tons or more annually in the United States. The implementation of 40 CFR Part 98 is referred to as the Greenhouse Gas Reporting Program (GHGRP). The intent of the program is to provide a better understanding of the sources of GHG emissions by creating an inventory of comprehensive, nationwide data. The inventory data allows for the

- First, the EPA data only covers the period from 2011 to 2018. This is not helpful in calculating companies' proportionate shares of the 2020 goal, which are based on 1990 emissions.
- Second, because the EPA categorizes gas companies differently from the EIA, it is not possible to match the GHGRP emissions from a particular company to a particular sector in the EIA data.
- Lastly, when the UTC compared the GHGRP emissions data to the EIA emissions data, the UTC found that the GHGRP data varied an average of 6% from the EIA emissions data, suggesting there may be additional discrepancies between the data.

ANALYSIS

Gas Companies' Progress

The Ecology GHG emissions inventory establishes the 1990 GHG emissions for the gas companies as 8.6 million metric tons CO₂e as shown in Table 1 and the accompanying chart. In the full 28 years considered, CO₂e emitted by the gas companies increased 3.3 million metric tons, or 118,000 metric tons CO₂e per year.

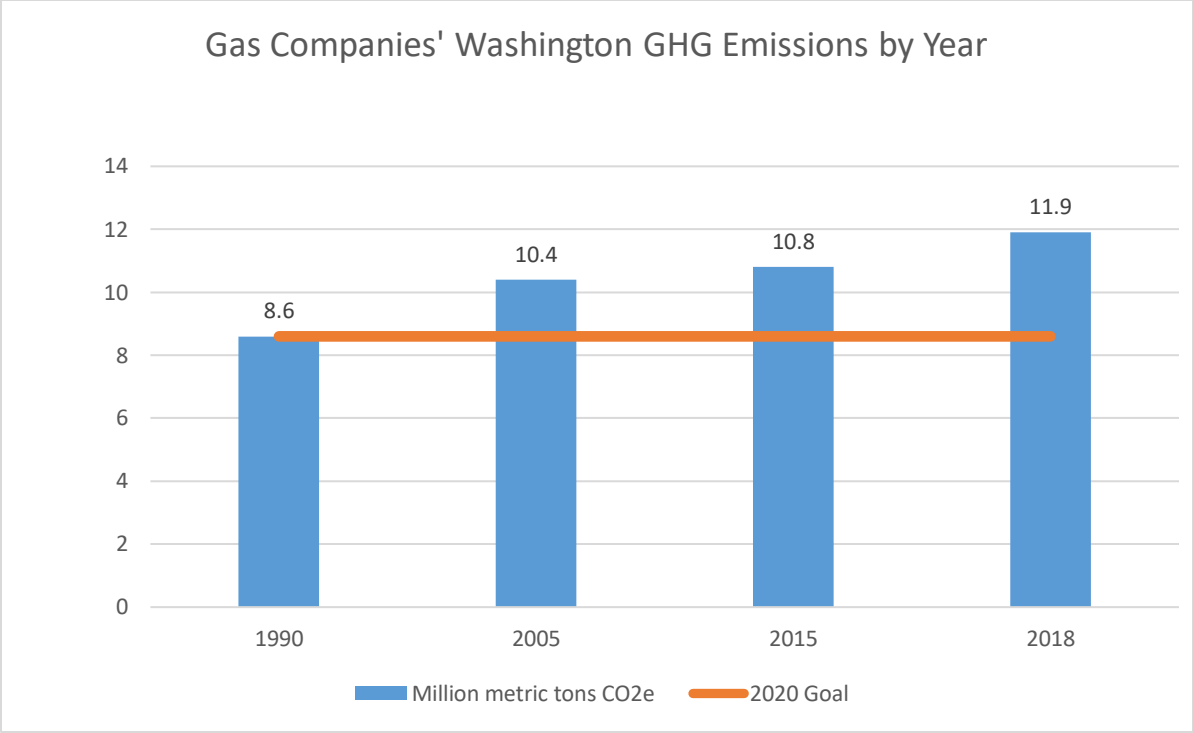
The UTC calculated the gas CO₂e factor of 0.0545 using the methodology described in Appendix A. The UTC multiplied the CO₂e factor by the EIA gas usage for the combined gas companies, resulting in the emissions estimates shown in Table 1.

| Table 1 - Combined Gas Company Emissions ¹⁷ | | | | |
|--|--------------------|------|------|------|
| | 1990 ¹⁸ | 2005 | 2015 | 2018 |
| Residential, Commercial, and Industrial Sector Gas Emissions million metric tons CO ₂ e | 8.6 | 10.4 | 10.8 | 11.9 |

development of policies, programs and initiatives to reduce GHG emissions. The GHG reports to the EPA are due on March 31 for emissions in the previous calendar year and are submitted electronically using an electronic GHG reporting tool (e-GGRT). While most small businesses don't meet the 25,000 metric ton threshold, the EPA GHGRP estimates that 85-90 percent of the total U.S. GHG emissions from over 8,000 facilities are covered by the GHGRP. Taken from the Greenhouse Gases Reporting Program Implementation Fact Sheet, 40 CFR Part 98, Published November 2013.

¹⁷ The UTC estimated 2005, 2015, and 2018 GHG emissions from gas for the residential, commercial and industrial sector.

¹⁸ ECY GHG emissions inventory, p. 6, gas emissions from RCI (residential, commercial, industrial) sector.



Gas Usage and Emissions by Company

The UTC also tracked company-specific gas usage and estimated emissions for 1997, 2005, 2015, and 2018.¹⁹ While the UTC calculated the emissions associated with this usage, the UTC is unable to report on each company’s progress toward the goal due to the lack of company-specific 1990 usage data as a basis for comparison to the state’s goal.

Table 2 shows the sum of each company’s gas usage for the residential, commercial, and industrial sectors, as downloaded from the EIA.

¹⁹ EIA gas usage data. 1997 is the earliest publicly available data for gas usage.

| Company | 1997 | 2005 | 2015 | 2018 |
|---------------------------------|-------------|-------------|-------------|-------------|
| Avista Utilities | 25,324,331 | 22,162,638 | 21,866,131 | 24,996,225 |
| City of Buckley ²¹ | 182,216 | 206,349 | n/a | n/a |
| Cascade Natural Gas | 77,576,393 | 51,999,490 | 58,789,699 | 61,228,381 |
| City of Ellensburg | 753,138 | 709,480 | 655,153 | 728,112 |
| City of Enumclaw | 368,983 | 396,529 | 358,913 | 392,756 |
| Northwest Natural Gas | 5,888,243 | 7,492,612 | 7,694,380 | 8,901,054 |
| Northwest Pipeline GT | 13,549,500 | 7,149,788 | 7,848,891 | 7,794,401 |
| Prometheus Energy ²² | n/a | n/a | n/a | 49,569 |
| Puget Sound Energy | 96,014,509 | 100,128,158 | 101,160,398 | 113,793,975 |
| Total | 219,657,313 | 190,245,044 | 198,373,565 | 217,884,473 |

Table 3 shows the estimated emissions for each company as calculated by the UTC. This data was developed by multiplying the gas usage data in the previous table by the gas CO₂e emissions factor, 0.0545.

| Company | 1997 | 2005 | 2015 | 2018 |
|---------------------|-----------|-----------|-----------|-----------|
| Avista Utilities | 1,380,069 | 1,207,770 | 1,191,612 | 1,362,189 |
| City of Buckley | 9,930 | 11,245 | n/a | n/a |
| Cascade Natural Gas | 4,227,586 | 2,833,753 | 3,203,791 | 3,336,689 |
| City of Ellensburg | 41,043 | 38,664 | 35,703 | 39,679 |

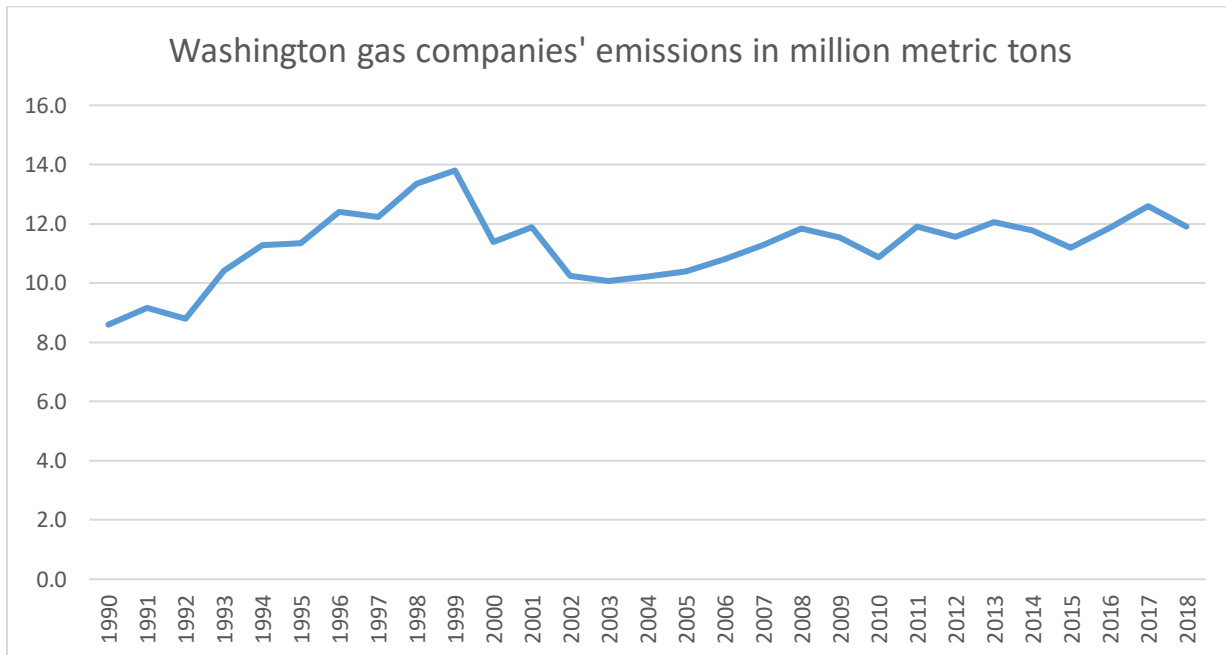
²⁰ *Id.*

²¹ Puget Sound Energy purchased the City of Buckley utility service territory in September 2014.

²² Prometheus Energy reported Washington state gas usage for the first time in 2018. The company develops liquefied natural gas projects. <http://www.prometheusenergy.com> is now <http://www.stabilisenergy.com>

| | | | | |
|-----------------------|-------------------|-------------------|-------------------|-------------------|
| City of Enumclaw | 20,108 | 21,609 | 19,559 | 21,404 |
| Northwest Natural Gas | 320,884 | 408,316 | 419,311 | 485,070 |
| Northwest Pipeline GT | 738,391 | 389,633 | 427,731 | 424,762 |
| Prometheus Energy | 0 | 0 | 0 | 2,701 |
| Puget Sound Energy | 5,232,386 | 5,456,563 | 5,512,815 | 6,201,292 |
| Total | 11,970,398 | 10,367,553 | 10,810,523 | 11,873,785 |

The emissions estimates in this report should not be used for analyzing Washington’s trends in either overall or per capita emissions because the underlying usage data is not adjusted for year-over-year variations in weather. This data actually depicts the annual variation in gas usage based on how cold it is in the winter heating season. Thus, it is not surprising to find that estimated emissions in 2018 are nearly the same as those reported in 1997. For additional context, the following chart shows the annual variation in gas-related emissions since 1990.²³



²³ U.S. Energy Information Administration, *Washington State Carbon Dioxide Emissions from Fossil Fuel Consumption 1980-2016*. (EIA emissions data) Downloaded Nov. 2019. The UTC added estimated data for 2017 and 2018 based on the calculations used to develop Table 3.
<https://www.eia.gov/environment/emissions/state/excel/washington.xlsx>

Appendix A

CO₂e Factor Calculation for Natural Gas Emissions

The UTC used the default natural gas emission factors from CFR, Title 40, Chapter 23, Part 98, Subpart C (as shown in Column A) to convert from kg per mmBtu of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) into per Mcf (as shown in Columns B-D). Next, the UTC multiplied that conversion by the global warming potential of those emissions as prescribed by [WAC 173-441-040](#) at Table 1 (as shown in Column E) to calculate the CO₂e factor for each GHG (as shown in Column F). Finally, the UTC added the three values in Column F to reach the total natural gas emissions CO₂e Factor of 0.0545.

CO₂e Factor Calculation

| Column A | Column B | Column C | Column D | Column E | Column F |
|------------------------------------|----------------------|------------------------|-------------------|---|--|
| Natural Gas Emission Factor | Conversion to scf | Conversion to MT | Conversion to Mcf | Global Warming Potential Factor | |
| 53.06 kg CO ₂ mmBtu | .001026 mmBtu scf | metric tons 1000 kg | 1000 scf mcf | 1 CO ₂ CO ₂ | = 0.05443956 metric tons CO ₂ /mcf |
| .001 kg CH ₄ mmBtu | .001026 mmBtu scf | metric tons 1000 kg | 1000 scf mcf | 25 CO ₂ CH ₄ | = 0.00002565 metric tons CO ₂ e/mcf |
| .0001 kg N ₂ O mmBtu | .001026 mmBtu scf | metric tons 1000 kg | 1000 scf mcf | 298 CO ₂ N ₂ O | = 3.05748E-05 metric tons CO ₂ e/mcf |
| Total | | | | | 0.054495785 metric tons CO₂e/mcf |

Source for Natural Gas Emissions Factors (Column A)

<https://www.ecfr.gov/cgi-bin/text-idx?SID=d329506de5243e19e2f650607f7539ae&mc=true&node=sp40.23.98.c&rgn=div6>

Source for Global Warming Potential Factor (Column E)

<https://apps.leg.wa.gov/WAC/default.aspx?cite=173-441&full=true#173-441-040>