SB 21-161

Legislative Council Staff
Nonpartisan Services for Colorado's Legislature

Greenhouse Gas Emissions Report

Drafting Number:	LLS 21-0106	**Date:**	March 22, 2021
Prime Sponsors:	Sen. Hansen; Coram Rep. Arndt	**Analyst:**	Christina Van Winkle | 303-866-6289 Christina.VanWinkle@state.co.us
BILL TOPIC:	**VOLUNTARY REDUCE GREENHOUSE GAS NATURAL GAS UTILITIES**		
Sectors Impacted:	☐ Electric Power ☐ Transportation ☐ Industrial Processes ☒ Waste Management ☒ Agriculture		☐ Natural Gas and Oil Systems ☒ Residential / Commercial / Industrial Fuel Use ☒ Coal Mining and Abandoned Mines ☐ Land Use / Land Use Change / Forestry ☐ Other
Net Change:	☐ Increase ☒ Decrease ☐ Indeterminate ☐ Minimal		
Report Status:	This report reflects the introduced bill.		

Emissions Summary

This bill is expected to reduce greenhouse gas (GHG) emissions by establishing a voluntary GHG emissions reduction program for natural gas utilities. Participation in the program will lower GHG emissions by reducing the use of fossil-derived natural gas and by avoiding emissions from other sources such as landfills, wastewater treatment plants, coalbed methane, and agriculture, which may be used to produce renewable natural gas (RNG). Assuming all four large and small natural gas utilities in the state participate in the program, this bill will result in an annual reduction of approximately 0.5 million metric tons of carbon dioxide equivalent by 2025. These amounts could double by 2030 and triple by 2035 if the targets are met. Over a 10-year period from 2022 to 2031, total GHG emissions reductions are estimated to be approximately 7.7 million metric tons of carbon dioxide equivalent.

Key Provisions

The bill establishes the following GHG emission reduction targets for large natural gas utilities, using their 2019 GHG emissions as a baseline:

- at least 5 percent by January 1, 2025;
- at least 10 percent by January 1, 2030; and
- at least 15 percent on and after January 1, 2035.

Natural gas utilities may achieve these targets by:

- using RNG, which must account for at least 35 percent of the emissions reductions;
- purchasing GHG emissions offsets;
- sequestering greenhouse gases in a Class VI injection well; and
- other programs approved by the PUC that demonstrate GHG emissions reductions.

The GHG emissions reduction program must include both the emissions associated with the combustion of natural gas by retail customers other than transportation sector customers, and the methane leaked during transport and delivery. The program will also include tradeable renewable natural gas environmental attribute credits, which gas utilities may use to comply with the targets. Gas utilities that participate in the program are not required to incur any additional costs under any other greenhouse gas emission reduction requirement.

Background

Natural gas utilities GHG emissions. Natural gas is primarily methane (CH_4), which is a greenhouse gas with a 100-year global warming potential 25-28 times higher than carbon dioxide.[1] Methane gas can leak from pipelines and other infrastructure during the distribution to retail customers. When retail customers burn natural gas at its end use (e.g., space or water heater), carbon dioxide is emitted. There are currently four large and small natural gas utilities in Colorado that may voluntarily participate in the GHG emissions reduction program established in this bill. These four utilities, with 2019 sales volumes and estimated GHG emissions, are reflected in the table below.

Table 1
Natural Gas Utility 2019 GHG Emissions

Natural Gas Utility	2019 Natural Gas Sales Mmcf[1]	Combustion Emissions MT CO_2e[2]	Methane Leakage Emissions MT CO_2e	TOTAL GHG Emissions MT CO_2e
PSCo (Xcel Energy)	150,182	8,184,234	185,909	8,370,143
Black Hills Colorado	23,792	1,296,561	29,314	1,325,874
Colorado Natural Gas	1,771	96,531	2,182	98,713
Atmos Energy	13,380	729,177	16,408	745,585
TOTAL	**189,126**	**10,306,502**	**233,813**	**10,540,315**

[1] Million cubic feet of natural gas. One cubic foot of natural gas is equal to 1,037 Btu (British thermal units) and 0.01 therms.
[2] Metric tons of carbon dioxide equivalent, calculated using IPCC 4th Assessment Report's 100-year global warming potential.

Source: Legislative Council Staff calculations, based on retails sales volumes provided by the Public Utilities Commission.

[1]Global Warming Potentials (GWP) allow for greenhouse gases to be 'added' together and reported in total as 'carbon dioxide equivalent'. When considered on a 20-year time scale, methane gas is 72-84 times higher than carbon dioxide, based on IPCC 4th and 5th Assessment Report GWP values respectively. The carbon dioxide equivalent used in this report will be based on 100-year IPCC AR4 values, which aligns with federal and state reporting practices.

GHG emissions caused by the combustion of natural gas are based on emissions factors estimated by the U.S. Environmental Protection Agency, which quantifies the GHG emissions per unit of natural gas combusted.[2] Based on these emissions factors and the averaged emissions across the four natural gas utilities, each retail customer (defined by meters) causes 3.76 metric tons of carbon dioxide equivalent to be emitted through combustion in 2018.

GHG emissions associated with leakage during natural gas distribution are based on local distribution company reports to the EPA through the Mandatory GHG Reporting Rule, which requires companies to report if they emit more than 25,000 metric tons of carbon dioxide equivalent. Methane leakage data was provided for two natural gas utilities, and extrapolated to other utilities based on an average emissions rate per volume of retail sales.

Renewable natural gas. The bill requires large natural gas utilities to meet a minimum of 35 percent of the emissions reduction targets with renewable natural gas (RNG). Sources of RNG, as defined in the bill, include:

- biogas;
- hydrogen gas derived from renewable energy resources; and
- methane gas derived from any combination of biogas, hydrogen gas, carbon oxides derived from renewable energy, waste carbon dioxide, wastewater carbon dioxide, coalbed methane municipal solid waste landfills, pyrolysis of municipal solid waste or waste tires, pyrolysis of biomass, or the decomposition of organic food waste.

RNG can be produced from biogas sources such as landfills, agriculture, and wastewater. RNG can also be produced from non-organic methane sources as coalbed methane and through other processes such as waste tire pyrolysis, hydrogen gas production, and waste carbon dioxide.

The GHG emissions reductions associated with RNG production will vary based on the source and processing methods. For instance, RNG projects that capture and recover methane from landfills that otherwise would have emitted into the atmosphere will result in greater GHG emissions reductions than RNG projects that produce methane from landfills that are currently flaring gas resources.

Assumptions. This GHG emissions assessment is based on a number of assumptions. First, it assumes that all four large and small natural gas utilities will participate in the program, since they have all expressed interest to the PUC to participate in the program. Second, it assumes that the PUC will establish the same targets for large and small natural gas utilities as outlined in Section 40-2-124.5 (3)(a)(I) of the bill.

[2] One million cubic feet (Mmcf) of natural gas causes 54 metric tons of carbon dioxide equivalent (MT CO_2e) to be emitted. EPA Emissions Factors for Greenhouse Gas Inventories. Available at: https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf.

Third, it assumes that gas utilities are able to achieve the GHG emission reduction targets without triggering the rate cap for total incremental annual costs established in the bill for large natural gas utilities (2 percent of total revenue requirements for a particular year). If natural gas utilities reach this rate cap prior to achieving the GHG emission reduction targets, emissions savings will be reduced.

And finally, it assumes that the RNG environmental attribute credits associated with the credit trading program will include the upstream emissions reductions associated with the production of RNG. As explained, the avoided GHG emissions associated with the production of RNG varies widely based on the source of emissions. If the RNG environmental attribute credits do not fully account for upstream avoided GHG emissions, emission reduction estimates may vary.

Emissions Assessment

This bill is expected to reduce GHG emissions by the target amounts established in the bill for participating natural gas utilities. By 2025, GHG emissions from natural gas utilities will be reduced by approximately 0.5 million metric tons per year compared to 2019 emissions levels. These emissions savings will double by 2030 and triple by 2035 under the targets. The table below reflects the emissions reductions for large and small natural gas utilities under each of the three GHG emission reduction targets.

Table 2
Annual GHG Emissions Reductions Under SB 21-161
Metric Tons of Carbon Dioxide Equivalent

GHG Emission Reduction Targets	Large Natural Gas Utility	Small Natural Gas Utility	Total GHG Emissions Reductions
5% by 2025	418,507	108,509	527,016
10% by 2030	837,014	217,017	1,054,032
15% by 2035	1,255,521	325,526	1,581,047

Source: Legislative Council Staff calculations.

Ten-year assessment. Assuming annual reductions in GHG emissions begin in 2022, and progress toward the emissions reduction targets in Table 2 occurs at a constant rate between each deadline, total emissions reductions from 2022 to 2031 are estimated to be 7.7 million metric tons of carbon dioxide equivalent over a ten-year period.

Limitations. The natural gas sales volumes used in this report reflect all sales by natural gas utilities to retail customers. Carbon dioxide emitted by transportation retail customers are excluded from the GHG emissions reduction program established in this bill. Natural gas sales volumes were not available for end use sectors, therefore, sales to transportation end users may be included in the sales volumes used to estimate baseline GHG emissions and GHG emissions savings under the targets.

In addition, it is not known with certainty how the GHG emission reduction impacts associated Senate Bill 21-161 compare with future natural gas sales and GHG emissions that would occur under current law. This analysis assumes that demand for natural gas during the duration of this analysis will not change significantly. Electrification efforts and demand-side management plans may reduce future demand for natural gas, but these reductions will likely be offset by an increase in demand for natural gas through new building construction and end users.

Data Sources and Agencies Contacted

Colorado Department of Public Health and Environment
Colorado Public Utilities Commission
U.S. Environmental Protection Agency