

# 2011-2022 Greenhouse Gas Reporting Program Sector Profile: Natural Gas and Natural Gas Liquids Suppliers

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## NATURAL GAS AND NATURAL GAS LIQUIDS SUPPLIERS SECTOR

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*All emissions presented here are as of 8/12/2023. Natural gas and NGL suppliers do not report actual emissions from a facility. Suppliers report the quantity of product placed into the economy and the emissions that would result if the products were completely combusted, oxidized, or released when used.*

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### Highlights

- The reported greenhouse gas (GHG) quantity associated with Natural Gas Liquids (NGL) supply has increased from 211.5 to 465.0 million metric tons (MMT) of CO<sub>2</sub> from 2011 to 2022.
- The reported GHG quantity associated with natural gas supplied by local distribution companies (LDCs) increased from 715.9 to 826.2 (MMT) of CO<sub>2</sub> from 2011 to 2022.

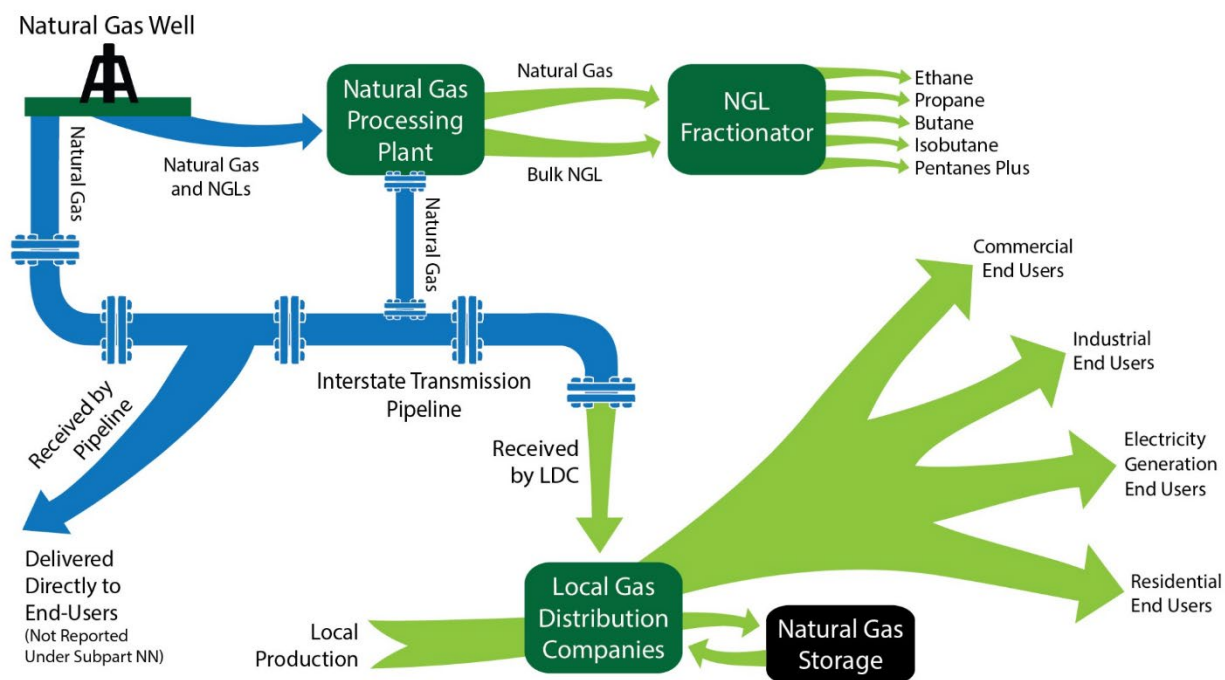
### About this Sector

This sector comprises NGL fractionators and LDCs.

- NGL fractionators are defined as installations that receive bulk natural gas or natural gas liquids from producers and then fractionated at least some of these raw inputs into individual liquid products (ethane, propane, normal butane, isobutane, or pentanes plus) and supplied those products into the economy during the reporting year.
- LDCs are generally the same companies to which you pay your gas bill every month. They receive natural gas from a transmission pipeline company and physically deliver the gas to end users.

Some facilities in the Natural Gas and Natural Gas Liquids Supply sector also submit GHG reports for their direct emissions (i.e. emissions from fuel combustion, process vents, and equipment leaks). Direct emissions data reported by these facilities are available in the industrial profiles for Petroleum and Natural Gas Systems and Petroleum Refineries. Greenhouse gas information associated with imports and exports of natural gas liquids is reported by suppliers of petroleum products.

Figure 1 shows the natural gas and natural gas liquid supply chain and highlights the information reported by LDCs and NGL fractionators.

Figure 1: Flows of Natural Gas and Natural Gas Liquids<sup>a</sup>

<sup>a</sup> Quantities marked with green arrows are reported to EPA by NGL Fractionators or Local Distribution Companies under Subpart NN.

Although most natural gas consumers receive their natural gas from LDCs, some natural gas is delivered directly to end-users by other distributors, including transmission pipeline companies, producers, gatherers, and storage companies. These companies mostly supply large-volume end users, such as large industrial and electric power generation customers. The natural gas delivered directly to end users is not reported to the Greenhouse Gas Reporting Program (GHGRP) by transportation pipeline companies or LDCs. Based on information from the U.S. GHG Inventory for 2021, roughly 50.1% of CO<sub>2</sub>e associated with natural gas combustion is being reported to GHGRP by LDCs (see Table 1).<sup>1</sup> However, most of the CO<sub>2</sub>e associated with the combustion of gas that is not reported by LDCs is combusted at large installations that are themselves required to report their GHG emissions to EPA. Therefore, the GHGRP covers the vast majority of emissions associated with natural gas use in reporting by either the supplier or the end-user.

<sup>1</sup> Total CO<sub>2</sub>e associated with gas supply reported to the GHGRP by LDCs divided by the total CO<sub>2</sub>e associated with U.S. natural gas consumption. Total CO<sub>2</sub>e associated with gas supply reported to the GHGRP by LDCs was calculated by multiplying total reported gas deliveries by 0.0544 x (10<sup>-6</sup>), the average CO<sub>2</sub> emissions from combustion of 1 Mscf of natural gas, and by the global warming potential (GWP) of 1 for CO<sub>2</sub>, measured in MMT CO<sub>2</sub>e. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2020. EPA 430-R-22-003. U.S. Environmental Protection Agency. April 14, 2022. Available at: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2020>.

**Table 1: Natural Gas Supplied to End-Users in 2021**

End-Use Sector	Total CO <sub>2</sub> e associated with gas supply reported to the GHGRP by LDCs (MMT) <sup>a</sup>	Total CO <sub>2</sub> e associated with U.S. natural gas consumption (MMT) <sup>b</sup>	Percentage of natural gas consumption reported to the GHGRP by LDCs
Commercial Customers	173.7	180.9	96.0%
Electricity Generating Facilities	138.5	612.9	22.6%
Industrial Customers	212.6	499.6	42.6%
Residential Customers	252.3	258.6	97.6%
All Sectors	777.1 <sup>c</sup>	1,552.0	50.1%

<sup>a</sup> Estimated by multiplying total reported gas deliveries by  $0.0544 \times 10^{-6}$ , the average CO<sub>2</sub> emissions from combustion of 1 Mscf of natural gas, and by the global warming potential (GWP) of 1 for CO<sub>2</sub>, measured in MMT CO<sub>2</sub>e.

<sup>b</sup> Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021. U.S. Environmental Protection Agency. April 13, 2023. EPA 430-D-23-001. Available at: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021>.

<sup>c</sup> The CO<sub>2</sub>e quantity for all sectors shown in this table differs from that presented in Table 5. The value in this table is calculated using the default CO<sub>2</sub>e emissions per unit of natural gas, whereas the value provided in Table 5 is calculated using supplier specific values for CO<sub>2</sub>e per unit of natural gas delivered, where reported.

## Who Reports?

Table 2 includes applicability information for the Natural Gas and Natural Gas Liquids Supply Sector as well as their corresponding reporting schedules. Table 3 summarizes the number of suppliers in the Natural Gas and Natural Gas Liquids Sector that submitted a GHG report from 2011 to 2022. In 2022, 471 suppliers in the sector submitted a report to GHGRP. Out of all suppliers reporting to the GHGRP, 41% are in the Natural Gas and Natural Gas Liquids Supply Sector. Table 2 includes details of the applicability of each reporter category as well as their corresponding reporting schedules. Table 4 shows the GHGRP coverage for Natural Gas and Natural Gas Liquids Supply.

**Table 2: Natural Gas and Natural Gas Liquids Supply Sector Reporting Schedule**

Subpart	Source Category	Applicability	First Reporting Year
NN	Local Distribution Companies	LDCs that deliver $\geq$ 460,000 Mscf of natural gas annually.	2010
NN	NGL Fractionators	All NGL Fractionators are required to report. <sup>a</sup>	2010

<sup>a</sup> All NGL fractionators are required to report to the GHGRP. However, suppliers may discontinue reporting if the quantity of GHG supplied is less than 25,000 metric tons CO<sub>2</sub>e per year for five consecutive years or less than 15,000 metric tons CO<sub>2</sub>e per year for three consecutive years.

**Table 3: Natural Gas and Natural Gas Liquids Supply Sector – Number of Reporters (2011–2022)**

Subsector	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Local Distribution Companies	381	386	385	383	383	382	380	378	374	367	365	357
NGL Fractionators	116	119	126	130	125	124	124	123	123	124	119	114
<b>Total Natural Gas and Natural Gas Liquids Sector</b>	<b>497</b>	<b>505</b>	<b>511</b>	<b>513</b>	<b>508</b>	<b>506</b>	<b>504</b>	<b>501</b>	<b>497</b>	<b>491</b>	<b>484</b>	<b>471</b>

**Table 4: Natural Gas and Natural Gas Liquids Supply Sector – GHGRP Coverage (2022)**

Subsector	GHGRP Applicability	Estimated Percent of Suppliers Covered by GHGRP	Estimated Percent of CO <sub>2</sub> e Associated with Products Covered by GHGRP
Local Distribution Companies	LDCs that deliver $\geq$ 460,000 Mscf of natural gas annually.	32.0% <sup>a</sup>	99.5% <sup>a</sup>
NGL Fractionators	All Fractionators	98.3% <sup>b</sup>	~100% <sup>b</sup>

<sup>a</sup> Estimate of size of industry and estimate of total CO<sub>2</sub>e coverage are based on reports submitted by LDCs to EIA via form 176, 2022. All operating LDCs are required to submit this form to EIA regardless of the size of their operations. The form contains the quantity of gas delivered by the LDC to end-users. The estimated total CO<sub>2</sub>e covered by the GHGRP was calculated by taking the total deliveries reported to EIA and subtracting the fraction of natural gas supplied by LDCs below the GHGRP reporting threshold.

<sup>b</sup> All natural gas liquids fractionators are required to report to the GHGRP; since 2012, 33 facilities have ceased reporting because they had a valid reason to discontinue reporting. We have determined that of these 33 facilities, 2 have ceased reporting because they met the criteria for off-ramping. See FAQ: When is a Facility Eligible to Stop Reporting? Available at: <http://www.ccdsupport.com/confluence/pages/viewpage.action?pageId=243139271>.

## Reported Greenhouse Gas Information

Table 5 includes the CO<sub>2</sub>e quantities (MMT) for the Natural Gas and Natural Gas Liquids Supply Sector from 2011 to 2022. The total quantity of CO<sub>2</sub>e reported by Natural Gas and Natural Gas Liquids Suppliers was 1,291.2 MMT in 2022 (Table 5). This excludes the quantity reported by 21 NGL fractionators that supply only one product, because their production quantities are considered to be confidential business information and are not published by EPA. The total CO<sub>2</sub>e quantity reported by these 21 fractionators is relatively small.

Because CO<sub>2</sub>e emissions associated with each product does not occur until the product is combusted or otherwise used, not all of the total reported 1,291.2 MMT CO<sub>2</sub>e was necessarily emitted to the atmosphere in 2022. Some of the products may be in storage for use in future years. Additionally, some natural gas and about 72.5% of NGLs<sup>2</sup> are used for non-energy purposes such as feedstocks for petrochemical production. Table 6 shows the percentage of NGLs used for fuel and non-fuel purposes, by product. Some carbon emissions from these products will be released at downstream chemical plants, and the remaining carbon emissions do not occur until the petrochemical product (e.g., plastic) decomposes or is combusted, such as in a landfill or a waste incinerator.

Some CO<sub>2</sub>e associated with natural gas supplied by LDCs is also reported to EPA by end-users of the gas. To account for emissions already reported to the GHGRP by end-users under other subparts, LDCs are required to report the quantity of gas delivered to large end-users, defined as those who receive greater than 460 million scf of gas per year. This threshold was selected as it is roughly equivalent to 25,000 metric tons CO<sub>2</sub>e; facilities that emit above this level are required to report their direct GHG emissions to the EPA.

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<sup>2</sup> Value was calculated by dividing the total heat content of NGLs (ethane, propane, butane/isobutane, and pentane plus) used for fuel purposes in 2022 by the total heat content of all NGLs supplied in 2022, multiplying by 100 to convert to percentage and then subtracting from 100 to determine the percentage of NGLs used for non-energy purposes. Data source: EIA, Petroleum & Other Liquids, Supply and Disposition. Annual, 2022. Available here: [https://www.eia.gov/dnav/pet/pet\\_sum\\_snd\\_d\\_nus\\_mbb1\\_a\\_cur.htm](https://www.eia.gov/dnav/pet/pet_sum_snd_d_nus_mbb1_a_cur.htm)

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**Table 5: Natural Gas and Natural Gas Liquids Supply Sector CO<sub>2</sub>e Quantity (2011-2022)**

Subsector	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Total Natural Gas and Natural Gas Liquids Supply Sector (MMT)<sup>a</sup></b>	<b>927.3</b>	<b>943.7</b>	<b>994.7</b>	<b>1,054.1</b>	<b>1,053.7</b>	<b>1,058.0</b>	<b>1,062.7</b>	<b>1,172.4</b>	<b>1,222.9</b>	<b>1,207.6</b>	<b>1,249.1</b>	<b>1,291.2</b>
NGL Fractionators <sup>a</sup>	211.5	234.3	222.8	261.9	288.1	305.3	320.4	358.3	400.4	433.2	458.2	465.0
Local Distribution Companies	715.9	709.5	771.9	792.2	765.6	752.7	742.3	814.1	822.5	774.4	790.9	826.2
CO <sub>2</sub> e associated with LDC deliveries to large end-users	206.5	242.0	236.8	247.2	261.0	260.8	256.1	275.6	277.1	270.3	282.5	290.9

<sup>a</sup> Excludes CO<sub>2</sub>e reported by 21 NGL Fractionators whose reported quantities are classified as confidential business information (CBI). Note: GHGRP data differs from EIA data in that their emission estimates are based on products supplied (which considers imports and exports) whereas GHGRP's is based on products produced at fractionating facilities.

**Table 6: Percentage of NGL Used for Fuel and Non-Fuel Purposes**

Natural Gas Liquid	Percent Used for Fuel Purposes <sup>a</sup>	Percent Used for Non-Fuel Purposes
Ethane	0%	100% <sup>b</sup>
Propane	77%	23% <sup>c</sup>
Butane/Isobutane	15%	85% <sup>b</sup>
Pentane Plus	50%	50% <sup>b</sup>

<sup>a</sup> Percent used for fuel purposes was calculated by subtracting the amount used for non-fuel purposes from 100%.

<sup>b</sup> Ethane, butane/isobutane, and pentane plus values were obtained from Monthly Energy Review, December 2022. U.S. Energy Information Administration, pg. 27, Hydrocarbon Gas Liquids (HGL) definition. Available here: <https://www.eia.gov/totalenergy/data/monthly/archive/00352212.pdf>.

<sup>c</sup> Propane for non-fuel purposes was calculated using total odorized propane sales data in 2022 from PERC (Available here: <https://cloudinary.propane.com/image/upload/v1698865606/website-media/2022%20Annual%20Propane%20Retail%20Sales%20Report.pdf>; p. 4) and propane products supplied in 2022 (Available here: [https://www.eia.gov/dnav/pet/pet\\_sum\\_snd\\_d\\_nus\\_mbbbl\\_a\\_cur-1.htm](https://www.eia.gov/dnav/pet/pet_sum_snd_d_nus_mbbbl_a_cur-1.htm)). The percentage was calculated as follows:  $(1 - \text{Propane Sales} / \text{Propane Products Supplied}) * 100$ .

Figure 2 shows the locations of LDCs that reported to the GHGRP, their service areas (if available), and the CO<sub>2</sub>e associated with natural gas supplied. The color of the shading corresponds to the quantity of CO<sub>2</sub>e reported by that LDC. There are also LDCs reporting CO<sub>2</sub>e associated with natural gas supplied located in Alaska and Hawaii.

Readers can view maps and identify the LDCs reporting the largest CO<sub>2</sub>e quantity by visiting the Facility Level Information on Greenhouse Gases (FLIGHT) website (<http://ghgdata.epa.gov>).



**Figure 2: Reported CO<sub>2</sub>e Quantity (metric tons) for Each LDC in the Natural Gas and Natural Gas Liquids Supply Sector**

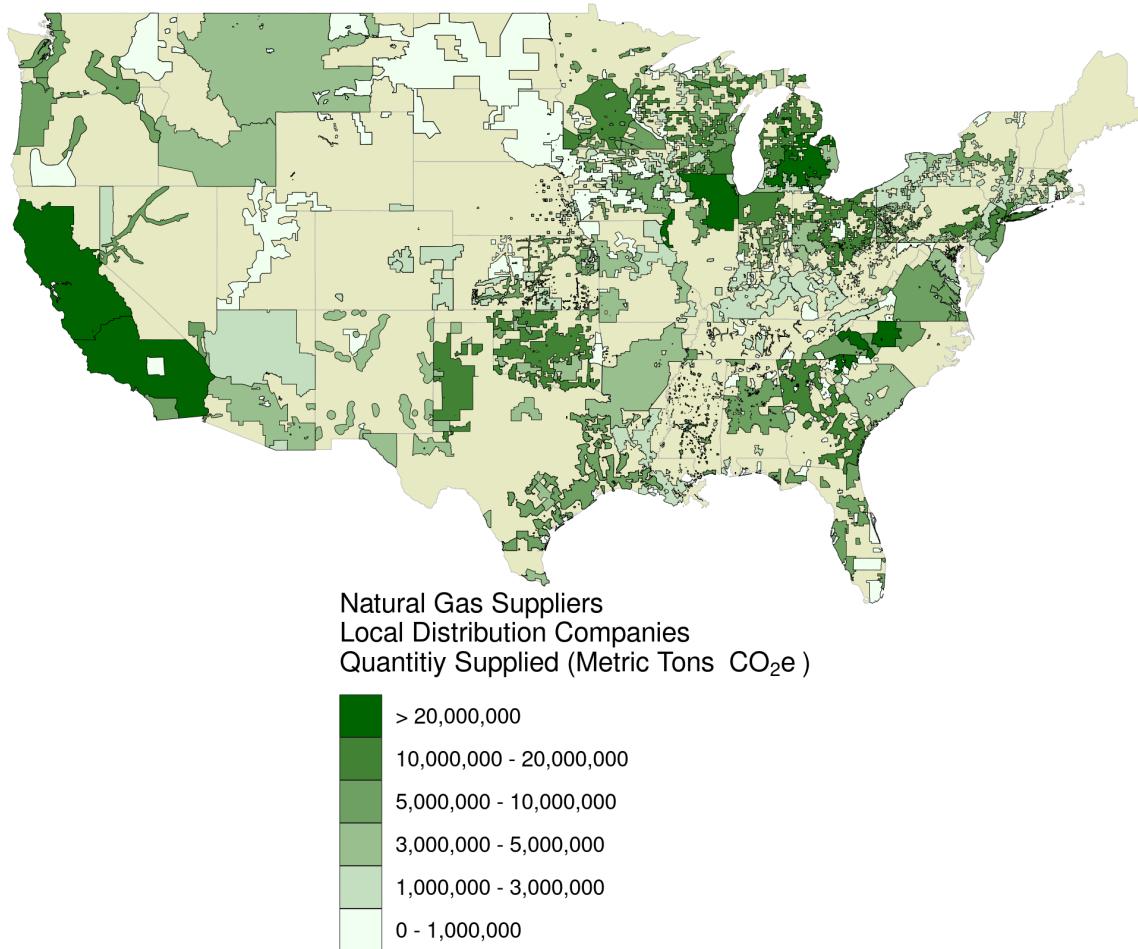
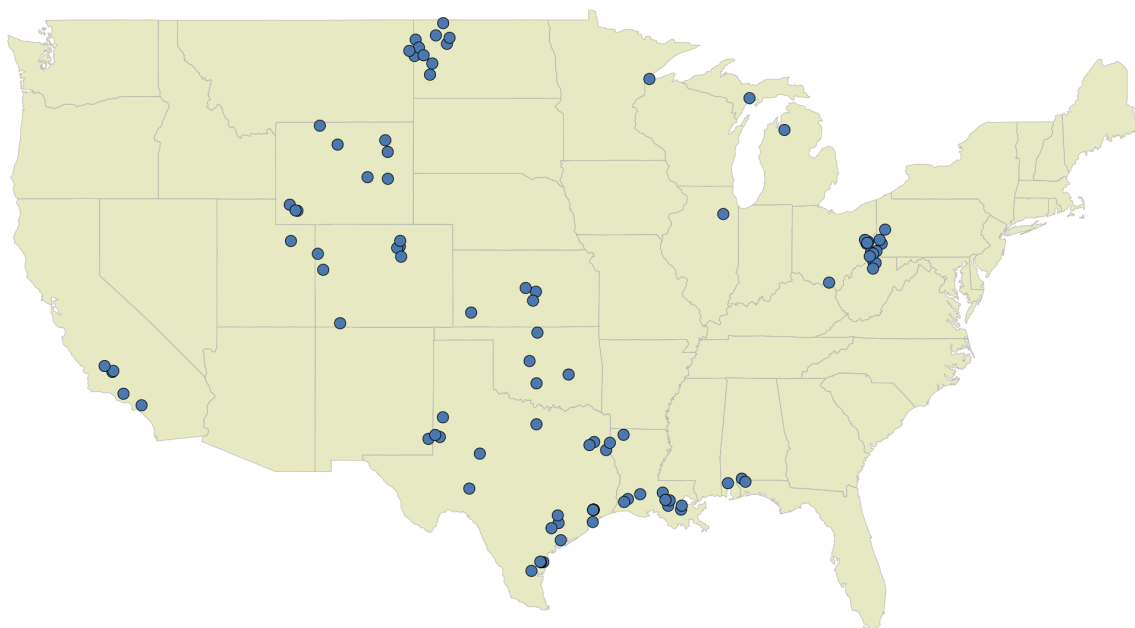


Figure 3 shows the locations of NGL fractionators that reported. The reported CO<sub>2</sub>e is not emitted at these locations. These products are supplied into the economy and are either combusted or used as a chemical feedstock by down-stream users. Readers can identify the NGL fractionators reporting the largest CO<sub>2</sub>e quantity by visiting the Facility Level Information on Greenhouse Gases (FLIGHT) website (<http://ghgdata.epa.gov>).

**Figure 3: Location and Relative Emissions for Facilities Reporting in the Natural Gas and Natural Gas Liquids Supply Sector (2022)**



GHGRP, 2022  
Natural Gas Fractionators Facility Location

## Natural Gas and Natural Gas Liquids Supply Sector Trend in Total Reported GHG Quantity 2011 to 2022

### Natural Gas Supply Trends

The CO<sub>2</sub> associated with natural gas supply reported by local distribution companies (LDCs) varies due to fluctuations in weather, the relative price of natural gas compared to other fuels and the prevailing economic conditions. The annual CO<sub>2</sub> reported for natural gas supplied by LDCs has ranged between a low of 709.5 million metric tons (MMT) in 2012 and a high of 826.2 MMT in 2022 and is directly proportional to the quantity of natural gas supplied. The total volume of natural gas supplied increased by 10.2% in 2018 and by 0.6% in 2019. In 2020, natural gas supplied decreased by 5.8% percent, but rebounded slightly in 2021. However, the CO<sub>2</sub> reported in 2021 was 31.6 MMT lower than the 2019 high of 822.5 MMT. The increase in natural gas supplied in 2018 and 2019 was primarily due to economic growth, relatively low natural gas prices resulting from high levels

of natural gas production, and greater reliance on natural gas to fuel power plants.<sup>3,4,5</sup> The lower annual CO<sub>2</sub> emissions reported for 2020 is due to a reduction in demand by residential, commercial (which includes restaurants, hotels, and schools), and industrial consumers. Natural gas supplied to residential, commercial, and industrial customers in 2020 decreased by 6.7 percent, 10.1% and 5.9%, respectively, compared with 2019, despite the lower natural gas prices.<sup>6</sup> The decrease in natural gas consumption by residential users is likely due to milder winter weather in January - March 2020 and November - December 2020, while the lower consumption in the commercial and industrial sectors is likely caused by plant closures caused by the COVID-19 pandemic.<sup>7</sup> Natural gas consumption by the electric power sector increased by 4% in 2020. In 2022, natural gas consumption increased across all sectors, with the largest increases occurring in the commercial and residential sectors, where consumption increased by 6.7% and 5.2% respectively.<sup>8</sup>

Increases in the residential and electricity sectors in 2022 were 5.2% and 7.9% respectively.<sup>9</sup> The average natural gas price for residential customers increased from \$12.18 per thousand cubic feet in 2021 to \$14.75 in 2022.<sup>10</sup> Natural gas consumption in the electricity sector has increased each year since 2018 and is due in part to low gas prices and the retirement of coal-fired power plants. Although natural gas consumption by the electricity sector decreased slightly in 2021.<sup>11</sup> Natural gas consumption by the electricity sector grew by 19.3 million cubic feet in 2021 from the 49.7 million

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<sup>3</sup> U.S. Department of Energy, Today in Energy, U.S. Natural Gas Production, Consumption, and Exports Set New Records in 2019, October 5, 2020. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=45377>.

<sup>4</sup> U.S. Department of Energy, Today in Energy, In 2019, the United States Produced and Consumed Record Volumes of Natural Gas, July 10, 2020. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=44336>.

<sup>5</sup> U.S. Department of Energy, Today in Energy, In 2020, U.S. Natural Gas Prices were the Lowest in Decades, January 7, 2021. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=46376>

<sup>6</sup> U.S. Department of Energy, Today in Energy, In 2020, U.S. Natural Gas Prices were the Lowest in Decades, January 7, 2021. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=46376>

<sup>7</sup> U.S. Department of Energy, Today in Energy, U.S. Natural Gas Consumption was Lower in 2020 in All Sectors Except Electric Power, March 10, 2021. <https://www.eia.gov/todayinenergy/detail.php?id=47076>

<sup>8</sup> U.S. Department of Energy, U.S. Energy Information Administration, Natural Gas Consumption by End Use. Available at [https://www.eia.gov/dnav/ng/ng\\_cons\\_sum\\_dcu\\_nus\\_a.htm](https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm)

<sup>9</sup> U.S. Department of Energy, U.S. Energy Information Administration, Natural Gas Consumption by End Use. Available at [https://www.eia.gov/dnav/ng/ng\\_cons\\_sum\\_dcu\\_nus\\_a.htm](https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm)

<sup>10</sup> U.S. Department of Energy, U.S. Energy Information Administration, Monthly and Annual Natural Gas Prices. Available at [https://www.eia.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm).

<sup>11</sup> U.S. Department of Energy, U.S. Energy Information Administration, Natural Gas Consumption by End Use. Available at [https://www.eia.gov/dnav/ng/ng\\_cons\\_sum\\_dcu\\_nus\\_a.htm](https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm)

cubic feet consumed in 2020 and may be due to higher natural gas prices in 2021. The average natural gas price paid by power plants in 2021 was double the price in 2020.<sup>12,13,14,15,16</sup>

The reported CO<sub>2</sub> for 2011 and 2012 are also affected by changes in the default emission factors. The default emission factor for natural gas supplied was revised in 2013 to a value about 1% less than the default emission factor used in years prior to 2013. For an LDC that uses the default emission factors, the total CO<sub>2</sub> value reported in 2013 and subsequent years is 1% lower than what would have been reported if the emission factor had not been updated. Since many LDCs use emission factors developed using their own data, the overall impact on CO<sub>2</sub> for the sector is small. However, the total CO<sub>2</sub> for the sector is lower for 2013 and subsequent years than would have been reported if the emission factor had remained unchanged.

## Natural Gas Liquid Supply Trends

For suppliers of natural gas liquids (NGLs), the reported CO<sub>2</sub> associated with NGLs supplied to the U.S. economy (i.e., ethane, propane, butane, isobutane and pentanes plus) has gradually increased from 211.4 million metric tons (MMT) in 2011 to 465.0 MMT in 2022. Except for a small decrease in 2013, the supply of NGLs has increased steadily every year with ethane and propane making up 70.9% by volume of the NGLs supplied each year by U.S. fractionators.<sup>17</sup>

The increase in reported NGL supply is due to increased production of natural gas in areas that are high in natural gas liquids, increased U.S. demand for NGL products, and increased exports.<sup>18,19,20</sup> Production capacity, however, decreased due to fewer fractionation plants reporting to GHGRP (114 plants in 2022 compared with 116 in 2011). The ratio of CO<sub>2</sub> to number of plants reporting has, therefore, increased from 1.85 MMT CO<sub>2</sub>/plant in 2011 to 4.1 MMT CO<sub>2</sub>/plant in 2022.

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<sup>12</sup> U.S. Department of Energy, Today in Energy, In 2019, the United States Produced and Consumed Record Volumes of Natural Gas, July 10, 2020. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=44336>.

<sup>13</sup> U.S. Department of Energy, Today in Energy, In 2020, U.S. Natural Gas Prices were the Lowest in Decades, January 7, 2021. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=46376>

<sup>14</sup> U.S. Department of Energy, U.S. Energy Information Administration, Monthly and Annual Natural Gas Prices. Available at [https://www.eia.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm).

<sup>15</sup> U.S. Department of Energy, Today in Energy, More than 100 Coal-fired Plants have been Replaced or Converted to Natural Gas Since 2011, August 5, 2020. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=44636>.

<sup>16</sup> U.S. Department of Energy, Today in Energy, In the past 20 years, natural gas has displaced most coal-burning generation in Pennsylvania, January 26, 2023. Available at <https://www.eia.gov/todayinenergy/detail.php?id=55319>

<sup>17</sup> U.S. Department of Energy, Energy Information Administration, U. S. Energy Information Administration/Petroleum Supply Annual 2022, Volume 1, Table 15. Natural Gas Plant Net Production and Stocks of Petroleum Products by PAD and Refining Districts, 2022, January 26, 2024. Available at: <https://www.eia.gov/petroleum/supply/annual/volume1/pdf/table15.pdf>.

<sup>18</sup> U.S. Department of Energy, Energy Information Administration, This Week in Petroleum, In 2020, Increased Propane, Other HGL Exports Contribute to Continued Strong Product Exports Despite Reductions in Major Transport Fuels, September 23, 2020. Available at: [https://www.eia.gov/petroleum/weekly/archive/2020/200923/includes/analysis\\_print.php](https://www.eia.gov/petroleum/weekly/archive/2020/200923/includes/analysis_print.php).

<sup>19</sup> U.S. Department of Energy, Energy Information Administration, The United States Exported More Propane than Distillate in 2020, March 8, 2021. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=47036>

<sup>20</sup> U.S. Department of Energy, Energy Information Administration, Hydrocarbon Gas Liquids Explained: Imports and Exports of Hydrocarbon Gas Liquids, December 26, 2023. Available at: <https://www.eia.gov/energyexplained/hydrocarbon-gas-liquids/imports-and-exports-of-hydrocarbon-gas-liquids.php>.

Although the number of plants reporting in 2022 decreased from a high of 124 in 2020 to 114, the CO<sub>2</sub> per plant increased from 3.5 MMT CO<sub>2</sub>/plant in 2020 to 4.1 MMT CO<sub>2</sub> /plant in 2022. The year-over-year increases in the CO<sub>2</sub> emissions associated with NGLs were 11.7% for 2018 and 2019, 8.2% for 2020, 5.8% for 2021 and 1.5% for 2022. Domestic consumption of NGLs increased by 49.3% from 2.25 million barrels per day in 2011 to 3.36 million barrels per day in 2022.<sup>21</sup> Increases in ethane supply between 2017 and 2022 are in part a response to the completion of new petrochemical facilities in the U.S. that use ethane as a feedstock.<sup>22</sup> However, the increase in annual NGL production reported in recent years is driven primarily by increases in exports due to high international demand and expansion of U.S. export facilities through the construction of new pipelines and export terminals.<sup>23,24,25</sup> The U.S. currently produces more NGLs than it consumes on an annual basis. Exports of NGL products increased from 0.25 million barrels a day in 2011 to 2.41 million barrels per day in 2022 (864% increase).<sup>26</sup> Although exports of all NGLs have increased over the decade, exports of propane have increased the most and make up the largest share of total NGL exports. Exports of propane increased from 0.30 million barrels per day in 2013 to 1.40 million barrels per day in 2022 driven by strong market demand in Asia.<sup>27,28</sup>

The reported CO<sub>2</sub> for 2011 and 2012 are also affected by changes in the default emission factors. For suppliers of natural gas liquids, the default emission factors used for calculating the CO<sub>2</sub> for ethane, propane, butane and isobutene were revised in 2013. The default emission factors for propane, butane and isobutane were increased by a few percentage points over the factors used prior to 2013, while the default emission factor for ethane decreased by over 30%. The impact these changes had on the total CO<sub>2</sub> reported by an NGL fractionator depends on the mixture of products the plant supplies and whether the fractionator used the default value or a measured value. Since most NGL fractionators supply ethane, the reported CO<sub>2</sub> across the industry was lower beginning in 2013 than would have been reported if the factors had not been updated.

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<sup>21</sup> U.S. Department of Energy, Energy Information Administration, Hydrocarbon Gas Liquids Explained: Imports and Exports of Hydrocarbon Gas Liquids, December 26, 2023. Available at: <https://www.eia.gov/energyexplained/hydrocarbon-gas-liquids/imports-and-exports-of-hydrocarbon-gas-liquids.php>.

<sup>22</sup> U.S. Department of Energy, Energy Information Administration, Hydrocarbon Gas Liquids Explained: Prices of Hydrocarbon Gas Liquids, August, 1, 2023. Available at: <https://www.eia.gov/energyexplained/hydrocarbon-gas-liquids/prices-for-hydrocarbon-gas-liquids.php>.

<sup>23</sup> U.S. Department of Energy, Energy Information Administration, This Week in Petroleum, In 2020, Increased Propane, Other HGL Exports Contribute to Continued Strong Product Exports Despite Reductions in Major Transport Fuels, September 23, 2020. Available at: [https://www.eia.gov/petroleum/weekly/archive/2020/200923/includes/analysis\\_print.php](https://www.eia.gov/petroleum/weekly/archive/2020/200923/includes/analysis_print.php).

<sup>24</sup> U.S. Department of Energy, Energy Information Administration, The United States Exported More Propane than Distillate in 2020, March 8, 2021. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=47036>

<sup>25</sup> U.S. Department of Energy, Energy Information Administration, Hydrocarbon Gas Liquids Explained: Imports and Exports of Hydrocarbon Gas Liquids, December 26, 2023. Available at: <https://www.eia.gov/energyexplained/hydrocarbon-gas-liquids/imports-and-exports-of-hydrocarbon-gas-liquids.php>.

<sup>26</sup> U.S. Department of Energy, Today in Energy, U.S. Natural Gas Consumption was Lower in 2020 in All Sectors Except Electric Power, March 10, 2021. <https://www.eia.gov/todayinenergy/detail.php?id=47076>

<sup>27</sup> U.S. Department of Energy, Energy Information Administration, The United States Exported More Propane than Distillate in 2020, March 8, 2021. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=47036>

<sup>28</sup> U.S. Department of Energy, Energy Information Administration, Hydrocarbon Gas Liquids Explained: Imports and Exports of Hydrocarbon Gas Liquids, December 26, 2023. Available at: <https://www.eia.gov/energyexplained/hydrocarbon-gas-liquids/imports-and-exports-of-hydrocarbon-gas-liquids.php>.

Table 7 shows the heating and cooling degree days as well as the natural gas consumption quantities for these sectors from 2011 to 2022. Table 8 includes the amount of natural gas deliveries that are reported to GHGRP by LDCs from 2011 to 2022.

**Table 7: Weather Data and Natural Gas Consumption**

Year	Heating Degree Days <sup>a</sup>	Natural Gas Consumption: Residential and Commercial Sector (MMcf) <sup>b</sup>	Cooling Degree Days <sup>a</sup>	Natural Gas Consumption: Electric Power Sector (MMcf) <sup>b</sup>
2011	4,280	7,869,096	1,482	7,835,473
2012	3,739	7,044,444	1,502	9,380,065
2013	4,444	8,192,673	1,312	8,198,389
2014	4,535	8,553,779	1,298	8,193,449
2015	4,078	7,814,622	1,483	9,731,656
2016	3,879	7,456,172	1,549	10,313,964
2017	3,833	7,577,938	1,418	9,599,491
2018	4,292	8,511,508	1,571	10,918,248
2019	4,327	8,533,084	1,484	11,596,874
2020	3,920	7,837,120	1,503	11,510,407
2021	3,945	8,005,734	1,474	11,341,637
2022	4,268	8,473,240	1,530	12,309,501
<b>Percent Change (2011-2022)</b>	<b>-0.3%</b>	<b>7.7%</b>	<b>3.2%</b>	<b>57.1%</b>

<sup>a</sup> NOAA National Centers for Environmental information, *Climate at a Glance: National Mapping*, published January 2024, retrieved on January 22, 2024 from <https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/national/time-series>

<sup>b</sup> U.S. Department of Energy, Energy Information Administration, *total natural gas consumption by sector*. These numbers differ from Table 8 because they represent all gas consumption, based on EIA data, which includes gas not delivered by an LDC. Available at: <https://www.eia.gov/naturalgas/ngqs/#?year1=2011&year2=2022&company=Name>

**Table 8: Natural Gas Deliveries Reported to GHGRP by LDCs (Bcf)**

Point in the Supply Chain	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Commercial Customers	3,040	2,807	3,196	3,372	3,110	3,022	3,075	3,395	3,416	3,071	3,194	3,379
Electricity Generating Facilities	1,860	2,403	2,242	2,236	2,540	2,493	2,152	2,461	2,500	2,546	2,547	2,686
Industrial Customers	3,294	3,518	3,674	3,788	3,689	3,764	3,843	4,022	4,048	3,809	3,907	3,904
Residential Customers	4,639	4,086	4,848	5,006	4,546	4,290	4,350	4,918	4,926	4,598	4,637	4,861
Total Reported Deliveries	12,833	12,814	13,960	14,402	13,885	13,569	13,420	14,796	14,890	14,024	14,285	14,831



## Calculation Methods Used

Suppliers in the Natural Gas and Natural Gas Liquids Suppliers sector can choose one of two different methodologies for calculating the CO<sub>2</sub>e quantity associated with the combustion or oxidation of the quantities of natural gas and natural gas liquids supplied.

- Calculation Methodology 1 – Multiply the volume of product supplied by the higher heating value (HHV) and a CO<sub>2</sub>e emission factor (EF). Use either measured or default fuel HHVs and CO<sub>2</sub>e emission factors.
- Calculation Methodology 2 – Multiply the volume of product supplied by a CO<sub>2</sub>e emission factor. Use either measured or default CO<sub>2</sub>e emission factors.

Table 9 shows the portion of reported CO<sub>2</sub>e associated with natural gas supplied by different calculation methodologies in GHGRP. For NGL Fractionators, more than 90% of reporters used the default HHV and emission factor values as opposed to measured values.

**Table 9: Portion of Reported CO<sub>2</sub>e Associated with Natural Gas Supplied by Calculation Method**

Methodology	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Measured Higher Heating Value (HHV) & Measured Emission Factor (EF) <sup>a,b</sup>	1.7%	1.7%	3.0%	1.4%	1.3%	8.1%	9.2%	8.0%	7.9%	8.3%	8.4%	8.2%
Measured HHV & Default EF <sup>b,c</sup>	17.9%	23.6%	15.0%	22.5%	21.7%	12.9%	15.7%	15.3%	11.6%	15.1%	20.4%	15.8%
Default HHV & Default EF <sup>b,d</sup>	80.5%	74.7%	81.9%	76.1%	77.0%	78.9%	75.0%	76.7%	80.5%	76.6%	71.2%	76.0%

<sup>a</sup> Includes LDCs that used Calculation Methodology 1 with both a measured CO<sub>2</sub> emission factor and HHV and those who used Methodology 2 with a measured CO<sub>2</sub> emission factor.

<sup>b</sup> CO<sub>2</sub> calculated using Calculation Methodology 1 and 2 is converted to CO<sub>2</sub>e by multiplying by a GWP of 1.

<sup>c</sup> Includes LDCs that used Calculation Methodology 1 with a measured HHV and default CO<sub>2</sub> emission factor.

<sup>d</sup> Includes LDCs that used Calculation Methodology 1 with a default HHV and CO<sub>2</sub> emission factor and those that used Methodology 2 with a default CO<sub>2</sub> emission factor.

## Data Verification and Analysis

As a part of the reporting and verification process, EPA evaluates annual GHG reports with electronic verification checks. EPA contacts facilities regarding potential reporting issues. Additional information on EPA's verification process is available [here](#).

Some of the information reported by LDCs and NGL fractionators is similar to data reported to the U.S. Energy Information Administration (EIA). EPA and EIA have collaborated to use some of this data to help verify that information submitted to each agency is correct.

## GLOSSARY

**Bcf** means Billion standard cubic feet.

**CBI** means confidential business information.

**Direct emitters** are facilities that combust fuels or otherwise put greenhouse gases into the atmosphere directly from their facility. Alternatively, **Suppliers** are entities that supply certain fossil fuels or fluorinated gases into the economy that—when combusted, released or oxidized—emit greenhouse gases into the atmosphere.

**EIA** means the U.S. Energy Information Administration, which is an independent agency within the U.S. Department of Energy that develops surveys, collects energy data, and analyzes and models energy issues.

**GHGRP** means the Greenhouse Gas Reporting Program under 40 CFR part 98.

**HHV** means higher heating value of a fuel.

**IPCC AR4** refers to the Fourth Assessment Report by the Intergovernmental Panel on Climate Change. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the

Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds)]. IPCC, Geneva, Switzerland, 2007. The AR4 values also can be found in the current version of Table A-1 in Subpart A of 40 CFR part 98.

**LDC** means a local distribution company for natural gas.

**MMT** means million metric tons.

**MMcf** means million cubic feet.

**Mscf** means thousand standard cubic feet.

**NGL** means natural gas liquid (ethane, propane, butane, isobutane, and pentanes plus).

**scf** means standard cubic feet.