NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Natural gas distribution

Reference Flow: 1 kg of natural gas

Brief Description: Pipeline distribution of natural gas from city gate to residential, commercial, and some industrial users.

Section I: Meta Data

Geographical Coverage: United States **Region:** National

Year Data Best Represents: 2010

Process Type: Transport Process (TP)

Process Scope: Gate-to-Gate Process (GG)

Allocation Applied: No

Completeness: All Relevant Flows Captured

Flows Aggregated in Data Set:

☑ Process ☐ Energy Use ☐ Energy P&D ☐ Material P&D

Relevant Output Flows Included in Data Set:

Releases to Air:	☐ Greenhouse Gases	☐ Criteria Air	☐ Other
Releases to Water:	☐ Inorganic	☐ Organic Emissions	☐ Other
Water Usage:	☐ Water Consumption	☐ Water Demand (throughput)	
Releases to Soil:	☐ Inorganic Releases	☐ Organic Releases	☐ Other

Adjustable Process Parameters:

loss	*[kg] kg of natural gas lost during distribution per kg of distributed natural gas*
NG_in	*[kg] kg of natural gas input (from transmission pipeline) per kg of distributed natural gas*

Tracked Input Flows:

Natural gas	*[Technosphere] natural gas from transmission pipeline*

Tracked Output Flows:

Natural gas	*Reference flow*
Vented gas [intermediate product]	*Intermediate product (sent to venting and flaring block with 0% flaring)*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage4_O_NG Distribution_2013-01.xlsx*, which provides additional details regarding relevant calculations, data quality, and references.

Goal and Scope

This unit process provides a summary of relevant input and output flows associated with pipeline distribution of natural gas. Distribution begins at the city gate and ends when natural gas is delivered to the end user. The distribution system leaks natural gas, resulting in methane emissions and product losses. The reference flow of this unit process is 1 kg of distributed natural gas.

Boundary and Description

This unit process provides a summary of relevant input and output flows associated with pipeline distribution of natural gas. Distribution begins at the city gate and ends when natural gas is delivered to the end user. The distribution system leaks natural gas, resulting in methane emissions and product losses. The reference flow of this unit process is 1 kg of distributed natural gas.

Large volumes of natural gas are transported long distances via the U.S. natural gas transmission network. However, the transmission network does not go beyond the city gate. At the city gate, large consumers such as power plants and some industrial facilities pull natural gas directly from the transmission network, but the distribution network is necessary to transport natural gas to smaller end users, such as small industrial facilities, commercial buildings, and homes.

This unit process accounts for the loss of natural gas during distribution. All of these losses are due to leaks.

The methane emissions from distribution are not inventoried in this unit process. Rather, this unit process sends a value for total natural gas distribution losses to a venting and flaring unit process. The venting and flaring unit process has zero percent flaring and allows parameterization of the gas composition.

Unlike the transmission network, the distribution network does not rely on compressors to move natural gas. Transmission pipelines operate at 1,500 pounds per square inch (psi), but distribution pipelines operate at much lower pressures – 3 psi or lower (NaturalGas.org, 2010).

Figure 1: Unit Process Sc

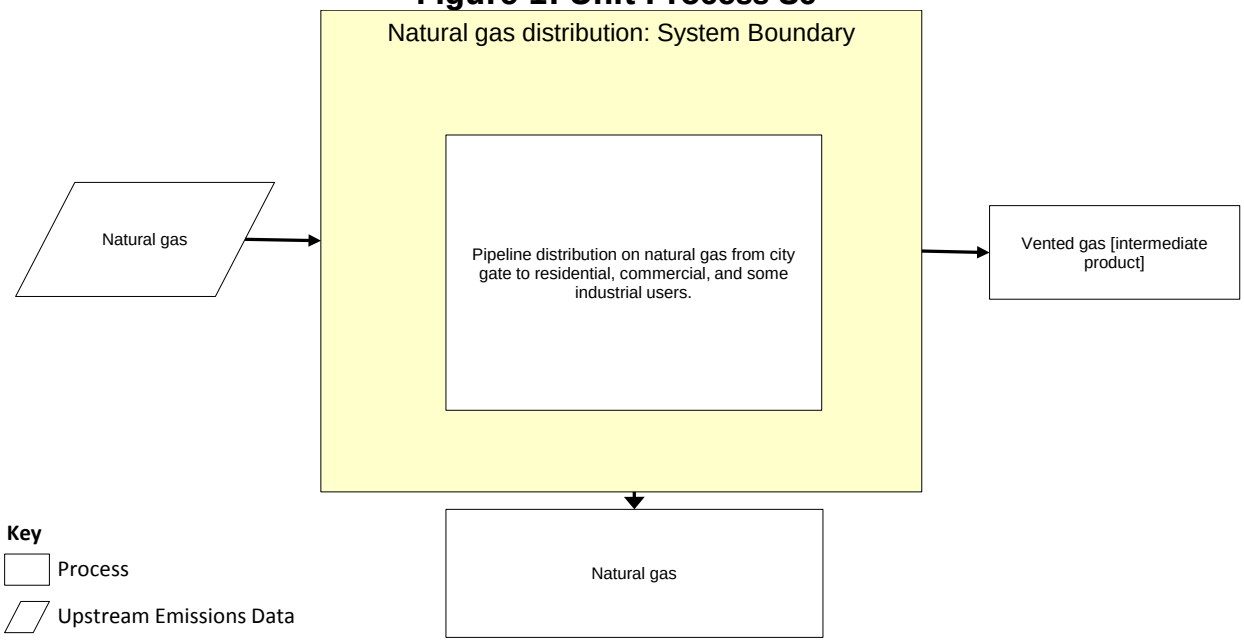

Table 1: Unit Process Input and Output Flows

Flow Name	Value	Units (Per Reference Flow)
Inputs		
Natural gas	1.00	kg
Outputs		
Natural gas	1.00	kg
Vented gas [intermediate product]	4.76E-03	kg

* **Bold face** clarifies that the value shown *does not* include upstream environmental flows.

Embedded Unit Processes

None.

References

EPA, 2013. Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 - 2011, USEPA, April, 2013. Retrieved October 29, 2013 from http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf

EIA, 2013. Natural Gas Annual. Table 1: Summary statistics for natural gas in the United States, 2007-2011. Retrieved October 10, 2013 from http://www.eia.gov/naturalgas/annual/pdf/table_001.pdf.

NaturalGas.or, 2010 Natural Gas Distribution. Retrieved November 12, 2013 from http://www.naturalgas.org/naturalgas/distribution.asp.

Section III: Document Control Information

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