NETL Life Cycle Inventory Data
Process Documentation File

Process Name: LNG Liquefaction, Construction

Reference Flow: 1 piece of LNG Liquefaction, Construction

Brief Description: This process encompasses the construction of a LNG liquefaction facility.

Section I: Meta Data

Geographical Coverage: US **Region:** N/A

Year Data Best Represents: 2010

Process Type: Installation Process (IP)

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

Allocation Applied: No

Completeness: Individual 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:

None.

Tracked Input Flows:

Concrete	*[Technosphere] Amount of concrete required for the construction of a LNG liquefaction facility.*

Structural steel	*[Technosphere] Amount of structural steel required for the construction of a LNG liquefaction facility.*
Steel pipe	*[Technosphere] Amount of steel pipe required for the construction of a LNG liquefaction facility.*

Tracked Output Flows:

LNG Liquefaction, Construction [Insert]	*Reference flow*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage 1-5_C_LNG_Liquefaction_ Facility_2013.01.xlsx*, which provides additional details regarding relevant calculations, data quality, and references.

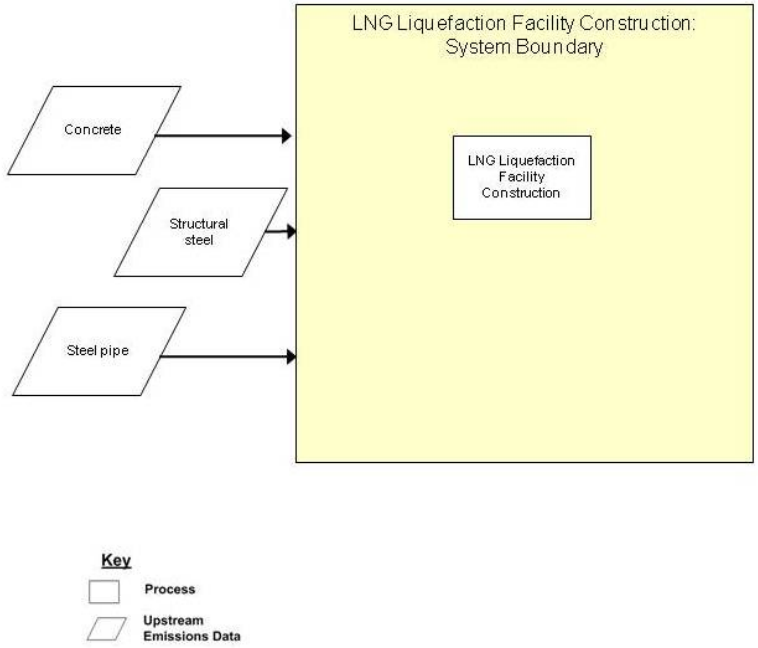
Goal and Scope

This unit process provides a summary of relevant input and output flows associated with the construction of a LNG liquefaction facility built in Qatar. The facility consists of LNG storage tanks, loading jetties, three liquefaction process trains, and all attendant infrastructure. Key inputs are concrete, structural steel, and steel pipe. The unit process is based on the reference flow of one piece of LNG liquefaction facility construction. The relevant flows of this unit process are described below and shown in **Figure 1**.

Boundary and Description

Figure 1 provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the LNG liquefaction power plant are not included in this study. Upstream emissions from the production of raw materials used for the construction of the liquefaction facility (e.g. concrete) are calculated outside the boundary of this unit process.

Figure 1: Unit Process Scope and Boundary



Data for the construction of the liquefaction facility was based on a LNG liquefaction facility in Qatar (Hydrocarbons Technology, n.d.). The materials for the construction of the facility were concrete, structural steel, and steel pipe. Concrete input was multiplied by its density (Prusinski et al, 2004) to scale the item to the reference flow of 1 piece of LNG liquefaction facility construction. The other inputs, structural steel and steel pipe, were converted to the reference flow. Other miscellaneous equipment was assumed to consist primarily of steel and was included in the structural steel input.

Table 1: Unit Process Input and Output Flows

Flow Name	Value	Units (Per Reference Flow)
Inputs		
Concrete	4.71E+08	kg
Structural steel	4.13E+07	kg
Steel pipe	2.80E+07	kg
Outputs		
LNG Liquefaction, Construction [Insert]	1.00E+00	piece

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

Embedded Unit Processes

None.

References

Hydrocarbons Technology (n.d.) *Qatar Gas I LNG Plan, Ras Laffan, Qatar*. Retrieved June 11, 2013, from ttp://www.hydrocarbons-technology.com/projects/raslaffanlng/.

Prusinski, J.R., Marceau, M.L., et al (2004). *Life Cycle Inventory of Slag Cement Concrete. Eighth CANMET/ACI International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete-Supplemental Papers*. Farmington Hills, MI. Retrieved May 13, 2013, from http://www.slagcement.org/download/123321_U128801__71549/Life%20Cycle%20Inventory%20of%20Slag%20Cement%20Concrete.pdf.

Section III: Document Control Information

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Revision History:

Original/no revisions

How to Cite This Document: This document should be cited as:

NETL (2013). NETL Life Cycle Inventory Data – Unit Process: LNG Liquefaction, Construction. U.S. Department of Energy, National Energy Technology Laboratory. Last Updated: June 2013 (version 01). www.netl.doe.gov/LCA

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