



Rio Grande LNG & Associated Greenhouse Gas Emissions

Rio Grande LNG has secured a permit from the US Department of Energy to export 3.61 billion cubic feet of gas per day.

With this terminal exporting at full capacity, burning just one year's worth of the exported gas exported from Rio Grande LNG creates greenhouse gas emissions equivalent to the annual emissions from **21** coal-fired power plants.

(3.61 billion cubic feet / day)(0.054717 metric tons CO₂ emissions/thousand cubic feet natural gas)(1,000,000 thousand cubic feet / billion cubic feet)(365 day / year) = 72,097,855 metric tons of CO₂ per year. According to the EPA, on average coal-fired power plants emit 3,435,617.88 metric tons of CO₂ each per year. So, 72,097,855 / 3,435,617.88 = 20.985 coal-fired power plants. Equivalencies provided by the [EPA GHG Equivalencies Calculator - Calculations and References](#).

Any methane that leaks into the atmosphere before reaching the final stage of combustion is a bad deal for the climate. If just 3.8% of the gas meant for these terminals in a given year escapes into the atmosphere before being burned, the Rio Grande LNG terminals would be doing the same annual climate damage as **44.56** coal plants.

*0.038 * 3.61 billion cubic feet per day * 19,260 tons methane per billion cubic feet * 365 * AR5 20-year GWP of 84 = 81,006,381.288 metric tons of CO_{2e} / 3,435,617.88 metric tons CO₂/power plant = 23.58 more coal plants. These calculations use a 20-year timeframe because of the immediacy of climate change. A Cornell University study finds an average 3.8% methane emission rate at conventionally drilled wells in the U.S., while shale gas leakage rates could be as high as twice that. Robert Howarth, "Methane Emissions and Climatic Warming Risk From Hydraulic Fracturing and Shale Gas Development: Implications for Policy," *Energy and Emission Control Technologies*, Volume 2015:3, page 45.*

And all that only considers the gas burned on the importing end. Accounting for extracting, piping, liquefying, and shipping the gas nearly doubles the carbon intensity of energy produced from RGV's exported LNG.

"Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States," U.S. Department of Energy National Energy Technology Laboratory, May 29 2014, page A-4. The U.S. Department of Energy found that when shipping LNG from New Orleans to Europe, natural gas power plant operations and electricity T&D account for 417.8 kg CO_{2e}/MWh of GHG emissions, while extraction, processing,

domestic pipeline transport, liquefaction, tanker/rail transport, tanker berthing & deberthing, and LNG regasification account for 369.4 kg CO₂e/MWh, an 88.4% increase.

Annual emissions of the Rio Grande LNG terminal and Rio Bravo pipeline:

Emission Source	Estimated tons per year of CO₂e	Citation
Terminal and compressor station 3 total	8,504,316	Table 9.2-1, p. RR9-7
Compressor station 1 total	762,783	Table 9.2-2, p. RR9-8
Compressor station 2 total	762,783	Table 9.2-3, p. RR9-8
Interconnect Booster Station 1 total	124,349	Table 9.2-4, p. RR9-9
Interconnect Booster Station 2 total	124,349	Table 9.2-5, p. RR9-9
Total	10,278,580	

(Equal to the annual emissions of 3 coal fired power plants, as per the equivalency noted above).

One-time emissions of the Rio Grande LNG terminal:

Emissions Source	Estimated tons per year of CO₂e	Citation
Construction activities for the terminal, including construction worker commutes 2017- 2023	59,426.3	Table 9.2-9, p. RR9-29 and Table 9.2-12, p. RR9-31
Terminal liquefaction train commissioning and start-up emissions	2,236,891	Table 9.2-13, p. RR9-32
Total	2,296,317.30	

All tables cited are sourced from Resource Report 9: Air Quality and Noise, Rio Grande LNG Project and Rio Bravo Pipeline Project, May 2016, CP16-454.