

Importing and Using LNG in Ireland Could Produce Double the Greenhouse Gas Emissions of the Pipeline Gas We Currently Import.

By Sam Moran, Stopshannonlng@gmail.com

Using the available evidence it can be calculated that the greenhouse gas (GHG) emissions resulting from the importation and use of Liquefied Natural Gas (LNG) in Ireland could produce at least double the GHG emissions of the pipeline gas we currently import.

How this was calculated

First, we calculate the total emissions of the gas Ireland currently imports. To do this we use the figure for the grams of CO₂ equivalent emissions per MegaJoule of energy produced for the combustion of natural gas in Ireland which is 56.52g CO₂/MJ, taken from the [SEAI website](#).

Then we add the the well to tank (WTT) emissions, of the gas we import from the UK. WTT emissions. Well-to-tank emissions refer to the total greenhouse gas emissions associated with the production, processing, and distribution of a specific fuel type from the point of extraction or production (the "well") to the point where it is stored. This figure comes from [Shannon LNG's Environmental impact Assessment Report](#) for their proposed LNG terminal, in Table 15.19 of the report. See screenshot of the table below

Table 15-19 WTT Carbon Intensity from Varying UK Gas Sources

Source of gas	Carbon intensity (kg CO ₂ e/boe)	Notes
UKCS	22	From UK Oil and Gas Authority (UK OGA)
Shale	22	Assumed to be same as UKCS ⁴

³ BoE – Barrel of Oil Equivalent; a standard unit of energy content used in the oil and gas sector

⁴https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/237330/MacKay_Stone_shale_study_report_09092013.pdf

The figure given is 22 kilograms of CO₂ equivalent emissions per barrel of oil (boe) of WTT/upstream and midstream emissions. We convert this to grams CO₂ equivalent per Megajoule

1 barrel of oil = 6117 MJ according to the website [changeunit](#).

(22kg CO₂e ÷ 6117 MJ) X 1000= 3.6g CO₂e/MJ.

This is given in Global Warming Potential 100 (GWP 100), impact on global warming over 100 years. However, methane is the main gas contributing to the WTT/ midstream and upstream emissions of LNG, and since Methane has a lifecycle of only around 12 years but is far more potent than CO₂, it is much more appropriate to use the measure of Global Warming Potential 20 (GWP), the impact on global warming over 20 years, when discussing methane emissions.

As Professor Robert Howarth does in [his paper](#), we will assume that the WTT emissions of 3.6 gCO₂e/MJ is entirely methane.

We know from the [IPCC 2021 report Table 7.15](#) that the GWP 100 value for Methane is 29.8 and the GWP 20 value is 82.5. In other words, changing from GWP 100 to GWP 20 increases the GWP of methane by a factor of 2.77.

So 3.6g CO₂e/MJ x 2.77= 9.97g CO₂e/MJ

We then add this figure for the upstream and midstream emissions of UK gas to the figure for the combustion of natural gas in Ireland.

56.62g CO₂e/MJ + 9.97g CO₂e/MJ = 66.59g CO₂e/MJ

So the total GHG emissions for the gas Ireland currently imports is 66.59g CO₂e/MJ

We then compare this figure with the figure that Professor Robert Howarth gave for the total GHG emissions resulting from the use of LNG imported from the United States on the first page of his 2023 paper '[The greenhouse gas footprint of liquefied natural gas \(LNG\) exported from the United States](#)' which is 160 gCO₂e/MJ measured using Global Warming Potential 20 (GWP 20) which is the global warming impact over a 20 year period.

160g CO₂e/MJ- 66.59g CO₂e/MJ= 93.41g CO₂e/MJ

Therefore, imported LNG would result in an additional 93.41g CO₂e/MJ

Expressed in percentage

(93.41g CO₂e/MJ÷ 66.59g CO₂e/MJ) x100= 140%

Therefore, we can conclude that the GHG emissions resulting from the use of LNG in Ireland could be 140% higher than the emissions resulting from the use of our current source of natural gas.

Calculations using more up to date figure for WTT Emissions of UK Natural gas

The one potential weak point of the previous calculations is the source of the WTT/Upstream emission value for UK Natural gas as it was taken from the Shannon LNG EIAR but the original source that they used could not be found.

A 2026 value for the WTT emissions of UK pipeline gas comes from the website [greencalculus](#). It is 0.03021 kg CO₂e / kWh which we convert to gCO₂e/kWh by multiplying by 1000

$$0.03021 \text{ kg CO}_2\text{e/kWh} \times 1000 = 30.2 \text{g CO}_2\text{e/kWh}$$

1 kWh = 3.6 MJ according to the website [changeunit](#)

So we divide 30.2g CO₂e/kWh by 3.6

$$30.2 \text{g CO}_2\text{e/kWh} \div 3.6 = 8.39 \text{g CO}_2\text{e/MJ}$$

So the WTT emissions of UK pipeline gas using this more recent figure is 8.39 gCO₂e/MJ. Again, we convert this figure to GWP 20.

$$8.39 \text{ gCO}_2\text{e/MJ} \times 2.77 = 23.24 \text{g CO}_2\text{e/MJ}$$

We add this to the figure for the combustion emissions of natural gas in Ireland of 56.62g CO₂e/MJ.

$$23.24 \text{g CO}_2\text{e/MJ} + 56.62 \text{g CO}_2\text{e/MJ} = 79.86 \text{g CO}_2\text{e/MJ}$$

So the total GHG emissions of the gas we currently import using this more recent value would be 79.86g CO₂e/MJ.

Again, we compare this to the figure that Professor Robert Howarth gave for the total GHG emissions resulting from the use of LNG imported from the United States on the first page of his 2023 paper '[The greenhouse gas footprint of liquefied natural gas \(LNG\) exported from the United States](#)' which is 160g CO₂e/MJ measured using Global Warming Potential 20 (GWP 20) which is the global warming impact over a 20 year period.

$$160\text{g CO}_2\text{e/MJ} - 79.86\text{g CO}_2\text{e/MJ} = 80.14\text{g CO}_2\text{e/MJ}$$

Therefore, imported LNG would result in an additional 80.14g CO₂e/MJ

Expressed in percentage

$$(80.14\text{g CO}_2\text{e/MJ} \div 79.86\text{g CO}_2\text{e/MJ}) \times 100 = 100.35\%$$

So, even using this more recent figure for the Well to Tank emissions of UK pipeline gas, the use of LNG In Ireland could result in GHG emissions 100.35% higher than the GHG emissions of our current supply of gas. In other words, importing and using LNG in Ireland could produce double the greenhouse gas emissions of the pipeline gas we currently import.