(AP Photo/Dita Alangkara) LNG tanker Al Hamra of Iran, sails Singapore strait May, 2000.

THE CLIMATE CASE AGAINST GAS EXPANSION

Carbon emissions from new gas infrastructure threaten our climate goals

About USD 380 billion of gas infrastructure is currently planned for Asia, much of which is slated to be built within a decade.[1] If all of this is built, it will nearly double Asian gas power generation capacity along with gas import capacity via pipelines and LNG import terminals.

This impending buildout of new gas infrastructure poses one of the greatest threats to meeting the goals of the Paris Agreement. Instead of forming a bridge – as gas proponents claim – gas expansion builds a wall against the clean energy future we need.

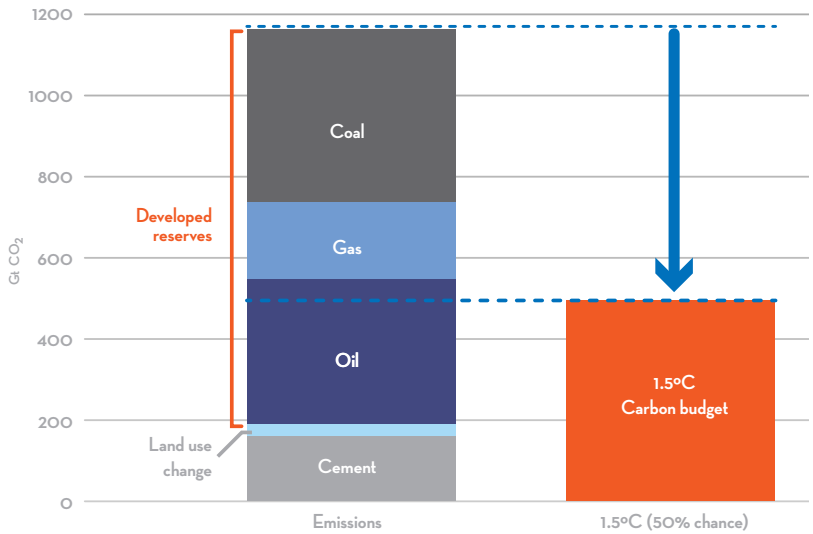
RISING EMISSIONS FROM GAS COMBUSTION BUST THE CLIMATE BUDGET

There is a finite amount of carbon dioxide that can be emitted while maintaining a good chance of meeting climate targets. We need to immediately reduce the consumption of all fossil fuels, gas included, if we are to maintain the Paris Agreement goal of 1.5 degrees Celsius (°C) and avert the worst impacts of the climate crisis.[2] The carbon budget for a 50% chance of maintaining 1.5°C will be exhausted in 10 years at current emission rates.

Figure 1 shows that emissions from currently producing gas, oil, and coal projects would take us beyond 1.5°C of warming. Even if coal use ends immediately, we still cannot burn all the oil and gas in these developed reserves.

This means that plans to develop new gas fields and expand gas consumption in Asia are incompatible with maintaining the crucial 1.5°C climate goal.

Figure 1: Carbon Dioxide Emissions in Global Developed Fossil Fuel Reserves Compared to 1.5C Carbon Budget



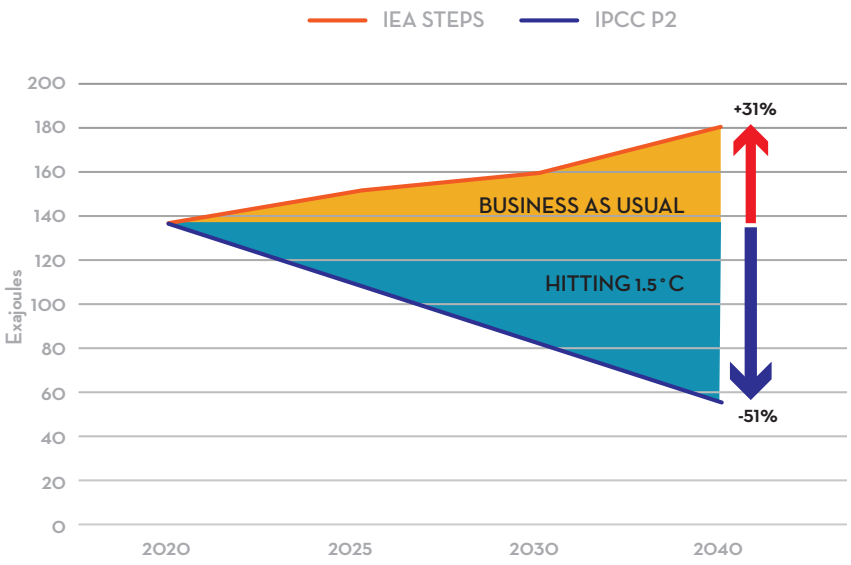
Sources: Oil Change International analysis based on data from Rystad Energy, IEA, World Energy Council, IPCC and Global Carbon Project. Carbon budgets shown are as of 1 January 2020

THE ONLY WAY FOR GAS IS DOWN

The Intergovernmental Panel on Climate Change (IPCC) has mapped out what the future of fossil fuels must look like if we want to stay under 1.5°C of warming.[3] In its P2 pathway, global gas demand declines over 50% from today's level by 2040.

However, the red line in Figure 2 shows the business-as-usual trajectory for global gas demand according to the International Energy Agency's (IEA). This would lead to at least a 2.7°C average global temperature rise by the end of the century.[4] This shows how current plans to grow gas production and consumption fail the 1.5°C test.

Figure 2: Global Gas Demand in a 1.5°C Scenario Compared with Business-as-Usual



Source: Oil Change International using IEA World Energy Outlook 2020 and IPCC 2018

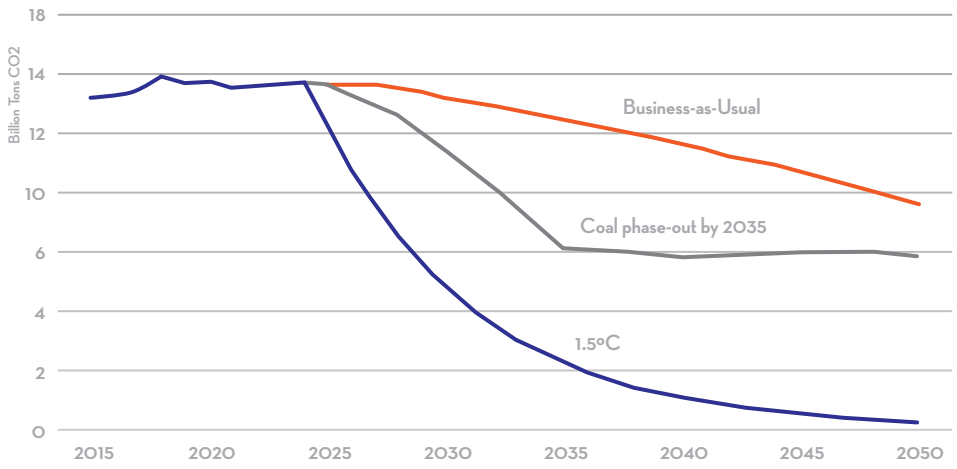
COAL-TO-GAS SWITCHING WON'T HIT CLIMATE TARGETS

The IPCC's landmark 1.5°C report states that, "[s]ince the electricity sector is completely decarbonized by mid-century in 1.5°C pathways, electrification is the primary means to decarbonize energy end-use sectors."[5] This means both coal *and* gas must be phased out of the power sector, not just coal. Building gas power plants instead of coal plants will not cut emissions by nearly enough and risks creating "stranded" assets that may never return the capital invested in them.

Analysis from Bloomberg New Energy Finance (BNEF) in 2019 showed that replacing coal plants with new gas plants will not cut carbon dioxide emissions by nearly enough. This is detailed in Figure 3 where the orange line shows global power sector emissions in a business-as-usual scenario; the blue line shows the decline in emissions needed to align with the 1.5°C goal; and the gray line shows emissions in a hypothetical scenario in which coal is phased out of the power sector globally by 2035 and replaced with a combination of gas and renewables, based on the policies and cost curves at that time.[6]

Emissions in 2050 in the coal phase-out scenario are lower than the business-as-usual scenario[7], **but with gas locked in as the primary replacement for phased-out coal, emissions remain substantially above the 1.5°C target.**

Figure 3: Global Power Sector Emissions in BNEF Scenarios



Source: Oil Change International based on BNEF New Energy Outlook 2019

UPSTREAM EMISSIONS MAKE GAS EVEN DIRTIER

Claims that gas is cleaner than coal and therefore has a role in addressing the climate crisis do not add up. The analysis above is based solely on the emissions from burning gas. When we look at the full greenhouse gas emissions associated with extracting, processing, storing, and transporting gas, the picture is even worse. The diagram on the right outlines the breakdown of emissions associated with the full Liquefied Natural Gas (LNG) life cycle.

METHANE EMISSIONS ARE ACCELERATING THE CLIMATE CRISIS

Methane — a climate super-pollutant over 80 times more potent than carbon dioxide — is the main ingredient of fossil gas. Methane is vented and leaked along the entire gas supply chain and has reached record levels in the atmosphere.[8] A 2020 study found that the contribution of the oil and gas sector to rising methane levels in the atmosphere is greater than previously thought.[9]

The methane emissions associated with gas reduce or eliminate any emissions benefit of switching from coal to gas for power generation or other uses.

Government and industry data on how much methane the oil and gas industry emits is patchy. However, attempts by the International Energy Agency (IEA) to estimate the industry's global methane emissions found them to have increased by 30% from 2000 to 2019, totalling 80 million tons of methane in 2019.[10] This has the equivalent impact of over 6.4 billion tons of carbon dioxide annually, more than the annual carbon dioxide emissions of the United States.[11]

A report from the United Nations Environment Programme states that, "Reducing human-caused methane emissions is one of the most cost-effective strategies to rapidly reduce the rate of warming and contribute significantly to global efforts to limit temperature rise to 1.5°C."[12] It identified the oil and gas sector as one of the key contributors to global methane emissions and a sector where reductions could be implemented at low cost. The IEA has noted the low cost of methane mitigation in the oil and gas sector since at least 2013.[13] However, the IEA data cited above clearly shows that the industry has failed to act.

The methane emissions associated with gas reduce or eliminate any emissions benefit of switching from coal to gas for power generation or other uses. When combined with the energy intensive process of liquifying, transporting and regasifying gas for LNG, imported LNG can be as polluting as coal or worse.

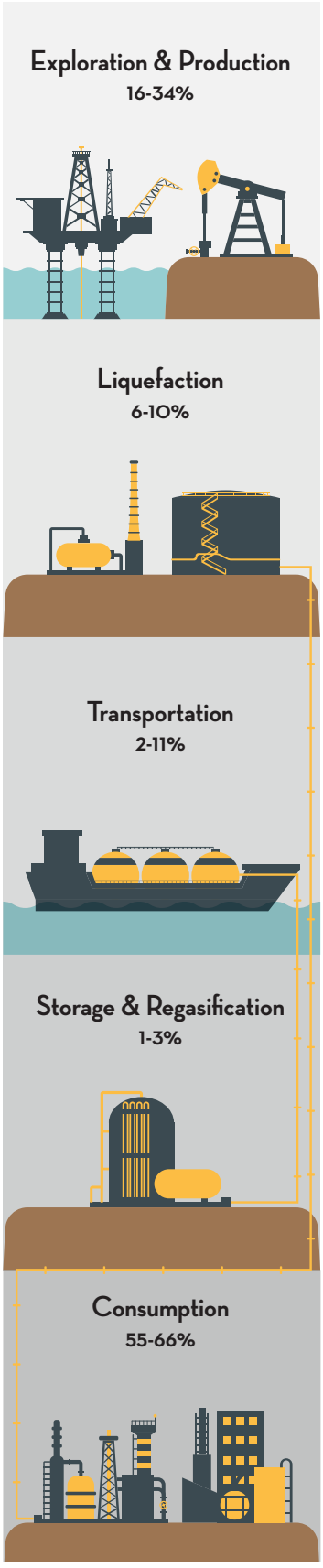


Figure 4: Breakdown of Greenhouse Gas Emissions in the LNG Life Cycle

Source: Solutions For Our Climate, Fueling the Climate Crisis: South Korea's Financing of Oil and Gas. 2021

LNG IS WORSE

The LNG process adds a significant amount to the full lifecycle emissions of producing and using gas. If methane leakage is not kept at very low levels, replacing coal with LNG will result in increased greenhouse gas emissions.[14]

LNG is fossil gas that is cooled to -162°C to reduce volume and facilitate shipping. On arrival, the liquefied gas is generally regasified to be further transported by pipeline to its final destination.

The process of making LNG requires a lot of energy. Ozone-depleting refrigerants are used in the super-cooling process. Electricity and gas are generally used to power the plants that chill the gas into LNG. Additional energy is required for shipping and regasification, and methane is released at the LNG plants and during shipping. The emissions associated with the LNG process can constitute up to 24% of the total life cycle emissions of LNG.[15] Current plans to add carbon capture and storage to gas processing and LNG plants are a false solution that is failing.[16]

CONCLUSION: GAS FORMS A WALL NOT A BRIDGE TO CLEAN ENERGY

Gas is dirtier than industry proponents claim. Mitigation won't be enough. Our diminishing carbon budget requires us to reduce fossil fuel use immediately. Gas is no exception.

Investing billions of dollars into gas power plants, pipelines, and LNG terminals risks locking in gas use and new carbon emissions at precisely the time that we need to start ramping them down. The technologies are available today to leapfrog gas straight to clean energy.[17] But instead of forming a bridge to a clean energy future, the proposed expansion of gas use in Asia and elsewhere forms a wall against the clean energy future we need. We must stop building that wall and build the clean energy we need.

ENDNOTES

1 Global Energy Monitor, 2021. Global Gas Plant Tracker and Global Fossil Infrastructure Tracker. GEM analysis.

2 Intergovernmental Panel on Climate Change, Special Report: Global Warming of 1.5°C, 2018.

3 Oil Change International, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production, September 2016.

4 Stated Policies Scenario from *World Energy Outlook* 2020, Organisation for Economic Co-operation and Development/International Energy Agency, October 2020. Note scenario only runs to 2040.

5 Intergovernmental Panel on Climate Change, Special Report: Global Warming of 1.5°C, 2018.

6 Bloomberg New Energy Finance, New Energy Outlook, 2019.

7 Emissions are estimated only at the power plant chimney stack, so actual emissions are higher when accounting for methane leakage.

8 National Oceanic and Atmospheric Administration, Global CH_4 Monthly Means, last updated March 5, 2021.

9 Benjamin Hmiel et al., "Preindustrial CH_4 indicates greater anthropogenic fossil CH_4 emissions," Nature 578, 2020, p. 409.

10 "Oil and gas sector methane emissions, historical and in the Sustainable Development Scenario, 2000-2030," International Energy Agency, last updated January 18, 2021.

11 This is based on converting methane to carbon dioxide by 80 times. IPCC AR5 20-year conversion is 87 when including feedback loops and oxidation. See Table 8.7 in Gunnar Myhre, et al., 2013, Anthropogenic and Natural Radiative Forcing. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.*

12 United Nations Environment Programme, Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions, May 2021.

13 International Energy Agency, Golden Rules for a Golden Age of Gas, October 2013.

14 Oil Change International, Jordan Cove LNG and Pacific Connector Pipeline Greenhouse Gas Emissions Briefing, January 2018.

15 Natural Resources Defense Council, Sailing To Nowhere: Liquefied Natural Gas is Not an Effective Climate Strategy, December 2020.'

16 Peter Milne, "Gorgon Emissions to Soar Until Chevron Fixes Restricted CO_2 Injection," Boiling Cold, February 10, 2021.

17 International Institute for Sustainable Development, Step Off the Gas: International Public Finance, Natural Gas, and Clean Alternatives in the Global South, June 2021.

ADDITIONAL RESOURCES

Oil Change International gas webpage

International Institute for Sustainable Development, Step Off the Gas: International Public Finance, Natural Gas, and Clean Alternatives in the Global South, June 2021.

Solutions For Our Climate, Fueling the Climate Crisis: South Korea's Financing of Oil and Gas. 2021

Lydia Plant and Ted Nace, Nervous Money: Global LNG Terminals Update, Global Energy Monitor, June 2021.

Natural Resources Defense Council, Sailing To Nowhere: Liquefied Natural Gas is Not an Effective Climate Strategy, 2021.

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