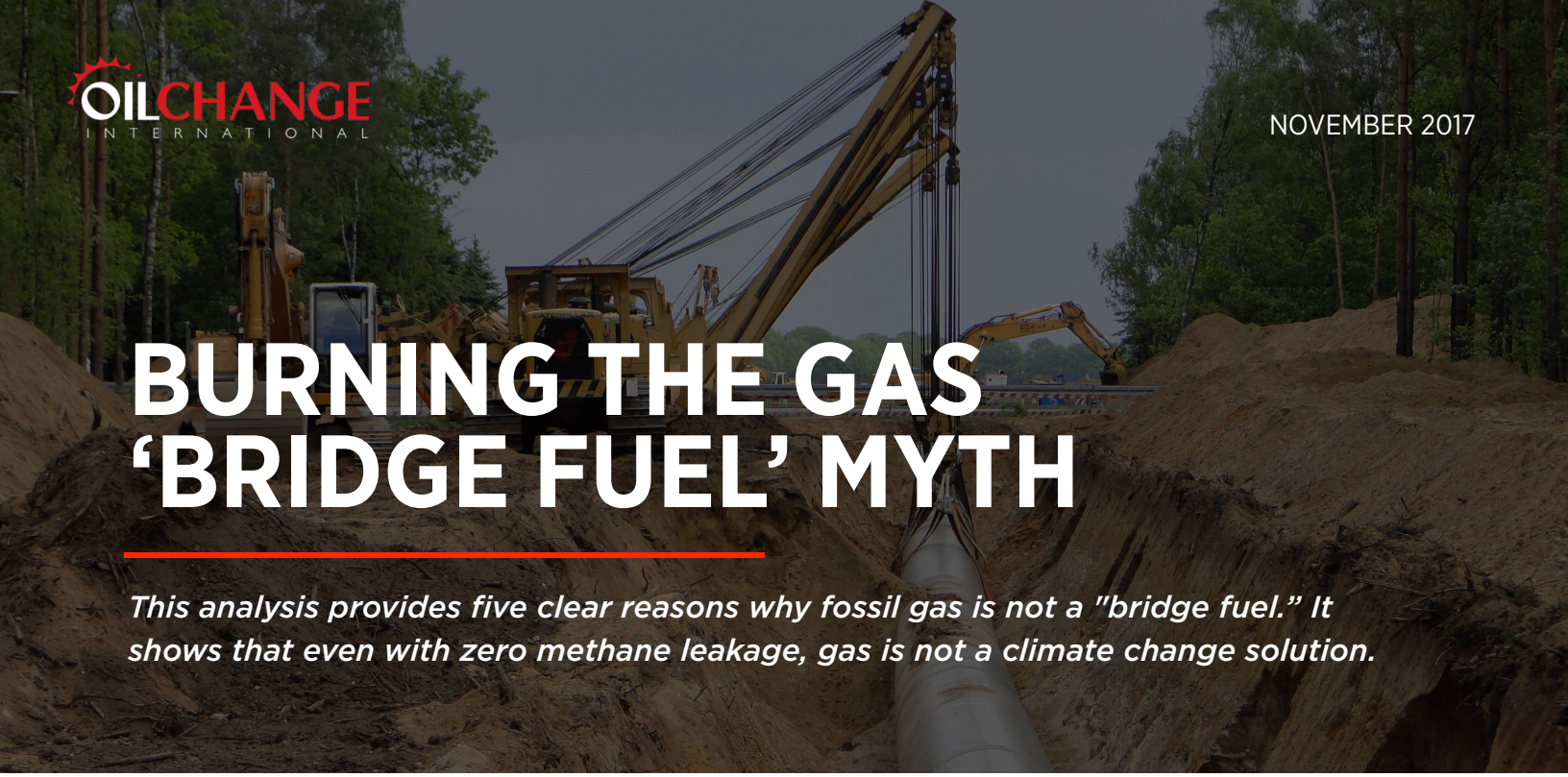
Exhibit 3



OILCHANGE INTERNATIONAL

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BURNING THE GAS 'BRIDGE FUEL' MYTH

This analysis provides five clear reasons why fossil gas is not a "bridge fuel." It shows that even with zero methane leakage, gas is not a climate change solution.

INTRODUCTION

"We see natural gas as playing an absolutely key role as a bridge fuel in transitioning to a lower-carbon economy," BP said in 2016.[1] The idea of fossil gas[2] as a "bridge" from coal to renewables has been strongly promoted by the industry over recent years, and echoed also by government leaders including former U.S. President Barack Obama[3] and EU Energy Commissioner Miguel Arias Cañete.[4]

Much of the debate has revolved around the issue of methane, a super-potent greenhouse gas (GHG) that is leaked and vented from the fossil gas supply chain and thereby undermines the emissions reductions of burning fossil gas in place of coal. How much methane is leaked? How much worse is it than carbon dioxide (CO2)? By how much can leakage be reduced? The answers to these questions are regularly tossed to and fro in order to defend or attack the role of fossil gas in achieving the climate goals that we so crucially need to pursue.

Given these disputes, we set methane leakage aside in this briefing and show that even in the hypothetical case of zero methane leakage, fossil gas cannot be a bridge fuel. This is not to say that the methane leakage issue is unimportant or that reducing leakage is not essential. However, it is to demonstrate that methane leakage is not the sole determinant of whether fossil gas causes net harm to the climate. **To meet climate goals, fossil gas production and consumption must, like that of other fossil fuels, be phased out, and reducing methane leakage does not alter that fact.**

This briefing discusses five key issues:

1. **No Room for New Fossil Gas:** Climate goals require the power sector to be decarbonized by mid-century. This means gas use must be phased out, not increased.

2. **New Gas is Holding Back Renewable Energy:** Wind and solar are now cheaper than coal and gas in many regions. This means new gas capacity often displaces new wind and solar rather than old coal.

3. **The Wrong Gas at the Wrong Time:** Claims that gas supports renewable energy development are false. The cheapest gas generation

[1] Jillian Ambrose, "Waiting for Big Oil to clean up its act," Daily Telegraph, June 11, 2016. http://www.telegraph.co.uk/business/2016/06/11/waiting-for-big-oil-to-clean-up-its-act/

[2] We use the term fossil gas to mean natural gas produced from fossil fuel sources.

[3] President Obama, State of the Union Address, January 28, 2014. https://www.washingtonpost.com/politics/full-text-of-obamas-2014-state-of-the-union-address/2014/01/28/e0c93358-887f-11e3-a5bd-844629433ba3_story.html?utm_term=.bb8d2cf7ef93

[4] Politico, "Cañete: Gas is a bridge between coal and renewables," September 23, 2015. https://www.politico.eu/sponsored-content/canete-gas-is-a-bridge-between-coal-and-renewables-but-in-2050-itll-still-be-there/

technology (CCGT) is designed for baseload operation, not intermittent peaking. In any case, most grids are a long way from renewable energy penetration levels that would require back up. Storage and demand response will be ready to step in by the time they are really required.

4. **New Gas Locks in Emissions for 40+ Years:** Companies building multi-billion dollar gas infrastructure today expect to operate their assets for around 40 years. Emissions goals mean this expectation cannot be met.

5. **Too Much Gas Already:** The coal, oil, and gas in currently producing and under construction projects is enough to exceed climate goals. Opening up new gas fields is inconsistent with the Paris goals.

No Room for New Fossil Gas (Even to Replace Coal)

The projected growth in fossil gas consumption is primarily attributed to its increasing use in electricity generation. While growth in electricity demand globally is slowing, particularly in developed countries,[5] the assumption is that coal-fired power plants will be replaced by gas-fired ones, with a potential reduction in emissions of 40 to 60 percent.

The Intergovernmental Panel on Climate Change (IPCC) reports that to stay within the Paris Agreement's long-term temperature goal, the electricity sector must rapidly decarbonize and, globally, must be carbon-free by roughly mid-century.[6] Shifting reliance from one high-carbon energy source to one that is around half as polluting is not a path to decarbonization.[7] The reductions needed are greater than a switch from coal to gas would achieve.

In Figure 1, we show that if we replaced all of the International Energy Agency's (IEA) projected coal-fired generation in 2040[8] with gas-fired generation, emissions from the power sector would be more than five times the median of IPCC scenarios giving a likely chance of keeping warming below 2 degrees Celsius.[9] Indeed, the chart shows that emissions from oil and gas power alone are too great, so in fact none of the coal can be replaced with gas: it must all be replaced with zero-carbon energy sources. And at the same time, we will need to reduce gas consumption, not increase it.

The fact that gas emissions will need to come down along with coal emissions is being obscured by a narrative driven by the gas industry and supporters in government and multilateral institutions such as the IEA.[10] The newfound abundance of fossil gas, enabled by the development of hydraulic fracturing (fracking) and horizontal drilling, is part of the foundation of this narrative. There is a clamour to find a use for all the gas available, rather than a clear-headed analysis of how much gas use is compatible with climate goals. At the same time, the rising urgency of the climate threat has forced some oil companies to belatedly embrace the idea of reducing emissions, which they have done by blaming coal (in which they have no stake) and calling for its replacement by gas (one of their two core products).[11]

This drive to maximize gas consumption[12] simply does not add up to the climate goals that have been set. While the analysis in Figure 1 is clear, we need to answer the inevitable question that it raises. The rest of this briefing aims to do that. That question goes to the very heart of the bridge fuel

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[5] Rembrandt Sutorius and Matt Frank, "The drivers of global energy demand to 2050," McKinsey & Company Energy Insights, June 2016. https://www.mckinseyenergyinsights.com/insights/the-drivers-of-global-energy-demand-growth-to-2050/

[6] IPCC, Fifth Assessment Report, Working Group III report, Fig 7.9, p. 555. http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter7.pdf

[7] Climate Action Tracker, "Foot off the gas: increased reliance on natural gas in the power sector risks an emissions lock-in," June 2017. http://climateactiontracker.org/assets/publications/briefing_papers/CAT-2017-06-16-DecarbonisationSeries-NaturalGas.pdf

[8] IEA, "World Energy Outlook," 2016, p. 552. http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html

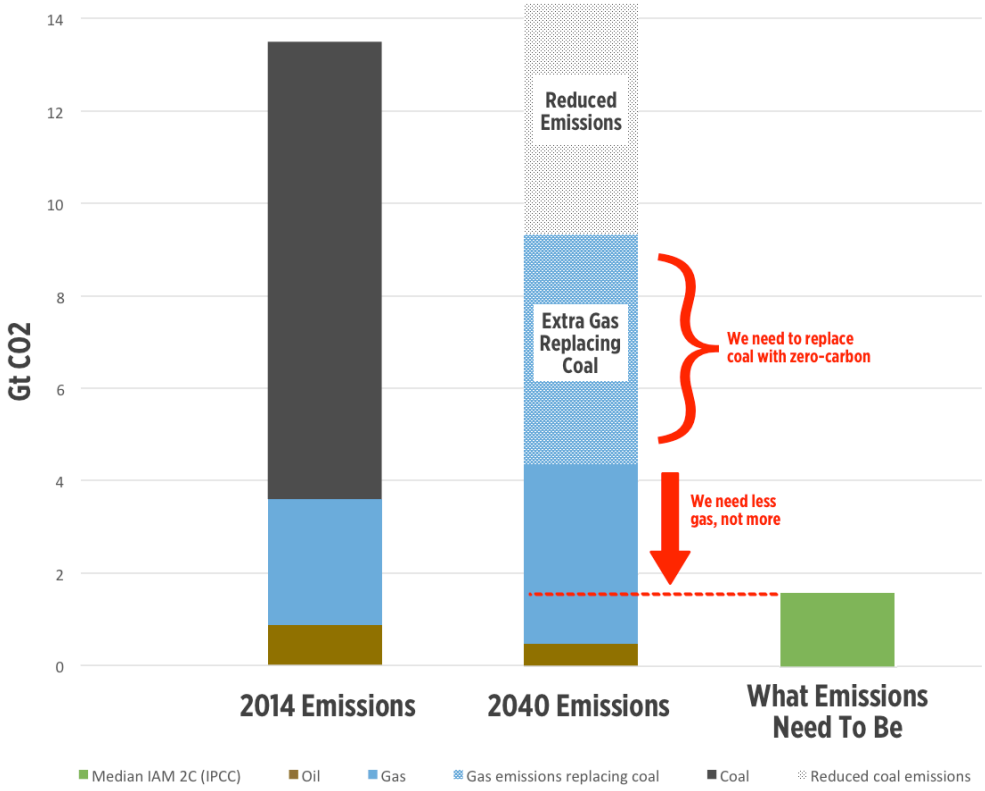
[9] IPCC, Fifth Assessment Report, Working Group III report, Fig 7.9, p. 555. http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter7.pdf

[10] IEA, "Commentary: The environmental case for natural gas," October 23, 2017. https://www.iea.org/newsroom/news/2017/october/commentary-the-environmental-case-for-natural-gas.html

[11] BG Group, BP, Eni, Royal Dutch Shell, Statoil, and Total, letter to Laurent Fabius and Christiana Figueres, June 1, 2015. http://newsroom.unfccc.int/unfccc-newsroom/major-oil-companies-letter-to-un/

[12] Peery Williams, Dan Murtaugh, and Yvonne Man, "Shell Invests to Boost Global Gas Demand," Bloomberg Markets, September 5, 2017. https://www.bloomberg.com/news/articles/2017-09-06/shell-seeks-to-boost-lng-demand-as-canada-in-mix-for-new-plant

Figure 1: We Need Less Gas, Not More: Global Emissions from Power Generation (2014 and projected 2040 in IEA New Policies Scenario) Compared to Median IPCC 2040 Power Emissions Consistent With a Likely 2°C Scenario



Source: Oil Change International analysis, using data/projections from IEA[13] and IPCC[14]

idea. Do we need gas to help us transition to zero carbon?

New Gas is Holding Back Renewable Energy

The problem is not just that gas does not go far enough in reducing emissions: it can also make the climate problem worse. In theory, emissions could be reduced from a business-as-usual scenario (albeit not enough to avoid dangerous climate change). But this is only if all of the new gas displaces dirtier coal. In reality, much of the new gas will in fact displace new renewable energy.

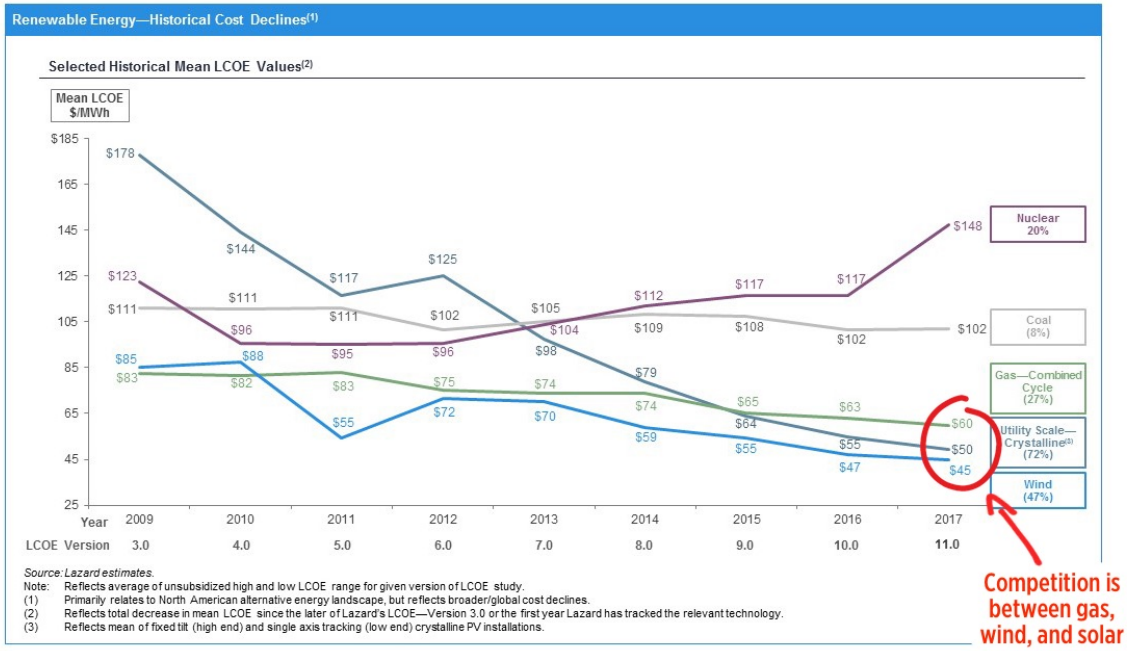
The cost of renewable energy has plummeted and costs will continue to fall as installations rise. In many regions today, the cost of building and operating new utility-scale solar and onshore wind is competitive on an unsubsidized basis with new fossil fuel plants, as shown in Figure 2. The cost of offshore wind is also coming down. Given these cost dynamics, it is clear that in many cases, building new gas capacity competes with renewable energy, not coal.

Indeed, several studies in the United States have modeled the competition between different fuels, finding that greater supplies of gas will not significantly reduce emissions (absent other regulatory measures on climate), in large part

[13] We use the IEA New Policies Scenario for 2040 power sector emissions. IEA, "World Energy Outlook," 2016, p. 552. http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html

[14] We use the median of IPCC scenarios for 2040 power sector emissions based on likely keeping warming below 2 degrees Celsius. IPCC, Fifth Assessment Report, Working Group III report, Fig 7.9, p. 555. http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter7.pdf

Figure 2: Gas Competes with Wind and Solar More than Coal



Source: Lazard[15]

because some of the additional gas displaces zero-carbon energy as well as coal.[16] A global study, using five integrated assessment models, found that increased gas availability or reduced gas cost led to either equivalent emissions, or in some cases higher emissions.[17]

The Wrong Gas at the Wrong Time

As renewable energy costs have declined, fossil gas advocates have increased their emphasis on questions regarding the intermittency and reliability of wind and solar. The sun does not always shine and the wind does not always blow, and therefore – they argue – gas-fired generation is needed to balance peaks and troughs in supply and demand. There are a number of flaws in this argument.

Nobody expects the transition to renewable energy to happen overnight. It is a decades-long process and while climate goals do require the transition to accelerate from today's adoption rates, it will be at least a decade before mature grids (in developed countries) achieve levels of renewable penetration – of 50 percent or higher – that would trigger system reliability issues. For example, the operator of the electrical grid in northeast Germany says the country's grid can handle up to 70 to 80 percent wind and solar even without additional flexibility options such as storage.[18] Australian grid operator Transgrid goes further, saying that 100 percent renewable energy is both affordable and practical using a combination of existing technology for storage, demand management, and efficiency.[19]

By the time renewables reach high penetration levels, energy storage technologies can be expected to have made significant progress and fallen in cost. Bloomberg New Energy Finance projects that the installation and use of non-fossil fuel technologies to manage intermittency will increase over five-fold by 2040, as shown in Figure 3.

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[15] Lazard, "Levelized Cost of Energy 2017," November 2017. https://www.lazard.com/perspective/levelized-cost-of-energy-2017/

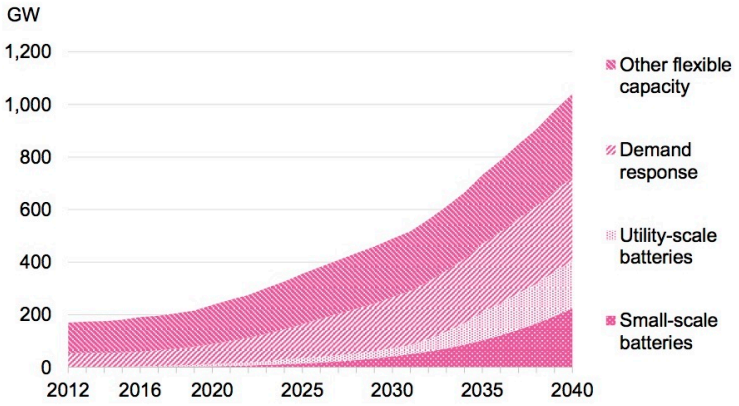
[16] Energy Modeling Forum. "Changing the Game?: Emissions and Market Implications of New Natural Gas Supplies." EMF Report 26. September 2013. Vol. I.
Shearer, C. et al., "The effect of natural gas supply on US renewable energy and CO2 emissions," Environ. Res. Lett. September 24, 2014. Vol. 9.

[17] H McJeon et al., "Limited impact on decadal-scale climate change from increased use of natural gas," Nature. October 23, 2014; 514(7523):482-5. doi: 10.1038/nature13837

[18] Tagesspiegel interview, clipping summarized in Clean Energy Wire, "Grid operator says 80% renewables no problem," June 6, 2016. https://www.cleanenergywire.org/news/grid-operator-says-80-renewables-no-problem-environment-ministry-turns-30

[19] Giles Parkinson, "Transgrid: 100% renewables is feasible and affordable," RenewEconomy, July 20, 2017. http://reneweconomy.com.au/transgrid-100-renewables-is-feasible-and-affordable-92062/

Figure 3: Demand Response and Batteries Meet Peak and Balance the Grid



Top 5 markets in 2040	
China	343GW
U.S.	200GW
India	127GW
Japan	62GW
Germany	30GW

Source: Bloomberg New Energy Finance 2017[20]

It makes no sense to install gas today to address renewable energy-related grid stability issues that may or may not be a concern ten years from now. It is a solution without a problem. Indeed, where high renewable energy penetration exists today, such as in the U.S. states of Texas and California, gas plant utilization rates have dropped and gas demand has declined,[21] suggesting that those systems already have more gas generation capacity than they need.[22]

Another problem with the claim that gas can partner with renewables is that the cheapest and most efficient gas generation technology, combined cycle gas turbine (CCGT), is not the technology best suited for balancing renewable energy intermittency. When most analysts compare the cost or emissions of renewable energy with gas, it is CCGT plants they generally use for the comparison. But because of the high upfront costs of building CCGT plants, they only make sense as baseload plants that are run at high utilization rates. CCGT is not economical for flexible generation. Open cycle gas plants are cheaper to build and can be profitable when run as 'peakers,' or plants that only run to handle periods of high demand, perhaps an hour or two per day. But these plants are less efficient and have higher emissions per unit of energy produced.[23]

If the goal is to reduce emissions as much and as quickly as possible, then increasing renewable energy capacity is the key. While stability will need to be addressed at different points for different systems, it seems clear that the most cost-effective and least emissions-intensive solution will increasingly be something other than a gas plant.

New Gas Locks in Emissions for 40+ Years

The problem with building a lot of new gas capacity is that the companies investing in gas infrastructure expect to operate their plants for decades to come.

Power plants and related infrastructure like pipelines and LNG terminals are multi-billion dollar investments that require decades of operation to turn a profit. Nobody investing today expects to retire the infrastructure before at least 40 years if not more. This means that gas plants built over the next few years will still be operating beyond 2050, when emissions from the power sector should be nearing zero.

What's more, it is hard to shut down a power plant once it's built because of the problem of lock-in. Once the capital has been sunk, the operator will always keep running a plant as long as they can sell power for more than the marginal cost of producing it – even if they make a loss on the invested capital. So it becomes very hard for alternatives to compete with it. Furthermore, there are legal barriers, and lobbying power against the early shutdown of plants.

A team of researchers from Oxford University identified additional risks of building new gas

[20] Michael Liebreich, 'Breaking Clean'. Presentation at Bloomberg New Energy Finance London Summit 2017. Sept. 19, 2017. https://data.bloomberglp.com/bnef/sites/14/2017/09/BNEF-Summit-London-2017-Michael-Liebreich-State-of-the-Industry.pdf

[21] Herman K. Trabish, "As gas plants struggle, California seeks new flexible capacity strategies," Utility Dive, June 27, 2017. https://www.utilitydive.com/news/as-gas-plants-struggle-california-seeks-new-flexible-capacity-strategies/445760/

[22] Herman K. Trabish, "Is renewable energy threatening power reliability? Reliability concerns are merely a 'Chicken Little argument' fossil generators use to advance their interests, analysts say," Utility Dive, June 1, 2017. https://www.utilitydive.com/news/is-renewable-energy-threatening-power-reliability/443701/

[23] Amber Lin, "Natural gas as a transition fuel: A bridge too far?," Bulletin of the Atomic Scientists, July 20, 2016. https://thebulletin.org/natural-gas-transition-fuel-bridge-too-far9671

generation in a paper published in 2016.[24] They found that emissions from the world's current stock of gas, coal, and oil power plants, if operated for their full economic lifetime, would be enough to take the world to 2 degrees of warming. Building more fossil fuel capacity (whether gas, coal or oil) can only lead to overshooting the goal, unless some is shut down before its expected expiry date.

To stay within safe climate limits, it is total cumulative emissions that matter. Once the atmospheric space is filled with CO2, there is no turning back. In the case of a coal plant with ten years of economic life left, shutting the coal plant early and replacing it with a gas-fired generator may cut emissions in half (assuming no methane leakage) for those first ten years. But when the gas plant's economic life is 40 years, the cumulative emissions from the gas plant would in fact be twice as much as those from operating the coal plant for ten more years. This is because the gas plant would emit half as much CO2 per year, but for forty years rather than ten.

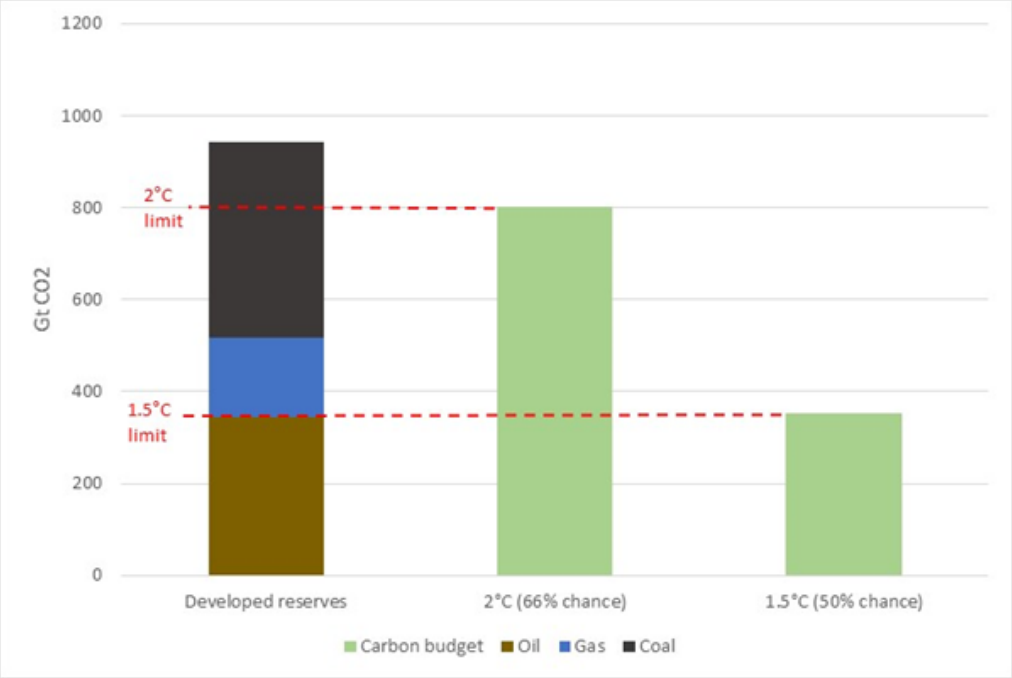
It seems clear that within the timeframe that we are working with, the addition of new gas power plants would push emissions beyond safe limits.

Too Much Gas Already

We can also see the problem of lock-in by comparing emissions from already-operating oil fields, gas fields, and coal mines with how much total oil, gas, and coal the world can afford to burn while achieving the Paris Agreement goals: the carbon budgets.[25]

We can see there is enough gas, coal, and oil in existing fields and mines to take the world beyond 2 degrees Celsius. And even if all the coal mines were shut tomorrow, the gas and oil alone would take us beyond 1.5 degrees Celsius. Even to stay within the upper limit of tolerable warming, of 2 degrees Celsius, no new gas fields can be developed unless more than a third of existing coal mines are shut early. Clearly, just like with power

Figure 4: No Room for More Gas: Locked-in Emissions from Existing Fields and Mines Already Exceed Carbon Budgets



Source: Oil Change International analysis; data from Rystad Energy, IEA, IPCC[26]

[24] Alexander Pfeiffer et al., "The '2°C capital stock' for electricity generation: Committed cumulative carbon emissions from the electricity generation sector and the transition to a green economy," Applied Energy, Volume 179, October 1, 2016, pages 1395-1408. http://www.sciencedirect.com/science/article/pii/S0306261916302495

[25] Greg Muttitt, "The Sky's Limit: Why the Paris Climate Goals Require A Managed Decline of Fossil Fuel Production," Oil Change International, September 22, 2016, pg. 21. http://priceofoil.org/2016/09/22/the-skys-limit-report/

[26] For detailed methodology see Muttitt, Sky's Limit, op.cit., Section 2.

plants, there is no room for new gas fields – but rather a need to wind down what we already have, while ramping up clean energy to take their place.

CONCLUSION

The myth of fossil gas as a bridge to a stable climate does not stand up. While much of the debate has focused on methane leakage, data shows that emissions just from burning the gas are enough to overshoot climate goals. We must reduce fossil gas combustion rather than increase it. The fact that methane leakage will never be reduced to zero only makes this more urgent.

Growing renewable energy does not require growing fossil gas use. Existing gas plants will not be shut immediately, but storage, demand response, and other grid management solutions will increasingly support renewable energy as gas is phased down.

There is an urgent need for policymakers and investors to use climate goals as a starting point for decisions around gas. Rather than searching for ways to justify using the abundant supply that new drilling methods have unleashed, policymakers and investors should consider how much gas is actually compatible with achieving the goals of the Paris Agreement. With this in mind, it is the same for gas as it is for coal and oil: we need less, not more.

This analysis was researched and written by Greg Muttitt and Lorne Stockman. Design by Matt Maiorana. All are with Oil Change International. Cover photo by Niteshift via Wikimedia Creative Commons.

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