
CAN THE
CLIMATE
AFFORD
EUROPE'S GAS
ADDICTION?
FOSSIL FREE EUROPE
Friends of the Earth Europe

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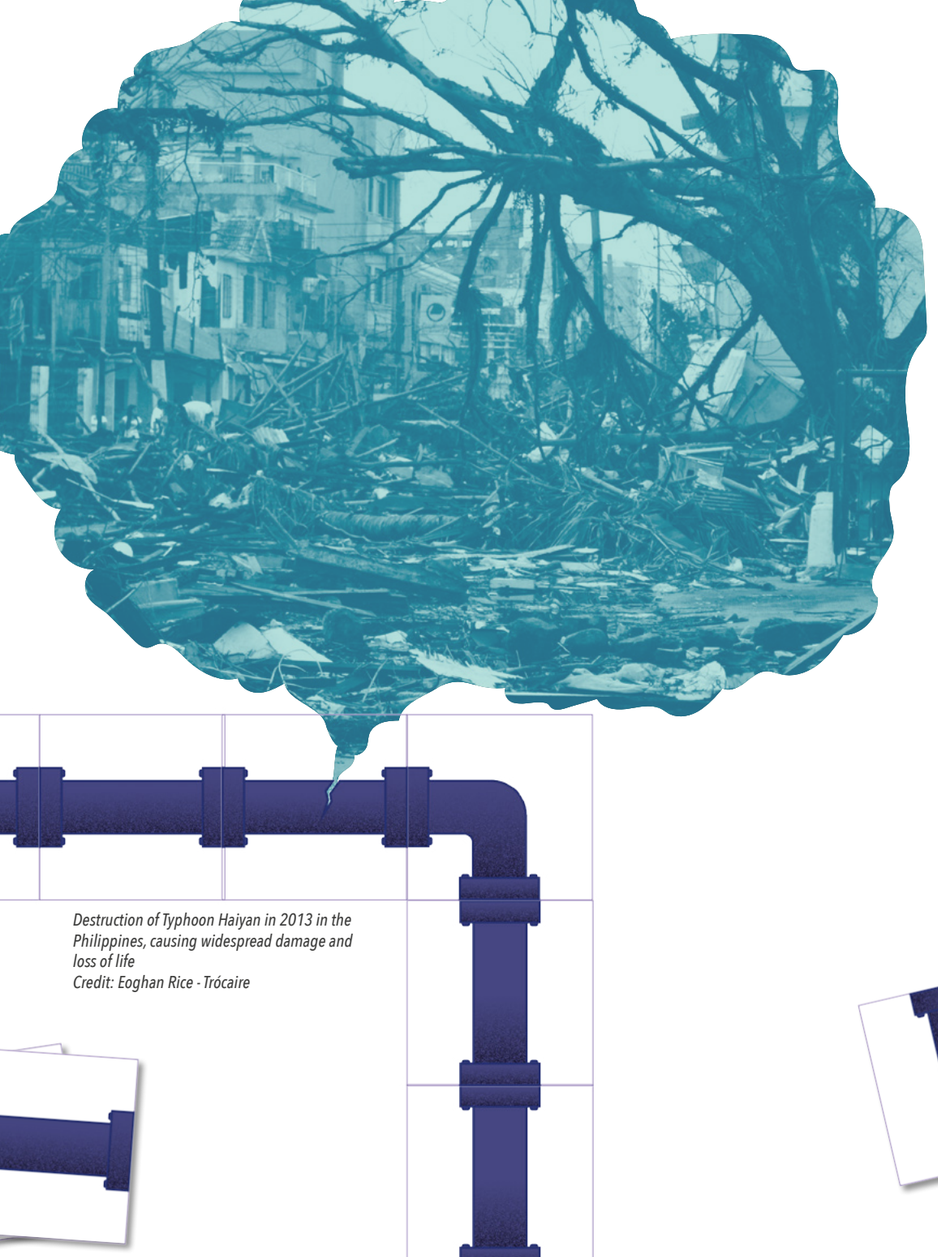


Destruction of Typhoon Haiyan in 2013 in the Philippines, causing widespread damage and loss of life
Credit: Eoghan Rice - Trócaire

INTRODUCTION

In December 2015, in Paris, world leaders agreed once again to put a halt to climate change, as they had in Cancun, Copenhagen, Kyoto and Rio before that. This time, signatories committed to *"holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels"*.[1] But despite these promises of climate action, the world remains on track for catastrophic global warming, with the United Nations Environment Programme (UNEP) warning that even if all the Paris pledges are kept, the world will still warm by more than 3°C.[2] Central to this continuing failure to meet the challenge of climate change is the world's relentless addiction to fossil fuels: coal, oil, and gas. The fossil fuel industry continues extracting and burning these hydrocarbons at unsustainable rates, and even persists in exploring for more. Yet there has been a shift in global energy politics: although many investments in coal and oil continue, there has been a significant turn towards gas.

It is partly in response to climate policies, and to the influence of the shale gas boom in the United States (U.S.), that the oil and gas industry is investing more heavily in gas. Gas is widely predicted not only to be a mainstay of the global energy system, but to play an even greater role. The International Energy Agency predicts a 50% increase in gas demand by 2040.[3] In the European Union (EU), gas is central to the so-called 'Energy Union' – the EU's vision for Europe's energy future.[4] But is this emphasis on gas compatible with the goals of the Paris Agreement that the EU has endorsed? Is there a sufficient carbon budget to replace one fossil fuel with another? Should the EU continue to support a gas-filled future? And what will the consequences be if it does?

RISING TEMPERATURES, DEVASTATING IMPACTS

Scientists have shown beyond doubt that a 2°C temperature rise cannot be considered 'safe'. Such a temperature increase will have devastating consequences that will hit the most vulnerable hardest. Even a 1.5°C rise in average global temperatures carries major risks, threatening the very existence of some small island nations and low-lying coastal regions. As no temperature rise is truly safe or acceptable, illustrated plainly by today's extreme climate-related weather events, countries should aim for the lowest temperature increase.

Last year, 2016, was the hottest year on record, with an average temperature 1.1°C above the pre-industrial era, while 16 of the 17 warmest years on record have occurred since the beginning of the 21st century.[5] And this year has brought numerous stark reminders that the world is facing a climate emergency: floods in South Asia and storms in the Atlantic have shown once again the devastating impact of climate change on human lives and livelihoods, particularly on the poorest and most vulnerable. Europe experienced the 'Lucifer heatwave', which affected millions and saw temperatures as high as 42°C in Split, Croatia.[6] Hurricanes Harvey and Irma (one of the strongest Atlantic storms on record) devastated large parts of the Caribbean, as well as showing that even the most developed countries are vulnerable to climate disasters.[7]

EUROPE'S CARBON BUDGET: NO ROOM FOR GAS

THE WORLD'S CARBON BUDGET IS RUNNING OUT

The world continues to burn fossil fuels and to put ever more greenhouse gases into the atmosphere, bringing us closer to yet greater climate disaster. In 2011, the Intergovernmental Panel on Climate Change (IPCC) estimated that in order to have a 66% chance of not reaching a 2°C temperature rise, the world has a carbon budget of just 1000 Gigatons (Gt) of carbon dioxide (CO_2).

Since then, one quarter of that budget has already been used up.[8] At the current rate of emissions, the world's carbon budget for even a 2°C temperature rise will have run out in only 20 years.[9] Much more urgent and effective climate actions are therefore needed before 2020, to have a chance of meeting the commitments made at the Paris climate talks.

Those with the greatest historical responsibility for climate change – the EU, the U.S. and other developed countries who benefitted from their historical greenhouse gas emissions – continue emitting greenhouse gases far above just or sustainable rates. In 2015, the world's richest nations, with just 17% of the planet's inhabitants,[10] produced 32% of the world's carbon emissions.[11]

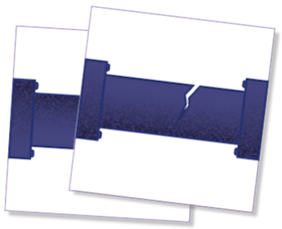
EUROPE'S SHARE OF THAT CARBON BUDGET IS RUNNING OUT FAST

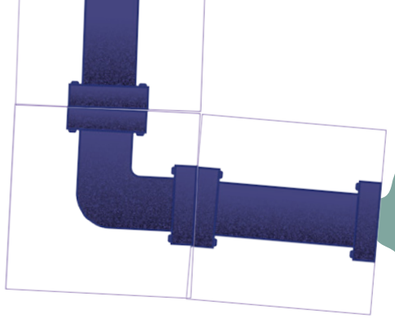
In April 2016, the EU and its 28 member states signed the Paris Agreement on climate change. The EU's Nationally Determined Contribution (NDC) to reduce greenhouse gas emissions, agreed in March 2015 before the Paris negotiations, is a binding target of at least 40% domestic emissions reduction by 2030, compared to 1990 levels. EU member states are in the final stages of agreeing the implementation of this commitment, at EU level.

But this level of commitment is insufficient to adequately reflect Europe's responsibility and capability to tackle climate change.

According to a review by global civil society organisations, including Friends of the Earth International, which evaluates fair shares of global mitigation efforts, the EU has a responsibility for a much greater level of mitigation than is currently contained in its NDC. According to this Civil Society Equity Review, the EU's NDC represents just over a fifth of its fair share of global mitigation efforts.[12] In other words, climate justice requires the EU to be doing nearly five times more to mitigate climate change. In order to determine whether there is still room for gas in Europe's carbon budget, Friends of the Earth Europe commissioned the Tyndall Centre at the University of Manchester and Teeside University to look at the compatibility of Europe's continued use of gas with the Paris climate goals.[13] According to this research, carried out by Professor Kevin Anderson and John Broderick, Europe has, at most, just 9 years of energy-only[14] emissions left before its 2°C carbon budget runs out, when taking into account the capacity of non-OECD countries to mitigate their own emissions. It is clear that achieving a lower temperature target would be an even more onerous challenge, though one that justice requires we do our utmost to meet.

In order to develop their estimates, Anderson and Broderick looked at the capacity for climate change mitigation in the global South within the global carbon budget for 2°C, and created several *"highly ambitious"* mitigation pathways for non-OECD country emissions, based on their energy-based carbon emissions peaking between 2020 and 2025.





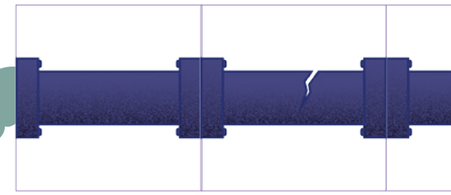
CLIMATE MODELS RELY ON NEGATIVE EMISSIONS, AND CARBON CAPTURE

A significant dimension to the current debate on carbon budgets is the existence in a number of key energy and climate scenarios of negative emissions technologies (NETS) and/or Bio-Energy Carbon Capture and Storage (BECCS). The effect of the inclusion of these unproven technologies is to enlarge the foreseen carbon budget available for fossil fuel emissions.

According to Anderson and Broderick, *"virtually all of the 2°C scenarios within the IPCC's database include negative emissions technologies removing several billion tonnes of carbon dioxide directly from the atmosphere. However there is wide recognition that the efficacy and global rollout of such technologies are highly speculative, with a non-trivial risk of failing to deliver at, or even approaching the scales typically assumed in the models."*

The International Energy Agencies Energy Technologies Perspective (based on their Reference Technology Scenario) also includes negative emissions technologies such as Bio-Energy Carbon Capture and Storage while their 350 Scenario includes substantial carbon capture and storage to offset fossil fuel emissions[20]. The use of negative emissions or CCS in these models allows for scenarios with stabilisation of planetary temperatures below 2 °C of warming and allow for the continued use of fossil fuels.

Relying on future negative emissions is both dangerous for the climate and those likely to be affected by the use of such technologies in the future. BECCS, for example, is likely to lead to large scale negative social and environmental effects such as landgrabbing and biodiversity loss due to the sheer scale demanded of any enterprise to balance fossil fuel emissions with biological offsets. Imagined emissions savings from these technologies should not be used to justify carbon emissions or to postpone climate action today[21].



"...there is categorically no role for bringing additional fossil fuel reserves, including gas, into production."

(Anderson and Broderick, 2017)

These pathways, which depict a short term peak and decline in non-OECD countries, contrast starkly with existing models such as the International Energy Agency's (IEA) International Energy Outlook, which expects a rise of non-OECD emissions through to 2040.[15] As Anderson and Broderick put it, their pathways for non-OECD countries are *"far beyond their respective Nationally Determined Contributions".*[16] With this in mind, Anderson and Broderick's calculation of how long the EU has, at current levels of emissions, before it surpasses its carbon budget can be considered an optimistic scenario.

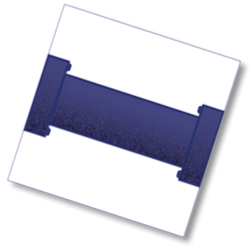
NO ROOM FOR GAS

Deriving an energy-only carbon budget for Europe based on these non-OECD mitigation pathways, Anderson and Broderick show that, by 2035, the EU will have to reduce its energy emissions, including from power generation, by 95% to be within Europe's carbon budget for achieving no more than 2°C warming. Any serious probability of staying within 1.5°C would demand even greater and faster mitigation efforts from the EU. These figures make it clear that there can be no future for gas or any other fossil fuel in Europe. As Anderson and Broderick state, *"there is categorically no role for bringing additional fossil fuel reserves, including gas, into production"*.

The conclusion that gas has no role in the EU's energy system derives from the fact that gas is a fossil fuel that emits substantial amounts of greenhouse gases. As Climate Action Tracker, an independent scientific analysis produced by three research organisations, has recently noted *"emissions for power from unabated natural gas are incompatible with power sector decarbonisation: life-cycle emissions, i.e. taking into account the emissions in the fuel chain and the manufacturing of the energy conversion technology, are estimated at 410–650 gCO2eq/kWh for natural gas combined-cycle plants [which are] much higher than for most renewable technologies (2–180 gCO2eq/kWh) (IPCC 2014)."*[17] While the combustion of gas may *"produce about half of the CO_2 produced by burning coal"*, as the gas industry likes to tell us,[18] it is only by looking at the entire life-cycle of the gas supply chain (and not only at the final combustion stage) that climate and environmental impact can truly be measured. When taken as a whole, the greenhouse gas emissions at every stage from gas exploration to gas consumption, combined with the environmental, social and health impacts associated with gas extraction, make gas a source of energy that is anything but clean and safe.

Even if Europe used the entirety of its remaining carbon budget solely on gas power generation, at current rates of consumption, and ignoring all other emissions, the budget would run out by the middle of the century.[19]

Given that the EU is already producing far more CO_2 than that just being emitted by gas power stations (including, for example, from coal power stations), Europe's gas power stations will need to close much sooner than mid-century. By 2035, Europe's total energy emissions will need to be as little as 5% of today's emissions. For a serious probability of staying within 1.5°C warming, an even faster phase out of all fossil fuels will be needed.



THE METHANE PROBLEM: LEAKING AWAY OUR CHANCES

CO_2 is not the only problem for the climate that arises from the use of gas as a fuel. In addition to CO_2 emissions from combustion, the production of natural gas is also responsible for large amounts of methane emissions, in the form of leaks. Methane, the main component of what we call gas, is a potent greenhouse gas. Though more short-lived in the atmosphere than CO_2, Anderson and Broderick note that methane emissions *"currently contribute approximately 20% of the anthropogenic warming impact on the climate"*.

DANGEROUSLY HIGH METHANE LEVELS

Methane emissions are at dangerously high levels. According to Anderson and Broderick, *"Increases in atmospheric methane concentrations have been observed since 2006 as well as regional increases in emissions"*, and are at the *"top end of IPCC scenarios"*. In other words, the levels of methane in the atmosphere are in line with the most pessimistic of the IPCC's emissions scenarios for future greenhouse gas emission levels (see figure 1).

While the fossil fuel industry is not the only source of methane, it is a significant one, contributing a third of all anthropogenic emissions, as Anderson and Broderick note.[22] These emissions come from the coal, oil, and most significantly, gas, industries.

CH4 CONCENTRATION BY YEAR

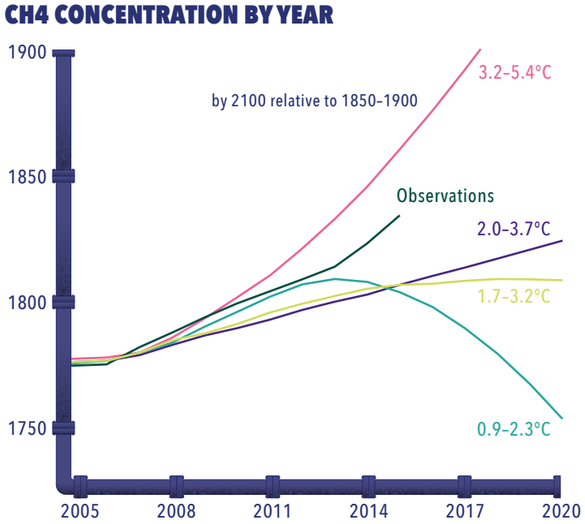


Figure 1. Observed methane concentrations in comparison to IPCC scnearios. Source: Saunois et al 2016, Global Carbon Project

METHANE'S CLIMATE IMPACT

Methane is a potent greenhouse gas, with a global warming potential 34 times higher than CO_2 on a 100-year time horizon, and 86 times higher on a 20 year timeframe (IPCC AR5).[23] Though relatively short lived in the atmosphere, as it degrades, or is "lost", over a period of approximately 12 years, *"[p]ersistently high emissions of methane will replenish this loss and maintain this initial warming effect"*, leading to a continuous wave of additional short term temperature increase, maintained over time, and in accompaniment to the warming effect of CO_2. (Figure 2).

GLOBAL TEMPERATURE CHANGE BY YEAR

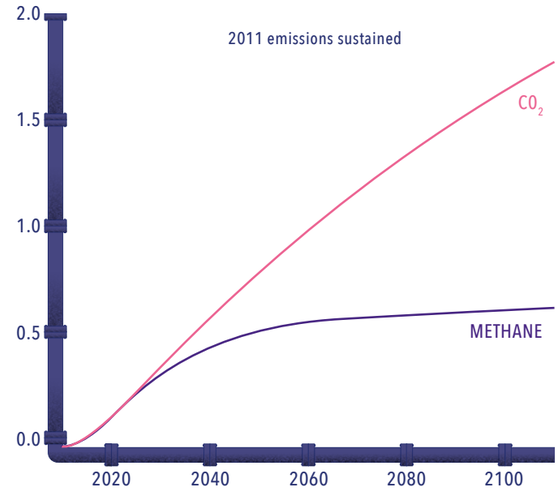
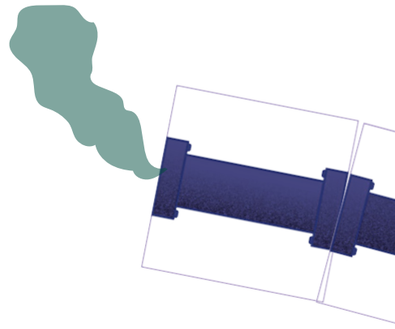


Figure 2. The consequences of failing to mitigate GHGs from present levels for C02 and Methane - reproduced from Allen et al (2016)



Although in the long run CO_2 emissions remain the main driver of global warming – due to CO_2's much longer lifespan once in the atmosphere – the reduction of methane emissions can have a significant short-term impact on climate change. As Stefan Schwietzke, lead author of a recent peer-reviewed study on the matter published in *Nature*[24] concludes, *"reducing methane emissions now will reduce climate forcing in only a few years – it takes much longer for CO_2. And since fossil fuel methane emissions are higher than previously thought, the potential to reduce climate forcing from this specific source is also greater"*.[25] Moreover, as shown by the Shindell et al peer-reviewed NASA study published in Science, in 2012,[26] a combined effort to reduce CO_2 and methane emissions offers the only pathway compatible with limiting warming to well below 2°C (see pink line in Figure 2).

TEMPERATURE CHANGE RELATIVE TO 1890-1910 BY YEAR

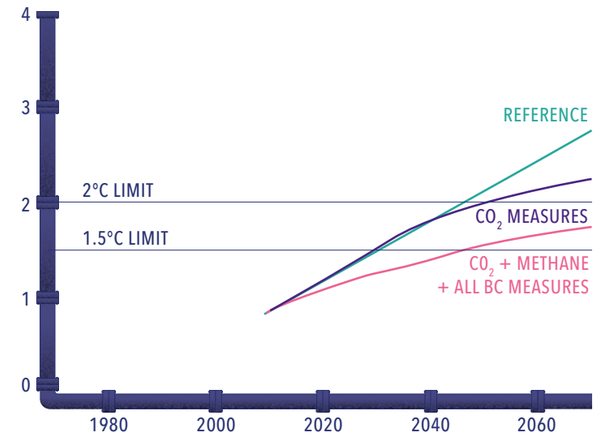


Figure 3. Observed temperatures through 2009 and projected temperatures thereafter under various emission reduction scenarios (Shindell et al, 2012)

THE UNDERESTIMATION OF EMISSIONS

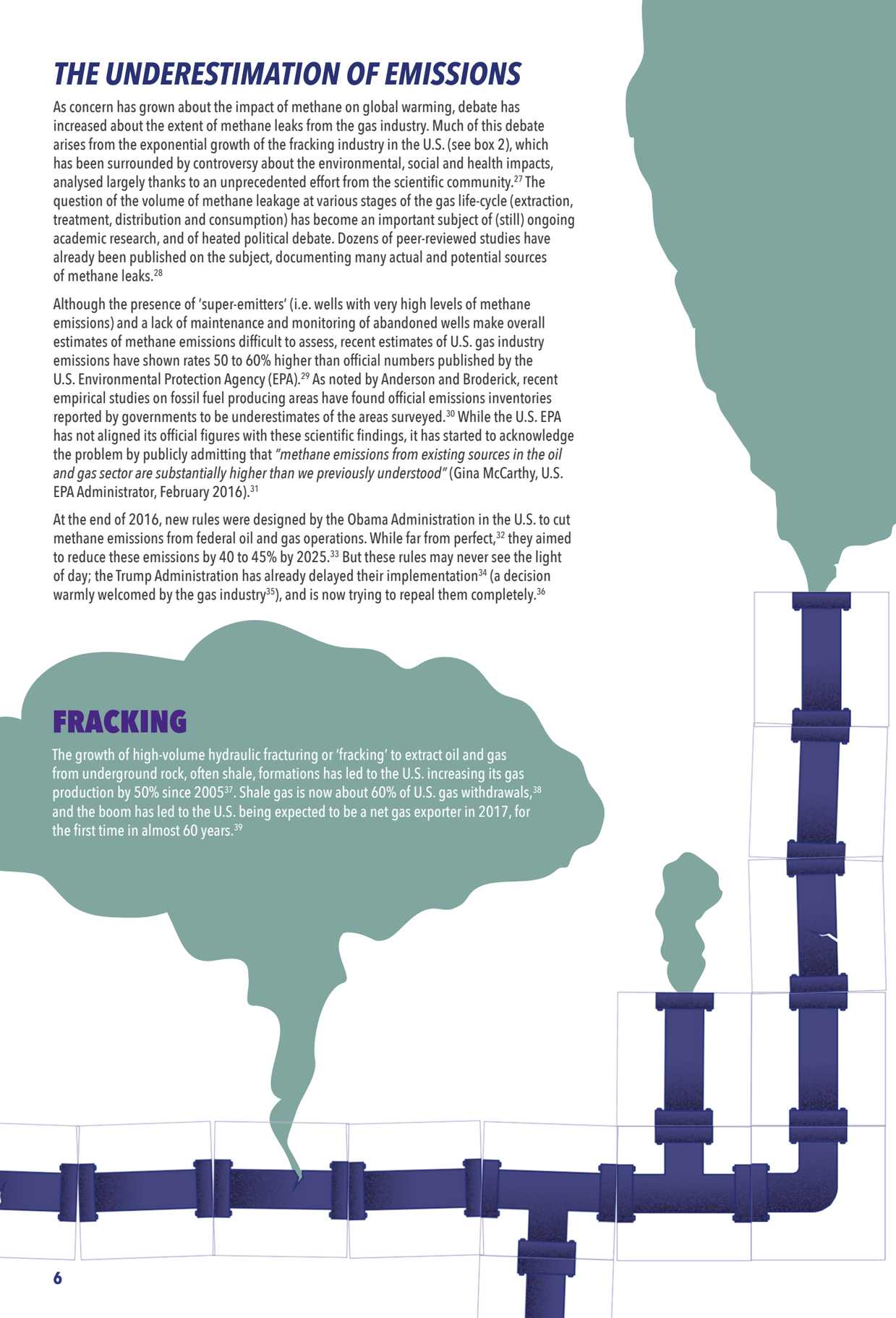
As concern has grown about the impact of methane on global warming, debate has increased about the extent of methane leaks from the gas industry. Much of this debate arises from the exponential growth of the fracking industry in the U.S. (see box 2), which has been surrounded by controversy about the environmental, social and health impacts, analysed largely thanks to an unprecedented effort from the scientific community.[27] The question of the volume of methane leakage at various stages of the gas life-cycle (extraction, treatment, distribution and consumption) has become an important subject of (still) ongoing academic research, and of heated political debate. Dozens of peer-reviewed studies have already been published on the subject, documenting many actual and potential sources of methane leaks.[28]

Although the presence of 'super-emitters' (i.e. wells with very high levels of methane emissions) and a lack of maintenance and monitoring of abandoned wells make overall estimates of methane emissions difficult to assess, recent estimates of U.S. gas industry emissions have shown rates 50 to 60% higher than official numbers published by the U.S. Environmental Protection Agency (EPA).[29] As noted by Anderson and Broderick, recent empirical studies on fossil fuel producing areas have found official emissions inventories reported by governments to be underestimates of the areas surveyed.[30] While the U.S. EPA has not aligned its official figures with these scientific findings, it has started to acknowledge the problem by publicly admitting that *"methane emissions from existing sources in the oil and gas sector are substantially higher than we previously understood"* (Gina McCarthy, U.S. EPA Administrator, February 2016).[31]

At the end of 2016, new rules were designed by the Obama Administration in the U.S. to cut methane emissions from federal oil and gas operations. While far from perfect,[32] they aimed to reduce these emissions by 40 to 45% by 2025.[33] But these rules may never see the light of day; the Trump Administration has already delayed their implementation[34] (a decision warmly welcomed by the gas industry[35]), and is now trying to repeal them completely.[36]

FRACKING

The growth of high-volume hydraulic fracturing or 'fracking' to extract oil and gas from underground rock, often shale, formations has led to the U.S. increasing its gas production by 50% since 2005[37]. Shale gas is now about 60% of U.S. gas withdrawals,[38] and the boom has led to the U.S. being expected to be a net gas exporter in 2017, for the first time in almost 60 years.[39]



LIQUEFIED NATURAL GAS AND PIPELINES

The fracking boom in North America and Australia has also contributed to, and coincided with, a second development in the worldwide gas market: the revival of the liquefied natural gas sector. Liquefied natural gas, or LNG, is gas cooled to a liquid form to be more easily transported across oceans, without the use of pipelines. LNG ships now deliver fossil gas around the world. The global LNG trade reached a record high in 2016, with a 5% growth rate in the same year.[40] The climate impact of LNG however has received little attention. LNG creates additional methane emissions through the extra steps in the supply chain that it entails, including liquefaction, transport and regasification of the gas. Converting gas into LNG by cooling it to minus 160°C, and then converting it back to its gaseous form, is a highly energy-intensive, and therefore emission-intensive, process.

Anderson and Broderick therefore conclude that though *"there are large uncertainties in the emissions associated with natural gas supply chains", "the additional emissions of LNG and long distance pipelines are approximately double those of short distance conventional production"*.[41] Drawing on a 2016 study led by Paul Balcombe from Imperial College London, they recognise that there is *"greater confidence in the conclusion that the additional energy required for LNG transportation (for liquefaction, shipping and regasification) adds a burden for LNG of approximately an additional 20% over emissions from combustion and short-distance pipeline transport"*. Balcombe et al find that lifecycle emissions from LNG can be as high as 134% of the end use combustion of CO_2. According to Wood MacKenzie, with the growth forecast in the sector, LNG *"will be the biggest source of carbon emission growth for the world's top oil and gas companies by 2025"*.[42] This makes LNG a particularly dangerous kind of energy for the climate, though one that continues to be greatly supported by the EU, which sees it as a valuable contributor to decarbonising the energy system.[43] The EU also transports considerable amounts of gas through pipelines, which are also significant emitters of methane. Anderson and Broderick cite Heath et al (2014) who *"identified pipeline distance and pipeline leakage rate as the dominant variables, whereby a doubling of distance would lead to a 30% to 35% increase in non-combustion GHG emissions"*.[44]

TOO GREAT AN UNCERTAINTY, TOO HIGH A RISK

A characteristic of the emissions from all these kinds of gas supply is the uncertainty about the real level of emissions, and therefore the real impact on the climate. In addition to uncertainty about U.S. fracking emissions, there is also uncertainty regarding the true level of emissions from other sources of supply, such as long distance pipelines. The Institute for Advanced Sustainability Studies (IASS), a research centre in Potsdam, undertook a comparative analysis of methane emissions inventories across nations. This revealed a clear lack of understanding of the many sources of methane leakage, as well as inadequate measuring techniques, across the entire natural gas supply chain, in both developed and developing regions[45].

Given the possibility that emissions from gas supply could be higher than currently estimated, a reliance on these sources may contain even greater risk than that already outlined above. IASS Potsdam concludes that *"sustainability and precautionary principles require that policy evaluations should presume the upper limit of these uncertainty ranges"*, and therefore *"natural gas cannot be recommended – from a climate perspective – as feedstock of sustainable energy systems nor as a bridging fuel towards a renewables-based energy system."*

Methane emissions from the gas industry are a dangerous threat to the climate, and to people most at risk from climate change. Whether produced domestically, or transported across borders by pipeline or by ship as LNG, the gas industry leaks methane, adding significantly to the climate harming effect of natural gas. Though we still do not know exactly how extensive and how dangerous these leaks are, cutting methane emissions is necessary to avoid catastrophic climate change.

Methane emissions from a gas storage tank, observed with an infrared camera
Credit: US EPA

EUROPE AND THE HYPE FOR GAS

EUROPE'S CONTINUED FOSSIL FUEL ADDICTION

Regardless of its international climate commitments under the Kyoto, Cancun and now the Paris Agreements, the EU continues to make public policy that provides support for fossil fuels. The EU and its member states, urged on by the oil and gas industry, continue to encourage the exploration, production and supply of fossil fuels for decades to come. Through finance and policy, it provides the public support and funding vital to keeping Europe hooked on fossil fuels. Despite its many promises to phase out fossil fuel subsidies, between 2014 and 2016 the EU and its members provided more than €112 billion per annum to support the fossil fuel industry. Within this picture of continued and extensive support to fossil fuels, there has been a shift in European energy policy in favour of gas.

Alongside the emergence of measures by the EU and some EU national governments to de-incentivise coal consumption, gas has been made a central component of EU energy policy.[46] This shift in emphasis can be seen in the consumption of different fossil fuels. Consumption of coal in the EU has declined by over 50% for hard coal and slightly less for lignite since 1990,[47] while consumption of gas has increased by 17% since 1990.[48]

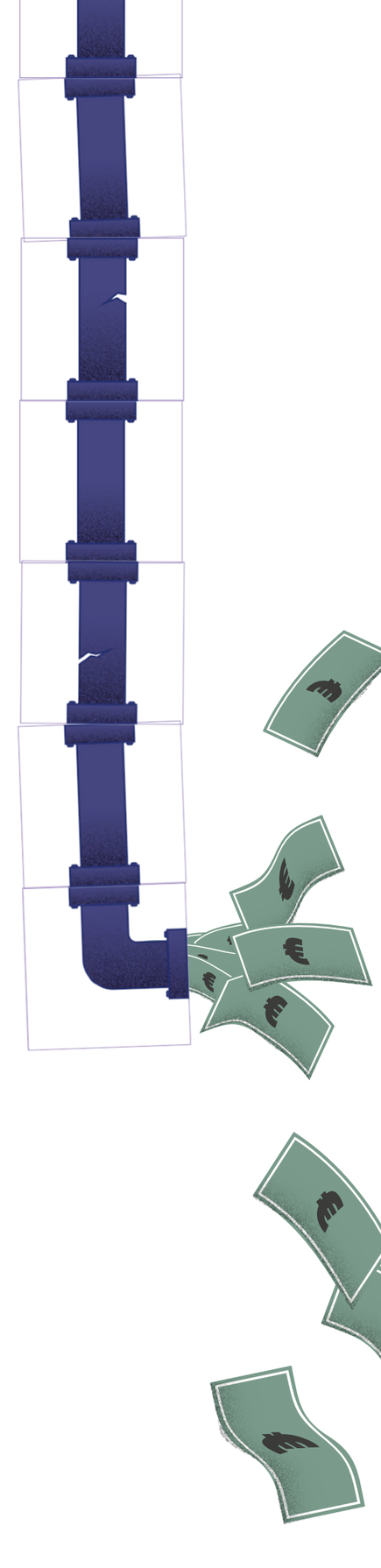
WHOLEHEARTED SUPPORT FOR GAS

The EU's 'Energy Union' plan places gas at its heart, explicitly backing the construction of *"infrastructure to deliver new sources of gas to the EU".*[49] The recently approved security of supply regulation encourages the building of LNG hubs, the completion of gas pipelines, the North-South and Southern Gas corridors, as well as the further development of domestic gas production.[50] The EU's new LNG strategy aims to ensure that the *"entire EU has access to multiple sources of gas",*[51] thereby legitimizing new investments in the fossil fuel in many parts of Europe. Even the European Commission's presentation of the Energy Union and Climate Action two years on boasts of its gas pipeline expenditure.[52]

But that is not all. Gas has also been placed at the heart of EU trade policy. The currently frozen EU-U.S. trade deal TTIP had proposed an energy chapter to free up trade in fossil gas,[53] while the recently agreed EU-Japan trade agreement was negotiated in parallel with a Memorandum of Understanding promoting LNG.[54] The CETA trade agreement between the EU and Canada will result in increased fossil fuel exports from Canada to Europe, according to recent statements from Canada.[55] The EU has also recently started discussions on a new comprehensive agreement with Azerbaijan, a major gas producer.

National and EU decision makers are also actively supporting investments into exploration and development of new gas reserves in Europe. Faced with increasing problems with major sources of domestic gas production in the North Sea and the Netherlands (the latter due to repeated earthquakes generating more than 80,000 claims over property damage[56]), heavy political and financial support has been given to exploration of recent offshore discoveries near Cyprus[57] and in the Black Sea.[58] Several pipeline projects aimed at connecting these potential production sites to the rest of Europe have received EU political support via the Union list of Projects of Common Interest (see below).

At the beginning of the 2010s, several member states provided heavy-handed regulatory, political and financial support to the fracking industry's attempts to develop their shale gas business in Europe. Despite evidence of environmental harm in the U.S., and an unprecedented level of opposition in most EU countries where licences were issued, governments in Poland, Romania, the UK,[59] Spain, the Netherlands and others decided to go "all out for shale".[60] However, a combination of well-organised grassroots resistance, unfavourable geology, higher costs, and stronger environmental standards than the U.S., has so far prevented the industry from developing. Bans and moratoriums on fracking have been enacted in numerous places as a result of vocal opposition from citizens.



PLANNING TO FAIL: LOCKING US IN TO GAS FOR DECADES

Despite the planetary emergency, the EU and its member states continue to plan and construct new, long-lasting gas infrastructure, which will facilitate the production and consumption of gas for decades to come. As part of its list of energy Projects of Common Interest (PCI), the European Commission and member states define the key energy projects needed to create its vision of an affordable, secure and sustainable energy system.[61] Yet, the second PCI list included 77 gas-focussed PCIs, including a dozen LNG projects and tens of gas pipelines (including mega pipelines like the 3500 kilometres-long Southern Gas Corridor to bring gas from Azerbaijan to Europe).

This infrastructure is a very serious threat to climate change, effectively promising to lock-in gas for the long-term. This kind of gas-infrastructure is designed to remain in place for decades, long after the deadline when Europe must stop burning fossil fuels, in accordance with its climate action commitments. Indeed, countless examples show that *"natural gas pipelines are typically designed to have a useful life of about 50 years".*[62] Europe's MEGAL pipeline connecting Austria, the Czech Republic, Germany and France, commissioned in 1980,[63] has already been in operation for more than three decades. Azerbaijan's Energy Minister NatigAliyev has stated that the Southern Gas Corridor is *"projected to remain active for 50-60 years".*[64] And Gazprom estimates that its Nord Stream gas pipeline *"is expected to operate flawlessly for at least 50 years".*[65] This means that new gas pipelines such as the proposed Nord Stream II are likely to last into the 2070s, decades too late for the climate. Similarly, LNG terminals are considered by the gas industry as *"a long-term business. Terminal operators look 40 years ahead or more when making decisions on infrastructure".*[66] Europe's oldest operational LNG facility in Barcelona was built in 1968, nearly 50 years ago.[67]

PUBLIC MONEY FOR GAS: SUBSIDISING CLIMATE DESTRUCTION

By supporting the development of gas, the EU is responding to the prompting of the oil and gas industry, providing these fossil fuel companies with substantial financial assistance. In an energy market that is already dense and sufficiently developed to respond to demand,[68] European gas companies and operators are struggling to find an economic model for new gas infrastructure without public subsidies. The EU has stepped in to provide significant amounts of direct finance to gas projects either through the EU budget or the EU's lending arms – the European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD). In just three years, the EU has granted more than €1 billion in finance to gas Projects of Common Interest (PCIs) through its Connecting Europe Facility programme.[69] The EIB and EBRD have lent to 27 gas projects between 2014 and 2016, while the European Fund for Strategic Investments spent €1.2 billion backing gas projects in 2015 and 2016 alone.[70] EU member states have also used their export credit agencies to support gas projects, including power stations, LNG facilities and pipelines.[71] Even EU research funds have been used to support gas, with more than €11 million of Horizon2020 funding going to support shale gas research.[72]

THE GAS LOBBY'S NEW GAME

As political decision makers have started to take action on climate change, the oil and gas industry has moved to respond. Dividing itself from the increasingly toxic coal lobby, it has sought to place itself as central to the *"transition"* to *"a low-carbon system"*.[73] Gas, in particular, is central to this strategy.

The carbon majors – the world's biggest oil and gas companies – have engaged in a sustained lobbying and PR campaign to ensure that gas is accepted as a continuing part of the world's energy mix, even as the climate crisis demands ever steeper and more urgent cuts in emissions to avoid climate catastrophe. The Norwegian oil major Statoil claims that *"Europe's biggest climate challenge is to phase out coal"*[74] and a *"coal to gas switch is essential to stay on track with the 2050 roadmap"*. Marco Alverà, president of industry association GasNaturally, has even claimed that gas's growing share of the energy mix is *"good news for the climate"*[75].

The industry has sought to present gas not just as a stop-gap measure, but as an indefinite part of the energy system. Shell CEO, Ben Van Beurden, proclaims that if Shell gets it right, gas is *"not just going to be a bridge"* but a lucrative part of the energy mix, indefinitely.[76] This view is seemingly shared by U.S. oil major Exxon, which, while pointing out that *"85% of global natural gas resources remain untapped"* which is *"enough gas to supply current global demand for more than 200 years"*, claims that natural gas is *"an abundant, reliable, and clean source of energy"*.[77]

This reorientation in favour of gas is reflected in investment strategies, with the oil and gas majors now shifting investments towards gas from oil, the traditional bedrock of their business. All the oil and gas majors, with the sole exception of BP, have increased the share of their energy production that comes from gas. French company Total proclaims that *"[w]hile natural gas production accounted for just a third of Total's output ten years ago, it rose to a little over 48% in 2016"*.[78] And even BP has now said that it will follow suit: its 2016 annual report announces a plan to ensure that *"[a]round 75% of our planned start-ups by 2021 are in gas projects"*.[79] It is the fossil fuel companies that have profited from causing climate change, that are now proposing that Europe continues to use fossil fuel into the future. They are now going to great lengths to portray gas as a solution, regardless of all the evidence that catastrophic climate change means ending our fossil fuel dependency, and ending it fast.

GREENWASHING GAS

This shift in strategy of fossil fuel companies has been backed by major public relations efforts. In the run up to the international climate talks in Paris in 2015, many of the oil and gas majors trumpeted their support for a carbon price, and promoted natural gas as evidence that they supported climate action.[80] Subsequently, Exxon, the largest private oil and gas company in the world, has also signed on to the idea, looking for a reduction in climate regulation in return.[81] The energy scenarios published regularly by the oil and gas majors now include an optimistic future for gas even in the context of climate action: According to BP energy outlook 2017's base scenario, use of *"gas is projected to grow 1.6% per annum between 2015 and 2035"*, *"more than twice the rate of either oil or coal"*.[82] Climate policies not relying on gas are described negatively, with BP going so far as to add that *"growth of natural gas may be threatened if there is less government support encouraging a switch from coal into gas."*[83]

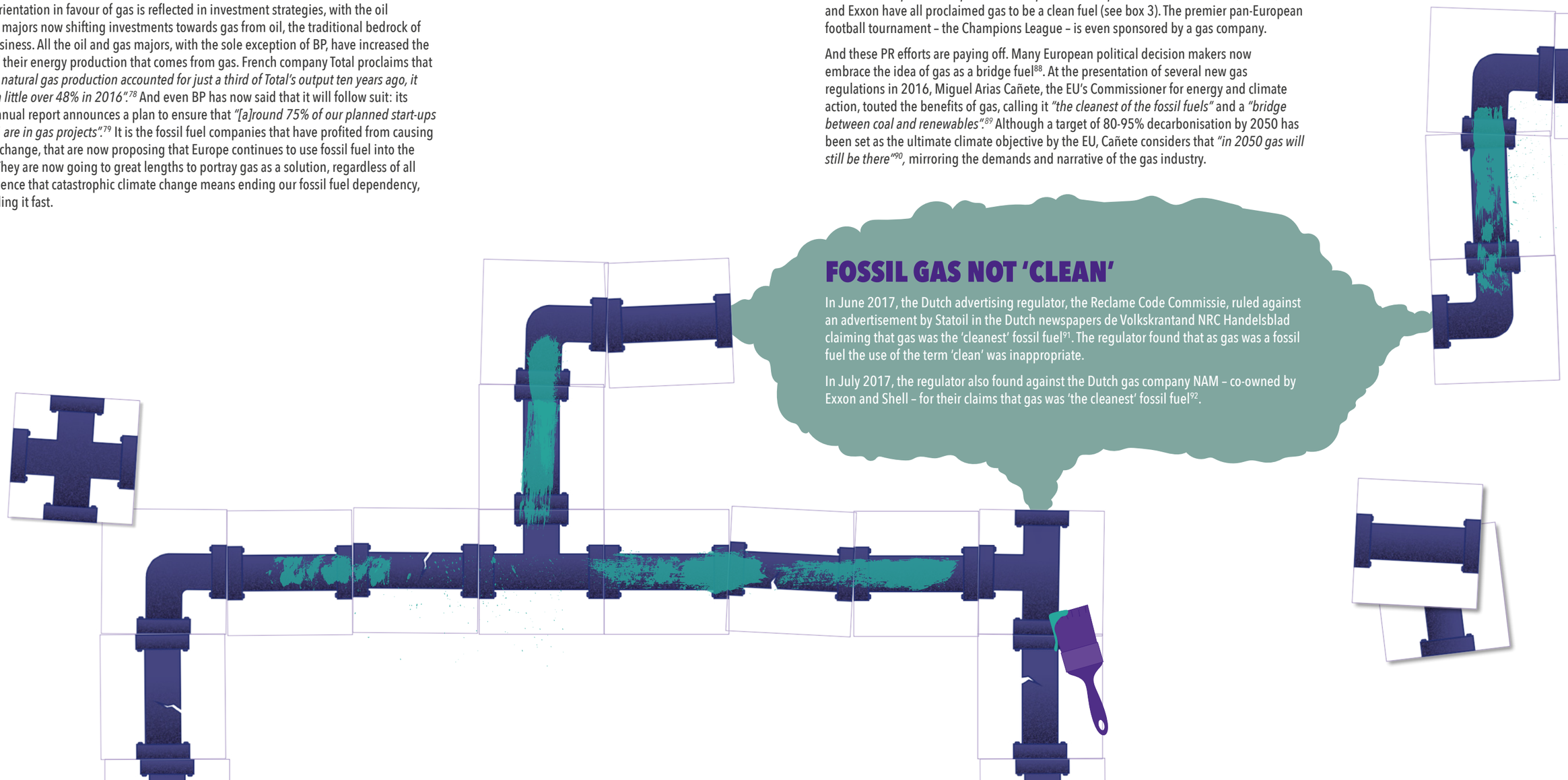
This campaign of greenwashing gas has also played out in massive advertising campaigns on television, on billboards, and on the internet, in Europe, the U.S.[84] and elsewhere, attempting to persuade the public that gas is 'green', 'sustainable' and 'clean'. In Belgium, Statoil ads have proclaimed Norwegian gas as *"low carbon"*.[85] In Brussels, the European industry association Eurogas ran ads that presented gas as contributing to "decarbonisation".[86] Enagas sent a touring exhibition around Spain and Portugal to promote LNG as *"the most environmentally friendly fuels, which is why its use is being encouraged for maritime transport and in ports around Spain and Europe"*.[87] In the Netherlands, Statoil, Shell and Exxon have all proclaimed gas to be a clean fuel (see box 3). The premier pan-European football tournament – the Champions League – is even sponsored by a gas company.

And these PR efforts are paying off. Many European political decision makers now embrace the idea of gas as a bridge fuel[88]. At the presentation of several new gas regulations in 2016, Miguel Arias Cañete, the EU's Commissioner for energy and climate action, touted the benefits of gas, calling it *"the cleanest of the fossil fuels"* and a *"bridge between coal and renewables"*.[89] Although a target of 80-95% decarbonisation by 2050 has been set as the ultimate climate objective by the EU, Cañete considers that *"in 2050 gas will still be there"*[90], mirroring the demands and narrative of the gas industry.

FOSSIL GAS NOT 'CLEAN'

In June 2017, the Dutch advertising regulator, the Reclame Code Commissie, ruled against an advertisement by Statoil in the Dutch newspapers de Volkskrantand NRC Handelsblad claiming that gas was the 'cleanest' fossil fuel[91]. The regulator found that as gas was a fossil fuel the use of the term 'clean' was inappropriate.

In July 2017, the regulator also found against the Dutch gas company NAM – co-owned by Exxon and Shell – for their claims that gas was 'the cleanest' fossil fuel[92].



THE CONSEQUENCES OF EUROPE'S LOVE AFFAIR WITH GAS

"We are the least of the polluters, but the largest of the casualties. The unfairness, injustice and inequality are painfully obvious," Prime Minister Gaston Alphonso Browne of Antigua and Barbuda UN General Assembly 21 September 2017.[93]

The consequences of the continued investment in, support for, and use of gas are to risk exceeding the EU's carbon budget in the short term, locking-in a fossil fuel future for Europe, and threatening a global failure to deliver on the Paris Agreement. The consequence of this will be catastrophic climate change, with devastating effect on the lives and livelihoods of people all over the planet, particularly the most vulnerable.

Even as the Paris Agreement was being concluded, the world was continuing to warm. 2015 was the warmest year then on record,[94] only to be followed by 2016 as the new hottest year.[95] The world is currently on course to more than 3°C of warming *even if* all Paris Agreement emission reduction pledges are kept,[96] and could be headed to 5°C of warming if they are not.[97]

Already, rising sea levels are pushing communities to flee from their homelands, while many of the world's staple crops, including wheat and rice, are being affected by the increased temperatures, with agricultural yields stagnating in some parts of the world.[98] The number of climate related disasters has doubled over the past forty years,[99] with floods and droughts increasing in frequency and severity.

The continued reliance on fossil fuels, and the failure of the EU and others to deliver sufficient action in line with the Paris Agreement, risks the global effort against climate change. Europe also has a heavy responsibility for creating the problem. The United Nations Framework Convention on Climate Change (UNFCCC) calls for action from members based on their *"differentiated responsibilities and respective capabilities and their social and economic conditions"*.[100] The EU is one of the wealthiest regions in the world and is responsible for a large share of historical carbon emissions. A failure by Europe to deliver the necessary action to keep the world within 1.5°C or even 2°C would be a grave failure to deliver on its responsibility, and one which would grievously undermine global climate action. Moreover, it would be a great climate injustice for the billions of people who will be affected by climate change but are not responsible for causing it.

While the European Union is just one bloc, it is key to delivering a multilateral response to climate change. It consists of 29 of the 197 parties to the Paris Agreement, and well over half of the Annex 1 members (29 of 43) i.e. the most developed members of the UNFCCC. These are the wealthiest countries with the capacity and capability to lead the transition to a fossil fuel free world. Following the announcement of the withdrawal of the U.S. from the Paris Agreement, it is more crucial than ever for Europe, and others historically responsible, to deliver first and fast on the promises of the agreement, if the world is to have a chance of an effective multilateral response to the climate emergency.

"We are the least of the polluters, but the largest of the casualties. The unfairness, injustice and inequality are painfully obvious."

(Gaston Alphonse Browne, Antigua and Barbuda Prime Minister, 2017)

CONCLUSION

The world's carbon budget, and Europe's, is fast running out. Climate change is already contributing to the destruction of human lives and livelihoods. And current pledges to cut emissions, by those historically responsible, are insufficient to halt catastrophic climate change.

But the EU and its member states, urged on by the oil and gas industry, continue to support and finance long-lasting fossil fuel infrastructure – most notably for gas – which will far outlast the day when Europe needs to have quit its fossil fuel addiction.

Gas, like coal and oil, cannot be considered as a short or a medium-term solution. Decades of political inactions have resulted in the situation today – the time for a fossil fuel-based transition is no longer possible if we want to avoid ever more catastrophic climate change. Europe must ensure it cuts the gas dependency now, and its reliance on all fossil fuels. If Europe is serious about its commitment to make efforts to limit temperature increase below 1.5 degrees, Europe's energy system must be fossil free by 2030.

To do anything less will continue Europe's failure towards those most at risk of climate change's worst impacts.

As Anderson and Broderick concluded their analysis, "considering both carbon dioxide and methane emissions, an urgent programme to phase out existing natural gas and other fossil fuel use across the EU is an imperative of any scientifically informed and equity-based policies designed to deliver on the Paris Agreement".

RECOMMENDATIONS

The EU's energy system needs to be transformed rapidly to be fossil fuel free by 2030.

The EU should immediately end all fossil fuel subsidies, including grants or loans to gas infrastructure projects.

The EU needs to ensure that the next EU budget is a fossil free budget.

The EU and its member states should halt support for all fossil fuel projects, including LNG terminals and gas pipelines such as the Southern Gas Corridor, and transform the Projects of Common Interest to support only the infrastructure necessary to deliver a fossil free future.

The EU should stop any new exploration for oil, gas and coal and ban unconventional fossil fuels such as tar sands and shale gas.

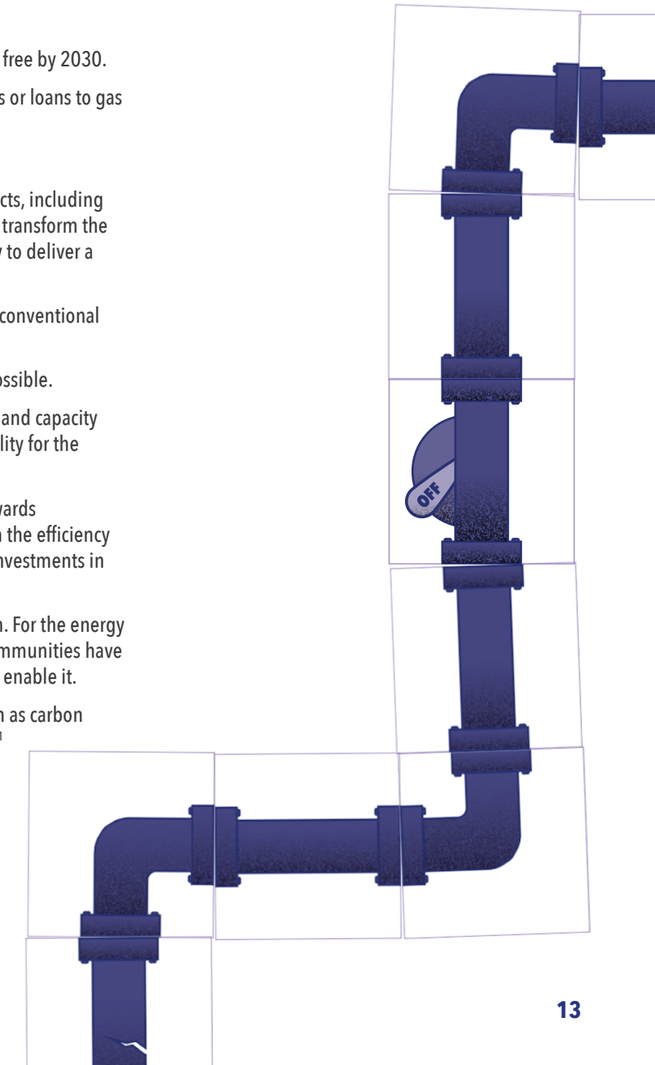
Fossil fuel use in non-energy sectors should be phased out as soon as possible.

Additionally the EU must provide adequate finance, technology transfer and capacity building for developing countries in line with its fair share of responsibility for the climate crisis.

The EU should urgently aim to reduce its energy demand by moving towards energy sufficiency and investing in energy savings, in particular through the efficiency first principle that systematically prioritises efficiency solutions to new investments in energy supply.

The EU should plan for a 100% renewable, people-owned energy system. For the energy transition to proceed at the speed required it is vital that citizens and communities have ownership of it and that the necessary legal framework is put in place to enable it.

The EU should not divert vital funds and resources to false solutions such as carbon capture and storage, unsustainable bioenergy or other false solutions.[101]



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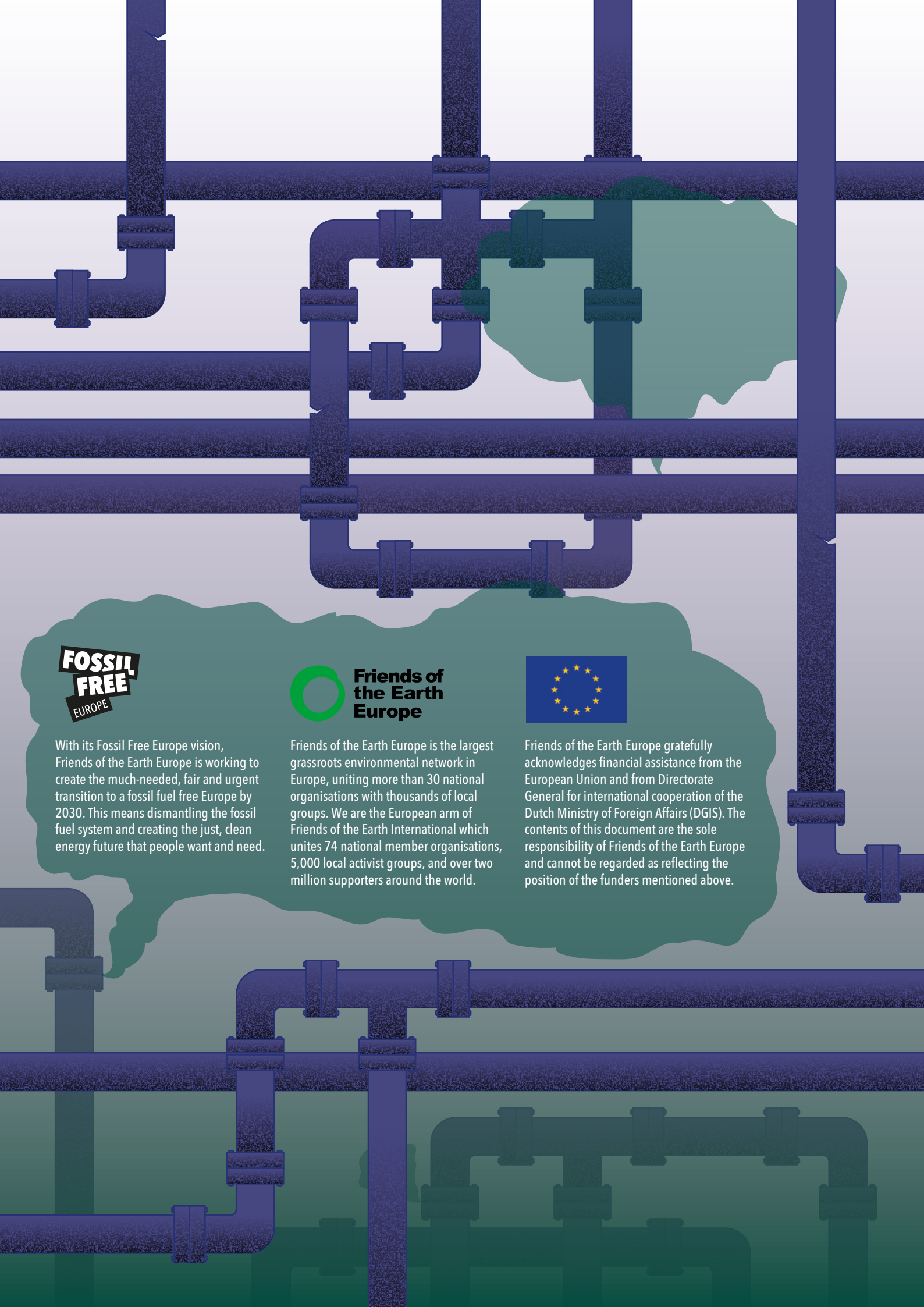
101 FoE rejects all false solutions to climate change including nuclear, carbon capture and storage (including BECCS - BioEnergy with Carbon Capture and Storage), REDD (Reducing Emissions from Deforestation and forest Degradation), big dams, agrofuels, large scale biomass, carbon trading and offsetting. False solutions are already causing human rights and environmental rights violations, and they distract from the real societal change that is needed.



With its Fossil Free Europe vision, Friends of the Earth Europe is working to create the much-needed, fair and urgent transition to a fossil fuel free Europe by 2030. This means dismantling the fossil fuel system and creating the just, clean energy future that people want and need.

Friends of the Earth Europe is the largest grassroots environmental network in Europe, uniting more than 30 national organisations with thousands of local groups. We are the European arm of Friends of the Earth International which unites 74 national member organisations, 5,000 local activist groups, and over two million supporters around the world.

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