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BRIEFING PAPER
JANUARY 2017

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EU gas infrastructure and EFSI: time for change

This briefing shows that further public investment in EU gas infrastructure is likely to represent bad value for money, given:

- the very limited need for new gas investment for security of supply;
- the change of the market where gas demand is falling;
- the failure to test new gas infrastructure against EU climate and energy targets;
- the opportunity cost of not investing scarce EU public funds in other more productive areas, notably energy efficiency, renewable energies and electricity grids.

As a result, funding for new gas infrastructure under the EFSI 2.0 should be phased out. This would send a powerful signal that the EU will properly implement the Paris Agreement and create a much needed international precedent.

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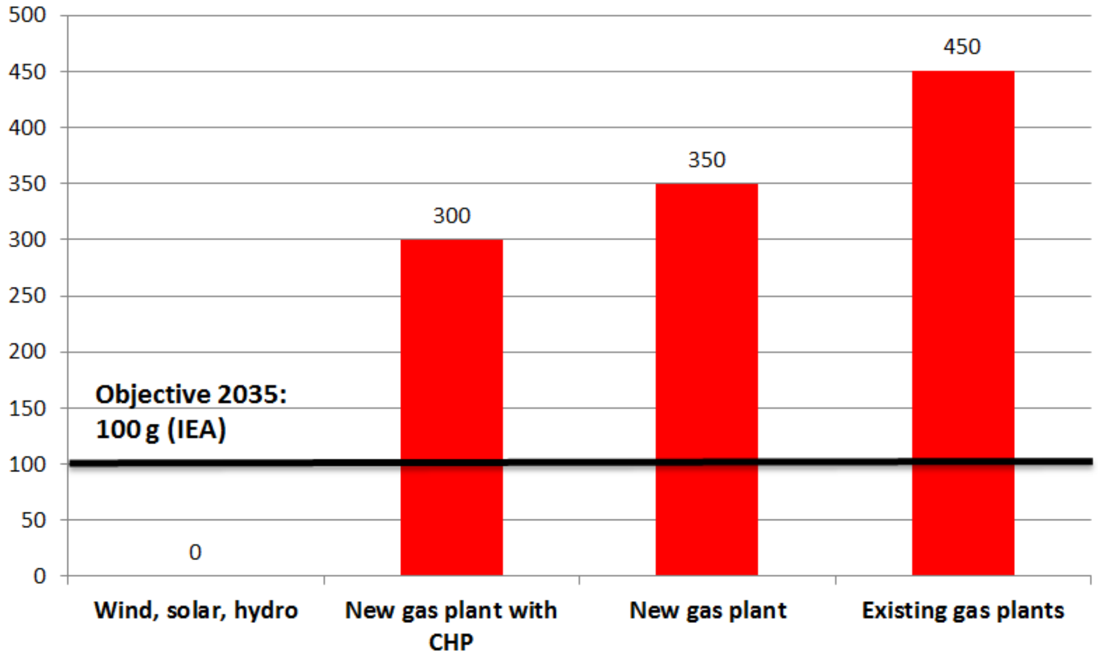
1. CLIMATE CHANGE: GAS IS A HIGH CARBON FOSSIL FUEL

1. Emissions from gas-fired power plants

The International Energy Agency stated that the world needs to reach an average of 100 g CO2/kWh over the next two decades to reach climate stabilisation[1]. Measurements at power plant level show that emissions from gas-fired plants – even the most modern ones – are at least three times higher than that. Despite the idea that gas is the "cleanest fossil fuels", gas-fired plants cannot be considered to produce 'low carbon' electricity (see Figure 1).

Figure 1. Emissions factors for power plants (g CO2/kWh)



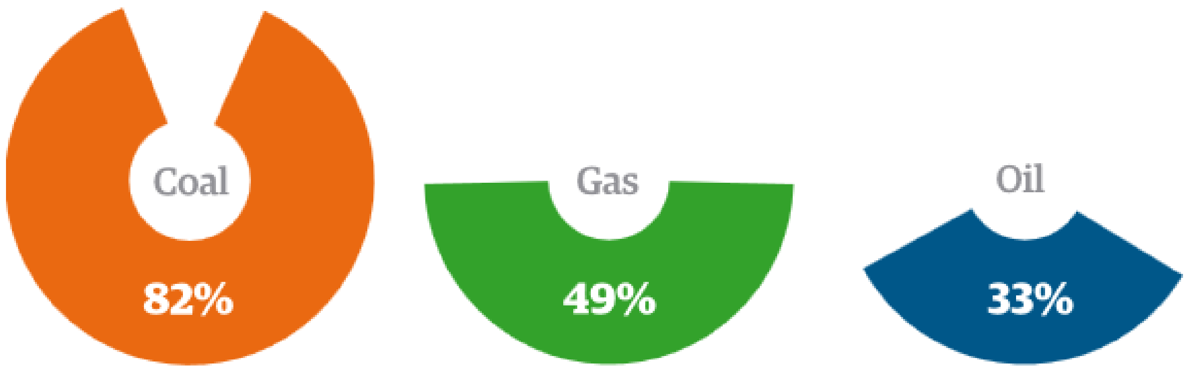
Sources: IEA, Ecofys, IPCC
CHP: combined heat and power

2. Fossil fuels and climate change: more than we can burn - including gas

Early 2015 the University College London (UCL)[2] published a ground-breaking study showing that in order to keep global warming below 2°C (let alone 1.5°C) the bulk of known fossil fuel reserves cannot be burnt and must be left in the ground. This includes **around half of global gas resources**[3] (see Figure 2).

[1] IEA World Energy Outlook 2016
[2] McGlade & Eking (2015), The geographical distribution of fossil fuels unused when limiting global warming to 2°C, in Nature
[3] Even with Carbon Capture and Storage (CCS): CCS power generation doesn't capture 100% of the CO2 and by the time CCS is available at scale we will need the power sector to be around zero carbon, if not carbon negative

Figure 2. Global fossil fuel reserves that cannot be burnt (%)



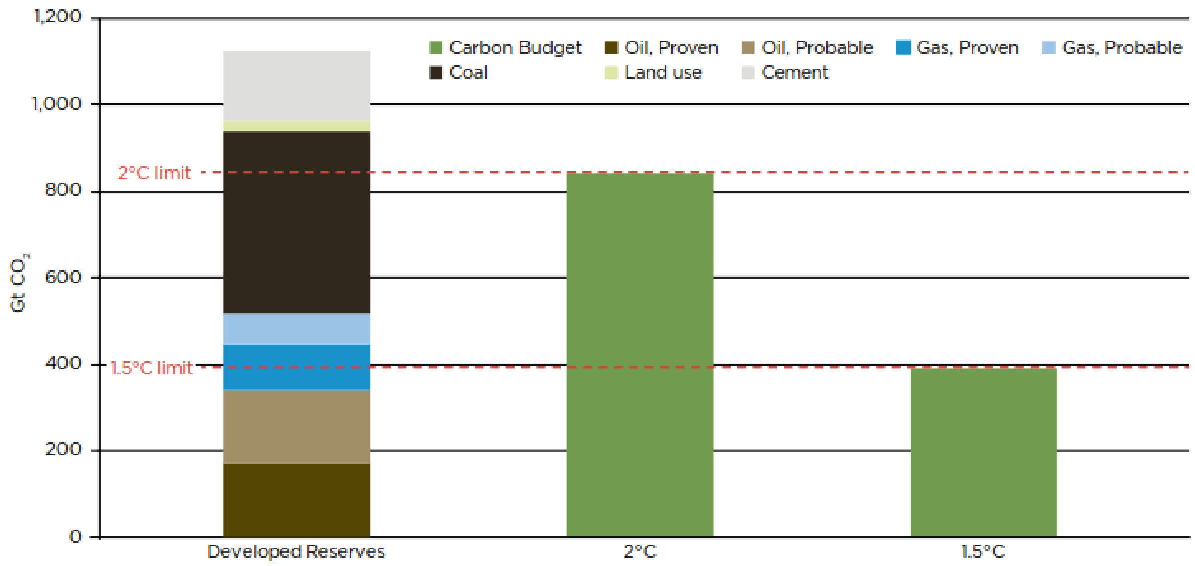
Source: University College London

For the 2°C or 1.5°C climate limits respectively 68% or 85% of known fossil fuel reserves must remain in the ground[4].

The situation is even more striking when focusing on fossil fuel reserves that have already been developed (see Figure 3). It is clear from the data that:

> **Burning the reserves in oil and gas fields *that are already operating*, even without any coal, would take the world beyond the Paris Agreement's target of 1.5°C.**

Figure 3. Emissions from developed fossil fuel reserves, plus projected emissions from associated land use and cement manufacture



Sources: Oil Change International, Rystad Energy, IEA, World Energy Council, IPCC

[4] Oil Change International (2016), The sky's limit

3. Gas use is worse for the climate than previously thought

Methane: much more potent than we thought

Until recently it was commonly accepted that methane was 21-times more powerful than CO2 as a greenhouse gas, based on a 1995 report of the Intergovernmental Panel on Climate Change (IPCC) in 1995. However this figure is outdated for two important reasons:

- The Global Warming Potential (GWP) of 21 was based on a 100-year timescale. This contrasts with an EU long-term climate target that relates to 2050 (a 34 year timescale) and an atmospheric lifetime for methane of only about 10-12 years[5]. Using a shorter timescale, such as the 20 year one suggested recently by the IPCC, would therefore be much moreappropriate;

- In 2013, the IPCC updated its data and stated that over a 20-year period, methane is 86-times worse than CO2 (over a 100 year timescale it is 34 times worse[6];

Updating the data in this way would lead to the use of a GWP figure of 86 for methane and not 21, four times higher than the figure that is usually used (see Table 1).

Table 1. IPCC's assessments of methane global warming potential (GWP)

	20 year	100 year
IPPC 1996	56	21
IPPC 2007	72	25
IPPC 2013	86	34

As a consequence, the latest studies (including a very recent one published in Nature) conclude that total fossil fuel-related methane emissions in tonnes of CO_2 equivalent are 60% to 110% greater than currently estimated[7].

Methane leakage: at least twice as high as previously thought

Natural gas is mostly made up of methane, which as described above is a very potent greenhouse gas. It is also typically under pressure (either under the ground or within gas infrastructure) and therefore escapes into the atmosphere at many different points in the natural gassupply chain. Scientific knowledge on methane leakage (sometimes referred to as fugitive methane emissions) has progressed rapidly over the past six years. For conventional natural gas, the scientific community now commonly agrees that **between 3.6% and 5.4% of the lifetime production of a gas well escapes to the atmosphere[8].** This compares with an estimate used until recently of of 1.8%.

The US Environmental Protection Agency recognised in 2016 that methane emissions from existing sources in the oil and gas sector are *"substantially higher than [they] previously understood"*[9]

The figure is even higher for US shale gas: up to 12% of lifetime production.

Given the above, it is possible to update the calculation of the climate impact of natural gas to take account of both the higher figures for fugitive emissions and the higher figures for global warming potential. Doing so shows that over a 20-year timeframe, coal-fired power generation has a *lower*

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5 http://www.columbia.edu/~jeh1/mailings/2016/20160414_Elec- tioneering.pdf
6 https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf
7 http://www.nature.com/nature/journal/v538/n7623/full/nature19797.html
8 Including both leaking and venting at the well site and during storage & delivery to consumers. Sources: Miller et al, 2013, http://www.pnas.org/content/early/2013/11/20/1314392110.abstract, Brandt et al, 2014 http://www.sciencemag.org/content/343/6172/733
9 http://www.reuters.com/article/us-ceraweek-epa-idUSKCN0VX2RC

carbon footprint than LNG if the upstream methane emissions for the latter are over 1.6% to 1.9% - which is very likely the case for US shale and other unconventional natural gas[10]. If the higher end of the above range for fugitive emissions is used, i.e. 5.4%, then LNG-fueled gas power plants are worse than coal-fired power plants even over a 100 year timeframe[11].

According to the EU strategy for LNG and gas storage[12], US shale gas could soon represent a significant share of European gas imports.

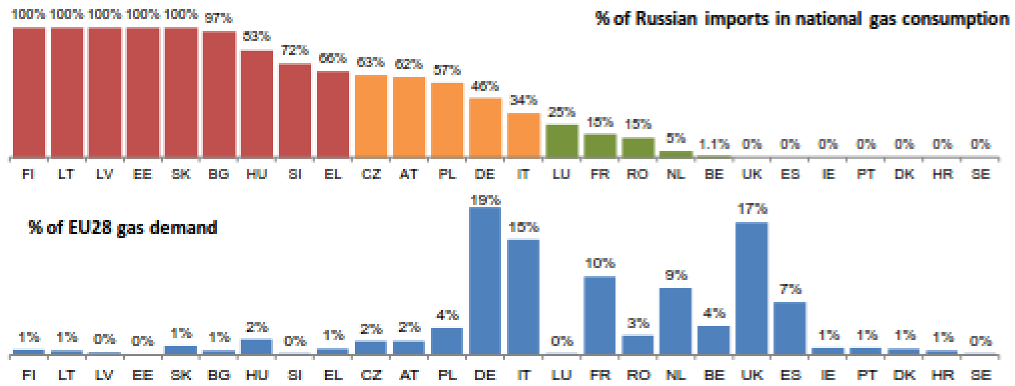
Over a 20-year timeframe, coal-fired power generation has a *lower* carbon footprint than LNG if the upstream methane emissions for the latter are over 1.6% to 1.9% - using latest figures on methane's Global Warming Potential

2. ENERGY SECURITY: HARDLY ANY NEW GAS INFRASTRUCTURE IS NEEDED

1. Countries most vulnerable to potential Russian gas supply disruptions represent less than 10% of EU gas demand

The E3G figure below[13] shows that nine Member States are highly (>66%) dependent on Russian gas and therefore highly vulnerable to related potential supply disruptions. However, it is important to note that together these countries only represent 7% of total EU gas consumption (see Figure 4).

Figure 4. % of Russian imports in national gas consumption and % of EU28 gas demand



Source: Eurostat, Eurogas, E3G. Note: Cyprus and Malta were not included for lack of data.

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[10] Romm Joe (2014), Energy Department Bombshell: LNG Has No Climate Benefit For Decades, if Ever
[11] Romm Joe (2014), By The Time Natural Gas Has A Net Climate Benefit You'll Likely Be Dead And The Climate Ruined
[12] https://ec.europa.eu/energy/sites/ener/files/documents/1_EN_ACT_part1_v10-1.pdf
[13] E3G (2015), Europe's declining gas demand – Trends and facts on European gas consumption

2. Energy Union Choices research: no need for new gas infrastructure in the EU[14]

In 2016 the Energy Union Choices research consortium, which included energy consultants Artelys and Climact, modelled different gas infrastructure strategies against a range of demand scenarios and potential shocks and disruptions. The results are striking:

- **Finding 1. Europe's current gas infrastructure is sufficient to ensure energy security, with the possible exception of South East Europe, where some limited further investment may be needed.**

  A range of demand scenarios and cases of extreme disruption were tested – including an extremely cold year and year-long disruptions to Norwegian, North African and Ukrainian supplies. **Existing EU gas infrastructure was sufficient to ensure physical security of supply in nearly all of these cases**. The exception to this was South East Europe, where steps need to be taken to ensure physical security of supply in the event of a disruption to gas supply via Ukraine.

  The report finds that current pan-European infrastructure can already cope with wide-ranging demand levels and potential supply disruptions. Even if coal were phased out by 2025, the report finds that it would not lead to gas supply issues if conducted in an orderly way.

- **Finding 2. Integrating gas and electricity systems delivers supply security at lower cost**
  A smarter integration of European gas and electricity systems and demand-side management can significantly decrease the need for investment in gas infrastructure. In both the 'high demand' and the 'current trends' scenarios, investment needs are cut in half by utilising the flexibilities of cross-border electricity network to help manage the impacts of a disruption to gas supplies.

- **Finding 3. Demand reduction and energy efficiency in buildings significantly reduces investment needs on the supply side**
  Buildings are one of the biggest sources of demand on the EU's energy system. Implementing demand side measures in line with a 2030 efficiency target will reduce infrastructure investment requirements by up to 74%. An integrated perspective looking at gas, electricity and the efficiency of buildings together has the potential to reduce gas infrastructure investments by 80%.

- **Finding 4. Delivering all the EU's 2030 targets will significantly reduce EU gas imports**
  A low carbon pathway in line with the EU's 2030 climate and energy targets will reduce EU gas imports by 95bcm (-29%) compared to a scenario that fails to meet these targets.

- **Finding 5. By 2050 new gas infrastructure will be a stranded asset**
  Once built, new gas infrastructure has a lifetime of 40 years or more. By 2050, the combined impact of economy-wide efficiency improvements and the trend towards electrification will sharply reduce gas demand in Europe – making new gas infrastructure redundant before the end of its economic life.

  The report suggests that policy makers should put more emphasis on renewable energy sources rather than relying on the existing strategy of building more gas pipelines.

Other analysts have also downplayed the security of supply risks in Europe, particularly with the start-up of new LNG terminals and the Nord Stream 1 pipeline bypassing Ukraine. For Fabio Genoese, research fellow with the Centre for European Policy Studies, "Security of gas supply is mainly an issue for south-eastern Europe today, which is dependent on one supply route. For other regions, security of supply is not such a pressing issue anymore since new infrastructure was deployed" [15].

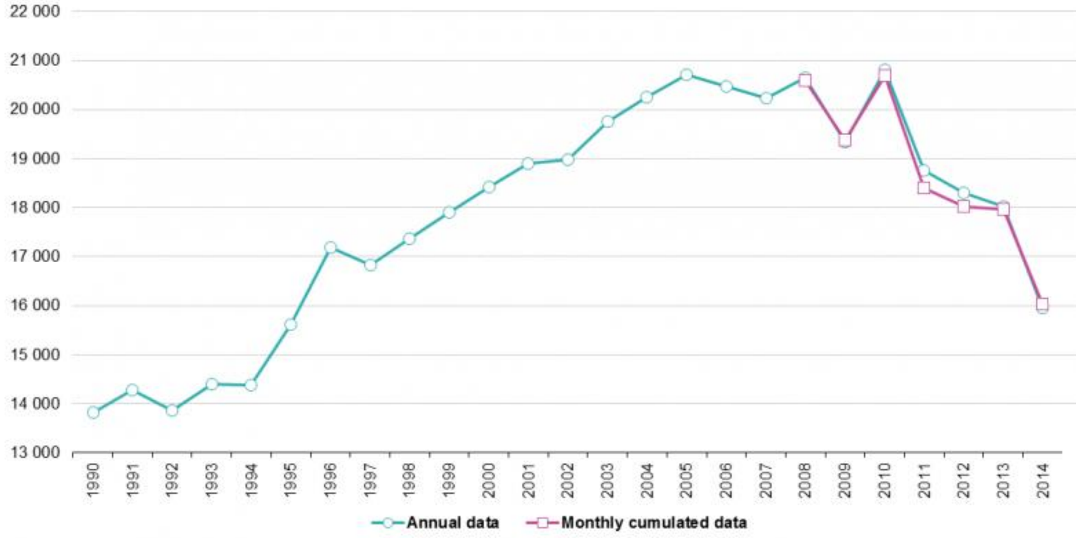
[14] Energy Union Choices (2016), A Perspective on Infrastructure and Energy Security in the Transition
[15] Andreas Walstad, March 2016, Europe overbuilding on gas infrastructure – report

3. THE GAS MARKET: DEMAND IS FALLING

1. EU gas demand is falling

According to Eurostat data, European gas consumption by 2014 has fallen by 23% compared to its peak in 2010 (see Figure 5).

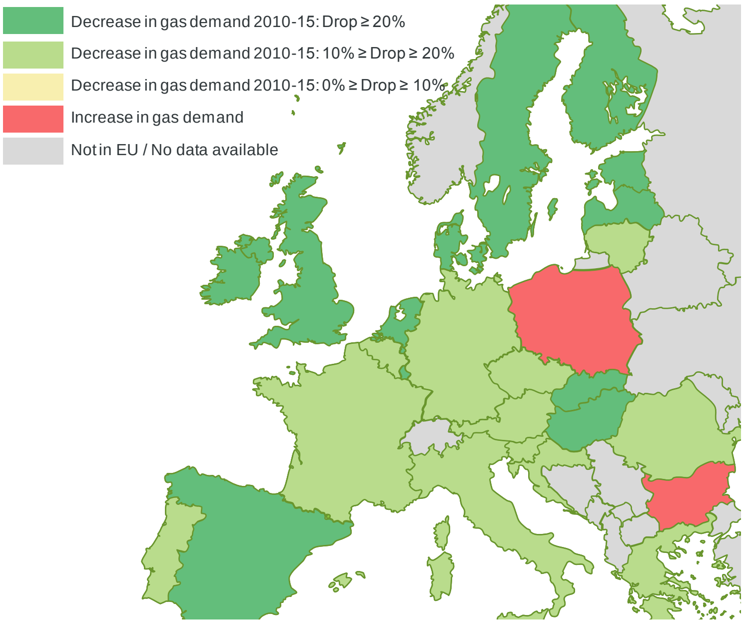
Figure 5. Gross inland consumption of natural gas in EU-28 (thousand terajoules)



Source: Eurostat

This trend was the same in 26 Member States for the period 2010-2013 (see Figure 6), with gas demand only increasing in Poland and Bulgaria.

Figure 6. Change in EU gas demand between 2010 and 2015



2. Three quarters of EU gas demand comes from six Member States with alternative plans

75% of EU gas demand comes from just six western EU countries: Germany, UK, Italy, France, Netherlands, Spain. All of them have strong energy efficiency measures and renewable energy deployment in place, things which are likely to further decrease demand in the future.

Some of these countries are currently so well-supplied with gas that they have become net exporters of gas, despite their domestic production being very marginal or even totally non-existent:

- Spain, with no domestic gas production, is now the second-biggest gas exporter in Europe after Norway, thanks to its LNG infrastructure. In 2014, a majority (60%) of the LNG cargoes shipped to Spain were reloaded.[16]
- Germany is now following this trend. According to the German federal statistics department, "*Germany's natural gas exports [have] experienced a significant increase*" "of almost 35%"[17].

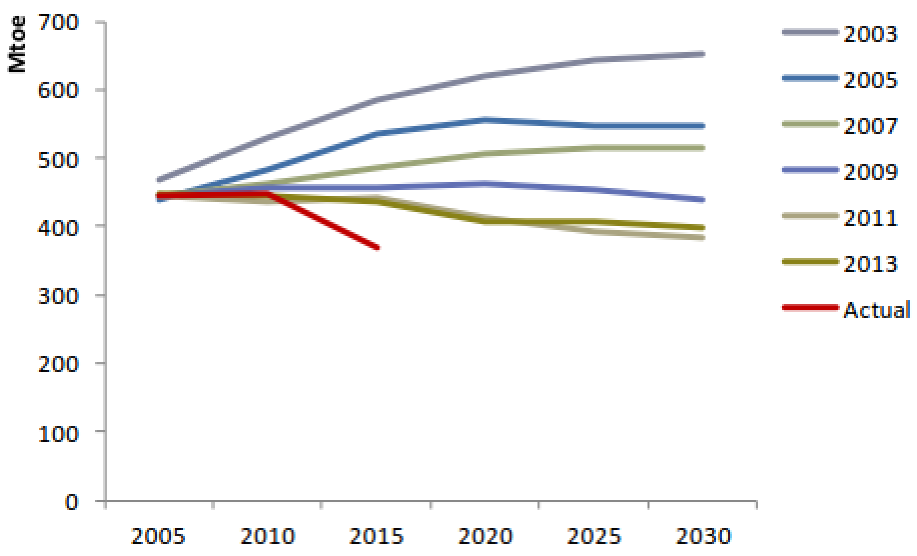
Diversification in these countries already seems to be the norm. Sufficient import and storage capacity is already in place in these countries not just to respond to domestic demand but also to provide capacity to neighbouring countries in a position of stress (for example following a disruption to gas supply or an extremely cold winter).

3. Europe has a long history of overestimating gas demand

Forecasts for EU gas demand have been consistently overestimated in recent years by the European Commission, the European Network of Transmission System Operators (ENTSOG), Eurogas, the International Energy Agency and oil & gas majors.

- **The European Commission**'s Energy Trends reports, using the model called PRIMES, include Europe's flagship official forecasts which feed into EU policy-making. The Commission lowered its gas demand projections every single time it produced a new reference scenario since 2003. Projections of what gas demand will be in 2015 have decreased by 23% over the past 10 years (see Figure 7).

Figure 7. European Commission projections of gas demand and actual consumption



Sources: E3G, European Commission

[16] http://www.kslaw.com/imageserver/KSPublic/practice_areas/energy/LNG-In-Europe.pdf
[17] https://de.statista.com/statistik/daten/studie/168531/umfrage/aufteilung-der-exporte-von-gas-auf-die-nachbarlaender/

This mismatch has been critiqued by the European Court of Auditors, who highlighted the uncertainty it creates for investors[18].

"The Commission has persistently overestimated gas demand ... and needs to restore the credibility of the forecasts it uses" European Court of Auditors, December 2015

- **ENTSO-G**, the European Network of Gas System Operators, is tasked with planning the EU gas infrastructure network through regularly updated "Ten-Year Network Development Plans". In its 2016 edition, it still publishes one scenario out of three in which the EU consumes more and more gas until 2030.
- Similarly, the upper end of the projected range for gas demand produced by industry body **Eurogas** in 2013 is significantly lower than the lower end of the projections they produced for that year in 2010. And even their lowest projection from 2013 is still above current actual demand levels.
- **Three of the largest oil and gas majors also publically release bullish demand forecasts:**
  - Exxon produces forecasts for European gas demand for 2025 and 2040. Both figures were revised down by 9% this year[19];
  - BP's Energy Outlook has revised down their 2015 forecast for gas demand in Europe and Eurasia by 11% in just 2 years;
  - Shell forecasted in 2012 that European gas demand would grow by 10% from 2010 to 2020[20]. By 2013, it had fallen 14% relative to 2010.

Despite this history of overestimation, most current projections still show an increase in gas demand - which is inconsistent with the new market reality of falling gas consumption. Eurogas foresees a 15-50% gas demand increase by 2035 compared to 2014 level (depending on the scenario). **The potential impact of a fall in EU gas demand is not taken into account or assessed, and given their influence on public policy such projections are deeply worrying.** It is not clear how the institutions in question justify their inflated forecasts. Certainly as regards forecasts by private companies it is typically because they take little or no account of the need to meet GHG targets, or assume that EU Member States will fail to meet targets that it has set itself.

4. Gas demand projections do not take account of EU energy and climate targets (which will further reduce demand)

How does gas demand change in scenarios where climate and energy targets are met?

Scenarios that take account of the EU's 2030 climate and energy targets (at least 40% reduction in greenhouse gasemissions, 27% renewable energy and a 27% improvement in energy efficiency) and its 2050 target (an 80-95% reduction in greenhouse gas emissions) show the opposite trend in terms of gas demand from the projections and forecasts described above:

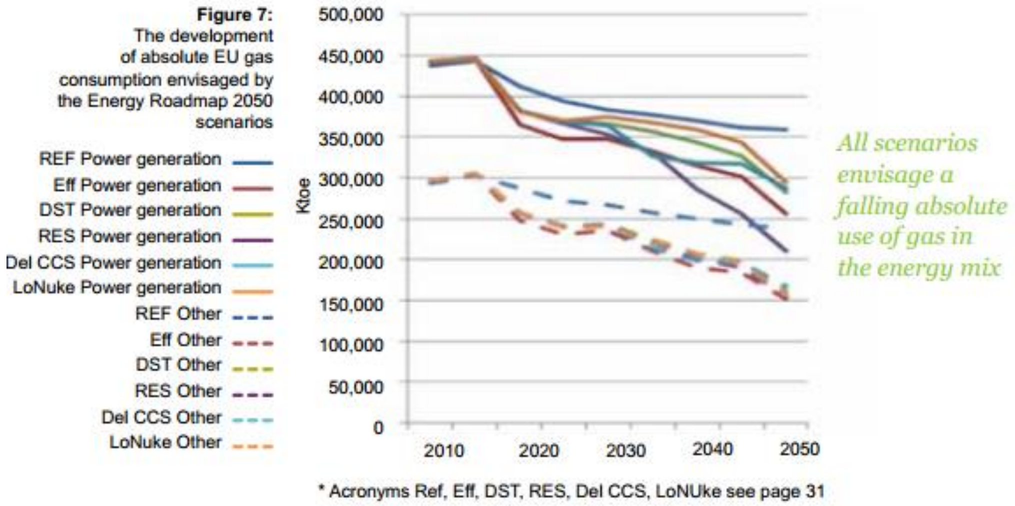
- The *European Commission 'trends to 2050'* scenario is based on the PRIMES model. It meets the lower end of the 80-95% GHG 2050 target but not the intermediate GHG, renewables or efficiency targets. In this scenario EU gas demand is **5- 20% lower in 2030** than in the ENTSOG scenarios;
- The *European Commission EE30* scenario applies a 30% energy efficiency target (referenced as an objective in the October 2014 council conclusions), as well as a 27% renewable energy target and a 40% greenhouse gas target. In this scenario gas demand is **23-35% lower** in 2030 than in the ENTSOG scenarios;

[18] Europea Court of Auditors (2015), Improving the security of energy supply by developing the internal energy market: more efforts needed
[19] http://corporate.exxonmobil.com/en/energy/energy-outlook/download-the-report/download-the-outlook-for-energy-reports
[20] Presentation "Strong Global Gas Demand underpins Shell's strategy", October 2012

- The *IEA 450 scenario* is based on a global energy transition consistent with keeping global warming to a maximum of 2 degrees. Within this scenario gas demand in Europe is **10-24% lower** than the ENTSOG scenarios;
- The *Energy Union Choices (Artelys/Climact)* model finds that in a scenario which meets the EU's 80-95% GHG reduction target, **overall gas consumption in 2050 falls by 72%** compared to 2014 (and gas import needs become negligible);
- In addition, the *Commission's gas security package* – released in February 2016 –included a heating and cooling strategy that foresees lower gas consumption in the sector.

***All* the long-term European Commission 2050 Energy Roadmap scenarios[21] estimate that gas consumption in the EU will decline in absolute terms** (see Figure 8).

Figure 8. 2050 Energy Roadmap scenarios for EU gas consumption



Source: WWF, European Commission, Energy Roadmap 2050

The Commission estimates energy efficiency measures could reduce EU gas imports by 174 Mtoe per year by 2030: that's about 20 times the projected import volumes from the Southern Gas Corridor, the EU's flagship gas infrastructure project.

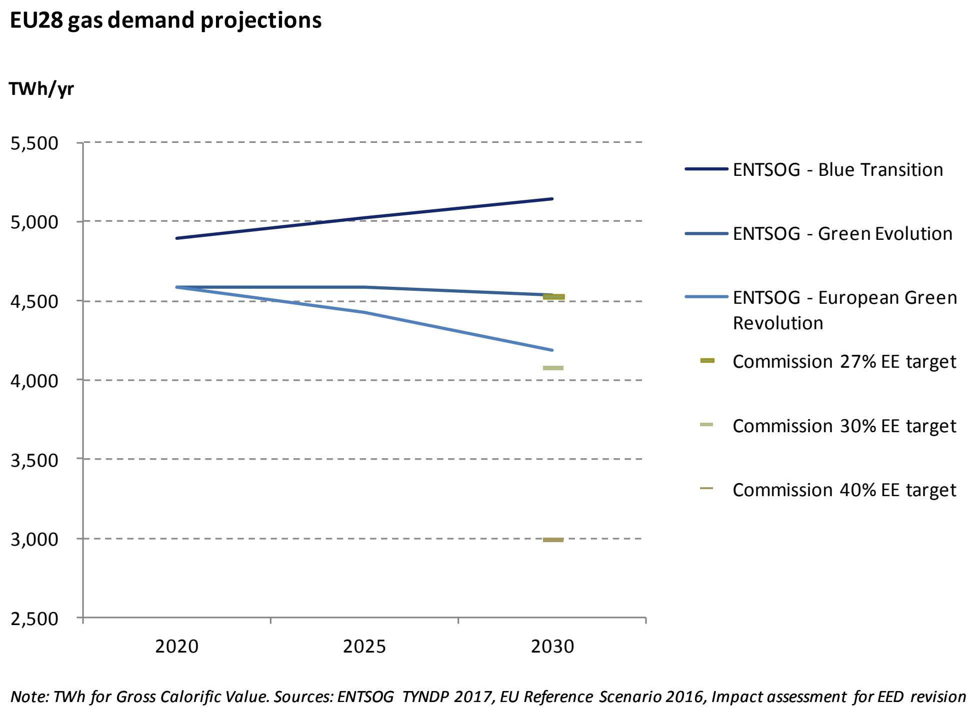
Whether EU targets are met clearly has a major influence on projections of future gas demand. Gas demand falls in scenarios in which EU energy and climate targets are met and flatlines or rises in scenarios where this constraint is not present.

Projections of gas imports follow a similar trend. **However new gas infrastructure is planned solely on the basis of a presumption of rising demand; projects are not tested against scenarios in which energy and climate targets are met.**

The primary EU gas network development plan is not based on meeting EU energy and climate targets. As a result, the gas demand in 2030 assumed for gas infrastructure planning is 30-55% higher than under a scenario in which the proposed 30% energy efficiency target for 2030 is met – creating the risk of policy misalignment (see Figure 9).

[21] European Commission, Energy Roadmap 2050

Figure 9. ENTSOG gas demand forecasts and gas demand under European Commission energy efficiency projections

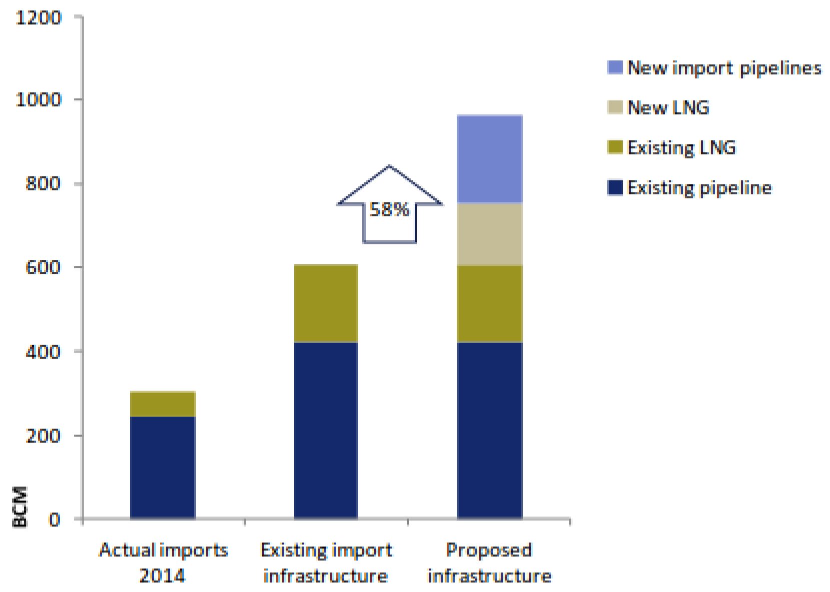


Sources: European Commission (2016 Energy efficiency directive impact assessment), ENTSOG, IEA

4. INVESTMENT PIPELINE: A HUGE AMOUNT OF NEW GAS INFRASTRUCTURE IS UNDER DEVELOPMENT

If current plans materialise, the EU will see a 58% increase in EU gas import capacity (import pipelines and LNG terminal capacity).

Figure 10. EU gas infrastructure projects under development



Sources: E3G, Bruegel, ENTSOG, European Commission)

This new infrastructure has been planned based on an expectation of rising gas demand, but there are serious and growing doubts as to whether this will actually materialise. EU infrastructure planners and institutions have a track record of persistently overestimating gas demand.

Only a small proportion of the current gas infrastructure planned is needed for security of supply, even under extreme disruption scenarios.

The Energy Union Choices research (Artelys/Climact)[22] focused on physical security of gas supply. This is only one of the drivers of new gas infrastructure; other drivers include creating more competition and integrating markets. And while four extreme stress tests were applied, the model did not test all potential sources of disruption. Nevertheless, it is useful to compare the infrastructure projects identified by the modelling as necessary to cope with an interruption to gas supply via the Ukraine and the scale of new investment that are actually planned. Doing so suggests that:

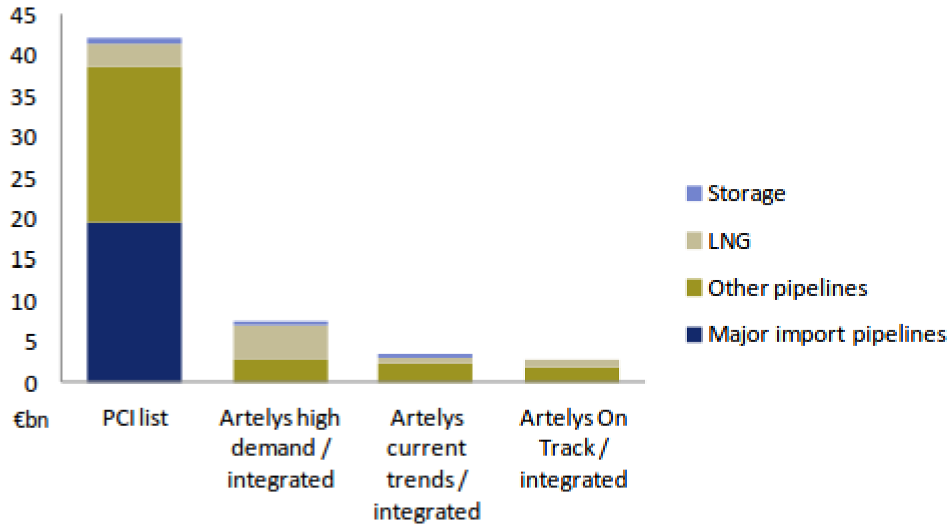
- **None of the gas import megaprojects (e.g. Nord Stream II, Southern Gas Corridor) are necessary** for security of supply under any of the scenarios or supply shocks – despite the considerable political attention these projects attract;
- **5 bcm of new LNG capacity would be sufficient to ensure physical supply security under the scenarios modelled. This compares to 147 bcm planned in the ENTSOG Ten Year Network Development Plan – almost 30 times as much;**
- Only a small proportion of the current planned infrastructure investment in the ENSTOG TYNDP and the PCI list is needed (€2.7 billion of investment is needed in the 'On Track'

[22] Energy Union Choices (2016), A Perspective on Infrastructure and Energy Security in the Transition

scenario in the report, compared to approximately €42 billion required to complete the projects in the PCI list).

The scale of the difference in costs between the scenarios suggests that there could be major benefits in reviewing how EU institutions and others are approaching this issue. It seems likely that investment needs could be lowered significantly through a smarter approach to infrastructure development – or indeed one that were consistent with the EU's own targets.

Figure 11: Cost of gas infrastructure investment in PCI list and Energy Union Choices modelling scenarios (€bn)



Sources: E3G, Artelys, Climact

5. CONSEQUENCES: THE GROWING RISK OF COSTLY, STRANDED GAS ASSETS

1. Many gas projects are already idle

In 2014 the utilisation of import pipeline and LNG terminal capacity stood at only 58% and 32% respectively[23]

While there are a significant number of new **LNG plants** in Europe, the existing ones are already largely idle. According to Thierry Bros, senior gas and LNG analyst at Societe Generale, European LNG deliveries dropped by 24% in 2013, following a 30% fall in 2012[24].

Adding to economic woes is the fact that many import terminals in continental Europe are under take-or-pay contracts that force them to accept LNG deliveries even when demand is absent, or pay stiff fines. **This seriously calls into question the economic rationale for any new LNG investment in Europe.**

Similarl concerns have been raised by the European Federation of Energy Traders[25] (EFET) in regard to **import pipelines**. EFET analysed a case from 2014 in which, according to OAO Gazprom and pipeline operator UkrTransGaz, Russia delivered 50% more gas to Europe via the Nord Stream pipeline (through the Baltic Sea, direct to Germany) than in the previous year, while cutting gas transit to Europe through Ukraine by 40%,. The increase in use of the Nord Stream pipeline resulted in Slovakia's Eustream pipelines being used less and its revenue falling by 11%, raising economic concerns for the Slovak gas system operator.

***"While European gas usage has waned, governments across Europe are still building pipelines whether the market needs them or not"[26]* – Doug Wood, chairman of the European Federation of Energy Traders gas committee**

2. The risk of over-investment in gas infrastructure

Gas demand is very likely to fall further – especially as 2030 EU energy efficiency, renewable energy and climate targets arepursued. This means that much of the planned infrastructure will become redundant before the end of its economic lifetime. This therefore casts **serious doubts on the commercial viability of most of the new gas infrastructure projects currently under development or planned.**

More generally, a proliferation of new transmission pipelines, LNG terminals and intra-EU connections that are surplus to market needs risks leading to stranded assets, and therefore raising energy prices unnecessarily.

The EU is not in a uniqueposition in this regard: similar concerns are growing at global level, concerns that oil and gas assets will become stranded – i.e. uneconomic before the end of their productive lifetime.

[23] Energy Union, Choices
[24] Reuters 20 September 2013, Many European LNG terminals face idling, seek new activities, http://www.reuters.com/article/2013/09/20/energy-lng-europe-idUSL5N0HF3KD20130920
[25] Bloomberg, EU risks stranding gas investments as block builds pipelines, 13 January 2015
[26] Bloomberg, EU risks stranding gas investments as block builds pipelines, 13 January 2015

To estimate the scale of potential stranding, Table 2 below gives estimates of projected capital expenditure over the next 20 years that will potentially be wasted. This amounts to almost $4 trillion in new gas fields and up to $2.6 trillion in gas transportation projects such as pipelines. The potential for gas asset stranding therefore represents amost half (45%) of the global total for stranding of all fossil fuel assets.

Table 2: Potential for global asset stranding: Projected (public and private) capital expenditure on new fields and mines, 2014-2035 (2012 dollars)

	Extraction Projects[55]	Transportation Projects[56]
Oil	$6,270 bn	$990 bn
Gas	$3,990 bn	$2,630 bn
Coal	$380 bn	$300 bn
TOTAL	$10,640 bn	$3,920 bn

Sources: International Energy Agency, Rystad UCube

6. PUBLIC FUNDING: EU GAS INFRASTRUCTURE IS HEAVILY SUPPORTED

Gas infrastructure has been a major recipient of EU public funding over the last decade, receiving several billion Euros in grants and financial instruments from the EU budget, and tens of billions of Euros more in loans from the European Investment Bank (see Table 3).

Table 3. EU public funding for gas infrastructure, 2007 – present

Source	Fund	Amount
European Commission infrastructure funding	Connecting Europe Facility	**€612m** spent on gas infrastructure projects since 2015
	European Energy Programme for Recovery	**€1,363m** spent on gas projects in the EEPR between 2009 and 2013, compared to €905 billion for electricity
	TEN-E (2007-2013)	**€64m** for gas in the last budget period, compared to €81m for electricity
European Structural and Investment Funds	European Fund for Regional Development, European Social Fund, Cohesion Fund	**€977m** spent on gas infrastructure in 2007-2013 budget period. A further **€930m** earmarked for gas infrastructure in current 2014-2020 budget period
European Investment Bank	EIB energy lending and European Fund for Strategic Investment	**€17 billion** in loans to gas projects from 2007-present A further **€2 billion** under consideration to support the TAP pipeline and **€1 billion** to support the TANAP pipeline.

Source: E3G, European Commission

7. POLICY RECOMMENDATIONS: THE EU APPROACH UNDER EFSI 2.0 SHOULD BE EXEMPLARY

1. Phasing out EFSI support for gas

Further public investment in gas infrastructure is unlikely to represent good value for money,given:

- the limited need for new investment for security of supply purposes;
- the limited potential economic lifetime for new infrastructure in a market where demand is falling;
- the failure to test gas investment against scenarios including EU climate and energy targets;
- the EU commitment, dating from 2009, to phasing out fossil fuel subsidies;
- the opportunity cost of not investing scarce EU public funds in other more productive areas, including energy efficiency and renewable energy technologies.

The **Paris Agreement on climate change**[27] is a game changer that should be properly implemented by the EU. Article 2 of that agreement highlights the need to **"make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development"** – in other words, to make financial flows consistent with the 'well below 2°C' climate target.

The EU should send a strong signal that it will properly implement the Paris Agreement. Phasing out funding for gas infrastructure under the EFSI would send such a signal and create a much needed international precedent.

There are better uses of public money than large-scale investment in new gas infrastructure. EFSI funding for new gas infrastructure should be phased out.

2. Energy infrastructure: reprioritising EFSI funding for grids

The Russia-Ukraine crisis which erupted in 2013 has had a disastrous impact on the EU debate on energy networks: it has led to the EU prioritising gas at the expense of electricity infrastructure, which would have been – and is now – a better investment. The need to tackle climate change requires the phasing out of natural gas use, meaning grid infrastructure will become largely redundant. Also, unlike gas pipelines, electricity networks can transmit energy from a variety of different sources.

The EU's long-term energy security will depend on its electricity transmission networks and smart grids, not its gas import pipelines.

Indeed, the Commission forecasts an increase in electricity demand of 14% by 2030 and 28% by 2050, despite EU energy demand as a whole dropping by 30% by 2050.

The deployment of smart grids could save €52 billion per year in the EU by reducing losses from electricity distribution and enabling greater energy efficiency.[28]

The Commission's Impact Assessment on Energy Infrastructure Priorities for 2020 and beyond[29] estimates that a massive €142 bn of investment is needed by 2020 in electricity transmission, offshore grid and smart grid infrastructure - of which **only 32% (€45 bn) is estimated to be business as**

[27] From the United Nations Framework Convention on Climate Change (UNFCCC)
[28] Oracle (2011), The Future of Energy – an independent report for Oracle Utilities.
[29] SEC(2010) 1395 final

usual delivery (not needing public financial support) while 63% (€90 bn) is commercially viable with public financial support. There is therefore a huge business case for the EFSI to significantly support electricity infrastructure projects.

In addition, **the Energy Union Package[30] puts forward a target of 10% interconnection of electricity grids** across Member State borders. Interconnection of electricity grids is a prerequisite for the shift to a largely renewable energy system. Even the 10% target is an objective the Commission itself admits is insufficient in the mid-long run: Europe's energy target of at least 27% share of renewable energy by 2030 "*requires more than 10% interconnection capacity*," the Commission notes in its communication, saying "*all efforts by the EU and member states must be guided by the need to reach at least 15% by 2030*".

Demand response and electricity storage is also increasingly important, to balance the growing renewable output. Financial support should concentrate on near-commercialised projects, which have significant short to medium term potential to help the EU achieve its policy objectives.

General sources

This briefing largely draws on research and analysis in the following reports:

- Energy Union Choices (2016), A Perspective on Infrastructure and Energy Security in the Transition
- E3G, Energy Union Choices (2016), More security, lower costs – A smarter approach to gas infrastructure in Europe
- E3G (2015), Europe's declining gas demand – Trends and facts on European gas consumption
- EEB, Justice and Environment, E3G, Food&Water Europe, FOEE, CounterBalance (2016), Stakeholders reaction on the next steps to elaborate the third list of Projects of Common Interest

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[30] European Commission (2015), Energy Union Package: A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy, COM(2015) 80 final

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EU gas infrastructure and EFSI: time for change

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