Question 1: Do you agree with the assessment for the above regions in terms of infrastructure development challenges and needs to allow potential access for all Member States, in particular the most vulnerable ones, to LNG supplies either directly or through neighbouring countries? Do you have any analysis or view on what an optimal level/share of LNG in a region or Member State would be from a diversification / security of supply perspective? Please answer by Member state / region.

The Commission needs to be aware that gas is part of the broader energy system. No Member State 'needs' LNG as such. It is important to first answer the question where gas (including LNG) will be used in the future. Gas will be used in the next decade(s) in most Member States. However, gas demand for heating is likely to decrease substantially over the next decades, as the energy efficiency of the EU's new and renovated housing stock improves over time. In addition, major uncertainties loom over the amount of gas that will be used in the sector of power generation, as gas might get squeezed out by e.g. more renewables, demand management solutions to intermittent renewables, energy storage in e.g. batteries, etc. Replacing gas as a feedstock for the petrochemical industry will be a bigger challenge and demand may be harder to reduce in the coming decades.

Given that gas is used for a wide range of purposes, it is important that the term 'vulnerability' is properly understood. In case of a gas supply disruption, cutting gas consumption by delaying some operations may be an option for some large industrial users, who use gas as a feedstock. But protected customers such as households – in particular their heating needs during winter and especially during a cold spell – are much more vulnerable to supply disruptions. For Food & Water Europe, it is clear that **the concerns about the EU energy security and reliance on Russia as a dominant gas supplier are really about a potential heating crisis**. Only to a lesser extent is there a potential crisis over how 'to keep the lights on' in the power generation sector, where there are more opportunities for e.g. fuel switching from gas to other fuels or electricity imports in the EU's internal electricity market in case of an interruption.

In our view, defining an 'optimal level / share of LNG' in a region or Member State' is impossible, until we have a clearer view of the sectors where gas is being used and especially the heating sector in different Member States (see Annex I). For example,

countries where district heating makes up a large share of the heating market (e.g. Finland and Lithuania), there may be opportunities for fuel switching from natural gas to other fuels and – in line with the EU's long-term decarbonisation targets – renewables. In countries like Hungary with a heavy reliance on individual gas boilers for heating, investments in energy efficiency will be crucial.

Until the EU has a clearer view on its level of ambition in terms of energy efficiency, in particular for the building sector, and the potential to decarbonize the heating sector, away from fossil fuels including natural gas, stating that e.g. Poland's optimal level of LNG is 25% will be meaningless. The Commission's Roadmap for its 'EU strategy for Heating and Cooling' admits as much[1]:

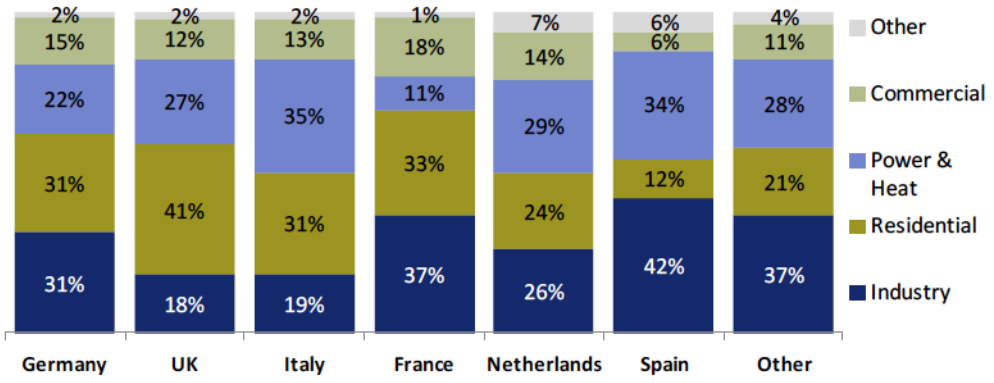
> *There is an insufficient understanding of the heating and cooling sector, as it has so far not been subject to a dedicated EU level assessment treating the sector as a whole. The energy saving potential of heating and cooling and the possible policies to mobilise the sector's contribution to the EU's energy and climate objectives has not been sufficiently assessed, nor is it harnessed. […] Uncertainties remain as regards the role of heating and cooling in meeting the 2030 targets and its interaction with other sectors and other parts of the EU energy system. Current EU policy instruments only partially address the heating and cooling sector. Due to these gaps, policy tools and capacities are not sufficiently developed to drive the transformation of the sector, to maximise the use of potentials and deploy solutions for demand reduction and decarbonisation at the required scale and pace.*

[1] http://ec.europa.eu/smart-regulation/roadmaps/docs/2015_ener_026_heating_cooling_strategy_en.pdf

Question 2: Do you have any analysis (cost/benefit) that helps identify the most cost-efficient options for demand reduction or infrastructure development and use, either through better interconnections to existing LNG terminals and/or new LNG infrastructure for the most vulnerable Member States? What, in your view, are reasons, circumstances to (dis)favour new LNG investments in new locations as opposed to pipeline investments to connect existing LNG terminals to those new markets?

About 80% of EU gas demand comes from just 7 EU Member States, all of which are located in Western Europe: Germany, UK, Italy, France, Netherlands, Spain and Belgium. Most of these EU Member States have been and will continue to pursue strong efficiency policies for their new and to be renovated building stock. In all of these Member States, natural gas plays a key role in the residential heating sector, varying between 30% and 80%. The share of the residential heating in their overall gas demand in these Member States varies between 12% and 41%.[2]

Figure 7: Gas demand per sector for largest European gas consumers, for 2013



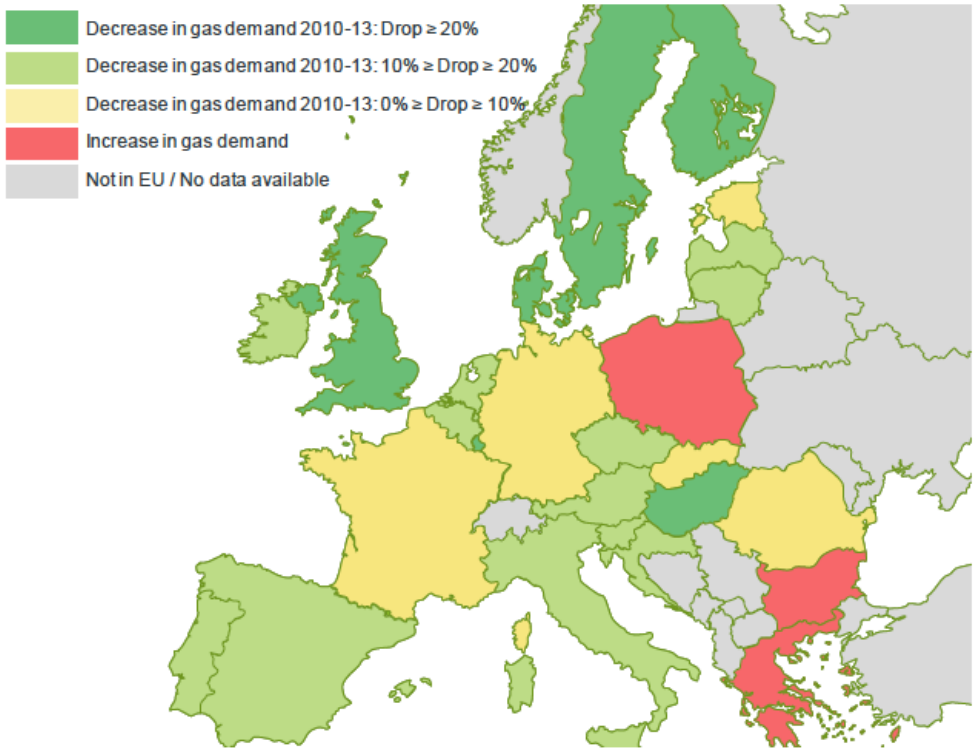
Western Europe's current large 'appetite' for natural gas in residential heating in combination with future investment in energy efficiency policies in the building sector means that current gas demand will significantly shrink in the coming decades in Western Europe, i.e. the 8 Member States that account for 80% of EU gas demand.

These same 8 Western European Member States all have well-diversified gas supplies to meet their big demand. Their sources include pipeline gas from Norway, Algeria and Russia, but also indigenous gas production and LNG imports from Qatar and other

[2] http://www.e3g.org/news/media-room/europes-declining-gas-demand

sources. For example, Italy sources its gas from no less than 5 suppliers on top of its indigenous production.[3] In addition, these 8 EU Member States also account for more than 50% of total gas storage capacity in the EU.[4] Demand in all of these 8 Member States has been precipitously dropping in recent years, wit demand dropping more than 20% in e.g. the UK. See the E3G overview below[5]:

Figure 3: Evolution of gas demand between 2010 and 2013 across the EU



Source: Eurostat, E3G. Note: Missing data for Cyprus and Malta.

Given past and foreseeable future drops in well-diversified gas demand of Western Europe, **Food & Water Europe firmly believes that the key challenge will be to redirect oversized gas import AND storage capacities in Western Europe to Member States in Eastern Europe**.

All gas demand scenarios until 2035 – which comply with EU environmental objectives (such as the IEA's 450 scenario and all PRIMES scenarios, except the reference

[3] http://www.eurogas.org/uploads/media/Eurogas_Statistical_Report_2014.pdf
[4] http://www.cedigaz.org/documents/2015/Gas%20Storage%20in%20Europe,%20recent.pdf
[5] http://www.e3g.org/news/media-room/europes-declining-gas-demand

scenario) – foresee a declining EU gas demand. By 2035, gas demand will somewhere between 320bcm/y and ± 400 bcm/y, if the EU keeps up its investments in energy efficiency and renewables.

Hence, it is unlikely that gas demand in the EU will ever move again above 500 bcm/y. Yet, today's total combined capacity of natural gas production, transport and storage infrastructure in the EU already stands at 683 Bcm/year:

- Pipelines: 397 Bcm/y
- Regasification capacity of LNG terminals: 196 Bcm/y
- Gas storage: 90 bcm/y
- Plus about 158 Bcm/y of domestic production of conventional gas

Compared to demand over the last years, it should be clear that the EU's current gas infrastructure in combination with domestic gas production far outstrips demand. The low level of utilization rates of the EU's LNG terminals (just above 20% since 2011) is indicative of this current over-supply.

Food & Water Europe is not aware of any cost-benefit analyses that specifically address the question whether better gas interconnections offer more value for money than building new LNG import terminals. Nevertheless, recent changes in e.g. the Baltic region – the potential Balticconector between Estonia and Finland, the Świnoujście LNG import terminal in Poland, better future connections between Lithuania and Latvia's Incukalns Underground Gas Storage Facility (capacity of 2.32 billion m³ of natural gas or 140% of annual Latvian consumption) – already address most of the energy security concerns in the region. Given these recent developments, promoting greater investments in LNG and gas storage in Northern Europe is in our view problematic, given likely further drops in demand and new supplies and infrastructure alleviating concerns about dependency on Russian imports.

Question 4: What in your view explains the low use rates in some regions? Given uncertainties over future gas demand, how would you assess the risk of stranded assets and lock-in effects (and the risk of diverting investments from low carbon technologies such as renewables and delaying a true change in energy systems) and weigh those against risks to gas security and resilience? What options exist in your view to reduce and/or address the risk of stranded assets?

During a recent gas industry event, Christopher Delbruck, CEO of E.ON Global Commodities, stated the following[6]:

> *We're long on everything -- we're long gas, we're long storage, we're long flexibility, we have too much of everything.*

This quote from an industry insider makes clear that the risk of stranded assets is very high and that security of supply concerns – except for some specific Member States in Eastern Europe whose populations rely heavily on Russian gas imports via Ukraine for their heating needs – are largely overstated. Both in the heating sector and the power sector, demand for gas is likely to decline between now and 2030 and beyond.

If the EU sets and meets (more) ambitious energy efficiency targets for buildings and prioritizes a decarbonisation of its heating sector, demand for gas for heating within the EU will decline further (see also answer to question 1). While it is not controversial to state that gas use is likely to decline for heating (or at least not grow), we believe that EU gas demand in the power sector (25% of total) might also decline. While natural gas has often been touted as a 'transition fuel', this does not mean that large volumes of gas will be needed for gas-fired power plants to accommodate an increasing share of renewables in a smarter and more connected grid system. Conventional thermal generation using gas will no longer be used to deliver base load electricity, but rather play a back-up role for renewables. Scenarios with a high share of RES and a more decentralized power system show that "most of the (incremental) capacity from thermal power plants is built to ensure reliability but not to deliver energy".[7] For example, the 2014 report on "Renewable Energy Integration in Europe", ordered by the European

[6] http://www.platts.com/latest-news/natural-gas/europe,%20emea/european-gas-supply-no-longer-a-risk-demand-is-26211997

[7] https://ec.europa.eu/energy/sites/ener/files/documents/201406_report_renewables_integration_europe.pdf

Commission, contains a 'high RES-E' scenario (1b) and a 'high RES-E' scenario with a high share of decentralized power generation (1b-DG) shows that the amount of natural gas generation in the EU's power generation actually decreases by 2030 (p. 82).[8]

2025	1b	1b-DG	1	1-DG	1a	1a-DG
Nuclear	844	844	844	843	844	843
Coal conv.	539	510	514	558	479	510
Gas conv.	356	290	537	433	615	547
Oil	5	4	8	7	7	7
Back up	2	2	5	3	3	3
Hydro	367	367	367	367	369	369
Biomass	323	323	330	330	330	330
Wind (on)	425	425	477	477	512	512
Wind (off)	286	216	307	216	346	216
Solar	118	263	123	280	146	308
Other RES-E	14	14	16	16	19	19
Total	**3,278**	**3,256**	**3,529**	**3,531**	**3,670**	**3,664**

2030	1b	1b-DG	1	1-DG	1a	1a-DG
Nuclear	713	713	713	713	713	713
Coal conv.	349	329	322	361	289	313
Gas conv.	209	196	332	279	377	335
Oil	6	9	8	10	7	9
Back up	9	9	13	15	14	16
Hydro	374	374	375	375	378	378
Biomass	334	334	333	333	355	355
Wind (on)	635	635	674	674	746	746
Wind (off)	480	286	524	307	595	346
Solar	224	417	256	473	318	567
Other RES-E	28	28	31	31	39	39
Total	**3,361**	**3,330**	**3,581**	**3,570**	**3,830**	**3,817**

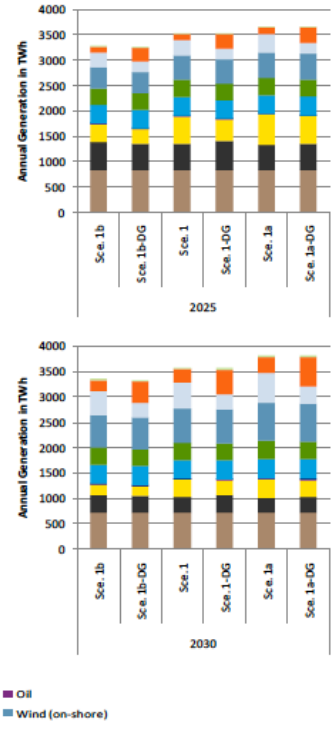


Figure 87 EU-28 electricity generation in the variations of scenario 1 (1, 1a, 1b) in the years 2025 and 2030 (EU-28, in TWh)

The amount of power, generated with natural gas, in a 'high RES-E' scenario depends largely on whether not investments are made in energy efficiency. A 'high RES-E' scenario with high demand requires about 377 TWh of gas-fired power plants in 2030, whereas a 'high RES-E' scenario with accompanying efficiency measures can decrease this role of natural gas power generation by almost 50% in 2030, i.e. to 196 TWh!

While natural gas has some medium-term role to play in a power sector with a rapidly growing share of renewables over the next 15 years, consumption of natural gas would rise by only relatively small amounts, even despite a declining role for coal and nuclear.[9] As Food & Water Europe, we conclude that **the role of natural gas as a balancing fuel will not require large volumes of gas.** Natural gas is only one of the many options to

[8] idem
[9] http://www.iddri.org/Publications/The-EU-s-2030-Climate-and-Energy-Framework-and-Energy-Security

deal with intermittent renewables, which limits the likelihood that gas demand will grow in the power sector.

Question 5: The Energy Union commits the EU to meeting ambitious targets on greenhouse gas emissions, renewable energy and energy efficiency, and also to reducing its dependency on imported fossil fuels and hence exposure to price spikes. Moderating energy demand and fuel-switching to low carbon sources such as renewables, particularly in the heating and cooling sector, can be highly cost-effective solutions to such challenges, and ones that Member States will wish to consider carefully alongside decisions on LNG infrastructure. In this context, do you have any evidence on the most cost-efficient balance between these different options in different areas, including over the long term (i.e. up to 2050)?

Any potential investment in additional LNG needs to be checked against gas demand scenarios, which incorporate the EU's climate targets and in particular the EU's long-term 2050 to completely decarbonize its economy. Food & Water Europe believes that EU's Heating and Cooling Strategy offers a more appropriate framework to better determine the most cost-efficient balance between LNG, efficiency investments and renewables, especially for heating purposes. The EU needs a more fine-grained analysis of the EU's heating sector in terms the energy demand in heating (for different heat devices, broken down by end-user, source, and technology), the building stock (apartment or house, age, location / heating degree days, ownership structure) and an assessment of the costs of different technologies (e.g. gas boilers vs. renewable heat) and resources (solar, geothermal, sustainable biomass). This information needs to be available to make informed decision about the cost-optimal mix between promoting more efficiency, renewable heating and additional LNG supplies

Regarding the cost of LNG, Food & Water Europe wants to emphasize that **LNG terminals carry a considerable price tag and their construction is plagued by delays and cost overruns**. For example, the cost of Świnoujście LNG import terminal in Poland with capacity of 5 bcm/a (possibly 7.5 bcm/y) cost around EUR 700 million –

1billion[10], which corresponds to respectively 30 to 50% of Polish gas demand. Lithuania's floating LNG terminal offers a capacity of 4 bcm/y, even though Lithuania's gas demand is around 2.5 bcm/y. In response to Lithuania's new LNG option, Gazprom dropped its gas price. While this is good news, it also leads to a situation where the Klaipėda terminal now operates at about one eighth of its 4 billion cubic meters per year technical regasification capacity. In order to pay back the construction costs of the Klaipėda terminal. The country has levied a surcharge on all gas sold in its market to pay the costs of the LNG terminal, initially estimated at 920 million euros during 55 years of operation."[11] **The high cost of LNG also necessitates high levels of support from public authorities, be it direct financial support for LNG projects, state aid and / or consumption subsidies.** For example, in Lithuania's case, €448m of state aid was approved to improve the economics of an oversized LNG terminal. In Poland, the European Commission has contributed €80m directly to Swinoujscie and has also approved €465m of state aid to nationwide gas infrastructure that will link into the new terminal.[12] Recent work by the IMF on the level of fossil fuel subsidies across the world, including in the EU, must be incorporated in this analysis. According to the IMF data, natural gas received about US $ 65 billion in 2013 in EU Member States.[13]

[10] http://www.bloomberg.com/news/articles/2014-08-05/poland-to-get-lng-terminal-on-time-as-costs-discussed-pbg-says
[11] http://af.reuters.com/article/energyOilNews/idAFL5N10F1BR20150804
[12] http://www.ft.com/cms/s/0/67308bb8-97f2-11e3-8c0e-00144feab7de.html#ixzz3nG5R0IZw
[13] http://www.imf.org/external/pubs/ft/survey/so/2015/NEW070215A.htm

Question 6: What in your view are the most critical regulatory barriers by Member State to the optimal use of and access to LNG, and what policy options do you see to overcome those barriers? Have you encountered or are you aware of any problems in accessing existing LNG terminal infrastructure, either because of regulatory provisions or as a result of company behaviour? Please describe in detail.

Question 7: What do you think are the most critical commercial, including territorial restrictions and financial barriers at national and regional level to the optimal use and access to LNG?

Question 8: More specifically, do you consider that ongoing EU policy initiatives and/or existing legislation can adequately tackle the outstanding issues, or there is more the EU should do?

The way questions 6, 7 and 8 are phrased implies that barriers for LNG infrastructure should be tackled. We believe that LNG terminal infrastructure and natural gas more generally already benefits from considerable financial support. See also our answer to question 5.

Question 9: How do you see worldwide LNG markets evolving over the next decade and what effects do you expect this to have on EU gas markets? Do you expect a shift away from oil-indexed LNG contracts, and if so under what conditions?

Food & Water Europe is skeptical about the Commission's assessment in the consultation document that the international LNG market will "show significant growth over the short to medium term", highlighting LNG exports from the US as being "of particular importance". **The Commission is overly optimistic about more liquid LNG markets in the near future, neglecting some key features of LNG**:

- Building LNG plants are extremely complex projects, meaning that they take a long time to develop (5 years at least).
- LNG plants are very expensive, often plagued by cost overruns, and price-sensitive due to very small margins.
- A 2013 E&Y report on global LNG concludes that these markets are not liquid: "High LNG development costs will require long-term ironclad take-off agreements".[14]

Shell's director of projects and technology, Matthias Bichsel, stated in June 2014 that "[t]here is always so much talk about these big LNG projects around the world, but only a small fraction of them will get built". This expert was especially doubtful about LNG exports from East Africa, which are unlikely to be delivered before 2020 as all infrastructure in e.g. Mozambique has to be built from scratch.[15]

Given that the US still imports about 10% of its natural gas demand – mainly from Canada -, the attention given to the possibility of massive LNG exports from the US is puzzling. Asked if Cheniere's Sabine Pass liquefaction facility in Louisiana, to be operational by late 2015/2016, could ease European import dependency for gas, its CEO Charif Souki stated:

> *It's flattering to be talked about like this, but it's all nonsense. It's so much*

14 http://www.ey.com/Publication/vwLUAssets/Global_LNG_New_pricing_ahead/$FILE/Global_LNG_New_pricing_ahead_DW0240.pdf

15 http://uk.reuters.com/article/2014/06/09/energy-lng-shell-idUKL5N0OQ1TB20140609#

nonsense that I can't believe anybody really believes it.[16]

While the rhetoric about a newfound abundance of natural gas in the US may give a different impression, the fact is that natural gas production from the major shale plays (Barnett and Haynesville) in the US already peaked in August 2012. Of all the major shale plays in the US, the Marcellus is the only shale play that has continued to show rapid growth, which has been able to compensate for declines elsewhere.[17] Even though prices have risen since their low point in 2008, gas-directed drilling is at its lowest level in the last 20 years. US gas prices will have to increase significantly to encourage more drilling for gas.[18] The US boom in shale gas production is under threat from low hub prices and the crippling debt incurred by most shale gas producers at a time when rising demand for natural gas in the US (coal power generation retirements and added industrial demand) will put upward pressure on US gas prices. This CEDIGAZ report concludes that "[t]his would penalize the export of U.S. LNG, whose prices are indexed to Henry Hub prices, compared to competing sources whose prices are usually indexed to the oil price".[19]

16 http://www.ft.com/intl/cms/s/0/96f9e220-c0cb-11e3-bd6b-00144feabdc0.html?siteedition=intl#axzz2ysYEqW4d

17 http://shalebubble.org/drill-baby-drill/

18 http://gis.bakerhughesdirect.com/Reports/YeartoYearComparisonForProduct.aspx

19 http://www.cedigaz.org/products/Cedigaz%20Insights/u-s-natural-gas-update-and-outlook.aspx

Question 12: Do you think there are any sustainability issues specific to LNG that should be explored as part of this strategy? What would be the environmental costs and benefits of alternative solutions to LNG? Please provide evidence in support your views.

Food & Water Europe deplores that the Commission has decided to sidestep the KEY issue of "the sustainability of natural gas relative to other sources of energy", in particular from a climate perspective. LNG is natural gas. Therefore, the same climate concerns exist regarding LNG, pipeline gas as well as domestically produced (shale) gas. Before embarking on a greater reliance on natural gas, instead of relying on 'no-regret options' such as energy efficiency and renewables, the European Commission needs to develop a better understanding of the carbon footprint of the complete natural gas lifecycle and its fugitive methane emissions, based on empirical evidence, not estimates.

The carbon footprint of natural gas remains an issue of intense scientific discussion. A study published in April 2012 in the *Proceedings of the National Academy of Sciences* finds that shifting from coal-fired to natural gas-fired electricity generation is only beneficial, as far as mitigating climate change, if the cumulative leakage rate of natural gas – including leakage during the production, processing, and transmission (but not distribution) stages -- is less than 3.2%. Roughly speaking, burning natural gas instead of coal to generate electricity cuts carbon dioxide emissions in half, taking into account the respective efficiencies of new coal- and gas-powered generation facilities in the U.S. What the authors calculated is that the climate impact of leaked natural gas (and thus methane), if beyond 3.2% of total natural gas production, actually negates the cut in carbon dioxide emissions from such fuel switching. This is looking at the potential climate benefit at all timescales of fuel switching. Because methane breaks down in the atmosphere more quickly than carbon dioxide, the so-called Global Warming Impact (a measure of cumulative radiative forcing from a pulse of methane, relative to the radiative forcing of an equivalent mass of carbon dioxide) decreases as the timescale on which the impact is measured is increased.

The discussion about the carbon footprint of natural gas should be seen in the context of the broader debate about the Global Warming Potential (GWP) of different greenhouse gases and the GWP value of methane in particular. Many studies compare the carbon

footprint of natural gas to other fossil fuels on the basis of methane having a 100-year GWP of 25. Given the urgency of climate change and the potentially short window of opportunity to curb emissions and avoid dangerous tipping points[20], the 20 year timeframe is equally if not more deserving of the focus of policy-makers. The IPCC consensus is that, on the 20-year timeframe, a pulse of methane is 72 times more powerful at increasing the retention of heat in the atmosphere than a mass-equivalent pulse of CO2. A 2012 peer-reviewed article by Drew Shindell of NASA and others suggests that the GWP over 20 years could be as high as 105, if the interactions between methane and aerosols are taken into account.[21]

Addressing methane emissions is indispensable to achieving the 2 degrees climate target:

> *Shindell et al. (2012) noted that the climate system is more immediately responsive to changes in methane (and black carbon) emissions than carbon dioxide emissions (Fig. 1). They predicted that unless emissions of methane and black carbon are reduced immediately, the Earth will warm to 1.5° C by 2030 and to 2.0° C by 2045 to 2050 whether or not carbon dioxide emissions are reduced. Reducing methane and black carbon emissions, even if carbon dioxide is not controlled, would significantly slow the rate of global warming and postpone reaching the 1.5° C and 2.0° C marks by 12 to 15 years.*[22]

As this scientific debate progresses, Food & Water Europe urges the European Commission and Member States to incorporate the latest peer-reviewed science about the GWP of methane in their analyses. Given the considerable uncertainty about the carbon footprint of natural gas, including both the 20-year and 100-year timeframes in all of its studies on the climatic benefits from coal-to-gas switching would be a good start.

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[20] Lenton, T.M. et al. (2012, February) "Tipping elements in the Earth's climate system." *Proceedings of the National Academy of Sciences*. Vol. 105 (6).

21 Shindell, D., Faluvegi, G., Koch, D., Schmidt, G., Unger, N. and Bauer, S. (2009, October) Improved Attribution of Climate Forcing to Emissions, *Science*: 326 (5953), 716-718, available at http://www.sciencemag.org/content/326/5953/716.figures-only

[22] Howarth, R. W., D. Shindell, R. Santoro, A. Ingraffea, N. Phillips, and A. Townsend-Small. 2012. Methane emissions from natural gas systems. Background paper prepared for the National Climate Assessment, Reference # 2011-003, Office of Science & Technology Policy Assessment, Washington, D.C. http://www.eeb.cornell.edu/howarth/Howarth%20et%20al.%20--%20National%20Climate%20Assessment.pdf

Annex I:

Member State	Level of exposure to Russian imports[23]	Share of gas in heating[24]
Estonia	100%	~ 10% from individual gas boilers 70% of heating from district heating, fueled by 50% gas[25]
Latvia	15%	~ 15% from individual gas boilers 45% of heating from district heating, fueled by 70% gas[26]
Lithuania	59%	~ 15% from individual gas boilers 55% of heating from district heating, fueled by ~ 80% gas[27]
Finland	100%	~ 50% of heating from district heating. In Finnish district heating, fuels include "natural gas, coal, peat, and increasingly wood and other renewable energy sources, such as biogas" and relies heavily on CHP.[28]
Bulgaria	100%	Less than 10% from individual gas boilers 30% of heating from district heating, fueled by 40% gas[29]
Greece	18%	~ 10% from individual gas boilers
Romania	31%	~ 40% from individual gas boilers
Hungary	35%	~ 70% from individual gas boilers ~ 15% of heating from district heating, fueled by ~ 80% gas[30]
Croatia	12%	~ 40% from individual gas boilers ~ 15% of heating from district heating, fueled by ~ 60% gas[31]

[23] https://ec.europa.eu/energy/sites/ener/files/documents/2014_stresstests_com_annex_en_0.pdf 'Exposure' is defined as follows "Missing gas volumes per affected country over 6-months period in Russian supply cut and cold spell scenario (total shortfall in mcm and largest relative monthly shortfall in %)

[24] Unless indicated otherwise, figures taken from https://ec.europa.eu/energy/sites/ener/files/documents/2014_stresstests_com_annex_en_0.pdf

[25] http://www.oecd.org/site/tadffss/EST.pdf

[26] KPMG (2009) Central and Eastern European District Heating Outlook, retrieved from https://goo.gl/9fScPa

[27] KPMG (2009) Central and Eastern European District Heating Outlook, retrieved from https://goo.gl/9fScPa

[28] http://energia.fi/en/home-and-heating/district-heating

[29] http://dbdh.dk/download/member_contries/bulgaria/BULGARIA.pdf

[30] KPMG (2009) Central and Eastern European District Heating Outlook, retrieved from https://goo.gl/9fScPa

[31] KPMG (2009) Central and Eastern European District Heating Outlook, retrieved from https://goo.gl/9fScPa