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OUTLOOK FOR EU GAS DEMAND AND IMPORT NEEDS TO 2025

BY IULIA PISCA

CIEP PERSPECTIVES ON EU GAS MARKET FUNDAMENTALS

CIEP PAPER 2016 | 2A

This paper is part of the series 'CIEP Perspectives on EU Gas Market Fundamentals'. This is the result of a comprehensive research project conducted in 2016 with a view to anticipate possible developments in gas supply and demand in the EU in the run-up to 2025 and discuss the sustainability of the EU's diversification efforts.

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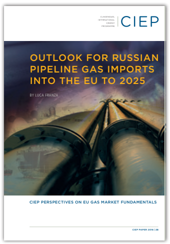

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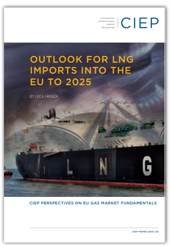

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OUTLOOK FOR EU GAS DEMAND AND IMPORT NEEDS TO 2025

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CIEP PERSPECTIVES ON EU GAS MARKET FUNDAMENTALS

1 EXECUTIVE SUMMARY

The rapid decline in gas consumption in recent years has impacted the position of gas across sectors. The EU decarbonisation framework has been the main driver behind the changes and will continue to be so in future. At the core of the uncertainty driving the gas demand projections by analysts and stakeholders are: varying expectations and assumptions regarding the extent of the policy commitment to further pursue this agenda in changing market conditions, as well as the direction, timing, effectiveness and impact of these measures. As a result, these projections show a wide range of scenario expectations, extending from nose-diving to surging gas demand levels.

Based on these projections, future import levels, while affected by the same range of uncertainty, are expected to have less downswing and more upswing, as indigenous gas production prospects are declining. In 2015, EU net gas import needs were 194 Bcm. In the lowest of demand projections import needs could be slightly lower (by some 10 Bcm) in 2020, but would then be some 20 Bcm higher than 2015 levels by 2025. As such, EU gas imports will continue to play a significant role in the future EU gas market. However, the uncertainty surrounding the level of future demand for imports is likely to hamper any major investments in new external supplies to the EU.

2 INTRODUCTION

Europe is the world's largest gas importing market. In the European market, imports depend on gas demand and production levels, with gas demand posing the largest uncertainty in the current market context. This paper aims to analyse the EU gas demand outlook and the resulting import needs between now and 2025.

The analysis looks at the EU in its entirety. While we do not see any indication of a significant shift in the balance and/or market structure between individual member states, this information is not included in the scenarios we collected, most of which provide overviews of gas demand for the EU as a whole.

The analysis in this paper was made before the UK referendum on its membership of the EU (Brexit). Both its evaluations and data are based on the current EU. Brexit would create a smaller EU. However, the main observations and conclusions of this paper will not be any different: the run-up to Brexit only contributes more uncertainty in the EU gas market.

This paper forms part of a set of papers which, combined, aim to offer insight into the prospects for the diversification of future gas supplies to the EU.[1,2,3,4]

1 Franza, L., 'Outlook for Gas Imports From New Suppliers Into The EU to 2025 – CIEP Perspectives On EU Gas Market Fundamentals', CIEP, 2016
2 Franza, L., 'Outlook for Russian Pipeline Gas Imports Into The EU to 2025 – CIEP Perspectives On EU Gas Market Fundamentals', CIEP, 2016
3 Franza, L., 'Outlook for LNG Imports Into The EU to 2025 – CIEP Perspectives On EU Gas Market Fundamentals', CIEP, 2016
4 'Prospects for Sustainable Diversification of EU's Gas Supply', CIEP, 2016

3 EU GAS CONSUMPTION DECLINE

Although it has the best environmental credentials among fossil fuels and hence could make a significant contribution to a viable decarbonisation path for the European Union's energy mix, natural gas has not been used to its full potential in recent years. The economic and financial crisis, the impact of policy measures around energy efficiency and renewable energy, and competition with coal, have all contributed to shrinking gas consumption.

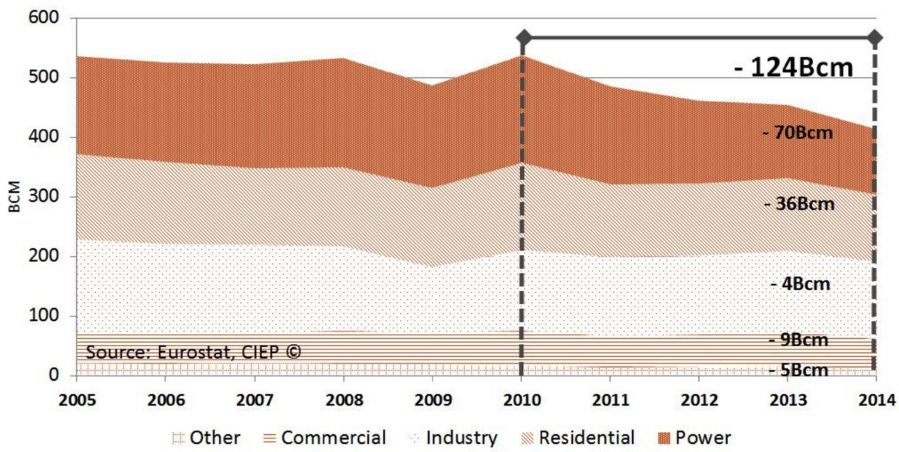

FIGURE 1 – EU-28 NATURAL GAS CONSUMPTION 2005-2014. SOURCE: EUROSTAT, CIEP©.

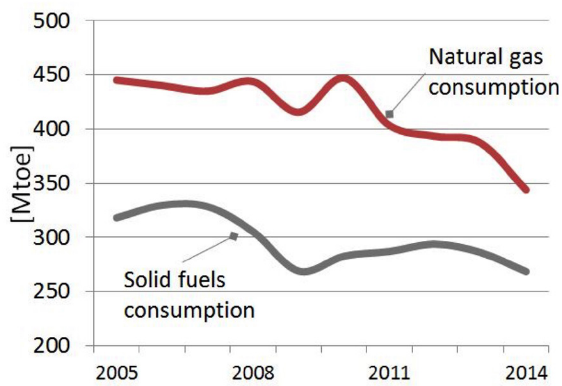

FIGURE 2 – DECLINE OF NATURAL GAS AND SOLID FUELS (COAL) CONSUMPTION BETWEEN 2005 AND 2014 IN THE EU-28 MARKET. SOURCE: EUROSTAT, CIEP©.

Between 2010 and 2014 gas consumption in the EU-28 shrank by a quarter (Figure 1), or 124 Bcm (CAGR -6.4%). Comparing gas to coal, both fuels experienced a decline in consumption, yet that of gas was more than that of coal (Figure 2). The decline in gas demand in power generation accounts for more than half of the lost volumes (70 Bcm), followed by the residential and commercial (45 Bcm) and industrial sectors (4 Bcm) (Figure 1).

The EU decarbonisation framework is at the core of all major shifts in the EU energy system, resting essentially on three pillars:

- Promotion of renewable energy systems (RES),
- GHG emission reductions, and
- Energy efficiency improvements.[5]

Of all sectors affected by the resulting policies, the power sector has been impacted by far the most.

THE POWER SECTOR

Following the implementation of the framework's decarbonisation measures, policy instruments such as RES subsidies, combined with an ineffective EU ETS reform, further deteriorated the competitiveness of natural gas in power generation.

Installed RES capacity has increased from 155 GW to 355 GW since 2008. RES electricity production entered the power mix merit order with near zero short-run marginal costs, and gradually pushed back electricity generated from conventional sources, such as coal and gas. A 200 GW increase in RES power generation capacity would be roughly equal to a 60 Bcm reduction in natural gas demand[6] if no other fuel were pushed out of the power generation mix.

5 'Trends to 2050-EU energy, transport and GHG emissions (reference scenario 2013)', European Commission, 2013.
Energy efficiency policy package: EcoDesign framework directive, Energy labelling directive, Residential energy use regulation, End-use energy efficiency and energy services directive, Energy performance of buildings directive and Energy efficiency directive (EED).
Renewable energy sources (RES) policy package: Cogeneration directive, Completion of the internal energy market 3rd package, Security of supply, market integrity and transparency regulation, RES directive, Nuclear safety and waste directive.
GHG emissions policy package: EU ETS directive, Geological storage of CO_2 directive, F-gas regulation and transport related policies.

6 Based on an average load factor of 20% for RES and 55% efficiency for the average gas power plant.

The EU GHG Emissions Trading System (EU ETS) has provided insufficient carbon price signalling to be able to influence the ordering of new energy sources in the carbon budget. The conjuncture of meagre CO_2 prices[7] and declining coal prices[8] have created favourable conditions for coal-fired power generation, which has stayed in the mix, ahead of gas. Market prospects provide little confidence that the EU ETS will strengthen before 2020, as the Market Stability Reserve (MSR) is unlikely to balance the supply and demand of carbon credits to produce a robust price signal.[9]

Apart from regulatory policy measures, the economic and financial crisis alongside fuel price competition has impacted gas consumption in power generation. Even if it is impossible to single out the impact of constrained spending on electricity demand, the economic downturn contributed, together with the other mentioned factors, to shrinking gas consumption.

Finally, coal-to-gas competition has played its role in lowering the market share of gas. An industry report argues that in the period 2010-2013, gas-to-coal switching accounted for 51 of the 58 Bcm volume losses.[10] Only in the UK market, where the introduction of a CO_2 price floor made a notable contribution, did gas replace coal in the merit order.[11]

Overall, the 70 Bcm volume loss in gas consumption is the result of cascading developments which reinforced each other. Electricity consumption on the European market has faced sustained low demand in recent years, prompting increased competition between coal and gas, whereby coal has benefited from price declines and meagre CO_2 prices to enter the power mix ahead of gas. In consequence, the share of natural gas in the electricity mix has dropped by 7%.[12]

7 WGI, 22 July 2015.
8 WGI, 19 August 2015.
9 WGI, 15 April 2016.
10 Cornot-Gandolphe, S., 'Gas and coal competition in the EU power sector', Cedigaz, 2014.
11 Stokes, D., Spinks, O., Viudez Ruido, E., 'Gas vs coal switching in continental power markets', Timera Energy, 2015.
12 Eurostat data illustrates that in the period between 2010 and 2014 European gross electricity production contracted by 5.2%, while the share of gas in gross electricity production declined from 22.7% to 14.3%. In consequence, gas turbines had their working hours severely reduced in markets such as Spain (REE), Germany (BDEW) and the UK (National Grid).

THE RESIDENTIAL AND COMMERCIAL SECTOR

Across EU member states natural gas used in households for heating, cooling and cooking is close to maturity, as reflected by gas specific consumption data.[13] The main factors which have affected this market segment are the weather and continued gains in energy efficiency.

The mild weather of the past years has suppressed gas consumption, especially in the NW European heating market. This accounts for a reduction of some 80%, or around 40 Bcm out of the total decline of 48 Bcm in these sectors between 2010 and 2014.[14]

In weather corrected terms, since 2000 efficiency measures have accounted for 36 Bcm, or 80%, of structural demand reduction in households.[15] Central and Eastern European member states can still yield important energy savings in the coming years when pursuing the implementation of the amended EED provisions.

THE INDUSTRIAL SECTOR

In the industrial sector, gas is embedded in industrial products whose demand is tied to changes in economic activity (GDP) and market competitiveness. Eurostat reports that European industrial output has contracted less than its associated energy use since 2008, with natural gas only marginally narrowing its share in the mix. The use of natural gas in industrial sectors can be in the form of energy and/or feedstock input. As energy input, natural gas can be used as either heat or electricity. Industrial activities using high temperature heat and electricity, derived from steam boilers or co-generation units, are concentrated in integrated clusters where gas is less vulnerable to being substituted by other energy sources. As feedstock input, gas used in fertilizer production, plastics and pharmaceutical products[16] has been robust on the EU market.

13 Lapillonne, B., Pollier, K., Samci, N., 'Energy efficiency trends for households in the EU', Enerdata, May 2015. This analysis breaks down the impact of 6 main factors which impacted the energy demand of the past decade: (i) consumption variation ↓; (ii) climate effect ↑; (iii) number of dwellings ↑; (iv) size of dwellings ↑; (v) adoption of central heating ↑; and (vi) energy savings ↓.

14 Derivation based on a model that predicts residential gas demand using the historical distribution of 'heating degree days' over the year.

15 Lapillonne, B., Pollier, K., Samci, N., 'Energy efficiency trends for households in the EU', Enerdata, May 2015.

16 Eurostat data indicates that since 2000, the share of natural gas used as feedstock in industry declined from 34% to 31%.

Similar to other sectors, efficiency gains have also impacted gas consumption in industry, only their implementation has been geographically staggered across the European market. Industry driven energy efficiency improvements started being implemented in the early 2000s, and their aggregate effect began to be structurally noticed soon before the economic and financial crisis. A compelling effect was noticed in the use of natural gas as energy input – heat in particular – in iron and steel manufacturing, non-ferrous metals production, and pulp and paper production as the gas intensity of these industries lessened.[17,18] The inability to remain competitive on the European market forced highly inefficient plants to close or relocate to different markets.[19,20]

The IEA estimates that since 2005 the implementation of energy efficiency measures has slashed 8 Bcm of the intensive industry's gas consumption across the EU's top five markets.[21] This represents about a third of the total sector decline (25 Bcm) between 2005 and 2014.[22] Generally speaking, the 4 Bcm decline in gas consumption since 2010 does not explain the energy efficiency improvements, whose implementation commenced more than a decade ago.

17 'Steel's Contribution to a Low Carbon Future and Climate Resilient Societies: World steel position paper', World Steel Association (WSA), 2015.

18 Laurijssen, J., 'Energy use in the paper industry: An assessment of improvement potentials at different levels', Utrecht University – Phd Thesis, July 2013.

19 Egenhofer, C., Schrefler, L., Genoese, F., Luchetta, G., Mustilli, F., Simonelli, F., Colantoni, L., Timini, J., Wieczorkiewicz, J., 'The steel industry in the European Union: Composition and drivers of energy prices and costs', CEPS, December 2013.

20 Gyorffi, M., Oren, G., 'Relocation of EU industry: An overview of literature', EP DG Internal Policies of the Union – Committee on Industry, Research and Energy (ITRE), 2011.

21 'Medium-term gas market report 2015', International Energy Agency (IEA), 2015.

22 Based on Eurostat data, between 2005 and 2014, industrial gas consumption declined from 156 Bcm to 131 Bcm.

COMPARING THE DIFFERENT FACTORS WHICH IMPACTED DEMAND DECLINE

The developments leading to the decline in European gas consumption, described above, are the consequence of both structural and non-structural effects (Figure 3). Structural effects generate long-lasting changes in the way gas is used across sectors. They include the proactive implementation of energy efficiency measures, RES capacity additions, the relocation or closures of activities using natural gas and the pursuit to electrify economic sectors. Non-structural effects are the consequence of transitory conditions, such as weather (seasonal) and economic market conditions (carbon prices[23] and relative commodity prices).

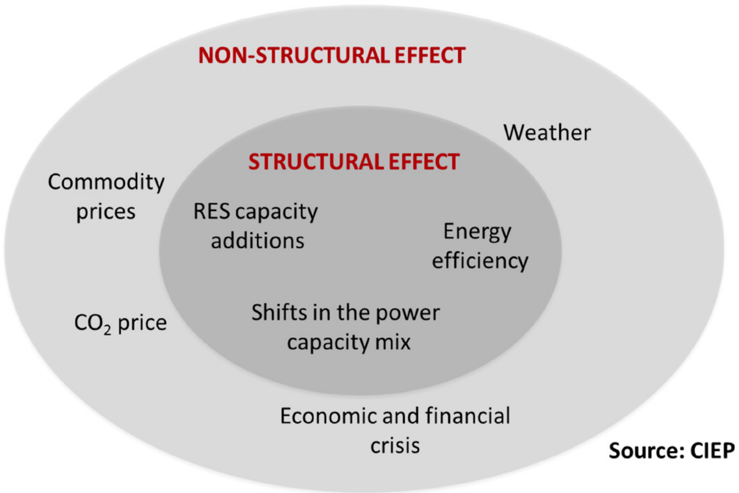

FIGURE 3 – ILLUSTRATION HIGHLIGHTING THE DIFFERENTIATION BETWEEN STRUCTURAL AND NON-STRUCTURAL EFFECTS ON EU GAS DEMAND. SOURCE: CIEP©.

23 The non-structural effect of carbon prices is questionable once the EU ETS receives policy backing in the form of a carbon price floor, such in the case of the British market.

4 EU GAS DEMAND OUTLOOK

AN EXCEPTIONALLY WIDE RANGE OF PROJECTIONS

How is gas demand expected to evolve on the European market in the coming decade (2015-2025)? Figure 4 presents various projections from a range of sources: European Commission[24,25], International Energy Agency (IEA)[26], IHS[27], Oxford Institute for Energy Studies (OIES)[28], Cedigaz[29], ENTSO-G[30], Eurogas[31] and Statoil.[32] It should be noted that the projections are not fully comparable, as their base years differ. Also, it appears that different starting years for projections translate into a higher confidence bias for the 2010 base year projections than for those with a base year of 2013 or later. Ultimately, the selection of projections is not exhaustive, nor does it aim to be, but is meant to be illustrative for the range of expectations regarding EU gas demand.

In essence, the outlooks project an upturn in EU gas demand from the 2014 low, which is partly confirmed by the 2015 gas consumption jumping up 12 Bcm. By 2020, the projected lower and upper limits of gas demand are 420 Bcm and 570 Bcm. This 150 Bcm range is equal to a third of the 2014 demand level. By 2025, the demand uncertainty remains stable, with the projections here also displaying a band of 150 Bcm. The association of Europe's gas grid operators, ENTSO-G, the trade organisation representing the gas industry, Eurogas, and the European Commission account largely for the upper and lower limits of the range, with the remaining projections falling somewhere in between.

24 'Staff working document on EU LNG and gas storage strategy ', European Commission, February 2016.
25 Vergote, S., 'The EU energy system towards 2030: Infrastructure fit for Europe's energy needs', European Commission, May 2016.
26 World Energy Outlook (WEO), 2015.
27 'Balancing the global gas market: Northwest Europe as a pivot point', IHS Energy, July 2015.
28 Honore, A., 'The outlook for natural gas demand in Europe', Oxford Institute for Energy Studies (OIES), June 2014.
29 'Medium and long term gas outlook', Cedigaz, February 2015.
30 'Ten year network development plan 2015', ENTSO-G, 2015.
31 'Eurogas Roadmap 2050', Eurogas, October 2011.
32 'Energy perspectives 2015', Statoil, 2015.

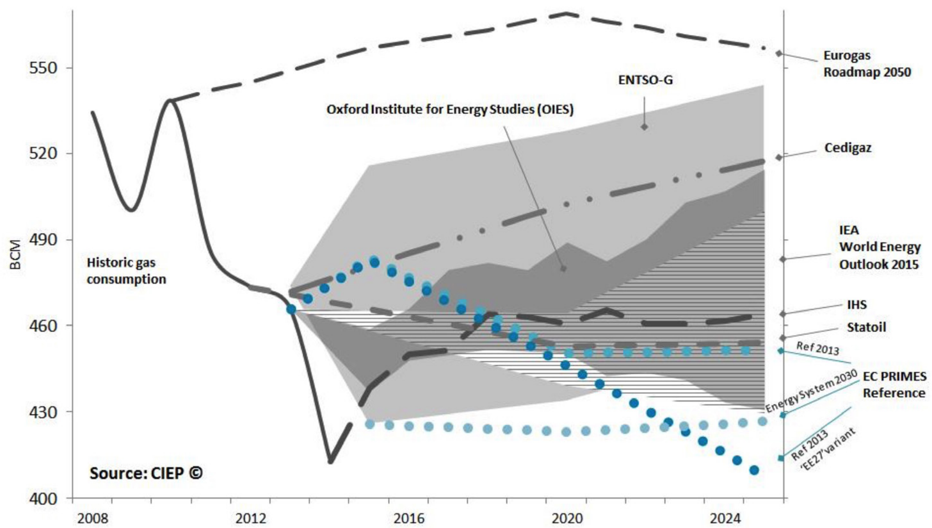

FIGURE 4 – COMPETING PROJECTIONS FOR EU-28 NATURAL GAS DEMAND[33,34]. SOURCE: CIEP©.

WHAT IS BEHIND THE WIDE RANGE OF UNCERTAINTY?

Such large differences in projected demand scenarios raise questions about the set of assumptions modelled. For example, the lower limit of the IEA WEO 2015 scenario represents the modelling outcome from policies that pursue stringent emission reductions while capping the long-term average global temperature increase at 2°C (a 450 ppm scenario), in which case gas demand declines from 466 Bcm (2013 reference) to 430 Bcm (2025).

For many scenario projections in the outlook it is unclear exactly what specific assumptions were taken about RES capacity additions, carbon prices, energy efficiency improvements, technological developments, other energy policy issues, market conditions and their timing. The common assumptions for the lower limits of the projections are a combination of unfavourable environmental policy towards gas, high commodity prices and low energy demand, which are mainly the themes of the 2010-2014 developments. The upper limits of the projections feature

33 EC projections are: (i) PRIMES (2013) reference scenario (32% GHG emissions reductions in 2030 (wrt. to 1990), 24% RES as percentage of final energy consumption, and 21% energy savings in 2030) and (ii) PRIMES (2013) reference scenario variant 'EE27' (40% GHG emissions reductions in 2030 (wrt. to 1990), 28% RES as percentage of final energy consumption, and 27% energy savings in 2030).

34 All projections use linear interpolation between the available fixed projections. Projections derived from OECD Europe required geographic calibration to align them with EU-28 scenarios. In such cases, conservative gas demand assumptions were used for Bulgaria, Cyprus, Malta, Croatia, Lithuania, Latvia, Romania, Turkey, Norway, Switzerland, Iceland and Israel.

economic growth and technological innovation, a substantial increase in the CO_2 price, and political decisions such as significant nuclear and coal capacity decommissions.

Generally, the narratives of fuel outlooks provide insufficient detail to fully assess the impact for each of the underlying assumptions, but sufficient data is available to suggest that the power sector accounts for the largest proportion in the uncertainty range.

THE POWER SECTOR

RES capacity additions, CO_2 and commodity prices, and nuclear and coal shut downs are the compounding uncertainty factors for gas demand in the power sector.

While the EU power market has been 'transformed'[35] by the RES capacity additions, increasing the capacity further could increase the pressure on gas in electricity generation. Scenario projections which model a tight implementation of climate targets by 2020/2030 (those by the European Commission and the IEA) feature a receding role of gas in the European electricity mix. As of 2014, the renewable energy targets set by the European Commission have been nearly achieved[36], which leads to the expectation that in the years up to 2020 RES capacity addition could continue to increase at a slower pace. Although gas demand in power generation has lessened since the adoption of the EC energy and climate targets, the pace of further decline driven by RES can be expected to diminish, yet the effects of EC climate targets on CO_2 and commodity prices can linger on.

The CO_2 price can have a deceptive impact on natural gas because of its collar effect on demand. Under the current market circumstances, the carbon price (now below 10€/tCO_2) is insufficient to trigger the switch from coal to gas in continental Europe and reflect the carbon budget ordering of fuels in the merit order. When CO_2 prices are high (e.g. in the order of 60-70€/tCO_2, as modelled by the IEA), natural gas cannot compete with RES. Therefore, depending on regional competition with other fuels and the type of gas capacity, the CO_2 price exercises a collar effect on gas demand in the power sector.[37]

35 'Balancing the global gas market: Northwest Europe as a pivot point', IHS Energy, July 2015.

36 'Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions on renewable energy progress report', European Commission, June 2015.

37 ENTSO-G Green also assumes a high CO_2 price (60-70€/tCO_2) which, contradictory to the price collar explanation, generates higher gas demand. This is supported by the compounded effect of low commodity prices and technology-specific policy objectives (e.g. electrification) which rapidly increase the demand for electricity.

Where indicated by scenario narratives, the CO_2 price is modelled below 15€/tCO_2 by 2020 and in the range of 20€/tCO_2 between 2020 and 2025. According to some scenarios, in conjuncture with expected commodity prices, such CO_2 prices manage to generate only partial coal-to-gas switching.[38] The European power market is currently disillusioned in thinking that the CO_2 price is able to reflect the carbon ordering of fuels entering the electricity mix, a perception likely to persist among market stakeholders until 2019 when the EU ETS reform[39] will yield its first results.[40,41,42] Without strong policy support, the market mechanisms that set the CO_2 price will not generate a switching price. A case in point is Britain, where policy makers have directly supported the implementation of a carbon floor price and pursued the phasing out old coal power generation capacity. Opposite from the British example, Germany policy makers have indirectly curtailed the role of gas in the power mix. Since 2010, the gas consumption in Germany has declined by 20% as a consequence of the government's actively supporting RES while cushioning the domestic lignite industry.[43,44]

Germany and the UK are extreme illustrations of individual efforts made by member states towards gas, yet their examples highlight two characteristics of the European power sector. First, the decarbonisation framework for the power sector requires policy support to attain its objective, specifically on CO_2 price. Second, the intervention of member states in the functioning of power markets reflects a persistent lack of coordination when dealing with market inefficiencies such as a low CO_2 price. These characteristics are not reflected in the narratives of the scenario projections; hence it is uncertain how either strong policy support or coordination at the member state level would pan out for gas in the outlook.

Projected commodity prices contradict current-day reality and their mid-term expectations. Available data shows that for both the lower and the upper limits of the projections, commodity prices are nearly double compared to current market levels and the lower-for-longer expectation.[45] Since mid-2014 commodity prices, i.e., coal and gas prices, have taken a nose dive: a recent development which has not yet

38 Scenarios using these assumptions are: IEA (NPS and CPS).

39 The EU ETS reform mainly translates into the removal of surplus credits and the introduction of the Market Stability Reserve. Both measures are intended to regulate the number of credits temporarily available in the market, with the aim to avoid sharp price fluctuations.

40 WGI, 17 February 2016.

41 WGI, 13 April 2016.

42 WGI, 27 January 2016.

43 'Report on the German power system', Agora Energiewende, February 2015.

44 'The Energiewende and Germany's industrial Policy', CIEP, November 2014.

45 Stokes, D., Spinks, O., 'Structural transition in gas prices', Timera Energy, September 2015.

found its way into any of the scenario projections. This can generate a situation in which plummeting gas prices produce a switch in the merit order, placing gas ahead of coal,[46] thus potentially reversing the current order, especially in continental Europe.

Arguably, coal and nuclear capacity shut-downs in the coming decade represent the largest unknown for the development of gas demand in the power sector. Because nuclear and coal capacity shut-downs depend on political decisions, the timing and extent (in GW) of shut-downs is deemed speculative. None of the scenario projections offer any indication of the manner in which this is modelled, except for the Cedigaz demand scenario, where an increase in gas demand 'is modelled at the expense of coal, where beyond 2020 gas capacity progressively takes over the retired and closed coal capacity'.[47] It was argued that gas would take over shut down coal and nuclear capacities in Germany, but immediate market reactions have been conflicting, as part of the coal and nuclear capacities have had their lifetime extended or were replaced by RES. The lack of sound quantifications for expected changes in the type, timing and regional progress of electricity capacity available on the European market represents one of the largest unknowns for the direction of gas demand in the power sector.

Technological learning is modelled as being detrimental for gas demand in the power sector. In the lower limits IEA 450s, OIES low and Statoil feature a strong technological learning effect in RES, CCS and electric vehicle batteries, which encourages investments in these areas and the propagation of inexpensive renewables to the detriment of gas technologies. The European Commission, contrary to the IEA, OIES and Statoil, models strong technological learning and a viable commercial introduction of batteries and CCS only after 2030.

THE INDUSTRIAL SECTOR

The demand for gas in the industrial sector owes its uncertainty to the uncertainty in the demand for industrial products on both within and outside Europe. With vast energy efficiency improvements already implemented across industrial processes on the European market, the issue in question becomes the competitiveness on international markets of industrial products such as petro-chemicals, steel and aluminium. The argument of some fertilizer and steel industry representatives, whose activities face the competition of cheap global supplies,[48] is that gas prices in particular reduce the competitiveness of their products.

46 'Medium-term gas market report 2016', IEA, May 2016.
47 'Medium and long term natural gas outlook', Cedigaz Presentation, February 2015.
48 'No, thank you: Tata Steel', The Economist, 2 April 2016.

Scenario projections which make short reference to the prospects of gas demand in the industrial sector (those of Eurogas and the IEA) argue for a robust development, with a variation of ±1% from 2010 demand levels.

THE RESIDENTIAL AND COMMERCIAL SECTOR

The consumption of gas in the residential and commercial sector is highly inelastic, meaning that price variations will not impact consumption severely. Recent policy-driven energy efficiency improvements have been able to gradually lower gas consumption in these sectors, but the savings achieved have been only a fraction of the impact had by abnormally warm weather on gas consumption. As such, weather conditions remain the largest uncertainty factor for gas demand in these sectors.

Scenario projections which make short reference to the prospects of gas demand in the residential and commercial sector (those of Eurogas, the EC and the IEA) predict volume losses, in weather corrected terms, by up to 5% compared to 2010, mainly attributed to energy efficiency improvements. The EC PRIMES projections model an accelerated decarbonisation rate of 2-3%/yr in the residential sector, as compared to the historic trend of 1%/yr.

MAIN UNCERTAINTIES IN GAS DEMAND DUE TO POLICIES

As for now, the outlook for natural gas, as discussed above, is uncertain owing to:

- EU policy direction and effectiveness thereof, in the following areas:
  - How much the role of EU ETS will be strengthened, towards robust CO_2 prices, if at all; [49]
  - The pace and amount of RES capacity growth, and its impact on the electricity system;
  - Pursuit of further energy efficiency gains in the industrial, residential and commercial sectors; and
  - The development of instruments to promote the use of gas beyond established sectors (e.g. transport).
- Political decisions towards coal and nuclear capacity shut-down, and nationally designed measures which complement instruments designed at the EU level.
- General market conditions reflecting the demand and supply for commodities (electricity, oil, gas, coal).
- Technological developments and their impact on fuel substitution.
- The timing of the above described potential developments.

49 Currently, the EU ETS does not reflect the investment signal to support the next set of decarbonisation targets.

The range of uncertainty seems inevitable, but its extent, as presented in the outlook, should be balanced between the lost opportunity to reach the projected demand levels and the role of central assumptions in thrusting projections towards 2020/2025. By way of illustration, the high ranging ENTSO-G Gone Green scenario is built on buoyant market conditions and is tied to the assumption that achieving timely GHG emission reduction targets yields robust CO_2 prices and promotes gas uptake, especially in power generation. CO_2 prices thus become a central variable for this scenario. Since the reference year, the gap between actual and projected CO_2 prices has broadened to the extent that a compensation for the lost opportunity is unattainable.[50] Practically, this means that if reiterated today the ENTSO-G Gone Green scenario would soften the uncertainty range, as gas demand will not follow suite.

It is not only the assumptions of high ranging scenarios that should be stressed, but also those of low ranging scenarios, such as the PRIMES based EC scenarios. Like most projections, they lack transparency, especially in areas connected to assumptions on commodity prices (which drive fuel substitution) and the direction and impact of policy pursuits. Aside from the intrinsic utility the EC scenario projections have, the authoritative position of the European Commission charges these projections with a strong message which resonates among market stakeholders. In this case the message is discouraging, notably in connection with import requirements.

50 The average upper limit for 2016 of the ENTSO-G ('Gone Green') CO_2 price assumption is 28€/tCO_2, while the average effective CO_2 prices in the first half of 2016 on the EU market have been below 7€/tCO_2. Towards 2020, ENTSO models the CO_2 price at reaching an average of 41€/tCO_2, while de facto the market expectation of a price revamp is grim.

5 EU GAS IMPORT NEEDS

The uncertainty surrounding gas demand is reiterated in the discussion concerning the diversification of gas supplies. Specifically, the emphasis in this section is placed on European gas import needs based on the range in the demand outlook. With indigenous gas production decline outpacing the most pessimistic of the future demand scenarios, this study argues that gas import demand in the EU will increase (Figure 5).

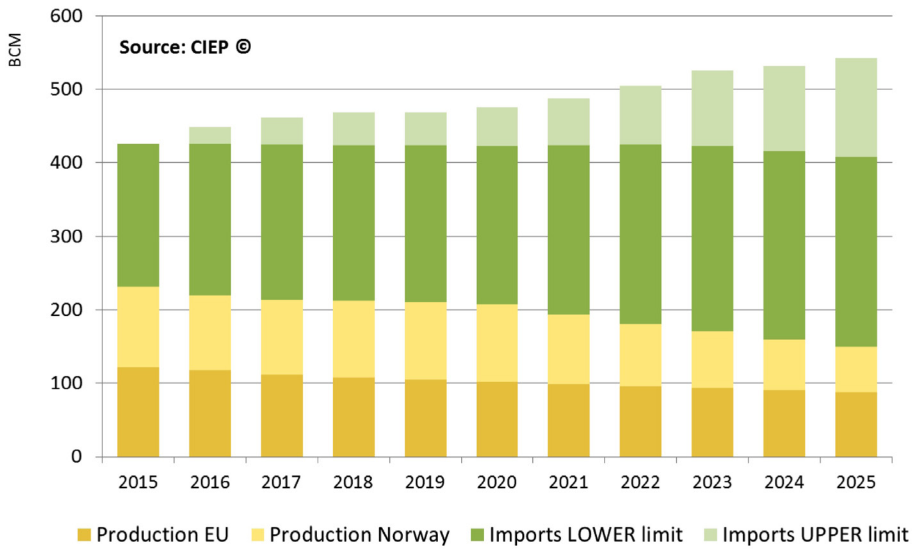

FIGURE 5 – INDIGENOUS GAS PRODUCTION ESTIMATES ARE BASED ON OFFICIAL REPORTS[51,52,53] AND WEIGHTED AGAINST THE DEMAND PROJECTIONS PRESENTED IN FIGURE 4. MINIMUM IMPORT NEEDS REPRESENT THE DIFFERENCE BETWEEN THE LOWER LIMIT OF THE GAS DEMAND PROJECTION RANGE AND THE ESTIMATED PRODUCTION, WHILE THE UPPER LIMIT IS A TRANSLATION OF THE DEMAND UNCERTAINTY DESCRIBED IN THE SCENARIO PROJECTIONS. SOURCE: CIEP©

51 'Ontwerp-instemmingbesluit gaswinning Groningen', Directoraat-Generaal Energie, Mededinging, 24 June 2016.
52 'Norwegian gas production prospects', Platts and Norwegian Petroleum Directorate (NPD), March 2016.
53 'UK oil and gas production projections', UKCS, 2015.

A point of discussion in this section is the assumption about indigenous gas production up to 2025. For the purpose of this analysis Norway has been included as an indigenous (EU) producer, as its gas pipeline exports are seen as 'must flow' volumes.[54] The focus points of this assumption are Norway, the UK and the Netherlands, which make up approximately 85% of indigenous gas production.[55] Following years of allocated investments, especially in the North Sea basin, production of gas was sustained and even increased by 10% in 2015. Subsequent to the drop in oil and gas prices, and with the increased competition on gas markets, it can be expected that additional upstream financing will be hard to justify. Production figures presented above are estimates and only partially reflect the anticipated 'global gas glut' and the tight investment situation in which the industry finds itself. Additional oil and gas price declines will force higher break-even costs onto upstream oil and gas producers in the North Sea.[56] In consequence, it is not excluded from consideration that gas production estimates from the North Sea will be weaker than the projected downward trend.[57]

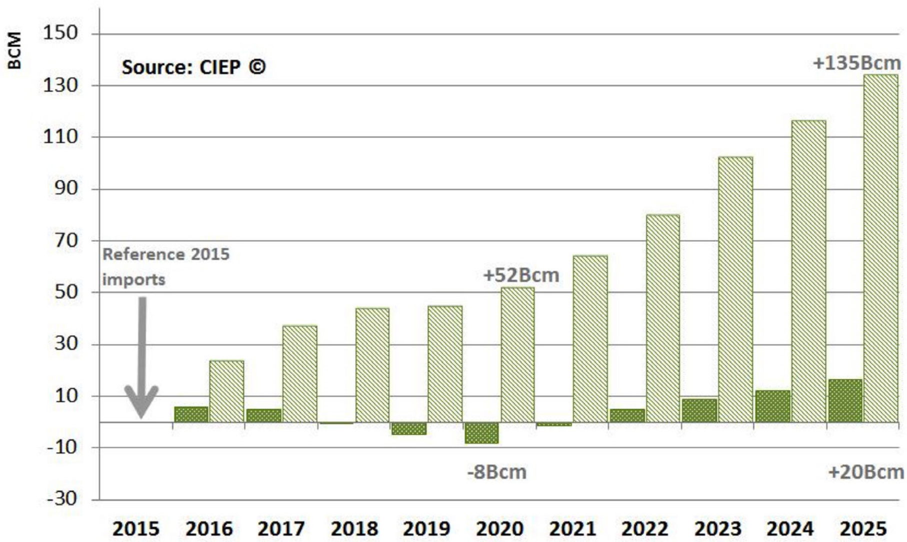

FIGURE 6 – NATURAL GAS IMPORT NEEDS USING 2015 IMPORTS (194BCM) AS REFERENCE FOR THE DEMAND OUTLOOK. SOURCE: CIEP©

54 Norway is perceived as a politically aligned country and member of EFTA, with no alternative pipeline connections to other markets to which it can dispatch its gas production (set within governmental targets).
55 We assume no shale production before 2025 in the EU.
56 The increase of break-even costs is associated with platform decommissioning and the removal of pipeline infrastructure.
57 'Medium-term gas market report 2016', IEA, May 2016.

The share of indigenous gas production in EU gas demand is projected to decline from 55% (2015) to somewhere between 27-37% (2025). In order to meet demand, the declining indigenous gas production translates into increased import needs (Figure 6). In relative terms, by 2020, the EU's gas imports could be between 4% lower and 27% higher than in 2015. In absolute terms, this import need can be from 8 Bcm lower to 52 Bcm higher than in 2015 (a range of 60 Bcm). By 2025, the range nearly doubles and all scenario projections display an increase in import needs. This conclusion is supported by the European Commission,[58] which acknowledges under the 'Energy System 2030' that import needs will increase within a decade.

What message does such a range send to various market stakeholders? For external suppliers, most import scenarios indicate that the EU market would at least need gas volumes comparable to those of previous years to satisfy its domestic demand. Owing to the uncertainty in import needs and the prospects of a prolonged buyers' market, EU market players will have little incentive to secure additional gas volumes under firm contracts for the period under review. EU market players and potential external suppliers may well take specific note of recent European Commission's scenario's,[59] giving a strong political signal that gas demand remains low in the coming decade and hence that the EU's gas import needs will hardly grow.

Based on the existing analysis of the range of import needs, it can be inferred that political decision making, more than market conditions, can reduce market variability and narrow the uncertainty band of gas demand, notably in the power generation sector. Dampening market variability related to capacity can mitigate the value depreciation of gas related assets and avoid further lock-in effects, while helping to ensure that the market is ready to meet further demand at the lowest cost possible.

58 Vergote, S., 'The EU energy system towards 2030: Infrastructure fit for Europe's energy needs', European Commission, May 2016.

59 'Staff working document on EU LNG and gas storage strategy ', European Commission, February 2016.

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