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The Future of Gas in the Energy Union: Managing Its Decline?

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16.1 Introduction

The story of gas in the European Union is a success story: starting from scratch in the sixties, it is representing today about 25% of the primary energy used in the European Union, before Brexit, representing 28 Member States and more than 500 millions consumers. There is a gas market in 26 Member States (Malta and Cyprus have no gas market, but Cyprus is likely to have one once gas discoveries in its waters will reach it), and gas might be further introduced in some neighbouring countries belonging to the Energy Community, such as Albania. In spite of a wide use in the EU and in the Energy Community countries and in spite of being the cleanest fossil fuel, gas seems to be a “mal aimé” by the national and European decision makers, at least according to the gas industry. The latter is indeed worried to see coal and lignite remaining favoured for various questionable reasons by several countries, such as Germany, Poland, Greece, Spain and beyond, Ukraine and in the Western Balkans,

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like Serbia. Others may say that gas industry has missed opportunities, being overconfident about the strengths of its product.

This chapter will examine more in-depth the position of gas in the European energy mix today and in the future, the functioning of the internal gas market and finally the key challenges facing gas in the Energy Union which should lead the European Union towards a low carbon economy, in line with the Paris Agreement of December 2015.

16.2 Gas in the European Energy Mix

16.2.1 Evolution of the Gas Production, Importations and Consumption

It is not the place here to deliver a detailed statistical analysis of the evolution of gas in the European energy mix. Eurostat publishes every year all the data, unfortunately with 2 years delay.¹ First of all, there is no European energy mix because the energy mix remains the result of the decisions taken by the Member States, as part of their sovereignty and by a myriad of actors, such as regions, cities, companies and individuals. In other words, as part of an explicit energy policy when it exists, gas may be promoted more or less by each Member State, according to its own situation: some Member States, such as UK, NL and DK, but also DE, IT, ROM, enjoyed for a long time good gas resources in their territory, leading them to favour an extensive use of gas in industry, agriculture, power generation, heating and cooking. Others were located close to a producing country and developed rapidly imports of gas, such as Belgium (from the Netherlands) and Spain (from Algeria). The development of the continental shelf of Norway offered another opportunity for gas in Europe. Finally, most of the eastern European countries which were part of the Soviet Union before their independence in the 1990s had developed gas use for heating and cooking and were irrigated by numerous pipelines bringing them Russian or even central Asian gas. In the meantime, gas benefitted particularly from the organised reduction of coal production everywhere in Europe to replace it for heating and power generation. Gas also benefitted from the

Tchernobyl accident in 1986 leading to a halt of nuclear investments, enabling it to enter massively into the power generation systems, something strangely prohibited by an EU directive of 1977 in the EU, until it became usual. As a result, by 1995, gas represented already 20% of the gross inland consumption and reached 23% in 2013, while during the same period, coal went down from 22 to 17% and oil from 39 to 33%, and renewables went up from 5 to 12%, while nuclear remained stable at 14%. Interestingly, the reduction of coal and oil was compensated by an increase of gas and renewables in the proportion of one-third/two-thirds. In other words, gas was particularly resilient and was able to increase its market share, in a period where the overall consumption of energy has decreased. And with a decreasing domestic production inside EU (from more than 200 BCM in 1995 to a bit more than 100 BCM in 2015), it meant an increase in imports and a subsequent greater dependency on external suppliers.

Looking at domestic production, EU has little to nothing to say about the production of natural resources which remains a sovereign decision to be taken by each Member State (Article 194 of the EU Treaty²). There is today no more or little debate about shale gas at EU level. Some countries such as France and Bulgaria have banned shale gas exploration and exploitation while UK and Poland have taken measures to facilitate such exploration and exploitation. EU may not influence this, and its main possibility of action lies in the environmental rules that could affect such operations. After the Polish disillusion of the early 2010 about its shale gas potential resources, nobody today believes in a major contribution of shale gas to the EU domestic production. In the meantime, the Netherlands is facing a dramatic situation in its Groningen gas fields leading it to reduce drastically its production (up to 30 BCMa). Whether this loss of production will be compensated by the discovery of new gas fields in the Black Sea and in East Mediterranean is still an open question. In any case, the decline of the domestic EU production and its likely stagnation around 100 BCMa in the next 10 years seems to be a reality and has to be matched by a reduction of consumption and/or an increase of imports. However, in our opinion, there are many reasons to consider the Norwegian production as part of the domestic production, as this production is

almost completely destined to the EU, before Brexit of course. Brexit is expected to alter significantly this situation as it will remove the UK production and imports from the EU statistics.

Concerning the consumption, three equally important segments are usually identified: industry, heating and cooling or residential and services and power generation. Gas demand was supposed to increase in the power generation segment, while it was expected to decrease in industry because of competition with low gas prices countries (US, Gulf States) and in heating and cooling as buildings are becoming more and more energy efficient. But it was finally in the power generation that gas lost ground because of the low price of carbon (the price of carbon went from €30 per ton in 2012 to €4 in 2016, coupled with a low price of coal (displaced from the US market by shale gas and combined with a lower consumption in China)) and a too high price of gas. Simultaneously, renewables enjoyed (generally too) generous subsidies and a priority of access to the grid without having to contribute to the stability of the grid and to the backup needed in case of absence of wind or sun. The rigidity of gas prices, due to the prevailing oil indexation formula, did not help maintaining gas in the power mix since 2010. In addition, electricity consumption was declining since 2005 as a result of improved efficiency and of the economic crisis. No surprise thus that the EU consumption of gas went down from 550 BCMa in 2010 to 400 in 2014 and 425 in 2015.

Finally, there is the likely impact of the major December 2015 Paris agreement on gas demand in the future. Can we now expect that coal will be removed faster from the mix? UK started this process already but Germany and Poland as well as some others are still investing heavily in coal and lignite to the detriment of their emissions levels and their public budgets. Will nuclear come back and replace coal to the detriment of gas as envisaged in UK,³ Poland, Hungary and Bulgaria? All these questions might be answered, at least partially, in the two coming years with the implementation of the governance scheme of the Energy Union.⁴ Each Member State is required to spell out, by 2018, its energy and climate strategy up to 2035, in line with the Paris agreement and the 2030 objectives agreed in October 2014 by the European Council, of which the target of a reduction of 40% of the GHG emissions is the

cornerstone. The last question is whether there will be a more voluntary approach to renewables and energy efficiency, once UK is leaving the European Union. UK was indeed a well-known opponent to binding targets in these two areas, in contrast to France and Germany which came in July 2016 with a joint paper advocating a stronger commitment of the Union in favour of renewables and energy efficiency.

Reverting to the question of gas import dependency, which is likely to increase given the decline of the domestic production and in spite of the reduction of the consumption, it is also useful to analyse the actual situation.

First of all, **Russia**, with 100 to 150 BCMa to the European Union and a large portfolio of long-term contracts up to 2030, is the main external supplier of gas and will remain so in the future as it owns, just after Iran, the largest proven resources, and as it is able to offer the lowest price of production and transport, up to now. Like Saudi Arabia in the oil sector, Russia is the swing producer of gas and may easily dictate the price. This is obvious today at a time US LNG tries to reach the EU coasts and other LNG producers are looking at the European market. Gazprom is probably able to lower its prices to the point to eliminate any competition. It may represent the biggest threat to the gas-to-gas competition in Europe, a situation which should be closely monitored by the DG Competition of the European Commission. The discussion about new import pipelines from Russia to the EU, such as NordStream2,⁵ SouthStream or Turk(ish)Stream, is raising many questions beyond removing Ukraine from the transit routes and beyond undermining the southern gas corridor. At stake is the dominance and control of Gazprom of the EU gas market involving even the ability to set the prices at the main hubs. These risks have to be properly understood and monitored. The longstanding EU–Russian energy dialogue, which has been developed since 2000, has been deeply impacted by the Ukrainian conflict and the Crimea annexation of 2014. As long as sanctions are imposed and as the Ukrainian–Russian conflict is not solved, there is no chance of a wide agreement between Russia and EU covering the energy exchanges and infrastructures, which would be the most logical way to solve all the bilateral problems in this area.

Norway, with about 110 BCMa, is the second external supplier and in reality should not be considered as an external supplier. Norway belongs to the European Economic Area which is implementing most of the internal market rules and is part of a robust institutional framework including a Court to judge any possible infringement of these rules including the competition rules. To measure the EU gas import dependency, it could be wise to consolidate the EU and Norwegian gas production as it would definitely reveal a level of import dependency which is well below 50%. An agreement between EU and Norway on this issue and on measures to be taken in case of emergency should be envisaged as part of a strategic gas partnership.

The third major external supplier is **Algeria**, with some 30/35 BCMa. Its importance has been seriously reduced in the recent years, because of production problems and a lack of investments in production, combined with an increase of the domestic consumption reducing the available volumes for exports. EU resumed in 2015 a new dialogue with Algeria which should be seen as a strategic partner.

Last but not least and probably, the most attractive solution in a very flexible market is **LNG**, bringing gas by ship from everywhere in the world, today mainly from Qatar, Nigeria, Libya and now from USA and many other new sources such as Iran and Australia in the future. Key question here is the price of gas. Will the gas prices in Europe be attractive (read high) enough to bring LNG cargoes to EU terminals which are now numerous and representing about a 200 BCMa capacity? This question cannot be separated from the price of competing piped gas from Russia, Norway, Algeria, Central Asia and the well functioning of the European gas hubs.

To conclude this overview, it may be said that (i) EU gas demand has declined sharply since 2010 and is now stagnating in a context of general decrease of energy consumption, (ii) new uses of gas are needed if it is to grow or even remain at the present level, (iii) the need to reduce GHG emissions affects deeply the future of gas, (iv) the abundance of gas as well as diversified sources of gas combined with a lower price is giving it a new opportunity at least to maintain its important share in the EU energy mix.

16.2.2 The Evolution of the Structure of Consumption of Gas

Three main segments of gas consumers are usually identified: industry, residential and services or buildings, power generation.

Industry has always managed in a more effective way its consumption of gas, as it is vital for its competitiveness. Thus, it may be expected to see industry constantly optimising its gas use. It is fair to say that industry appreciated most the opening of the gas market, especially since the third package, giving it the full choice of suppliers across the EU. It is mainly concerned by the GHG emissions because industry has to pay for their emissions and while gas is a fossil fuel, there may be an incentive to replace gas by renewables including biogas, wherever technically possible.

For the residential segment, one of the main features of the creation of the internal market is the choice given to the consumer to choose its supplier and thus to switch easily from one supplier to another.

This is more or less the reality since 2010, with some Member States being much more dynamic than others, where the incumbents and associated regulated prices have been able to slow down, if not to prevent, this process. In some countries, like Belgium, consumers associations or communities started to act on behalf of their members to negotiate better prices or to auction for the gas supply services. Simultaneously, energy efficiency obligations like those set by the 2012 Energy efficiency directive, combined with favourable financing schemes, produced the desired impact of a reduction of consumption for heating and cooling in buildings. In addition, new tools are now available to allow the consumer to manage more closely and economically his consumption, like intelligent thermostats (Google-Nest) and other formulas like those based on comparative behaviour of consumers (Opower). Demand side management, long ignored, is becoming a new fuel per se, as the digitisation and the Internet of things are offering new solutions to better match supply and demand in the field of energy. In addition, the new sensitivity of consumers to energy prices and sometimes their interest for green energy lead them to invest in renewable sources of energy and particularly solar PV for heating and for electricity.

What it means for gas demand is still difficult to assess, but it might have a very significant impact.

For the third segment, that is power generation, the conditions for a come back of gas to this segment may be of two orders: first, the price of carbon should be much more significant to remove coal from the mix, and this should come from the new ETS to be in place from 2020, and second, the new power market design to be proposed by the European Commission before the end of 2016 should create a better level playing field for gas and renewables. It is also true that a number of countries have decided to remove coal from their power generation mix (like UK) and that banks like EIB are not financing any more new coal-fired power plants. This move is likely to favour gas, but at the same time, the price of renewables is continuing to come down.

Given the difficulties encountered by gas in its traditional segments, finding new segment may be the way out for securing a better future for gas. And there is one emerging: the transport segment. It starts with LNG for shipping: new environmental rules promulgated by the International Maritime Organisation oblige ships to abandon heavy fuel for bunkering. LNG offers less harmful environmental consequences and may replace heavy fuel provided the engines of the ship are adapted and that ports offer the appropriate infrastructure for bunkering. These conditions seem to be present in many places in Europe, particularly in the Baltic and North Seas, where LNG for shipping is now flourishing. Another major development appears to be the use of gas for heavy truck transport, where ports may also offer micro-LNG stations to fill their reservoirs. And finally for light vehicles, big car manufacturers include now in their catalogue Natural Gas Vehicles. Some countries like Italy developed this segment long ago already, and it is not sure yet that others will follow, since it may require some tax incentives. In contrast, electric vehicles seem to attract more interest from the public authorities which tend to give, like in Norway, major incentives to purchase such vehicles.

Recognising the need to stimulate alternative fuels on the market, the EU has created already a few years ago a regulatory framework to encourage the construction of the needed infrastructures for alternative fuels in transport and Member States have to establish by November

2016 investment plans to make this a reality. Several EU funds are also helping the financing of these new infrastructures (Connecting Europe Facility, EFSI, etc...).

16.2.2.1 Prospects of the Gas Market

As explained, gas is and will remain an important fuel for the energy sector. After a continuous increase between 1970 and 2010, gas market in Europe reached a certain level of maturity and needs now to adapt to a new environment which is governed by the Paris Agreement of December 2015, the 2030 objectives of the European Union and the subsequent transition towards a low carbon economy.

Against this background, the key words of the European Union will be decarbonisation, energy efficiency and renewables which all affect the future of gas.

Decarbonisation of gas has to be sought by the gas industry as, by 2030, this will become a key requirement for keeping gas in the mix. In spite of the efforts of the European Union in 2010–2012 and several billion euros committed, not a single project aiming at demonstrating the viability of carbon capture and storage technologies has been completed, leaving the impression that decarbonisation of coal and gas will not happen. In 2016, the same impression prevails and gas industry should at least demonstrate concretely its willingness to address the issue. This is going beyond the need of a carbon price making such investments more economic.

As already said, investments in energy efficiency and more particularly the improvement of the energy performance of existing buildings will have a great impact on the gas demand. Depending on the speed of the rehabilitation of the building fleet, the reduction may be spectacular. As may be the impact of modernisation of the district heating systems in many countries, especially in Central and eastern Europe.

Renewables and decentralised power generation will continue to attract major investments by individuals and companies, reducing again the need for gas in large combustion plants. Instead, small and fast units powered by gas should be used, but this will never represent huge volumes of gas in comparison with a base load system. At the same time,

biogas is now coming into the picture, with some countries showing great ambitions to develop it, like the Scandinavian countries, Germany and more recently France.

In a more distant future, there are also other possibilities for gas to participate in the evolution of the energy sector. The power to gas technologies is under development and should enhance the cooperation between renewables and gas, a duo which is already working to combine gas as a backup to renewables in the production of power but which could also work to transform the excess of renewable electricity into gas, thanks to a methanisation process still to be economically mastered.

16.3 The Internal Gas Market

16.3.1 The Implementation of the Third Energy Package in the Field of Gas

It took a very long time to open the European gas market. In each Member State, there was usually a single player controlling the national market. And each national market was well protected against any incumbent from the neighbouring countries. In addition, long-term contracts concluded between the incumbent and the external supplier of gas, such as Gazprom, Statoil or Sonatrach, included destination clauses, prohibiting any reexport of gas to another country. To ensure the full control, the transmission system was owned and controlled by the main supplier and was not equipped to allow reverse flows. It is well known that the company which is controlling the infrastructure is controlling the market. This was made obvious by the sector enquiry made by DG Competition of the European Commission in 2006, convincing the Commission to propose the third package and the (in) famous ownership unbundling provisions, requiring the separation of infrastructure ownership and management from the production and supply of gas. It was not a surprise that these provisions were the most attacked by the Member States, and particularly France and Germany with many others hiding behind them. The Commission had no other

choice than accept a very mild version of unbundling under the name ITO for independent transmission operator, the vertically integrated incumbents keeping the right to own and manage the transmission system provided they ensured some independence of the management and of investment decisions of the subsidiary from the mother company (Chinese walls and so on, compliance officer and of course supervision by the regulatory authority having to certify the compliance of the TSO with the provisions of the third gas directive, subject to scrutiny by the Commission etc.). After the adoption of the third gas directive, we have, however, seen decisions of divestment by several incumbents, particularly the Germans (EON and RWE) and the Italians (ENI) while France maintained GRTGas inside GDF Suez, now ENGIE, and several east European countries are maintaining the ITO model. All in all, EU counts a bit more TSOs that are fully ownership unbundled than TSOs which are still ITO.⁶

After this fierce battle between the Member States, supported by their champions, and the European Commission, things went more smoothly with the creation of ENTSOG, the European Network of Transmission System Operators for Gas, tasked with the elaboration of network codes, under the guidance of ACER, the Agency for the Cooperation of Energy Regulators, to be processed later on by the EU legislators, the Council and the Parliament. During the last 5 years, these bodies have been working hard to elaborate common rules to manage and operate the gas transmission system. At the last GIE Conference held in June 2016 in Sofia, a panel devoted to the implementation of the third package came with the conclusion that the regulatory framework was now largely in place to enable the wellfunctioning of the internal gas market. Without being naive, because a lot remains to be done as witnessed by the numerous infringement procedures engaged by the Commission against the Member States for lack of compliance, this conclusion is fair enough and recognises the huge commitment of all the players to ensure the success of the market.

In this respect, the gas crisis of January 2009 acted also as a wake-up call about the negative consequences of the fragmentation of the European market on the level of security of supply of each Member State and of the European Union as a whole. Indeed, the supply

disruption of the Ukrainian route of Russian gas deprived a dozen of east and Central European Member States of part or all of their gas in the middle of the winter. Western Member States companies were full of gas but not able to ensure its transport to the East because of gas pipelines running exclusively from East to West. This situation highlighted the biggest weakness of the European gas market which was the physical impossibility to ensure the free flow of gas throughout the European territory. Hence, the most significant element of the subsequent regulation 994/2010,⁷ adopted as a result of the crisis, was the imposition of virtual as well as physical reverse flows at all interconnection points within the EU. Fortunately, the European Commission got a crisis budget in 2010 allowing to finance many of the equipments needed to make possible such reverse flows, in spite of the reluctance of number of incumbents. Today, reverse flows are possible on most pipelines, those exempted should still be equipped, and the paradox is that today Ukraine, as part of the Energy Community Treaty, imports more Russian gas through reverse flows from EU than from Russia itself.

Thus, the reality is that gas, whatever its origin (domestic, piped imports, LNG, storages), may flow East/West, West/East, North/South and South/North. What is preventing this to happen is linked to the lack of interconnections or to some artificial bottlenecks due to regulatory insufficiencies. The 347/2013 infrastructure regulation⁸ aimed at solving these physical problems.

16.3.2 The Role of Infrastructures

We explained how the management of infrastructures and their ability to transport gas in all directions played a fundamental role in integrating the European market, leading to convergence of prices never seen before.

It is the combination of a detailed regulatory framework and of a corresponding infrastructure development policy which enabled the working of the internal market.

Trans-European networks (TEN) have been launched at EU level well before the rules of the market were established. The Maastricht Treaty introduced a chapter on TEN for energy, transport and

telecommunications as early as 1992 although the first rules governing the energy market came in 1996 for the first gas directive, 2003 for the second and 2009 for the third. Money was already allocated for funding TEN in 1994, but Member States were deciding about the infrastructures to be financed, without any consideration for the market functioning.

It is only with the third package that the link between the market and the need for infrastructures was fully made. Following the regulation 715/2015,⁹ the establishment of transmission system operators (TSOs) exclusively dedicated to the management and the development of the gas network, their association at European level within ENTSOG and their obligation to work at a Ten Year Network Development Plan (TYNDP) based on a common analysis of the needs were the decisive elements for the integration of the European network and of the gas market. The first TYNDP was elaborated in 2010, as “a non-binding Community-wide ten-year network development plan, including a European supply adequacy outlook” to be updated every 10 years. National regulatory authorities, acting nationally but having to take the neighbouring countries into account, and ACER, acting to foster the European dimension of the exercise, were able to identify possible investment gaps and to assess the evolution of the supply adequacy. They used various scenarios made more realistic thanks to the gas crisis of January 2009 (e.g. assessing for instance the impact of the disruption of various supply routes, like the Ukrainian one, on the Member States and beyond on the Western Balkans). With the entry into force of the TEN-E regulation in May 2013, the TYNDP acquired a new role, becoming the first step of the identification of the Projects of Common Interest (PCI). This regulation introduced also the need for a detailed cost–benefit analysis (CBA) methodology. An extensive public consultation has to take place. The TYNDP process has gained in robustness and the fourth TYNDP report published in 2015 reflects an in-depth analysis, through the development of models, key indicators, monetisation, alternative gas demand scenarios and gas supply scenarios, of the 259 projects submitted (by transmission, storage and LNG terminal operators), assessing their contribution to the physical integration of the market as well as to the enhancement of security of supply. Last but not

least, the 2015 report includes a supply adequacy outlook for the period 2015–2035. In 6 years time, the players of the gas market have been able to create this essential tool to assess the evolution of the gas market and the needs for investments. This is an unprecedented improvement of the past situation where infrastructures were decided nationally on the basis of mere political decisions, leading sometimes to “white elephants”. It is, however, clear that, as usual in the energy and infrastructures areas, a “political control” remains, not only based on concerns of security of supply and geopolitical considerations but also based on the need for the approval of all levels of public authorities in order to authorise the building of these infrastructures. Public acceptance of any new infrastructure is today a key element and a key determinant of the speed with which commissioning of new infrastructures may take place.

In this respect, the 2013 TEN-E regulation offered a facilitation of the permit-granting procedure to Projects of Common Interest, mainly cross-border projects like interconnectors, which, as part of the TYNDP developed by ENTSOG, are identified by regional groups of countries to ensure an equal level of effective support on both sides of the border. This is a nice example of regional cooperation and solidarity which aims at facilitating the smooth implementation of any PCI, as well as the financing which may be complemented by EU funds, especially from the Connecting Europe Facility (CEF) established in 2014 for the period up to 2020. Similarly, the list of PCIs is updated every 2 years to take into account new projects but also the progress made with projects adopted previously. The last list has been adopted in 2015 and published as a regulation of the Commission of 18-11-2015. The next list under preparation will be published before end 2017.

As a result of the third package, the regulation on security of gas supply and the TEN-E regulation, a comprehensive and open process, involving all players and stakeholders, has been put in place to identify regularly infrastructure needs to integrate physically the market and to ensure security of supply. This is a major achievement of the European Union, fully in line with the objectives of the Energy Union aiming at optimising the use of the resources and infrastructures of the EU, in a spirit of solidarity.

16.3.2.1 The Liquidity of the Market

The wellfunctioning of the internal market can be measured at the liquidity it is offering to the participants. Coming from national monopolies to a multitude of suppliers and traders is not an overnight operation. With 28 countries coming from different situations and levels of concentration, it is rather normal to see that competition is not working everywhere in favour of the consumers.

Looking at the retail markets essentially governed by national governments, 13 Member States maintain regulated prices for end consumers and 11 for industrial consumers. This is clearly favouring the incumbent as the regulated prices are usually not allowing to cover the costs, preventing any competition to take place. Favouring the incumbent, which is usually state owned or controlled, is still a frequent situation that the European Commission is trying to solve through infringement procedures that are slow and largely inefficient as Member States are buying time. This means also hidden subsidies to fossil fuel and it is running against energy efficiency and a smooth energy transition. It is also favouring all kinds of opaque agreements between external suppliers and national champions, as evidenced by the various agreements concluded between the Russian Federation and Gazprom on the one hand and some Member States and their national champions on the other hand at the time of the South Stream pipeline development between 2009 and 2014. ACER is producing every year a report on the progress of retail markets which is highlighting all the problems still affecting the retail markets, from the regulated prices to the lack of choice of suppliers, the absence of smart meters and the little consideration for consumers' interests. The last report was published in November 2015, covering the year 2014.

Examining the situation of the wholesale market, which is essentially governed by EU rules, things appear to have evolved more favourably with hub pricing beginning to overtake the oil indexed prices of long-term contracts. As a result of an effective diversification of sources of gas, supported by more flexible routes thanks to reverse flows, and as a result of the demand decrease and of an abundant offer, the price of gas

has decreased from 12\$ per Mbtu in 2012 to 6 in 2016, in comparison with less than 3 in USA. This major decrease in price has, however, not been sufficient to remove coal from the power generation market but has been significant enough to maintain the market share of gas in the energy mix.

Again, the reporting by ACER on market monitoring and by the European Commission, in its last State of the Energy Union, both dated 18 November 2015, showed an improvement of the market functioning.¹⁰ However, their recommendations for a better observance of the rules to ensure competitive and liquid markets and for better physical interconnecting of Member States should not be underestimated. Convergence of wholesale prices between the various regions is encouraging but may be improved.

Regional cooperation may help such improvement, such as BEMIP between the Baltic States, Finland and Poland, the Central East South Europe Gas Connectivity (CESEC) and the High Level Group for gas interconnectivity of the Iberian Peninsula and France.¹¹

16.4 Threats and Opportunities

16.4.1 Decarbonisation

With all its intrinsic qualities, including its abundance and its relatively cheap price, gas remains a fossil fuel which has to cope with the main objectives of the energy and climate policies agreed at the December 2015 Paris Conference.¹² If some say that replacing coal by gas would solve the climate change problems, this is a short term view. With half the emissions of coal, gas still emits too much and if it is a nice replacement of coal in the next 10 years, it does not mean that it should not ensure its decarbonisation from 2030 onwards. Today, some banks like the European Investment Bank, followed by some national Development banks, do not borrow anymore to finance projects which are generating more than a certain level of greenhouse gases, de facto eliminating coal-fired power plants. This trend is likely to be followed

worldwide but the level of GHG may well be lowered in the coming years to hit equally gas in a foreseeable future.

The ETS now being revised for the period after 2020 will have a growing impact on gas, as it may be expected to see the CO₂ price to reach €25 by 2025. And it is not excluded that some countries are going for more ambitious policies such as a carbon tax to accelerate the transition and stimulate cleaner technologies.

Natural gas producers have now a duty to work hard at decarbonising their fuel. Whether it may be achieved by carbon capture and storage technologies or by any other means is a question to be solved primarily by industry. And it is for the industry to take the initiative and not to wait for the solutions to come from the public authorities as has been seen up to now.

16.4.2 Diversification of Sources and Routes

Security of gas supply is a public good. As such, Member States, like any government in the world, will always consider gas supply as part of their responsibility. For good or less good reasons, the geopolitical dimension of gas will continue to affect the rules governing gas in the market. The increase of import dependency of gas is a reality which requires to be addressed by a genuine diversification policy. This diversification requires to rely on several (some say at least three) geographical sources of gas, several routes such as pipelines and LNG terminals, and from several counterparts, i.e. different supplying companies. In addition, a fully flexible network should be available, connecting the transmission system to the storages and LNG terminals across the European Union where the free flow of gas should be ensured at all times. Domestic resources should also be made available very flexibly at least in case of emergency. Major progress has been made in the last 5 years in this respect, not only in terms of effective cooperation but also in terms of physical infrastructure. This acquis should be well maintained and improved where it is needed.

16.4.3 A Genuine Competition

The efforts made since 2009 to create a liquid gas market, open to all suppliers and enabling consumers to choose their suppliers, have to be pursued particularly by empowering more the consumers. Barriers to entry have to be removed, incumbents have to be challenged, regulated prices have to be removed and if not removed, should not act as a barrier to entry and be linked to hub prices. Hub pricing should be favoured and long-term contracts should be indexed on hub prices. Liquidity of the hubs should be ensured by enough diversification of sources and consolidation of hubs should be sought with common rules for all. Manipulation of the market and particularly of hub prices should be prevented by appropriate monitoring, through a rigorous REMIT regulation implementation and market monitoring,¹³ including the use of competition rules governing abuse of dominant position, as some major external suppliers may be tempted by such manipulation. There is a need to create a global gas market to replace the present regional markets dominated by few suppliers and to achieve liquidity of the market everywhere in the European Union. This is the condition for the consumers to trust gas as a commodity and not as a political fuel, subject to various manipulations or abuse as we have seen in the past.

16.5 Conclusions and Recommendations

Gas is a key element of the energy mix today and will remain an important component in the next three decades. Whether it is a bridge fuel, a transition fuel or a destination fuel is not the issue. The energy transition, as enshrined in the Energy Union project of the European Union and as mandated by the Paris agreement of December 2015, is the new rule of the game and requires to reduce the emissions of greenhouse gases as soon as possible. The sense of urgency can only grow in the future.

Gas is still a fossil fuel which is emitting such GHG, meaning that there is a strong incentive to replace it by other fuels which are cleaner.

Renewables are clearly preferred to gas in terms of investments as witnessed recently by the International Energy Agency in its first World Energy Investments Outlook, even if gas appears to be a good complement to renewables in power generation.

In addition, the world of energy is changing fast not only through the new affordability of renewables but also thanks to the progress made in energy efficiency and demand side management which are leading to very significant reductions in consumption, affecting also the other segments of consumption of gas such as industry and buildings.

The gas industry should worry about the ability of gas to cope with the future requirements of the energy sector as dictated by the climate change policies.

If successful in decarbonising the molecule, gas may also expand to new areas such as transport. Biogas may also become an important part of the future gas landscape and infrastructures which have been built to hold between 30 and 60 years might well remain in use. The same may be said of new technologies like power to gas, under development.

The main recommendation is addressed to the gas industry. It is its dynamism and its ability to adapt to change and to climate change which will govern the future of gas. It will be up to the industry to demonstrate to the population and to the policy decision makers that gas is a fuel that deserves to stay in the energy mix because it will also make substantial efforts to reduce drastically its carbon footprint. Again this is going well beyond the various slogans usually heard such as gas being the bridge fuel, the transition fuel or the destination fuel.

Notes

1. See Eurostat pocket book at <https://ec.europa.eu/energy/en/statistics/energy-statistical-pocketbook>. The 2016 edition covers 2014.
2. Article 194 of the Treaty on the Functioning of the European Union is the first explicit legal basis for energy legislation and has been introduced by the Lisbon Treaty which entered into force in 2009.
3. The UK decision made in September 2016 to build Hinkley Point C is the last expression of this willingness but will it mean that it will be

finally built is another question, given the conditions attached to this decision and the high price to be paid over decades.

4. The governance of the EU energy policy is a key issue of subsidiarity: how will the Member States design their energy and climate policies to cope with the 2030 objectives of the EU and with the Paris agreement of December 2015. The non-binding character of the targets for renewable and for energy efficiency, coupled with the binding character of the EU target leaves a great freedom to the Member States to organise their energy policies. See the conclusions of the European Council of 24 October 2014 at http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf. See also the Communication of the Commission of 25 February 2015 about the Energy Union “A Framework for a Resilient Energy Union with a Forward-Looking Climate Change Policy” COM (2015) 80 final at http://ec.europa.eu/priorities/energy-union/docs/energyunion_en.pdf and for a broader view of the Energy Union, see Andoura Sami and Vinois Jean-Arnold: “From the European Energy Community to the Energy Union: a policy proposal for the short and the long term” preface by Jacques Delors, Institut Jacques Delors, 27 January 2015, Paris at www.delorsinstitute.eu (Andoura and Vinois 2015; European Commission 2015).
5. NordStream2 is “the” dividing pipeline of the Energy Union. Some Member States support it while others are vehemently opposed to it. A lot of articles have been written in 2015–2016 taking position in favour or against. For a European view, see Thomas Pellerin-Carlin and Jean-Arnold Vinois in *Natural gas Europe* of 16 December 2015.
6. See the third gas directive: directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC, OJ L211/94 of 14.08.2009. On the issue of certification of TSOs see Inge Bernaerts, the third internal market package and its implications for electricity and gas infrastructure in the EU and beyond, in *The Energy Infrastructure of the European Union*, EU Energy Law, volume VIII pages 7–36, Claeys & Casteels.
7. Regulation (EU) n°994/2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC of 20 October 2010.

8. Regulation (EU) n°347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision 1364/2006/EC, OJ L115/39.
9. Regulation (EC) n°715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) 1775/2005, OJ L211/36 of 14.08.2009.
10. These papers are most interesting as they also look at the situation of each Member State and are offering a general assessment and an in-depth analysis. See www.europa.eu on Energy Union. A second State of the Energy Union has been published on 1 February 2017 and it includes a lot of useful information about the implementation of the roadmap for the Energy Union and key indicators.
11. All the papers referring to these regional cooperations are available on www.europa.eu.
12. UN document FCCC/CP/2015/L.9 issued by UNFCCC on 12 December 2015.
13. Regulation (EU) n°1227/2011 of the European Parliament and of the Council of 25 October 2011 on Wholesale Energy Market Integrity and Transparency, OJ L326/1.

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Author Biography

Jean-Arnold Vinois, a Belgian lawyer, spent most of his professional career in the European Commission. Starting in 1987, he occupied several management posts dealing with internal market, transport, trans-European networks and energy policies and acted lastly as director for the internal market for electricity and gas. At his retirement in 2013, he was appointed Honorary Director. He is now Adviser on the Energy Union at the Jacques Delors Institute in Paris and Berlin.