Geostrategy of the European Union in Energy

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André B. Dorsman, Andries Nentjes, and Petr Polak

Abstract

Among the many problems the European Union (EU) is facing, the energy question is an important one. Climate change forces the EU to reduce the use of fossil fuel. However, security of supply of energy relies heavily on the use of fossil fuel. This creates a dilemma for EU policy. The pollution caused by gas is less than the pollution of the other fossil fuels such as coal and oil. Therefore it seems reasonable that the first reduction will take place in the use of coal and oil and later on gas. This brings us to the next problem, namely that the EU is dependent on the gas import from politically instable countries. In this chapter, we will pay attention to the reduction of the use of fossil fuel as well as to the EU policy on gas import. We give an overview of the steps that the EU has taken and shall take to realize her goals for the coming years. To secure the availability of energy the EU will face a high gas dependency for quite some time. The gas market knows a number of instable countries, which makes energy a difficult political issue. The EU has to speak with one voice. In the EU every member country has a blocking vote, which weakens the position of the EU in the negotiations with non-EU gas suppliers. An alternative is the Energy Union, where the member countries have no blocking vote but takes their decisions based on the majority of the voting countries. To operate as one block is a better position than when EU-members negotiate bilaterally.

A. B. Dorsman (✉)
VU University, Amsterdam, The Netherlands
e-mail: a.b.dorsman@vu.nl

A. Nentjes
University of Groningen, Groningen, The Netherlands

P. Polak
University of Brunei Darussalam, Gadong, Brunei

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10.1 Introduction

The EU has nowadays (2018) 28 members and every member has a blocking vote. Only in the case of unanimity, the EU takes a decision. In other words, every country can uphold every decision and can try to negotiate on advantages in return for her vote. The consequence is that the decision-making process takes a long time. The reaction of the EU on its threats is mostly too late and too weak, which is, in fact, an invitation to the counterparties to take serious steps against the EU. The former UK Prime minister Cameron promised his voters that there would be a referendum on the EU-membership of the UK. Cameron negotiated with the EU president Tusk to improve the conditions for the UK membership. He has got the right to refuse inhabitants of East European countries such as Poland, Romania, and Bulgaria to get access to the UK social funds. Nevertheless, the UK voters decided in 2016 to leave the EU ("Brexit"). The separation between the UK and the EU is a painful process that will take some time. The remaining 27 countries have all a blocking vote in the Brexit negotiation. Prime minister May of the UK started the official exit process in March 2017. The procedure contains a time frame of two years for the exit process. The fear is that during this period the internal EU struggle makes a strong EU position in negotiations with non-EU countries unlikely. Besides the Brexit, the EU is facing many threats such as an overload of refugees/immigrants, the political developments in Poland, and Energy supply security.

In other words, the Energy problem is not a stand-alone case but has to be understood and solved as a part of the total palette of issues in the EU. For example Poland with its deep-rooted distrust of Russia, relies heavily on coal as its primary source of energy, a natural resource that it can harvest in abundance without depending on Russia for its supply. Its imports of Russian gas amount to less than one-quarter of Germany's, which leads Europe in imports of Russian gas (see Table 10.2 in Sect. 10.3). In defiance of the EU's transition to more sustainable fuel sources, Poland's MEPs (member of European parliament) have voted consistently against the energy plans of the European Commission. Often they have stood alone in their opposition. Now, as the transition to a low-carbon economy becomes inevitable in Europe and throughout the industrialized world, Poland faces a prolonged and extremely expensive challenge to wean itself from its dependence on coal. The special position of Poland is not easily to solve. The Polish government takes political actions that are not in line with the democratic ideas of the EU (e.g., its controversial judicial reform). Poland can by using her blocking voting right obstruct every EU decision in reducing the CO_2 emissions. The position of Poland is also important due to its special relationship with Germany, a large supporter of the energy switch from fossil fuel to renewables.

The EU has formulated some goals on this switch. We will give an overview of the tasks that have already been done and the tasks EU has to do to realize the formulated goals.

Since 1987, the year the Brundtland Report was published, the awareness of the sustainable development and the global warming problem have been growing in the EU corridors of power. Greenhouse gas (GHG) emissions from human economic activities are held responsible for warming up the atmosphere. In the hope to set an example for the world the European Union has drawn up an ambitious masterplan for the reduction of its GHG emissions. The implementation of EU climate policy is still on the runway, with a target of 20% lower GHG emissions in 2020 compared to 1990. The decade 2020 to 2030 will see the take-off. The ambition is to have GHG emissions in 2030 at least 40% lower than in 1990. Passing in full flight in 2040 the target of 60% reduction, the landing at the destination of 80% to 95% reduction compared to the start will be in 2050 (European Commission 2014).

The goal of this chapter is twofold. Firstly, after the overview of the steps that already have been taken to reduce CO_2 pollution, we formulate the steps that have to be taken to realize the goals that EU has formulated. Secondly, we will look at the EU gas policy and strongly advise to support the Energy Union.

The originality of the work is that—as far as we know—this chapter is the first that pays attention to two mutually opposing goals, namely CO_2 reduction and energy independency of the EU. We believe that the EU can make progress on both goals by switching from oil and coal to gas (the least polluting fossil fuel) and renewables and by developing in the same time a coherent EU gas policy for all EU countries, using the Energy Union to avoid the blocking voting rights of individual EU countries.

In Sect. 10.2 we will look at the economic feasibility of the emission reduction targets of EU climate policy and the impact the policy will have on the position of fossil fuels in the EU. The EU energy policy to countries outside the EU will be presented in Sect. 10.3. In that section also the informal group called the Energy Union will be introduced. Section 10.4 concludes with our main arguments and takes a look ahead into the future.

10.2 EU Climate Policy and the Future of Fossil Fuels

EU climate policy is changing the rules of the game for the EU energy policy. Its traditional role is to make sure fossil fuels remain available for consumption in sufficient quantity at a reasonable price. The climate policy challenge is not how to secure fossil fuels but, to put it bluntly, how to get rid of them.

Over the period 1995 through 2014 GHG emissions in the EU-28 have decreased with a rate of change equal to the decrease of fossil fuel consumption (measured in toe: tons of oil-equivalent); both in the face of an increase in Gross Domestic Product (GDP). The development implies—see Table 10.1—that the GHG intensity of GDP, that is the quantity of emissions per euro of GDP, has fallen by about 38%. Moreover, so did the fossil fuel intensity of GDP with an exponential rate of decrease

Table 10.1 Indexes of GDP, fossil fuel consumption, GHG and CO_2 emissions 1995–2014

Indexes of	1995	2014	% change
Gross domestic product (GDP)	100	136.7	+ 36.7
GHG emissions	100	85.2	−14.8
Fossil fuel consumption	100	85.2	−14.8
GHG intensity of GDP	100	62.3	−37.7
Fossil fuel intensity of GDP	100	62.3	−37.7

Based on European Commission (2016, pp. 152, 161, 163, 41, 169)

Table 10.2 Biggest EU importers of Russian gas in billion of cubic meters

Country	2016
Germany	49.83
Italy	24.69
UK	17.91
France	11.47
Poland	11.07
Austria	6.08
Hungary	5.54
Czech Republic	4.54
Netherlands	4.22

Source: Gazprom company, Russia (http://www.gazpromexport.ru/en/)

of 2.5% per year. The figures illustrate the link between economic growth and consumption of fossil fuels has been broken and also that the fall in GHG emissions was tied very tightly to the diminution of fuel consumption. We expect no change in the relation and shall use as a guideline that every 1% reduction in GHG emissions requires 1% reduction in fossil fuel consumption.

The enormous saving in the use of fossil fuel for the production of GDP of 37.7% over 19 years can for only a minor part be ascribed to its substitution by renewable energy, given the modest rise of the share of renewable resources in total energy from 5% in 1995 to 13% in 2014. Increase in the use of bio-fuels is a further possibility, but we have no information on that option. Substitution of gas for coal and oil in power generation also has contributed: CO_2 emissions (measured in kilograms per gigajoule) are for natural gas about half the emissions of coal, while oil is just in between (IEA 2016, p. 150). The decrease in the share of industry in GDP and the larger share or the service sector, where fossil fuel intensity is lower, might also have played a role in reducing the consumption of fossil fuels, although that effect was largely compensated and possibly overcompensated by the strong growth of the very fossil fuel intensive service sector transport. Altogether the contribution of fuel substitution and sector changes to the lowering of the fossil fuel intensity of GDP cannot have been substantial.

Our preview that in 2030 fuel consumption will be 25% lower than in 2020 differs from the scenario the EU has in mind. To pick potential winners it finances carbon capture and storage (CCS) projects with several billion euro of subsidy. CCS is a

technology to decrease carbon emissions in the atmosphere by trapping the CO_2 after combustion and transport it to a place where it can be stored in the ground. If CCS becomes available at sufficiently low costs, it opens the perspective of a carbon-free economy with the continuation of fossil fuel consumption, for example in electricity generation. Presently (2017), the technology still is in the demonstration stage and far too costly to be a competitive option. Our preview is based on the expectation that CCS will not succeed to make a breakthrough in the period 2020 to 2030. Whether GHG emissions in 2030 at a level 25% lower than the target for 2020 will be economically feasible depends crucially on the rate of fossil fuel saving technical progress. Assuming the decade will see an annual rate of GDP growth of 1.5% and an (exponential) decrease in fossil fuel consumption by 2.9%, an ongoing rise in the share the costs of energy consumption takes in GDP can only be prevented if the annual rate of fossil fuel saving technical progress is not below 4.4% (1.5% + 2.9%) per year over the whole decade.

Climate Policy in Two Sectors

GHG emissions are released by various sectors and the instruments applied to restrict emissions vary between the sectors. In this section, we focus on two major sectors: fossil fuel-intensive industry and road transport. The emissions of fuel-intensive industry, 45% of all GHG emissions in 2014, are contained with an economic instrument: The European Union Emission Trading System (EU ETS). In the transport sector, 20% of all GHG emissions in 2014, the command-and-control method of CO_2 emission standards for cars and vans is applied.

10.2.1 The EU-ETS System

10.2.1.1 The EU-ETS System: 2005–2020

The EU ETS was introduced in 2005. The scheme covers the GHG emissions of oil refineries, steel works and production of iron, aluminum, metals, cement, lime, glass, cardboard, acids and bulk chemicals. Included are also power and heat generation—think of electricity production transported through the public grid—and further commercial aviation for its flights within the EU. Next to carbon dioxide, two other GHG gases have been brought into the system. The three gases are measured in tons of CO_2 equivalent emissions. The target of EU ETS is to have in 2020 those emissions 21% lower than in 2005, the year the system started. For 2030 the target proposed by the European Commission in July 2015 is to have 43% lower GHG emissions than in 2005.

A firm operating under EU ETS has obligation to hand over to the supervising authority an allowance for every tonne of CO_2 equivalent emissions released by its installations. The number of allowances made available per year is equal to the target for the CO_2 equivalent emissions in that year for the whole group of firms. The allowances are made available by way of auction. Companies also adjust allowances to their emissions by buying or selling allowances on the secondary market. Since the supply of allowances is fixed the market price has the function to adjust the

demand for allowances to available supply. Growth in GDP increases the consumption of fossil fuels; by that it raises the demand for allowances to cover the additional CO_2 emissions. So the allowance market price goes up. Fuel saving by companies lowers the demand for allowances, which leads to a fall in their market price. Given the supply of allowances the actual development of the market price in EU ETS depends on which of the two forces at the demand side has the upper hand.

Over the past years the allowance price in EU ETS has been falling from its early peak of 35 € in July 2008 to 7 € in Fall 2017 and in between even lower. Why is the price so low? The usual answer is that the emission target was too weak and as a consequence too many allowances have been handed out. Further the economic crisis and recession from 2008 to 2014 reduced output and in its trail the demand for allowances. That conventional explanation is incomplete. It overlooks that ongoing fuel saving technical progress has been reducing the demand for allowances from year to year since 2005 and must have been a major factor in depressing the market price. So, the conclusion must be that the low price of carbon allowances over the past six years reveals that GHG emissions are reduced at extremely low marginal cost thanks to technical progress in fossil fuel saving in the EU ETS sectors. Those costs are far below the expectations in 2005. That should not come as a total surprise. The phenomenon that as the reduction percentage goes up the average cost of emissions reduction actually goes down instead of up, as was forecasted, has been noted before (Krozer and Nentjes 2007).

A very widely shared view is that the price of carbon allowances is too low (e.g., The Economist 2013) The argument runs that such a low carbon price falls short as an incentive for research, development and introduction of low carbon technology. We don't detest the incentive effect has been weak. However, what the critics forget to mention is that over the past years fossil fuel saving technical progress has been going on, despite the low allowance price, because all the time the price of fossil fuels was and still is there as a strong economic incentive to save on costly fossil fuels. It has been working effectively in raising the efficiency of fossil fuels and in that way it has lowered the cost of reducing GHG emissions. Thanks to that development the sectors under the reign of EU ETS are going to meet the collective target of GHG emissions 21% lower in 2020 compared to 2005 easily by reducing their consumption of fossil fuels.

10.2.1.2 The EU-ETS System: 2020–2030

After having concluded that the sectors in EU ETS will meet the collective GHG reduction target for 2020 at low costs, we have to look forward to the target for 2030. One can have good hope that the rate of progress in fossil fuel efficiency will accelerate compared to the annual rate of 2.5% over the period 1995 through 2014, thanks to decrease in (a) the cost of production of solar electricity, (b) in the cost of storage of electricity in batteries and (c) in the cost of long-distance transport in electricity. The three developments have it in them to give in combination an enormous boost to the diffusion of electricity from renewable sources in the power sector, where it will be a substitute for fossil fuels.

The decrease in the cost of solar electricity is indeed spectacular. In the decade 2005 through 2014 the cost of power from large-scale photovoltaic installations in Germany fell from 0.40 €/kWh in 2005 to 0.09 € in 2014. It is expected that depending on annual sunshine the power cost by 2025 will be 0.04 € to 0.06 €/kWh (Fraunhofer ISE 2015). Cengis and Mamis (2015) conjecture that in the years between 2017 and 2024 the cost of PV panel production will have come down to grid parity around the world.

The cost of lithium-ion cells, the primary component of batteries, are coming down fast (The Economist 2017c). Grid operators are beginning to install lithium-ion battery packs for large-scale storage of electricity to smooth out the effects of intermittent power supplies from sun and wind and to manage peak power demand. Battery packs for small-scale storage are bought by companies and households that want independence from the grid or to store the electricity they produce and sell into the grid at the most lucrative time.

The variability of electricity supply from sun and wind as well as its costs are also diminished by the penetration of new technology for the long-distance transport of electricity. Large-scale generation of electricity from renewables often requires high voltage transport over long distances. When the grid employs the usual alternate current (AC) it leads to large loss of electricity on its route to consumers. That is avoided by investment in a special cable for direct current, the so-called long–distance ultra-high-voltage direct-current (UHVDC) connector. China is by far the leader in applying the technology (The Economist 2017a). In Europe, the first steps are set by 50Hertz, a German grid operator. A new UHVDC-line will ship electricity produced in wind parks in northeast Germany to Meitingen in Bavaria where it will replace the power from south German nuclear plants. Boris Schucht, 50Hertz's boss, foresees in the not so far future an infrastructure of UHVDC-lines that will bring electricity generated in large windmill parks to Scandinavian hydroelectric plants to pump water uphill in the storage reservoirs and transform intermittent supply in base-load electricity supply (The Economist 2017a).

The combined technical progress in solar panels, batteries and long-distance electricity transport holds for the decade 2021 through 2030 the promise of a great breakthrough in the production, transport and consumption of electricity based on renewables at costs equal to and lower than energy from fossil fuels. As the scenario unfolds it will release a formidable supply of carbon allowances from electricity companies within the power sector that will become available for companies in other EU ETS sectors. The supply will depress the market price for carbon allowances and keep the cost low for companies in EU ETS that cannot do without fossil fuels. Further the development towards steadiness in the supply of electricity from renewable resources will gradually wipe out the notion that the increasing share of renewables leads to an increasing need for base-load electricity, generated by nuclear power installations.

10.2.2 Emission Standards and Energy Breakthrough in Road Transport

The share of the transport sector in total GHG emissions of the EU is around 22%; more than two-thirds of it comes from road transport. The key instrument to curb CO_2 emitted in road transport is command-and-control in the form of mandatory maximum CO_2 emissions for new cars and vans in various classes, with differentiation of the emissions standards according to mass of the vehicle. The maxima set for 2021 imply a 40% reduction in CO_2 emissions compared with the fleet average in 2007. Up to now (2017) little has been done to cut the GHG emissions from heavy-duty vehicles. Transport is the only major sector where in 2014 total GHG emissions were higher than in 1990. The increase of emissions by 20% was caused by the tremendous growth in the volume of road transport, which largely undid the effect of more strict standards for CO_2 emissions of new cars.

The mandatory standards for new cars and vans are based on what is deemed to be feasible in the technology of the internal combustion engine. They do not command revolution; yet that revolution has already started: the switch-over to the battery-charged electric vehicle (EV). Patel et al. (2017) project EVs may be competitive by the mid-twenties and by the mid-thirties make up between 27% and 37% of new car sales.

The success of the EV is above all the fruit of the miraculous development of the lithium-ion battery. Battery costs per kWh have come down immensely while battery energy density (watt-hours compared to energy per liter petrol) increased progressively. The fear that an electric car will run out of power before reaching a charging point is in remission. EV drivers with off-street parking and a socket to plug in can charge at home; 90% of charging is done in this way. Investments in public charging points have in rich countries just about kept pace with the growth of EVs. The Economist (2017d) sees it as unlikely that a lack of infrastructure will hold back the spread of EVs.

We conclude that by 2030 the electrical car will be well established, thanks to market forces. Regulation will follow its lead by basing new emission standards on the emissions of a car propelled by electricity. Calculations for the U.S. find that existing electric cars reduce carbon emissions by 54% compared with petrol powered cars (The Economist 2017b). It illustrates the superior fuel efficiency of electricity from central power stations, compared to burning oil in separate engines. This is only a halfway station. By 2030 good progress will have been made in making electric cars cleaner, thanks to the technical progress in production, transport and storage of electricity from renewables, on which Sect. 10.2.1 reported.

In 2015 almost half of total oil consumption in the EU was in road transport. The Economist (2017b) mentions that Royal Dutch Shell foresees global demand for oil will reach its peak between 2025 and 2030. It inspires the journal to unfold a scenario in which producers with vast reserves that can be tapped cheaply will pump what they can before it is too late, while in new, high-cost areas investment will come to a stand-still. However, the scenario overlooks that in 2015 cars counted for one third of the EU's total oil consumption (own calculations based on Eurostat). Major

oil-slurping, growing sub-sectors in transport, such as heavy duty vehicles, on and off the road, and also shipping and aviation, will only slowly get loose from their addiction to fossil oil. Together with the demand for crude oil from petro-chemical industry that will keep the oil industry alive and reasonably well for the next two decades or more, unless new developments succeed to make bio-fuels a substitute that in costs is competitive with fossil oil.

10.2.3 Concluding Remarks on Climate Policy and Energy

From the information available in Fall 2017, it is evident that the climate policy of the European Union will be successful in bringing down its GHG emissions by 20% in 2020 compared to 1990. This has been done by way of a proportional reduction in the consumption of fossil fuel enabled by fuel-saving technical progress. Companies have an incentive to make the efforts that generate such improvements in energy technology because they have an interest in lowering the cost of fuel input in their production process and also in their products, such as cars. The major role of fuel-saving technical progress explains why the cost of energy has remained low despite the growth in GDP.

The target of EU climate policy for 2030 is 25% lower GHG emissions than in 2020. We foresee for that period in the sectors fuel-intensive industry and road transport a development that is basically similar to the experience up to 2017: steady reduction of GHG emissions, brought about by lower fuel consumption, thanks to fuel-saving technical progress. The difference between the two periods will be that the future rate of progress in fuel saving has to be twice as high as before to prevent a steady rise in the costs of energy consumption. There is no guarantee that such an acceleration will occur, but it is within sight thanks to the breakthroughs in the production of electricity from renewables, the penetration of that new technology and its further improvement during the decade in the process of learning by doing. It is not difficult to see that the technical progress will also transform the use of energy in other sectors, such as households.

10.3 Current State of Energy Policy in the EU

As we have seen in the earlier sections, the EU has a large focus on CO_2 reduction by switching from fossil fuel to renewables. However, due to the unexpectedness of wind and solar energy, the energy security is at stake. The pollution of gas is less than the pollution of oil and coal. Therefore, although we have the switch from fossil fuel to renewables, the gas production and consumption will continue on a certain level. In this section we will foremost look at the EU gas market and will pay attention to: gas supply in the EU, Energy dependency challenges and the Energy Union.

10.3.1 Gas Supply in the EU

The EU is not only importing gas, but also has its own gas industry. Starting the sixties of the last century Groningen (The Netherlands) produced gas and The Netherlands has a well developed gas network. Nearly every household in the Netherlands has a link with the gas network. However, the production of gas has also its disadvantages. Groningen is facing earthquakes caused by the gas production. Buildings are becoming damaged by the earthquakes, and the population of Groningen wants that the gas production is decreasing substantially. Some hardliners wish a total stop in production in Groningen. Furthermore, we see that the gas production in North-West Europe is declining. The United Kingdom (UK) was untill 2006 a (net) gas exporting country, but switched to a gas importing country. Skea et al. (2012) write that during cold days UK are facing potential shortfalls. The switch from a gas exporting to a gas importing country is less abrupt in The Netherlands. The gas production in The Netherlands will decrease gradually, and the developed gas network will be used for gas imports from other countries. Schipperus and Mulder (2015) write that the Netherlands choose for the alternative of a gas roundabout. It will import gas and due to the well-developed gas network, it can easily distribute this to other countries. The own gas production in The Netherlands will serve as a swinging supplier.

One of the potential newcomers is the eastern part of the Mediterranean. There seems to be a large potential for future gas production. Countries like Cyprus, Egypt and Israel, which are not traditional gas suppliers, have offshore gas fields. The main question is: Can these countries deliver the gas in the competitive European market? [see also the chapter of Karbuz (2018) in this book].

First of all, the market suffers under a supply that is higher than the demand and it is expected that also in the coming years this imbalance will not disappear. Second, the Eastern Mediterranean knows a high political risk. North Cyprus is recognized only by Turkey as an independent country; Cyprus suffered a couple of years ago under a bank crisis and her strong link with Russia is not a recommendation; Egypt has internal political problems with the Muslim Brotherhood and the relationship between Israel and its neighboring countries is not optimal. The opportunities of the Eastern Mediterranean on the European gas market are mixed. Its gas can be a good alternative for the Russian gas. However, the high political risk is an important disadvantage.

Energy policy belongs to the so-called shared competences of the EU and its shape is therefore influenced by all Member States and the EU itself. EU institutions mainly as coordinate, but there are also areas in which the EU Council and the European Parliament (EP) can approve legally binding legislation for member states, based on the European Commission proposal. These include the necessary measures, especially in the fiscal area, to help achieve energy policy objectives set out in Article 194 of the Lisbon Treaty signed in 2009. Conversely, setting the energy mix, choice of energy suppliers and deciding on the direction of energy policy the Lisbon Treaty leaves power to national governments, which allows different approaches of

individual Member States. France is supplied mostly by nuclear power, Germany promotes the renewable energy and Poland is largely remained dependent on coal.

The current EU energy policy is based on the Green Paper "A European Strategy for Sustainable, Competitive and Secure Energy" from 2006 in which the European Commission has set out six key areas on which to focus. These are: the completion of the internal market in electricity and gas, the internal energy market that guarantees security of supply; solidarity between Member States; security and competitiveness of energy supply (=diversification of energy sources); integrated approach to tackling climate change, promoting innovation and technology and a common external energy policy.

In order to realize this, in 2007 the third liberalization package of legislation on the internal energy market was approved, aimed at ensuring effective competition, creating favorable conditions for investment and diversity of supply security. The EU concern relates primarily to natural gas, due to the several Member States depending on a single supplier—Russia. In January 2014, the European Commission introduced a new draft package of energy and climate policy objectives until the year 2030. It is aimed at bridging problems with energy sector over-regulation, which goes to the detriment of the competitiveness of European industry.

The EU remains acutely aware of its vulnerability to disruptions of its energy supplies. Commercial disputes between Russia and Ukraine in 2006 and 2009 severely reduced the flow of natural gas to the rest of Europe, while accidents, natural disasters and concerns related to climate change continually reveal the precarious foundations on which Europe balances its industrial and social prosperity.

To reduce this vulnerability, the Commission adopted measures in 2008 under its Energy Security and Solidarity Action Plan to reinforce its relationships with supplier nations, enhance the security of transit channels and accelerate development of energy-related infrastructure, especially pipelines. The effectiveness of this plan depends on solidarity between the EU's member states and their accommodation of diversity in their sources and suppliers of energy, especially natural gas. To this end, EU policy has focused on interconnection with Baltic countries, construction of a southern corridor to transport gas from the Caspian Sea and the Middle East, construction of liquid natural gas (LNG) terminals to reduce reliance on gas shipments from Iran, the Middle East and sub-Saharan Africa to Mediterranean ports, and a unified network from north to south for the transmission of electricity and gas.

EU may include an increased import of natural gas from above-mentioned regions to 100.5 billion cubic meter (bcm) building the gas pipeline Galsi (between Algeria and Italy) and the opening of the gas pipeline MedGaz (between Algeria-Spain), etcetera. For the EU is also important the Trans-Sahara gas pipeline that should connect Nigeria and Algeria. However, the project has been delayed by political and security problems. With the advancement in technology that now allows transport of natural gas to large distances, the EU gets a new source of energy, liquefied natural gas, which may come from Australia or USA.

The European Commission published in January 2014 a report according to which energy prices in the EU are much higher than elsewhere in the world. The

price of electricity in the EU is two times higher than in the USA, and the price of natural gas is even 3–4 times higher compared to prices in the USA or Russia (Polak 2014). EU gets into a comparative disadvantage when it wants to lure energy-demanding investors. The fault is not only a high dependence on energy supplies from abroad (mainly from Norway, Nigeria, Qatar, Algeria and Russia), but also ambitious commitments made e.g., within the energy-climate package of Europe 2020, Europe's growth strategy with ambitious binding targets in energy and climate protection.

While the development of shale gas may help in lowering energy prices, European industries continue to demand high levels of energy for their operations. With this in mind, the European Commission has proposed the relaxation of binding commitments by member states to reduce CO_2 emissions by 2030. Instead, the Commission proposes that each country achieve emission reductions according to its individual capabilities, either through increasing the role of renewable energy or through an emphasis on an efficient core source while alternative sources can be developed.

Primary the EU-28 energy production in 2014 was spread across a range of different energy sources, the most important of which in terms of the size of its contribution was nuclear energy (28.7% of the total); the significance of nuclear fuel was particularly high in France, Belgium and Slovakia where it accounted for more than half of the national production of primary energy. More than one fifth of the EU-28's total production of primary energy was accounted for by renewable energy sources (25.5%) and solid fuels (19.4%, largely coal), while the share for natural gas was somewhat lower (15.2%); crude oil (9.1%) made up the remainder of the total (Eurostat, on line data codes: nrg_100a and NRG_107a).

On 20–21 March 2014, the European Council discussed the EU energy security. It concluded that "efforts to reduce Europe's high gas energy dependency rates should be intensified, especially for the most dependent Member States".[1] Progress made since the 2006 and 2009 energy supply crises in creating a common energy market and implementing mechanisms that would ensure the security of supply has been insufficient. The EU remains vulnerable to political pressure due to its high dependency on oil and gas imports. Its room for maneuver vis-à-vis Russia is limited, and its efforts in the current crisis have been less effective as a result.

10.3.2 Energy Dependency Challenges

This text proposes a set of measures that address the EU's energy dependency challenges. Its implementation could lead to the creation of a genuine "Energy Union" in Europe. All the measures and instruments should be introduced based on the Treaties with full respect for the current balance of competencies between the

[1] http://gastechinsights.com/article/eu-seeks-strategy-to-reduce-gas-dependency

EU institutions and the Member States and the sovereign right of Member States to determine their energy mix.

The Lisbon Treaty has created a legal basis for EU energy policy with full respect to the Member States' right to exploit and choose their energy sources and structure their energy supply. The EU has already undertaken actions to ensure: the creation of a functioning common energy market; the security of energy supply in the EU; the promotion of energy efficiency; the development of new and renewable energy sources; the promotion of the interconnection of energy networks; and the strengthening of the external dimension of EU energy policy. Now is the time for the EU to accelerate its activity and fully exploit its current treaty competences to build an "Energy Union".[2]

10.3.2.1 First Pillar: Infrastructure

Removing energy islands and bottlenecks from the infrastructure map of Europe remains an urgent challenge. Gas and oil imports dependency remains an unaddressed challenge for the EU. It includes rediscussing the importance and needs of the oil sector in order to decrease oil dependency and address lack of diversification capabilities of the EU refining sector. The EU needs to find a way for including the oil sector in its financial support policies i.a. Via support for oil infrastructure and storage capacities and developing new technologies for refining sector to mitigate the dependency from single supply sources.

10.3.2.2 Second Pillar: Solidarity Mechanisms

Faced with a crisis, the EU should make use of its aggregated power. That should include developing preventive planning and emergency responses to potential supply disruption scenarios. In the event of a crisis, no Member State should be left alone.

The security of supply regulation should be revised in order to enable the development of EU-level response mechanisms for crisis situations: EU risk assessment; EU preventive plan; EU emergency plan. The system should be built upon crisis and management capacities of the European Commission; optimized use of existing and planned infrastructure, including gas storage facilities; the full advantage of the specificities and potential of each Member State's energy system. Combined, these elements should allow for the creation of a system that would ensure a flexible and fast reaction to any events that could result in supply disruption. Before a revision of the SoS (security of supply) Regulation, the Commission would be invited to prepare an EU Risk Assessment, taking into account new geopolitical risks which could lead to disruption of gas transit through Ukraine.

[2]Huge thanks to Mr. Szymon Polak, First Secretary, Energy Section, Permanent Representation of the Republic of Poland to the EU, for his kind comments and ideas.

10.3.2.3 Third Pillar: Strengthen the Bargaining Power of Member States and the EU Vis-à-Vis External Suppliers

Member States should reinforce their position during negotiations with third countries by acting under the" umbrella" of the EU and making use of the internal market and economy of scale benefits. A creation of demand aggregation mechanism for external gas supplies at the EU or at the regional level could be an efficient tool to optimize the bargaining position of the major wholesale gas recipients on the EU market and could form an effective remedy to the segmentation of national markets and inequality in terms of gas pricing among the Member States. This could take the form of a collective purchasing mechanism, and the Commission should be invited to analyze its potential structure and impacts on the development of the functioning internal gas market and to ensure security of supplies. Since there are several models of collective purchasing mechanisms, further work should be done to examine the best market-based options applicable for the EU regions and suppliers concerned.

10.3.2.4 Fourth Pillar: Development of Indigenous Energy Sources in the EU

European dependence on oil imports has grown from 76% in 2000 to 90% in 2014. The EU spends some 215 € billion on oil imports, over five times as much as on gas imports (40 € billion). Russia is the biggest supplier: dependence on Russia has grown from 22% in 2001 to 30% in 2015.[3] The development of utilization of indigenous resources should be treated as an investment in the EU energy market that will stimulate the economy. It could shift the European capital flows from external suppliers to the European energy producers. Hydrocarbons help to address energy dependency challenges cost-effectively. No energy source that might contribute to the EU's energy security should be discriminated against. Conventional fossil fuels should be acknowledged as a vital element of EU energy security. The EU should also support those Member States who decided to exploit their unconventional gas and oil resources by: emphasizing the fundamental importance of unconventional resources for the EU's security of supply and competitiveness; confirming that current EU legislation is adequate and sufficient for the safe exploitation of unconventional resources so that there is no need for new legislative proposals in this respect; stressing that drafting specific national regulations on environmental and investment conditions (that means for the extraction of shale gas) lies within the competence of Member States; supporting the integration of shale gas infrastructure with the gas networks of Member States; supporting the development of environmentally safe unconventional hydrocarbon technologies, sharing best practices and raising public awareness.

[3] http://energypost.eu/europe-increasingly-dependent-oil-imports-russia/

10.3.2.5 Fifth Pillar: Diversification of Energy Supply to the EU: Gas and Oil in Particular

The better the energy infrastructure in the EU and the more integrated the EU energy market, the easier it will be to attract alternative external suppliers. Energy infrastructure development and EU market integration will attract alternative external energy suppliers. We should, therefore, strive to enhance EU cooperation with current alternative external suppliers and invite new ones for oil and gas deliveries.

The global LNG market is of particular potential in this regard, especially since the shale revolution in North America opened access to significant shale gas and tight oil reserves. At the same time, the growing interest of the North American gas sector to invest in gas-export infrastructure, namely LNG, will soon allow for a significant increase of LNG shipments. The EU should, therefore, enhance its cooperation with Canada and call for opening US gas exports to the EU. This would be beneficial both to the EU's gas consumers and to US gas exporters which would gain access to Europe's integrating gas market. Australia is also a prospective partner in that regard. We should continue work on the Southern Gas Corridor, enhancing cooperation with new suppliers from the Caspian Region as well as the Mediterranean, such as Azerbaijan, Turkmenistan, Iraq or Israel where new investments in the exploitation of energy reserves are being launched.

In order to diversify oil supplies and attract new suppliers (e.g., from Kazakhstan or Azerbaijan) the EU should increase the scope of financial support to new oil-import infrastructure and support investment in the refinery sector allowing for efficient oil processing regardless of the type of oil delivered.

10.3.2.6 Sixth Pillar: Reinforcing the Energy Community

The path to EU energy security leads through a stable and secure neighborhood. Safe neighbors mean a safer EU.

Support of the EU for the Energy Community should be streamlined especially towards Ukraine and Moldova to enable the implementation and application of binding legislation under the Energy Community Treaty. The EU should provide technical support with regards to creating independent energy-market regulators in these countries.

Significant progress should be made as regards the realization of missing projects that will connect the Energy Community countries, in particular, Ukraine and Moldova, with the EU internal market. These include:

- Gas reverse-flow on the Brotherhood pipeline;
- Upgrading, developing and technical integration of electricity and gas grids of bordering the Member States and upgrading interconnectors between EU and Energy Community countries.

EU support for the modernization of Ukraine's gas transit system should be accompanied by progress in the implementation of relevant binding legislation under the Energy Community Treaty (pointing to the need for an EU task force).

A long-term strategy for developing indigenous energy sources and increasing energy efficiency should be further promoted in the Energy Community countries.

Technical support on the part of the EU (and with the direct participation of the Commission) should be considered for the Energy Community countries (on request) in their negotiations with energy suppliers from outside the EU. Legal capacities of the Energy Community Secretariat need to be strengthened to provide for the swift and efficient implementation of the EU energy acquis in the Energy Community countries.

EU's Energy Imports from Russia

The EU gas dependency of Russia is large but not equally divided among the EU countries. Table 10.2 contains the biggest EU importers from Russian gas in 2016.

The EU currently imports more than 60% of its natural gas. By 2030, this figure is expected to rise to 80% for gas. While the EU has access to other suppliers besides Russia, some individual states rely more heavily than others on Russian sources. Finland, Slovakia, Baltic states and Bulgaria still depend on Russia for almost 100% of their gas consumption. Greece and the Czech Republic import 70% of their gas from Russia. However, in Germany, Austria, and Poland, Russian gas accounts for less than half of their annual consumption. Belgium and the Netherlands import only 5% of their gas from Russia, while Denmark, Sweden and Cyprus import no gas from Russia at all.

Obviously, an increase in imports of gas from Russia would have a different impact in different countries. In Belgium, it would merely diversify its sources of supply; in the Czech Republic, it would reinforce the country's dependence on Russia for its energy requirements.

It is also important to keep in mind that dependence among European countries on Russian gas can be alleviated by Russia's dependence on Europe as a consumer of its supplies. Of Russia's total gas exports, more than 80% goes to the EU. Russia depends on oil and gas to generate about half of its total budgetary revenue. Regardless of President Vladimir Putin's geo-political ambitions, Moscow cannot afford to jeopardize such a critical source of revenue.

In April 2014 Polish Prime Minister (now President of the European Council) Donald Tusk published an essential article in the Financial Times of London.[4] In the article, Tusk urges Europe to re-create an energy union as a defense against what he calls Russian energy blackmail. As proposed by the Polish Prime Minister, the common energy policy abandons many of the ideas that informed a suggested European Union energy union in 2007 and 2008. In their place, it accommodates the current energy interests of Central and Eastern European EU members, including Poland, the largest of these countries. In an apparent response to the conflict in Ukraine, Tusk holds that Europe has become excessively dependent on Russian energy supplies. "A dominant supplier has the power to raise prices and reduce supply," he says. "The way to correct this market distortion is simple. Europe should

[4] www.ft.com/intl/cms/s/0/91508464-c661-11e3-ba0e-00144feabdc0.html%20axzz38qBBIR6P

confront Russia's monopolistic position with a single European body charged with buying its gas."

Using "the stand-off over Ukraine" as a starting point, Tusk's proposal for an energy union protects the interests of Eastern EU member states and initiates a diplomatic energy battle against Germany, whose energy policy, called Energiewende, seems to remain inextricably linked to a direct supply of Russian gas (Polak 2014).

Referring to the European Coal and Steel Community, formed in 1951, Tusk says an energy union would address similar challenges that reflect the fundamental principles of the European project. "Whether in coal, steel, uranium, credit or gas, the principal idea of the EU has always been to bring Europe together, deepening our security and establishing fair rules where the free market is lacking," he says. "An energy union, too, would be based on solidarity and common economic interests."

In pursuit of his proposal, Tusk sets out six principles:

1. The EU must create a mechanism for jointly negotiating energy contracts with Russia.
2. Mechanisms guaranteeing solidarity among member states should be strengthened in case energy supplies are cut off.
3. The EU should support the construction of storage capacity and gas links with the highest level of co-financing from Brussels: 75%.
4. Europe should make full use of available fossil fuels, including coal and shale gas. "We need to fight for a cleaner planet," Tusk says, "but we must have safe access to energy resources and jobs to finance it."
5. The EU must reach beyond its boundaries for partners such as the U.S. and Australia, which can supply the European market with liquefied natural gas.
6. The EU strengthens energy security of the eight countries on its eastern borders and reduces its dependence on Russian gas by reinforcing the existing Energy Community Treaty, created in 2005.

10.3.3 Energy Union

In outlining his proposal, Tusk has incorporated many of the ideas that were discussed after Russia shut down its gas shipments to the EU in 2009. Since then, EU's natural-gas operations have undergone some fundamental changes. The European Commission forced gas companies to unbundle their supply, transmission and storage operations and to guarantee non-discriminatory access by independent suppliers to the transmission network through virtual trading points.

With gas markets opened to competition, prices became subject to volatility and speculation, and trading of short-term contracts intensified. Conventional long-term contracts based on prices derived from the cost of producing and transporting petroleum products became far less attractive. However, Russia's dominant gas supplier, Gazprom, refuses to sell its gas on the open market and maintains long-term contracts with Europe's leading gas companies such as Wintershall in Germany and ENI in Italy (Polak 2015).

In this context, the economic logic of Tusk's proposal for a common European platform to purchase gas from Russia becomes clear. One large customer can negotiate much better terms with a supplier than dozens of small customers on their own. A single entity formed under an energy union would balance the scale of Gazprom so that the two sides could negotiate on equal footing. Once this occurs, Europe could begin to break the Russian monopoly on gas supplies and open its energy marketplace to free competition.

Like other proposals for a unified European energy policy, Tusk's does not acknowledge the role of private companies in the energy marketplace but instead focuses on the need for government action. Nevertheless, Tusk's proposal would affect the execution of existing long-term contracts between European importers and Gazprom. Initially, it would remove from existing bilateral contracts clauses that limit market principles. It would also establish a model for all future contracts, ultimately negotiated by the European Commission on behalf of EU Member States. In calling for more transparent long-term contracts in a single-market EU, Tusk's proposal would only enhance the competitive environment for energy supplies, enhance the transparency of long-term contracts and eliminate vertical integration to create infrastructure linkages.

The implementation of his proposal is a much more complicated matter. Tusk compares his energy union with Euratom, which acts for all EU nations in purchasing uranium for European nuclear power plants, assists in negotiations with suppliers and ensures that customers have equal access to supplies while adhering to the principles of energy security. However, centralized purchasing of natural gas presents a much more complicated process. Compared to uranium, quantifying future demand for gas requires much more complex calculations, and security of supply in an open marketplace depends on much greater market flexibility.

This is not to dismiss Tuck's proposal. However, a central purchasing mechanism under the supervision of the European Commission can succeed only under the following conditions:

- The mechanism works in conjunction with free-market trading at virtual trading points;
- The mechanism applies only to long-term contracts, and
- It would not interfere with the freedom of private European companies to compete for market share.

Austvik (2016) discusses the debates about the Energy Union and looks at the different positions of Central and Eastern European countries (CEEC) and the Western European countries. The CEEC were under the Soviet Union regime and became more gas dependent from Russia than the Western European countries. In the last decades of the twentieth century, the Soviet Union exported gas by pipelines to the CEEC countries, sometimes against a lower price than the market price, and also to the Western European countries against market prices.

Austvik (2016) refers to Mr. Perle, assistant secretary of defense in the Reagan administration, who mentioned in 1982 three reasons for the Russian gas export

policy to (Western) Europe. Firstly, the Russian gas export to Western Europe was a good tool to receive hard currencies. Secondly, an economic link between Europe and the Soviet Union was created. Thirdly, the European gas dependency of the Soviet Union gives the Soviet Union a tool for political pressure. Later a fourth reason was added, namely that the material for the gas pipeline infrastructure came from Western Europe, but could also be used for military purposes.

After the breakup of the Soviet Union in 1991, the gas was now transported through independent countries to Western Europe. Some of these transit countries - such as Ukraine - had no longer a good relationship with Russia, the successor of the Soviet Union. The gas delivery from Russia through Ukraine to Western Europe was sometimes stopped due to disagreement about prices (but unofficially also due to political reasons).

Austvik (2016) mentions some hurdles for a joint EU policy.

1. There are heterogeneous preferences about what the EU is and normatively should be. Spain negotiates with Morocco about energy; not the EU and Morocco.
2. The market between East and West, but also within the West differs.
3. Economic developments differ between East and West and contribute in creating different preferences in the field of the environment and climate change.
4. Eastern and Western European relations to Russia in general and for Russian gas, in particular, are formed in a somewhat different sum of hard and soft forces, path-dependent relationships and constraints.
5. The financing of extended infrastructure and better interconnectedness is based on the premise of a financially strong EU, a greater degree of supranationality, and more extensive use of the "Community Method".

Misik (2017) comments the article of Austvik (2016) and argues that CEEC is no longer a homogeneous group of countries and he is less pessimistic about a European answer on Russia. Misik (2015) writes that the countries that joined the European Union after 2004 after in general highly dependent on Russian energy supplies and some of them (Slovakia and Bulgaria) have no or only limited alternative suppliers.

10.4 Conclusion

In this chapter, we dealt with two energy questions of the EU, namely the EU climate policy and the Energy Union to secure the availability of energy. The EU climate policy has direct consequences for the EU energy policy, since the aim of emissions of greenhouse gases in 2050 at a level that is 80% to 95% lower than in 1990 cannot be achieved without a reduction in the consumption of fossil fuels of about the same percentage. The transmission to a carbon-free world will bring an end to the economic era based on energy from fossil fuels.

Historically the ongoing decrease in the fossil fuel intensity of production has come from technical progress driven by the incentive to save on costly energy. In a

growing EU economy an annual rate of increase of 2.5%, as was realized over the years 1995 through 2014, will be insufficient to achieve the planned reductions in GHG emissions without continuously rising cost for society. Looking forward to the decade 2020 to 2030 we foresee such an acceleration in the rate of fossil fuel saving technical progress thank to four breakthroughs: spectacular decreases in the costs of production of solar electricity, storage of electricity in batteries, long-distance transport of electricity and the electric car evolution. The four developments have it in them to give in combination an enormous boost to the diffusion of electricity from renewable sources as a substitute for all three fossil fuels and even for nuclear energy.

For the decade between 2020 and 2030, the scenario of decreasing fossil fuel consumption by 25% in 2030 compared to 2020 will, in particular, hit the consumption and production of coal, which is the most carbon-intensive of the fossil fuels. The regions within the EU that are economically highly dependent on coal industry are looking forward to substantial times of economic adjustment. The breakthrough of the electric car will lower the demand for oil, but heavy-load road transport, shipping, and aviation will keep oil consumption going, albeit at a lower level. Gas, with the lowest carbon intensity and a substitute for coal in electricity generation, can function as a transition fuel, which may slow-down its fall in consumption in the period between 2020 and 2030.

In 2013 the EU emitted 10.8% of global CO_2 emissions; third in rank, after China (27.4%) and the U.S (15.7%) (European Commission 2016, p. 18). In an uncertain world, the wise strategy is to look for economically and politically powerful states as international partners that intend to go into the same direction as EU. Implementation of the Paris Agreement in the form of international coordination of national policies to reduce GHG emissions helps to create more economic certainty and stability in political relations. In the context of such cooperation, information can be exchanged and coordination tried out of such difficult issues as the shrinkage in the international consumption, imports and exports of fossil fuels.

Just as they did after the Word War II, European leaders wonder whether they should assess energy security collectively as members of the EU or individually as autonomous nation states. While the debate continues, a European Energy Union cannot function effectively as long as individual nations pursue their sovereign energy strategies. Germany's unilateral pursuit of an energy policy based on renewable resources backed up by gas-powered electrical plants, conflicts with and disrupts the stability of energy strategies pursued in neighboring countries. Likewise, the special relationship between German energy companies and their Russian supplier works to their benefit and to the detriment of other European countries in their relationships with Gazprom.

Russia remains the primary supplier of natural gas to the European Union, and natural gas continues to play an important role in relations between the EU and the Russian Federation. The EU's fundamental energy-related challenge is to restrict its dependence on Russia and try to geographically diversify energy sources. To this end, Europe must better align its gas pipeline network and invest more heavily in the capacity of port terminals to accommodate imports of LNG (Polak 2017).

To achieve its objectives, Europe must constantly speak with a single voice to denounce onerous long-term contracts for gas imports from Russia and to gain a stronger bargaining position. As part of its diversification strategy, Europe must also invest in an Iran-Europe Pipeline to bring gas to Europe from Central Asia and Iran.

Russia currently faces threats on multiple fronts to its role as Europe's dominant supplier of natural gas. If the EU can exploit Russia's vulnerabilities to its advantage while putting in place the contracts and infrastructure to import gas from alternative sources, it can increase its energy security on more competitive terms. To this end, European countries must be willing to set aside their interests for the sake of their collective long-term benefit.[5]

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