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The Paris agreement:

And its impact on the European gas industry

Alexandra-Maria Bocse, EUCERS Fellow



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RF design
www.RFportfolio.com
Approved by
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December 2017

Impressum

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Alexandra-Maria Bocse has extensive experience researching on international governance, energy security and energy policy at University of Cambridge, Harvard University and King's College London. She completed an MPhil in International Relations at University of Cambridge, UK and a PhD on European energy policy at the same institution. She taught at both undergraduate and graduate levels European Politics, Global Energy and Environmental Politics and International Affairs in Cambridge and London.

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Foreword

By Dr Gerhard Wahlers, Deputy Secretary General, Konrad-Adenauer-Stiftung (KAS) and Professor Dr Friedbert Pflüger, Director, EUCERS, King's College London.

In 2016/17, for the fifth time in a row, the Konrad-Adenauer-Stiftung (KAS) supported the Fellowship in Energy Security at EUCERS. This year we welcomed two fellows at the European Centre for Energy and Resource Security, Department of War Studies, King's College London. This year's fellowship topic was "The Impact of the Paris Agreement on the Energy Sector".

Beyond the research study, the fellows also assisted in a workshop series jointly organised by EUCERS and KAS on four different topics related to the impact of the Paris agreement on the energy sector. These topics focused on energy and climate policy between the Trump presidency and Paris Agreement, the role of natural gas in the EU energy mix in the context of Paris, a discussion on industrial carbon performance and the security and financial dimension of climate change. We welcomed a variety of speakers from the energy industry, academia and policy-makers. Amongst others, Claire Perry MP, Minister of State at the Department for Business, Energy and Industrial Strategy. The energy talks series offered fellows the opportunity to present their findings at the workshops that related to their subject and incorporate feedback and results from the energy talks into their research.

The following research study is the product of Alexandra-Maria Bocse's fellowship year. She focused in her research on the impact the Paris Agreement has on the European gas industry. Her findings show that the Paris Agreement has impacted the gas industry in several ways. For example, new EU climate and energy policies such as the Green Energy Package have at least partially been justified by the agreement. Further, the European gas industry responded by changing its business model and by trying to play a more important role in global energy governance and EU policymaking. The study also found that industry is increasingly interested in participating in global energy and climate governance by developing initiatives such as the Oil and Gas Climate Initiative that allowed leading oil and gas companies to take an official joint position in the global debates on the Paris Agreement and to coordinate their work in responding to the Agreement and associated climate change policies.

EUCERS is delighted to host this exceptional Fellowship jointly and funded by KAS. We would like to take the opportunity to thank Hans-Hartwig Blomeier, Director of the KAS London office and the EUCERS team for their unwavering support of our joint projects and we are looking forward to our continued cooperation.

We hope you will enjoy the following study.

Executive summary

The study is assessing the impact of the Paris Agreement on the European gas industry. It acknowledges that the measures taken by countries worldwide through their nationally determined contributions (NDCs), the EU and the climate and energy stakeholders on the continent (energy companies, investors, consumers, etc.) might not be enough to hold the global temperature increase to well below 2°C above pre-industrial levels by the end of the century. However, the study is arguing that industry (in particular the European gas majors) has taken over the last years a series of measures to respond to the Paris Agreement and climate change constraints. The study found that the Paris Agreement has impacted the industry in several ways:

- In the European context, industry has responded to both the framework provided by the Paris Agreement and the framework of the EU's climate policies. The two frameworks are interconnected. New EU climate and energy policies, such as the Green Energy Package, have been at least partially justified by making reference to the Paris Agreement. The Paris Agreement influenced the European industry both directly and indirectly.
- The European gas industry responded by changing its business model and by trying to play a more important role in global energy governance and EU policymaking. Some changes were made ahead of the signing and entry into force of the Paris Agreement, in recognition that climate change constitutes a problem and anticipating the Agreement. The Paris Accord provided a final confirmation that the industry needs to undergo changes.
- When it comes to changing its business model, this study found that industry is adopting a series of strategies: oil and gas majors place an increased focus on gas. However, as gas is unlikely to remain part of the energy mix on the long term in the absence of advancements in carbon capture and storage (CCS) and carbon capture, utilisation and storage (CCUS) technology, large oil and gas companies are increasingly including renewable energy in their portfolio. At the same time they are investing in research in low carbon technology (new types of energy, energy storage or CCUS). Companies have also pledged to reduce the environmental footprint of their operations and increase their energy efficiency.
- We are also witnessing a process through which conventional oil and gas companies are restructuring and splitting with one branch remaining involved in the traditional energy business and the other becoming more focused on low carbon energy and energy services.
- The study also found that industry is increasingly interested in participating in global energy and climate governance by developing initiatives such as the Oil and Gas Climate Initiative that allowed leading oil and gas companies to take an official joint position in the global debates on the Paris Agreement and to coordinate their work in responding to the Agreement and associated climate change policies.
- Based on elite interviews conducted with leading EU policy stakeholders, the study found that the gas industry is losing ground in the Brussels-based policymaking arena to renewable energy representatives. While the renewable sector used to be consulted in the past on EU legislation applicable to their business, they now have more opportunity to provide input on energy policy in general.
- The research also found that so far the announced withdrawal of the United States from the Paris Agreement has had little impact on the EU, who remains committed to the Paris Agreement and the EU 2030 decarbonisation targets, and on the European gas industry which intends to continue implementing its adaptation and decarbonisation plans.

Introduction

Governments are the legal Parties to the Paris Agreement, but its successful implementation will depend on a wide range of public and private actors. The agreement aims to hold by the end of the century ‘the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels’ (The Parties to the Agreement 2015, Article 2). The main challenge for major economies in reaching this goal is transforming their energy systems (Grubb 2015).

The energy sector is the source of two-thirds of greenhouse gas emissions, according to the World Energy Outlook (IEA 2016). Half of those emissions are coming from oil and gas, with gas accounting for 14% of the emissions (Total 2017). Fossil fuels still occupy an important role in our energy mix. According to BP’s Statistical Review of World Energy, in 2016, oil accounted for 33% of the world’s energy, coal for 28% and gas for 24% (BP 2017c). The energy industry will have, beyond doubt, an important role to play in turning the Paris Agreement into a success story. This study is focused mainly on the major European gas producers, but discusses other industry sectors to the degree to which these are relevant to understanding changes experienced by the gas industry.

This study was driven by a central research question: **what impact did the 2015 Paris Climate Agreement have on the European energy industry?** Despite the role that industry is due to play in implementing the Agreement, there is limited systematic and rigorous academic literature on the implications of the Paris Climate Agreement for the energy industry. The media speculated broadly on potential implications and various think tanks published preliminary studies on the topic (for instance Carnegie in Washington). The study analyses developments around the Agreement and does not limit itself to changes taking place immediately after 12 December 2015 when the Agreement was adopted by consensus. This is because the research revealed that the negotiation processes that preceded the agreement also affected the industry.

The study does not argue that the Paris Agreement is the ultimate solution to climate change. This study acknowledges that the Paris Agreement might not deliver on its 2°C target. Scholars have pointed to the fact that the NDCs countries committed to are not ambitious enough to effectively tackle climate change. A study in the prestigious journal *Nature*, for instance, argues that ‘the near-term mitigation targets set by countries for 2020–2030 are insufficient to secure the achievement of the temperature goal. An increase in mitigation ambition for this PERIOD will determine the Agreement’s effectiveness in achieving its temperature goal’ (Schleussner et al. 2016, p.827). The

MIT 2016 Food, Water, Energy and Climate Outlook indicated that, even on the assumption that Paris pledges are met and retained post-2030, ‘the global mean surface temperature increase is in the range of 1.9 to 2.6°C (central estimate 2.2°C) by 2050 relative to the preindustrial level (1860–1880 mean), and 3.1 to 5.2°C (central estimate 3.7°C) by 2100’ (MIT 2016, p.5). Zero emissions cannot be reached in the absence of effective CCS and CCUS technologies. In addition, the withdrawal of the US from the Paris Agreement can pose additional challenges to the implementation of the Paris Agreement.

However, the study argues that the Paris Agreement led to changes at the level of the European gas industry that will contribute to European and global emissions reduction. Even if not ambitious enough to sustain the 2°C target, emissions reduction can delay the process of irreversible climate change and buy us more time for the development of technologies that can help tackle global warming (energy generation technologies low in carbon, carbon storage and processing technologies, but also geo-engineering).

This study analyses in particular the impact that the Agreement had on the field of natural gas. Among the fossil fuels, gas has the lowest carbon footprint. However, to maintain a considerable environmental advantage over coal, gas needs to be produced domestically. There is agreement among experts that currently gas is also widely available (in the context of the fracking revolution in the US), flexible in power generation and that it can bring consistency to the grid in partnership with renewable energy sources. The data released by the Energy Information Administration (EIA) shows that starting with 2005 the presence of natural gas in the energy mix prevented over a billion metric tonnes of CO₂ from being generated by power plants in the US (Energy Information Administration 2015). According to the International Energy Agency’s 2015 World Energy Outlook, as it can ‘replace more carbon-intensive fuels or backs up the integration of renewables, natural gas is a good fit for a gradually decarbonising energy system’ (International Energy Agency 2015, p.24). Gas is the only fossil fuel whose share in the global energy mix is predicted to increase (International Energy Agency 2016).

The research focuses on the impact of the Paris Agreement on the European gas industry. The European Union is a very relevant case to study. Europe played an important role in the architecture and negotiation process of the Paris Agreement. The EU was successful in securing five-year mandatory reviews for each country’s commitments and was present at every major development in the negotiations. This should make the EU a champion when it comes to promoting a policy framework that would favour climate friendly energy.

The role of companies in European energy policymaking and governance remains understudied with the main focus being placed in the specialised academic literature on the preferences of the European institutions and governments. This study will help remedy this. The European Union has an established reputation of consulting stakeholders in the policy formulation process. We would therefore expect the energy industry in general and the gas and renewable energies industries in particular to participate in European policymaking in the context of energy transition.

The European Commission launched the Energy Union in February 2015, an institutional and policy framework that aims to support additional EU integration in the energy field. The European energy security goals are related to energy availability, access to energy at a price that will foster economic competitiveness, and sustainability (European Commission 2014a). This research will engage in particular with this third dimension of EU energy security. The Energy Union is planning to achieve decarbonisation by facilitating the transport of gas and electricity generated by renewables on the European market (Helm 2015).

Gas is predicted to maintain a relatively stable share in the EU energy mix until 2050, according to the modelling exercise conducted by the European Commission (EU Commission, DG Energy et al. 2016). The Commission estimates the need for gas at around 400bcm/year.

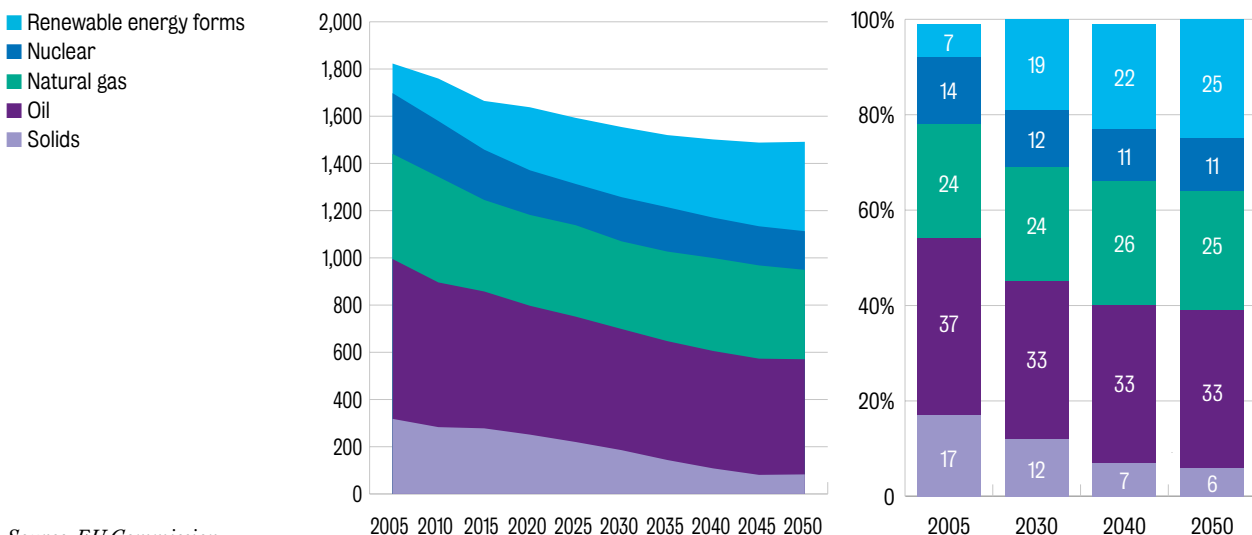
According to the International Energy Agency, European natural gas consumption will increase to more than 450 in 2040 by contrast to 418 bcm in 2014 (International Energy Agency 2016). BP is estimating that natural gas consumption will grow by 0.7% p.a. in Europe, faster than the historical trend of 0.4% (BP 2017a). BP is predicting that natural gas will grow twice as much as oil or coal,

but also admits that for this to happen there is a need for governmental policies that support a shift from coal to gas (BP 2017b). At the same time, the International Energy Agency estimates a dramatic drop in the domestic European gas production, 45% by 2040 (International Energy Agency 2016). Only Europe among the major regions sees a decline in output, as production falls in Norway, Netherlands and United Kingdom. Consequently, according to the IEA, EU gas imports will increase to 380bcm/year by 2040 (International Energy Agency 2016). According to estimates coming from industry, LNG imports will cover around two-thirds of the imports increase and increasing Russian pipeline imports will cover the rest (BP 2017a).

The fact that gas will be imported in Europe limits its environmental competitive advantage in relation to other fuels, such as coal. The carbon footprint of imported gas comes close to the footprint of domestic coal given that CO₂ is released in the transport process. CO₂ emissions generated by domestic German coal are not higher than Russian pipeline gas imported from remote exploitations (Umbach 2016). While replacing coal with gas helps the EU meet its NDCs, it creates negative climate externalities along the gas transport routes external to the EU.

According to the EU Commission, existing gas import infrastructure is sufficient to cover the EU's gas import projections. If the LNG import capacity is included, the existing infrastructure can handle 680 bcm/year. The European Commission recently showed scepticism regarding the development of certain pipeline systems such as Nord Stream 2 on the ground that there will not be a need in the future for the 55bcm/year of Russian gas that this pipeline plans to deliver under the Nord Sea to Germany and from there to the European market. Speaking strictly from an economic perspective, additional

Figure 1: EU28 Gross Inland Energy Consumption (Mtoe, left; shares (%), right)



Source: EU Commission, DG Energy et al. 2016, p.3.

gas volumes would increase the market liquidity, might trigger a drop in prices and be beneficial to consumers. This is the argument that economic agents, including the representatives of Nord Stream 2, are making (Nord Stream 2, 2017). However, the Commission claims, interconnectors internal to the EU rather than external pipelines should receive priority (for instance, interconnectors between the Iberian Peninsula and continental Europe or connecting Southeast Europe). Several bottlenecks in this region are currently addressed by the European Commission (intervention of EU official at EUCERS event 2017).

In answering its main research question: ‘**what impact did the 2015 Paris Climate Agreement have on the European energy industry?**’, this study will be looking in particular at the following aspects:

- **Changes in policy frameworks that constrain the industry.** The EU took upon itself to act as a leader when it comes to climate governance. The EU’s credibility as a supporter and architect of a new global climate agreement depended on the European Union adopting climate friendly policies at home and acting as a leader through its own example, even before the agreement was adopted. The Agreement triggered changes in national and EU regulatory and investment frameworks that, at their turn, impact industry.

One of the main goals of the agreement as set in Article 2 is: ‘Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development’ (The Parties to the Agreement 2015, Article 2). Signs of change in energy financing are already visible. World’s top investors such as Bill Gates and Mark Zuckerberg took the commitment to finance new energy technologies without expecting immediate returns by forming the ‘clean energy investment coalition’ (Milman 2015). In the framework of the programme ‘Mission Innovation’, 22 leading economies and the EU promised to double (from \$10 billion to \$20 billion/year) their clean research and development (R&D) spending in the next five years. It is unclear what financial resources can be mobilized by governments to cover this spending. As it is unlikely that tax revenues can cover the bill, carbon pricing can constitute an additional source of funding for technological development in the energy sector (Grubb 2015). The energy industry itself will most likely need to invest more in R&D in the future. Consequently, the paper investigates:

- **The measures that established oil and gas actors are taking in response to the Paris Agreement.** In great part, these changes take place in order to allow companies to remain competitive and enjoy the benefits of energy transition. In addition to changes to their business model and economic measures, the study aimed to investigate if there are:

- **Changes in the role played by industry in energy and climate policy.** The Paris Agreement intended to innovate by contrast to the 1997 Kyoto Protocol by embracing a bottom-up rather than a top-down approach. Countries were invited to take initiative and advance intended nationally determined contributions (INDCs) that will help them collectively limit the increase in global temperature. The contributions that each country makes are due to increase gradually. A bottom-up approach offered industry an enhanced opportunity to impact the pledges made by each country and will offer further opportunity to shape future pledges. In addition, the energy industry is in a good position to provide advice to governments and the EU on the most economical, efficient and technologically feasible ways of ensuring the transition to an energy system low in carbon. As this research shows, windows of opportunity to impact policy open up in particular for the industry that can argue it can help fight climate change (gas and renewable industry).

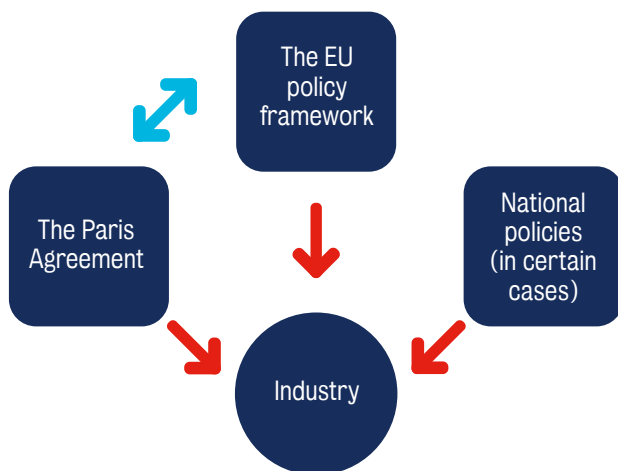
In order to investigate the developments listed above, the study uses a combination of primary and secondary sources. The study draws on statistical data provided by the European Commission, the International Energy Agency, the Energy Information Administration and the statistics divisions of oil and gas majors. It also analyses corporate reports, policy papers and media output. The study also draws on interviews with representatives of the major players in the European gas and energy industry, as well as representatives of the governmental and supranational sectors. Industry associations representing both the conventional and the renewable energy sectors were interviewed. Industry associations benefit from a lot of access to EU policymakers as they speak on behalf of the whole sector and provide good policy inputs, according to sources in the EU institutions (interview with senior EU official 2017; interview with EU official 2017). They have the opportunity to be close to policy developments, as well as to influence them.

The study includes four main chapters that are at their turn divided into several subchapters. The first chapter discusses the changes in its legislative framework that the EU made in anticipation of the Paris Agreement and after the Agreement was adopted by consensus in December 2015. The second chapter looks at the different measures that the oil and gas sector took in response to the Paris Agreement. The third chapter discusses the contribution that the energy industry can bring to policymaking in the context of energy transition and what sectors of the energy industry remain influential in the Brussels-based policy making environment. The fourth chapter discusses the degree to which the announced withdrawal of the United States from the Paris Agreement might lead the European industry to reverse some of the measures that it took in response to the Agreement. The last section includes conclusions and a set of policy recommendations.

Chapter 1: Changes in EU policy and legislative framework in the context of Paris

The industry operating in Europe responds to both the Paris Agreement and the EU framework that was developed to prepare the ground for the signing of the Agreement and to implement the Agreement. The EU's climate and energy policies are not just a response to the Paris Agreement, they also contributed to shaping the agreement. The European Union played an important role in the negotiations that led to the agreement, as well as in the process of the Agreement entering into force on 4 November 2016 by swiftly ratifying the Agreement (European Commission 2017, p.3). In addition, also actions taken at the national level worked in conjunction with the EU-level framework. Certain EU governments, such the British and German governments, changed the frameworks in which companies operate ahead of Paris to better support renewable energy sources (interview with industry representative 3, 2017).

Figure 2: The policy frameworks impacting on EU industry



Source: diagram designed by the author.

Ahead of the signing of the Agreement, the European Union announced its intention to commit to ambitious targets hoping that other countries will enhance their level of ambition in the INDCs submitted in the year preceding the Paris Summit. By 2030 the EU committed to achieving 'a 40% cut in greenhouse gas emissions compared to 1990 levels; at least a 27% share of renewable energy consumption' (European Commission, DG Energy 2017a). The EU also plans to achieve 30% energy savings. The 2030 targets were designed with the Paris Agreement in mind, as demonstrated by documents released by the European Commission in 2014: 'we need to make an

ambitious commitment to make further greenhouse gas emission reductions in line with the cost-effective pathway described in the 2050 roadmaps, and to do so in time for the upcoming negotiations on an international climate agreement' (European Commission 2014b, p.3). The fact that a global agreement was eventually reached in Paris in 2015 made it easier for the EU to justify the EU's climate and energy policies, as well as to dedicate financial resources to those policies, but also put pressure on the EU to go beyond the agreed targets (interview with industry representative 4, 2017).

After the Agreement was signed, the EU continued to take additional policy measures to deliver on Paris (European Commission 2017, p.3). The European Commission adopted legislative proposals to support the energy transition and the greening of the EU energy system, while promoting economic growth. According to the Commission: 'these proposals and the facilitating measures accompanying them contribute fundamentally to the Commission's overall agenda to create jobs, growth and related investments' (European Commission 2017, p.3).

Developments in the EU energy policy such as the EU-ETS reform, the release of the Clean Energy Package (including the New Renewable Energy Directive and the Review of the Directive on Energy Efficiency) should help the EU meet the commitments it took under the Paris Agreement. At the same time, the EU aims to develop a 'new governance system based on national plans for competitive, secure, and sustainable energy... they will ensure stronger investor certainty, greater transparency, enhanced policy coherence and improved coordination across the EU' (European Commission, DG Energy 2017a). Regulatory certainty is essential to investment and there is agreement in this regard at the level of industry, as well as at the level of EU officials (interview with industry representative 2, 2017; interview with senior EU official 2017).

The policies through which the EU aims to tackle climate change and implement the Paris Agreement impact the environment in which energy companies operate. The EU policy framework pre-Paris created incentives for industry to change and adapt its business model, while the signing and ratification of the Paris Agreement made it evident that many countries around the world are taking a firm commitment towards a greener development path and that the industry will have to respond to this reality:

'the Paris Agreement, which strives to limit the global average temperature rise to well below 2°C, offers the world a clear signal that will help all actors

to take actions and make investments towards a lower carbon future. The OGCi believes that this offers significant opportunity for innovation and investments in lower GHG emission solutions' (Oil and Gas Climate Initiative, OGCi 2015c).

And:

'the ambitious agreement reached by the United Nations CLIMATE change conference (CO P21) in Paris is an important milestone in the attempt to transform our energy systems. We welcome the result, and recognize that meeting the challenging aim it set will require new approaches, new policies and practical action, both in the energy sector and elsewhere. It will not be easy or cost-free, but it will also open up new opportunities' (OGCI 2016b, p.5).

The rest of this chapter will discuss in particular two types of developments in the EU energy and climate frameworks that are closely related to some of the measures taken recently by the oil and gas industry and discussed in greater detail in chapter 2: increasing the share of natural gas in their portfolio and investing in CCUS (in response to a reformed EU Emissions Trading System, EU-ETS), including or expanding the share of renewable energy in their portfolio and increasing the efficiency of their operations (in response to the Clean Energy Package).

The EU-ETS and the Effort Sharing Regulation (ESR)

Since 2005 the European Union has tried to incentivise European businesses to reduce their carbon emissions and invest in greener technology in power generation and industrial production. The EU-ETS is a cap-and-trade system that establishes a cap on the GHG emissions, generates emissions allowances and allows businesses to trade these allowances. The system is supposed to attach a cost to pollution. Unfortunately, in recent years the EU-ETS failed to keep the carbon price high enough to incentivise investment in low-carbon technologies.

Demand for allowances was low in relation to the offer. According to the European Commission, the surplus in allowances was generated by: 'the downturn in economic activity during the crisis, the ready access to international credits and, to a lesser extent, the interaction with other climate and energy policies' (European Commission 2014b, p.8). Despite its failures, the EU-ETS benefits from a lot of support from the EU Commission and the energy industry (oil and gas majors, as well as the renewables sector). The EU-ETS was and is still regarded as a 'central instrument to bring about the transition to a low carbon economy' (European Commission 2014b, p.8). Organisations such as Eurogas¹ argue that:

'the ETS is the most important tool that the EU has to reduce greenhouse gas emissions cost-efficiently. That's why Eurogas has strongly supported the back-loading and cancelling of surplus allowances that depress the price of allowances to the extent that they no longer fulfil their role in reducing greenhouse gas emissions' (Eurogas 2017a).

Individually, companies advanced similar arguments. 'Putting a price on CO₂ is the most efficient financial mechanism to change the rules of the game quickly' claims Patrick Pouyanné, Chairman and Chief Executive Officer of Total (Pouyanné 2016). Pouyanné argued that a carbon price of 30 to 40 USD would enable the switch from coal to gas and renewables in the field of power generation. It could also encourage investment in technologies that are helpful in reducing emissions, such as CCUS (Total 2017, p.14). BP supports pricing carbon via a carbon tax or an emissions trading system such as EU-ETS (Dudley 2016a). Shell also argues that for net-zero emissions, there is a need for 'regulatory measures such as government implemented carbon-pricing mechanisms to motivate investment in emissions reduction and energy efficiency' (Shell 2017a).

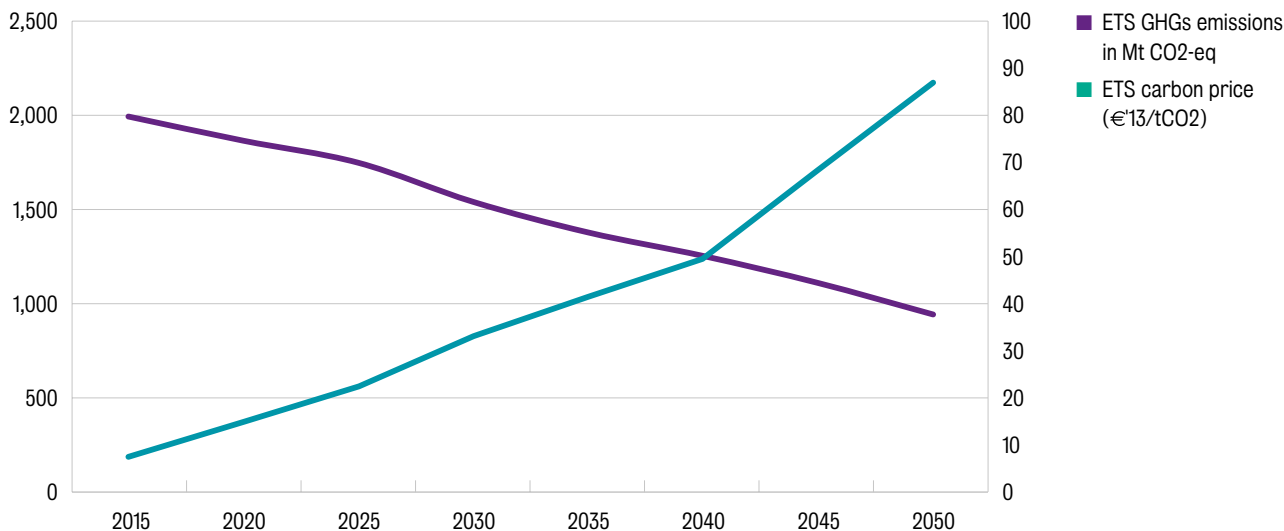
A Market Stability Reserve will operate starting with January 2019 (European Commission, DG Clima 2017b). The reserve will be useful in dealing with the surplus of allowances and to protect the EU-ETS against market shocks as it allows for the adjustment of auctioned allowances. According to modelling exercises performed by DG Energy this should trigger an increase in the carbon price in the medium and long term.

In addition, the European Commission advanced in July 2015 a proposal for dealing with the lack of functionality of the EU-ETS by revising the system for the period after 2020. The proposal was discussed in house by the Council and the European Parliament until February 2017 and currently the two institutions are trying to close the gaps in the official positions that they took on the reform of the EU-ETS (interview with EU official 2017). The legislative process is expected to be finalised in the near future.

The reform of the EU-ETS 'is the first step in delivering on the EU's target to reduce greenhouse gas emissions by at least 40% domestically by 2030 in line with the 2030 climate and energy policy framework and as part of its contribution to the Paris Agreement' (European Commission, DG Clima 2017a). The reform of the EU-ETS entails a few measures that would allow the EU-ETS sectors to reduce emissions by 43% (compared to 2005), helping the EU reach its overall 40% target. In this regard 'the overall number of emission allowances will decline at an annual rate of 2.2% from 2021 onwards, compared to 1.74% currently' (European Commission, DG Clima 2017a).

¹ According to its own description, 'Eurogas is an association representing the European gas wholesale, retail and distribution sectors.

Founded in 1990, its members are 44 companies and associations from 22 countries' (Eurogas 2017b).

Figure 3: ETS emissions and carbon prices

Source: EU Commission, DG Energy et al. 2016, p.6.

The reform also includes provisions on avoiding carbon leakage,² on funding low carbon technology and modernising the energy sector through the establishment of mechanisms that would help industry and the power field transition to a low-carbon economy. The investments required by the transition will be supported through an: ‘innovation fund – extending existing support for the demonstration of innovative technologies to breakthrough innovation in industry; modernisation fund – facilitating investments in modernising the power sector and wider energy systems and boosting energy efficiency in 10 lower-income Member States’ (European Commission, DG Clima 2017a). Free allowances will be made available for the modernisation of the energy field in lower-income EU countries.

There is however a lot of scepticism in the industry circles regarding the ability of these proposals to actually deliver (interview with industry representative 3, 2017). It is hard to say at this point to which degree the EU-ETS reform will contribute to the increase in the price of carbon. The European Commission itself does not target setting through the reform a particular price and argues that the price should be set by the forces of the market (interview with EU official 2017). Furthermore, Brexit can pose additional obstacles to the EU-ETS reform and its ability to deliver the 40% targets. The EU will need to adapt the system and

possibly revisit its emissions reduction targets in the context of UK leaving the EU and the EU-ETS.

A functional EU-ETS can enhance the competitiveness of natural gas in relation to coal, especially in the field of power generation. A higher carbon price on the EU market would close the gap in the price difference between electricity generated by using coal and electricity generated from gas. At the same time, a higher carbon price would stimulate additional investment in CCS (carbon capture and storage) or CCUS (carbon capture, utilisation and storage) and might contribute to extending the life of coal on the short and mid-term and of gas on the mid and long-term in the European energy mix.

The Clean Energy Package

The package ‘Clean Energy for All Europeans’ was launched on 30 November 2016, very soon after the Paris Agreement entered into force and it includes several measures that support energy transition. According to the European Commission, the package and its associated proposals on renewable energy and energy efficiency met three main goals: ‘putting energy efficiency first, achieving global leadership in renewable energies and providing a fair deal for consumers’ (European Commission, DG Energy 2016a). The Commission is placing a lot of power with consumers in the process of energy transition, as well as in shaping future energy markets:

‘consumers are active and central players on the energy markets of the future. Consumers across the EU will in the future have a better choice of supply, access to reliable energy price comparison

² Describes ‘the situation that may occur if, for reasons of costs related to climate policies, businesses transferred production to other countries which have laxer constraints on greenhouse gas emissions. This could lead to an increase in their total emissions’ (European Commission 2016, p.4).

tools and the possibility to produce and sell their own electricity. Increased transparency and better regulation give more opportunities for civil society to become more involved in the energy system and respond to price signals. The package also contains a number of measures aimed at protecting the most vulnerable consumers' (European Commission, DG Energy 2016a).

Measures related to increasing the share of renewable energy in the European energy mix, increasing energy efficiency and empowering consumers impacted the thinking and the strategies advanced by the European gas industry in the last years, as it will be shown in greater detail in chapter 2. For now, this section will discuss in particular the policy changes that the Clean Energy Package brought in relation to the role of renewable energies in the European energy mix and in relation to energy efficiency in Europe.

A 'New Renewable Energy Directive for the period after 2020' was advanced in order to help implement the EU 2014 climate and energy framework, as well as the Paris Agreement. Experts from various sectors agreed that the Paris Agreement will contribute to the promotion of renewable energy in the EU energy mix:

'the more ambitious the mitigation target the better. [...] The Paris agreement sends a clear signal that the fossil fuel era is coming to an end and investments are now shifted to renewables and energy efficiency. Europe needs to make full use of its competitive advantage in these fields' (Matthias Groote, S&D spokesperson for environment in Euractiv 2015).

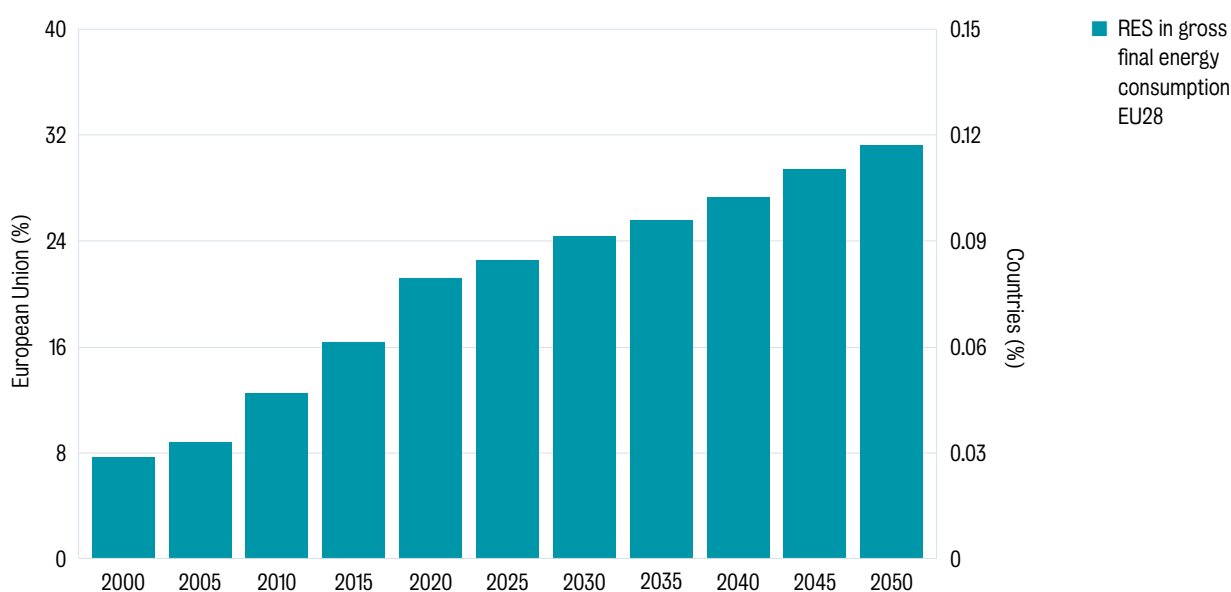
And:

'implementation of INDCs will mean that renewables will make up 78% of new power generation investment to 2030 in major economies. This will drive down the cost of renewable energy. Delivering this will require major reforms to electricity markets, business and financing models' (Nick Mabey, CEO of E3G in Euractiv 2015).

The New Renewable Energy Directive is meant to help the EU deliver on its emissions reduction targets while providing access to energy that supports economic growth. According to the European Commission, the benefits that renewable energy sources provide for the EU include supply security, jobs and growth, as well as financial savings: 'avoided imported fuel costs due to increasing use of renewable energy amount to around €20 billion a year for the EU as a whole. By 2030, this figure might rise to around €60 billion' (European Commission, DG Energy, 2016c, p.4). However, in order to enter the market, new technologies are subsidised so the savings are to be achieved on the mid to long-term and are dependent on a drop in the price of these new technologies. For instance, in Germany, renewables cost the taxpayers around €20 billion annually in subsidies (Ball 2017). The German government and the EU envision the gradual phasing out of subsidies for the renewable sector and recent research indicates that by 2023 renewables should be financially viable in the absence of governmental subsidies (Goldman Sachs Research 2017).

The reform of the legislation applicable to renewables detected six areas of action among which: developing a

Figure 4: Anticipated increase of renewables in EU energy consumption



Left-hand axis refers to European Union; Right-hand axis refers to selected EU countries

Source: European Commission, DG Energy 2017b.

framework for additional deployment of renewable sources in electricity; increasing the contribution of renewables to the sectors of heating and cooling (1 percentage point/year in the total supply by 2030) and providing access to district heating and cooling systems for renewable producers; decarbonising transport and strengthening the EU's sustainability criteria for bioenergy (European Commission, DG Energy 2016c). The revised directive also 'introduces an obligation on European transport fuel suppliers to provide an increasing share of renewable and low-carbon fuels, including advanced biofuels, renewable transport fuels of non-biological origin (e.g. hydrogen), waste-based fuels and renewable electricity' (European Commission, DG Energy 2016c, p.2). The share increases from 1.5% in 2021 to 6.8% in 2030 (3.6% of advanced biofuels, at least) (European Commission, DG Energy 2016c, p.2). By 2030, 50% of the European electricity should come from renewable sources. The directive aims to simplify administrative procedures and reinforce the local acceptance of projects that involve renewable energy.

Another area in which EU legislation went through substantial changes in recent years is that of **energy efficiency**. The EU Commission adopted proposals for a revision of the Energy Efficiency Directive and the European Performance of Buildings Directive, as well as provisions on ecodesign and energy labelling of appliances in order to help the EU meet its 2030 goals (European Commission, DG Energy 2016b, p.1). The EU has an energy savings target of 20% by 2020 (by contrast to the energy use projected for 2020) and of 30% by 2030. Initially the EU committed to a 27% increase in efficiency and the shift to 30% 'emphasises EU commitment towards its international climate and energy goals for 2030 and beyond' (European Commission, DG Energy 2016b, p.2). The EU is committed also under the Energy Union to prioritise energy efficiency:

'achieving decarbonisation by 2050 is cheaper in the long run with a 30% energy efficiency target in 2030 as the average annual system costs are €9 billion lower than with a 27% energy efficiency target only. Energy efficiency contributes to the reduction of greenhouse gases and goes hand in hand with renewable energies to enable the energy transition' (European Commission, DG Energy 2016b, p.6).

These targets are to be met by adopting a combination of EU and national policies, including policies related to appliances (domestic and industrial), vehicles and buildings (European Commission 2014b, p.7). The directive simplifies the requirements for calculating energy savings. For instance, energy savings coming from buildings renovation can be claimed in full, as long as energy savings are recorded amongst final consumers (European Commission, DG Energy 2016b, p.1). Also 'provisions on the metering and billing of electricity will from now on be consolidated under the Internal Market legislation... and consumers' rights to clear and frequent information will be strengthened' (European Commission, DG Energy 2016b, p.2).

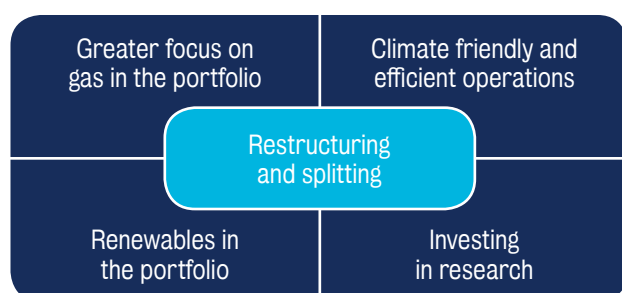
The EU policy changes discussed in this section, some of which have anticipated the Paris Agreement, some of which were locked, reinforced or triggered by the Agreement have triggered responses and changes at the level of the European gas industry. The next section captures the industry response in very specific areas.

Chapter 2: Industry responses to climate change policies

Changes in the policy frameworks and forecasts impact the business model that major oil and gas companies embrace. In the aftermath of the signing of the Paris Agreement, Morgan Stanley maintained an 'attractive' rating for the European oil and gas majors, but admitted that, in the long term, the Paris Agreement challenges their business model (Walt 2015). According to Morgan Stanley, by 2020 the Paris Agreement could reduce substantially the profitable investment prospects of fossil fuels companies (at least in the scenario in which the US is committed to the Paris Agreement³). An issue that major oil and gas companies might need to tackle is that of 'stranded assets'. Those include oil and gas reserves, exploitation and transport infrastructure that might turn out to be a bad investment, if not used for the whole period for which initially planned. This can happen if climate considerations push oil and gas out of the energy mix earlier than currently anticipated.

The Paris Agreement was expected to make an impact on the energy mix, at least in regions that remain committed to the Agreement, as is the case with the European Union. Research and forecasts published by entities such as the International Energy Agency, but also research and forecasts conducted in-house by energy companies show a mixed future for conventional fuels. According to forecasts released by companies such as BP 'although oil, gas and coal remain the dominant source of energy, renewables, together with nuclear and hydro energy, provide half of the additional energy required out to 2035' (BP 2017a). According to its Energy Outlook 2017, BP also expects the share in the energy mix of natural gas to grow faster than oil or coal, while the share of renewable energy is to quadruple in the next two decades (BP 2017a).

Figure 5: European oil and gas industry's response to the Paris Agreement



Source: diagram designed by the author.

Companies (especially the oil and gas majors) have adapted to these new circumstances and try to remain competitive by: 1) Placing greater focus on gas in their portfolio; 2) Diversifying their portfolio by including renewable energy; 3) Developing climate friendly and energy efficient operations; 4) Investing in research; 5) Restructuring and splitting. The next section will discuss in greater detail all these processes of adaptation.

In this regard, the section analyses policy papers and business plans released by industry organisations that speak on behalf of the European industry (the International Association of Oil and Gas Producers, IOGP⁴, Eurogas, etc.), as well as by European oil and gas majors (BP, Total, etc.). This section also draws on interviews conducted with industry representatives.

Greater focus on gas in the portfolio of oil and gas majors

Oil and gas majors (such as BP and Total) have embarked on a process of increasing the amount of natural gas in their portfolio. For instance, BP is intending to shift its portfolio from 50/50 oil and gas to 40/60 by 2020 as new BP gas projects become operational across the world, according to the company's chief executive Bob Dudley (Dudley 2016b). BP is an important player behind the Southern Gas Corridor, a pipeline system linking Europe with the gas-rich region of the Southern Caucasus and in particular with the Shah Deniz 2 gas field in Azerbaijan. The Southern Gas Corridor is supposed to help the EU meet not only sustainability, but also energy security goals as it brings to the European market gas different to Russian gas. Total also plans to increase the share of gas (that currently accounts for half of Total's reserves and production) to 60% in its output mix over the next two decades (Total 2017, p.25).

Overall, the last years have seen a decline in the upstream oil and gas investment. According to the International Energy Agency's latest study on investment in the energy field 'most of the decline can be explained by lower unit costs, but a significant share of the contraction is due to reduced drilling activity' (International Energy Agency 2017, p.59). According to the IEA 'average upstream costs worldwide have fallen over the last two years by about 30%

³ Chapter 4 discusses in greater detail the impact of the US announced withdrawal on the effectiveness of the Paris Agreement.

⁴ In its own description, this organisation represents leading oil and gas companies, industry associations and upstream service companies (IOGP 2017).

to levels of more than a decade ago' (International Energy Agency 2017, p.66). Oil and gas projects with shorter payback time are now prioritised reflecting the financial constraints that the industry is facing given the drop in the price of oil and gas. However, investment is expected to pick up in 2017.

The industry is also aware that reducing the methane emissions in the natural gas production process is essential to increasing its environmental advantage over coal (Dudley 2016b, p.5). Methane accounts for 20% of total global GHG emissions. Methane has also '34 times the global warming potential of CO₂ over a 100-year time frame, according to the IPCC AR5 report' (Shell 2017d). However, CO₂ can last up to millennia in the atmosphere, while methane lasts for approximately 12 years before being removed by chemical reactions. On the other hand, reducing methane emissions increases the cost of producing and transporting gas and reduces its economic competitive advantage in relation to coal.

Companies have taken substantial measures in recent years to reduce their methane emissions and are planning to continue taking such measures (in 2015, methane emissions accounted for less than 5% of Shell's total emissions). Processes like venting and flaring in the upstream operations are major generators of methane and companies are looking into eliminating them (Shell 2017d).

Renewable energies in the portfolio

However, there are signs that in the long term, gas might be faced with obstacles in remaining part of the energy mix. Natural gas is expected to play in the medium term an important role in the energy mix of the European Union, however, in the long term, given the EU decarbonisation objectives, the role of gas is expected to diminish (intervention of EU official at EUCERS event 2017). The ability of gas (and oil for that matter) to remain an important part of the energy mix beyond the mid of the century is dependent on substantial developments in the field of CCS and CCUS and its ability to provide solutions for sectors that are currently dominated by oil (such as transport).

Thinking on the long term and as the global energy mix is expected to be in the future more reliable on renewable energy sources, major oil and gas companies are **diversifying their portfolio to include renewable energies**. There is an expectation that the renewable sector will become increasingly profitable. Companies such as Total started a significant investment in renewables in 2011 and are currently accelerating this trend: 'we want to make low-carbon businesses a genuine and profitable growth driver accounting for around 20% of our portfolio in 20 years' time' (Patrick Pouyanné, Chairman and Chief Executive Officer of Total 2016). One of the companies that have showed so far great commitment to renewables is

the French Engie, former GDF Suez. Starting with 2014, Engie has moved away from fossil fuels that generate a lot of carbon, such as coal. The core business of the company is now in the field of electricity, natural gas and energy services, trying to make the most of the developments in the field of renewable energy technology, energy efficiency and digitalisation (Engie 2017).

Several companies are showing interest in the field of biofuels. Shell is investing in developing alternative fuels for transport, hydrogen and advanced biofuels (Shell 2017b). The company produces biofuels in Brazil through the Raizen joint venture. Total is also tapping into the opportunities that the transport sector might offer to biofuels and aims to draw on its 20 years of experience in producing biofuels and on being the top European marketer in this field (Total 2017, p.27). It started a process of converting oil refineries into biorefineries (La Mède refinery in France). However, representatives of these companies admit that currently biofuels are far from constituting realistic replacements for oil in the field of transport.

Well established oil and gas companies have also recently bought in smaller businesses in the renewable sector or supported start-ups in unconventional energy production and storage. Challenges to the use of renewable sources in power generation are related to their variability (which is a function of their dependence on climate conditions) and the technological and financial challenges still faced by electricity storage. In July 2016, Total acquired the company Saft, a world leader in batteries for industry. The acquisition constitutes a 'springboard' for Total's expansion into electricity storage (Total 2017, p.33). Owing Saft will allow Total to stay updated on developments in this field and be an important player in it if it takes off.

The fact that big oil and gas companies are regarding the field of renewables as an important area of growth is also reflected in the appointments they make. There seem to be increasing opportunities for experts in renewable energy to occupy higher level positions in oil and gas companies. As the business transforms, the industry recognises the need to bring in new expertise and experts with an energy background beyond the fossils sector.

Total has recently appointed as its Vice-President European Affairs one of its employees with the broadest expertise in the renewable sector. Pratima Rangaraja, Former GE energy wind and energy storage general manager, was recently appointed as the CEO of the OGCI Climate Investments. The newly established, OGCI Climate Investments 'intends to invest \$1 billion over the next ten years to develop and demonstrate innovative technologies that have the potential to significantly reduce greenhouse gas emissions' (OGCI 2017a). The initiative aims to develop technology related to carbon capture, use and storage; methane management; as well as to enhance industrial energy efficiency and transport efficiency.

Climate friendly and energy efficient operations

Large oil and gas companies are taking measures to reduce emissions from their current operations (BP, Shell). Measures to increase the energy efficiency of energy companies include 'improving the reliability of our equipment, (by) smart scheduling of maintenance activities or (by) installing more energy-efficient equipment' (Shell 2017b). Shell is claiming that such measures did pay off and that in 2009-2015 the energy intensity of their refineries decreased by about 6%, while the refining carbon emissions footprint was reduced by 1.5 million tonnes yearly (Shell 2017b). In addition, producing advanced fuels and lubricants can help the costumers of these goods reduce their carbon footprint.

The position that industry took over the last years was supportive of carbon emissions reduction and of carbon pricing. The EU gas industry is supportive of the reform of the EU-ETS. Major oil and gas companies have started to apply an internal carbon tax, on average \$40 per tonne of GHGs. They take into consideration this tax in the financial feasibility study they conduct for their planned investments. Shell, for instance, applies the GHG project screening value on new projects since 2000. Since 2008, they adopted a scenario in which a price or levy of \$40 per tonne GHG emissions was imposed by governments (Shell 2017c). Such an approach allows the company to integrate climate costs in the financial estimates for future projects and shy away from those that are too costly.

Industry also points very often to the dangers of phenomena such as carbon leakage. The chances of carbon leakage are very high as long as the trading partners of the EU do not price carbon. Carbon pricing unilaterally applied by the EU would increase the price of the power and of goods produced in Europe. This might place similar industries abroad at advantage in relation to the European industry and, in certain scenarios, determine the European industry to relocate.

Investing in research

A key area of research and development in which the oil and gas industry is currently investing is carbon capture and storage (CCS) and carbon capture, utilisation and storage (CCUS). According to the International Energy Agency, in the absence of CCS, the cost of achieving the 2°C scenario would be 138% higher. Reducing the carbon footprint of natural gas by resorting to CCS has an important impact on the ability of natural gas to be an important part of the energy mix on the long term. For instance, a recent study on the case of the UK and considering its 80% emissions reductions target by 2050 showed that 'without CCS, the scope for UK gas use in 2050 is little more than 10% of its 2010 level' (McGlade et. al 2016).

Large oil and gas majors feel that the industry can contribute to achieving progress in the field of CCUS (in reducing costs and increasing the safety of storage) given their expertise, operations in the field and financial power. They argue that: 'our industry has the requisite experience and knowledge to make CCS technology a part of the solution' (IOGP 2014, p.3). Shell started operating in 2015 Quest, a CCS project in Canada. Total's R&D CCUS budget tripled in the last two years and is estimated to account for 10% of Total's R&D budget (Total 2017, p.29). Large oil and gas companies contribute to the development of CCUS also through the OGCi Initiative. Almost half of OGCi Climate Investment's funds will be dedicated to CCUS technology (Total 2017, p.29).

Restructuring and splitting

Well established companies have divided into two companies: one company still involved in the conventional energy business and the other responding to the 'new energy world' (Uniper 2017). This was the case with Uniper and E.ON in January 2016. According to Uniper 'the classic energy world has the indispensable task of ensuring supply security. Alongside it is emerging the new world of distributed energy solutions' (Uniper 2017). While Uniper aims to succeed in the classic energy world (by taking over E.ON's fossil fuels and nuclear power ventures), E.ON 'will focus on the new energy world with renewables, distribution networks, and customer solutions' (Uniper 2017). RWE followed the model of E.ON and on 1 April 2016 split into two companies: RWE (retaining the assets in the fields of nuclear, gas and coal) and Innogy (including renewables, grids and sales).

Some of the measures taken by industry and included in the section above precede the moment of the adoption by consensus (on 12 December 2015) and entry into force (4 November 2016) of the Paris Agreement. Many of the industry representatives I spoke with indicated that the industry started to take before Paris measures that showed its climate awareness (interview with industry representative 1, 2017; interview with industry representative 2, 2017; interview with industry representative 3, 2017; interview with industry representative 5, 2017).

The industry anticipated the Paris Agreement and even participated in the process of developing the Agreement through initiatives such as the Oil and Gas Climate Initiative that will be discussed in additional detail in chapter 3. Starting with the late 2000s there was increasing consensus that climate change is happening and that the international community should respond to this challenge. One of the responses included a binding intergovernmental climate agreement that was in the end achieved in Paris in 2015.

The anticipation of the agreement triggered a change in the business strategy adopted by companies (interview with industry representative 2, 2017). The actual signing and ratification of the Agreement was an additional confirmation for the energy industry that things are changing and that they need to adapt their business model to the new realities. In the words of representatives of the European industry:

‘there is perhaps a growing realisation that they will have to move away from coal and lignite; the upstreamers’ strategy is more and more one of recognising that there is a window that is closing for gas, as well as oil. They will try and push that window wide open up to 2030 and 2035 and try to hold it open, but I think that around 2050 there will be big challenges for gas’ (interview with industry representative 3, 2017).

And:

‘strategy wise it wasn’t a huge change because the gas industry had already thought about the role that gas would have in a world where you need to emit less and less so I would say that the Paris Agreement was a strong commitment which kind of made that official. Therefore it was even more important for the gas industry that the role of gas be recognised as something that’s going to actually help get to the objectives under Paris’ (interview with industry representative 4, 2017).

Once Paris was signed and entered into force, the industry made announcements regarding their long term strategy (interview with industry representative 1, 2017). The Paris Agreement was preceded by a dialogue between gas and renewables which intensified after the agreement came into force: ‘the discussions that the gas and renewable industries had before, now with additional initiatives, are becoming institutionalised, not necessarily new content, but it takes a new, more official shape’ (interview with industry representative 4, 2017). There was also an agreement at the level of the representatives of the conventional energy industry and renewable energy industry I interviewed that the Paris Accord created momentum and speeded up the process to decarbonise the EU energy system including in the field of power generation (interview with industry representative 6, 2017). It also gives more weight to arguments regarding electrification in Europe.

Although companies started to change their strategies in anticipation of a global intergovernmental agreement, the actual signing of the Agreement strengthened their conviction that they need to undertake changes in their business model. At the same time, as the section below will show, the Agreement determined the industry to set up initiatives that allowed them to get more involved in climate and energy governance.

Chapter 3: Industry as energy governance actors in the context of Paris

Businesses and governments have to work together to deliver on the Paris Agreement. Governments set the policy framework in which businesses operate, but businesses play an important role in implementing policies. The energy industry studied here declared its interest in working with governments towards the implementation of the Paris Agreement. Bob Dudley, chief executive of BP, mentioned that ‘if governments put the right policy frameworks in place as the architects, then businesses can go to work as the builders and deliver solutions’ (Dudley 2016a). Also Shell seems to embrace this collaborative approach in relation to governments:

‘governments play a key role in their energy transitions: their policy choices can drive innovation in low-carbon technologies, and encourage investment in low-carbon energy and infrastructure. Policies and frameworks need to be developed to support businesses and consumers to make choices that reduce emissions. This could bring about fundamental change. Innovation can be driven by a global carbon emissions market – an approach that is suggested in the Paris Agreement’ (Shell 2017c).

The relationships established between private and public actors led to the development of a governance web that is essential in fostering the transition to a carbon-free future. One of the aims that the EU wants to achieve in the framework of the Energy Union is to improve EU energy governance. An enhanced and effective EU energy governance system will help the EU meet its climate and energy policy goals and targets for 2030. Also ‘the governance system will provide a timely assessment and forecast as regards the fulfilment of EU energy policy objectives and agreed climate and energy targets’ (Council 2015). A governance approach integrates in the decision-making and broader policy process a wide range of actors, supranational, governmental, energy companies and non-governmental. According to the Council 2015:

‘the design and implementation of Energy Union governance will integrate cooperation and ensure exchanges of information and best practices through a constructive dialogue between Member States and the Commission. The energy governance implementation will also encourage consultations at national level with civil society and stakeholders and will ensure the trust of investors, consumers and citizens’ (Council 2015).

The governance system proposed draws on multilevel governance and acknowledges the impact that different layers of government will have on the general policy outcomes. The governance system is meant to foster: ‘coordination between actors responsible for climate and

energy policy, at EU, regional and national level’ (Council 2015). The energy industry can impact governance at all these levels. The Paris Agreement has already opened additional opportunities for the energy industry to influence policy-making. Companies have responded to this opportunity by developing **regional and global governance initiatives**. The next section will discuss such an initiative and its implications for climate and energy policy.

The Oil and Gas Climate Initiative

Oil and gas companies have showed their interest in participating in energy governance processes by developing initiatives such as the Oil and Gas Climate initiative. The Oil and Gas Climate Initiative was set up by major oil and gas companies in recognition of the fact that climate change is a reality and that an international agreement to tackle climate change will be eventually signed. In the words of the initiative itself ‘this unprecedented collaboration is a sign of the seriousness of the challenge facing the industry’ (Total 2015b). The initiative is the result of discussions that took place at the World Economic Forum Annual Meeting in January 2014 and was launched at the UN Climate Summit in September 2014.

It includes ten influential national and international companies (jointly they cover approximately 20% of the global production of oil and gas supplying 10% of the global energy, Total 2015a). Those ten companies⁵ include major European companies such as BP, Total, Eni and Shell. The initiative is driven by the CEOs of these corporations. CEO-level meetings take place annually and are marked by the release of declarations. To a certain degree, they are similar to the summits that reunite heads of state and government in intergovernmental frameworks.

Through the initiative, companies committed to reporting their work in mitigating and adapting to climate change, to sharing information on best responses to climate constraints and to increasing the investment in technologies that can reduce the climate footprint of their operations and products.

The initiative also allowed industry to keep close to the developments in the climate change regime and speak with a louder voice on issues related to climate. The initiative constitutes a bottom-up approach to tackling climate change, but it develops in a context in which there is

5 BG Group, BP, Eni, Pemex, Reliance Industries, Repsol, Saudi Aramco, Shell, Statoil and Total.

awareness that top-down approaches are needed (such as a global intergovernmental climate agreement). Ahead of the Paris conference, the initiative aimed to contribute to the climate change debate. A workshop was held in May 2015 and the results of the workshop informed the first OGCI report published ahead of the Paris conference. The report included a list of the 'actions taken by OGCI member companies to improve greenhouse gas emissions management and to transition to lower carbon energy in the longer term' (OGCI 2015a). Ahead of the Paris conference the OGCI recognised that climate change is a real phenomenon and expressed its position of support for a global agreement:

'ambitions for achieving substantive results at the United Nations climate change conference (COP21) in Paris are higher than ever. The climate change debate has advanced significantly. The science has been recognized for years, but now there is also a general aspiration to try to limit the global average temperature rise to two degrees centigrade in comparison to pre-industrial temperatures, in order to avoid significant climate change. Governments around the world are starting to respond, outlining intended nationally determined contributions and new policies to achieve them' (OGCI 2015b, p.5).

The CEOs of the companies that are part of the OGCI met in Paris on 16 October 2015, a few weeks before the Paris Agreement was signed. According to the collaborative declaration on climate change made by the ten CEOs meeting in Paris on the 16 October 2015, the Paris Agreement will contribute to the stability of climate and energy policies, create more predictability for investment and in this way will support the industry in responding to climate change (Total 2015a). Of course, the position of the OGCI does not reflect the position of all sectors of the energy industry. However, such industry positions gave signals to governments that there is a strong interest in the oil and gas industry to contribute to decarbonisation and that the intergovernmental top-down measures can be matched by bottom-up efforts undertaken by companies.

The official position of the OGCI regarding the Paris Agreement remains one of support, despite the announced withdrawal of the United States from the agreement, as indicated by a recent statement: 'The ambitious agreement reached by the United Nations climate change conference (COP 21) in Paris is an important milestone in the attempt to transform our energy systems. We welcome the result, and recognize that meeting the challenging aim it sets will require new approaches, new policies and practical action, both in the energy sector and elsewhere' (OGCI 2017b). The consistent support for the agreement confirms that changes in the energy system are irreversible. In this context, such an initiative is very helpful as it allows industry to consult and to adapt to the post-Paris environment:

'the Initiative serves as a platform to address climate change concerns, to share industry best practices, advance technological solutions, and to catalyse

meaningful action and coordination on climate change' (OGCI 2014).

OGCI claims to be well equipped to help governments in the implementation of the Paris Agreement: 'we will use the considerable convening and catalytic power of our expertise, facilities and networks to galvanize action both within our industry and beyond' (OGCI 2016a). It claims to be instrumental in systematically reducing emissions generated by the energy sector while ensuring the energy supply (OGCI 2015b, p.5). The energy industry is in a good position to make an impact on energy transition as it has considerable knowledge of the technological process of producing energy and material resources that can be dedicated to research in low-carbon energy sources.

Within the OGCI, companies set up a fund to support research that can help them adapt to a world in which climate change considerations limit their conventional business and, in this way, remain competitive (OGCI 2015b, p.5). In November 2016, the OGCI announced that it will invest '\$1 billion over the next ten years, to develop and accelerate the commercial deployment of innovative low emissions technologies. This new, additional investment will complement the companies' existing low emissions technology programs and will draw on the collective expertise and resources of the member companies' (OGCI 2016c). Through this fund, the industry is pooling the financial resources that can help the development of technologies such as CCUS or to reduce methane emissions generated by the gas industry. Advancements in CCUS can contribute to prolonging the life of natural gas and oil in the European energy mix. Investing in technologies that can reduce GHGs can generate profit in the long term if those technologies reach a point at which they are commercialized. In addition to the financial support, political support is needed for CCS and CCUS to be deployed at large scale in the future. Recent years have seen the European institutions showing support for these technologies, while Member States have not been equally supportive. CCS/ CCUS are areas in which the supranational, national and corporate sectors need to work together.

Not surprisingly, the OGCI also aims to enhance energy governance processes by promoting 'partnerships and multi-stakeholder initiatives: seeking opportunities to accelerate climate change solutions by working collectively or individually in industry and other initiatives' (Total 2015b). In the Common Declaration released on 16 October 2015, the OGCI committed itself to fighting climate change by cooperating with the United Nations, other multilateral organisations, governments and the civil society, including initiatives such as Sustainable Energy for All, the Global Methane Initiative, the World Bank and its Zero Routine Flaring Initiative or the Climate and Clean Air Coalition (OGCI 2015d). OGCI Climate Investments plans to work in strategic partnerships with other entities that seek to develop and use technologies that generate low emissions levels (OGCI 2017a) and support start-ups active in the

renewable energy field (OGCI 2017c). Such initiatives indicate the industry's intentions to become increasingly involved in climate and energy governance processes, but those intentions still have to fully materialise.

This section showed that the prospect of the Paris Agreement, as well as the agreement itself led companies to coordinate their work and actively participate in global energy and climate governance. The next section will discuss a new trend in the influence of companies in regional energy governance based on developments observed at the EU level. It will argue that in particular renewable energy companies or companies that are developing a portfolio in renewable energy are increasingly involved in the EU policymaking process. This is not to say that conventional industries are excluded from the process, but there are signs that their influence is diminishing.

A shift of influence towards the renewable sector

The need to tackle climate change created more opportunities for the renewable energy sector to get involved in policymaking. Based on the elite interviewing I conducted in Brussels with policymakers and stakeholders, I found that there is agreement among EU officials, representatives of the fossil fuels industry, as well as of the renewable energy industry that the renewable industries are increasingly visible and influential in Brussels (interview with industry representative 1, 2017; interview with industry representative 3, 2017; interview with renewable energy industry representative 2017).

First, this is the case given that the EU legislative agenda is more connected these days with the field of renewables. The Clean Energy Package provided the renewable sector with an additional opportunity to generate policy input. It created an opportunity for the renewable and electrification sector to interact with policymakers and organize joint events with MEPs (interview with industry representative 6, 2017). Brussels is a policy environment that tends to be more open to the advice and the expertise that the industry is offering and to the solutions and new ideas provided by the industry than national governments (interview with industry representative 1, 2017). The areas on which legislation is currently developed are very technical: issues related to energy market design, energy efficiency, energy transition financing. Debates on energy policy extend to technical issues (areas that in the past would have been covered by secondary legislation or by an implementing act) and this opens opportunities for industry to provide input (interview with industry representative 4, 2017).

Second, the renewable energy industries are more influential given the increasing role that renewables are playing in the energy mix:

‘even ten year ago, when the first renewable energy directive was discussed between 2007 and 2009,

our organization was very involved in the decision-making process so we are influential now, we were also influential then. However, it is a completely different story because at the time wind and solar were more niche energy and now we are moving to a completely different place, we are moving to mainstream, supplying more than 10% of EU's power’ (interview with renewable energy industry representative 2017).

According to a Commission senior official, the renewable energies policy lobby has developed a good network, a network that also includes MEPs (interview with senior EU official 2017).

At the same time, the opportunities for the gas sector to influence policymaking seem to be reduced. The European Commission tends to be more sceptical regarding the role of natural gas in energy transition than the International Energy Agency. In 2013-2014 gas as a bridge fuel in the process of energy transition had more supporters in Brussels than it currently has. In the words of a representative of an influential European gas association: ‘whereas we used to be welcome as we were part of the solution, increasingly we are more and more viewed as part of the problem and that's what we have to overcome’ (interview with industry representative 3, 2017). As the European Commission becomes more sceptical regarding the future role of natural gas in the European energy mix, there is less opportunity for the gas industry (companies that have a stake in the field of gas and the associations that represent them) to influence policymaking.

However, despite what seems to be its relative decline, the gas industry still remains influential. These companies maintain an important role in the Brussels-based policymaking process given their material resources (the funding that they can mobilise for outreach and governmental affairs), as well as the connections that they have established in the policymaking world: ‘it is a bit too early to say that the gas industry is taking a back seat also because these are industries that have been in the discussion for a very-very long time, have connections with policymakers’ (interview with renewable energy industry representative 2017). At the same time, they are important providers of information on technical and financial aspects of the energy business.

The Commission is interested in ‘having a fairly representative view of the industry’ (interview with senior EU official 2017). Major oil and gas companies, especially those that are building also a portfolio in renewables, argue that they are able to provide this ‘holistic approach’ and that they remain realistic about what can be achieved when it comes to decarbonising the economy and the speed at which decarbonisation can actually be achieved.

In the words of the representative of an oil and gas major: ‘as professionals of energy, we have the obligation to tell them we are not preventing things from moving, but the right

speed is needed' (interview with industry representative 1, 2017). The interviewee cast doubts on the transition to renewables happening at the pace envisioned by NGOs or environmental groups despite the fact that the European institutions are increasingly sharing their point of view in the Brussels bubble: 'Brussels is a bubble; associations are in this bubble; the tendency is to argue to go renewable quickly, to decarbonise, but that is a major shift, a major revolution, we have to advocate the right trajectories' (interview with industry representative 1, 2017).

Similarly to the EU and governmental affairs representatives in the gas sector, the renewable energy industry is trying to become more credible as an interlocutor that can provide a holistic approach, hoping that in this way they will gain more influence:

'we are no longer playing in our own lane, we need to think also system-wide so our ability to maintain or increase our influence will also depend on our ability to be perceived as mainstream, to engage on that and also to have a system-wide approach. Now we are working not only on support mechanisms for wind energy, we are also thinking of more systemic things, working on electrification in heating and transport, promoting demand response in order to have a more flexible energy system, we are also working together with some gas companies on the capacity mechanism, on the emissions performance so in a way I think the job is changing. We still coordinate with NGOs, with other renewable energy associations, etc., but we had a makeover, changing names and adjusted our strategy to be mainstream and that comes also with additional influence' (interview with renewable energy industry representative 2017).

As indicated also above, the gas industry and the renewable energy sector find themselves increasingly often on the same side of the policy debate. This triggered also a shift in the energy policy coalitions that operate at the EU level. The divide at the level of the coalitions that the industry is forming is not between the fossil fuels industry and the renewable energy industry, but at the level of the fossil fuels industry (interview with NGO representative 2017). Over the last years, the European oil and gas industry has defined itself in opposition to the coal industry, arguing that natural gas can be a great substitute for coal (in particular when it comes to power generation) given its lower carbon footprint and can in this way contribute to the energy transition (interview with industry representative 4, 2017). Industry associations, industry governmental affairs representatives, as well as CEOs of major oil and gas companies provide ample examples of such discourse:

'gas emits only about half the carbon of coal when burned for power and the OGCI has calculated that we could cut energy-related emissions by 10% by switching all the world's coal-fired power stations to state-of-the-art gas-fired plants' (Dudley 2016a, CEO of BP).

According to recent research, the environmental competitive advantage of new natural gas plants over new coal power plants is dependent also on the methane leakage rates. With high methane leakage rates the competitive advantage of the gas plants is lost (Farquharson 2017)⁶. Gas is also presented as a bridge fuel that can help deal with the seasonality in power generation presented by renewable sources. Industry is talking about a 'marriage between gas and renewables and that gas and renewable energy go together' (interview with industry representative 2, 2017). In practice, this means that oil and gas companies, as well as associations representing the gas industry, work with the renewable sector by releasing common statements (for instance, with the biogas association) or by organising common events. Gas Naturally organised an event with Wind Europe and Solar Power Europe (the main voices of the renewable sector in Brussels) to advocate for the gas and renewable-based power market as the market of the future.

High officials from the oil and gas industry are sitting on the board of major renewable energy associations active in Brussels (interview with industry representative 1, 2017; interview with NGO representative 2017). Oil and gas majors are also leading investors in renewable energy in Europe. Already having an established position as interlocutors of the European institutions, they can use also these platforms to get their ideas across. In addition, oil and gas companies started to designate to speak on their behalf people that have experience in the renewable sector. When represented in the policy dialogue with the institutions by these people, companies can reach the European institutions more easily (interview with industry representative 1, 2017). This constitutes a way for the companies to gain more access to the European Commission: 'they know we are not against renewables as a company, they listen to you, yes, it is a bit easier, but my job is to talk about fossil fuels also' (interview with industry representative 1, 2017).

This chapter argued that the Paris Agreement impacted the role of energy industry in energy governance in two ways: by determining the industry to develop initiatives that would allow it to have a greater role in energy governance and by empowering sectors that play an important role in the energy transition, such as the renewables sector, to be more involved in EU energy policymaking. The gas sector benefits from less access to the European institutions than it did a few years ago, but it remains highly influential given the material, social and informational resources it possesses. The next section will discuss briefly the degree to which a recent development, the announced withdrawal of the United States from the Paris Agreement on the 1st of June 2017, can limit the impact of the Agreement in particular on the European energy industry.

6 The same study found that certain types of coal-fired power plants with CCS have lower climate impact than gas power plants with CCS, especially if the methane leakage rates are higher than 2%.

Chapter 4: The withdrawal of the US from the Paris Agreement

On the 1st of June 2017, Donald J. Trump announced that the United States will withdraw from the Paris Agreement. The actual withdrawal cannot take place earlier than November 2020, according to Article 28 of the Paris Agreement. So far the announced withdrawal of the United States from the Paris Agreement has had a limited impact on the European industry. There is agreement at both the EU institutions and EU industry levels that the US withdrawal from the Paris Agreement will not trigger a reduction in the commitments taken by the EU as the 2030 objectives constitute ‘an irreversible trend’ (interview with senior EU official 2017). On the contrary, the US withdrawal renders the EU leadership in the field of climate policy even more important (interview with EU official 2017; interview with governmental official 1, 2017).

Existing literature is defining environmental leaders as the actors that shape international environmental negotiations, promote sustainable development as an organising principle of global governance, and go beyond the defence of self-interest (Vogler and Stephan 2007). Entities emerge as leaders to ‘the extent to which they are capable of, and willing to, take on a particular responsibility of guiding other parties in directions that could lead to joint solutions’ (Skodvin and Andresen 2006, p.13). In the process that led to the Paris Agreement, it was mainly the EU and the US that acted as environmental leaders. With the US withdrawing, the role of leader in the climate regime remains to be fulfilled by the EU: this can be both an opportunity and a burden for the EU. The EU has responded to this challenge by searching to forge alliances with other actors, such as China. In the words of the European Commission:

‘global leadership of the European Union on the clean energy transition is required. As a global market place for clean technologies is being unlocked at an unprecedented scale, the European Union is using its external policies to share its experiences in this area and to mainstream the shift to a low-carbon global economy, first and foremost by developing strong partnerships with countries and regions’ (European Commission 2017, p.12).

So far, the EU has been at least partially successful in engaging China. Experts based in Beijing strongly believe that China will remain committed to the Paris Agreement, although they doubt that China will go beyond merely implementing the NDCs China committed to so far (interview with governmental official 1, 2017; interview with governmental official 2, 2017; interview with Chinese expert 2017). At least for now, China plans to remain part of the Paris Agreement. This is mainly for two reasons: 1)

increasing environmental awareness and social movements demanding a higher level of environmental protection and air quality emerging recently in China (interview with governmental official 2, 2017) and 2) economic interest by considering solar and wind power generation as being the engine of economic growth (interview with governmental official 1, 2017). National interests rather than the desire to protect the global environment motivate Chinese behaviour when it comes to global climate policy, as already pointed out by existing research (Umbach 2017). China is definitely constructive and is showing interest in the success of the Agreement, but it is far from acting as a climate leader.

Various experts (from the intergovernmental sector, industry, both conventional and renewable industry sectors) believe that the US withdrawing from the Paris Agreement will have a limited, if any, impact on the European energy industry (interview with industry representative 1, 2017; interview with renewable energy industry representative 2017). The European energy industry (oil and gas, as well as the alternative sector) has maintained its position of support for the Paris Agreement (interview with industry representative 4, 2017; interview with industry representative 6, 2017). Such a position reflects the shift already made at the level of the strategies adopted by major companies and shows that this shift is not (easily) reversible (interview with industry representative 4, 2017). Companies see the switch to gas and renewables as a good business opportunity that is supported also by technological change (interview with industry representative 1, 2017).

To a certain degree, the American withdrawal from the Agreement has had a more limited impact than expected, even in the United States. Certain companies, environmental groups, state and local administrations remain committed to delivering on Paris, including by supporting the development of renewable energy. ExxonMobil, for instance, opposed the withdrawal of the US from the Paris Agreement and states that it remains committed to reducing the risk of climate change (ExxonMobil 2017).⁷ When it comes to Europe, at least for now the US withdrawal is expected to have a limited impact on the European climate commitments and energy industry.

⁷ In a letter addressed to President Trump in March 2017 a senior ExxonMobil official referred to the Paris Agreement as an ‘effective framework for addressing the risks of climate change’ (Johnston 2017). In addition, the withdrawal from the Agreement does not additionally impact the existing American climate policy trajectory (Dolsak and Prakash 2017). Dolsak and Prakash argue that measures such as the discontinuation of the Clean Power Plan, the go-ahead for Dakota Access and Keystone pipelines and opening public lands to extractive industries already placed the United States on a policy path that is not consistent with Paris.

Conclusion

The Paris Agreement impacted the European energy industry, particularly the oil and gas majors, directly or indirectly (through the developments that it triggered in EU policy). The European energy industry is influenced in the positions it takes and in its actions by two frameworks: that provided by the Paris Agreement and that provided by the EU's climate and energy policies. The adaptation that the industry undergoes responds to newer pieces of EU legislation, such as the Clean Energy Package and the EU-ETS reform.

It is probably a bit too early to assess the degree to which industry will help the EU meet its climate goals and obligations taken under the Paris Agreement, as well as support the EU ambitions of global climate leadership. However, industry is adapting the business model in a way that should help the EU deliver on its GHG emissions reduction targets. There is a need to acknowledge that the Paris Agreement is accompanied by a wide range of transformations in our energy systems that work in conjunction with the Agreement to determine changes in the energy industry: renewable energy technology has become progressively more affordable (Goldman Sachs Research 2017); production of energy has been decentralised, now that there are options to produce energy from renewable sources at home; the digitalisation of the energy systems has brought additional players to the energy field (interview with industry representative 1, 2017; interview with industry representative 3, 2017). As the solar and hydro power sectors are picking up, we live in times of energy abundance so the issue is not anymore the supply. The consumer also becomes energy producer and has more choice (although this does not translate all the time to lower energy prices as can be seen in the case of Germany in the context of its *Energiewende*). In this context, sources from the industry are predicting that we are going to see the structure of the energy supply industry change dramatically in the next generation (interview with industry representative 3, 2017).

This study showed that in this very complicated and transformative context, major European energy players such as BP, Total, Shell, GDF Suez are changing their business model and embarking on processes of restructuring. They are moving their business towards the gas and renewables sectors, taking additional measures to reduce the environmental footprint of their operations and making additional investments in research that can help them stay in business for a longer time. These measures might not prevent irreversible climate change, but will contribute to delaying the moment when we reach it. According to the International Energy Agency 'carbon dioxide emissions stagnated in 2016 for the third consecutive year due to protracted investment in energy efficiency, coal-to-gas switching and the cumulative impact of new low carbon generation' (International Energy

Agency 2017, p.16). Although the Paris Agreement might not be the ultimate solution to tackling climate change, it is incentivising changes in the behaviour of governments, businesses and consumers.

This study also showed that in responding to climate change, the industry is establishing joint platforms that can help them get more involved in global and regional governance processes. Platforms such as the OGCI allow the industry to exchange information, pool financial resources necessary for adapting to climate change constraints and engage with one voice with policymakers. They are also using such platforms to jointly invest in low-carbon technologies that might be beneficial to the whole oil and gas sector.

As renewables are playing an important role in the energy mix, industry sectors representing the renewables industry gain more access to policymakers and have more opportunity to influence policy. This is not to say that the conventional energy sector is becoming powerless. The gas industry remains influential given its resources (material and informational) and policy contacts. Especially policymakers that are convinced of the role that gas can play as a bridge fuel in the energy transition are more likely to listen to gas industry representatives. The increase of influence of the renewable sector is challenging a paradigm in which major companies (developing fossil fuels) dominated national, regional and global energy governance processes and will have implications not only for policymaking, but also for geopolitics.

This study argued that oil and gas companies are restructuring their strategies and business model. It also showed that they are playing an increasingly important role in the governance of the energy transition and in financing that transition. But is the effort they are making substantial enough? The \$1 billion of investment OGCI is making in innovative low emissions technologies over the next decade is a drop in the ocean of investment that is needed. The global spending on energy research and development in 2015 was \$65 billion, but spending on clean energy has not risen in the last four years (International Energy Agency 2017). CCUS developments are slow despite the fact that the IEA is considering it essential for halving global emissions by 2050.

In addition, the announced US withdrawal from the Paris Agreement did not spell good news for climate protection. However, the withdrawal had so far limited impact on the EU's commitment to fighting climate change and the European energy industry. It remains to be seen what will be the effects of the withdrawal in the longer term. Building on its findings the study advances a series of policy recommendations:

Policy recommendations

- Unless increasingly higher emissions reductions are pledged, the Paris Agreement might not deliver on its goal of holding the global temperature increase to well below 2°C above pre-industrial levels by the end of the century. Countries around the world need to commit to higher emissions reduction targets and provide clear, stable and ambitious climate policy frameworks.
- Such frameworks are essential for attracting investment and fostering the development of a low-carbon and competitive energy sector.
- The fact that President Trump reversed certain climate policies advanced during the Obama Administration and announced the withdrawal of the US from the Paris Agreement further reduces the prospects of the Paris Agreement delivering on its goal. Stronger climate leadership needs to be exercised by the European Union in the world and ambitious policies need to be implemented at home.
- The EU-ETS is considered the central tool to the EU decarbonisation process. This tool needs to undergo reform in order to perform better and might need to be complemented by additional instruments (such as a carbon floor, a carbon tax, etc.). At the same time, the EU needs to promote carbon trading internationally in order to facilitate meaningful global emissions reductions and reduce the exposure of its industry to carbon leakage.
- In increasing the share of gas in its portfolio, the European oil and gas industry needs to be mindful of the fact that gas might not survive in the energy mix in the long-term in the absence of CCS and CCUS so more substantial efforts to invest in these technologies, as well as to attract political support by working with governments, need to be undertaken. Instead of over-relying on gas, committing to even a greater share of renewables in the portfolio might increase its ability to survive the energy transition. This can be a good response to shrinking carbon allowances.
- Investment in low carbon technologies made by energy companies, but also financial institutions or individuals needs to be encouraged through adequate policy. Especially the investment in low-carbon energy generation and storage capacity can make a true difference.
- Major changes in the energy system will have to take place in order to effectively tackle climate change. In this process, climate considerations and concerns regarding accessible and affordable energy will need to be balanced. Governments and the EU should consult with a wide range of stakeholders in determining the speed and the characteristics of national and EU energy transitions. Country particularities, as well as the availability of domestic energy sources, need to be taken into consideration.
- Companies and associations representing the oil and gas sector, as well as the renewable sector seek to be involved in EU energy and climate policymaking. Inviting all relevant energy sectors to consultations (for instance on topics such as the phasing out of subsidies for renewables) can be beneficial to the policymaking process given the technical and financial knowledge these entities possess. The energy industry is in a good position to provide advice on the most economical, efficient and technologically feasible ways of ensuring the transition to an energy system low in carbon. Tackling climate change requires both top-down and bottom-up approaches.
- In meeting energy demand and ensuring the stability of the continental energy system, key to economic growth, investments need to be encouraged in all types of energy that can insure the transition to a future low in carbon. Special attention should be given to the lower-carbon sources that can help tackle the intermittency of renewable energy sources.
- Energy and carbon markets should be allowed to function as freely as possible and ideally the EU and national governments would intervene by providing the right regulatory framework and abstain from the abuse of state aid or subsidies. Proper implementation of the EU climate and energy policy in the Member States is essential.

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