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Securing the Energy Union: five pillars and five regions

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Reports

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FOREWORD

Only a few years ago, nobody would have predicted that the then highly controversial Nord Stream pipeline under the Baltic Sea would have ended up actually reducing Russia's ability to use gas supply as a tool to exercise pressure on European governments. Yet a combination of EU rules, technical know-how and political developments have now made it possible – through the so-called reverse flows from Germany eastwards – to provide ailing Ukraine with precious energy at a difficult juncture. While this was probably an unintended consequence of the 2005 deal sponsored by then German Chancellor Gerhard Schroeder, such a bizarre twist has come to showcase the benefits of the Energy Union strategy formally launched by the EU in 2015. The underlying rationale of combining single market regulation, infrastructural connectivity and political solidarity with a view to reducing both collective external dependency and overall CO₂ emissions is indeed proving effective – and generating tangible benefits both inside and outside the EU. At a time when the added value and the merits of European integration and EU common policies are increasingly contested, this is no minor feat, considering also that it was notably in the energy sector that the European project had its genesis when it was first conceived more than 60 years ago.

Another feature of the Energy Union strategy is that it ends up overcoming and superseding traditional distinctions between what is internal and what external in EU policymaking. The most effective way of reducing external dependency is increasing cross-border connectivity and extending market-related principles – with evident spill-over effects in adjacent countries and regions. To use a fashionable term, enhancing energy resilience is a shared interest of the EU and its neighbours. This is also why the project coordinated by Gerald Stang on the distinct (sub-)regional dimensions of the Energy Union strategy feeds extremely well into the ongoing reflection and discussion on how to foster resilience across Europe and its neighbouring areas. This Report has the additional bonus of offering a focused analysis of each and every (sub-)region and its energy profile, local players and outstanding challenges while maintaining a common – if flexible and patchwork-like – policy template. As such, it provides a valuable contribution to future developments in this and other related domains.

Antonio Missiroli

Paris, February 2017

INTRODUCTION

Gerald Stang

The European Union's motto, 'United in diversity', can be used to describe the goals of the Energy Union, the EU's framework strategy for providing all Europeans with secure, sustainable and competitive energy. But while the countries of the EU all share these same goals, both in their national energy policies and in their support for the Energy Union, there remain significant differences in the energy priorities of individual member states and of the different regions of the EU. While they all share a reliance on imported energy, for example, the countries of eastern Europe are generally more concerned about their energy security, particularly due to higher dependency on Russian supplies. In this context, helping the different parts of the EU better understand each other's priorities, with their different supplier relations and decarbonisation preferences, could help better shape the operationalisation of the Energy Union.

The Energy Union was launched in February 2015 as 'A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy.'¹ It has five interrelated pillars:

- Energy security, solidarity and trust
- A fully integrated internal energy market
- Energy efficiency
- Climate action – decarbonising the economy
- Research, innovation and competitiveness

It was launched soon after Russia invaded Crimea and began destabilising eastern Ukraine, and following years of Russian 'divide and conquer' efforts directed at European energy cooperation. The energy security and solidarity aspects of the Union were thus the early focus of attention. Some details for this pillar were fleshed out in February 2016 with a new energy security package. It included a Security of Gas Supply Regulation to enhance the transparency and reduce the fragility of European gas supplies, notably by shifting from national approaches to a regional approach when designing security of supply measures. It fleshed out a solidarity principle that would have countries supply each other to ensure gas supplies to essential services and households in

1. Communication from the Commission, 'A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy', COM/2015/080 final, Brussels, February 2015. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2015:80:FIN>.

the event of a severe crisis. The package also introduced a plan for ex-ante compatibility checks to ensure that agreements signed by member states with third countries are transparent and comply with EU law. In addition, the package includes an LNG strategy to support LNG infrastructure development so that all member states have access to LNG as an alternative gas source, notably in southern and Eastern Europe. Each of these components has been designed with a view to ensure energy security at national, regional, and European levels.

But the other pillars of the Union are also important factors in building European energy security. For example, efforts to fully integrate energy markets can facilitate energy exchanges so that the solidarity aspect of the Energy Union, with its focus on emergency management in case of crisis, could become less important, as more liquid and connected markets become better able to respond to any supply shortages. Similarly, improved energy efficiency and reduced carbon emissions both can help reduce usage, and thus imports, of fossil fuels, improving energy security. Thus, progress on all five pillars of the Energy Union is important for energy security and it is increasingly recognised that progress need not be uniform across Europe.

Overview of the Report

This Report seeks to investigate the energy situation of the different regions of Europe, highlighting shared priorities and common projects, as well as barriers to integration and cooperation, with a particular focus on regional efforts to improve energy security and cooperate with countries in the EU's neighbourhood. The bulk of the Report is taken up by five chapters that look at the balance of energy priorities of five different regions of the EU and how the Energy Union fits into the equation, while the closing chapter investigates the role of regional cooperation projects in pushing forward the development of the Energy Union, particularly with respect to energy security and the expansion of energy markets beyond the EU's borders.

The five regional chapters investigate both the energy challenges and priorities that may be common for all the countries across that region, and highlight differences between individual countries and what this means for shaping common energy projects. Notably, the energy mixes of the different countries within the five regions are all highly heterogeneous. These five chapters also have an eye on the future, looking at the most important factors that will shape the regional energy scene over the coming decades, including issues such as national climate goals, the pace of regional market integration, relations with Russia, energy infrastructure path dependency, and the evolution of national energy mixes, as well as the impact of technological change. There is a particular focus on how regional energy markets are likely to evolve, both within and outside the EU. Finally, each chapter investigates what role the Energy Union can play to help address the energy challenges specific to that region, including those related to energy security and relations with external suppliers.

Each EU member state is included in at least one of these five regions, though some are included in more than one – the regional divisions in the Report were chosen not to define or limit, but to facilitate analysis of areas that have similar challenges and priorities, and within which regional cooperative efforts are already underway.

The first chapter by Dimitar Bechev focuses on southeast Europe: Bulgaria, Croatia, Greece and Romania (plus some discussion of non-EU states Albania, Bosnia, FYROM, Kosovo, Montenegro, Serbia and Turkey). This region has been increasingly central to European energy discussions in the last decade, as various gas import projects have been touted for bringing gas from the Caucasus, Russia, or Central Asia through southeast Europe into the rest of the EU. While eventual progress on some of these projects may help to further anchor the region into European gas markets, there has already been progress on gas infrastructure improvements and some market liberalisation, supported by the EU. At the same time, the Energy Community has played a role in extending regulatory and infrastructure support to the non-EU countries of the region. This progress is important, given the continued Russian energy dominance in the region and the relative weakness of regional cooperation efforts. Looking to the future, Bechev highlights how technological change will bring new opportunities, including in electricity cooperation, as countries take more advantage of local renewable sources. He concludes by highlighting the role of the Energy Union as an anchor for facilitating regional cooperation, both within and beyond the EU, including through support for market liberalisation and infrastructure development, especially in the electricity sector.

The second chapter by Eamonn Butler investigates the countries of Central Europe: Austria, the Czech Republic, Slovakia, Hungary, Croatia and Slovenia. Butler notes that energy is a common and pressing security concern for all of these countries despite major differences between them in terms of their energy mix, import dependence, relations with Russia, and the dominance of national actors within energy markets. The chapter highlights how improved energy cooperation could bring significant benefits to the region. Better gas infrastructure, for example, would help develop a regional gas market and allow the import of gas from more distant sources, including Norway, and LNG imports, reducing reliance on Russian supplies. Similarly, improved electricity connections would facilitate increased electricity trade, with pricing and flexibility benefits, although the role of nuclear power may prove a complicated obstacle. Looking to the future, Butler sees little change in the type of challenges facing the region: complicated relations with energy suppliers, infrastructure development, and planning for and financing more sustainable energy systems. He sees an important role for the Energy Union in engaging and coordinating regional efforts, notably for market liberalisation, enhancing interconnections and improving energy security.

Chapter three by Simone Tagliapietra looks at the countries of southern Europe: Cyprus, France, Greece, Italy, Malta, Portugal and Spain. This chapter highlights the diversity of the energy landscape, with, for example, Italy far more reliant on gas, and Greece far more reliant on coal, than the other countries of the region. Supply sources also vary, with Russia, Algeria, Norway and the international LNG market playing dif-

ferent roles. Regional cooperation is not well advanced. Looking to the future, Tagliapietra notes that the region is moving towards more renewables and improved energy efficiency, but is also excited about the potential for big new gas projects such as the Southern Corridor and the major gas finds in the eastern Mediterranean, which could both supply gas to southern Europe as well as transform it into a transit platform for supplying the rest of Europe. He also describes a Euro-Mediterranean cooperation scheme through which Europe's southern neighbours could pursue a sustainable energy transformation strategy with support from the EU, with southern Europe benefiting both as project partners and as importers of energy from a transforming southern neighbourhood. Tagliapietra sees the Energy Union as essential for providing a framework for decarbonisation and integration, while supporting major projects that can improve energy security for all of Europe.

The fourth chapter, by Zuzanna Nowak, investigates the countries of the Baltic Sea region: Estonia, Finland, Latvia, Lithuania, Poland and Sweden. She sees the energy landscape in this region as quite heterogeneous and disconnected, but sharing the same worries about overreliance on that other Baltic state – Russia. As with the other regions, the energy mixes of the countries in the Baltic Sea region are quite varied, with Sweden, Finland, and Latvia among the countries with the highest shares of renewable energy in the EU, while Estonian and Polish energy systems remain highly carbon-intensive. But regional energy cooperation is improving as interconnections and import routes develop, including via support from the EU's Baltic Energy Market Interconnection Plan and for Lithuania's Klaipeda LNG import facility. As the region moves towards building resilience against potential energy shocks from the east, there is a shared commitment to moving towards common European goals. While it is unclear whether shared energy security worries are enough to create closer regional solidarity, the concrete actions of the Energy Union can help improve regional energy security. The Union provides a framework for accountability, but freedom for setting national priorities while helping with common projects, and setting common rules for the benefit of the entire region.

The fifth chapter, by Kirsten Westphal and Gerald Stang, looks at the wider North Sea region: Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands and the UK. These are among the most economically advanced and integrated countries in the EU, with increasingly mature and interconnected energy markets. While the EU's major oil and gas production fields are located here, they all face declining production rates and the threat of increased import dependence. But the North Sea region is already more energy secure than much of the rest of Europe, and a common focus on pursuing a sustainable energy transition should improve this further. The liberalisation of energy markets is proceeding, with mostly competitive gas markets, multiple gas hubs, and electricity markets ranging from competitive to moderately concentrated. In terms of sustainability, Denmark's economy is the least carbon-intensive, and it has taken the lead, along with Germany and the UK, in fleshing out long-term national decarbonisation pathways. However, this region also contains several countries that will struggle to meet their 2020 targets for renewable energy. Looking to the future, there is significant

agreement on a common vision of decarbonised power production, increasingly electrified economies, and interconnected gas and electricity markets. The region could help drive wider European energy integration by connecting further with other regions, increasing support for energy research, and improving long-term gas planning, including managing relationships with Norway and LNG suppliers.

The final chapter by Gerald Stang looks at the trend towards the construction of the European Energy Union via progress on a patchwork of regional initiatives, including some that reach beyond the borders of the EU itself. The chapter reviews a series of initiatives in different regions, many with Commission involvement, especially the Energy Community, although some are led by member states. These initiatives have shown how all five pillars of the Energy Union contribute to the energy security of the EU. Importantly, the deepening and interconnection of energy markets – nationally, regionally, within the EU, and beyond its borders – are central to this, facilitated by EU support for improved infrastructure and common rules.

I. SOUTHEAST EUROPE

Dimitar Bechev

State of play

Over the past two decades, southeast Europe has become increasingly important in the context of the EU's rising energy security concerns. Encompassing the Balkans and Turkey, the area lies in between hydrocarbon producers in the Caspian Basin and the Middle East and consumers in western and central Europe. It therefore plays a central role in efforts to reduce dependence on Russian gas imports, as part of the so-called 'Southern Corridor' which bypasses Russia. At the same time, the region is key to Russia's strategy of diverting gas flows away from Ukraine, as evidenced by the cancelled South Stream pipeline and its successor, TurkStream.

The region itself is confronted with multiple challenges. With limited indigenous resources of oil and gas, it relies extensively on imports (see Table 1). Geography and historical factors explain why the region is one of the parts of Europe where Russia's footprint is at its largest. Countries such as Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia (FYROM) buy 100% of their gas from Gazprom, while the corresponding statistics for Bulgaria and Serbia are 92% and 80% respectively (see Table 2).

TABLE 1: ENERGY IMPORTS, NET (% OF ENERGY USE)

Albania	12%
Bosnia and Herzegovina	28%
Bulgaria	37%
Croatia	53%
Greece	60%
Kosovo	24%
FYROM	48%
Montenegro	26%
Romania	19%
Serbia	24%
Turkey	72%

Source: World Bank.

TABLE 2: IMPORT DEPENDENCE ON RUSSIA

	Crude oil	Gas	Gas as share of energy consumption
Bosnia and Herzegovina		100%	2.2%
Bulgaria	84%	92%	13.8%
Croatia	31%	0%	22.1%
Greece	20%	75%	8%
FYROM	0%	100%	4.7%
Romania	50%	33%	30.1%
Serbia	70%	80%	12.4%
Turkey	10%	67%	22%

Source: International Energy Agency.

The picture is more variegated as regards electricity. Coal (often low-grade lignite) and hydropower remain a major source of energy, with the exception of Turkey where 43% of electricity is generated by gas-fired stations (compared to 19% in Greece and just 5% in Bulgaria). Although the share of renewables in the energy mix is growing, southeast Europe is yet to fulfil its potential, particularly in areas such as solar, wind and geothermal power. Romania, Bulgaria and Bosnia and Herzegovina are self-sufficient and even export electricity to neighbours. In the case of the first two countries, overcapacity is due to the legacy of socialist-era industrialisation and the development of nuclear power plants. The rest of the region, notably Turkey with its huge energy needs and market, suffers from shortages. Blackouts have been fairly common in parts of the western Balkans. On 31 March 2015 Turkey experienced a massive blackout, which spread to 45 out of 81 provinces, including Istanbul and the capital Ankara. The cause was the substandard quality of the grid.

The contrast between oil and gas, on the one hand, and electricity, on the other, suggests that external dependency is only one among several problems. There are multiple home-grown issues as well. Cross-border infrastructure in electricity and gas is deficient and the vision of an integrated regional market pioneered by the EU remains a distant prospect. Energy efficiency is also at a low level. Market liberalisation, technological innovation and alignment with EU energy legislation have been moving forward at a slow pace. The sector is, by and large, dominated by state-owned utility companies, which face financial difficulties, tend to be vulnerable to political clientelism, and lack transparency and accountability. That is why reform is difficult, while corruption and state capture are endemic, particularly – yet not exclusively – in the post-communist countries in the region. Energy poverty is entrenched, with large swathes of the population lacking access to affordable sources. So even if reliability, the first element of energy security, is not an issue, affordability is.

To be sure, there are important differences across southeast Europe. Turkey differs from the Balkans in several important respects. It has a larger population (74 million, as compared to around 60 million for the Balkans), which is also expanding, unlike that of the post-communist countries and Greece. Turkey's economy has been growing at a steady rate since 2002, with the only exception being the crisis year of 2009. By contrast, Greece and also its neighbours to the north have suffered recession and/or slowdown since 2008. Starting from 2010, Greek GDP contracted by a quarter as a result of the financial crisis and the fiscal consolidation measures adopted by the government in order to comply with the financial bailout conditionality. As a result, Turkey's energy demand has been on the increase. The government expects that it will nearly double by 2023, the centenary of the foundation of the Turkish republic. Even if such projections are to be taken with a pinch of salt and demand may actually plateau in the next decade because of efficiency gains or declining growth, the contrast with the post-communist Balkans and Greece is easily observed. Energy consumption in the four EU members of the region (Bulgaria, Romania, Croatia and Greece) is roughly at the levels it was in 2000. Granted, some of that can be explained by improving energy efficiency. But another factor at play is the ups and downs in economic growth.

Diversity does not necessarily rule out regional cohesion. On the contrary, it translates into complementarity which, in turn, creates incentives for joint action. It is manifest, for instance, in the area of the electricity trade. Surplus countries have been exporting to deficit ones since the 1980s. Cross-border infrastructure projects have also established some basis for regional cooperation. The Trans Adriatic Pipeline (TAP), to cite one example, unites Greece and Albania as well as other neighbours such as Bulgaria, which is implementing an interconnector running from Stara Zagora to the northern Greek town of Komotini, as well as with Montenegro, Bosnia and Croatia, stakeholders in the proposed Ionian-Adriatic Pipeline (IAP) which is an offshoot of TAP.

The EU is doing its share to strengthen regional links too. It promotes the so-called Energy Community, which includes the non-member countries of the western Balkans along with Moldova and Ukraine. The scheme is primarily a platform for exporting the relevant *acquis* in the fields of electricity, gas and oil to create a homogenous regulatory environment and push for infrastructure development. The Energy Community has also provided a mechanism to work out 'projects of common interest' among its member states, which could generate investment. It is more or less the same process as the one taking place inside the EU, in the context of the Connecting Europe Facility (CEF). Unfortunately, Turkey, for all its significance as both a market and soon a conduit for gas, is staying out of these schemes. It has declined to join the Energy Community while the energy chapter in the accession talks is still blocked by Cyprus.

Intergovernmental initiatives and common projects have not gone far enough to overcome fragmentation and inherent mercantilist thinking shaping national policy across countries. This is particularly pronounced in the field of gas. Virtually every country has been entertaining plans to establish itself as a 'gas hub/trading centre', capitalising on geographic location to accrue commercial and strategic benefits. At the popular level, at

least, there is no common consensus as to what the concept of a hub entails and what are the preconditions, in terms of market reform and the encouragement of competition, to attain that goal. This applies even to Turkey where the notions of ‘transit state’ and ‘hub’ are often confused. In consequence, states in southeast Europe oftentimes compete against one another. Combined with inefficient governance, institutional inertia and financial constraints, competition has hindered and delayed the process of interconnecting the region in the interest of diversifying gas supplies.

Continued fragmentation has perpetuated Russia’s role as the dominant player in the region’s market. Moscow has exploited its dominant position to exert political leverage. Russia controls the commanding heights in the oil business in Bulgaria, Serbia and Republika Srpska, an entity within Bosnia, thanks to the virtual monopoly of LUKoil, Gazpromneft and Zarubezhneft which control refineries and chains of filling stations. Russian gas and oil firms have close connections to the political and business elites across the region. Suspicions of export of corruption have always been rife. But the reality on the ground is often complex. Energy players from the region (governments, individual political leaders, firms etc.) are either vulnerable to Russian pressure or are co-opted in one way or another. However, they also leverage ties with Moscow to maximise their interests and generate clientelistic rents. That was, for instance, the case of the (now defunct) South Stream project in Bulgaria, whose cost grew by a factor of three between 2008 and 2014 because of political meddling.

Future prospects

A number of factors will shape southeast Europe’s energy landscape over the 2020s and 2030s.

The first factor is technological change. The advance of new technologies in areas such as the generation of electricity from renewable sources, energy efficiency and storage, carbon capture, improved methods for burning biomass, and smart grids could provide the means for the region to harness indigenous potential and reduce import dependency. Southeast Europe’s potential lies primarily in renewables. This is already visible in parts of the western Balkans. Albania produces 100% of its electricity from hydropower, Montenegro 63%, Croatia 60%, and Bosnia 41%. But intermittent supply means that coal remains a backup fuel. This is why decarbonisation would be far from easy.

The second factor is the capacity of regional states to elaborate and pursue co-operative strategies. This will be a critical condition for success. Integration of electricity transmission infrastructure and the establishment of high-power connections will be essential to balance the grids across wider southeast Europe, from Turkey to the Adriatic. But political constraints at the national level, institutional inertia, deficient governance, infrastructure bottlenecks and deficits in implementing common strategies will, no doubt, delay the process. In other words, it is not realistic to expect a dramatic change in the energy landscape of the region, at least not in the coming decade.

The third main variable is the role of external anchors, with the EU first and foremost, but also including global instruments such as the Paris Climate Agreement from December 2015. The EU will remain the most powerful external driver of positive change within the sector. Either through membership or through other mechanisms such as the Energy Community, Brussels will continue with its effort to export the *acquis* and expand its regulatory space. The region will be absorbed into the EU's internal market.

In the electricity sector, EU-driven change entails the establishment of flexible markets where a multiplicity of agents compete in generation, wholesale, distribution and retail, backed by regulators independent from the core executive. Cross-border markets and regional electricity exchanges may emerge too. But the usual political and governance-related constraints will no doubt hinder reforms. Whether a given country is a member or not will also bear on the pace of reform.

The gas sector is bound to evolve as well. It has come a long way thanks to the EU's regulatory activism and the profound shifts in global markets empowering consumers against producers. Infrastructure development (involving cross-border connectivity, reverse flow capacity, and storage) is the key priority. The region is currently lacking connections going from south to north and from west to east but this drawback will be gradually overcome in the next decade. Rather than ambitious projects such as South Stream or Nabucco, it is likely that we will see smaller-scale ones establishing physical connections between national grids. Physical connectivity, flexible flows and gas-to-gas competition might speed up gasification and create some extra demand in the Balkans. This is precisely what the EU strategy of completing and expanding the internal market in gas is geared towards. In the ideal-case scenario it should be possible to transport gas delivered to the Aegean Sea coast as far north as Ukraine or even Poland. Equally, shipments from Central Europe or the Adriatic could end up in Bulgaria, Greece or even Turkey. The availability of storage is also essential from the point of view of energy security. It will help cushion the effects of a new cut-off of supplies as happened in the winters of 2006 and 2009 when the dispute between Gazprom and the Ukrainian government led to a freeze in several Balkan countries.

Towards the end of this decade Azeri gas will reach the region through TANAP/TAP and its offshoots but the volumes will be negligible. Whether the South Corridor capacity is scaled up remains an open question. It depends on whether more gas can be extracted from the Shah Deniz field off the coast of Azerbaijan and, even more importantly, whether stagnant demand in core EU markets recovers. Put differently, Russia could well preserve its market share in countries such as Greece, Bulgaria and Serbia, having lost Croatia and Romania after 2009. If the TurkStream pipeline is implemented Gazprom will lock in demand in Turkey too. It is important to note that Russia will still be competitive on price. Its links with local energy companies will be at play as well. But Russia will be less and less in a position to dictate the terms. Gazprom's long-term contracts will be more flexible – especially with regard to the price-setting formula. Liquefied Natural Gas (LNG) is not likely to make a profound difference, at least not in the short term. Prices are still well above those of piped gas, which is a disincentive

to invest in new facilities – e.g. Croatia’s plan to construct a terminal on the island of Krk or the Greek-Bulgarian project for a regasification unit and storage facility off the Aegean port of Alexandroupolis. The prospects for such ambitious projects are not clear, given the limited demand. Existing terminals in the region – Revithoussa (west of Athens), Aliğa (near Izmir in Turkey) and Marmara Ereğlisi (operated by the Turkish state-owned company BOTAS) – will not be sufficiently well-connected to neighbouring countries. Even if gas becomes a globally traded commodity, like oil, thanks to the rise of LNG, southeast Europe will be a latecomer to this trend. If there is one exception it will be Turkey, which already imports 7.6 bcm in LNG – 15.8% of its total gas imports.

The Energy Union will benefit the region by helping to deepen functional integration and giving a boost to market liberalisation and infrastructure development. Moreover, it may blur the lines between members and non-members by bringing ‘third countries’ onboard through flexible arrangements. The key is to engage the Energy Community as well as Turkey and offer them a seat at the table, some form of association, and a voice in decision-making. The challenge is to draw a clear distinction between the expanded Energy Union and the Energy Community. One way to square the circle is to specify that non-EU states which seek association with the Energy Union are not expected to harmonise their legislation with the *acquis*, a sensitive issue for Turkey. In other words, the extended Union will provide a forum for joint priority-setting and regional cooperation.

II. CENTRAL EUROPE

Eamonn Butler

Energy is considered by the countries of Central Europe to be one of the region's most pressing security concerns. The countries of the region – Austria, the Czech Republic, Slovakia, Hungary, Croatia and Slovenia – all recognise that they share common energy challenges. These include safeguarding supply security and lower consumer prices, the need to support continued integration of the market, and ensuring compliance with climate change commitments. However, they also recognise that despite developing extensive policy responses over the past 10-15 years, they still have much more to do. Furthermore, although collaboration is actively encouraged as a way to address these common challenges, bespoke national responses which take into account the historical, societal, political and economic circumstances of each state are also needed. These national positions can create intra-regional challenges, as the region's states pursue diverse approaches to addressing energy insecurity. As the EU, via the Energy Union, strives to speed up integration and better coordinate European responses to common energy challenges, the diversity of the Central European region could potentially place limitations on its success.

State of play

The diversity of Central European energy systems is quite pronounced due to historical legacies. Issues to be taken into account include differing energy mixes; historical and economic challenges to infrastructure development; continued asymmetrical import dependence; political and societal attitudes towards nuclear power and renewable energy sources (RES); varied levels of trust in third party actors such as Russia; and the extent to which national champions remain dominant, often with state support. Balancing these differences will be key to ensuring that the region plays an effective role in developing the wider European energy landscape.

With the exception of lignite or brown coal in the Czech Republic and Slovenia, the region has limited indigenous energy sources and is therefore heavily dependent on the importation of fossil fuels such as oil and natural gas. This is particularly the case for natural gas, where Central European countries import upwards of 100% of their requirement need, with Russia often providing 50%-100% of that gas.

TABLE 1: NATURAL GAS IMPORTS (2013)

	Import dependency (%)	Top supplier (% of imports)
Austria	75	Russia (63%)
Croatia	32	Kazakhstan (13%)
Czech Republic	100	Russia (100%)
Hungary	72	Russia (95%)
Slovakia	96	Russia (99%)
Slovenia	100	Russia (58%)
EU-28	65	Russia (39%)

Source: EU Commission Staff Working Documents, Country Factsheets – ‘State of the Energy Union’, 2015.

TABLE 2: GROSS INLAND CONSUMPTION (2014)

	Austria	Croatia	Czech Republic	Hungary	Slovakia	Slovenia	EU
Solid Fuels	9%	8%	38%	10%	21%	16%	17%
Petroleum & Products	36%	39%	22%	28%	20%	35%	34%
Gases	20%	25%	15%	31%	23%	9%	21%
Nuclear	0%	0%	19%	18%	25%	25%	14%
Renewables	30%	24%	9%	8%	9%	18%	13%

Source: EU Commission, DG ENER, Unit A4, ‘Energy datasheets : EU-28 countries’, update of 6 July 2016.

(NB Figures may not add up to 100 due to electricity imports and exports and rounding differences.)

Gas

The majority of natural gas imports to the Central European states are Russian and transit through Ukraine, although Austria, the Czech Republic and Croatia have other supply routes enabling gas procurement from western Europe, specifically Norway.

In the case of the Czech Republic, it was acknowledged that Norwegian gas would be more expensive than Russian, but it was felt that the cost was justified. This proved prescient as it enabled the country, unlike Slovakia, to weather the 2006 and 2009 Ukrainian gas crises comfortably. Ironically, despite the introduction of an additional supplier, a system of gas trade swapping means that much of the purchased Norwegian gas is substituted with Russian gas. Austria imports the majority of its gas from Russia, but

also buys from Norway. Slovenia is 100% dependent on imports, with 61% purchased from Austria (mostly of Russian origin) and a further 37% procured directly from Russia. Regardless of the location of purchase, Russian gas remains dominant within the Slovenian market. Croatia has significant indigenous production capacity and until recently additional imports have come from Italy, although its long-term supply contract with ENI was not renewed in preference for concentrating on domestic production and purchases on the spot market. The development of a liquefied natural gas (LNG) terminal on Croatia's Adriatic coast at Krk is key to enabling Croatia, and potentially Slovenia and Hungary, to buy gas via the spot market. This would be a significant development for Hungary which imports around 70% of its supply needs from Russia. Although Hungary signed a 4-year extension to its long-term gas supply contract with Russia taking it to 2019, the planned completion of the Croatian LNG terminal by 2020 would coincide with the end of this extended contact allowing it to look for alternative suppliers should it so desire. It is clear that LNG is considered an essential strategic development for the region's gas market, but its value will be contingent on successful delivery of the North-South corridor as a transmission route across the region.

Geopolitical uncertainties stemming from Russian-Ukrainian relations have reinforced concerns first raised during the 2006 and 2009 Russia-Ukraine gas crises about the potential for conflict to impact supply and the continued lack of alternative suppliers for the region. In response, diversification projects which focus on infrastructure thus allowing new suppliers to enter the market continue to be promoted. These include the promotion of new spurs and extensions to Southern Corridor pipeline ventures such as the Trans Adriatic Pipeline (TAP) which would bring gas from Azerbaijan's Shah Deniz field to Europe, and the aforementioned North-South energy corridor. This corridor will eventually connect the Baltic with the Adriatic seas via a series of existing and new pipelines and cross-border interconnectors, thus allowing LNG to be imported and distributed as an alternative to Russian gas. These projects have become even more important for the Central European states in light of the collapse of the large-scale EU-backed Nabucco and Russia-backed South Stream pipeline projects. Significantly, the failure of large static pipeline projects has forced the Central European countries to focus attention on smaller, more manageable projects such as the North-South corridor interconnectors, which in turn actually promotes greater cooperation in line with the vision of the Energy Union to join up the region's transmission system. Looking forward, the Energy Union has the potential to help Central Europe complete the North-South corridor by facilitating improved access to European funding, helping to better identify and coordinate projects of common interest, and managing appropriate regulatory activity.

Storage is one of the other infrastructure challenges that each of the countries has sought to improve in response to supply insecurities. All countries successfully coped with the 2014 stress test carried out by the European Commission and have storage to cover a minimum of 30 days disruption as required under the 2010 EU Security of Gas Supply Regulation (SGSR). Austria, the Czech Republic and Hungary's depleted gas fields provide them with some of the largest underground gas storage facilities in the region. Austria has already capitalised on this by transforming its Baumgarten

facility into the Central European Gas Hub, which includes a modern trading platform. Baumgarten also plays a key role for Slovenia which has no storage facilities of its own. However, despite not having the extensive storage capacity of other states it is Slovakia that remains the primary virtual gas trading hub for the region due to its location, capitalising on the fact that east-west routes for 50% of Europe's Russian gas imports traverse its territory. This position is threatened by the development of Nord Stream 2 and a possible new Austro-Czech interconnection which could see Russian gas bypass Ukraine and subsequently Slovakia. Moves to alleviate Slovak concerns and use its transmission network have been suggested, but the possibility of a more direct pipeline being built remains a reality and limits levels of mutual trust between regional actors.

Despite the region's existing storage and trading hub structures, the wider regional gas market remains underdeveloped. This offers opportunities for alternative gas hub locations to be promoted as infrastructure improves. Hungary, for example, has touted its potential to maximise its storage capacity, which at 6 bcm is the fifth-largest in the EU, and host an alternative storage and trading hub. Alternative and competing hubs do raise questions about joined-up approaches to the region's market and reinforce national rather than regional priorities; however, they need not be overly problematic for the market and indeed could benefit it in terms of pricing. In order to fulfil this, improved enhancement to regional infrastructure development will be essential over the coming 10-20 years if the region is to capitalise on the benefits of being part of a comprehensive and functional gas market.

Electricity

Like the gas market, the electricity market also faces a number of challenges, notably the need for new investment. Austria is differentiated from the other countries in the region due to its non-communist legacy and long ties with Germany in the field of energy; a common power market is well established between the two. This has been beneficial for Austria in terms of lowering wholesale and consumer prices and allowing it to benefit from the growth of renewable energy sources in Germany, specifically wind power.

A key challenge for this coupled market is the dated grid infrastructure and lack of connector capacity to deal with fluctuating volumes of electricity and subsequent electricity loop-flows via neighbouring country grid systems. The Czech Republic, Slovakia and Hungary have all complained about German loop-flows which overload their grids and can result in 'brown-outs' and lost revenue.

Suggested solutions have included splitting the Austro-German coupled market but this is opposed by Austria as it would reduce access to cheap German green electricity and at the European level would be in direct contradiction to the promotion of 'ever closer union' in energy markets. An alternative but temporary solution to loop-flows al-

ready enacted is the installation of phase-shift transformers on the grid-border between Germany and the Czech Republic. Planned new connections to improve capacity on the German-Austrian north-south grid route are not due to be delivered until 2020 at the earliest.

Improving infrastructure development and facilitating enhanced coupling of markets will go some way towards addressing cross-border problems. The signing in 2014 of a Memorandum of Understanding between transmission system operators, power exchanges and national regulators in Austria, Germany, Croatia, Hungary, Czech Republic, Slovakia, Hungary and Slovenia was a first step towards this; however, there is still some way to go before the region fulfils such levels of transmission and market integration allowing for efficiency gains, a higher standard of service and more competitive and possible even single pricing. There is a potential role for the Energy Union to play here by helping to further coordinate and encourage such cooperation.

One of the big problems standing in the way of commonly traded electricity, once a regional market is in place, is the source of power. For Austria, electricity generated via nuclear power is not acceptable. Austria's position stands in stark contrast to that of its neighbours to the east, all of whom promote nuclear power within their long-term energy strategies. The Czech Republic recognises nuclear as a key alternative to continued burning of low grade lignite. It sees future investment at its existing nuclear facilities in Temelin and Dukovany as essential, with nuclear energy potentially providing upwards of 50% of the country's future electricity needs in comparison with the current 33%. Nuclear is also seen as a cornerstone development in Hungary, where the government recently agreed a contract where Russia would finance a loan worth 80% of the €12 billion cost to extend the Paks facility with 2 new reactors. Slovakia has also committed itself to extending operations and expanding capacity at both its Bohunice and Mochovce sites, with 2 new reactors currently under construction. Slovenia's Krško nuclear power station, providing Slovenia with 38% and Croatia 20% of their electricity needs, is also earmarked for expansion and recently saw its lifespan extended by 20 years to 2043. Croatia has no nuclear facility of its own but has also been floating the idea of developing nuclear capacity in the east near the Serbian border and with Albania to the south.

The biggest challenge for the development of new nuclear facilities is finance. In the Hungarian case, accessing a Russian loan has raised significant questions regarding political transparency. In Slovakia, a lack of financing has delayed new builds at Mochovce and refusal to pay a long-term set fee for electricity produced by Bohunice prevented investment by Russia's Rosatom. The region has also seen investment interest from China. China National Nuclear Corporation (CNNC), which has also been developing investments in the UK and France, has expressed interest in Slovakia, and in 2015 a nuclear cooperation agreement was signed. Although no major investment was agreed, public perceptions of foreign interest were cautionary with concern that Slovakian strategic infrastructure could end up under the control of China and, by proxy, Russia.

This raises questions of trust in foreign ownership and reflects moves by the governments of the region, including Hungary and Slovakia, to support national ownership (private and public) of strategic energy infrastructure and operators. In Hungary, this was witnessed through the purchase in 2011 of 21.2% MOL shares from Russia's Surgutneftegaz and its continued 100% ownership of electricity company MVM. This places them in a similar situation to Austria and the Czech Republic, where national companies OMV and CEZ have sizeable government shareholdings. The Czech Republic has a stated policy position not to reduce state control in strategic energy companies and to reduce the influence of countries or companies on which the Czech Republic is already heavily dependent (i.e. Russia).

Renewables

Social attitudes towards nuclear power are quite different across the region, with the Austrian public and government very much against the expansion of nuclear power. Instead, renewable energy is seen as a preferable alternative. Renewable technologies, while improving and becoming more efficient, are also viewed in different ways by the region's governments. Austria has a long heritage of hydroelectric and biomass which plays an important role in district heating markets and it has a policy of increasing renewables within its energy mix. It also recognises the importance of research for driving improvements in the renewable energy industry. The other countries all recognise the importance of renewables *vis-à-vis* diversification and climate change decarbonisation initiatives, but appear less committed to invest, as nuclear and fossil fuel sources remain more cost effective in the immediate to longer term. In Hungary, biomass remains the primary renewable energy source, as wind and solar are considered to have less viability, while geothermal energy, despite having great potential, faces problems of high operational costs and low investment in research and development.

For Slovakia, renewables are not prioritised in the same way as nuclear and gas, with the government viewing them as unstable and unpredictable. In the Czech Republic, demands to address EU decarbonisation targets have furthered debate over the country's reliance on lignite, which the Czechs use far more than their Central European neighbours. Even though the long-term financial sustainability of the renewables industry is challenged by the lack of investment and possible loss of regular subsidies, there is a recognition that certain forms of renewables, such as energy from waste and biomass, could replace lost capacity from the decommissioned lignite power stations. The key goal for the Czech Republic is to maximise diversification while keeping import dependency at or below current levels. Along with Croatia, the Czech Republic already meets its 2020 renewable energy use target of 13% of Total Primary Energy Supply (TPES). This does raise questions about incentives for revising that target towards 2030 and beyond, and how this may be managed and financed.

Future challenges and the Energy Union

Many of the future energy challenges for the Central European region will likely be similar to those these countries face today. Questions about energy suppliers, infrastructural development, geopolitical situations, financing and climate change targets require long-term planning. Capitalising on developments across these issues at a regional level will be necessary to ensure effective and operational delivery of a regional market with flexibility across wholesale, distribution and retail, which at present only partially exists. Taking into account sensitive positions on the future of nuclear power in the region will also be of immense importance, and finding technical ways to manage nuclear energy within a common regional energy mix will be necessary if Austria is ever to fully buy into being part of a wider Central European energy region.

The Energy Union has a valuable role to play, helping to coordinate and engage with member states and the various European, regional and national agencies and organisations that oversee energy matters. The Union's five aims (energy security and solidarity, a fully integrated market, energy efficiency, decarbonisation, and research and innovation) are all shared by the countries making up the Central European region. Reflecting on these aims by helping to create a sense of unity and regional identity beyond that currently expressed by Central European countries will also be essential. However, it is not the role of the Energy Union to create a homogenised market across the region, and to attempt to do so would merely reinforce mistrust of the Energy Union and potentially encourage the pursuit of national priority policy to the detriment of the development of an integrated market. Both the Czech Republic and Hungary, despite supporting the Energy Union's development, have at different times publicly queried European strategies on issues such as financial aid and subsidy promotion, failure to account for state budgets, and rights of states to negotiate bilateral deals. Therefore, mutual trust could be said to remain weak.

The EU has played a major role in transforming the Central European energy landscape, particularly with respect to liberalisation of national markets. Connecting those national markets, encouraging regional cooperation and preventing backsliding towards partial or even full renationalisation must be a priority for the EU and its members over the coming period. Key to this will be ensuring that integrated markets and policy goals account for national interests rather than compete with them. There is also an onus on the countries of the region to acknowledge the Energy Union, taking it and their neighbours into account when developing national policy so it feeds into regional strategies in the appropriate manner. There needs to be full and complete buy-in to the Energy Union from member states based on the principles of responsibility, solidarity, trust and transparency. Failure to do so will prevent the effective implementation of a truly functioning regional, and ultimately European, energy market.

III. SOUTHERN EUROPE

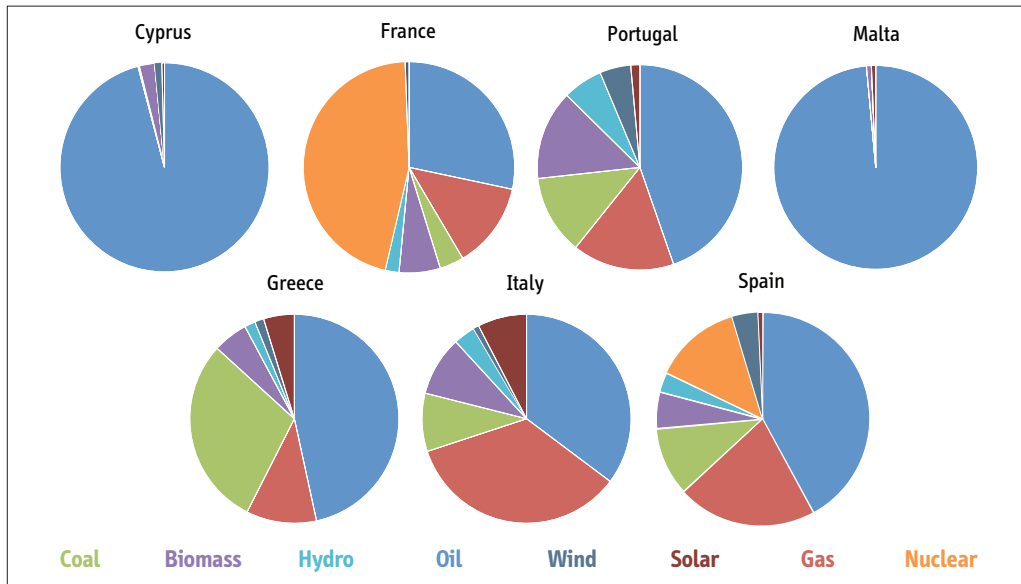
Simone Tagliapietra

Energy in southern Europe: the big picture

The energy landscape of southern Europe is profoundly varied.¹ Given different economic structures, energy resource endowments and energy policy evolutions, the energy mixes are widely dissimilar (see Figure 1), and interconnections between them (whether gas or electricity) are limited.

Coal plays an important role in Greece, for example, but only a marginal role in the other southern countries. Oil represents an important share for all of them, although in very different proportions. Gas is a cornerstone of Italy's energy system, and is an important energy source for the other countries in the region except for Cyprus. Nuclear power remains a mainstay of France's energy economy, with only Spain having additional – if much more limited – capacity. Biomass and hydro provide much of the renewable energy across the region, while wind and solar play a rather limited – although rapidly increasing – role.

FIGURE 1: ENERGY MIXES IN SOUTHERN EUROPEAN COUNTRIES

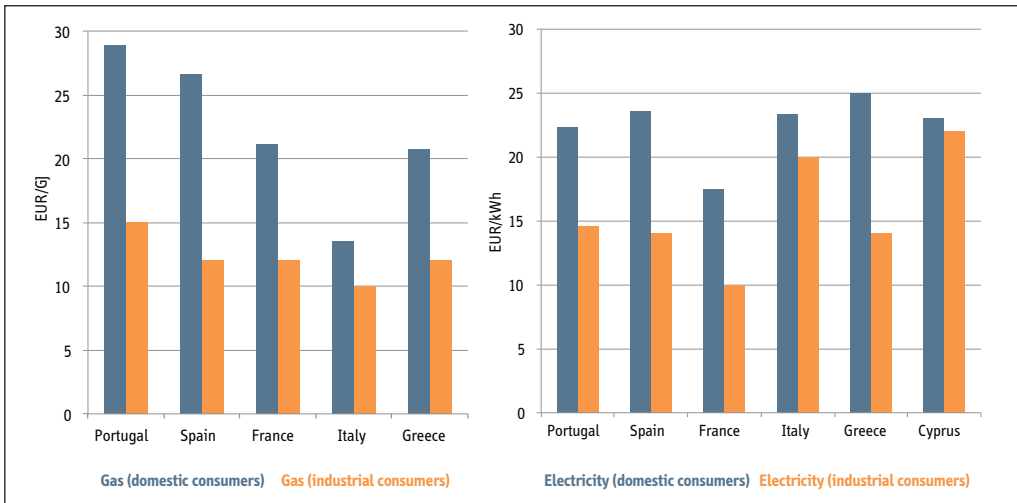


Source: author's own elaboration based on Eurostat database (accessed in October 2016).

1. The EU's other Mediterranean states, Croatia and Slovenia, are covered separately in the chapter on southeast Europe.

The differences among these states in terms of energy use and choice of energy sources are not only related to the energy mix, but also to import portfolios and pricing. This is evident in the case of gas. Italy imports half of its gas from Russia, while Spain relies mainly on liquefied natural gas (LNG) and imports from Algeria, and France gets most of its gas from Norway. Such different import portfolios also contribute to determine different levels of prices (see Figure 2). For instance, having only two key gas suppliers, Portugal has higher gas prices than Italy, a country with a well-diversified import portfolio with more than five key suppliers. In the case of electricity, the generation mix drives prices. France certainly stands out, with prices consistently lower than other countries, due to its strong nuclear component.

FIGURE 2: ENERGY PRICES IN SOUTHERN EUROPEAN COUNTRIES (2015)



Source: author's own elaboration based on Eurostat database (accessed in February 2017).

Although the broad goals of EU energy policy (competitiveness, sustainability, security) are reflected in the energy policies of all these states, intra-state differences in energy architectures do not favour the alignment of national energy policies, and can even represent a barrier to energy cooperation projects in the region.

A clear example of this problem is the MidCat gas interconnection project between Spain and France. In addition to its two major pipelines transporting gas across the Mediterranean from Algeria, Spain is the EU country with the highest capacity for receiving LNG. Over the last few decades it developed a number of LNG terminals, on the basis of strong expectations about future gas demand. These expectations then proved to be overly optimistic, and today only 30% of this LNG infrastructure is utilised. In this context, Spain strongly promotes the construction of a new gas interconnection with France, in order to channel a regular supply of gas to the rest of Europe. This project, strongly supported by the EU in the framework of its gas supply diversification policy, is however not advancing due to French reluctance to commit to the initiative.

However, on the basis of the EU energy and climate policy frameworks, southern European states share common objectives such as: increasing the level of renewable energy in their mixes, increasing the level of energy efficiency and reducing their greenhouse gas (GHG) emissions. As with all other EU member countries, the states of southern Europe have signed up to binding national targets for the share of renewables in their energy consumption by 2020, under the EU Renewable Energy Directive. These targets vary, reflecting the different starting points for renewables production and capacities to quickly increase the use of renewables (see Table 1).

TABLE 1: RENEWABLE ENERGY EVOLUTION

Share of energy from renewables in gross final consumption of energy			
	2005	2014	2020 Target
Greece	6.9%	10%	18%
Spain	8.7%	15.2%	20%
France	10.3%	18.6%	23%
Italy	5.2%	17.6%	17%
Cyprus	2.9%	6%	13%
Malta	0%	2%	10%
Portugal	20.5%	25%	31%

Source: author's own elaboration based on Eurostat database (accessed in October 2016).

Like other EU countries, in recent years, southern European states have made substantial progress in renewable energy deployment. Italy has even surpassed its 2020 target, while Portugal and Spain are already close to their respective targets.

In line with a wider EU trend, the developments in energy efficiency have been less encouraging. Energy consumption decreased across the region over the last decade, but mainly as a result of the economic crisis. The decoupling of energy consumption and economic growth is likely to gather further pace. According to the European Commission² the indicative energy efficiency targets set by Cyprus, Greece, Italy and Portugal in their National Energy Efficiency Action Plans are not ambitious enough.

Both the increase in renewable energy and energy efficiency will be highly beneficial, not just in the environmental sphere, but also for energy security. As none of these countries have substantial domestic oil and gas resources, they all have high import requirements. This vulnerability is particularly worrying in the case of natural gas, which is considered to be much more geopolitical than oil due to its (still) primarily regional distribution arrangements and its unique transportation infrastructure requirements.

2. European Commission, 'Assessment of the progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive 2012/27/EU as required by Article 24 (3) of Energy Efficiency Directive 2012/27/EU', COM(2015) 574 final, Brussels, 18 November 2015.

Looking to the future

For countries still recovering from the financial crisis, the further shift to renewables, increases in energy efficiency and steps towards closer energy cooperation will happen only gradually. But the potential development of big new energy projects may encourage more rapid changes in energy policy among the countries of southern Europe.

As gateways to gas-rich regions of North Africa, the Levantine Basin, the Middle East and the Caspian region, the countries of southern Europe could potentially be transit states for other European markets. In particular, two key opportunities for cooperation are represented by the Southern Gas Corridor (SGC) and the potential Eastern Mediterranean gas hub.

The evolution of the Southern Gas Corridor

Over the last two decades, the idea of channelling gas from Azerbaijan, Turkmenistan, Iraq and Iran to Europe via the SGC has been a key topic of any discussion about security of supply to the EU. However, notwithstanding the political support of the EU, Turkey and even the United States, the initiative has never concretely materialised. Launched in 2002, Nabucco – the original flagship pipeline project of the SGC – encountered a number of commercial and financial barriers that prevented its advancement. The deadlock was broken only in 2011, when Azerbaijan reshaped the regional gas game by developing its own project to bring future gas flows from its Shah Deniz field to Turkey and Europe via the Trans-Anatolian Pipeline (TANAP). In 2013 the Trans Adriatic Pipeline (TAP) project was selected by the Shah Deniz Consortium to connect TANAP to Italy and the European market, giving a definitive shape to the SGC initiative.

TANAP and TAP are projected to supply Europe with 10 billion cubic metres per year (bcm/y) of Azeri gas, starting in 2020, with the possibility of expanding to double that volume should supply and demand materialise. TAP will serve Bulgaria, Greece and Italy, but could also connect to central and northwest Europe via reverse flow pipelines connecting Italy and Austria (i.e. the Trans Austria Gas [TAG] pipeline) and Italy, Switzerland, France and Germany (i.e. the TransitGas-TENP pipeline system).

In this context, southern European states could become transit platforms for gas supplies to the rest of Europe. These potential flows could enable southern suppliers – such as prospective TAP suppliers – to compete with northern suppliers (mainly Russia and Norway) in the wider EU gas market. Just as Italy imports more expensive (in relation to Russian prices) gas from Norway and the Netherlands as part of a diversification strategy and for security of supply reasons, it is possible to imagine that operators north of the Alps will import gas from Italy (and beyond). Large wholesalers, operators and clients north of the Alps with high gas requirements might be willing to pay a premium for further diversification in their supply portfolio, thereby increasing the security of their supply.

Due to the limited volume of 8-9 bcm/y (depending on how much TAP gas will finally remain in Greece) from 2020, this intra-European flow will not radically change the EU gas landscape. However, this will provide a new opportunity for regional energy cooperation not only between the countries of southern Europe, but also between various regions of Europe.

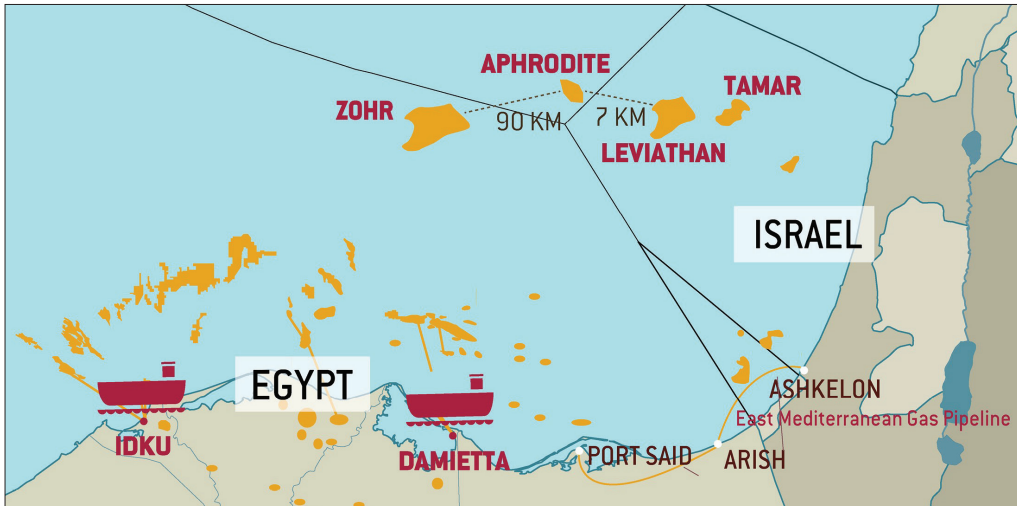
Eastern Mediterranean gas prospects

Another opportunity for regional energy cooperation is represented by recent gas discoveries in the eastern Mediterranean. With the 2009/2010 discoveries of the Tamar and Leviathan fields offshore Israel and the 2011 discovery of the Aphrodite field offshore Cyprus, there was a wave of unprecedented enthusiasm about the potential rise of the area as a new hotspot in the regional gas markets. However, due to various commercial and (geo)political reasons, neither Israel nor Cyprus have been able to turn their gas potential into reality. Export expectations have progressively weakened, unleashing a general sense of scepticism about the entire eastern Mediterranean. Expectations were revived in 2015, however, by the discovery of the Zohr gas field off the coast of Egypt – the largest natural gas discovery ever made in the Mediterranean Sea. Zohr might represent a game-changer for the regional gas outlook, with impacts well beyond Egypt's boundaries, particularly taking two aspects – geographic proximity and infrastructure – into consideration.

Zohr is 90 km from Aphrodite, which in turn is only 7 km from Leviathan. This proximity could facilitate the coordinated development of the gasfields and thus create the economies of scale needed to put in place a competitive regional gas export monetisation scheme. Egypt has 19 bcm/y of idle LNG export infrastructure in place, which could be used to export Egyptian gas, as well as Israeli and Cypriot supplies. Commercially speaking, this option might represent a win-win-win situation for the three players involved, as: (i) Egypt might enhance its geo-economic role in the region, and also gain revenues from transit; (ii) Israel and Cyprus might swiftly gain access to international markets.

Such a solution would be beneficial not only for their gas supply diversification, but also for Europe's overall security of supply. In fact, LNG terminals in Italy, France and Spain could receive gas and make it available also for central and north-western European markets, provided that the necessary interconnections (i.e. the MidCat pipeline, and reverse flow systems on TAG and TransitGas-TENP) are realised, also according to the terms of the recent 'LNG and Storage Strategy' published by the European Commission.³ This development would, of course, further enhance energy cooperation between southern European states as well as between them and the other regions of Europe.

3. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on an EU strategy for liquefied natural gas and gas storage, COM(2016) 49 Final, Brussels, February 2016.

FIGURE 3: THE EAST MEDITERRANEAN GAS LANDSCAPE

Source: Bruegel, 2016.

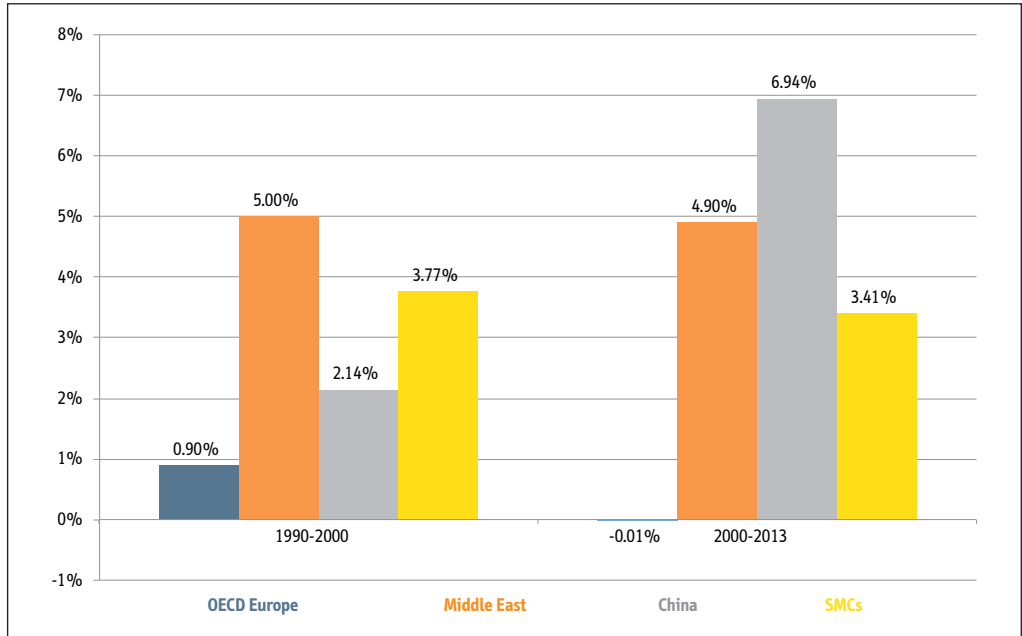
A new eastern Mediterranean gas hub could give new impetus to the long-lasting EU gas supply diversification strategy, and also represent an important element of international collaboration in an area that otherwise currently presents very few margins of cooperation.

A new Euro-Mediterranean sustainable energy cooperation scheme

In addition to natural gas, another important energy cooperation opportunity between the countries of southern Europe is represented by the search for sustainable energy solutions across the Mediterranean region.

First, it should be noted that the key energy challenge for southern Mediterranean countries (SMCs: Morocco, Algeria, Libya, Tunisia and Egypt) will be to meet their own rapidly growing energy demand in a secure and competitive way. The energy consumption of SMCs has continuously grown over the last few decades (see Figure 4). Up to 2000, this growth occurred at an even greater pace than China. Between 2000 and 2013, SMCs maintained their growth rate at a level of about 3.4 percent, compared to 0 percent in OECD Europe.

FIGURE 4: TOTAL FINAL ENERGY CONSUMPTION IN SOUTHERN MEDITERRANEAN COUNTRIES



Source: author's own elaboration based on International Energy Agency (2016).

Energy demand in SMCs will continue to grow in the future, mainly in response to population and GDP growth. For energy exporters, this jeopardises future export capability, while for energy importers it exacerbates the negative impacts of high energy bills on the national economies.

To meet this challenge, SMCs will need to transform their energy systems in a sustainable manner. Most notably, the rich renewable energy resources of the region (i.e. generally high solar radiation and high wind speeds in certain areas) will have to be exploited, to switch electricity generation away from fossil fuels. The best way to turn the regional renewable energy potential into reality is to tackle the various commercial, regulatory, infrastructure and financial barriers that impede renewable energy development at one fell swoop.

Europe could play an important role in accompanying SMCs in this transformation, notably via existing institutions that are already involved in regional issues related to energy development. Institutions like the European Investment Bank, Germany's Kreditanstalt für Wiederaufbau, Italy's Cassa Depositi e Prestiti and France's Caisse des Dépôts et Consignations have already invested in regional renewable energy projects over the last decade. However, their work has not been coordinated, thus remaining basically limited to the financing of sporadic projects.

The activities of these European financial institutions could be coordinated in the future, with the aim of creating a Euro-Mediterranean financing mechanism able to leverage international capital markets. Such a mechanism could provide risk-mitigating and credit enhancing tools to institutional and private investors willing to act in the region. Only private and institutional investors such as pension funds, insurance companies, mutual funds and sovereign wealth funds have the capital needed for a vast long-term investment in regional renewable energy transformation.

As close neighbours and trading partners of the SMCs, the states of southern Europe would be able to benefit, both as partners in the development of the project, and as energy importers. A scale-up of renewable energy in SMCs would ensure the sustainability of gas exports to Europe from countries like Algeria, Libya and Egypt, otherwise at risk of having insufficient energy resources. It would also enhance the macroeconomic position of SMCs, undermined by increasingly unsustainable fossil fuel subsidies schemes. It would, finally, also contribute to the climate change mitigation promises encoded in the Paris Agreement.

Conclusion

To conclude, it might be useful to outline the twofold relation between the southern European member states and the Energy Union initiative.

On the one hand, the Energy Union provides a unique opportunity to stimulate these countries in pursuing decarbonisation, by increasing the use of renewable energy and improving energy efficiency. It also provides a unique framework for the development of a truly European internal energy market, with all the related benefits, spanning from competitiveness to security.

On the other hand, these states can provide their own contributions to the development of the Energy Union. Notably, as illustrated in this chapter, they have the opportunity to enhance the EU's quest for energy security, particularly in terms of gas diversification. Finally, they could also provide a contribution to the development of the EU neighbourhood, as illustrated by the case of sustainable energy cooperation with the southern shore of the Mediterranean.

IV. THE BALTIC SEA REGION

Zuzanna Nowak

Dividing Europe into regions is a tricky exercise, as shared borders do not necessarily translate into shared political interests, economic preferences, or social choices. In the energy field, the EU countries around the Baltic Sea display a variety of options, behaviours, rationales and perceptions. Until recently, Estonia, Finland, Latvia, Lithuania, Poland and Sweden had been developing their energy policies independently and without taking sufficient account of each other. Nevertheless, the European Energy Union has the potential not only to align more closely the energy systems of the countries around the Baltic Sea but also, through enhanced energy cooperation, to strengthen the whole European Union.

Mix of mixes

A brief overview of the energy mixes and energy consumption patterns of the countries around the Baltic Sea shows that the region is very heterogeneous and marked by extremes, potentially impeding regional cooperation or at least leading to mutual incomprehension regarding each other's needs.¹

TABLE 1: ENERGY MIXES OF THE COUNTRIES AROUND THE BALTIC SEA

	Estonia	Finland	Latvia	Lithuania	Poland	Sweden
Solid Fuels	67%	13%	1%	4%	52%	4%
Petroleum & Products	16%	28%	32%	37%	24%	25%
Gases	6%	7%	24%	31%	14%	2%
Nuclear	0%	18%	0%	0%	0%	35%
Renewables	13%	29%	36%	19%	9%	36%

Source: EU Commission, DG ENER, Unit A4, 'Energy datasheets: EU-28 countries', updated.

(NB Figures may not add up to 100% due to electricity imports/exports and rounding differences.)

The Swedish energy mix is dominated by two energy sources: nuclear (35% – likely to decrease soon due to closure of plants), and renewables (36% – most of which is hydro-power). Gas plays only a marginal role, with all of it coming from neighbouring Denmark. While Denmark constitutes a guarantee of security of gas supplies, Sweden still

1. All data from Eurostat and Country Data Sheets for 2014.

intends to build LNG terminals to give its market more flexibility. Sweden's economy is the least carbon-intensive in the whole of the EU.

The Finnish energy mix is also characterised by a strong presence of nuclear power (18%) and renewables (29%) – putting Finland at the forefront of European renewable leaders. Gas – almost entirely imported from Russia as Finland is geographically isolated from the European gas market – represents only 7% of gross inland energy consumption. Only in September 2016 did Finland put its first small LNG terminal in Pori into commercial operation, and it plans to open more in the coming years.

Estonia's energy mix is dominated by solid fuels (almost 67%) and petroleum (16%). Hence, it has the second most carbon-intensive economy in the EU. It has significant resources of oil shale and biomass, but is highly dependent on Russia for its limited gas imports (accounting for only 6.5% of gross inland consumption).

Latvia uses very few solid fuels and its energy mix is composed of three main sources: petroleum (32%), gas (24%) and renewables (36%). Therefore, it has the second-highest renewable energy share in the EU after Sweden. It is however still largely dependent on gas supplies from Russia. What is more, its gas storage facility in Incukalna, which has enough capacity to provide secure supplies for the three Baltic States in the event of a major disruption, still remains under Russian control. It is also worth underlining however that Latvia's plans to liberalise its gas market will materialise only in 2017.

Lithuania's energy mix differs from Latvia's, with a bigger share of petroleum (37%) and gas (31%). Lithuania was obliged to close its Chernobyl-type nuclear power plant, Ignalina, after EU accession and therefore had to balance its electricity needs with energy derived from other sources. It can still import gas from Russia; however the country has chosen to build a floating LNG terminal – named 'Independence' – in the port city of Klaipeda, which is capable of fully catering for not only Lithuania's needs, but also 90% of the needs of all three Baltic States. Lithuania also has recently begun to focus more on developing clean energy sources, with renewables increasing to 19% of the total mix and 50% of all electricity generation. By 2050, Lithuania aims to replace all fossil fuels with more renewables and new nuclear capacity.

Poland, like Lithuania, is trying to balance the rapid growth of its economy with increased energy efficiency and reduced energy intensity. However, Poland and Lithuania remain among the most carbon-intensive economies in the EU. In Poland, this problem stems from the fact that its energy mix still remains dominated by coal (52%), petroleum (24%) and gas (14%). What is more, these resources are imported in significant amounts (respectively accounting for around 50%, 90% and 75% of imports) from Russia. The share of renewables is increasing steadily (9%) and Poland is developing its nuclear power programme in order to mitigate the economy's impact on climate as well as satisfy the need for capacity. Due to its geographical location, size and developing infrastructure, Poland is well-placed to become a gas hub for Central and Eastern Europe.

Ever closer

Notwithstanding the numerous differences among the countries of the region, they face broadly similar energy challenges and share many of the same priorities.

It is crucial to emphasise that another Baltic Sea neighbour plays a key role: the Russian Federation. The Soviet legacy has had an enormous impact on the region – as things stand currently, those Baltic Sea countries that are highly dependent on Russian supplies remain vulnerable and can be manipulated by the Kremlin through unfavourable bilateral deals targeting gas, but also electricity supplies. Importantly, Lithuania, Latvia and Estonia have not yet desynchronised their power systems from the Russian IPS/UPS system to the Continental European Network. What is more, the Kremlin's geopolitical calculations related to energy infrastructure projects on the territory of the Kaliningrad enclave and Leningrad Oblast have a strong influence, both direct and indirect, on regional energy policies. The aim of the countries around the Baltic Sea is not necessarily total independence from Russian energy supplies, but resilience to Russian influence and the establishment of a common market, with short-term contracts, transparent rules and no hidden interests. The issue is all the more urgent as these countries are still poorly interconnected, hence their markets remain fragmented and are furthermore particularly vulnerable as they have only recently been brought into line with EU energy liberalisation rules. This situation hinders the development of a proper common single European energy market and – something which is of the utmost importance for the region – use of European emergency mechanisms for ensuring security of supplies.

This however does not mean that nothing has been done in recent years to improve the security of regional energy markets. These countries are beneficiaries of several initiatives aiming at strengthening regional cooperation, which have already brought tangible results. The Baltic Energy Market Interconnection Plan (BEMIP), started in 2009, constitutes a catalyst for infrastructural developments and has enhanced mutual understanding of the respective countries' needs. A few important electricity interconnectors in the region were commissioned, such as NordBalt linking Lithuania and Sweden or the LitPol Link, allowing for electricity flows between Lithuania and Poland, both of which opened in 2015. In the gas sector, several positive developments have occurred, including the opening of LNG terminals in Poland (Świnoujście) and Lithuania (Klaipėda). Nevertheless, other initiatives such as GIPL (Polish-Lithuanian pipeline) or Balticconnector (pipeline between Finland and Estonia) need to be pursued with more momentum. This is why 7 Baltic region electricity projects and 8 gas projects are listed as European Projects of Common Interest (PCI), while 5 electricity projects and 7 gas projects are on the list of priorities in the European Energy Security Strategy (EESS). BEMIP, according to the Memorandum of Understanding signed in June 2015, will continue to aim at ensuring further integration of the Baltic countries' systems and markets; it will also additionally expand its activities towards other energy policy areas, including energy efficiency and renewable energy.

As a consequence of Russia's controlling influence, the dominant preoccupation for the majority of the region's countries remains the security of supplies. Nevertheless, other pillars of the EU's energy policy – competitiveness and sustainability – are not neglected in the region, even though they attract less attention. Securing domestic energy production from diverse types of renewables, nuclear energy or shale oil and gas, is a strategic aim shared by all countries in the region. The steady pace of development of clean technologies, steps to make industry less carbon-intensive and the increase in energy efficiency means that the countries of the region may yet be able to achieve the energy goals set at the EU level for 2020, 2030 and 2050. Doing so, however, will require a gradual evolution of the energy mixes in the region. But this, as in the case of Sweden or Poland, can come at a high cost, including in terms of the substantial efforts required to gain popular backing for governmental choices. After a period of strong political rejection of further nuclear development in the country, the challenge of meeting the country's electricity needs has pushed Sweden to reconsider the future of its nuclear programme. Similar concerns in Poland relate to the reduction of the dominant share of coal in the fuel mix, which will require strong measures and both environmentally- and economically-grounded arguments to counter pressure from the national coal lobby. This is partly why electricity and energy commodity prices will constitute an important challenge for the region. The situation is further compounded by the fact that some of the Baltic Sea countries, mainly Latvia and Lithuania, have high rates of fuel poverty among sections of their population.

Towards resilience

Although clearly not without challenges, the future of the region looks promising in energy terms. All the states in the region appear to be committed to following the European path they have chosen, and intend to become an integral part of a fully effective, single energy market. A successful outcome depends on several factors that are internal to the region, including the ability of the countries to recognise and build upon areas where common interests are complementary to national ones, work at overcoming existing energy policy divisions, exploit the potential for EU support and funding, avoid duplication and competition, and share information and resources. The integration of energy islands and fragmented markets is a major problem, and overcoming existing barriers will be a big step forward for the region itself and for the whole EU.

However, besides national preferences and agendas driven by self-interest that might hamper solidarity, there are several external factors that could potentially have a much bigger influence, both positive and negative, on the achievement of the region's energy goals. Obviously, ongoing Russian activity in the region cannot be discounted – whether overt (e.g. construction of the Nord Stream 2 pipeline in the Baltic Sea, thereby undermining European supply diversification efforts) or more indirect (e.g. through the construction of controversial nuclear power plants in the vicinity of the Baltic states, just beyond European borders, hence beyond the reach of European law). Depending on the ability of the countries in the region to find European allies and foster the sense of soli-

clarity that allows member states to see that European interests are also national ones, the region should be able to defend its interests. As shown by the ongoing Ukraine crisis, geopolitical conditions and instability in neighbouring countries result in a common sense of insecurity, and thus can lead to increased regional cooperation. It is not by coincidence that the then Polish Prime Minister Donald Tusk called in 2014 for an Energy Union to break Russia's stranglehold on gas, and the idea was immediately supported by most of the EU countries. Yet, until the countries of the Baltic Sea region establish commercial relations with Russia on a new footing and diversify towards other suppliers, develop greater resilience towards external shocks and build a common front to tackle energy challenges, they will remain vulnerable, thereby weakening the whole EU.

Clearly, the potential for major economic or geopolitical shocks is by far the most striking factor shaping regional energy choices and cooperation. Nevertheless, the evolution of global energy policies will also considerably affect the region. Taking into account Baltic plans to construct several new LNG terminals, prices and availability of American and other liquefied gas suppliers will play a crucial role in securing infrastructure development, and determining the region's import needs. Also, the outcome of international negotiations (e.g. the 2015 Paris COP agreement) will have consequences even for this region, especially taking into account its lacklustre energy efficiency record. For these countries, adaptation of their economies might be painful, depending on how much margin of manoeuvre they have regarding how they go about attaining established objectives. This is particularly important for Poland, which is fighting to maintain its coal industry while trying to implement new carbon technologies or solutions such as nuclear power in order to mitigate emissions, an outcome that is not necessarily welcomed by other EU member states. In this context, development of nuclear technology in Baltic countries will depend on the direction that the global nuclear industry will take in the forthcoming years. As the example of Fukushima has shown, a single accident can lead to nuclear programmes being put on hold in Poland, and similarly in Lithuania (due also to other reasons) while in Sweden – already well advanced in terms of nuclear technology – the incident contributed to a major change in public attitudes towards nuclear power. Similarly, it may be expected that major research achievements allowing for better use of renewables, electricity storage, etc. have the potential to change the situation prevailing in the Baltic region. It should be noted however that these countries seek to contribute to global research efforts in this field (with Sweden at the forefront), and that their involvement should be intensified.

Energy Union

Given the situation in the Baltic Sea region, the challenges facing these countries, the priorities they espouse, and the range of external factors shaping their energy choices, the Energy Union appears to be a promising platform for regional energy cooperation. Not only can Energy Union foster coordination and cohesiveness among these countries, and counter Russian energy dominance, but it could also infuse their economies with a new dynamism.

The Energy Union idea may be said to have been conceived in this region, having originally been proposed by then Polish Prime Minister Donald Tusk, and despite having been adapted to the EU member states' preferences, it has not lost its most important rationale for the Baltic region – energy security. Since the moment the project was conceived, it has allowed for better coordination of efforts in this field and the Baltic countries' concerns have been brought to the attention of all of the EU member states. It is to a large extent thanks to the countries of this region that the Nord Stream 2 issue is high on the European agenda. Moreover, the Energy Union's four other pillars² highlight the main shortcomings of the countries of the region in this regard: fragmented energy markets, low energy efficiency, carbon-intensive national economies, and – last but not least – insufficient research and innovation efforts. The Energy Union therefore brings hope to the region that it will get help from Brussels in overcoming these entrenched weaknesses. As a consequence, the Energy Union can constitute for the Baltic countries a point of reference, a higher instance where their needs can be formally addressed, with the support of all the EU member states. Following this logic, the Energy Union has the capacity to be an important mechanism for assisting Baltic countries in their dealings with external suppliers, through its *acquis*, energy market mechanisms, the growing authority of its representatives or mere solidarity among the 28 EU member states. At the same time, the Energy Union means that the Baltic countries can benefit from a fresh external perspective on their own major individual preoccupations, thereby putting their own needs in a broader context of well-coordinated interregional cooperation.

The merit of Energy Union stems from the fact that while guaranteeing solidarity and granting the EU member states freedom in determining their energy mixes (something which is particularly important for the Baltic region countries), it imposes a new rhythm for energy accountability with periodic reviews of energy statistics, enhances the transparency of energy deals, sets a well-defined framework for the development of energy mixes, and imposes much more cooperation within and between the EU regions. There is no doubt that Energy Union already brings multiple benefits to the Baltic region. It cannot be forgotten, however, that Energy Union is the outcome of a struggle of interests between all EU member states. Therefore, in order to maintain the Baltic cooperation momentum gained since 2014 and to uphold the Baltic countries' priorities, so that they do not become diluted in a multitude of other problems that the EU must face, active participation of the region's countries in further advancement of the Energy Union concept is indispensable. However, the major challenge for the Baltic region is to prove its own added value for the Energy Union and the European Union as a whole.

2. The five pillars of the European Energy Union are: (i) security of supply; (ii) an integrated energy market; (iii) improved energy efficiency; (iv) emissions reduction and (v) research and innovation.

V. THE NORTH SEA REGION

Gerald Stang and Kirsten Westphal

This chapter focuses on the energy situation in the EU member states of northwest Europe: Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands and the UK. This region includes many of the most advanced economies and interconnected energy markets in Europe. It also encompasses the EU's three largest national markets: France, Germany and the UK. In particular, Germany and the UK are the EU's biggest natural gas markets and most important gas 'roundabouts' and trading places. However, the national energy systems in the region, in terms of energy mix, market structures, and level of interconnectivity, reflect the very different energy paths taken by the different countries. While they have all agreed to pursue common European goals of improved energy security, sustainability and market interconnectivity, the national pathways towards these goals will be quite different. In the long run, it is possible to envision a region with decarbonised power production, increasingly electrified economies, and deeply interconnected gas and electricity markets. In the short term, however, the region will continue to grapple with contrasting national priorities and one of the major uncertainties for the EU's future and for the fulfilment of the Energy Union: the likelihood of Brexit following the 2016 UK referendum.

The region today

Energy mixes and import dependencies

These member states display the energy mixes of industrialised countries, with a balance of coal, oil, gas, nuclear and renewable energy sources. The EU's major oil and gas producers are located in the North Sea: the UK, Denmark and the Netherlands. Yet all European producers – Germany among them – face a trend of gradually depleting oil and gas production. While the depletion of their own fossil fuel reserves provides an additional incentive to transform their energy system into a more sustainable one, this depletion might also require investments in new fossil fuel infrastructure for managing the changing supply and demand balances, despite the need to phase out the use of fossil fuels in the long run.

Import dependence is expected to increase significantly. Imports of piped gas from Norway but in particular from Russia will rise along with imports of liquefied natural gas (LNG) – at least for a long transitional period before the region fully decarbonises

later this century. Because of the relatively large number of LNG terminals and pipeline routes as well as diversified suppliers, the region has many flexible options to import natural gas. Additionally, imports of crude oil are well diversified and oil markets are fungible. This flexibility is one of the main reasons why this region has the highest level of energy security in Europe, with national energy policies being less defined by energy security concerns than in eastern Europe. But security concerns cannot be completely discounted. Depending on the future evolution of oil prices, consumption patterns in the transport sector and the refinery landscape, import dependency for oil products could become a sensitive issue.

TABLE 1: GROSS INLAND ENERGY CONSUMPTION 2014

	Belgium	Denmark	France	Germany	Ireland	Netherlands	Luxembourg	UK	EU
Solid Fuels	6%	14%	4%	25%	15%	12%	1%	16%	17%
Petroleum & Products	44%	39%	31%	35%	49%	42%	63%	36%	34%
Gases	24%	17%	13%	20%	27%	38%	20%	32%	21%
Nuclear	16%	0%	45%	8%	0%	1%	0%	9%	14%
Renewables	6%	26%	9%	11%	7%	4%	5%	6%	13%

Source: EU Commission, DG ENER, Unit A4, 'Energy datasheets: EU-28 countries', update of 6 July 2016.
(NB Figures may not add to 100% due to electricity imports/exports and rounding differences.)

The eight countries have divergent approaches to the issue of nuclear energy. Nuclear power provided 45% of 2014 gross inland energy consumption in France, and smaller portions in Belgium (16%), the UK (9%) and Germany (8%), but looking ahead to the future these countries have very different nuclear policies. While nuclear power is seen as part of the decarbonising process for the energy mix in the UK, it is being phased out in Germany as part of the country's 'Energiewende' and significantly scaled down to 50% in France. Germany has instead focused on expanding its renewable energy resources and, along with Denmark, can be seen as a global frontrunner in promoting renewable energy sources. However, due to Germany's industrialised economy with a high export surplus, its economy remains the most carbon-intensive in the region, with per capita emissions nearly double that of nuclear France. Moreover, Germany's continued reliance on coal exacerbates this situation. The UK, in comparison, has been gradually replacing coal with cleaner domestic gas supplies since the 1970s, with coal use in 2016 at its lowest point in more than 150 years.

TABLE 2: CARBON INTENSITY OF ECONOMY (2013)

	Carbon intensity (tCO ₂ equiv. /€ millions)
Denmark	228
France	240
Luxembourg	277
UK	305
Netherlands	312
Belgium	320
EU	328
Ireland	347
Germany	355

Source: EU Commission, DG ENER, Unit A4, 'Energy datasheets: EU-28 countries', update of 6 July 2016.

Interconnection and market developments

The countries around the North Sea are relatively homogeneous compared to other EU regions with respect to the implementation of the EU internal market packages and in the maturity of their electricity and natural gas markets. The majority have competitive gas markets (with the exception of the Netherlands because of the dominant Groningen field which is operated by a single producer) and have electricity markets that range from competitive to moderately concentrated. This coincides with a relatively high level of regional integration and cross-border interconnections (compared to the overall EU level). Yet, cross-border interconnections as well as domestic interconnections will also need to be extended across EU regions into Norway, the Baltic countries and the Iberian Peninsula.

In terms of electricity, the Benelux countries and Denmark have interconnection levels with neighbouring countries that are well above the 10% target envisioned for all member states as part of the Energy Union, while Germany's interconnection level is already at 10%. All of these countries are committed to improving cooperation, including via the Pentalateral Forum that unites Benelux, Germany and France, with Austria and Switzerland as observers. Expanding and adapting the grid remains a major challenge that is closely linked with the issue of adequacy of generation, loop flows and system stability. In addition, in 2015, Germany and 11 of its neighbours agreed to a new cooperation framework for security of electrical supply (the Baake Declaration) to ensure that the designs for electricity markets in the region are increasingly developed on a cooperative basis. As might be expected from their island geography, the UK (6%) and Ireland (9%) have lower interconnection levels.

In terms of gas, the UK's national balancing point (NBP) has long been the major gas price marker of the region, with UK gas liberalisation having started earlier than on the continent. But because of its island location and the likelihood of reduced gas production volumes from its North Sea fields, its dominance relative to growing continental hubs may start to decline. The Benelux countries, in particular, are all well interconnected with their neighbours and occupy a strategic position especially in European gas grids. Belgium serves as an important LNG importer, transit country and trading hub (Zeebrugge). The Netherlands also serves an important gas roundabout due to imports from Norway, the interconnector to Britain and its LNG import facilities in Rotterdam. Its Title Transfer Facility (TTF) has become the reference hub for continental Europe. However, with the cap on production from the Groningen gas fields due to earthquakes, the country faces the big challenge of replacing its own low-calorific gas with high-calorific gas from other sources. This is a challenge which the Netherlands shares with Germany and Belgium. Germany has become a major physical (and increasingly virtual) transport hub for Russian gas. The role of the German marketplace Gaspool may increase in the future depending on the future routes of Russian gas flows into the EU.

Priorities within the strategic triangle

The strategic triangle of security, sustainability and competitiveness which frames EU energy policy is also used to guide energy policy for all of the countries of northwest Europe. While the particular balance among the three parts of the framework is different in each country, they all share the same broad goals of improving the security of supplies, improving energy efficiency, developing renewable energy supplies and managing energy costs for businesses and households.

In terms of energy security, the countries of northwest Europe are considered to be the most secure on the continent, with relatively diverse energy sources and supply routes, and effective storage and emergency response mechanisms. Notably, most of the EU's gas production and LNG import facilities are located in the region, and Norway's oil and gas production is right next door. Energy security concerns may actually be seen as one of the reasons why the energy mixes within the region have evolved so differently; following the oil shocks of the 1970s, with different countries choosing different paths, including massive investment in nuclear energy (France), targeted support for more domestic gas exploration (UK), and the multiplication of gas import routes, including from the Soviet Union (Germany). Today, energy security concerns are not as prominent as they were in the 1970s but, as highlighted by the adoption of the 2014 EU Energy Security Strategy and the conduct of stress tests that same year, energy security worries remain. And many of the policies being developed to improve competitiveness and sustainability are also lauded for how they contribute to improved energy security. These range from improving energy efficiency to developing domestic renewable energy to improving interconnections with neighbouring states. Yet, with respect to the Energy Union's first priority of energy security, diversification away from Russia is not as pressing a concern as in eastern Europe.

In the UK, energy efficiency and competitiveness have traditionally been high on the agenda, as market liberalisation guided energy reforms relatively early compared to continental Europe. Progress on market liberalisation and interconnection among the continental countries of the region has shown more progress in the last decade, with the European Commission's Third Energy Package providing important impetus to progress within each country. Germany, in particular, has made progress in building a liberalised and competitive national energy market, as privatisation took place prior to the unbundling of the major energy companies that has been taking place in the last decade.

While economic competitiveness remains a key factor in shaping national energy policies, especially since the economic crisis began in 2008, climate and sustainability concerns have increasingly become a priority, guiding energy policies across the region. All of the countries of northwest Europe have adopted the shared EU objectives for cutting carbon emissions, including the objective of cutting emissions by 80-95% by 2050 from 1990 levels, as originally called for in the 4th Assessment Report (2007) of the Intergovernmental Panel on Climate Change (IPCC). While the Commission has issued suggested guidelines for a potential pathway to reach this ambitious target, including the 2030 goal of 40% emission reductions for each country (later adopted by the European Council in 2014), in practice, each EU country is left to pursue its own plans for getting there.

There has been a renewed focus on sustainability, especially in the UK, Germany and Denmark, and to a lesser extent in France, the Benelux countries and Ireland, which have not yet defined a pathway up until 2050. Yet, the differences lie in the detail. Whereas Germany and Denmark rely on renewables and energy efficiency for their energy transition, the UK builds upon decarbonisation through the use of natural gas, nuclear and renewables. Moreover, the pace of ambitions for energy transition differs across the region.

The countries of the region will need to implement the EU's 2020 targets as well as live up to, or define national alternatives to, the 2030 strategy and beyond under the Paris Agreement of 2015. In terms of renewable energy, Denmark is the only country in the region that will definitely meet its 2020 targets. In 2014, the European Commission estimated that Germany and Ireland were also likely to meet their targets, while all the other countries would likely fall short. In terms of overall GHG emissions, the EU as a whole has already surpassed its 2020 target of a 20% drop below 1990 levels (22% in 2015), and most of the states in northwest Europe (Denmark, France, Germany, the Netherlands and the UK) are expected to surpass their targets as well, while Belgium, Ireland and Luxembourg may fall short.

TABLE 3: PROGRESS TOWARDS 2020 TARGETS

	Renewables (as % of energy mix)		GHG Emissions (1990 = 100)	
	2014	2020 Target	2015	2020 Target
Belgium	8.0	13.0	91.7	85
Denmark	29.2	30.0	85.0	80
France	14.3	23.0	87.4	86
Germany	13.8	18.0	90.7	86
Ireland	8.6	16.0	89.5	80
Luxembourg	4.5	11.0	86.4	80
Netherlands	5.5	14.0	80.1	84
UK	7.0	15.0	84.4	84
EU	16.0	20.0	n/a	80

Source: European Parliament (Jan 2017). See: [http://www.europarl.europa.eu/RegData/etudes/ATAG/2014/528741/IPOL_ATA\(2014\)528741_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/ATAG/2014/528741/IPOL_ATA(2014)528741_EN.pdf)

Moving towards a sustainable future

Based on progress to date, all of these countries, even those expected to meet their 2020 targets, will need to move to a much steeper curve in reducing emissions in the decades ahead in order to meet the 2050 targets. And they will likely continue along separate pathways towards decarbonisation, with each path strongly defined by its starting point – the energy mix.

Denmark stands out for its vision of an energy system projected to be fully independent of fossil fuels by 2050. It has invested heavily in renewable energy, but has not yet mapped out detailed pathways to reach its ambitious 2050 target.

Germany and the UK have taken the lead in terms of defining long-term national pathways for decarbonisation to meet the 2050 targets. Although somewhat aspirational, defining these pathways provides an important framework for analysis of public energy and climate policies. Germany has a relatively dense series of policies primarily for renewable energy use and nuclear phase-out. This reflects the long tradition of a ‘Green Energy Transition’ in the country since the 1980s. More recently, though, more detailed climate action plans across multiple sectors have been formulated, particularly up to 2020. These include energy efficiency measures e.g. in the building sector but also a stronger move towards an ‘Energiewende’ in transportation. Electrification and sector-coupling are guiding paradigms. Beyond 2020, the ‘Energiewende’ policy covers both medium-term (2030) and long-term (2050) strategies with specific targets and pathways until 2050 for greenhouse gas reductions, renewable energy and energy efficiency. The

UK, in turn, has laid out policy roadmaps for energy efficiency, energy security and decarbonisation. It also set out a trajectory for each 5-year time period leading to 2050, with a carbon budget for each period. The first five carbon budgets, leading to 2032, have been set in law.

France, Ireland and the Netherlands have made some progress in defining their pathways towards 2050. France has specific targets for 2030 and 2050 for final energy consumption, fossil fuel use, renewable energy use and, notably, the share of nuclear in power generation, which is expected to decrease from 75% to 50% in the next decade. France is also planning a series of 5-year carbon budgets up until 2030 to help define the pathway for reaching the longer term goals. Ireland plans to begin five-yearly national mitigation plans, with the first expected in 2017, while the Dutch 2013 'Climate Agenda' is an intermediary stepping stone towards defining the next steps towards 2030 and 2050.

Belgium and Luxembourg are still in the process of defining their approaches to an energy transition beyond 2020/2030. In Belgium, notably, many climate mitigation and adaptation initiatives are taking place at sub-national levels.

The region tomorrow

Imagining the region tomorrow is difficult because of two major uncertainties: BREXIT is one 'sword of Damocles', but more broadly there is also the deep existential crisis the EU is currently facing. In this context, moving forward with implementation of the Energy Union could provide momentum for continued EU integration. Yet, internal EU cohesion on energy and climate issues is sometimes shaky, reflecting different levels of ambition. Lack of consensus on energy and climate targets could also be an impediment, within the EU as a whole, but also within this nucleus of countries which as a bloc has the potential to give real impetus to the construction of a European Energy Union.

As can be seen in the implementation process of the Energy Union, and is also reflected in the EU's 2030 energy and climate strategy, there is no shortage of ambition, but an operational consensus is difficult to achieve. The latest round of proposed reforms of the late 2016 'Winter package' shows that there remains significant room for inter-governmental bargaining. Achieving the targets for 2030 (a 40% cut in GHG emissions compared to 1990, at least 27% renewable energy, and at least 27% energy savings compared with the business-as-usual scenario) will require compensatory mechanisms, burden-sharing efforts and negotiated package deals and the North Sea region will have to play a leading role.

There are also two significant trends that are very likely to expand and shape the energy policy environment in the region. First, increasing electrification will likely play a major role in an energy transition, including in many sectors, such as transportation, which

remain fossil-fuel intensive today. And in order for this electrification trend to contribute to decarbonisation, electricity generation has to move towards carbon-neutrality. Even though the expansion of renewable energy generation is already underway and will expand in the years ahead as renewable prices drop, much more substantial common efforts are necessary. Exploiting the geographical and meteorological advantages of each member state requires an extension of interconnections and a more dense grid, including beyond the relatively cloudy, but windy North Sea region. Second, the intermittent progress towards competitive and liberalised local energy markets will continue its inexorable progress, as these types of markets are a necessary precondition for ensuring a successful sustainable energy transition. Ensuring both sustainability and competitiveness will involve the completion of robust continentally interconnected markets that have high grid stability and can best exploit national power grid particularities.

These moves towards electrification and increasing competition and liberalisation will result in additional focus specifically on forging deeply interconnected electricity markets, with capacity markets and other security of supply provisions increasingly defined through regional cooperation frameworks. At the same time, efforts at cooperation and market integration on particular forms of power generation, from nuclear to gas to renewables, may begin to take a back seat; i.e. the grids and electricity outputs may become the primary locus of cooperation and investment rather than the pipelines and power generation centres that provide the primary energy inputs to the electricity system.

Conclusion: Making the North Sea region a driving force for the Energy Union

Achieving the security, sustainability and competitiveness goals that frame the energy policies of all the states of northwest Europe will be facilitated by moving towards increased energy cooperation and interconnection, with increasing integration of national gas and electricity markets. As the most economically advanced and integrated region on the continent, northwest Europe can take the lead in rejecting the observed trend towards renationalisation and state intervention seen in other regions. It does not require any changes to the role of the EU in shaping energy policy, but that national energy policies be developed in full understanding of the advantages provided by working jointly via the Energy Union in pursuit of shared goals. It will mean supporting an active push toward open markets because of their importance as a precondition for ensuring low prices and security of supply.

In addition, an energy transition in the transport sector will be required at the global level, but there is as yet no clear indication of which ‘winning technologies’ will be involved in that transition; as such, more research and innovation will be required. There is thus an opportunity for the Energy Union to provide important support for work across Europe on batteries/storage, exploiting hybrid energy solutions, supporting e-mobility and, most urgently, on clarifying the role of natural gas for a decarbonising continent.

Moreover, this region is predestined to use its existing gas infrastructure to integrate natural gas/biogas/synthetic gas into a sustainable energy system, including by increased use of gas for a broader range of applications. If natural gas is more widely identified as a transitional fuel, then it will make sense to facilitate the pursuit of strategic long-term LNG deals today, in order to secure supply to the EU for the longer term. Once the current LNG glut on global markets is past, a rebalancing of global production and consumption is likely to occur, potentially changing the balance of negotiating power between exporters and importers like Europe. It will also be important to ensure a strong relationship with Norway, engaging this most secure and most sustainable external source of fossil fuels in long-term planning processes for the EU, and the northwest European countries in particular.

Given its historic roles both in driving European integration and in driving a sustainable energy transition, leadership from the northwest region will be continue to be essential for the construction of the wider Energy Union.

VI. PATCHWORK UNITY – REGIONAL APPROACHES INSIDE AND OUTSIDE THE EU

Gerald Stang

No two EU member states have the same energy profile. Even close neighbours that might have similar political and economic histories rarely have similar energy mixes or energy security priorities. But these differences need not be impediments to successful energy cooperation, particularly as the main priorities for EU energy policies (competitiveness, sustainability, security) are also the priorities in the energy policies of all member states. This commonality of goals means that all EU countries are planning to improve their energy security, develop deeper energy markets, and cut their carbon emissions. The methods for making progress in these areas are increasingly diverse. Notably, at the same time as pushing forward with the continental Energy Union, regional co-operation initiatives are becoming more common, including some that extend beyond the borders of the EU itself. Led either by member states or the Commission, these initiatives are helping push forward coordination where and when it makes sense locally, including beyond EU borders, with many of them targeting better market integration.

Much of the focus of Commission energy policy in the last 20 years has been about helping to break apart the historic rigidities within national energy markets, with considerable success. However, the subsequent process of tying these gradually liberalising national energy spheres into an integrated continental energy market has been more tentative. With the difficulties of finding and implementing uniform approaches to liberalisation and integration for all member states, there is now openness to finding other methods for constructing a continental market – notably via multiple initiatives at regional levels with varying levels of ambition and focus.

This work on markets and integration is essential for improving European energy security, strengthening the internal dimensions of the equation, and facilitating efforts to reach out to and cooperate with neighbours, energy suppliers and transit partners. The EU has been successful at defining the rules of the energy game in its neighbourhood, with its strategic energy goals (sustainability, security, competitiveness) and energy rules (for competition, transparency, safety and environmental protection) being spread beyond its borders by a number of mechanisms. While it is not always easy to find common ground among the member states for pursuing common external energy policy, including with respect to relations with energy exporters, the continuing progress on building a European energy market is helping to soften the impact of these potential areas of disagreement. And now, far from being a potential source of disunity, pursuing these efforts through regional bodies is seen as important for facilitating the overall

European energy project. Unlike debates in other fields about the role of one-size-fits-all policies and programmes for the EU, in the energy field, an uneven patchwork of cooperative experiments is actively encouraged, with the EU often acting as a support for regional energy groups.

Liberalisation and regionalisation

During the twentieth century, national energy markets, both in gas and electricity, were dominated by a few vertically and horizontally integrated firms. These were often monopolies that were either owned by governments or were heavily regulated private companies. Over the last 25 years, liberalisation efforts have split the transportation and distribution components from the production components, and monopoly actors were broken apart or forced to yield part of their market share. These processes have had different starting dates, and have proceeded at different rates across the continent. The EU has played a key role in this process, particularly since the introduction of the 2009 Third Energy Package, which regulates transmission network ownership to ensure the separation of supply and production activities from transmission and distribution. It also provides common rules for independent national energy regulators. This strengthening of national actors was seen as important for removing entrenched rigidities and facilitating liberalisation at national levels, as a step towards integration across the continent.

The countries of western Europe, which are generally more energy secure than those in Eastern Europe, have made considerable progress in creating liquid and sustainable energy markets. In contrast, the countries of southern and eastern Europe are generally less energy secure, with lower levels of market integration with their neighbours. The size of a country, and thus the size of its economy and energy market, is also a factor. Because the liberalisation of energy markets requires the participation of multiple actors so as to allow some level of competition, the liberalisation process can be tougher to achieve in smaller countries with limited market size and limited numbers of legacy energy actors. In these cases, marketisation can perhaps be achieved more readily across regions, with the participation of multiple countries. Thus the process of market liberalisation and regional integration may proceed hand-in-hand in areas where neither has advanced far yet.

One major factor impacting the drive towards liberalisation/integration is the increasing pace of technological change. The last decade has seen major improvements in the cost effectiveness of solar and wind power projects, reducing the amount of government support needed for projects to be cost competitive against non-renewable energy projects. This spread of newer technologies is facilitating less centralised electricity production, with solar panels and windmills springing up across the landscape in the hands of different producers and even consumers. With decentralised renewable production, improved battery options, and better measurement technologies, pricing and distribution will contribute to the reconfiguration of both grid systems and market structures.

Due to differing endowments of sun and wind, and to the historical differences in the development of the national energy mixes, every country will tread a different path towards decarbonisation. On current trends of technological advancement, solar, wind, hydro, and nuclear power (currently contributing about one third of Europe's electricity) are likely to form the largest components of a decarbonised future European energy system. As the costs of nuclear power over its full lifecycle have been recognised to be significantly higher than estimated in previous decades, nuclear power will be unlikely to expand significantly. Similarly, good locations for hydropower installations are close to being tapped out across most of Europe, limiting its future growth. This leaves solar power, wind power, and improved energy efficiency as the largest growth areas over the coming century. This will transform the geography of energy production and transportation across the continent, making the effective development of the Energy Union all the more urgent.

Evolving markets, evolving plans for regional cooperation

Regional initiatives are seen as contributing to the development of the Energy Union, notably those related to construction of an EU Internal Energy Market that provides secure energy for all Europeans. There are already a range of initiatives and organisations that bring together different groupings of member states (and sometimes non-member states). Some regional efforts have been organised on a Europe-wide basis with all member states divided into neat groups, while others have been the result of member country initiatives that bring together coalitions of states. Some of these could be replicated throughout Europe. For instance, bilateral and regional agreements on intra-day and day-ahead electricity market coupling have spread across the continent – most national electricity markets are now coupled with at least one other member state and, in some regions, electricity markets are deeply connected through price coupling.

As more intermittent renewable power sources come online, more trade will be taking place across borders to expand the connected power base and cushion the impact of the irregularities. This will help improve the electricity supply security. Both market structures and grid infrastructures are adapting, and the EU has a role in supporting both. Regionalisation in the electricity sector is intended to ease the relationship between the European and national levels, facilitating the common work of delivering the Energy Union. With deeply interconnected electricity markets, the individual sources of electricity, whether from North Sea wind farms or distributed solar panels on rooftops in southern cities, will become less of a focal point for cooperation efforts, while systems for distributing and storing electricity will become the primary focus. And regional cooperation also facilitates efforts to reach beyond EU borders and cooperate with neighbouring countries.

The European power system is operated by national Transmission System Operators (TSOs), which are responsible for security of supply and market facilitation, working both on long-term investment planning and real time grid management. Member states, their regulators and the TSOs use regional approaches to integrate energy markets and coordinate grid planning. At the continental level are two cooperation organisations for European Network Transmission Systems Operators (ENTSOs). ENTSO-E (electricity) and ENTSO-G (gas) were created by merging several regional associations of TSOs. The ENTSOs are also tasked with facilitating improvements to the internal market and helping improve the security of supply, taking into account levels of interconnection between member states, generation capacity, and the supply/balance. ENTSO-E has multiple non-EU members, while ENTSO-G only has non-EU participants as observers. In addition, the Agency for the Cooperation of Energy Regulators (ACER) promotes cooperation between national regulatory authorities at regional and European levels, monitors progress in the implementation of the 10-year network development plans and monitors the internal markets in electricity and natural gas. The ENTSOs, together with ACER, create network codes and access rules and ensure coordination of grid operation. Beginning in 2006, ACER set up Regional Initiatives to facilitate voluntary early implementation of Network Codes for gas and electricity. By 2016, this work was largely complete in the gas and electricity sectors, and the initiatives began to be discontinued, as other cooperation activities moved to new structures. While the Gas Regional Initiative is still operating, notably in the South and South-South East regions, the North-West region is inactive. Other regional groupings have developed, however, including Regional Security Coordinators. These were first set up for electricity grid operation on a voluntary basis by TSOs in 2008, and by the end of 2017, each region of the EU should be covered.

In November 2016, the Commission issued a new 'Winter package' ('Clean Energy for all Europeans') which pushes the theme of regional cooperation. The package encourages better regional cooperation plans and bodies for facilitating regional energy crisis responses and deeper electricity interconnections. It includes a proposed regulation on risk preparedness to be carried out in a cross-border context, including regional stress tests. Eventually, the Commission envisions the creation of new Regional Operational Centres set up by TSOs to perform new tasks, such as coordinated capacity calculation, security analysis and crisis simulations. The package also calls for member states to create comprehensive long-term low emissions strategies and integrated 10-year national energy and climate plans starting in 2021. These plans would be developed using a common, coordinated approach with each national plan developed via a cooperative regional process that allows feedback from other states.

This coordination will be especially important for helping manage the transition to greener energy sources. The package proposes an obligation for member states to open national renewables support schemes to cross-border participation. In a fully integrated market, renewable energy projects could be located more optimally, according to sun and wind availability, with the generated electricity transported where it is needed across the continent via integrated grids. In conjunction with this, the package puts

forward new electricity market design proposals to make markets more responsive to variable renewable energy generation and drive investment towards key areas such as demand response and storage.

Energy security and regional cooperation

Making the Energy Union useful for each country requires that the pillars of the Union coincide with and support national priorities. While it is quite common to hear calls for national governments to shift their thinking and to support European goals over national ones, this is unlikely to win the necessary member state support. This is especially the case for energy security where conditions and perspectives vary significantly in the different regions of the EU.

The external component of regional cooperation plays out differently on the different corners of the continent. For example, having significantly improved their energy security following the oil price hikes of the 1970s, the advanced economies of north-west Europe are today focused on transformation of their energy systems as a way to achieve their key energy goals of security competitiveness and sustainability. Not having achieved the same level of energy security as the countries of western Europe, much of southern and Eastern Europe, while also pursuing transformation, retains a focus on improving energy security by improving supplies and routes of *all* types of power.

And the borders of the EU are no barriers to cooperating on energy market integration or security improvements, provided that it all takes place among states with harmonising regulatory environments and similar energy goals. Creating more harmonised and integrated energy markets in the EU's neighbours should improve the energy security of both the European Union and its partners. Those member states facing the east and the south, in particular, are focused on relations with their non-EU neighbours, to minimize downsides and maximise upsides. The Energy Union is a potentially dynamic mechanism for framing these external relations, even if the frontiers of the Energy Union may blur as cooperation with these neighbours improves.

1. Eastern Europe – the Baltic Sea, central and southeast regions

Many of the countries of eastern Europe, from the Baltic Sea down to the Aegean, continue to have significant dependence on Russian energy supplies and a high level of worry about this dependence. While far from uniform across the region, it is clear that the solidarity and energy security components of the Energy Union are a higher priority in this region than in the countries further west. At the same time, with less of a history of integration among the countries of the region, there is perhaps an even stronger emphasis on national independence in energy policymaking than in western Europe, where it is already very high. It is in eastern Europe, then, that the European Union plays

a very important role in facilitating and funding interconnections at the physical level as well as improved coordination at the policy level. For example, the construction of a new LNG terminal in Lithuania and the electricity connections between Lithuania and Poland and to Sweden were supported by the Baltic Energy Market Integration Plan (BEMIP). These, plus continued policy coordination with any number of states (including via ENTSOs and regional initiatives – see above) might not have taken place had the national governments of the region been unable to count on EU support.

The EU also takes the lead in improving regional cooperation beyond the EU's eastern borders. Since 2006, the Energy Community is the EU's primary project for extending the internal energy market to southeast Europe and beyond, helping countries in the region on a range of energy issues, including with implementation of the *acquis communautaire* for energy. The Energy Community includes Albania, Bosnia and Herzegovina, Kosovo, FYROM, Moldova, Montenegro, Serbia and Ukraine, while Georgia, Armenia, Norway and Turkey are observers. Another EU programme, INOGATE, has facilitated regional energy cooperation between the EU and countries of the Eastern Partnership and Central Asia since 1996. It has now been replaced by EU4Energy, a programme to help improve data use and support evidence-based energy policy-making.

As a further complement, the Eastern Partnership Platform on Energy Security brings together representatives from the EU, Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine to work on energy security, renewable energy, energy efficiency and nuclear safety. Other initiatives include the Eastern Europe Energy Efficiency and Environment Partnership (E5P), and the EU Technical Assistance Facility for Sustainable Energy for All (SE4ALL), and a High Level Group for Central Eastern and South-Eastern European Gas Connectivity (CESEC) which includes 9 EU member states and six members of the Energy Community (Ukraine, Republic of Moldova, Serbia, FYROM, Albania and Bosnia and Herzegovina). EU energy sector support in the neighbourhood also includes support for infrastructure, including via the Neighbourhood Investment Facility.

It is clear that EU efforts throughout Eastern Europe (both inside and outside the EU) play a major role in enhancing cooperation and greater interconnection and can thus give vital impetus to the fight for improved energy security and closer solidarity, reducing the regional fragmentation that has facilitated Russian energy dominance in the region.

2. North Sea region

For northwest Europe, all the countries of the region are genuinely committed to pursuing the sustainable energy transition. But in this region, bilateral and multilateral energy cooperation increasingly takes place, sometimes without direct Commission participation, on a wide range of issues, moving beyond harmonisation and initial interconnection towards deeper integration. Notably, improving ties with energy-rich Norway, the largest non-EU country in the region, is an important component of these efforts. One group of 12 countries in central and northern Europe (including two non-EU countries:

Norway and Switzerland) signed the Baake declaration in 2015 to more rapidly move forward on electricity market integration. Yet another group (the North Seas group) of ten countries (including Norway) plus the EU has pursued electricity grid cooperation through the North Seas Countries Offshore Grid Initiative (NSCOGI) since 2009. And the Pentilateral Energy Forum brings together national ministries, regulatory authorities, and TSOs for Austria, Belgium, France, Germany, Luxembourg and the Netherlands, along with the Commission, to improve market integration and assess security of supply risks at a regional level.

3. Southern Europe

Geography remains a major factor defining the level of interconnectivity between the countries of southern Europe and their overall level of economic integration with their neighbours. For these states therefore, efforts towards interconnectivity or improving solidarity mean something different than for states with multiple close EU neighbours. It is not surprising then, that opening new and expanding old routes for importing gas from the south-east (Southern Corridor and eastern Mediterranean) and international LNG markets rate high on national agendas. However, the financial crisis has had a huge impact on southern Europe, and continues to depress energy demand and limit the rate of investment in new energy sources and transportation routes.

And while southern Europe is the gateway to the Mediterranean, regional cooperation initiatives have generally had less success than bilateral projects. For example, the energy components of the Union for the Mediterranean and the Africa-EU Energy Partnership have yet to fulfil their promise. In contrast, there is great hope for cooperation with Morocco following a joint declaration to establish a 'Roadmap for Sustainable Electricity Trade Between Morocco and the European Internal Energy Market' signed with four EU states (Germany, France, Spain, Portugal) in November 2016. While the Morocco declaration did not have the EU as a signatory, the EU has taken the lead in pushing forward energy relations with Algeria, establishing a strategic energy partnership in 2013.

Conclusion

With the development of decentralised generation, better electricity storage, smart grids and active consumer participation, the European energy landscape will be very different in the decades ahead. The increasing pace of technological change will lead to the diminishing cost of renewable energy relative to other primary sources, with the result that countries that would otherwise have been unable to rapidly pursue a sustainable energy transition will find it cost-effective to do so. This change will mean that pursuing a clean energy transition will be even more important for energy competitiveness and security goals, and not just sustainability goals. It will thus be important for the Energy

Union to progress rapidly and with broad support. The discussion above has shown how regional initiatives, both within and beyond the EU, are increasingly important for developing clear pathways for energy development and integration that make sense at national, regional and European levels.

Importantly, these initiatives take place within the strategic and regulatory frameworks agreed at the European level, ensuring that though progress may take place at different speeds, there will be no major incongruence in the eventual results. As the Energy Union takes fuller shape, especially via the recent packages issued in 2015 and 2016, progress on the five pillars will proceed with varying prioritisation across the EU. Although some initiatives are led by member states, the EU has a key role, not just in laying out the frameworks, but in helping overcome the various geographic, political, and infrastructure hurdles to build a flexible but unified union. This is especially the case for regional efforts that reach beyond EU borders, where leadership and financial support mechanisms from Brussels are often essential for building cooperation with neighbours of the EU.

It remains an open question how much all of this regional cooperation will lead to deep strategic energy cooperation at the continental level, in terms of major investments and deals with energy suppliers. As with so many other areas in the history of the EU, it seems likely that the functionalist approach that is being pursued to construct the Energy Union, including its regional projects, will gradually gnaw away at the strategic differences between member states, even if the level of concern about energy security continues to vary greatly across Europe.

Annexes

ABBREVIATIONS

ACER	Agency for the Cooperation of Energy Regulators
bcm	billion cubic metres
BEMIP	Baltic Energy Market Interconnection Plan
EESS	European Energy Security Strategy
ENTSO	European Network Transmission Systems Operator
FYROM	Former Yugoslav Republic of Macedonia
GDP	Gross Domestic Product
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LNG	Liquefied Natural Gas
OECD	Organisation for Economic Cooperation and Development
RES	Renewable energy sources
SGC	Southern Gas Corridor
SMCs	Southern Mediterranean Countries
TAG	Trans Austria Gas Pipeline
TANAP	Trans-Anatolian Natural Gas Pipeline Project
TAP	Trans Adriatic Pipeline
TPES	Total Primary Energy Supply
TSO	Transmission System Operator

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