Research Paper

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Europe Programme/Energy, Environment and Resources | March 2016

Europe's Energy Union

Foreign Policy Implications for Energy Security, Climate and Competitiveness

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Summary

- Plans for an EU-wide Energy Union are taking shape, following the European Commission's adoption in February 2015 of a 'Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy'. The strategy underlines the EU's ambition to attain 'secure, sustainable, competitive, affordable energy for every European'.
- The initiative seeks to transform energy markets and energy/climate policy across the EU. Its goals include cross-border coordination and integration in energy security, supply, market operations, regulation, energy efficiency, low-carbon development, and research and innovation.
- There is an important foreign policy aspect to the Energy Union, given the imperative of managing security and supply risks in Europe's neighbourhood and further afield. By addressing structural divisions between member states, the Energy Union could have a marked beneficial effect on the EU's capacity to conduct a unified and effective foreign policy.
- Development of the Energy Union presents abundant challenges, however. Policy and legislative changes will need to be coordinated across 28 countries. Variations in EU member states' attitudes to security and energy policy may lead to differences in, or clashes between, priorities. The wider context is also complicated. Interrelated challenges rooted in broader policy issues include the partial transition to low-carbon energy, and concerns over competitiveness relative to other major economies.
- The current EU approach to energy security and infrastructure focuses on natural gas. This 'gas first' approach risks crowding out other responses to the energy security challenge. It could result in the creation of 'stranded assets', if the future gas demand on which investments are predicated does not match projections. A narrow focus on new gas infrastructure could also impede development of other dimensions of the Energy Union.
- The markets for coal, oil, gas and renewables are changing significantly. The shale oil and gas 'revolution' in the United States has altered the economics of hydrocarbon fuels, and the plunge in oil prices since mid-2014 is causing energy businesses in the EU to reassess investment plans.
- The EU is rapidly expanding the use of renewable energy. Dramatically falling prices for renewables will challenge traditional energy utility business models. How the Energy Union enables market access for new business models will be key to determining future energy trajectories.

Introduction

In February 2015 there was a significant development in plans for an EU-wide Energy Union, with the European Commission's adoption of a 'Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy'.[1] The new strategy document outlines the Commission's ambition to attain 'secure, sustainable, competitive, affordable energy for every European'.

The initiative seeks to transform energy markets and energy/climate policy across the EU. Among other things, the Energy Union is intended to facilitate cross-border coordination and integration in energy security, trade, regulation and efficiency, as well as in low-carbon development and research and innovation.

The development of the Energy Union presents abundant challenges. Policy and legislative changes will need to be coordinated across 28 countries. Variations in EU member states' attitudes to security and energy policy may lead to differences in, or clashes between, priorities. The wider context is also complicated, as the EU faces a number of interrelated challenges to its energy and climate policies. Many of these are rooted in broader policy issues: violence and instability in energy-supplier countries, the partial transition to low-carbon energy, and concerns over the impact of policy and market changes on competitiveness relative to other major economies such as the United States and China.

Two issues, above all, stand out. One is the fact that the EU's current energy strategy focuses on securing, and expanding, supplies of imported natural gas. The war in Ukraine, following Russia's annexation of Crimea in early 2014, has ensured that the need to avoid potential gas shortages has taken centre stage and has prompted efforts to coordinate the diversification of supplies. One positive effect of this is that the creation of the Energy Union has become a top priority for the European Commission. Yet while this political momentum to integrate Europe's energy sector could be beneficial, there is also a risk that the Ukraine crisis could securitize the energy agenda and place a disproportionate focus on security of supply, in particular the supply of natural gas. This could lead to the EU 'locking itself into' investments in gas pipelines and other infrastructure that may prove unviable if unsupported by (increasingly uncertain) future demand.

The other issue that goes to the heart of the challenges facing the Energy Union is the intensifying debate on climate change, following the landmark agreement at the UN Climate Change Conference in Paris ('COP21') in December 2015. The agreement provides a new long-term goal for limiting global temperature increases, and – given that countries' existing commitments are likely to be insufficient to achieve this goal – establishes mechanisms to increase policy ambition over time. The Energy Union must therefore perform a twin climate-related role: it must support delivery of the existing commitments in the EU's 2030 Climate and Energy Package; but it must also lay the groundwork for a debate on larger reductions in greenhouse gas emissions in future.

This research paper explores the Energy Union from a primarily foreign policy perspective. It examines the political and economic forces likely to inform the creation of what aims to be, in effect, a single market with flexible and frictionless energy trade between all 28 member states. It considers the *internal* foreign policy dynamics of coordinating market development among countries whose energy priorities and domestic political imperatives often differ. It also considers the *external* diplomatic challenges such an initiative presents for the EU as a whole – for instance, the obstacles to developing closer energy links

[1] European Commission (2015), 'Energy Union: secure, sustainable, competitive, affordable energy for every European', press release, Brussels, 25 February 2015, http://europa.eu/rapid/press-release_IP-15-4497_en.htm (accessed 27 Jul. 2015).

with European Neighbourhood countries that offer alternative sources of imported hydrocarbons but may be politically unstable, authoritarian and/or unable to ensure reliable supply. Further, this paper assesses the implications for the Energy Union of a range of European and global trends: the boom in production of shale oil and gas in the United States; the plunge in oil prices since mid-2014; the likely decline in future coal-fired generation in the EU; and the increasing use of renewable energy in the EU.

The Energy Union will need to accommodate potentially competing factors, embodied in the tension between energy security, economic competitiveness and climate change policy. Although this tension is not new to energy policy, external pressures and broader foreign policy challenges in each of these areas provide critical context for EU policy as the Energy Union evolves. Is there a pathway to creating a shared definition of energy security at the European level? What does this imply for future priorities and the balance of supply- and demand-side energy measures? How do other external policy issues, such as the review of the European Neighbourhood Policy and the EU's Global Strategy on Foreign and Security Policy, interact with energy?

Background to EU climate and energy policy

Two main processes are driving climate and energy policy across Europe: the 2030 Climate and Energy Package, which formed the basis of the EU's contribution to tackling climate change at the UN Framework Convention on Climate Change (UNFCCC) negotiations; and the development of the Energy Union. The 2030 Climate and Energy Package targets a reduction in greenhouse gas emissions of 'at least' 40 per cent by 2030. It calls for a rise in the share of renewables to 27 per cent of energy consumption over the same period (a target that is binding on the EU as a whole). It also has indicative targets of a 27 per cent rise in energy efficiency, and electricity interconnection capacity equivalent to 15 per cent of production capacity.

Jean-Claude Juncker made the creation of an Energy Union a priority on his appointment as president of the European Commission in 2014. The Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy outlines the five 'dimensions' of energy policy that the Energy Union seeks to address:[2]

1. **Energy security, solidarity and trust.** Focuses on diversification of supply (especially for gas), on improving member state coordination in response to crises, on a stronger European role in global energy markets, and on more transparency over gas supply.
2. **A fully integrated European energy market.** Focuses on 'hardware' (such as pipelines) to link markets through physical interconnections, as well as on 'software' in terms of enforcing energy-related legislation and removing regulatory barriers to integration. Also targets increased regional cooperation and a stronger focus on consumers and vulnerable energy customers (generally the poor and the elderly, for whom affordability is a key issue).
3. **Energy efficiency contributing to a moderation of demand.** Focuses on increasing energy efficiency, particularly in the building and transport sectors.
4. **Decarbonizing the economy.** Focuses on integrating the 2030 Climate and Energy Package into the Energy Union process, continuing the EU Emissions Trading System, and retaining world leadership in renewable energy.

[2] European Commission (2015), *A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*, COM/2015/080 Final, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2015%3A80%3AFIN (accessed 17 Dec. 2015).

5. **Research, innovation and competitiveness.** Focuses on developing a new strategy for research and innovation in areas such as renewables, smart grids, carbon capture and storage, and nuclear technology.

The Energy Union also features in the European External Action Service's strategic review in preparation for the EU's Global Strategy on Foreign and Security Policy, which High Representative Federica Mogherini will present to the European Council in June 2016. In the review, the Energy Union is seen as a key framework 'to tackle fragmented energy markets through more effective coordination of energy policies and new investments in critical infrastructure'. In addition, 'efforts to build [it] will help rebalance relations with Russia, the Caucasus and the Middle East'.[3]

In July 2015 the EU Foreign Affairs Council launched the Energy Diplomacy Action Plan.[4] This aims to strengthen energy diplomacy through regular discussions and ad hoc papers in order to forge common understanding of related foreign policy issues and facilitate joint action. The plan emphasizes support for new and existing energy cooperation dialogues, especially on gas-related issues with Central Asia, Ukraine and other European Neighbourhood countries, and countries that export liquefied natural gas (LNG) to the EU. It also proposes new ways to build coherence between the EU's energy policy and its development, climate and trade goals. This includes promoting business opportunities for low-carbon and energy-efficient technologies.

In addition, the Action Plan sets an objective of enhancing the global energy architecture and multilateral initiatives, including through the G7, G20 and International Energy Agency (IEA); through the Sustainable Development Goals; through modernization of the Energy Charter; and through reform of the Energy Community (see Box 1). The Foreign Affairs Council has called for the development of specific proposals for common EU messages on energy diplomacy, including through the EU Energy Diplomacy Experts Network and an energy diplomacy mapping exercise. This would involve enhanced coordination with the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) on funding for energy infrastructure in member states and European Neighbourhood countries, and through other EU-level funds.

Box 1: The Energy Community

Established in 2005, the Energy Community is an organization that seeks to create an integrated energy market between the 28 EU member states and eight neighbouring countries.[5] It seeks to improve investment and competition, to secure the supply of energy, and to forge trust and solidarity among contracting parties. Countries ratifying the Energy Community Treaty are required to adopt the EU's *acquis communautaire* in the field of energy. They must also liberalize their energy markets and be accountable to a common regulatory framework, which includes a dispute-settlement procedure. The current treaty expires in 2026. The Ministerial Council, with representatives from all parties, meets once a year. The permanent secretariat, which is primarily responsible for oversight and assistance, is based in Vienna. Its operating budget is 94.9 per cent funded by the EU, with the rest made up by contributions from the eight non-EU members.

[3] European External Action Service (2015), *The European Union in a changing global environment. A more connected, contested and complex world*, Brussels, http://eeas.europa.eu/docs/strategic_review/eu-strategic-review_strategic_review_en.pdf (accessed 12 Sep. 2015).
[4] Council of the European Union (2015), 'Council conclusions on energy diplomacy', press release, 604/15, Brussels, 20 July 2015, http://www.consilium.europa.eu/en/press/press-releases/2015/07/20-fac-energy-diplomacy-conclusions/ (accessed 27 Jul. 2015).
[5] Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Moldova, Montenegro, Serbia and Ukraine are contracting parties. Armenia, Georgia, Norway and Turkey hold observer status, with Georgia presently in the process of joining as a full-fledged member. See Energy Community, 'Members', https://www.energy-community.org/portal/page/portal/ENC_HOME/MEMBERS (accessed 27 Jul. 2015).

The Energy Union and the 2030 Climate and Energy Package will be linked by a new energy governance mechanism. The development of the latter is a response, in part, to the political compromise at the heart of the 2030 Climate and Energy Package: a renewables target that is binding on the EU as a whole but not on individual member states. This contradiction reflects deep differences among member states on the role of sectoral targets, differences that – during negotiation of the Climate and Energy Package – had left open questions about the transparency of member states' actions and whether there would be any enforcement or additional measures if the EU veered significantly off-track from the 2030 targets.

> Effective policy requires member states to be able to rely on the cooperation of their peers in times of crisis. Yet the economic challenges affecting the eurozone, and the ongoing influx of refugees and migrants, demonstrate the extent to which crises can test trust and solidarity in the EU.

This balance between collective and individual responsibility is at the centre of energy security concerns in the EU. Effective policy requires member states to be able to rely on the cooperation of their peers in times of crisis. Yet the economic challenges affecting the eurozone, and the ongoing influx of refugees and migrants, demonstrate the extent to which crises can test trust and solidarity in the EU. New proposals by the European Commission seek to address this, in an energy context, by creating an obligation for EU member states to provide gas to neighbouring states facing severe disruptions in supply.[6] However, there are questions as to the practicality of the arrangement. It would require member states to take the potentially unpopular move of sacrificing domestic energy provision in order to provide for key services in neighbouring countries.

To date the discussions about the new energy governance mechanism have focused on transparency and reporting. More robust options are likely to be discussed at some stage. However, the broader context remains challenging, given the upcoming UK referendum on membership of the EU on 23 June 2016 and ongoing concerns over the single currency and the refugee/migrant crisis. These and related issues are all likely to factor in discussions of energy governance.

European foreign policy and the politics of energy

Energy politics are at the heart of EU foreign policy. Energy is the archetypal supranational challenge for Europe, characterized by the power of international market forces, divergent interests and priorities among member states, conflicting and sometimes contradictory policy aims, and the constraints of physical infrastructure. These factors mean that the case for collective action is persuasive, but also that its practicalities are formidable.

Energy is the source of many of the divisions that have hampered the EU's attempts to build consistent and strategic relations with its energy-supplying neighbours – most notably with Russia. As mentioned above, concerns over Russia's actions in Ukraine were the catalyst for the Energy Union initiative, which began as an effort to reduce dependency on Russia and undermine the country's leverage in Europe. As that crisis has shown, the dynamics of energy politics create specific foreign policy dilemmas for European leaders. These include the following:

[6] For details of the European Commission's new proposals, see European Commission (DG Energy) (2016), 'Commission proposes new rules on gas and heating and cooling strategy', Brussels, 16 February 2016, https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-gas-and-heating-and-cooling-strategy (accessed 16 Feb. 2016).

- **Security of supply and human rights concerns.** The desire for enhanced energy security sometimes clashes with concerns about human rights in supplier countries, particularly given the tendency for income from energy exports to reinforce the positions of elites and create opportunities for corruption and rent-seeking, which may undermine democratic legitimacy. An obvious example is the EU's drive to import gas from Azerbaijan as a means of diversifying supply away from Russia, despite the repressive policies of the authoritarian regime in Baku. Such a pragmatic approach signals that the EU is sometimes willing to overlook its reservations about human rights in the pursuit of strategic interests. However, this risks reputational damage and accusations of hypocrisy, given that at the same time the EU is promoting political reform in its neighbourhood based around a loosely defined notion of European values.
- **Trade-offs between short- and long-term goals.** Many of the EU's foreign policy goals are long-term and transformational, but the politics of energy can sometimes limit the willingness of member states to embrace a long-term strategy. Understandably, states that are highly dependent on Russian gas have been wary of either antagonizing their main supplier or of putting at risk deals that they have struck individually. This is illustrated by Hungary's willingness to seek preferential terms for Russian gas while sanctions against the Kremlin remain in place. The short-term risks – for example, an interruption in supply – may be seen as too high a price for a longer-term strategy that seeks to transform relations with neighbouring states.
- **Alignment of technical and political imperatives.** The EU is often criticized for its technical and bureaucratic approach to dealing with foreign policy issues. The key trigger for the crisis in Ukraine was President Viktor Yanukovych's refusal to sign an association agreement with the EU in 2013. Ironically, the proposed agreement reflected an attempt by the EU to depoliticize a deeply political process. The danger is that technocratic approaches may not fully take account of the political implications of economic or energy policy choices. Conversely, technocratic processes can sometimes provide legal or bureaucratic cover for decisions with significant foreign policy implications, such as the European Commission's antitrust probe into Gazprom in April 2015.
- **Commercial interests that clash with foreign policy.** Even as the EU has successfully brokered a common position on sanctions in response to Russian actions in Ukraine, member states have continued to allow commercial energy companies to deal with their Russian counterparts. Hungary's deal with Russia involving the supply of new nuclear reactors by Rosatom for a site at Paks seemed to contradict the EU's aim of limiting dependency on its neighbour. Similarly, the Nord Stream 2 pipeline project – a partnership between Gazprom, Royal Dutch Shell, E.ON, OMV, BASF/Winterfall and ENGIE – would create a new gas pipeline under the Baltic Sea between Russia and Germany, increasing supply capacity by 55 billion cubic metres per year. Regardless of the merits of such developments for Europe's wider energy mix, they confuse the EU's overall message to Russia, and in the case of Nord Stream 2 will have important effects on gas transit countries, in particular Ukraine. There is also a risk that the interests of major European energy companies will diverge further from those of European governments. This could create political complications for the latter, reducing their scope for foreign policy actions.

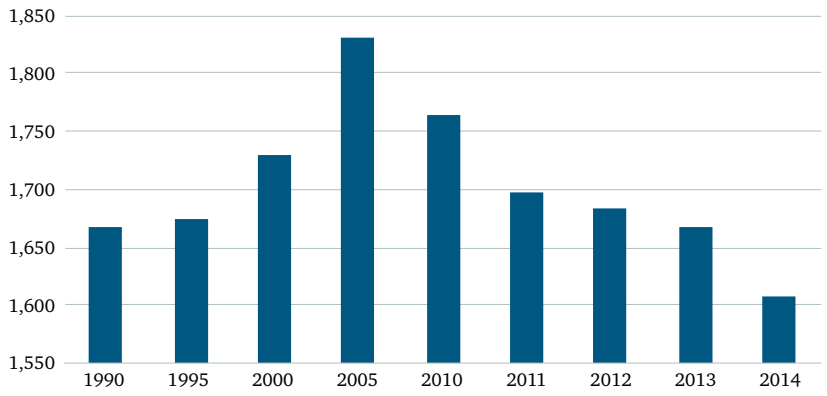
These challenges illustrate the close interconnection, and occasional clashes, between the EU's efforts to build a common foreign policy and the conduct of energy politics across the continent.

By addressing many of the structural causes of divisions between member states, the Energy Union could help to bridge the divide between the EU's internal and external policies. If realized effectively, the Energy Union would have the potential to transform not just the policies of member states but also, in the longer term, the drivers of their common interests. This could have a marked effect on the EU's capacity to conduct a unified and effective foreign policy.

Energy security and Europe's changing energy landscape

Energy consumption in the EU peaked prior to the financial crisis and has since fallen by around 12 per cent (see Figure 1). Petroleum products make up one-third of consumption (33.4 per cent), followed by gas (23.2 per cent), solid fuels (17.2 per cent), nuclear energy (13.6 per cent), renewables (11.8 per cent), and non-renewable waste and electricity (0.8 per cent). In recent years there has been a significant fall in the use of coal, alongside an expansion in the use of renewables and gas. For example, between 2010 and 2014 the EU's installed electricity-generating capacity recorded a net increase of over 116 GW from wind power, 87 GW from solar photovoltaics (PV) and 100 GW from gas. At the same time coal-generating capacity fell by over 24 GW and nuclear by 13 GW.[7]

Figure 1: EU gross inland energy consumption, 1990–2014, million tonnes of oil equivalent

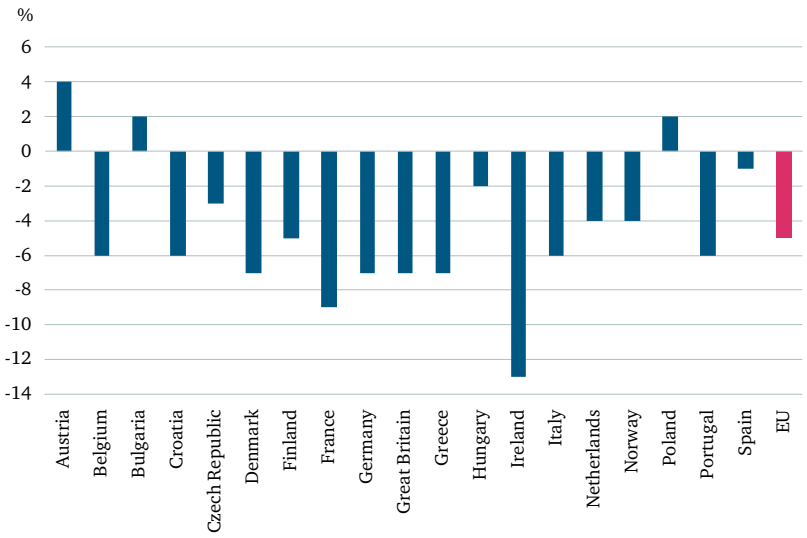


Source: Eurostat.

EU-level trends belie significant variation in consumption between member states. For example, overall power demand has increased in Poland, Austria and Bulgaria (see Figure 2), even though in aggregate it has fallen in the EU. Similarly, Figure 3 shows that between 2010 and 2014 gas demand fell in all member states except Poland and Bulgaria. Petroleum demand fell by 7 per cent across the whole of the EU between 2009 and 2013, but again this figure masked significant variation between member states (see Figure 4).[8] These differences are critical in shaping the attitudes of member states to energy-related objectives. In particular, trends in Eastern Europe tend to be quite different from the EU average.

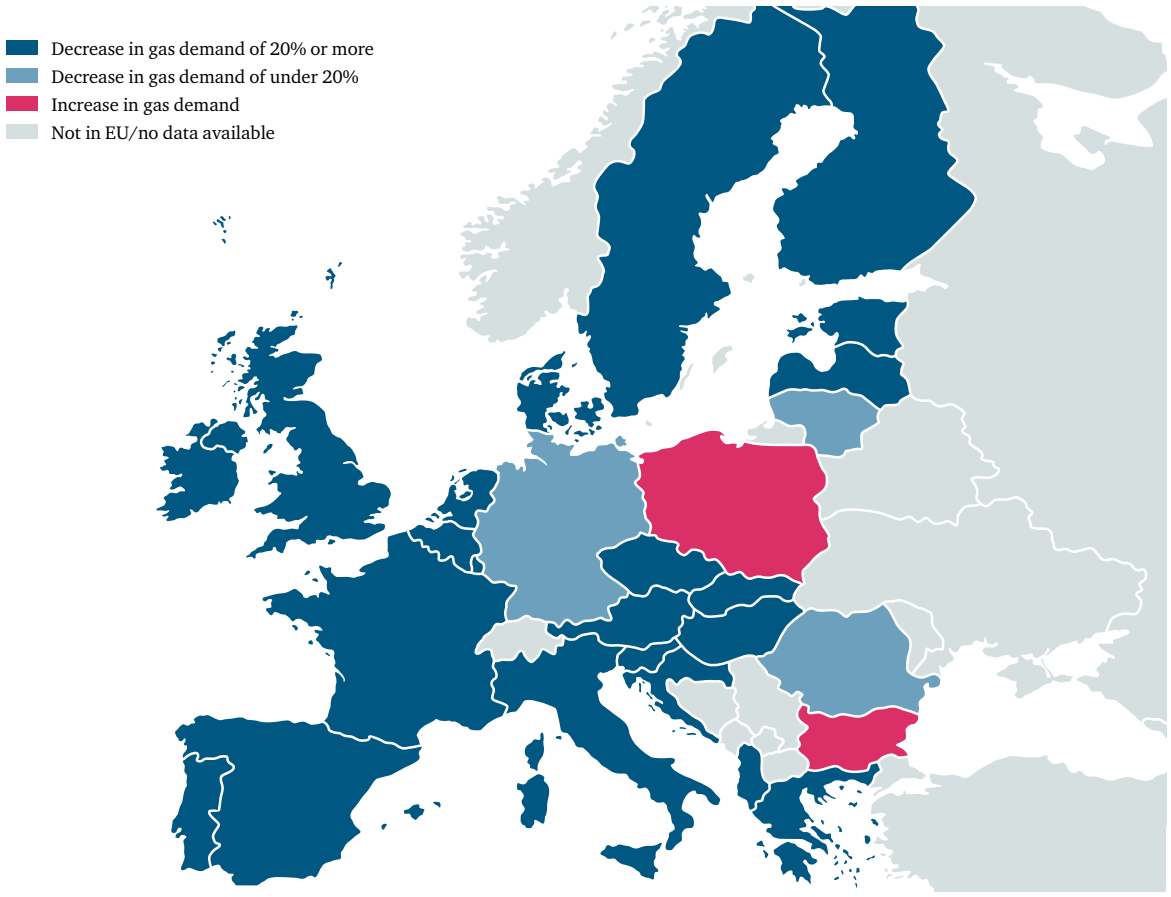
[7] European Wind Energy Association (2015), *Wind in power: 2014 European statistics,* February 2015, http://www.ewea.org/fileadmin/files/library/publications/statistics/EWEA-Annual-Statistics-2014.pdf (accessed 15 Mar. 2015).
[8] Jones, D., Dufour, M. and Gaventa, J. (2015), *Europe's Declining Gas Demand: Trends and Facts on European Gas Consumption*, E3G report, http://e3g.org/x7Knc (accessed 12 Dec. 2015).

Figure 2: Percentage change in electricity demand, 2010–14



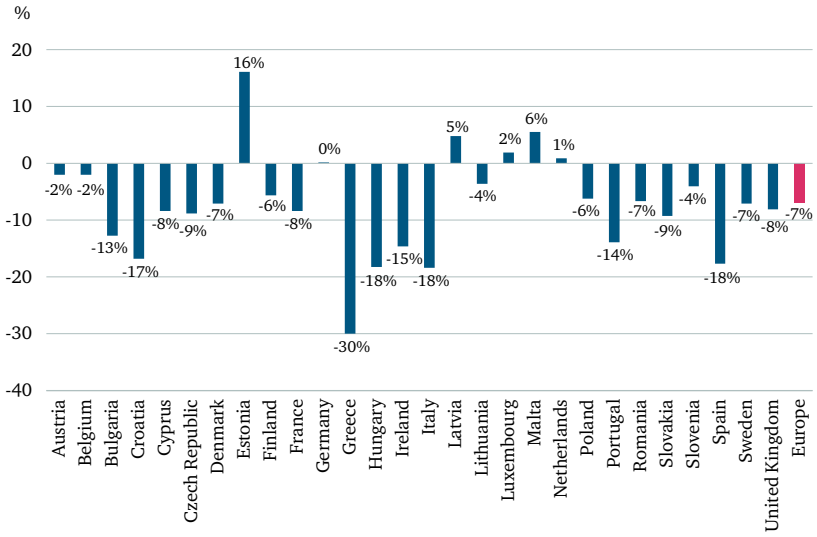
Source: Sandbag (2015), 'The Eternal Surplus of the Spineless Market'.

Figure 3: Evolution of EU gas demand, 2010–14



Sources: E3G, Eurostat.

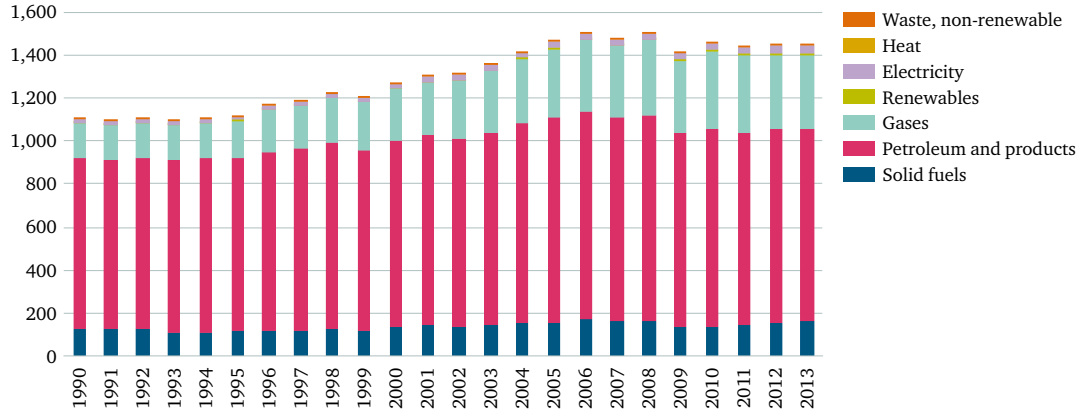
Figure 4: Percentage change in total consumption of petroleum products, 2009–13



Source: U.S. Energy Information Administration.

Even with these changing patterns of supply and demand, the EU remains significantly dependent on energy imports. In 2013 imports accounted for 90 per cent of the EU's crude oil consumption, 66 per cent of its natural gas consumption and 42 per cent of its solid fuel consumption; the EU's energy import bill was an estimated €400 billion in that year. The annual figure will have fallen since then, given the collapse in global oil prices (see the section 'Responding to global oil market developments').[9] The EU's energy imports peaked in 2008 and have since fallen slightly, as shown in Figure 5. Russia is a key supplier: in 2013 the country accounted for 39 per cent of the EU's gas imports, 29 per cent of solid fuel imports and 33.5 per cent of crude oil imports, the latter worth approximately €100 billion.[10]

Figure 5: EU energy imports, 1990–2013, million tonnes of oil equivalent

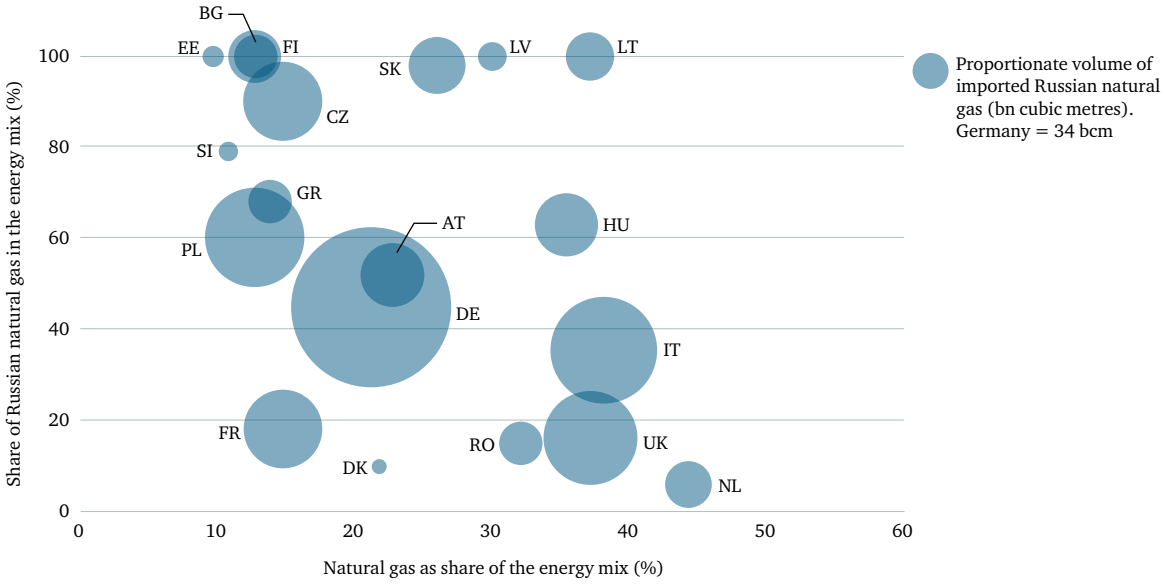


Source: Eurostat.

[9] European Commission (2015), *A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*.
[10] Eurostat (2016), 'Energy production and imports', http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_production_and_imports (accessed 12 Jan. 2016).

Securing gas imports has been a focus of European energy diplomacy for many decades. Five member states rely on Russian imports for 100 per cent of their gas, and a sixth – Slovakia – sources 98 per cent of its gas from the country.[11] In terms of volume, the largest importers of Russian gas are Germany, Italy, Poland and the United Kingdom (see Figure 6). However, this energy relationship swings both ways: just as the EU is dependent on Russia for energy imports, Russia is dependent on the EU for export revenues. Moreover, a combination of fixed pipeline supply and limited LNG capacity means that Russia has few options in terms of diverting its exports to alternative markets.

Figure 6: Russian gas imports to the EU, 2013



Sources: Eurostat, Gazprom.

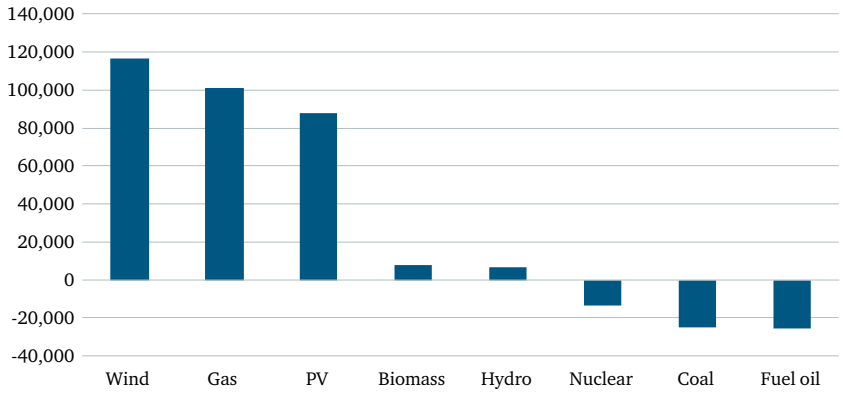
In the electricity sector, Europe is rapidly expanding the use of renewable energy, such as wind and solar PV, alongside gas (see Figure 7). At the same time there has been a small net reduction in installations that use nuclear energy, coal or fuel oil. The costs of renewables technologies are rapidly falling, which may soon make them competitive with fossil fuels even without significant subsidies. The costs of solar PV cells have fallen by 10–12 per cent per annum for the past five years.[12] Financial analysts estimate that solar PV has already reached 'socket parity'[13] in most parts of continental Europe, the southwest United States and Australia, and that it will do so in Japan by 2016 and in the United Kingdom and Brazil by the early 2020s.[14]

Electric vehicles may also disrupt transport-sector demand for fossil fuels. The investment bank Morgan Stanley estimates that the opening of Tesla's new 'Gigafactory' in Nevada will reduce battery costs globally from $250/kWh to $150/kWh by 2020. This will potentially create a market

[11] The five states are Bulgaria, Estonia, Finland, Latvia and Lithuania.
[12] Darby, M. (2016), 'Solar panel costs predicted to fall 10% a year', *Guardian*, 26 January 2016, http://www.theguardian.com/environment/2016/jan/26/solar-panel-costs-predicted-to-fall-10-a-year (accessed 15 Feb. 2016).
[13] 'Socket parity' is where the levelized cost of electricity for a technology (the per-kWh cost of a technology over its lifetime) becomes equal to or less than the retail price of purchasing electricity from the grid.
[14] Citi Research (2014), *Energy 2020: The Revolution Will Not Be Televised as Disruptors Multiply*, 28 July 2014, https://ir.citi.com/ceUKTj9wAJSPHBmpGoRGfQYz1rZm8CKVCFO7wPNIGAzn7%2feoGJhCRKXBw2LnpF%2bmPt5wCNmiHIw%3d (accessed 18 Sep. 2015).

of 3.9 million electric vehicles in the United States by 2028, with a battery storage capacity when combined of 237 GW (10 times larger than current storage in the US grid).[15]

Figure 7: Net electricity-generating installations in the EU, 2010–14, MW



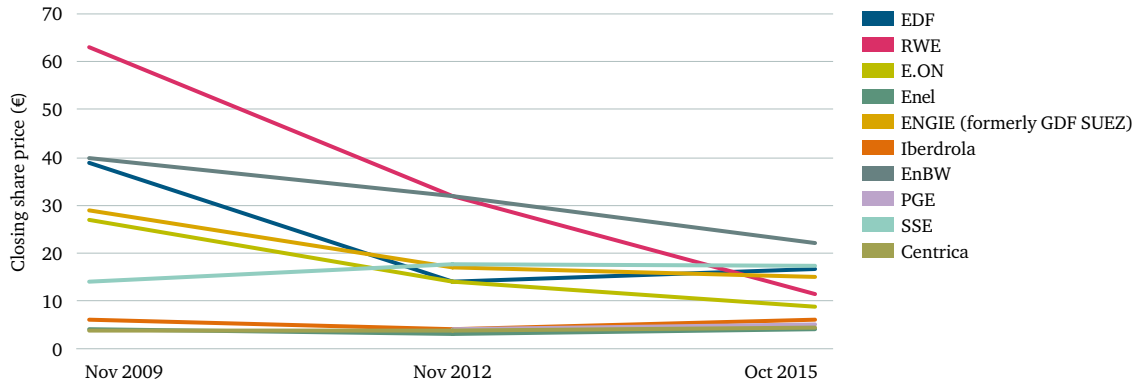
Source: European Wind Energy Association (2015), *Wind in power: 2014 European statistics.*

The rise of renewables is challenging the business models of traditional energy utilities. In Germany renewables accounted for 22 per cent of total power generation in 2014, and their share of generation peaked at 80 per cent on a single day in May 2015. The trend has hit investor confidence in European electricity companies, many of which have suffered sustained falls in their share prices (see Figure 8). According to analysis by UBS, 'Large-scale power generation […] will be the dinosaur of the future energy system: Too big, too inflexible, not even relevant for backup power in the long run.'[16] To address the structural challenges that growth in renewables presents, the German utility E.ON recently announced that it was splitting itself into two: the main company focusing on renewables, distribution and customer solutions; and a new company being spun off for E.ON's upstream commodities and fossil-fuel power generation operations.[17]

Many of the major energy utility companies in Europe have significant levels of state ownership. For example, EDF is 85 per cent owned by the French government and Enel is 25 per cent owned by the Italian government. Their futures will be affected by political decisions as well as by market forces. Given the challenge to established players' core business models, the future structure of the Energy Union and its implications for completing the internal market and allowing new entrants will be a key factor in determining the trajectory of the industry.

[15] Morgan Stanley Investment Management (2014), 'Solar Power & Energy Storage – More Disruption Ahead for Utilities?', 29 July 2014, https://www.morganstanley.com/public/08182014.html (accessed 18 Aug. 2015).
[16] Hummel, P., Houchois, P. et al. (2014), UBS Limited, 'Global Utilities, Autos & Chemicals. Will solar, batteries and electric cars reshape the electricity system?', Q-Series, 20 August 2014, http://www.qualenergia.it/sites/default/files/articolo-doc/ues45625.pdf (accessed 2 Mar. 2016).
[17] Steitz, C. (2014), 'German utility E.ON to split in two in major overhaul', Reuters, 30 November 2014, http://uk.reuters.com/article/2014/11/30/uk-e-on-divestiture-idUKKCN0JE0TZ20141130 (accessed 23 Oct. 2015).

Figure 8: Share prices of major European electricity companies, 2009–15



Source: Reuters.

The outlook for the coal sector underlines the challenges to established business models, as several EU policies will affect the future operation and viability of coal plants. These policies include the Large Combustion Plant Directive (LCPD) and its successor, the Industrial Emissions Directive (IED). From 2008 to 2015, the LCPD required each power plant to meet stricter emissions standards or 'opt out' by accepting a 20,000-hour limit on its operational life.[18] The IED came into effect on 1 January 2016. It requires the most polluting coal stations to be upgraded, to limit their operations, or to close. It has replaced seven existing EU directives, including the LCPD, and covers post-2015 coal use. An estimated 124 GW of current capacity in the EU is not compliant with the IED; this capacity is concentrated in the United Kingdom (22 GW), Germany (22 GW) and Poland (33 GW).[19] Existing plants may still be exempt from IED compliance, but would be limited to no more than 17,500 hours of operation between 2016 and 2023.[20] Some analysis suggests that up to 40 GW of coal capacity will be closed by 2023 as a result of the IED.[21]

The Russia–Ukraine crisis and the risk of gas infrastructure 'lock-in'

The EU has long sought to reduce its dependency on Russian gas. These efforts were accelerated by disputes between Ukraine and Russia that led to interruptions in supplies of gas to Europe in 2006 and 2009, as well as by the war in Georgia in 2008. The rise in tensions between Russia and the EU from early 2014 as a result of war in Ukraine has returned energy security to the top of the European energy agenda. However, during the winter of 2014–15 major disruption of supply into the EU was avoided. This was due to efficient utilization of EU gas storage during the summer (thus providing a buffer for winter); to relatively mild weather across much of the continent; and to effective interconnection of supplies across the EU and with neighbouring Eastern European states. However, the prospect of continued instability in the region, including the ongoing Gazprom–Ukraine disputes, has led to a focus on longer-term solutions.

[18] Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants.
[19] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) Text with EEA relevance.
[20] Bloomberg New Energy Finance (BNEF) (2012), *Industrial Emissions Directive: gas over for EU Coal?,* Power Research Note, 18 October 2012.
[21] Caldecott, B., Dericks, G. and Mitchell, J. (2015), *Stranded Assets and Subcritical Coal: The Risk to Companies and Investors,* Oxford: University of Oxford, Smith School of Enterprise and the Environment, http://www.smithschool.ox.ac.uk/research-programmes/stranded-assets/SAP%20Report%20Printed%20Subcritical%20Coal%20Final%20mid-res.pdf (accessed 1 Jan. 2016).

The five dimensions of the Energy Union agenda are designed to be interrelated and mutually reinforcing. However, in practice much of the political focus has been on advancing elements of the agenda related to gas diversification and investment. Unsurprisingly, member states such as Poland and Bulgaria – which have seen gas demand increase over the past five years and which have very high dependency on Russian imports – have emphasized the need for new gas infrastructure. However, there is broad support for a 'gas first' strategy among stakeholders who stand to benefit from new infrastructure investment in pipelines or LNG supply routes cutting across member states.

Commitments to mobilize EU funding for new infrastructure further highlight the centrality of gas. The European Commission has said that it 'will reinforce its support for this process through the use of all available Community funding instruments in particular the Future European Fund for Strategic Investments (EFSI), and fully involving European financial institutions'.[22] Similar commitments on EU-level financing have not yet been made for renewables or energy efficiency in the Energy Union strategy documents.

The five dimensions of the Energy Union agenda are designed to be interrelated and mutually reinforcing. However, in practice much of the political focus has been on advancing elements of the agenda related to gas diversification and investment.

The European Commission has deprioritized an initial proposal for the establishment of a single, consolidated gas buyer for the EU, as some Western European countries regard this as anticompetitive. Maroš Šefčovič, vice-president of the European Commission responsible for the Energy Union, has accepted that any such system would be voluntary. Instead, a variety of EU governments have given their support to the development of new gas routes (including northern routes such as Nord Stream 2 and southern routes through the Mediterranean). These are intended to facilitate flows of Russian gas around transit countries such as Ukraine and ultimately to establish new connections between Central Asian producer countries and Europe. Although new pipeline routes would potentially reduce the EU's exposure to risks in transit countries, they would not immediately alter European dependence on Russia. They could eventually connect Europe to new supplier countries such as Iran or Algeria (Italy is planning a new pipeline to bring Algerian gas to Sardinia), but this will take time.

There is also a risk of diversification strategies creating additional energy security challenges, given the significant risk of instability in new supplier countries. For example, in 2015 there were several attacks on gas pipelines in Turkey, exposing current fragilities there. In Algeria declining domestic reserves, rising domestic gas consumption and anti-fracking demonstrations might deter future investment.

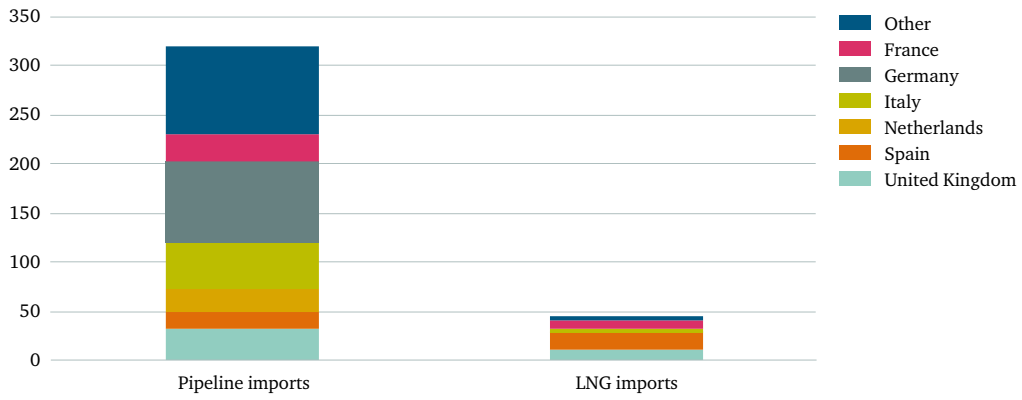
In the western Mediterranean, Morocco remains a focus for EU clean-energy investment (led by Germany and France), with funds flowing into renewables and EU interconnection.[23] Tunisia has also seen some clean-energy investment from the EU. However, following the collapse of DESERTEC[24] and increased terrorist activity in the country, the EU's focus is now on energy's relevance to domestic stability in Tunisia, rather than on the country's potential as a supplier. In the eastern Mediterranean,

[22] European Commission (2015), *A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy.*
[23] Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit [Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety] (2013), 'German government supports world's largest solar power plant', Berlin, 10 May 2013, http://www.bmub.bund.de/en/press/press-releases/detailansicht-en/artikel/german-government-supports-worlds-largest-solar-power-plant/ (accessed 16 Feb. 2016).
[24] DESERTEC was a consortium that sought to harness renewables in areas where they are particularly abundant, such as deserts. By the end of 2014, the vast majority of shareholders had withdrawn from the consortium.

the EU's relations with Egypt and Libya are dominated by security concerns and energy shortages in both countries. New prospects for the exploitation of offshore gas reserves in the Mediterranean exist in the newly discovered Zohr gas field off Egypt and the Leviathan field off Israel. However, significant disputes over ownership and licensing need to be resolved before these can be developed. Also, even if new gas routes from Egypt are established, energy security risks in the country will remain.

LNG currently accounts for a small proportion of the EU's gas imports (see Figure 9). The IEA has projected that this share could double by 2020, but does not expect LNG to significantly displace Russian imports into the EU.[25] New LNG capacity could be significant in certain countries, however, which is why investment in it is a central element of the Energy Union strategy. Like other EU states, Lithuania is trying to reduce its dependency on imports of Russian gas, and development of LNG could affect its price negotiations with Russia. Equally, however, enhanced LNG capacity could increase any importing state's dependence on suppliers such as Qatar and Nigeria, which are also vulnerable to regional or local instability. Therefore, the European Commission's LNG strategy also aims to remove barriers to imports from new suppliers such as the United States, while improving the transparency of internal supply and upgrading storage capacity.

Figure 9: European gas imports by type, billion cubic metres, 2014

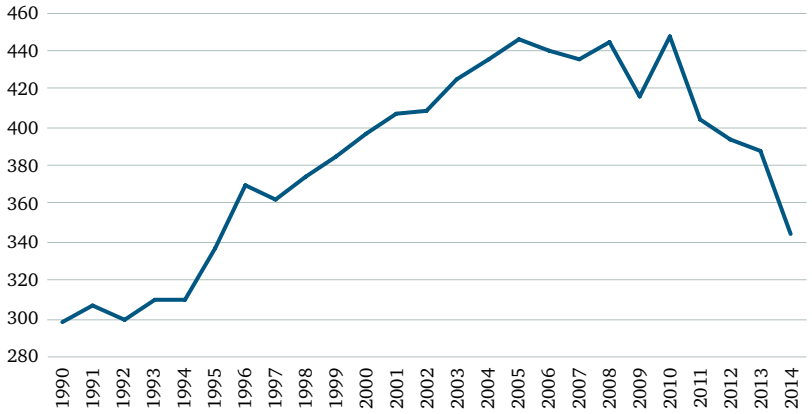


Source: BP (2015), *BP Statistical Review of World Energy June 2015*.

New pipelines and LNG infrastructure are generally only possible with long-term supply contracts in place. The inflexibility of gas supply through pipelines means that without legally binding agreements upfront, there is a significant incentive for importers to renege on price commitments once the infrastructure is in place. Although LNG offers the apparent potential for more flexibility, it is worth remembering that 80 per cent of supply from the world's 12 largest LNG projects is already accounted for in long-term contracts.[26] This highlights the risk of Europe being 'locked into' a dependency on gas if the Energy Union ends up promoting gas infrastructure as the primary response to the EU's energy security challenges.

[25] International Energy Agency (IEA) (2015), *Medium-Term Gas Market Report 2015*, Paris: IEA.
[26] IEA (2013), *World Energy Outlook 2013,* http://www.iea.org/publications/freepublications/publication/WEO2013.pdf (accessed 15 Mar. 2015).

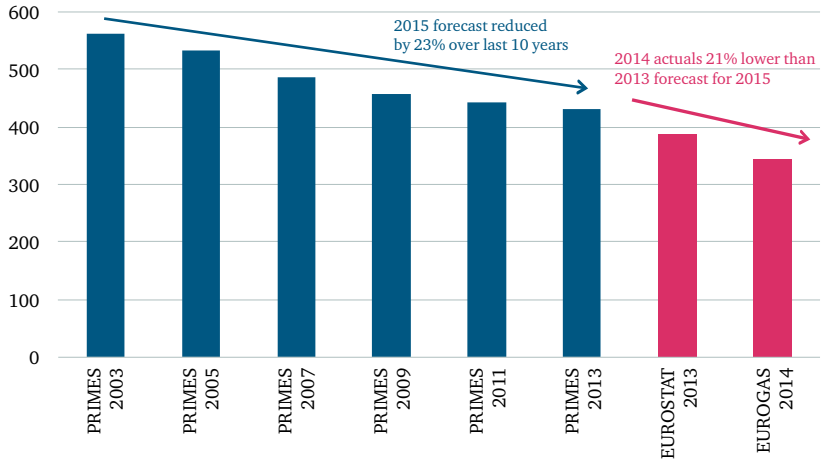
Figure 10: EU gross inland gas consumption, 1990–2014, million tonnes of oil equivalent



Source: Eurostat.

There is also significant uncertainty about the level of future EU gas demand. As Figure 10 shows, demand across all sectors peaked at 447 million tonnes of oil equivalent in 2010, and has since fallen by 23 per cent. Forecasts over the past decades have consistently overestimated EU gas demand. For example, between 2003 and 2013 the European Commission had to cut its gas demand forecast for the year 2015 by 23 per cent, yet actual 2014 consumption still proved to be 21 per cent lower than this forecast (see Figure 11); this suggests that future numbers are likely to come down even further. Again, the implication for EU policy is that expanding gas infrastructure at a time of softening demand could result in investment being locked into 'stranded assets' that are never fully utilized.

Figure 11: European Commission PRIMES gas demand forecasts for 2015, by year of forecast



Source: E3G.

In this context, the development of the Energy Union presents an opportunity to rebalance energy policy priorities and to assess more fully the risks associated with a 'gas first' approach to infrastructure investment. This should include an assessment of the implications for gas investment of meeting the 2030 Climate and Energy Package's targets for renewables, emissions reductions, energy efficiency and interconnection. There should also be an assessment of the risks of using new supplier

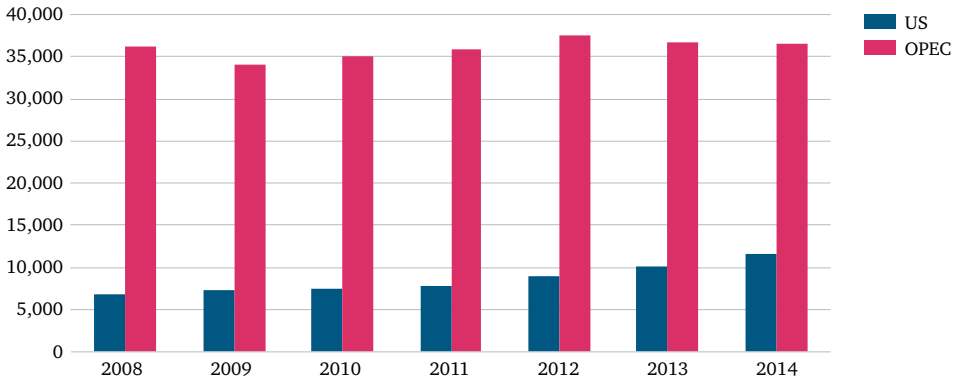
and transit countries. Diversification of supply routes will only be effective if the relevant country risks are low and if the new routes are not subject to similar vulnerabilities to those along existing ones. The EU should explicitly factor the threat of regional instability, particularly in the Middle East and North Africa, into investment decisions.

There is currently very little transparency over the assumptions in the European Commission's gas forecasts, which are based on its PRIMES model. Opening up such models to independent assessment could improve rigour and allow for a better-informed debate on future energy pathways. This could be achieved in many ways. For example, making all of the details available online would allow research institutes to provide independent scrutiny. The new energy governance mechanism could also be used to create an independent 'observer' organization at the European level to provide oversight of energy-related data and information.

Responding to global oil market developments

Changes in the global oil market are highly significant for EU energy security. The rise of new producers – for example, as a result of the development of shale deposits in North America – has had profound implications. US oil production has increased by 70 per cent since 2008, while total OPEC production has been almost flat (see Figure 12).

Figure 12: Oil production, United States and OPEC, 2008–14, thousand barrels per day



Source: BP (2015), *BP Statistical Review of World Energy June 2015*.

The growth in non-OPEC supply was a key factor in OPEC's November 2014 decision, led by Saudi Arabia, not to defend prices by reducing production. Since then prices have fallen dramatically, with West Texas Intermediate dropping from over $90/barrel in September 2014 to around $30/barrel in February 2016. It is unclear how the market will progress from current lows, but there are signals that it might not rapidly recover. The prospect of stronger post-Paris climate regulation and new technology may prompt producer countries to shift their focus towards increasing supply to utilize as much of the remaining global 'carbon budget' before new climate regulation or new technology leads to a transition away from oil. In 2015, Saudi Arabia's oil minister admitted that there may not be a future for fossil fuels beyond 2050, stating: 'In Saudi Arabia, we recognize that eventually, one

of these days, we are not going to need fossil fuels. I don't know when, in 2040, 2050 or thereafter.'[27] This view was reinforced at the G7 summit in Germany in June 2015, at which heads of state committed to phasing out the use of fossil fuels by the end of the century; and in the Paris climate agreement in late 2015, which set a long-term goal of achieving a balance between human-related greenhouse gas emissions and their removals by carbon sinks in the second half of the century.[28]

The changes in the global oil market mean that Saudi Arabia is no longer playing the role of swing producer. This is pushing oil towards a more conventional commodity cycle,[29] which would imply lower average prices but also more volatility, with swings between under- and oversupply creating short periods of extremely high prices. Already price changes are prompting major oil companies to trim their investment plans and seek opportunities for consolidation (witness the merger between Royal Dutch Shell and BG Group).[30] Also affecting the oil market's prospects is the fact that shale oil production in the United States can be scaled up relatively quickly in response to changes in demand; this may place a ceiling on any immediate price rebound. In the medium to long term, new technologies such as electric vehicles could drive a structural shift in energy demand away from hydrocarbons. This would have major implications for oil producers.

The United States' growing energy independence may reshape its foreign policy in the Middle East. The next US president will have to contend with a region in which US interests are changing. This could lead to shifts in America's relationships with key oil-producing allies such as Saudi Arabia, a prospect that would be further complicated by the re-entry of Iran into the global oil market.

To date the EU has largely been willing to let the United States take the lead in terms of providing oil security in the Middle East, and has not developed a distinct strategy of its own. But as US foreign policy may change, it will increasingly become a priority for the EU to consider its own strategy for oil security. Although there is recognition of this in Energy Union discussions, the EU needs to scale up its engagement with producers in the Middle East, Russia and Africa, and expand efforts to build dialogues with major consumer countries such as China. Heightened market volatility could have significant effects on EU businesses and consumers. The Energy Union needs to actively manage these risks, including by looking into alternative energy systems such as electric vehicles.

Balancing energy security responses across different time horizons

As mentioned previously, there is a risk that the dominance of gas in the development of the Energy Union could marginalize other options for managing energy security. This is likely to be true even if gas is framed as part of a strategy that encompasses all available options. There are limits to the political and physical capital available within the EU, and with current policy emphasizing a 'gas first' approach – especially in terms of support from EU-level funding sources – there are legitimate concerns that this could undermine the opportunities for alternatives. It is therefore important that the debate about the future of the Energy Union allows for the examination of all energy options. Policy-makers will need to prioritize each option based on its contribution to meeting security, competitiveness and climate objectives.

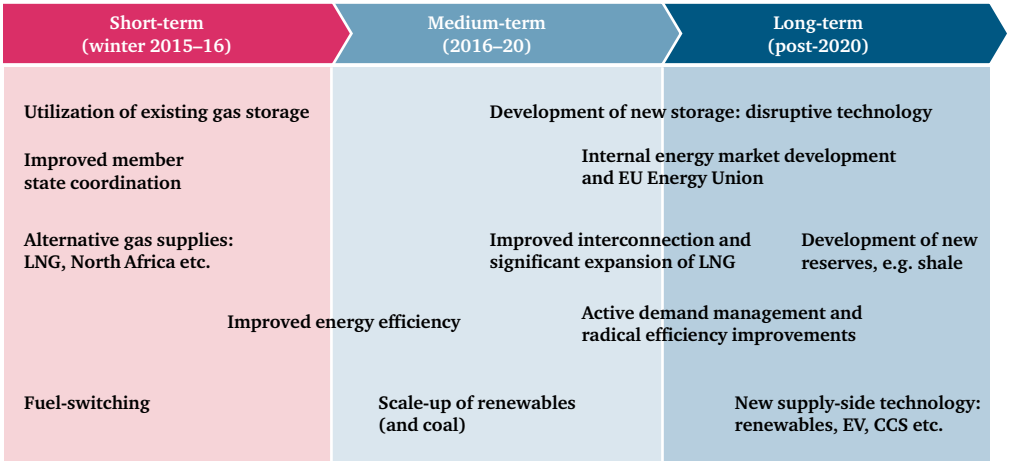
[27] Clark, P. (2015), 'Kingdom built on oil foresees fossil fuel phase-out this century', *Financial Times*, 21 May 2015, http://www.ft.com/cms/s/0/89260b8a-ffd4-11e4-bc30-00144feabdc0.html#axzz3iQd6eZjx (accessed 12 Sep. 2015).
[28] Ibid.
[29] Mitchell, J. and Marcel, V. (2015), *Oil and Gas Mismatches: Finance, Investment and Climate Policy,* Research Paper, London: Royal Institute of International Affairs, https://www.chathamhouse.org/publication/oil-and-gas-mismatches-finance-investment-and-climate-policy (accessed 16 Jan. 2016).
[30] Ibid.

Timing is a critical factor. As Figure 13 shows, a balanced strategy requires a mixture of short-, medium- and long-term options. In the short term (the next 12 months), realistic policies for the EU include better utilization of existing gas storage, improved cross-border coordination between member states, maximization of existing LNG capacity, and the potential conversion of some power plants to lower-carbon fuels where possible (such as co-firing of biomass in coal-fired power stations).

Over the medium term (the next three to five years), a range of other options exists alongside gas infrastructure development. These include energy efficiency and demand-management initiatives, enhanced electricity interconnection, the scaling-up of renewables, the retrofitting of existing coal-fired plants (although this would have implications for climate objectives), and the development of the internal market across the EU.

In the long term (beyond 2020), more radical options include deep improvements in energy efficiency (especially in buildings), demand-response measures such as smart grids, and greater penetration of new technologies such as electric vehicles and batteries. Given the construction times and high costs associated with nuclear power, new nuclear plants beyond those already planned would also only become available over the longer term.

Figure 13: Examples of energy security response options



The range of options for managing security of supply presents an opportunity to reframe the Energy Union debate – moving away from an isolated focus on 'access and transport of fuels' to considering policies for managing demand and promoting stability. To do so requires enhanced recognition of the risks of continuing to focus primarily on fossil-fuel infrastructure, and of the potential lock-in of future energy pathways this might cause. Progress would require policy-makers to articulate clearly the value of low-carbon security, and to embed discussion of low-carbon transformation into bilateral and plurilateral diplomacy covering security, finance and trade.

Climate change and neighbourhood stability

The global deal agreed in Paris at the end of 2015 was a milestone in international efforts to address climate change. The EU played a central role in the negotiations that delivered a legal text to align action across 196 countries. The climate change commitments of countries – known as Intended

Nationally Determined Contributions (INDCs) – will provide a new baseline for assessing global 'business as usual' for the energy sector, and will shape the context for future investment in clean technology. Major international banks such as Goldman Sachs and Barclays have published statements indicating that the Paris deal will improve the fundamentals for renewable energy and electric-vehicle investment, while undermining the economics of high-carbon investments.[31]

> Climate change is one of the most significant strategic threats to Europe's security. Rising global temperatures will have marked effects on Europe's neighbourhood, its strategic partners and international trade.

Although the current INDCs represent a step change in ambition from what was on the table six years ago in Copenhagen, there is still a significant gap between the emissions cuts they represent and what is actually necessary to limit the global temperature increase to 'well below' 2°C above pre-industrial levels. A recent UN Environment Programme *Emissions Gap Report* is clear that the world cannot wait until 2030, the endpoint of most current INDCs, to increase action.[32] In order to bridge the gap between promises and reality, the Paris outcome includes a mechanism to increase ambition over time, with a review of country contributions every five years and a facilitative dialogue starting in 2018. This provides a political opportunity for the EU to work with the United States, China and other major economies to raise ambition between now and 2020 to achieve a below-2°C trajectory. The Paris commitments will influence the implementation of the current EU Climate and Energy Package, but they will also require the EU to consider more ambitious targets alongside other countries by 2020.

It is not just the EU's internal response to climate change that matters. Climate change is one of the most significant strategic threats to Europe's security. Rising global temperatures will have marked effects on Europe's neighbourhood, its strategic partners and international trade. Climate change will increase pressures on fragile states, driving changes in precipitation, desertification and sea-level rises. Such developments could greatly increase local resource competition, livelihood insecurity and migration.[33] Where tensions or conflict already exist and adaptive capacity is low, this may have dire consequences. For example, by 2025 climate change may have increased water stress along the Euphrates River to eight times the 2010 levels, exacerbating transboundary water tensions between Turkey, Syria and Iraq. This would erode access to water and undermine food security for tens of millions of people in a conflict-affected region where control of water resources has become a weapon of war.[34]

The US Department of Defense, in its *2014 Climate Change Adaptation Roadmap*, predicted that climate change:

> … may cause instability in other countries by impairing access to food and water, damaging infrastructure, spreading disease, uprooting and displacing large numbers of people, compelling mass

[31] Kar-Gupta, S. and Nielsen, A. (2015), 'Renewable energy stocks rally after Paris climate deal', Reuters, 14 December 2015, http://www.reuters.com/article/climatechange-summit-stocks-idUSL8N14318J20151214; and Evans-Pritchard, A. (2015), 'COP-21 climate deal in Paris spells end of the fossil era', *Telegraph*, 29 November 2015, http://www.telegraph.co.uk/finance/economics/12021394/COP-21-climate-deal-in-Paris-spells-end-of-the-fossil-era.html (accessed 17 Dec. 2015).
[32] United Nations Environment Programme (UNEP) (2015), *The Emissions Gap Report 2015*, UNEP Synthesis Report, Nairobi: UNEP, http://uneplive.unep.org/media/docs/theme/13/EGR_2015_301115_lores.pdf (accessed 17 Dec. 2015).
[33] Rüttinger, L. et al. (2015), *A New Climate for Peace: Taking Action on Climate and Fragility Risks*, independent report commissioned by the G7 members, https://www.newclimateforpeace.org/#report-top (accessed 17 Dec. 2015).
[34] Shamout, N. and Lahn, G. (2015), *The Euphrates in Crisis: Channels of Cooperation for a Threatened River*, Research Paper, London: Royal Institute of International Affairs, https://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20150413Euphrates_0.pdf. (accessed 17 Dec. 2015).

migration, interrupting commercial activity, or restricting electricity availability. These developments could undermine already fragile governments that are unable to respond effectively, or challenge currently stable governments, as well as increasing competition and tension between countries vying for limited resources.[35]

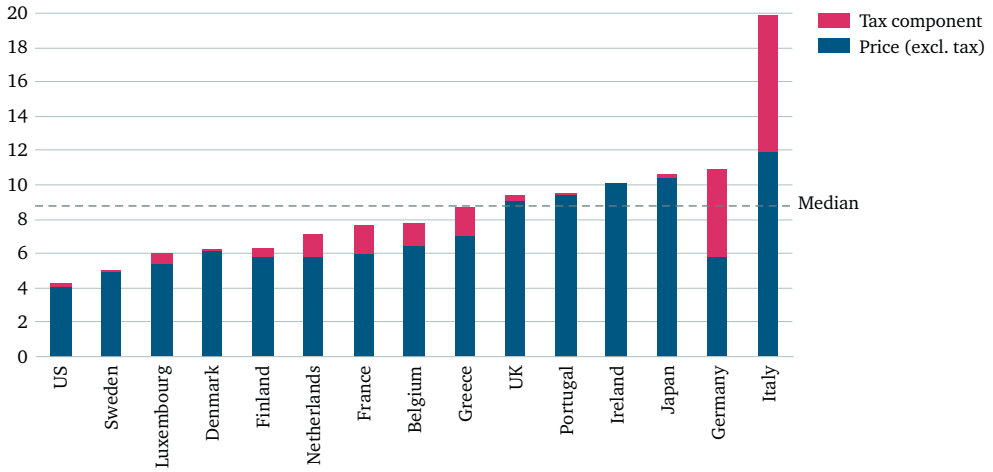
The current refugee crisis highlights the effects of regional instability on the EU. Climate change may exacerbate flows of people, absent effective action to address it.

Investments in sustainable development in the EU's neighbourhood can help build resilience to climate impacts and support economic growth. Delivering this agenda will depend on many factors, of which energy is an important component. The choices that the EU makes about its internal energy system, and about actions to support sustainable energy systems in its neighbourhood, can therefore play a key role in defining its future security. This applies to the EU's security as a whole, not just to energy. Supporting the development of sustainable energy systems in the neighbourhood could, as part of a broader development agenda, enhance stability within the countries concerned as well as help tackle the effects of climate change. In this respect the future of the Energy Union will have a significant bearing on broader foreign policy issues.

Energy competitiveness and trade

Prior to the Russia–Ukraine crisis, concerns about economic competitiveness – rather than energy security – had gained prominence in EU energy discussions. This was in large part a result of the 'shale revolution' in the United States, which caused domestic US energy prices to fall rapidly. As Figure 14 shows, the United States has significantly lower industrial electricity prices than other major developed countries. US prices are less than half those in the United Kingdom, and an even lower proportion of prices in Germany and Italy. The United States' price advantage largely developed during 2005–12 (see Figure 15). The difference between US prices and the EU15 and G7 median increased by 175 per cent from 2005 to 2012, although since then it has been relatively static.

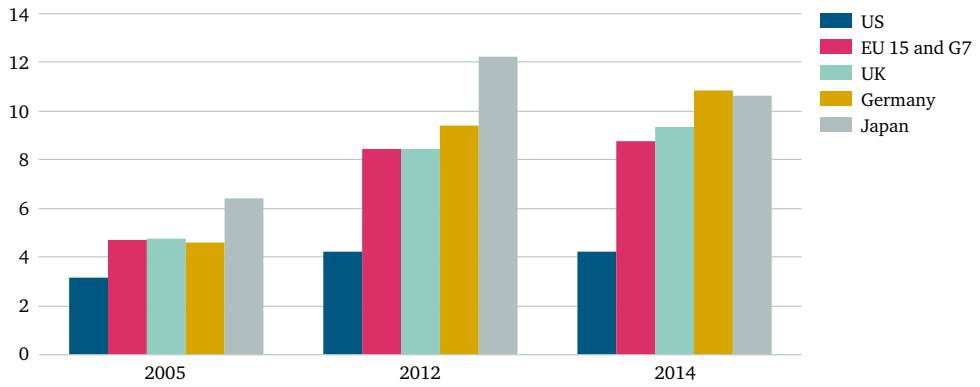
Figure 14: Industrial electricity prices in selected countries, 2014, pence per kilowatt-hour



Source: UK Department of Energy & Climate Change (2015), 'Industrial electricity prices in the IEA', https://www.gov.uk/government/statistical-data-sets/international-industrial-energy-prices (accessed 4 Jan. 2016).

[35] US Department of Defense (2014), *2014 Climate Change Adaptation Roadmap*, Alexandria, VA: Office of the Deputy Under Secretary of Defense for Installations and Environment (Science & Technology Directorate), http://ppec.asme.org/wp-content/uploads/2014/10/CCARprint.pdf (accessed 12 Sep. 2015).

Figure 15: Industrial electricity prices 2005–14, selected countries, pence per kilowatt-hour



Source: UK Department of Energy & Climate Change (2015), 'Industrial electricity prices in the IEA', https://www.gov.uk/government/statistical-data-sets/international-industrial-energy-prices (accessed 4 Jan. 2016).

Energy prices are important across a range of energy-intensive economic sectors, including iron and steel, aluminium, cement, glass, pulp and paper, and refining. Globally, these sectors account for approximately 20 per cent of industrial value added, 25 per cent of employment and 70 per cent of industrial energy use.[36] The IEA New Policy Scenario predicts that high energy prices relative to those in other markets will cause the EU and Japan to suffer a combined 30 per cent reduction in their global share of energy-intensive exports by 2035 from 2012 levels.[37] The Russia–Ukraine crisis shifted additional policy attention to energy security, but as the EU negotiates the Transatlantic Trade and Investment Partnership (TTIP) with the United States, competitiveness is likely to rise up the agenda again. TTIP promises to improve US firms' access to European markets and vice versa. This could exacerbate the effects of energy price differentials by making it easier for US-based firms with lower energy costs to access the EU market.

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However, economic competitiveness is a complex issue and energy prices are only one of many relevant factors. Economic growth is not zero-sum, and the economic success of one country need not come at the expense of another. In fact the reverse is often true, with expanding demand in one country or region often supporting growth in others. The relative importance of energy-intensive industries to international competitiveness is easily overstated. Such industries account for just 1.3 per cent of value added as a proportion of GDP in the EU.[38] In addition, these sectors include high-end and niche products, for which other factors such as intellectual property are the main competitive advantage.

[36] IEA (2013), *World Energy Outlook 2013*.
[37] The New Policy Scenario is based on the assumption of a cautious implementation of both current and announced national policies out to 2030. See IEA (2013), *World Energy Outlook 2013*.
[38] Ibid.

Box 2: Defining national competitive advantage

The theory of national *competitive advantage*, as first put forward by Michael Porter in the 1980s, provides an alternative to traditional trade theory based on *comparative advantage*. Competitive advantage is determined by a combination of attributes that allow an organization or economy to outperform its competitors, and is not necessarily tied to initial endowments of natural resources.[39] Focusing on comparative advantage of initial endowments can lead countries to fall into a 'productivity trap' by specializing in low-value-added sectors (e.g. exports of raw materials), where the terms of trade lock in a low-wage, low-growth future. In contrast, the theory of competitive advantage suggests that it is better to focus on sectors that maximize economies of scale in high-value-added goods and services. This will generate greater long-run productivity gains, and hence stronger and more sustainable economic growth.[40]

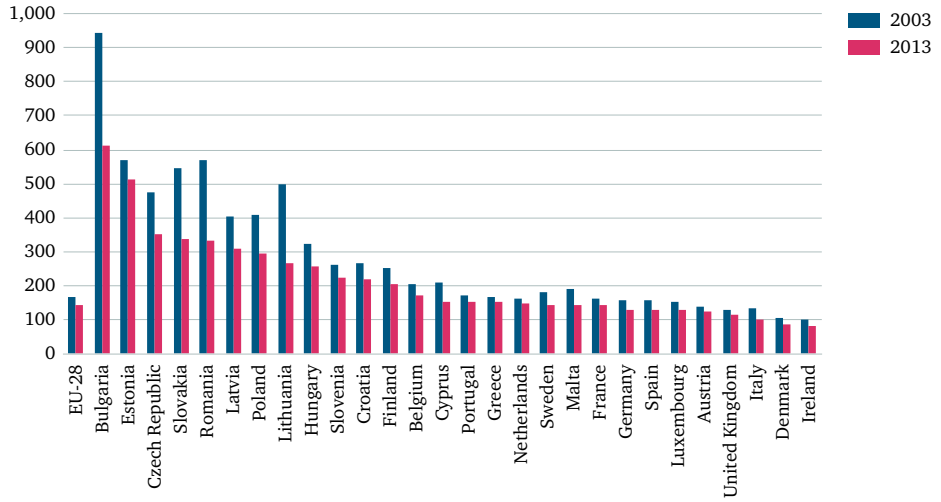
Political discussions often present trade as a zero-sum game of static gains and losses, with exports counting as a normative 'good' and imports as a normative 'bad'.[41] However, it is important to see national competitive advantage as being dynamic, focusing on industries and sectors that can maximize future growth. Competitive advantage therefore suggests that energy price differentials between countries should only have a large macroeconomic impact if they directly affect high-value-added sectors with the potential for strong productivity growth.

Movements in exchange rates are also critical for competitiveness and may dominate energy price effects. Natural resource booms may lead to the phenomenon of 'Dutch disease', whereby investment in natural resources causes a country's currency to appreciate, with a commensurate loss of competitiveness in other areas of the economy such as manufacturing.[42] In the medium term, the impact of the boom in shale oil and gas production in the United States may cause an appreciation in the US dollar, which would make its economy less internationally competitive.[43]

For non-energy-intensive sectors, changes in energy prices tend to have a smaller macroeconomic impact over time. Following the rapid increase in oil prices in the early 2000s, energy price changes had a much smaller effect on advanced economies than did the oil shocks of the 1970s and early 1980s.[44] It is also important to separate energy 'prices' from the energy 'costs' that industries face. The EU is more energy-efficient that the United States, although there is a significant disparity between eastern and western EU member states (see Figure 16). In terms of primary energy consumption per unit of GDP, the United Kingdom and Germany are 25–35 per cent more efficient than the United States.[45] The potential for further efficiency improvements provides a strong synergy between energy security, competitiveness and climate objectives.

[39] Porter, M. (1985), *The Competitive Advantage: Creating and Sustaining Superior Performance,* New York: Free Press.
[40] Stutz, F. and Warf, B. (2011), *The World Economy: Geography, Business, Development*, Sixth Edition, Essex: Pearson Education Limited.
[41] Krugman, P. (1994), 'Competitiveness: A Dangerous Obsession', *Foreign Affairs*, 73:4, March/April 1994.
[42] Ebrahim-Zadeh, C. (2003), 'When countries get too much of a good thing', *Finance and Development*, 40:1, Washington, DC: International Monetary Fund, March 2003.
[43] Houser, T. and Mahon, S. (2014), 'Fueling up: The Economic Implications of the American Oil & Gas Boom', presentation, Washington, DC: Peterson Institute for International Economics, January 2014.
[44] Blanchard, O. J. and Gali, J. (2007), 'The Macroeconomic Effects of Oil Shocks: Why are the 2000s So Different from the 1970s?', NBER Working Paper No. 13368, Cambridge, MA: National Bureau of Economic Research, September 2007.
[45] IEA (2013), *World Energy Outlook 2013.*

Figure 16: Energy efficiency improvements, 2003–13, kg oil equivalent per €1,000 of GDP



Source: Eurostat.

The five dimensions of the Energy Union provide an opportunity to refocus policy on facilitating energy efficiency and demand-response options. The EU could improve its competitiveness (and simultaneously meet other economic objectives) by placing the consumer at the centre of energy policy; and by providing support for smart-grid development, energy-efficient building standards and retrofits. The completion of the internal energy market across the EU would also address these issues. In the long run, innovation and productivity growth will be the major determinants of economic competitiveness. This is currently reflected in the fifth dimension of the Energy Union, which focuses on 'research, innovation and competitiveness'.

Conclusion: building a robust Energy Union to meet foreign policy challenges

The Energy Union provides an opportunity to enhance Europe's capacity to manage geopolitical and geo-economic risks. Security comes from managing trade, interconnections, price volatility, and market and consumer risks in the short and long term. The Energy Union could articulate clearly the value of low-carbon systems for economic resilience against price and supply risks. This could reframe how the foreign policy community sees energy security – from an isolated 'access and transport of fuel' strategy towards managing demand and stability across time.

However, there are also significant risks that the Energy Union could lock in fossil-fuel infrastructure. A narrow focus on gas in response to the Russia–Ukraine crisis and defensive actions to protect incumbent energy utilities from competition could crowd out investment for creating a truly modern energy system and lead to the creation of stranded assets.

Foreign policy challenges also have implications for the new energy governance mechanism. Creating a system that establishes trust between member states in delivering cooperative responses in times of crisis will be key. This system could also assess the balance of rights and responsibilities between member states on policy for delivering renewables and efficiency measures under the 2030 Climate and Energy Package.

The relationship between the Energy Union, the new energy governance mechanism and other EU foreign policy instruments will also need to be addressed. The links to the Global Strategy on Foreign and Security Policy that the European External Action Service is preparing should be solidified, and there needs to be continuing work to understand how intra-EU energy finance and investment decisions affect the EU's relations with countries in its neighbourhood. Similarly, the EU Energy Diplomacy Action Plan needs to be backed by a coherent set of tools to ensure coordination of efforts between EU member states and European institutions. By explicitly recognizing energy policy's implications for security, climate and competitiveness, the Energy Union can help to resolve differences between member states and build a common vision for future priorities. If designed properly, the Energy Union has the potential to transform the EU's relations with its neighbours and energy suppliers.

In terms of external relationships, the Energy Union should integrate the assessment of energy, climate and competitiveness objectives into a robust risk-management framework. The framework needs to achieve the following:

Measure accurately the security benefits provided by low-carbon energy compared with continued exposure to fossil fuels. One of the main foreign policy considerations in the choice of EU energy pathways is the risk of instability in exporter or transit countries for fossil fuels. An assessment of this would enable a clearer cost–benefit analysis of the value of low-carbon energy as a way to improve energy security by limiting future import dependency. This should include an analysis of systemic risks across regions, as well as risks in individual countries. Events such as the Arab Spring and the rise of Islamic State of Iraq and Syria have affected several countries simultaneously. Risk assessment should enable a better understanding of whether supply-diversification options provide an 'independent' risk of disruption, where diversification will lower overall risk profiles; or a 'dependent' risk, where diversification may not reduce risk levels as much as initially anticipated.

Projections of energy supply and demand, combined with political and security analysis, are a critical feature of this type of assessment. There is currently very limited transparency on a number of the key tools and processes used as part of the EU's energy policy planning, such as the PRIMES model. The new energy governance mechanism should consider options to improve transparency and enable independent oversight of climate and energy analysis. This could be achieved through the establishment of a dedicated institution, building on templates such as that of the United Kingdom's Committee on Climate Change, or by making more data, modelling and assumptions publicly available.

Assess how a European consumer-centric energy system can contribute to security, climate and competitiveness goals. The choices that the EU makes about its energy system will not only affect its internal development, but will also provide a model for other countries, especially in the Energy Community. As new technology enables the rise of 'prosumers' – individuals who are both producers of energy at home/in their business and consumers of energy – questions of market regulation, access and infrastructure investment will be critical.

The 2015 Paris climate agreement sets up a ratchet mechanism to align country actions. It provides a critical window between now and 2020 to review ambition and take action to keep within reach the goal of keeping global warming 'well below' 2°C. The effect of the Paris agreement may be to catalyse a wave of innovation; new consumer-centric energy models provide one such pathway to unlock transformational change.

However, placing the consumer at the heart of the energy system provides a fundamental challenge to energy utilities' traditional business models. This is of particular relevance to the EU, but similar challenges are present around the world. The energy models that the EU develops have the potential to shape policy around the world, especially in the Energy Community but also in countries such as the United States and Australia. However, moving to a truly consumer-centric energy system will require managing incumbent energy suppliers and allowing new entrants into a highly regulated market.

The Energy Union should therefore provide an assessment of how an energy system that prioritizes investment in electricity grid, storage, renewables, energy efficiency and active demand management can contribute to security, climate and competitiveness goals. This should include a clear foreign policy assessment of how the EU can drive transformation in other countries.

Develop an independent strategy to assess changes in the global oil market. The EU needs a clear strategy to respond to recent developments in the oil market, and to assess the implications for European business and consumers. Any strategy needs to consider future cooperation with other major energy-importing countries, such as the United States and China, and assess how engagement in regions such as the Middle East may evolve. The strategy should consider how new technologies, such as electric vehicles, and future climate regulation may affect oil demand over the medium to long term. This should include a consideration of whether EU oil companies face exposure to stranded assets, and of the implications for European financial markets.

Accelerate global clean-energy market development and low-carbon trade. Building deep, liquid international markets for low-carbon technology can accelerate global action on climate change and provide growth opportunities for low-carbon businesses within the EU. Investment in high-value-added sectors with strong potential for productivity growth would help the EU to maintain its international competitive position. The Energy Union should assess the potential synergies between trade, innovation, climate and competitiveness objectives that could be achieved by accelerating development of low-carbon energy markets. This would build on the Energy Union's

fifth dimension of 'research, innovation and competitiveness'. These energy objectives should be linked to the European Neighbourhood Policy and foreign policy instruments to build global demand for clean energy; and to the EU's internal innovation policy through the European Strategic Energy Technology Plan and other EU policy instruments.

Identify high-impact resilience investments in the neighbourhood and energy-exporting countries. The choices the EU makes over the direction of its energy policy will have a significant impact on its neighbourhood, as well as further afield in energy-exporting countries. In managing the transition to sustainable development, the EU should consider how its internal energy system can create synergies in third countries to manage risk and build resilience. An assessment of how investments in low-carbon energy, demand-side measures and infrastructure choices affect wider regional stability would enable the prioritization of high-impact options. Working with the EBRD, the EIB and development agencies in member states could enable the EU to coordinate the creation of sustainable, resilient energy systems in other countries and help manage the transition to low-carbon development. This would contribute not only to stability in those countries but also to the EU's resilience in the long run.

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Acknowledgments

The authors would like to thank the speakers and participants at a series of workshops in Brussels, Berlin and London who provided valuable insights for this paper. The authors would also like to thank Rob Bailey (Chatham House), Antony Froggatt (Chatham House), Kirsty Hamilton (Chatham House), Nick Mabey (E3G), Jonathan Gaventa (E3G), Luca Burgamaschi (E3G) and Sabrina Schulz (E3G) for their advice and comments, and Nick Bouchet and Jake Statham (Chatham House) for their edits and suggestions.

Special thanks are due to the University of Kent's Brussels campus and to the Hertie School of Governance in Berlin for providing venues and support for the workshops.

The authors would also like to give special thanks to Georgina Wright (Chatham House) for her tireless work in setting up the workshops, gathering data and helping to edit the paper. Any errors are the responsibility of the authors alone.

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ISBN 978 1 78413 097 8

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