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Energy moves and power shifts

EU foreign policy and global energy security

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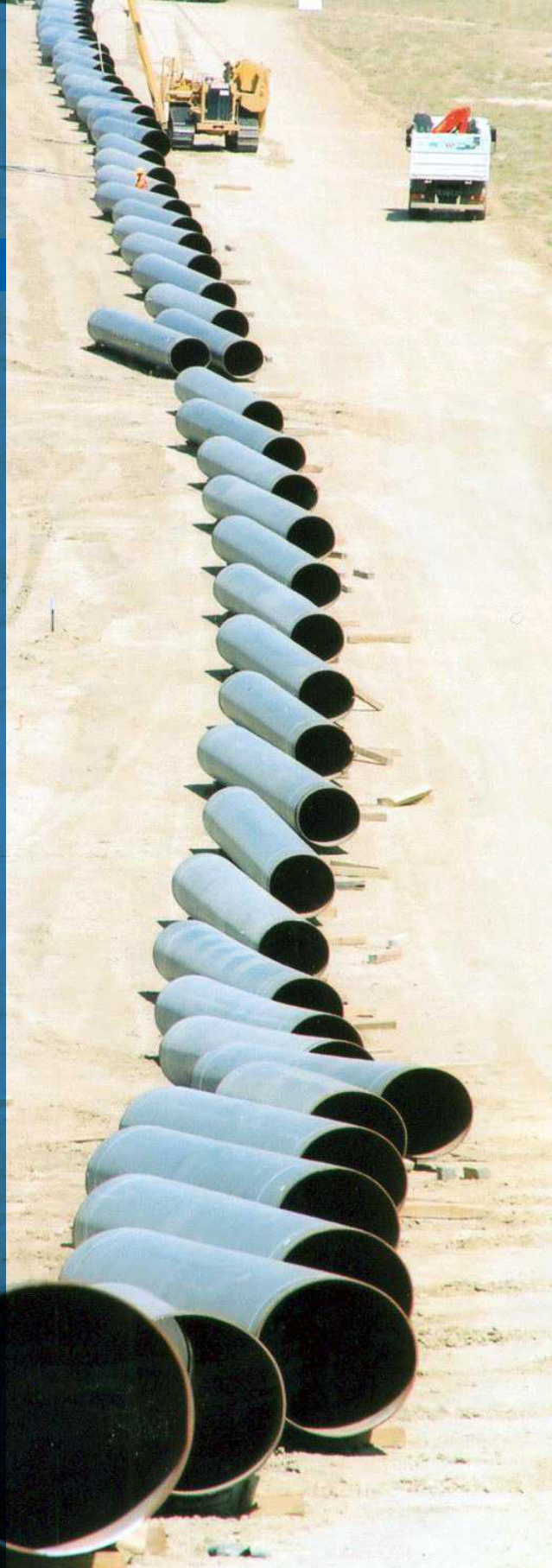

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EXECUTIVE SUMMARY

Energy security has climbed the list of EU energy and foreign policy priorities in the last decade. This process was accelerated by the shock of the 2006 and 2009 disruptions in Russian gas supply through Ukraine, and by the new possibilities offered by the Lisbon Treaty. Efforts have been directed at interconnecting national gas and electricity markets, diversifying energy suppliers and promoting rules-based energy trade in the wider European neighbourhood. The EU's primary energy security goals are to reduce the strategic dependence of individual member states on single external suppliers and to ensure that energy markets are liquid, open and functioning according to stable market rules rather than power logics. Yet energy security also needs to be balanced against environmental and economic competitiveness concerns.

This report undertakes an appraisal of global energy trends and draws conclusions for the EU's external energy security policy priorities, taking into account that energy mix choices, supply strategies and foreign policy remain national prerogatives. The centre of gravity for global energy markets is shifting to emerging markets, particularly in Asia. The EU is undergoing relative economic and demographic decline: retaining a major role in the global energy scene will be more and more challenging. Its ever-increasing reliance on oil and gas imports makes it more sensitive to political and commercial changes beyond its borders.

87% of the world's primary energy supply comes from fossil fuels: coal, oil and natural gas. This state of affairs is likely to continue for decades as the development of climate-friendly energy sources remains limited. Nuclear power is stalled at just above 4% of the global primary energy supply, and expansion is only likely in large emerging markets. Hydroelectricity accounts for 6.7% of the world's primary energy supply and, despite rapid growth, geothermal, solar, and wind power only 1.9%. On current trends, the world is likely to see a 3.6°C temperature rise by 2100, surpassing the 2°C target intended to avoid the worst effects of climate change.

The use of cheap, abundant and CO_2-intensive coal has expanded quickly, particularly in emerging markets. EU coal consumption has remained stable in Central and Eastern Europe and in Germany, the bloc's biggest economy, where it represents a quarter of the energy mix. Renewables, including hydro, have rapidly expanded and account for 10% of EU energy consumption. Gas accounts for 29%, nuclear 14% and petroleum 35%.

For decades, energy geopolitics have been shaped by the conflicting interests of leading oil importers, mostly developed democratic countries, and leading exporters, led by the Organisation of Petroleum Exporting Countries (OPEC). This dichotomy is changing: Asian states are becoming more import dependent, and the US more energy independent. This creates new challenges for global energy governance. The EU

is beginning to share more dependency concerns with Japan, China and India than with the US. Many of these countries, particularly China, prefer to secure energy supplies via state-led mechanisms, relying less on markets than do Western importers. This makes their integration into current energy market governance regimes crucial to avoid zero-sum competition risks.

Oil and gas scarcity *per se*, however, will not be the major issue in the years ahead. In the last decade, scarcity fears have been stoked by rising demand in emerging markets, turmoil in the Middle East and the return of resource nationalism in energy exporters (e.g. Russia and Venezuela). Yet some fundamentals have shifted. New oil and gas finds around the world, including in the eastern Mediterranean, and the shale revolution in North America have led to a sense of relative abundance. Nonetheless, the oil price – hovering near US$100 – remains high and volatile, reflecting continued market tensions. Today, the biggest oil and gas reserves are controlled by state-owned companies whose capacities to develop new and technically challenging fields, or to ensure adequate investment in exploration and development, raise questions for future global energy security.

In addition to high and volatile fossil fuel prices, the EU faces the challenge of how to adapt electricity systems to the rapidly rising share of intermittent renewable energy sources in a cost-effective manner. In emerging markets, governments are struggling to expand power production and electrical grids to meet rising demand from growing middle classes.

The shale revolution in the US is reshaping the global energy landscape. In combination with the rise of liquefied natural gas (LNG), which allows transport of gas on ships, the shale revolution is 'globalising' hitherto regional gas markets. The US is likely to become a gas exporter, sending LNG to Asia. Over time, gas markets could resemble the more liquid, fungible, and price-volatile oil market. The abundant gas in the US is partly driving out coal, some of which is exported to the EU where low CO_2 prices are easing the replacement of gas with coal to produce electricity. Increasing energy security is impacting on the strategic outlook of the US, although this does not necessarily make the US less concerned with high prices and price fluctuations in oil markets. The US may, however, have more flexibility in its political engagements with energy suppliers, not least in the Middle East. Technical, legal, commercial and public opinion issues are likely to delay large-scale shale oil and gas development outside the US.

Recent transformations in gas markets mean that, in the EU, some long-term supply contracts with the state-owned companies of the key gas suppliers – Russia, Norway and Algeria – have been renegotiated to bring down prices and partially replace oil price indexation, taking into account prices on spot markets. The rise of spot markets has been helped by the implementation of the EU's liberal market reforms of the 2009 Third Energy Package. Thanks to progress on interconnections and markets within Europe, the strategic dependence of EU member states on individual gas sup-

pliers is seen as less dramatic than it was just a few years ago. However, gas markets in the Baltics, Central and Eastern Europe and the Balkans – the most vulnerable areas – remain overly reliant on a single supplier and insufficiently reformed and interconnected.

Global energy governance mechanisms are ill-equipped to handle the energy world of the future. Existing organisations are limited in their scope, membership, and legal 'bite'. Among these, the International Energy Agency (IEA) reflects the concerns of the major oil importers of the 1970s. It coordinates the use of strategic oil reserves, organises the sharing of energy data, produces market forecasts and serves as a forum to discuss energy and environmental policies (e.g. energy efficiency). New centres of energy consumption – China, India and other emerging markets – are excluded.

An almost unbridgeable gap between exporter and importer interests is reflected in the fate of the Energy Charter Treaty (ECT) – of which the EU is a member. The core aim of this 1994 treaty is to secure the production, trade and transit of energy through legally binding rules. Initially meant to be a global treaty, it has largely remained Europe-centred. The World Trade Organisation (WTO) is not well prepared to deal with energy-specific issues. As renewables policies are deployed across the world, trade frictions have arisen. The recent enthusiasm for renewables led to the creation of the International Renewable Energy Agency (IRENA), but this body has yet to make a mark and issues no rules.

The report identifies six priority areas for the EU's international energy engagements:

- **Improving multilateral approaches to energy security**

The EU could strengthen its position in the shifting energy world through closer engagement with multilateral organisations that deal with energy. One avenue is through multilateral trade policy, strengthening trade rules and opening markets in all energy sectors via the WTO. The recent initiative to launch talks on liberalising trade in green goods is one step in the right direction. Many of the world's remaining non-WTO members are oil exporters; they should be encouraged to join (Algeria, Azerbaijan, Kazakhstan and Libya). Another avenue could be to promote membership in the IEA for emerging importers such as China and India, and for the EU itself. Although the EU Commission works closely with the IEA, the EU's full legal membership would give better weight, credence and coherence to the EU's voice in international discussions on energy security.

- **Engaging deeply with Russia on binding rules for trade and investment**

With less demand and more competition on EU gas markets, this is a good moment for the EU and Russia to pursue a deeper conversation regarding mutual investments in each other's energy sectors – notably the protection of investment in exploration,

infrastructure and distribution. This could include efforts to reach some form of agreement on much of the content of the ECT, long resisted by Russia. Russia could commit to some of the key goals of the treaty as part of newly launched discussions on a new partnership treaty. The EU will need to make compromises on issues where Russia has legitimate commercial concerns. One such step could be to clarify the licensing terms for foreign investors in transmission systems (the so-called 'reciprocity clause' in the 2009 Gas Directive) to avoid the risk of unjustified discrimination against a foreign investor in a gas transmission system. This presumes that the ongoing antitrust case against Gazprom – Russia's primary gas exporter – will be properly terminated, that it acts on the case findings, and that progress on finalising the EU internal gas market continues.

- **Cooperation with the US and Japan on market and investment issues**

For the EU, the US remains a primary energy partner. Although US shale gas might not reach Europe in large amounts in the future, ongoing trade discussions may allow for a trade deal with a strong energy chapter that can then be used as a model for trade and energy relations with other partners and in the WTO. A similar approach could be taken with Japan in the context of ongoing bilateral trade negotiations. Trade talks could be leveraged to enable the energy sectors of both sides to become more competitive and innovative. This will mean tough choices in Japan, the US and Europe on mutually opening their energy markets.

- **Dialogue and cooperation with China to set the tone for the developing world**

China is a model that others in the developing world would like to emulate, making it an important leverage point for influencing global energy trends. China has come to value the smooth functioning of international markets and has announced a plan to give a 'decisive' role to markets in its economy by 2020. EU efforts to build open, liquid international energy markets, therefore, may increasingly be pursued with China. Guiding Beijing towards energy choices that protect the environment and reduce demand on international energy markets could be facilitated by helping China join the IEA, continuing bilateral work on urbanisation issues and helping the Chinese design policies on energy efficiency. A 2% improvement in Chinese vehicle efficiency may have a bigger impact on energy markets than the development of a major new oil field.

- **Managing demand: climate policy *is* energy security policy**

Reducing global demand for fossil fuels is an energy security goal and a competitiveness goal as much as an environmental goal. Developing new pipelines or better supplier relations can shift the global supply/demand balance in the right direction, but speeding up necessary changes in how the world uses energy may fundamentally alter that balance. Post-Kyoto agreements on emission reductions (which translate

into reduced fossil fuel use) will be more likely if decarbonising can be accomplished in a cost-effective manner that does not harm economic development. EU efforts on international climate negotiations, therefore, should not be an environmental niche, but should have the full support of the energy, trade and industry sectors, working to find economic and technological pathways that can bring partner climate and energy positions closer to Europe's own. Among other opportunities, the EU can expand cooperation on reducing energy consumption subsidies. Developing states often express interest in technological modernisation which the EU can support. Improved work on safety and environmental standards, plus transparency in costing, can help the development of nuclear energy as a non-fossil alternative, particularly in China and India, which have rising demand, political will and economies of scale for large programmes.

- **Managing supply: focus on the neighbourhood**

Energy partnerships with distant countries may have limited pay-off for the EU because of the internationalisation of energy markets. This increases the relative attractiveness to the EU of forging partnerships with pipeline-connected neighbours including Norway, Russia, Algeria, Libya, and, to a limited extent, Azerbaijan/Turkmenistan. While eastern Mediterranean gas volumes are not massive, the EU would benefit from having the gas exported via pipelines rather than by tankers subject to price pressures from Asia. Working with Turkey, already a key transit state, on the energy chapter of the *acquis* may be an important step in helping it become a possible partner for nascent exporters Cyprus and Israel. The EU-sponsored Energy Community of the eastern neighbourhood has become a moderate success. A similar arrangement for the non-exporters of the southern Mediterranean could be initiated, preceded by their joining the ECT. Libya and Algeria, both important energy suppliers for Europe, are less likely to respond to similar incentives. Given their likely roles as energy suppliers to the EU in the decades ahead, significantly increased EU bilateral engagement efforts, on energy and governance issues, could have important benefits for the Union. Both countries should be encouraged as a priority to join multilateral bodies such as the WTO and the ECT.

I. INTRODUCTION

The scenarios are many: oil and gas export embargoes used as political weapons, riots in the streets when energy bills rise, importing countries turning a blind eye to human rights violations by unaccountable political regimes living off oil rents, cash-rich petro-states financing terrorist activities, pipeline projects done or undone in global races for power, money and access to vital resources. Clearly, energy plays a key role in global politics.

But the EU has until very recently not been a central actor in this game. Whether via special relationships with former colonies in oil-rich regions or through nationally-determined political schemes (such as the pipeline projects of West Germany's *Ostpolitik* of the 1970s), European energy politics has traditionally been controlled by the member states. National energy policies, and notably those related to 'energy security', have long escaped the decades-long process of expanding influence by Brussels. In a way, initially supranational powers were 'repatriated' – a quintessential case of 'spill-back' (rather than 'spill-over') effects. Yet times have changed.

Several factors coincide in making the EU an emerging actor in global energy politics. First, the EU's shrinking share of the global population and world GDP, made more acute by the economic crisis, increasingly pushes its members to act jointly on international issues so as to be able to continue to shape the international order. This pressure is exacerbated by the EU's ever-increasing reliance on energy imports, making it more vulnerable to sudden price or policy changes beyond its borders. Second, Russia's assertive resurgence in the last decade, and events such as the gas crises of 2006 and 2009, perceived to be driven by political motivations, have raised awareness that energy policy in an enlarged EU needs a common approach. Third, the Lisbon Treaty, in force since 2009, delegates more tasks to the EU in the realm of foreign and energy policy, even if competencies in both fields are shared with member states.

In 2011, EU member states requested that the High Representative of the Union for Foreign Affairs and Security Policy take into account the 'energy security dimension' in her sphere of action. The European Commission has received mandates from member states to negotiate with third country governments on projects to improve the bloc's energy security. Conversations on energy have started with a number of countries. Clearly, there is increasing support for the idea of tackling energy issues jointly at EU level.

The definition of energy security used in this report is the simple and relatively broad one used by the International Energy Agency (IEA): 'the uninterrupted availability of energy sources at an affordable price'. Achieving energy security requires efforts to reduce risks to energy systems, both internal and external, and to build resilience for managing the risks that remain. Tools to achieve this include: ensuring markets

function so that demand and supply meet optimally; providing adequate production and transport infrastructure; developing risk management systems (reserves, emergency planning and alternative supply routes); maintaining a diversified portfolio of energy suppliers; and keeping demand under control (energy efficiency).

Energy security considerations must also be weighed against economic competitiveness considerations and environmental concerns – notably those related to climate change. EU energy policy needs to strike a balance between these goals, and there are often tradeoffs involved. The difficulty in achieving this balance can be seen in the current debate in Europe on its renewable energy and climate policies.

There are limits to what the EU can do internationally on foreign policy and energy matters, but the EU can still deploy the instruments it has at its disposal to further its interests and continue developing a global order where rules and norms – even in the energy field – take precedence over crude power. Thus, it is important that EU institutions operate with a solid understanding of the geopolitical and economic realities 'out there', and that they do not attempt merely to export the EU's domestic policies.

The key questions addressed in this report are: how can the EU tackle energy security as part of its international action, taking into account its unique institutional realities and constraints? How can action on this front fit best with other EU foreign policy goals as enshrined in its treaties, notably those promoting freedom, democracy, prosperity, and sustainable development? This report is a first appraisal of EU energy diplomacy as seen from a 'foreign policy' angle and thus only tangentially approaches the intra-EU aspects of this challenge. Its point of departure is that internal and external policies are strongly interlinked and need to be shaped in a consistent manner. In its policy proposals, it emphasises priority issues, priority regions and feasibility. The idea is to help the European foreign policy community understand the key trends that are shaping the energy world and work on key priorities in the years ahead.

The report is structured as follows. The first section summarises key developments in global energy markets and how they interact with global geopolitics. It also flags up emerging energy security issues in Europe and globally. The second section provides an overview of the energy and foreign policies of world powers and leading energy exporters. The third section reviews the EU's energy policies, its current energy security situation, and its initiatives to increase its energy security. The final section concludes with a selection of ideas on how the EU could effectively approach energy security issues and match them with its foreign policy and climate priorities.

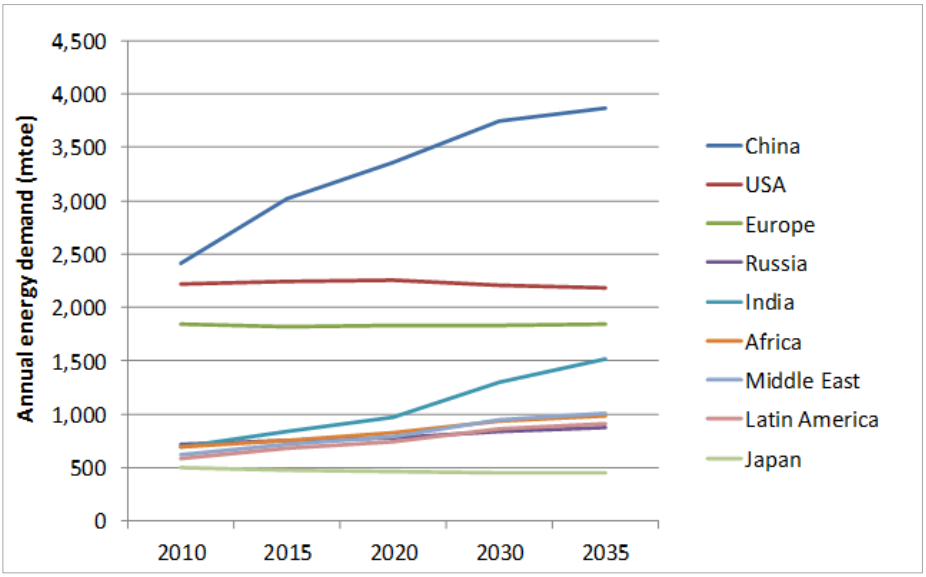
II. CHANGING GLOBAL ENERGY MARKETS

This section outlines key trends in global energy markets, identifies emerging energy security challenges and discusses regimes for energy governance. It shows how the eastward shift in economic and demographic gravity is transforming global markets and how the relative abundance of fossil fuels exacerbates the climate change challenge and shapes international energy regimes.

Demand grows and shifts to emerging markets

Energy markets have shifted along the same patterns as the global economy, inexorably moving their centre of gravity towards Asia and to emerging economies. Economic growth in the emerging world has led to social transformation, with the rise of new middle classes which are expected to account for half of global consumption by 2025 [McKinsey, 2012]. The world is becoming more urban, with the UN projecting that 'less developed regions' will see the share of their population living in urban areas rise from 46% today to 57.9% in 2035.

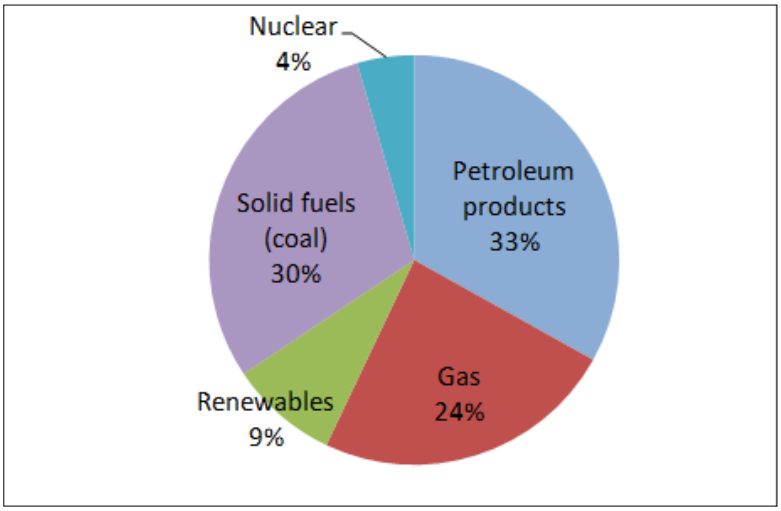
Figure 1: World primary energy demand



Source: IEA, *New policies scenario*, 2012

These trends will significantly impact on energy markets. According to the International Energy Agency [IEA, 2013f], energy demand growth in Asia will be led by China this decade, but will likely shift towards India after 2025. South East Asia will also contribute significantly to demand growth, reducing its historic role as an energy-exporting region. According to the IEA [IEA, 2013g], the region's energy demand could increase by over 80% by 2035, a rise equivalent to the current demand in Japan. The Middle East is also emerging as a major energy consumer on the back of economic and demographic growth, with its gas demand expected to grow by more than the entire gas demand of the countries belonging to the Organisation for Economic Co-operation and Development (OECD) by 2035 [IEA, 2013f].

Figure 2: World primary energy mix, 2012



Source: *BP Statistical Review 2013*

Global energy trade is likely to be significantly re-oriented from the Atlantic basin to the Asia-Pacific region. The IEA [IEA, 2013c)] predicts that between 2012 and 2018 oil exports from the Middle East to Asia will increase by 1.2 million barrels per day (mbpd), including 0.4 mbpd to China, while exports to the US and OECD Europe will shrink by 1 mbpd and 0.3 mbpd respectively. The development of unconventional oil in the US will also contribute to this trend. China is about to overtake the EU as the largest oil importer and India is expected to become the largest importer of coal by the early 2020s. As renewable energy sources (renewables) develop, trade in goods (final goods and industrial components) and services as well as foreign investment related to renewable energy is likely to play an increasingly important role in global politics and economic policy-making. This was highlighted by recent solar industry trade frictions involving the US, the EU and China.

Despite efforts to reduce pollution, the world's primary energy supply remains dominated by fossil fuels: coal accounted for 30%, oil 33%, and natural gas 24% in 2012 (BP, 2013). It seems likely that this fossil fuel dominance is here to stay, for at least the next two decades.

Coal is abundantly available, easy to transport, price competitive and rarely problematic in terms of energy security. In recent years, increased gas use for power generation has partly displaced coal use. Oil has almost completely been sidelined for power generation, and is now primarily for transport. While use of renewables (hydroelectricity, wind, solar, biofuels, waste etc.) is rapidly growing, their share in the global energy mix remains small.

The share of nuclear power in the global energy mix increased quickly after the oil embargo in 1973, reaching 4% in 2012 [BP, 2013], although investment in nuclear energy has been very limited since the 1986 Chernobyl disaster and the drop in oil prices of the late 1980s. Concerns over uranium supplies are not significant for most countries as plants generally keep sufficient fuel on site to operate for more than two years and the global market encompasses a broad array of producers and enrichers. Nuclear power's future in advanced economies looks uncertain due to rising safety and cost concerns but output from nuclear generation could still increase by two-thirds in the years leading up to 2035 [IEA, 2013f], led by China, Korea, India and Russia.

Shifting interests: no more 'West vs. the Rest'

Energy geopolitics is shaped by three deeply interrelated themes: economics (supply, price and competitiveness), security (issues related to strategic dependence on trade in oil and gas), and sustainability (climate change in particular) [Bressand, 2012]. The alignment of interests around these issues has been rapidly shifting in the new millennium. Until recently, geopolitical dividing lines could be summed up as 'the West vs. the Rest'.

On the economic front, emerging economies are concerned primarily with access to modern energy and controlling domestic energy prices. The challenge is daunting. According to the IEA, in 2011 nearly 1.3 billion people lacked access to electricity and more than 2.6 billion relied on traditional biomass fuels for cooking. Over 95% of this population is located in Asia and sub-Saharan Africa. Their interests differ greatly from those of advanced economies which have increasingly focused on reducing carbon emissions, adopting renewable technologies and liberalising their markets.

Since 1973, the major dividing line in energy geopolitics has been shaped by the conflicting interests of leading oil importers, mostly advanced countries with democratic regimes, and leading exporters, mostly authoritarian former colonies of Western powers. In short: IEA vs. OPEC. The IEA was created in 1974 as a response to the oil em-

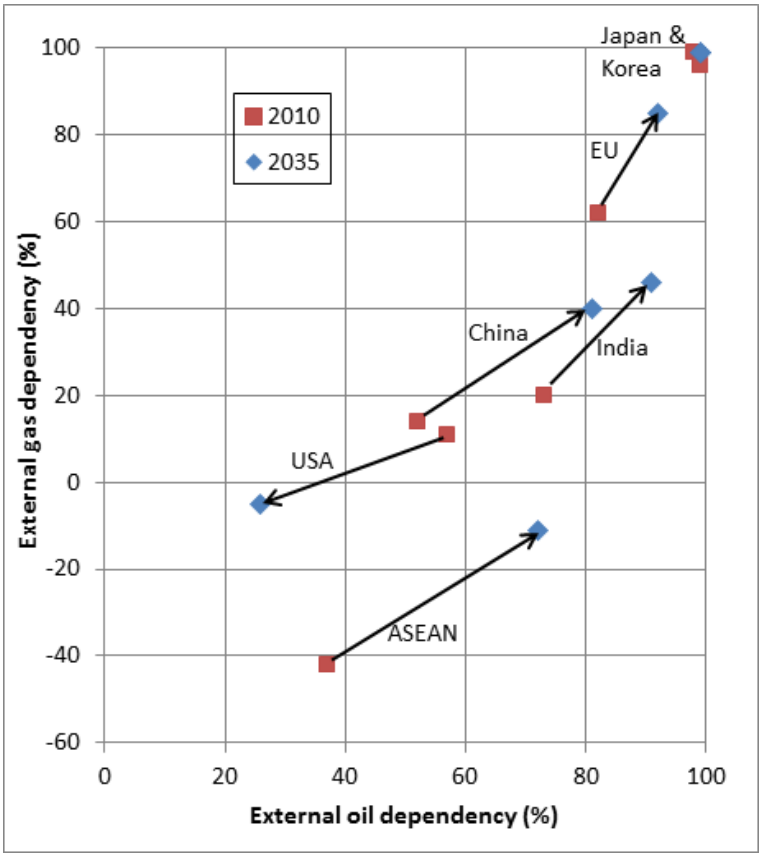
bargoes and worries over the West's strategic dependency on external sources of energy. Around the same time, Western Europe started importing Russian oil and gas via new trans-continental pipelines, which helped them reduce reliance on OPEC suppliers, but created its own problems. This situation has become more complicated since the collapse of the Soviet Union as newly independent oil producers in Central Asia sought to diversify their export routes away from Russia. The Baku-Tbilisi-Ceyhan (BTC) pipeline was built in the early 2000s in this context, notably with active diplomatic involvement of the US [Yergin, 2011].

Since the 1990s, climate change has become a major challenge with the core dividing line between advanced and developing economies. The latter, concerned with economic development and taking the view that advanced countries are primarily responsible for high levels of greenhouse gas emissions in the atmosphere, remain reluctant to take on binding emission reduction targets. This divide is expected to continue to structure global debates, even if attitudes to climate change across the developed and developing worlds are shifting.

Below the level of grand oil and climate geopolitics, the 'West vs. the Rest' story has always been much more complex. The developing world has been split as oil importers face the double challenge of managing import security and of absorbing oil price hikes, to which their less prosperous populations and economies are highly sensitive. Political regimes can also be vulnerable to the political turmoil that rising prices or shortages can cause, which explains why many developing countries subsidise petroleum consumption. Some developing countries are also more interested in climate change mitigation, given their higher vulnerability to climate change impacts, putting them in a position of potential disagreement with high-emitting developing countries like China. These fractures have deepened in the last decade.

The developed world has also become more fractured on energy questions. Rich economies have not been unanimously in favour of binding emissions commitments: the US did not ratify the 1997 Kyoto Protocol, despite signing it, and Canada pulled out completely. Europe, Japan and South Korea also remain very import-dependent for oil and gas – and will likely increasingly share more interests on that front with China and India – whereas the US is reducing its import dependence in the aftermath of its shale revolution. What is more, the economic crisis has pushed energy prices and industrial competitiveness concerns further up the priority list in policy debates, raising questions about the direction and evolution of future climate policies.

Figure 3: Net oil and gas dependency 2010-2035



Source: Frank Umbach, *World Energy Outlook 2013,* based on IEA data

Hydrocarbons – from scarcity fears to volatility management

The global hydrocarbons market is rapidly changing. During the last decade, 'peak oil theories' – predicting that the world was running out of oil – made a comeback, echoing debates from the 1970s when geologist Marion King Hubbert's 1956 prediction that US oil production would be in decline by the 1970s appeared to have been vindicated. Such scarcity theories are often accompanied by dire predictions of resource-related conflict [Yergin, 2011].

The primary driver of high oil prices this century has been the demand shock created by economic growth in Asia. This shock, combined with the disappearance from markets of large producers for reasons of war (Iraq and Libya) or embargoes (Iran) has pushed oil prices to historically high levels. Oil prices approached 150 USD/bbl. in 2008 when Russia, a major oil producer, waged war for the first time since the end of the Cold War, invading neighbouring Georgia. The new millennium also saw the return of resource nationalism surfing on the wave of rising energy prices – most spectacularly in Russia and Venezuela. The nationalisation of foreign-owned assets, when viewed alongside the rising geopolitical assertiveness of producing countries, raised alarms about potential supply disruptions. These worries were compounded by the concern that nationalised companies have fewer incentives for energy production. National oil companies (NOCs), such as Saudi Arabia's Saudi Aramco, Russia's Gazprom, Venezuela's PDVSA, Mexico's PEMEX, and Russia's Rosneft, control about 80% of global oil and gas reserves. Many NOCs have limited capacity for energy investment due to the demands of government coffers, putting pressure on production capacity, straining supply and putting long-term upward pressure on prices. They often struggle to take on the costly task of developing new, technically challenging fields (deep water, shale gas, oil sands etc.). NOC reserve control has forced private international oil companies to engage in costly exploration of new frontiers as easily exploitable oilfields have become inaccessible.

Another concern of the last decade has been rising competition with emerging markets. In the last quarter of the twentieth century, the oil sector became more liberalised and the market more globalised as Western governments let private companies take commercial (and political) risks in buying and investing across the world. Governments largely limited their involvement to requesting investment protection agreements from host countries and backing up commercial energy deals with diplomatic action. This liberalism, however, has declined in the 2000s with increasing participation of emerging market importers in global energy markets. Their largely state-owned companies offer not only investment to host countries, but also soft loans, infrastructure investments and a blind acceptance of the regimes hosting their companies. This is perceived as skewing the playing field to the detriment of Western consumers. It is also perceived as undermining *nascent* efforts, previously ignored by Western states as well, to improve governance in developing economies and avoid the 'resource curse'. Government control over importer NOCs, such as those of India and China, however, seems as likely to hinder their activities (through political interference) as to help (by providing financial support). Market pressures on internationally active NOCs have also pushed them to increasingly resemble their privately owned Western competitors in the drive to create value and to work efficiently.

Box 1: Nationalisation, war and global oil supplies – history lessons

While the nationalisation of oil supplies has a long history (including Mexico in 1938 and Iran in 1951), it was not until the 1970s that dependence on distant reserves under the control of foreign states became a major concern for importers. Revolutions (Iran 1979), energy policy transformations (Venezuela 1999), political instability (Libya since 2011) or war (Iraq – 1980s, 1990, 2003) can all threaten oil production and exports. Historically, however, these events have not had as significant effects on the physical supply of oil to global markets as might be expected. Production in war zones has often decreased at the onset of conflict, as seen during the 1990 invasion of Kuwait, the Iran-Iraq War (1980–88) or recently in Libya, but energy infrastructure and exports have proven remarkably resilient. After an initial shock, Iraqi and Iranian oil production both increased during their years of war [Luciani, 2011]. Should a local disruption occur, loss of production can be offset by increased production elsewhere. In the last decade, for example, the economic slowdown in Russia freed extra capacity for exports which counterbalanced OPEC limitations to some extent. Most suppliers are themselves concerned about market stability for the sake of revenues and investment planning. Saudi Arabia has played – so far – the role of 'swing producer', maintaining a spare capacity of more than 2 mbpd in recent years. Functioning, liquid markets are the best mechanism for managing disruptions.

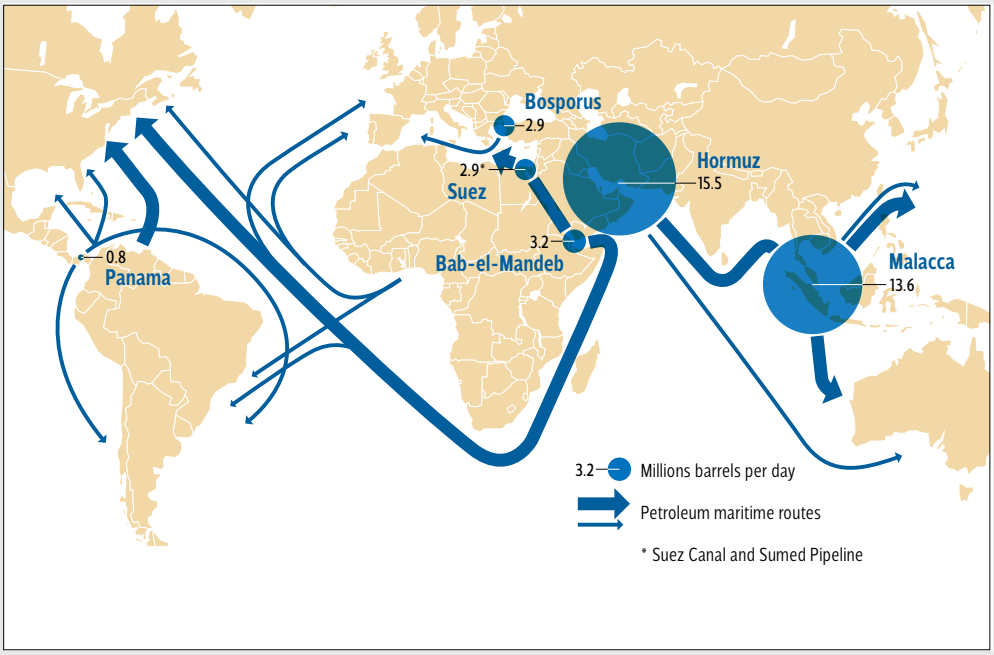
Yet despite rising demand, volatile supply, resource nationalism and competition from the emerging world, estimates of global recoverable oil and gas reserves continue to surge year after year, undermining 'peak oil' theories. In its latest *Statistical Review of World Energy*, BP estimates that global proved oil reserves – i.e. recoverable under current technical, economic and financial conditions – rose from 1,322 billion barrels in 2002 to 1,669 in 2012. The IEA [IEA, 2013f] estimates recoverable resources at 2,670 billion barrels of conventional oil (including NGLs), 345 billion barrels of light tight oil, 1,880 billion of extra-heavy oil and bitumen, and 1,070 billion of shale oil, more than enough to cover the projected demand of 790 billion barrels of oil to 2035. Repeating a process first observed after the 1970s oil shocks, the high price environment of the last decade has spurred exploration, driven technological progress and encouraged investments in energy sources previously considered too difficult to access.

OPEC countries have generally had less incentive to innovate and, with an estimated 73% of global reserves [BP, 2013], will continue to play a central role in global oil markets. The IEA [IEA, 2013f] expects OPEC's share in global oil output to shrink until the end of this decade, but to pick up again after 2020. Beyond OPEC, however, new fields continue to be discovered and new technologies developed in every corner of the globe, a trend that is expected to continue. In North America, the development of light tight oil (LTO), the Canadian oil sands, and offshore deep-water reserves have reversed the decline in oil production underway since the 1980s. Since its nadir in 2008 at 6.8 mbpd, US oil production reached 8.9 mbpd in 2012, and exceeded

9.8 mbpd in the first ten months of 2013. According to BP, proved reserves of oil in the US have increased by 20% since 2002 to 35 billion barrels. This has been complemented by the growth of Latin American reserves, particularly in Venezuela, Brazil and Ecuador, who now account for 19.7% of global proved oil reserves. Reserves from the former Soviet Union (FSU) have also increased, from 90.3 billion barrels in 2002 to 126 billion in 2012, representing 7.5% of global reserves. New discoveries and growing production from underexplored Africa, as evidenced by recent finds in Uganda, Ghana, Mozambique and Tanzania, are also expected to make significant contributions to global energy markets.

While the world is not running out of oil, however, oil prices have remained stubbornly high despite the financial crisis and an expected slowdown in emerging economies. This points to several continued problems on the supply side: political turmoil in the Middle East (reduced flows from Iraq, Iran and Libya), markets that remain closed, and problems with the technological, managerial and financial capacity of NOCs to bring new reserves on stream. Newer fields, while abundant, are thus generally more expensive to develop. The capital expenditure required to produce the marginal barrel has steadily and sharply increased during the last decade. Financial 'speculation' on oil futures contributes only marginally to the situation. However spectacular, North America's new oil output does not appear to have altered global oil price dynamics [Fattouh et al, 2013].

Box 2: Trade disruption at maritime choke points



Sources: U.S. Government Accountability Office (2011) and EIA (data estimates based on APEX tanker data, 2009)

Worries abound over oil and LNG supply interruptions due to disruptions at maritime 'choke points'. Emerging doubts about the future role of the US as ultimate guarantor of the freedom of sea lanes feed into such concerns. Maritime choke points are seen as a major geopolitical challenge by China, which is expanding its naval capabilities (and alarming its neighbours in the process) partly in response to this perceived challenge. Some fears over potential blockades of maritime choke points might, however, be overblown. The Strait of Malacca and the Suez Canal, two common sources of worry, can both be bypassed by longer routes – if necessary. Considering that rents generated by the Suez Canal account for 10% of Egypt's hard currency revenues, intentional closure of this choke point by Egypt appears very unlikely [Fernholz, 2013]. The Turkish Straits, however, has no bypass route and an accident in the Bosporus could disrupt important tanker traffic from Black Sea suppliers. More worryingly, despite some Saudi Arabia capacity to export oil via pipelines through Oman to the Red Sea, the Strait of Hormuz also has no bypass route and remains the most worrisome choke point for the global oil supply. It is no coincidence that the US 5th fleet is based in Bahrain. The US has repeatedly declared that it, in partnership with any number of allies and economic partners, would be able to protect continued traffic through the Strait, including during a regional war, although the costs and market fears associated with such a situation would be prodigious. To help cope with sudden disruptions, the IEA and the EU both require member states to store 90+ days' worth of strategic oil stocks.

Both demand and supply of oil are quite rigid in the short term. This market tightness favours volatility of prices on spot markets, as any relatively small supply shock can act in a destabilising manner. During the first months of the conflict in Libya in 2011, Libyan oil production plummeted. Although Libyan production amounted to approximately 2% of global production, oil prices increased by over 30% in the first two months of the conflict, despite the release of 60 million barrels from IEA country strategic reserves and a rapid increase in Saudi production. The same international markets that provide flexibility in re-directing supply also transmit the price shocks that can accompany any disruption, adversely affecting energy investment decisions and putting constraints on long-term oil supply development.

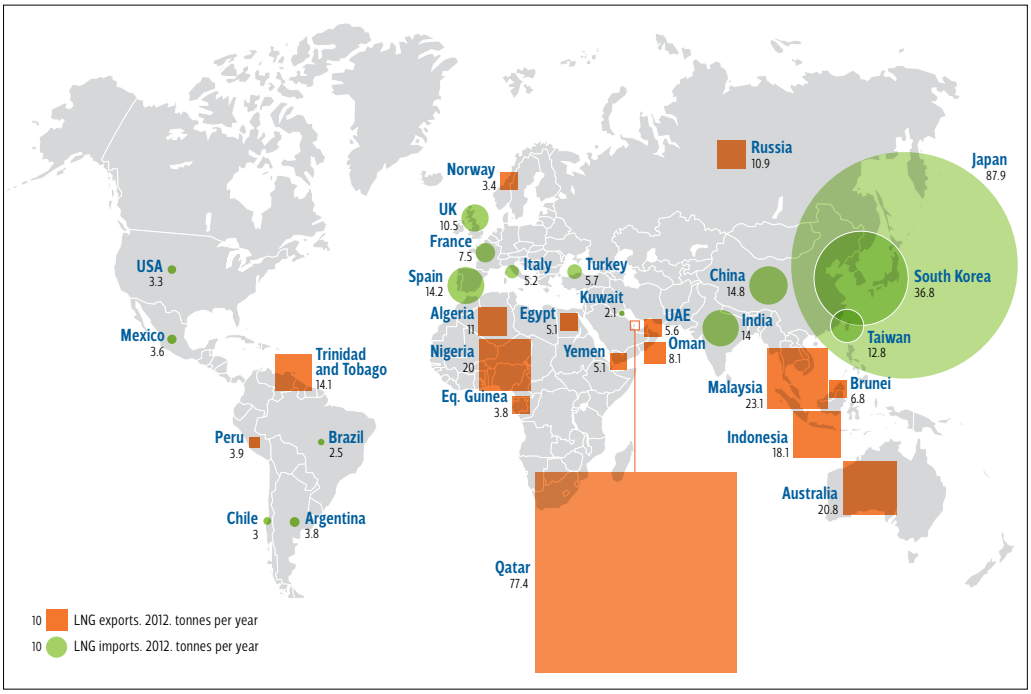
Although the growth of unconventional oil sources and recent new conventional discoveries have pushed the frontiers of available reserves, the fundamental functioning of oil markets has remained largely the same for decades. The story is different for natural gas markets.

A revolution in gas – shale, LNG and the rise of spot markets

The production of unconventional gas (and oil) has become more economically viable due to improvements in the drilling of horizontal wells and hydraulic fracturing, or 'fracking', a process which involves the injection of sand, chemicals and water into shale rock to release trapped hydrocarbons. As a result of the shale gas revolution, the Energy Information Administration (EIA) expects natural gas production in North America to grow by 56% from 2010 to 2040 [EIA, 2013i], with the US accounting for two thirds of this growth.

The boom in unconventional gas has led to a radical reassessment of global gas resources, but expectations about the quick exploitation of these resources remain cautious. The EIA expects shale gas production to expand to countries with large technically recoverable resources, such as China, Australia, Mexico, and parts of Europe, but the timing and rate of production growth in individual countries remains uncertain. Geological, regulatory, infrastructure and, especially in Europe, negative public perception limitations mean that replication of the US shale boom is unlikely to be repeated elsewhere at a large scale in the next decade.

Figure 4: LNG trade



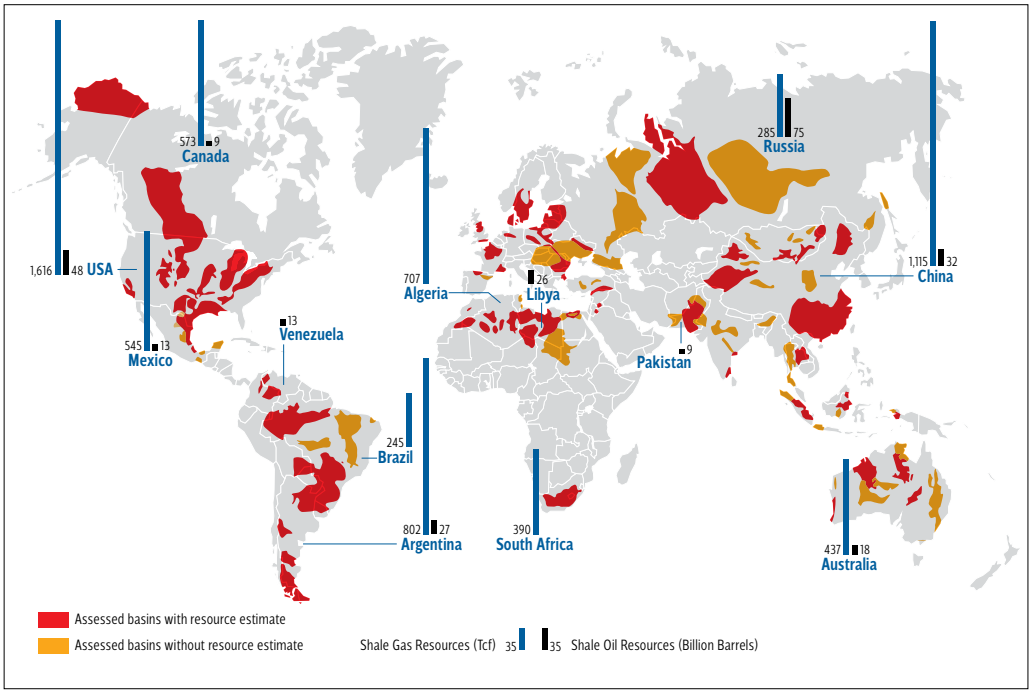
Source: IGU World LNG Report, 2013

Natural gas markets are overwhelmingly of a regional nature, with three dominant regions: North America, East Asia and Europe. The gradual rise of shale gas contributes to an existing trend towards 'globalisation' of gas markets via trade in liquefied natural gas (LNG). Although expensive, LNG can be transported by tankers rather than pipelines. Over the last decade, LNG technology costs have gradually come down and LNG trade now accounts for a tenth of all gas produced. Despite temporary setbacks in LNG trade in 2012 due to supply problems on certain markets (IEA, 2013b), the planned development of new gasfields and the construction of LNG export facilities in countries like the US and Australia stoke expectations that the LNG trade will continue to grow significantly. The EIA expects world LNG trade to double from about 283 bcm in 2010 to 566 bcm in 2040.

The global LNG trade is allowing gas exporters to sell to the highest bidders – currently located in East Asia – and allowing gas importers to diversify their imports. This flexibility has facilitated the emergence of 'spot' prices on short-term capacity markets, which are becoming increasingly attractive for businesses and regulators. While Qatar has become, and will likely remain, the global leader in LNG exports, a number of exporters, particularly Australia, are expected to contribute to increasing liquidity in global gas markets. These changes make the traditional, and still domi-

nant, model of pricing gas through oil-indexed long-term contracts less attractive for consumers. In the long term, this could significantly alter their relationships with producers. Natural gas prices could continue to slowly delink from oil, though the rise of short-term contracts, spot prices, and a global LNG market means that gas could have its own volatility pressures as it starts resembling the oil market.

Figure 5: Assessed world shale gas and shale oil resources



Source: EIA/ARI World Shale Gas and Shale Oil Resource Assessment, 2013

Box 3: Possible shocks in the years ahead

As recently as 2010, multiple US-based energy firms were pursuing plans to import LNG. The unforeseen boom in shale gas production, however, quickly transformed American gas markets, putting an end to most import plans and initiating a flurry of LNG export proposals. While corporations, governments and international organisations put immense effort into tracking trends and producing forecasts, energy markets continue to surprise. What sudden trend changes might appear in the years ahead?

(1) Shale boom everywhere? Or nowhere? The US boom in unconventional oil and gas production has raised expectations about replication in other countries, most of which have run into geological, technical, political, environmental or hydrological barriers. If/when these barriers are overcome, variations of the US boom, with its energy price and industrial impacts, may occur in other countries with significant reserves such as China, Argentina, France or South Africa. An alternative scenario may see not only the absence of other booms but also a downward re-evaluation of US shale gas recoverability and a slowing US boom. In 2012, the EIA *Annual Energy Outlook* estimated that US shale gas production in 2035 could be anywhere from 275 to 580 bcm/yr, a huge range that reflects the uncertainty of the projections.

(2) China's economy has a hard landing. Economic forecasters have long worried about this scenario. The potential disruption to energy markets (and many other markets) would be massive, likely cutting global energy demand/prices – a favourable energy scenario for other importers, but difficult for energy producers and for the global economy.

(3) China begins rapid decarbonisation. Current projections see Chinese energy use, particularly coal, continuing to expand rapidly in the coming years. Whether due to domestic pollution concerns or an inherent capacity to spring surprises, a relatively rapid Chinese transition towards a greener growth path would upend coal and oil markets, climate discussions and the economies of scale for green technology markets.

(4) The stranded gas of Central Asia (and Iran) finds quicker routes to market. While pipelines have been creeping into Turkmenistan and Azerbaijan by fits and starts over the last 20 years, political barriers and low gas prices have slowed the process. A potential combination of decarbonisation efforts, high gas demand and regional political breakthroughs could transform both the region and the balance of power in global gas markets.

(5) Electric/natural gas-powered vehicle technology expands rapidly. Oil has slowly been removed as a fuel for power plants, but has retained a stranglehold on transportation. What might happen if the tens of thousands of electric and natural gas-powered cars currently in use were joined by millions of others at competitive prices? If natural gas-powered cars became the norm, the increase in natural gas demand would change gas markets, including the choice of many oil producers to re-inject their produced gas.

(6) The Arab Spring reaches Saudi Arabia, bringing instability and disrupting oil exports. The impact on global oil markets could be massive given Saudi Arabia's traditional role as swing supplier and balancer of oil markets, and could rival the impact of the 1970s oil shocks.

Cutting emissions during a golden era for coal

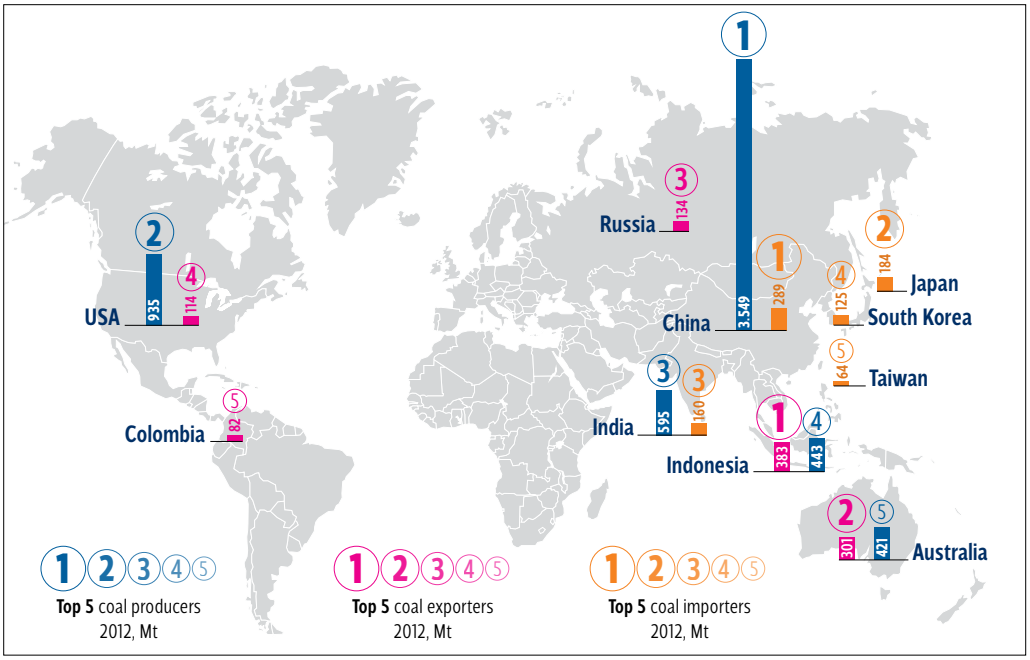
Whereas the new sense of relative abundance of hydrocarbons has eased concerns over global supply security, those concerned with climate change have fewer reasons to cheer. The IEA and the NGO Carbon Tracker calculated in 2013 that to limit the long-term rise in the average global temperature to 2 degrees Celsius (°C) by 2100, a target seen as potentially sufficient to mitigate the worst effects of climate change, only 565-886 billion tonnes of additional CO_2, a 'carbon budget', may be added to the atmosphere in the next 40 years. However, as of 2012, the total reserves of internationally listed and state-owned energy companies are estimated to contain enough carbon to produce 2860 billion tonnes of CO_2. Not all of this can be burnt.

With current trends and policies, the world is likely to surpass the 2°C target and see a 3.6°C rise by 2100 [IEA, 2013f]. In May 2013, CO_2 levels in the atmosphere exceeded 400 parts per million for the first time in several hundred millennia. Global energy-related CO_2 emissions increased by 1.4% to reach 31.6 gigatonnes (Gt) in 2012, breaking a historic record. But oil and gas are not the biggest emitters: coal is. The average number of grams of CO_2 per kWh emitted by coal-fired electricity generation is estimated at 972, compared to 779 for oil and 450 for natural gas [IEA, 2012a]. Oil, because of its high cost, is now less commonly used to produce electricity, but it contributes to transport's very important share (22%) in global CO_2 emissions.

Over the past two decades, despite the development of renewable energy, the share of coal-fired power generation in global energy supply has risen from 37% to 42% [IEA, 2013a]. Coal contributed 44% of CO_2 emissions in 2011, compared with 35.3% for oil and 20.2% for natural gas. Coal was the fastest growing source of primary energy in 2011, with China accounting for three quarters of this expansion.

Yet Asia is not the sole coal story. The shale gas revolution in the US has put downward pressure on US gas prices, with monthly Henry Hub prices dropping to 2-4 USD/MBtu. This has led to a switch from coal to natural gas in power generation, freeing cheap US coal for European markets. Low coal prices, supported by low CO_2 prices, as well as the pull-back from nuclear power in Germany since 2011, has caused a significant gas-to-coal switch in Europe, which had a 10% rise in coal imports between 2009 and 2011. This raises doubts over the EU's ability to meet its CO_2 emissions reduction targets by 2020 (see Chapter IV), especially if economic growth picks up.

Figure 6: Coal in the world



Source: World Coal Association, excluding brown coal (minor share)

Renewables and energy efficiency

Since at least the oil shock in the 1970s, renewables have been considered promising sources of energy to counteract fossil fuel reserve depletion, strategic import dependence, air pollution and climate change. The most important sources of renewables are hydroelectricity and biomass. Since 1973, the share of 'biofuels and waste' in primary energy use has remained stable (10% in 2011, down from 10.6% in 1973), while hydroelectricity's share has risen from 1.8% in 1973 to 2.3% today. Despite rapid growth, other renewables, such as geothermal, solar and wind, still only account for 1% of total primary energy supply [IEA, 2013a].

The IEA expects nearly half of the net increase in electricity generation to 2035 to come from renewables. In the OECD, power generation from non-hydropower renewables is expected to rise to 11% of gross generation in 2018, up from 7% in 2012 and 3% in 2006 [IEA, 2013e]. The EU has been the epicentre of renewables growth in the last decade due to a strong policy framework, mandatory targets and generous subsidies. However, it is in China that growth is expected to be strongest. The IEA expects China to account for 40% of global renewables growth over 2012-18 [IEA, 2013e], due primarily to hydropower and wind power, with some contribution from

solar power. Other emerging markets, including Brazil, Thailand, Morocco, South Africa and Turkey are also deploying renewables – they could account for 23% of renewable capacity growth by 2018 [IEA, 2013e]. Onshore wind and, in some countries, solar power are increasingly competitive with *new* gas and coal-fired plants.

Large-scale global renewables development remains slow pending economic, technological and economy-of-scale improvements. The economics of the entire energy system requires re-thinking: intermittent wind and solar power require advanced grid management, expensive connections to consumption areas and force traditional, baseload electricity generation plants (coal, gas, nuclear) into 'intermittent' use, undermining existing business models. Yet conventional power sources are needed to provide back-up, a challenging role to perform profitably.

Energy efficiency savings, on the other hand, are seen as a more economically palatable method to cut emissions and reach climate goals. Much of the developed world has made progress on reducing the energy intensity of its economies over the last 40 years, partly through efforts to ensure that market prices are felt by end users of energy – removing subsidies and building competitive markets. Much work remains to be done, but there is increasing awareness of the economic and emissions benefits of reducing domestic demand. Developing countries, however, often price domestic energy very low through direct or indirect subsidies, making it more likely that the energy industry is inefficient, with excess waste and flaring, limiting energy development. Low energy prices are seen as an important benefit for local populations, particularly in states where other benefits do not filter down to the population. These energy subsidies, explicit or implicit, can be politically difficult to remove, as demonstrated by recent Russian, Nigerian and Indonesian efforts.

Fixing electricity systems while preserving the climate

Tomorrow's energy security concerns will not be so much about the physical availability of oil and gas, but about making electricity systems – grids, technology and market design – function better. This will require heavy investments, strong government coordination, good regulation and good financing conditions. These conditions are not always present even in Europe, much less in the developing world. This challenge was highlighted by the spectacular blackouts in India in 2012 which left more than 600 million people without power – the world's biggest power cut.

Recently, the spectre of power shortages has also haunted advanced economies: in Japan, after the shutdown of its nuclear power plants in 2011, or in Europe, as electricity systems digest the massive influx of intermittent renewables. Conventional electricity production capacity has been increasingly mothballed in Europe, causing fears of shortages or blackouts during peak demand periods.

Making electricity systems work raises questions of both the economic and environmental sustainability of power production. Low and middle income countries are likely, by default, to use coal as the primary energy source for electricity production. In advanced economies, coal and gas compete with hydro and nuclear energy to provide conventional back-up capacity for the growing role of intermittent renewables. In terms of CO_2 emissions, burning gas is better for the climate than burning coal [Helm, 2012] but suffers from cost and transport challenges. Gas is also mistrusted by some environmentalists for fear that leaking methane, a highly potent greenhouse gas, reduces or eliminates the savings on CO_2 emissions accrued from replacing dirty coal. Improving methane management, both in upstream and downstream systems, can thus be beneficial for the climate and win more public support for gas development and use across Europe.

A fragmented governance system

Globally shared energy policy challenges are manifold. But there is no overarching international governance system for energy to address them. International legal regimes and organisations dealing with energy tend to be limited in scope and membership, with few synergies, and are ill-equipped to handle the energy world of the future. The IEA, created after the 1973 oil shock, and OPEC, the author of that shock, respectively represent the interests of the major oil importers and main exporters of the 1970s. The IEA coordinates the use of strategic oil reserves in times of supply disruptions, organises the sharing of energy data and produces market forecasts. It is also a forum where energy and environmental policies (e.g. energy efficiency) are discussed. Its membership is composed of a subset of OECD members: its rules stipulate that OECD membership is required to join. This means that the major emerging centres of energy consumption – China, India and other emerging markets – are excluded. This raises questions about the relevance of an organisation intended to bring together those countries who share interests as net importers of energy.

Similarly, OPEC excludes some of the world's leading oil exporters, not least Russia. Even with a limited membership, cohesiveness has not been its hallmark. Geopolitical rivalries in the Middle East and the inevitable temptation by individual members to cheat on production agreements have left Saudi Arabia with the task of balancing oil markets.

A more inclusive dialogue between importers and exporters emerged in the 1990s and led to the creation of the Riyadh-based International Energy Forum in 2003. It allows both producers and consumers to discuss common concerns: security of 'demand' and sufficiently high prices on the one hand, and security of 'supplies' and attractive prices on the other, with both groups sharing concerns over volatility. It remains a largely informal, non-committal forum.

The almost unbridgeable gap between exporter and importer interests is also reflected in the fate of the Energy Charter Treaty (ECT). The core aim of this 1994 treaty is to secure the production, trade and transit of energy on the basis of World Trade Organisation (WTO) rules. It includes notably strong provisions to protect energy investors from undue expropriation and has investor-to-state arbitration procedures. In a world where gas and oil are often transported via pipelines, the agreement has sought to introduce rules for countries through which such pipelines run to meet demand in third countries further downstream. Initially meant to be a global treaty, initiated following the fall of the Berlin Wall and the collapse of the Soviet Union, it has largely remained Europe-centred – with some members in Central Asia and the Caucasus. The US, though it helped develop the ECT and remains an observer, never joined. Russia, although applying the treaty provisionally, pulled out completely in 2009, plunging the organisation into an existential crisis. Nonetheless, its current members and international companies consider the ECT to be useful because it sets minimum legal standards for energy market governance and helps protect investments in signatory countries.

The WTO itself theoretically covers all trade, including of energy, but neither its regulations nor mechanisms of implementation are well-suited to deal with issues that are specific to the energy sector. Its rules on investment, a key problem in the energy sector, are weak. The WTO's key focus is on import barriers, whereas in the field of hydrocarbons, worries are more about export barriers (embargoes, export taxes, etc.) [Selivanova, 2012], investor access to pipelines, and transit through third countries. As renewables policies are being deployed across the world, restrictive investment regulations such as local content requirements are a rising source of concern. Perhaps the WTO's most helpful role so far has been, thanks to the emerging case law in its dispute settlement body, in helping flesh out the legal scope and limits of government intervention in the renewable energy sector (biofuels, solar panels, wind power) through subsidies, local content requirements, or tariff barriers. Such interventions distort global competition and delay the emergence of competitively priced renewable energy products and services.

The recent enthusiasm for renewables has led to the creation of the International Renewable Energy Agency (IRENA) in 2011, with Germany at the forefront. Headquartered in Abu Dhabi, United Arab Emirates (UAE), it has more than 120 members. Its creation can be seen as a reaction to the difficulty of traditional energy organisations – notably the IEA, with its traditional focus on hydrocarbons and nuclear power – to broaden their focus and membership. It promotes a product. But IRENA is yet to make a mark internationally and faces criticisms that it focuses more on wind and solar power than on other renewable energies such as hydropower. Another sector-focused international organisation is the International Atomic Energy Agency (IAEA) which promotes civil nuclear power, best practice on nuclear safety, and proliferation control.

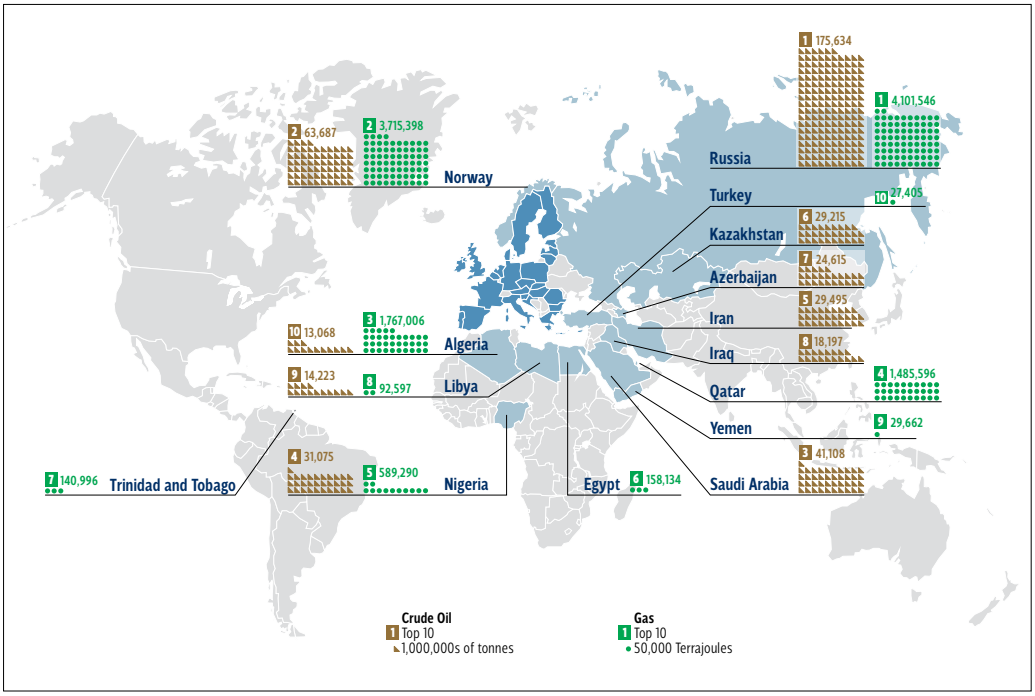
Other energy-governance initiatives include the Kyoto Protocol on climate change and the Extractive Industries Transparency Initiative (EITI) launched in 2002 and championed by the United Kingdom to promote better governance in poor resource-rich countries. EITI seeks to reduce the complicity of international firms in perpetuating poor governance practices, such as bribery, but the scheme remains voluntary.

Like other international regimes and organisations, such as the United Nations (UN), the International Monetary Fund (IMF), the G8 and the G20, those governing energy face problems of modernisation, relevance and adaptation to a world of shifting economic and political power. The challenge for energy is the greater as the existing regime is less universal and much more fragmented. This fragmentation helps foster institutional competition and innovation, as seen by the creation of IRENA, but the system's track record in bridging fundamental gaps in the interests of the players – producers, importers, transit countries, old and new CO_2 emitters – is not very encouraging for the future [van de Graaf, 2012].

III. THE GEOPOLITICS OF ENERGY

This section reviews the energy-foreign policy nexus of the world's major powers, the EU's key suppliers of hydrocarbons (as shown in the map below), and of its neighbours. It also roughly sketches key dimensions of their energy relationships with the EU.

Figure 7: Top 10 external suppliers to the EU, 2011



Source: Eurostat

US energy and foreign policy post-shale

The US may in some ways be compared to China in terms of its energy focus: they are continent-sized countries with significant domestic resources that worry a lot about the Persian Gulf. While lagging behind Europe in terms of public sentiment and government regulation on climate issues, the trend is toward increasing American focus on carbon reduction in the coming years, as evidenced by the approval delays for the Keystone pipeline from Canada's oil sands, the 2013 Environmental Protection Agency (EPA) announcement of tighter coal plant regulations (limiting CO_2 emissions for new coal-fired power plants to 500 kg/MWh) and ever-tightening automobile emission standards.

The American government has long played a role in supporting key energy developments abroad, such as the BTC pipeline from Azerbaijan, for a mix of geopolitical and energy security reasons. But the US's relatively low import dependency (by European standards) has meant that efforts to improve energy security have had a major focus on domestic production. These have paid off with the recent shale boom. Forty years after the 1973 oil embargo, energy security appears to be losing strength as a policy justification. High levels of domestic production and close partnerships with exporters Canada and Mexico have long meant that US energy worries were more related to price spikes in international markets than to physical interruption of oil supplies. The current US energy transition can thus be seen as contributing to an existing position of relative energy security. While not transforming the country, however, the shale boom may push the country towards a different mindset when it comes to energy.

The impact of the changing US energy outlook on its foreign policy continues to be a matter of discussion, particularly in the Middle East. Historically, only limited amounts of Middle Eastern oil went to the US, which imports more from the Americas. Yet the US chose to push Iraq out of Kuwait in 1990, even though the US received only 5% of their oil from the Gulf at the time [Luft, 2013]. US engagement in the Middle East will more likely be determined by other factors, including their role as a price taker in global energy markets (oil price surges will still hit US consumers), worries about terrorism, nuclear proliferation concerns and support for partners such as Israel. The US 5th Fleet, guardian of the Straits of Hormuz, seems unlikely to leave its Bahrain base. The 2013 spat with Saudi Arabia over US willingness to engage in dialogue with Iran and reluctance to bomb Syria may indicate, however, that American energy partners may be losing their sway in Washington. This flexibility may allow the US to untie itself, to an extent, from the demands of countries with very different goals and outlooks. More confident in its energy security, and with a stronger economy benefiting from a domestic energy boom, the US may even be willing to engage itself more fully, in the Middle East or elsewhere, on an opportunistic basis: 'A prosperous United States means an omnipresent United States.' [Luft, 2013] On the other hand, military budget cuts, fatigue from the wars in Afghanistan and Iraq and a focus on East Asia may turn US attention away from the region, regardless of energy considerations.

Chinese energy and foreign policy challenges

China's choices are structurally important for world energy markets. Despite massive investments in nuclear power, renewable energy and domestic fossil fuel production, China will not return to energy self-sufficiency. China's relatively low import dependence (by European standards) is based on its reliance on domestic coal, which has contributed approximately 70% of the country's primary energy mix for at least 30 years. China now uses as much coal as the rest of the world combined [IEA, 2013f]. Oil accounted for 19% of China's primary energy mix in 2011 (with 59% of that im-

ported) while gas accounted for only 4% of the mix (22% of it imported) [EIA, 2012b]. The most recent Five Year Plan (2010-2015) calls for gas to account for 7.5% of the energy mix by 2015. Hydropower accounts for 6% of the energy mix, but further expansion will likely be limited by the lack of new appropriate dam sites.

China is also the world's largest market for renewable energy, having developed large solar and wind power industries, although they remain a negligible component of the total energy mix (0.3% in 2011). Recent troubles in the markets for these products, however, may have been behind Premier Wen Jiabao's March 2012 call for more emphasis on nuclear, shale gas and hydro power and an 'end to blind expansion in industries such as solar energy and wind power' [Slusarska, 2013]. Nuclear energy remains a niche industry (1% of the energy mix) but is a wild card in a longer-term perspective. Nuclear expansion plans were paused following the 2011 Fukushima disaster, but nuclear energy remains a key part of government plans, with a post-Fukushima government target of 60 GWe of production by 2020 [World Nuclear Association, 2014]. China remains one of the few countries where significant nuclear developments in the years ahead will be more than empty rhetoric. Since 2008, China has conducted a structured dialogue with EURATOM on fission and fusion research, security and safeguards and nuclear safety, and DG Energy has requested a Council mandate to pursue further nuclear cooperation with China [Zurita, 2013].

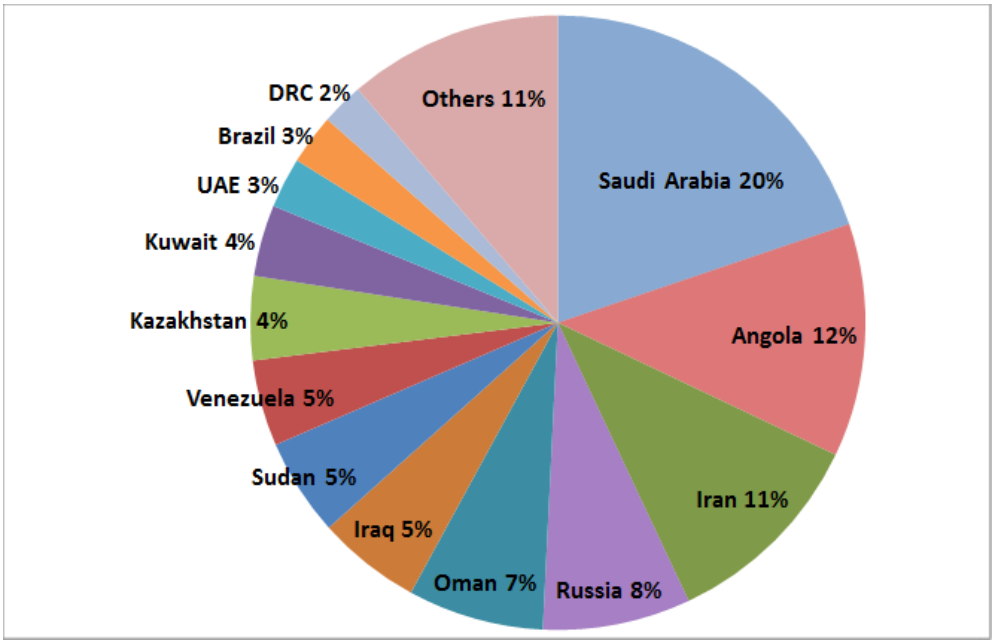
In its international engagements to secure oil and gas supplies, China has indicated its preference for long-term energy deals and control or ownership of energy sources abroad, offering stability of demand, infrastructure investment packages, financial aid and political engagement without making political demands of its partners. Reliance on long-term trading contracts rather than open markets ensures a closer connection between energy security and geopolitics than is the norm in Western states. China's international energy policy mirrors their broader foreign policy, prioritising state-to-state relations that respect the legitimacy of all existing government regimes. Their partnerships with states such as Sudan and Angola suggest that their perceptions of stability and reliability may differ from those of Western governments. This has implications for highly sensitive political topics, such as the current negotiations over the future of Iran's nuclear programme. China's traditional approach to foreign policy and its rising thirst for oil and gas and sense of vulnerability to negative supply shocks could matter in forging a final deal.

China's efforts to lock up energy sources through long-term bilateral deals, however, do not necessarily lead to a net reduction of oil and gas available on global markets. The oil and gas that China imports through those deals is energy that they will not be sourcing on the open market. This reduces market liquidity, but there is no net loss to the world [US Department of Energy, 2006].

Moving forward, China will very likely continue to pursue diversity and security in its energy supplies. For gas, its policy has included building or financing pipelines from

Burma/Myanmar and Turkmenistan, and fostering LNG imports from Australia, Qatar, Indonesia, Malaysia and others. It also includes efforts to expand the domestic conventional gas industry and initiate a domestic shale gas industry, a highly uncertain prospect for geological, technical and water availability reasons. China is also in its third decade of discussion with Russia over gas imports from Siberia, a process which could bear fruit soon [Hille, 2014] but is unlikely to involve enough gas to transform the energy outlook of either country. Natural gas has not been a source of major security worries but this may change as China expands efforts to reduce carbon emissions and replace coal with gas.

Figure 8: China's crude oil imports by source



Source: EIA, *China Country Analysis Brief*, 2012

With regard to oil, China's pursuit of supplies has included expanded pipelines from Kazakhstan, long-term contracts with Middle East suppliers (particularly Saudi Arabia and Iran) and pursuit of other partners, especially in Africa. The multi-hued pie-chart above shows the success of their efforts toward achieving diversity of their oil imports. Oil has historically been the cause of the most worry for Chinese leaders because of its irreplaceability for transportation.

China has been described as having three major maritime energy security worries: the Malacca Strait, the Strait of Hormuz, and the South China Sea [Leung, 2011]. In the potentially resource-rich South China Sea, China has border disputes with

several neighbours, the resolution of which will require political agreements beyond the energy realm. The Malacca Strait dilemma receives a lot of press coverage but may be overstated: for any non-military disruption of trade, other routes are available, and for any military conflict, Malacca is only one point of larger potential sea interdiction. Despite significant advances, China is unlikely to have either the regional partnerships or naval capacity to play a role in protecting the Strait of Hormuz in the coming decades.

While China has long resisted internationally negotiated carbon reduction targets, they have targeted and significantly improved the energy intensity of the economy over the last decade [Slusarka, 2013]. China is also beginning to respond to the same pressures that forced Western countries to prioritise environmental issues in previous decades: local air and water pollution. The EU and China signed a Partnership on Urbanisation to work with cities on urban issues such as energy use and pollution. China initiated work on a series of local emission trading schemes in 2013, although the relatively constrained and undeveloped nature of Chinese energy markets may make it difficult to develop a successful emissions trading system [Slusarka, 2013]. China has begun experimentation with domestic price reform in fields such as telecommunications, albeit in a tentative way, and has started a process to tie retail oil product prices to international crude oil markets, hoping to attract downstream investment and reduce energy intensity.

The Chinese have shown interest in cooperating more closely with the IEA and working with the ECT, of which China is currently an observer state. EU efforts to build and protect open, liquid international energy markets, therefore, may increasingly be pursued not only in partnership with their closest partner, the US, but also with China.

Indian energy approaches

India has long held relatively autarkic world views, championing non-aligned politics, avoiding trade liberalisation and relying as much as possible on domestic energy supplies. They have historically played a relatively marginal role in multilateral discussions on many issues, a situation that is only slowly changing. Energy poverty is a major concern, and India remains a generation behind China in terms of development, energy use, and demand impact on energy markets as well as in terms of its importance as an energy partner for Europe. India has not been a highly engaged partner for the EU on many issues, energy included, though it has expressed interest in clean coal discussions and energy efficiency support.

Despite having in place a National Action Plan on Climate Change since 2008, the issue has not been a high priority [Caputi, 2013]. India has adamantly rejected any internationally binding carbon reduction targets because of their development status. Traditional biomass use by India's population still constitutes almost a quarter

of total energy use. India's economic boom in the last 15 years has relied on coal (41% of the 2011 energy mix – mostly domestic but increasingly imported) and more and more on imported oil (23%) and natural gas (8%). Like China, India has multiple nuclear reactors under construction and hopes to vastly increase the share of nuclear energy in the national mix, from 4% in 2011 to 25% in the long term – although it is doubtful the goal can be achieved. India has been a party to the Nuclear Suppliers' Group agreement since 2008.

Energy trade plays an important – but difficult – role in India's international engagements. Negotiations have been slow to progress with Nepal over possible Indian purchases of hydro-electricity, though smaller cross-border electricity interconnections with Bhutan and Bangladesh point to possible opportunities for improved regional power trade. Possibilities for international pipelines feeding gas or oil to India have run up against local political barriers. Burma/Myanmar has already agreed to sell most of the country's excess gas to China (and to serve as a Chinese pipeline route for bypassing the Malacca Straits). Bangladesh has been hesitant to sell its limited gas reserves, preferring to develop them for domestic use. Continuing conflict with Pakistan makes the suggested pipelines from Turkmenistan (TAPI) or Iran (IRI) unlikely. Regional cooperation mechanisms such as the South Asian Association for Regional Cooperation (SAARC) appear unlikely to solve these issues unless relations between India, Pakistan and Bangladesh vastly improve. Indian firms have begun to seek bilateral energy deals abroad, like China, but without the same financial backing. These have often been limited to signing memorandums of understanding (MOUs) with countries that have significant risks of political instability.

Japan's energy policy conundrum

Not only is Japan facing major demographic challenges, an erosion in competitiveness and an intensifying geopolitical rivalry with China: its energy policies appear to be in an impasse.

After a series of minor nuclear incidents in the 1990s, public trust in the nuclear industry was already low before the Fukushima Daiichi accident occurred in March 2011. Today, three years after the accident, Japan's nuclear power plants remain shut and reopening remains a difficult prospect as public trust is at a record low. Having renounced a source that provided 27% of its power, Japan is faced with its traditional 'energy security predicament' [Vivoda, 2012] more starkly than ever before, which has economic repercussions as well as implications for the geopolitics of energy and of climate change.

Japan has almost no domestic fossil fuel resources. It is the world's third largest consumer and importer of oil after the US and China, the second largest importer of coal behind China, and the world's largest importer of LNG. Coal-based electricity

generation represents more than 27% of its energy mix. With nuclear power plants shut down, LNG and oil have risen significantly in the island's power mix, rising to 48% and 16% respectively [EIA, 2013g]. Record high oil and LNG prices – to peaks of which its imports have contributed – explain in large part Japan's first trade deficit in decades registered in 2013 and compound Japan's marked loss of industrial competitiveness.

74% of Japan's oil imports originate in the Middle East. Despite relatively strong support from their government, Japan's upstream oil companies struggle to keep pace with the government-backed strategies of companies from equally import-dependent China, India and South Korea in securing long-term supplies in the Middle East, Africa and elsewhere. Its alliance with the US means that it had to renounce importing oil from Iran. Its energy utilities have been investing in upstream LNG projects to secure supplies from promising LNG export markets in North America, Australia and Indonesia. Russia's share in Japanese imports of LNG and oil has increased recently.

Japan recently announced that it would not be able to meet the CO_2 emissions targets it had signed up to in the 1997 Kyoto Protocol. The world has thus lost, at least temporarily, one of the most ambitious countries in terms of fighting climate change. Without a change in its energy mix, reducing CO_2 emissions will be the more difficult for Japan as the country is already the world's most energy efficient, and only radical technological breakthroughs could lead to an even better performance. Whereas ambitious plans were introduced in 2012 to promote renewable energies, especially solar power, even in the most optimistic scenarios these are only expected to reach 10-12% of its energy mix by 2030 [Vivoda, 2012]. Constraints on the development of potential, marginally available, domestic sources of energy remain high: renewable geothermal energy development is likely to meet strong local opposition for environmental and landscape preservation reasons, while existing hydrocarbons resources are located in part of the East China Sea contested by China.

Japan is a member of the IEA and of IRENA and participates in the International Energy Forum (IEF).

Russian gas power: losing ground?

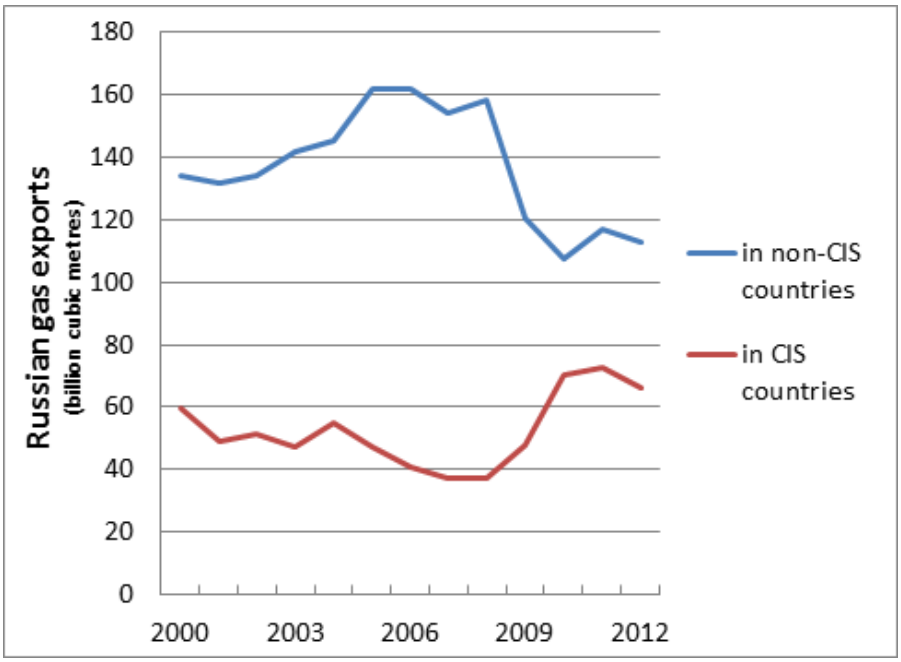
Russia's rising geopolitical assertiveness has a significant energy dimension. Gazprom, the state-owned Russian gas company, enjoys a monopoly on gas exports to Russia's western neighbours, and over pipelines carrying Central Asian gas to Europe. Its unique position has made the company a vehicle for the Kremlin to wield political and economic influence in its neighbourhood.

While gas geopolitics have made the most headlines, the Russian government relies far more on oil than it does on gas, earning 6 to 8 times more revenues from oil [Konończuk, 2012]. This is partly because Russia exports three quarters of the oil it produces but only one third of the gas it produces [ibid]. Gas represents a more useful instrument in the Kremlin's foreign policy toolbox because Russia has been more able to define the terms of its pricing, while Russia must remain a price taker on the global oil market. Russia's economy and exports have become more dependent on exports of fossil fuels over time, now accounting for more than two thirds of Russian exports. The EU is Russia's main export destination, making the country vulnerable to negative demand shocks from Europe.

Since the onset of the 2008 financial and economic crisis, its gas export volumes to Europe have been reduced due to high oil prices, the global economic crisis, explicit European efforts to diversify supply away from Russia, and the rise of LNG options in a world with increasing shale gas production. Current EU efforts to remove differential pricing among its customers add pressure on Russian prices and practices in Europe (this is examined in more detail in the next chapter).

Moscow is increasingly incentivised to look to East Asia as a customer. The Eastern Siberia Pacific Ocean (ESPO) pipeline started operating in 2012, and now brings oil to East Asia. Last October, the independent Russian energy company Novatek secured a long-term contract to supply liquefied natural gas to China. Efforts to sell Russian oil and gas to Asia have long been stymied by the vast distances that the energy must be shipped, uneasy relations with China, disagreements over gas pricing (China does not want to pay the same prices as Europeans while Russia does not want to set a precedent of selling at lower prices, because this would unleash demands in Europe for price reductions) and limited exploration and development of eastern basins in East Siberia, Karil-Aleut and Sakhalin. Large volumes of sales to the east still remain a relatively distant prospect, and oil exports look likely to develop quicker than gas as ESPO expands its capacity to export over 1 mbpd. If they occur in future, they are most likely to be from eastern sources that do not interfere with traditional flows to Europe, sources that are increasingly likely to be developed with Chinese oil company involvement [Ma, 2013].

Figure 9: Russian exports of gas 2000-2012



Source: Central Bank of Russia, 2013

Russia has been seeking to build new pipelines into Europe with the aim to rely less on transit states like Ukraine or Belarus. It succeeded with the Nordstream pipeline, a €10 billion project, that now ships gas to Germany via the Baltic Sea. It is working to build South Stream, a pipeline that crosses the Black Sea and aims to bring gas to Austria and Italy, costing a massive €25-30 billion, and raising serious questions about its commercial viability.

Like most oil and gas exporters, Russia prizes stability and predictability in energy income. This explains its preference for long-term (20-30 years) supply contracts with its clients that tie gas prices to oil prices. The high oil prices of the last decade have eased the recovery of Russian state power. The Putin years have witnessed the rapid renationalisation of Russia's resource sector, including the seizing of foreign assets and the nationalisation of the then-biggest Russian oil and gas company, Yukos, in 2004-2005. Today, the ability of Russia's NOCs to bring new, more complex and costly fields on stream, as traditional fields slowly dry out, has been negatively impacted by the exclusionary nationalist policies. The recent development of new international partnerships to develop difficult fields – such as the tie-up between Rosneft and Exxon on Arctic exploration since 2011 – may be an indicator that the limits of nationalisation have been recognised by the Russian authorities.

The shale gas revolution and the pressures to reduce gas prices in Europe amidst plummeting demand, as well as the rising attractiveness of spot markets, have put pressures on the European business model of the Russian monopoly exporter, Gazprom. In recent years, European gas companies have started renegotiating their contracts with Gazprom to obtain either price reductions or partial linkage of gas prices to spot market prices. This is putting pressure on Russia to reform its domestic gas sector. The launch of a sensitive antitrust case by the competition authorities in Brussels in 2012 has further entrenched Gazprom in a defensive position. The domestic upstream gas sector is now experiencing managed, but increasing, competition with Gazprom in production and even export. Russia recently announced the end of Gazprom's monopoly over exports of LNG. Importantly, Russia is also making efforts to use price signals to improve its energy efficiency by beginning to raise domestic energy prices, which could also make the Russian market more attractive to Central Asian producers.

Russia has so far avoided legally binding obligations over the way it operates in its energy markets. It pulled out of the ECT definitively in 2009 as it was never satisfied with various aspects of the treaty, not least its Transit Protocol. The trigger for this definitive pull-out was when a group of foreign shareholders in the nationalised Yukos company obtained a ruling in an international court that Russia was bound by the treaty's provisional application clauses. This has prompted a group of foreign investors to seek compensation (the claims run up to €100 billion) in an international arbitration tribunal under the ECT's investor-to-state dispute settlement clauses. The ruling is expected in early 2014. Russia joined the WTO in 2012 after close to twenty years of negotiations, but energy trade is not what the WTO covers best. Russia collaborates with the IEA, and participates in fora such as the International Energy Forum (IEF). Russia is not member of OPEC. Although transparent open governance may not yet be in the offing in Moscow, and Russia ratifying the ECT a very unlikely prospect, their decision to join the WTO in 2012 indicates a progressive acceptance of enforced international impartial standards for the country's external commercial relations, even if over the long term this means that the Kremlin's ability to engage in highly politicised trade relations with its neighbours will be constrained.

Transit countries: Ukraine and Turkey

Ukraine is the key transit country for Russian gas, traditionally carrying more than 100 bcm to Europe every year, although this had dropped to 85 bcm by 2012. **Turkey** is a transit country for Central Asian oil and is about to become a transit country for the EU's projected Southern Corridor (see Box 5 in Chapter III) for gas. For both countries, closer relations with the EU have long been under discussion. With Turkey, accession negotiations started in 2005, which were then halted for reasons, among others, related to the recognition of Cyprus, an EU member since 2004.

Ukraine, which emerged as an independent nation as a result of the disintegration of the Soviet Union, and which has been engaged in a complex process of democratisation and institutional *rapprochement* with the EU since the middle of the last decade, will continue to be an important transit country for Russian gas. Ukraine's role in the gas shutdowns in 2006 and 2009 was strongly criticised in Europe and by Russia. Being dependent on Russia for two thirds of its domestic gas consumption, Ukraine has been seeking to reduce its exposure to commercial and political pressures from Russia stemming from this dependency. This dependency also explains why Ukraine pays among the highest prices in Europe for its gas from Russia (ca. 400 USD per thousand cubic metres). In its attempts to induce Ukraine to join the Eurasian Customs Union and to turn away from signing an Association Agreement with the EU in late 2013, Russia has offered significant price discounts to Ukraine. But these prices can be revised every three months. Russia's plan to bypass Ukraine as transit country in its deliveries to Europe pose a threat for Ukraine's own income from transit fees. Ukraine has sought to diversify its energy mix away from gas and has enthusiastically embraced the idea of developing shale gas on its territory, and even nurtures hopes of becoming a gas exporter in a distant future. The EIA [2013d] has estimated Ukraine's technically recoverable shale gas reserves at 5.5 tcm, slightly more than Poland's.

Ukraine is a member of the ECT and it joined the Energy Community (see Chapter III) in 2011. This process has facilitated the establishment of reverse flow capacity on its pipelines to Europe. Hence Ukraine's recent purchase of German gas originally sold to Germany by Russia, thereby starting to dent Russia's exclusive access to Ukraine's gas system [Popescu, 2013].

Turkey also relies heavily on Russian gas (58% of imports in 2011). It is a dynamic emerging market experiencing rapidly growing energy demand. For both economic and geopolitical reasons, Turkey has an interest in becoming an energy hub. Turkey produces most of the coal that it burns, but relies on imports for nearly all of its oil and gas. Its primary energy mix changed from 2001 to 2011 with oil dropping from 41% to 29% while gas rose from 19% to 32%, reflecting a major expansion of gas-fired electrical plants. Coal (29%) and renewables (10%) changed little and make up the rest.

Just as in its broader foreign policy, Turkey has been developing an active and independent regional energy policy, seeking to diversify its supply and to become an important energy corridor for Europe. This can be seen in Turkey's willingness to invest directly in the TANAP gas project with Azerbaijan, with whom Turkey shares deep historical ties, while European efforts to develop the alternative Nabucco pipeline project (see Box 5) did not pay off. Turkey has also opposed sanctions and sought closer energy ties with Iran, from whom it has intermittently bought gas over the years, and with the Kurdish Regional Government in northern Iraq, to the deep consternation of the central government in Baghdad.

These independent policy efforts have run in tandem with a rhetoric of disconnect from Europe as accession talks with the EU have languished. With Turkey's rapidly increasing energy demands and efforts to develop the Southern Corridor it has remained willing to cooperate with the EU on energy discussions, including energy security. A portion of the nearly €1 billion that the EU continues to provide to Turkey each year in pre-accession funding has been dedicated to energy and infrastructure reform [European Commission, *Turkey – Financial Assistance*, 2014], and 17% of the EBRD's €2.5 billion portfolio in Turkey is dedicated to energy projects [EBRD, 2014]. Progress has been impeded, however, by Turkey's intransigence over the Cyprus issue and the subsequent termination of accession talks on their energy chapter. Turkey remains only an observer of the Energy Community. Turkey is also a hesitant partner in climate/emissions discussions but, as with other growing middle income countries, is increasingly faced with its own domestic pollution issues (particularly from coal) and can expect to be more open to emissions discussions if a strong economic case can be made for investment in efficiency and cleaner fuels.

The discovery of significant gas deposits offshore Israel and Cyprus since 2009 has raised questions regarding possible energy cooperation with Turkey, and of possible positive impacts on Turkish relations with these two states, but prospects remain uncertain. Given past relations, neither Israel nor Cyprus may be willing to place trust in Turkey as the primary outlet route for their gas, despite the potentially higher costs of alternative pipeline routes or LNG facilities. Both Israel and Cyprus are also focusing on integrating these new domestic gas sources into their own economies, replacing imports, as they develop longer-term plans for export infrastructure [Greek Energy Forum, 2013]. Pending political breakthroughs, therefore, offshore Mediterranean gas, as with gas from other potential regional sources in Iran (hobbled by international isolation) and Iraq (with whom relations are complicated due to disagreements over the Kurdish region), may not arrive in Turkey soon.

Supplier states: the EU Neighbourhood

Norway is a major exporter, matching Russian gas exports to the EU in recent years. Despite some reserve replacement worries in the early 2000s, Norway remains a stable, reliable partner to the EU with decades of oil and gas reserves available at current production rates. Norway's importance can be easy to ignore. Norway is almost completely reliant on hydropower for its grid and has plans to sell electricity to Germany and the UK. Buying more energy from Norway is seen as lowering the overall threat of disruption in EU energy supplies. Norway has not ratified the ECT treaty, but applies most of the EU's laws as a member of the European Economic Area (EEA).

Close to 100% of EU imports from **Algeria** is in the form of fossil fuels, although Algeria's share of EU gas supply has been cut by 40% in the last decade. In 2011, Algeria was the EU's 11th largest oil supplier (by sea) and 3rd largest gas supplier (by

3 pipelines and by sea). Oil production has been stagnant but continues to be the biggest money earner for the government. Gas production has been declining in the last 5 years, but Algeria has huge conventional gas reserves (9th in the world) and is estimated to have vast shale gas reserves. Nearly half of all gas produced is re-injected to enhance wet gas and oil production [EIA, 2013c]. Although domestic power production has been growing rapidly (primarily gas-fired but with a declared target of 37% solar by 2030) to meet the needs of an expanding and industrialising population, Algeria's proven reserves allow for more than 50 years of production at current rates, and more, including shale gas, is likely to be found [EIA, 2013c].

Algeria shares similarities with Russia. Both, along with Iran, have expressed interest in converting the Gas Exporting Countries Forum into a gas version of OPEC with the clout to control global gas markets (long considered a highly unlikely development, even before the boom in shale and LNG markets [Lewis et al, 2007]. Sonatrach and Gazprom even signed an MOU in 2006 that raised worries in Europe of collusion between Europe's top two gas suppliers, although cooperation between the two has not advanced [Darbouche, 2007]. Algeria and Russia often underperform in the production and development of new fields, with state-run firms dominating domestic industry. Algeria's regulatory environment has remained particularly uninviting for international investment. The country also presents potential risks of political instability. A smooth eventual transition to a post-Bouteflika era is far from assured, and this remains a considerable concern.

Libya has been a minor gas exporter despite the country's significant reserves (22nd in the world, with much optimism that there is more to be found), focusing instead on lucrative oil exports (it contains the world's ninth largest oil reserves). Most oil and nearly all Libyan gas is pumped to Europe via the Greenstream pipeline to Italy and some minor LNG facilities. Considering its small population (6 million), it seems unlikely that domestic usage will gobble up future finds, as is already occurring in Egypt (even though it has bigger proven gas reserves than Libya). Problems with political instability loom large in the short term, but Libya represents a potentially very important opportunity for the EU.

Egypt has long been a gas exporter and was Europe's sixth largest gas supplier in 2011. Gas production has flatlined, however, and Egypt became a net gas importer in 2012. With booming energy demand from a rapidly growing population of more than 80 million, it seems unlikely that Egypt will regain exporter status.

The EU's relations with these key North African states are deep and complex, but are difficult to compare with the bloc's relationship to European partners in the Balkans or to its East, as the lack of EU accession prospects and the existence of significant hydrocarbon rents limit EU influence.

Supplier states: the Gulf

Iran has the second largest gas reserves in the world, after Russia. These are used almost exclusively for domestic purposes, with minor sales to Turkey periodically disrupted for technical reasons and imports from Turkmenistan sometimes exceeding total exports. Iran instead makes its money from oil exports [EIA, 2013a]. The current political impasse over Iran's nuclear programme has precluded it from becoming an energy supplier to Europe, as an embargo is in force against the country. A political opening could allow much-needed investment into Iran's oil and gas industries, although nationalist sentiments, decades of mistrust and uncertainty over business conditions may slow investment. Eventual openness to international technical expertise could significantly help reduce inefficiency in Iran's gas industry, which flares more gas each year than Azerbaijan produces [EIA, 2013e and EIA, 2013a]. In the long term, Iran may join Qatar as a major LNG producer, adding significant liquidity to global LNG markets although domestic reliance on subsidised gas by Iran's 76 million citizens, and for reinjection to support oil production, will lessen this impact.

Most of Iran's known reserves are in the south of the country, making exporting via the Gulf more attractive than via northern or Caspian routes. Iran's reserves in its northern Caspian region are relatively small and underdeveloped [EIA, 2013a]. A northern pipeline route has been discussed as a possible project for Iran, Turkmenistan, Iraq and other producers to send gas to Europe. Increasingly, however, the forecast lack of European demand does not augur well for any major expansion of trans-Turkish lines beyond planned Azeri and perhaps Turkmen flows. A more likely option may be the expansion of Turkmen gas sales to Iran if Iran is able to develop LNG exports through the Gulf. Significant energy 'peace dividends' may thus flow from any resolution of the political standoff with Iran.

Iraq has the world's fifth largest proven oil reserves and has the potential to massively increase oil exports and even become a swing producer not unlike Saudi Arabia. While Iraq's security situation deteriorated in 2013, attacks against the country's oil and gas infrastructure remain relatively rare. Iraq has not significantly developed gas production even though its proven gas reserves are the 12th largest in the world [EIA, 2013b]. Most gas is flared, re-injected or used for domestic power and any potential gas production increases are targeted for domestic power production. Most oil production is in the south and exported via the Gulf. Access to the 15-20% of Iraqi oil located in the north is complicated by a political dispute between Baghdad and the Kurdish regional government which controls pipeline access to Turkey. Turkey has signed deals with the Kurdish regional government but most importers, from China to the US, deal with the central government.

Qatar is a significant oil exporter and has significant oil reserves (13th in the world) but its unique importance arises from its role as the world's number one LNG sup-

plier. Qatar is ranked just below Iran and Russia in gas reserves (13% of the world total) and produces more natural gas liquids (NGLs) than crude oil. The monarchy uses its gas revenue to project the country as an active international player, funding the TV channel Al Jazeera, bidding for the World Cup, financing Syrian rebels, and involving itself in Egyptian politics (in support of the Muslim Brotherhood). For the EU, Qatar has become an important partner due to its role in the global LNG market and its increasingly active political role throughout the Middle East.

Saudi Arabia, on the other hand, has generally been perceived to use its money and influence with circumspection, historically wielding great influence in Washington and throughout the Islamic world. It has sailed through regional disruptions in recent years with enough oil money and enough finesse to avoid major domestic problems [EIA, 2012a]. As the aftermath of the Arab Spring continues to disrupt the entire Arab World, however, it remains uncertain for how much longer Saudi Arabia can manage its prominent role as the world's swing oil producer while avoiding major political reforms at home. Saudi Arabia remains, by far, the world's dominant oil exporter with decades of available reserves and the ability to ramp production up or down to weigh on (not always successfully) world oil markets. Saudi Arabia has recently begun to focus on managing its domestic energy demand and has indicated its intention to produce 50% of its electricity from renewable sources (primarily solar) by 2020.

The United Arab Emirates (UAE) is ranked seventh in the world for both oil and gas reserves, but has actually been a net importer of gas in recent years, with gas dedicated to reinjection in oil reserves or for domestic power. The UAE has made significant efforts to move beyond a hydrocarbon economy and become a financial and trading centre, although oil still accounts for 80% of exports.

Supplier states: the Caucasus and Central Asia

After the Persian Gulf, the second locus of hydrocarbon supplies beyond the EU's immediate neighbourhood is in the Caucasus and Central Asia, where oil from Kazakhstan, gas from Turkmenistan, and both oil and gas from Azerbaijan, have increasingly whet global appetites. While it remains in the EU's interest to allow for increased exports from this region to the global markets, rather than just to Russia and China, the benefits of EU engagement, and of major infrastructure projects to bring these resources to Europe, remain slow to develop (see Box 5).

During the 1990s, the future trajectories of the Caucasus and of Central Asia were the focus of much concern in the US and Europe, who hoped to see the development of democratic, Western-leaning regimes. Russia was weakening, China seemed far away, and the US was active there, as in many parts of the globe, taking advantage of the disappearance of the USSR. In the energy field, this was demonstrated by the efforts

to construct the US-backed BTC pipeline that allowed Azeri and Kazakh oil to bypass Russia. This pipeline, completed in 2005, made Baku a minor new centre of power and made the distant reserves of Central Asia suddenly appear much closer. All five of the Central Asian states, along with Azerbaijan, joined the ECT.

The geopolitics of the region have changed. Russia has re-prioritised its engagement. China has massively expanded its presence in Central Asia, and the USA has retreated. Only massive investment commitments by newly rich Azerbaijan, rather than from importer countries, have been able to sustain life for Europe's Southern Corridor initiative. The political trajectory of the Central Asian states, in particular, remains primarily influenced by their giant neighbours China and Russia.

Kazakhstan has significant and expanding oil reserves (30 billion barrels) and exports oil west via Russian pipelines to the Black Sea, across the Caspian Sea to join the BTC, and east via a new pipeline to China, soon to be expanded. In 2012, it was the EU's sixth biggest crude supplier and trade with the EU accounted for almost 40% of Kazakhstan's total international trade, almost equalling the combined trade shares of Russia and China. Gas production is mostly associated with oil production and is intended for domestic use. Kazakhstan has been more open to international energy investments (with both US and Chinese companies playing big roles) than its neighbours, including gas-rich Turkmenistan, but retains close relations with Russia, including through their membership in the Eurasian Customs Union (along with Belarus).

Azerbaijani hydrocarbon production has been transformed since the opening of the BTC pipeline in 2006. The BTC vastly increased government rents and allowed the quick development of newly discovered gas fields, transforming the country from gas importer to exporter. Most gas is still used for domestic purposes, with small volumes exported to Turkey, pending the development of trans-Turkish export routes [EIA, 2013e]. The TANAP connection to Europe via the Southern Corridor is the most recent and most concrete plan for Azeri gas to reach Europe, although development remains uncertain as Russia plans its own competing southern export route. Azerbaijan also wants to bring in Turkmen gas from across the Caspian Sea to join TANAP, as it currently does with Kazakh oil for the BTC, but Russian and Iranian intransigence over potential trans-Caspian pipeline routes have put this development on hold indefinitely. The EU has actively engaged Azerbaijan on the development of a Southern Corridor for its imports.

Turkmenistan's gas reserves were estimated at 7,500 bcm in 2011, the world's sixth largest [EIA, 2013f]. They are isolated from most of the world's major gas markets. Turkmenistan currently exports gas to Russia via the existing Soviet network, and to China via a pipeline completed in 2009. Potential exports west across the Caspian Sea remain stalled by Russian opposition to a pipeline that would allow Turkmen gas to flow west to Azerbaijan and thence to Europe via the Southern Corridor. Since 2011,

the EU has played a role in discussions to resolve this dispute. Turkmenistan, while interested in finding new markets for its gas, is unlikely to wish to disrupt its existing relationships with China or Russia by reorienting gas flows towards uncertain European markets. Plans for exports south via a Turkmenistan-Afghanistan-Pakistan-India (TAPI) line remain far-fetched while exports (swaps) south to Iran remain minimal. Normalisation of Iranian relations with the international community could potentially open Iran's own gas exports via the Gulf and allow more Turkmen gas to fuel the Iranian market.

Other suppliers

Many states export oil and gas, including to Europe. None of the countries on this list seems likely to become a major supplier to Europe but collectively provide diversity to European imports and liquidity to global energy markets. Efforts to improve relations with these states are valuable but appear unlikely to have a major impact on EU energy security so long as demand and price levels for oil and gas shipped by tankers are determined in Asia.

Sub-Saharan Africa

Nigeria has Africa's second largest proven oil reserves (after Libya) and has long been a major oil exporter to Europe and the US, despite significant unmet domestic energy needs. It also has the largest proven gas reserves in Africa (eighth in the world). Nigeria was the world's fourth-biggest LNG exporter in 2012, despite the fact that most produced gas is flared. Instability and violence have limited onshore production. A massive electricity deficit in an energy-poor country means that if Nigeria ever improves its governance, the gas that is currently flared or exported may be directed to power production. Electricity has been declared as one of the three areas of focus for the EU's Nigeria country strategy for 2014-20. **Angola** is Africa's third largest oil producer (after Nigeria and Algeria) with most exports going to China. Angola has limited proven gas reserves (40th in the world) but has just begun minor shipments of LNG in 2013. **Mozambique** and **Tanzania** have taken early steps to begin developing gas finds, though both are several years away from production. Estimates of recoverable gas reserves have been listed at 3 to 4.5 tcm for Mozambique and 0.7 to 1.2 tcm for Tanzania in 2012, with Western firms leading the exploration [Franza, 2013]. Both states seem likely to contribute LNG to global markets after 2020, but may not be game changers, particularly as they are currently energy-poor with growing populations and energy-hungry neighbours.

The Americas

Brazil is booming in oil and gas, while **Argentina** has the third largest shale gas resources in the world (but they are not likely to be put on stream in the decade ahead). Depending on the rate of domestic demand, Brazil probably has sufficient reserves to become a mid-sized oil exporter, trailing Venezuela and Mexico in Latin America,

with all three historically focused on American and Chinese markets. **Trinidad and Tobago** is a minor oil producer which, despite not being among the world's top 30 countries in terms of natural gas reserves, was sixth in the world in LNG exports in 2012. This high pace of production has come at a cost: proven reserves fell nearly 40% between 2005 and 2011. Trinidad and Tobago is also the only functioning democracy among the EU's non-European oil and gas suppliers.

Asia

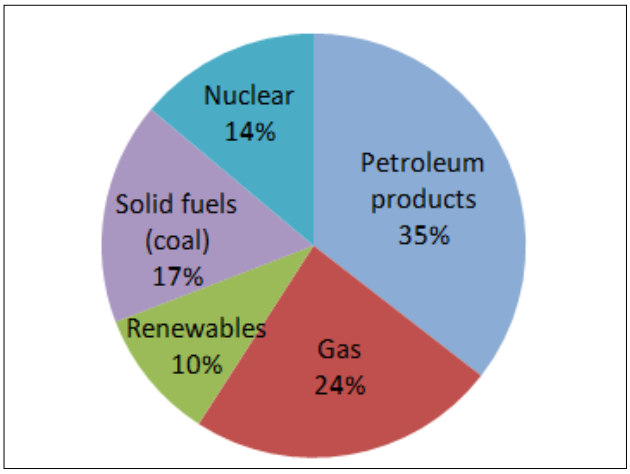
Malaysia and **Indonesia** have historically been major hydrocarbon exporters, primarily to Asia, with Malaysia being the world's second largest LNG exporter. Rapidly growing domestic demand, however, combined with limited domestic reserves, means that Indonesia has become a net importer and Malaysia is likely to follow suit in the coming years, leaving their customers to look further afield for LNG. **Australia** is rapidly expanding its LNG exports, almost entirely to Asia, and is expected to be a major exporter, perhaps competing with Qatar for top position.

IV. THE EU AND GLOBAL ENERGY MARKETS

This section examines how the EU has scaled up energy security in its energy and foreign policies over the last few years. It lays out the Union's challenges in pursuing these policies and sets them against the current trends in global and European energy markets.

Coal plays a lesser role in the EU than in the US or China. At the continental level, consumption patterns have remained relatively stable in the last decade, except for the recent upsurge in renewables. According to Eurostat, the share of renewables increased from 5.7% in 2001 to 10% of the primary energy mix in 2011, while gas consumption (24% in 2011) and nuclear energy (14%) remained stable. Dependency on petroleum products decreased from 38% to 35% (with Western Europe much higher – 41% – than the east – 27%) whereas solid fuels (i.e. coal) consumption decreased moderately from 18% to 17%.

Figure 10: EU gross inland energy consumption, 2011



Source: Eurostat

However, individual EU member states have very different energy mixes (See Annexes). The surge in German coal use in 2010 and 2011 meant that German recourse to coal was about the same in 2011 (24.5%) as in 2001 (24.4%) and accounted for 27% of solid fuels consumed in the EU. In France, nuclear power represents close to 80% of its power production. In Italy, gas plays a dominant role. Renewables have developed rapidly. While Western Europe was able to decrease its coal dependence (from 12.7% of gross inland consumption in 2001 to 10.5% in 2011), coal

use remained more or less the same in the East (26.6% in 2011). Poland, where the share of coal in its energy mix stands at more than 50%, accounted for 19% of EU coal use. Recent policy decisions in countries like the Czech Republic and Poland point to increasing coal consumption. The diversity of energy mixes reflects physical and market realities, as well as divergences in terms of national economic and energy policy.

The EU big picture: persistent fragmentation despite rising ambition

Although the EU's founding treaties dealt with energy – the Coal and Steel Community (1951) and EURATOM (1957) – energy policy has largely remained in the hands of member states. The 2009 Lisbon Treaty, however, lays the foundations for a common energy policy by stating that energy policy is to be based on the simultaneous pursuit of competitiveness, supply security and (environmental) sustainability. However, the treaty enshrines the principle that energy mix choices and energy supply strategies remain a sovereign national prerogative. This legal situation makes it difficult to devise a coherent common energy policy at EU level, let alone an external energy strategy, when foreign policy is also still a member state prerogative.

During the last decade, two major policy areas set the tone in policy-making in the EU: climate policies, and achieving the internal market in energy. Energy markets have largely remained national in scope due to a tradition of strong state involvement in the sector. A raft of legislation adopted in 2009 reflects this emphasis on climate and the internal market. The Third Energy Package aims to increase competition and open up national electricity and gas markets. Its hallmark measure has been to oblige vertically integrated energy companies to separate, or 'unbundle', their production, transmission and distribution activities. The EU also set out ambitious targets for emissions and renewables, embodied in its 'talismanic' 20-20-20 goals [Youngs, 2013]. The EU mandated that by 2020, greenhouse gas emissions must be 20% below 1990 levels and renewables must account for 20% of electricity generation. Targets were also set for a 20% improvement in energy efficiency. Before that, the introduction of an EU CO_2 emissions trading scheme (ETS) in 2005 was hailed as an ambitious market-friendly policy to set a price on CO_2 emissions and incentivise emission reductions.

The prolonged economic crisis is likely to lead to increased pressure from businesses and voters to reduce energy prices and question current climate policy. The intense resistance to reform of the EU's Emissions Trading Scheme (ETS) displayed in the European Parliament in early 2013 has signalled what political difficulties will lie ahead in taking decisions that might increase the cost of doing business in the short term. The outcome of the debate on the successor policy to the current 2020 policy, the key tenets of which were announced by the Commission in January 2014 (exact details are to be voted in later in 2014), already reflects these pressures. The Com-

mission has retained ambitious goals to reduce CO_2 emissions by 40% by 2030 (relative to 1990). But it proposed a less ambitious increase in renewable energy sources by 2030, proposing an easy-to-reach 27% EU-wide goal, and abandoning mandatory national renewables targets. A proposed adjustment to the ETS through a market stability reserve would come into force only in 2021.

EU projections on where current policies are taking EU markets – embodied in its *EU Energy, Transport and GHG Emissions: Trends to 2050 – Reference Scenario 2013* could turn out to be optimistic. They project that energy consumption in the EU in 2050 will be similar to what it was in 2010, with a movement of energy systems towards more electricity use. They also forecast that the share of renewables in power generation will reach 50% by 2050, but predict only a 46% drop in CO_2 emissions from 1990 levels, well behind the target of an 80% cut.

These trends are likely to reduce the EU's clout in climate change negotiations, perhaps undermining its traditional aim to achieve global binding emissions reductions targets. The last Conference of the Parties (COP) meeting reflects this, as the language on emission reductions has shifted from 'commitments' to 'contributions' [Marcu, 2013].

Today's situation: fossil fuel abundance, slowly integrating markets and uncertain gas demand

Since 2009, the EU's ability to access supplies of coal, oil and gas has increased. Cheap coal displaced from the US has made gas less competitive as a fuel to generate electricity, just as gas demand has been reduced with the onset of the economic crisis, leading to a 4.1% reduction of natural gas consumption in 2012 [ACER/CEER, 2013]. Shale gas deposits on EU soil may significantly alter the outlook for the EU's long-term gas import dependence. The countries holding the largest reserves in the EU, Poland and France, hold technically recoverable shale resources of 4,134 bcm and 3,851 bcm respectively [EIA, 2013d].

There has been significant progress in making the EU's gas market more liquid and integrated, amidst the rapid growth of hub-based trading as the Third Energy Package starts biting. In the first half of 2013, three main hubs saw more than 20% growth in traded volumes relative to the first half of 2012 [European Commission – DG Energy 2013]. However, the EU's single market in gas will not likely be completed by the end-2014 deadline. Markets in Central and Eastern Europe remain illiquid and disconnected. The process of interconnecting these markets with the EU and diversifying their sources of imports has been notable but slow. Gas market infrastructure resilience in Central and Eastern Europe is still considered weak [ENTSOG, 2013], requiring that final investment decisions under the Projects of Common Interest be made quickly [Wittmann, 2013]. The uncertain demand outlook for gas, however, makes decisions regarding investment into new gas infrastructure difficult.

The combination of low GDP growth and excessive allowances for energy-intensive industries has led to a collapse in CO_2 prices in the ETS to record lows: about €6 per tonne of CO_2 at the time of writing on the European Energy Exchange (EEX). Attempts in 2013 to reform the system by reducing the number of free quotas allocated have run into significant political resistance, and have hence been tentative and not raised the CO_2 price. The Commission proposal in January 2014 to establish an ETS market stability reserve from 2021 may help stabilise the ETS, but the international credibility of European climate policies (driven by Brussels and the member states alike) has taken a significant dent.

The EU's electricity market developments throw into question the viability of gas import infrastructure projects, notably the Southern Corridor and planned LNG terminals in the Baltic and Adriatic. The Russian South Stream project will very likely run unprofitably due to overcapacity, and thus could further undermine the economics of big EU-sponsored projects aimed at diversifying import routes and sources [Umbach, 2013]. Finally, although the current outlook for shale gas development in the EU remains bleak, domestic shale gas could eventually alter the economics of investing into more import capacity. Today, the EU's gas markets are anything but a buyer's market. The very recent trends in Europe's LNG imports signal what lies ahead in a globalising gas market where the highest prices are set in Asia: in 2012, there was a diversion of LNG cargoes away from Europe, which has influenced hub price formation and contributed to rising wholesale prices [ACER/CEER]. Given that most gas markets are still largely national and not very interconnected, only a fully unified and dynamic gas market could contribute to Europeans being less exposed to LNG price fluctuations.

An energy security strategy gains momentum

Tensions on global hydrocarbons markets (see Chapter I) and the 2006 and 2009 gas crises pushed supply security up the policy priority list in Europe. This concern is unlikely to go away as the EU's import dependency on gas is expected to rise to close to 80% in the next twenty years, up from 67% today.

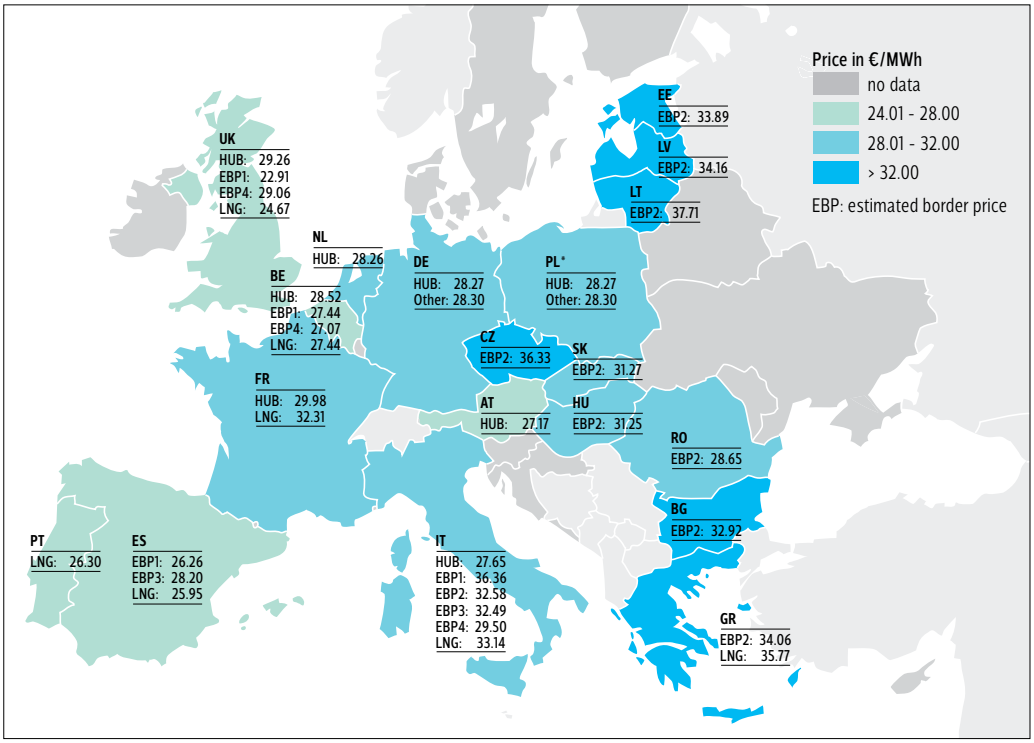
During the 2006/2009 gas crises, due to disputes over gas pricing with transit country Ukraine, Russian gas stopped flowing to Europe, leaving many Central and Eastern European member states in the cold. The crises were a wake-up call. Although the EU as a bloc has little need to worry about the availability and diversity of hydrocarbons import sources, not least thanks to the rising LNG trade, individual member states face different realities. In Central and Eastern Europe, Bulgaria, Hungary, the Baltic States and others are overly reliant on one single supplier. This led them to suffer disproportionately from the 2006/2009 gas disruptions, created political divisions among member states and weakened the bloc's clout *vis-à-vis* Russia.

The crises revealed how much the persistent national compartmentalisation and the monopolistic nature of energy markets, especially of those in Central and Eastern Europe, have contributed to the vulnerability of this region to supply disruptions [Dreyer et al, 2010]. Long-term import supply contracts involving competition-stifling measures (such as 'destination clauses' that forbid re-exporting gas to other partners or priority access regimes to transmission systems) and a dominant role for the supplier in intermediary trading and transit companies have helped lock in that import dependency.

In the aftermath of the crises and in an effort to protect member states from the risks of supply disruptions and unfair price differentials, in February 2011 the EU Council set the goal of achieving the single market in energy by the end of 2014. A series of measures were introduced in the aftermath of these events. A regulation on security of gas supplies (Regulation (EU) No 994/2010) introduced common standards for infrastructure and consumer protection in case of crisis. Brussels started intervening in contract negotiations of member state companies (e.g. Poland-Russia in 2010) to guarantee compliance with EU competition law. In late 2013, the EU Commission stated it would become involved in negotiations with Gazprom on the South Stream pipeline project for the same purpose. Gazprom's investments in Central and Eastern Europe were scrutinised, leading to the opening of an antitrust case in 2012 (whose outcome is still pending). EU authorities are investigating whether Gazprom divided gas markets by hindering the free flow of gas across member states, whether it has prevented the diversification of gas supply, and whether it may have imposed unfair prices on its customers by linking the price of gas to oil prices. The company could face fines of up to 10% of its turnover if the findings confirm these suspicions.

The second pillar of the EU's response has been to develop a more activist international gas security strategy.

Figure 11: Wholesale gas prices in the EU – 2nd Quarter 2013



Source: EU Commission, *Quarterly Report on European Gas Markets, Second Quarter*, 2013.

The international dimension of EU energy policies: rising ambitions

In most policy areas, the EU tends to pursue an international agenda that reflects its domestic regulatory priorities: energy is no exception. The EU has a traditional rules-based agenda targeted at its neighbourhood. The prime example of this is the establishment and promotion of the ECT. Despite the disappointing early record of the ECT, the EU's rules agenda regained prominence in the middle of the 2000s with increased vigour. This was reflected in its immediate European neighbourhood with the launch of the Energy Community, part of a strategy to prepare partners in the Balkans (since 2005) and the Eastern Neighbourhood (since 2011 for Ukraine and Moldova) for possible EU membership. The method consists of expanding the energy *acquis communautaire* – i.e. having these partners adopt EU energy-relevant regulations and directives. In return, Energy Community members gain access to EU energy markets and financial and other assistance, including for infrastructure development. The Energy Community treaty came into force in 2006 and in October 2013 was extended for another ten years.

Beyond promoting its rule-book in its neighbourhood, in recent years the EU has tried to take a more centralised approach to its international energy engagements, emphasising links with emerging markets, its aid policy and embryonic common foreign policy. The EU first undertook a 'political' energy dialogue in 2000 when it worked on the EU-Russia Energy Dialogue, followed by the EU-Norway Energy Dialogue. The European Commission has also negotiated non-binding MOUs with its energy partners, beginning with Ukraine in 2005 and followed by Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan, Egypt and Algeria.

2011 was a turning point. The February 2011 EU Council conclusions implicitly aimed at bringing both economic competitiveness issues and security of supply matters higher on the EU's energy policy agenda. At the time, EU energy policy was seen by some as too narrowly focusing on climate [Oettinger, 2011]. In addition to the 2014 deadline for completing the single market, the Council called for stronger international action:

> 'There is a need for better coordination of EU and Member States' activities with a view to ensuring consistency and coherence in the EU's external relations with key producer, transit, and consumer countries' [European Council, EUCO 2/1/11 REV 1].

It called for the EU Commission to 'improve the consistency and coherence of the EU's external action in the field of energy'. The Council also invited 'The High Representative (...) to take fully account of the energy security dimension in her work. Energy security should also be fully reflected in the EU's neighbourhood policy.' The Commission's ensuing Communication (see Annex) set out the EU's ambitions for international energy engagements. It seeks deeper integration of the EU's energy market with its neighbours, strengthened dialogue with suppliers in the neighbourhood, cooperation with advanced economies (US, Japan) on low-carbon innovation, improved global safety standards (in nuclear as well as hydrocarbons sectors), the establishment of a predictable and stable global framework for energy trade and investment, improved access to sustainable energy in developing economies, and improved coordination among member states.

Among those efforts, it is worth highlighting the following:

First, there has been a concerted effort to integrate EU gas and electricity markets, as a means to make them more cost-competitive, to foster investment in alternative supplies, and to put into practice the 'spirit of solidarity' enshrined in the Lisbon Treaty [Andoura, 2013]. An ambitious Gas Target Model process was initiated to help interconnect markets by developing a system of network codes in order to facilitate interconnection between future regional 'entry-exit' zones [Yafimava, 2013]. The EU has stepped up political and financial support for infrastructure connecting member state gas markets. The Commission wants strategic energy networks and storage facilities to be completed by 2020 and to this end has identified 12 priority corridors

and areas covering electricity, gas, oil and carbon dioxide transport networks. In the face of financial and political difficulties, not least in the vulnerable Central and Eastern European countries, the EU issued a list of 248 'Projects of Common Interest' in 2013 that it is ready to support financially through the Connecting Europe Facility (CEF), under which a €5.85 billion budget has been allocated to trans-European energy infrastructure for 2014-20. This was complemented by measures to improve the transparency of individual member state treaties signed with supplier states, so as to ensure the clauses comply with EU regulation.

In its drive both to finalise the single market in energy and to put an end to isolated energy markets – energy islands – in the Baltic region, the EU initiated a Baltic Energy Market Interconnection Plan (BEMIP). The aim is to connect these markets, which for historical reasons are integrated into the Russian system, to the European grid system. In February 2012, EU member states mandated the EU Commission to negotiate a legal framework between the Baltic member states and Russia and Belarus.

Second, the EU has been more active outside its borders in attempting to diversify its import supply routes and strengthen its ties with non-Russian suppliers in its neighbourhood. This had led to a nascent 'energy diplomacy'. Already in 2008 the EU had launched a strategy to open up new gas import routes from Central Asia, the Caucasus and the Middle East – a project known as the Southern Corridor (see Box 5 on p. 60). The EU has also stepped up its engagement with Algeria, and contributed financially to the 2011 completion of the Medgaz pipeline carrying gas to Spain.

Third, energy is playing a greater role in EU external policies. In terms of trade policy, energy is increasingly an issue on the table. This is the case with the EU's ongoing Deep and Comprehensive Free Trade Agreement (DCFTA) processes with Ukraine, Georgia, Moldova and Morocco. The EU has also stepped up discussions on hydrocarbons trade with the US, via its bilateral Energy Dialogue as well as in the context of Transatlantic Trade and Investment Partnership (TTIP) negotiations. The EU's aid policy also includes a stronger focus on energy, combining climate change issues with facilitating access to energy for the poor, particularly renewables [Youngs, 2013]. The EU has further stepped up its diplomatic activity on energy, signing, for example, a Joint Declaration on a strategic energy partnership with Iraq in 2011, an Urbanisation Partnership and a Joint Declaration on Energy with China in 2012 and MOUs with multiple partners. None of this is legally binding, but the EU is obviously making its presence felt.

BOX 4: Policies promoting solar power development – EU challenges

Solar power use has been growing rapidly in the last decade, and Europeans have attempted to champion its spread at home and internationally.

The EU accounts for more than 70% of global installed photovoltaic (PV) capacity, with Germany (33% of worldwide PV capacity in 2012) leading the fray, with one of the world's most competitive solar panel industries [van de Graaf, 2013]. The EU has also tried to promote a solar power strategy for its neighbourhood, based on utility-scale concentrated solar power (CSP). On all these fronts, ambitions have had to be scaled down, as an economically and politically viable strategy to promote solar energy remains elusive. The price of producing solar power globally has dropped. With average global price ranges standing at USD 120-250 for utility-scale solar PV, USD 130-300 for CSP, and USD 160-300 for small-scale PV, solar continues to struggle in competing with onshore wind power, let alone new coal and new gas power plants [IEA, 2013e]. Price competitiveness differs according to geography. For example, solar power is more competitive in Southern than in Northern Europe.

National financial support schemes (feed-in-tariffs) have boosted the industry's growth. Other emerging markets, particularly China, have also entered the PV industry. China accounts for 45% of global PV cell production, four fifths of which is exported to the EU. Fears of runaway costs for consumers and the crisis in eurozone public finances have led EU member states to significantly cut down on support schemes for the solar industry, throwing it into a crisis of overcapacity.

Boosted by technological development and inflated by subsidies, the surge in trade of PV panels has led to trade frictions. In 2012, the United States introduced anti-dumping duties on imports of Chinese PV panels. In 2013, the EU introduced high anti-dumping and anti-subsidies import duties on PV panels averaging 47.7% of their value for a period of two years and reached an agreement with China on export restraints. The issue has been divisive in the EU, among member states, environmentalists and the industry itself [Karmakar, 2013]. Environmentalists and solar power services providers actually tend to welcome the lower prices provided by China's capacity to mass-produce (regardless of the lavish subsidies received by the industry by the government [Yergin, 2011] to its solar panel exports), whereas the reality of global industrial supply chains means that Chinese solar companies import a significant share of European components to produce solar panels for export, and that about 70% of the industry's value added remains European. European and American trade frictions with China over renewable energies are part of wider political and economic anxieties related to China's rise, but also highlight future challenges for the global trading system as the world is trying to pursue green growth with industrial policies that undermine market principles enshrined in legal regimes such as the World Trade Organisation (WTO).

The EU has also initiated moves to promote solar power internationally, mostly in its neighbourhood. Elaborated under EU auspices, the Mediterranean Solar Plan launched in 2008 provides a framework for large-scale solar plants for electricity export from North Africa to Europe. The project has been considered a means to implement the EU's external and neighbourhood policies – prosperity, stability and environmental sustainability. High cost estimates have shifted the focus towards electricity production for domestic use, where demand is growing. Large-scale electricity export to Europe is not possible because EU electricity markets are insufficiently integrated and interconnected so as to be able to provide adequate demand that makes large-scale investments in power plants and cross-country and cross-continental grids pay off.

The most important underlying cause for most EU energy security initiatives is the troubled relationship with Russia. As the EU has reduced its vulnerability to gas supply disruptions, these relations have further deteriorated. Russia has disproportionately suffered from the reduced demand in the EU: in 2012, Gazprom accounted for more than 12 bcm of the estimated 16 bcm decline in gas imports. Norwegian gas has strongly substituted for Russian gas as Norway has been more flexible in meeting European pricing demands. These trends, combined with increased European assertiveness and self-confidence as to the way it wants the mutual energy relationship to be based (e.g. the Gazprom antitrust case, gas market unification, Energy Community) have increased the sense of vulnerability in Moscow. Some aspects of the EU's drive to unify and make its gas market competitive and safe from supply disruptions have gone very far and added further ingredients to the many irritants in this relationship. For example, the 2009 Gas Directive introduced, in article 11, requirements for foreign companies who had invested in EU gas markets to apply unbundling provisions. It also allows member states to refuse to grant an operating licence to a foreign investor in a national transmission system if it considers that the country's security of supplies might be jeopardised by this investment. This clause has been dubbed the 'reciprocity clause', or 'Gazprom clause'. The clause does not actually demand that the state from where the company originates apply the EU's unbundling requirements back home – a frequently held belief. But the fact that extra requirements may be demanded from the company is a potential source of arbitrariness and hence discrimination that could be exposed to a legal challenge under current international commercial law [Cottier et al, 2010].

Yet, Russia is one of the EU's 'strategic partners'. Biannual summitry has held steady and lines of communication have been kept open. In 2010, both sides signed a Partnership for Modernisation to support Russia in an economic modernisation programme introduced under the Medvedev presidency. The 2013 signing of the *Roadmap for EU-Russia Energy Cooperation until 2050* is a sign that both want to keep on working together.

Box 5: Southern Corridor – the answer to our energy security prayers?

In June 2013, the Shah Deniz consortium and its leading stakeholders (the State Oil Company of Azerbaijan (SOCAR), BP, Statoil, Total, Lukoil, NICO and TPAO, Turkey's national energy company) concluded negotiations that have lasted over a decade, approving the Trans-Adriatic Pipeline (TAP) for the final leg of a pipeline bringing gas from the Shah Deniz field in the Caspian Sea to European markets. Six months later, the consortium made a Final Investment Decision (FID) for stage 2 development of the Shah Deniz field, triggering plans to expand the South Caucasus Pipeline through Azerbaijan and Georgia, construct the Trans-Anatolian Gas Pipeline (TANAP) across Turkey and construct the TAP across Greece and Albania and into Italy. The first gas delivery to Europe (10 bcm/y) is scheduled for 2019 while plans to double this capacity are on the books. Another 6 bcm/y will go to Turkey. The development of the pipeline will mark a success for a long-mooted project that has been plagued with worries over long-term profitability in supplying Europe with additional gas.

In order to diversify EU gas supply, and to provide Caspian suppliers with new export routes, several projects have been studied, re-evaluated, scrapped and resurfaced for the Southern Gas Corridor. Initial plans foresaw the construction of a 31 bcm pipeline called Nabucco from Baku to the Bulgarian border and then to Baumgarten, Austria, but the Shah Deniz consortium's 2013 decisions will connect Baku to Greece via TAP and TANAP (20% owned by Turkish BOTAS and TPAO and 80% by SOCAR). The European Commission's declared objective remains to eventually supply 10% of European gas demand via an enhanced Southern Gas Corridor [European Commission, 2013c], but the current scenario would see the Corridor initially supply about 2% of Europe's demand. This may seem minor, but the countries receiving the gas – from Bulgaria to Greece – are those that have the biggest energy security concerns due to reliance on Russian gas. The pipeline is also expected to instigate further infrastructure connections throughout the Balkans. The Commission has invested major efforts over the last decade in supporting first Nabucco, and now TAP/TANAP, granting the project exemption from third-party access regulation. Project costs have been estimated at €3.9 billion for TAP [Mombelli, 2013], €9 billion for TANAP, and almost €30 billion for the entire project, including further development of the Shah Deniz field [Chazan et al, 2013].

TANAP and TAP, however, are competing with Gazprom's much larger South Stream pipeline which, despite its mind-bogglingly high construction costs (currently estimated at €28 billion [*The Economist*, 2013]), apparently remains a key part of Russian plans to bring gas to Italy (across the Black Sea, Bulgaria, Serbia, Hungary and Slovenia). The 63 bcm/y project dwarfs TAP and reflects Russia's expectations of increasing European demand and its willingness to pay high costs to remain the dominant player in meeting it. South Stream, however, has not received EU support or exemption from third-party access regulation, adding regulatory hurdles.

The source diversification provided by the Southern Gas Corridor is not a panacea for European energy security but represents an important step in expanding Europe's energy frontiers towards the Caucasus and potential future partners in Iraq, Turkmenistan or Israel. Yet it remains uncertain how many pipelines of what size and from what source will actually be supplying gas from the south in the decade ahead.

Energy market rules expansion in the neighbourhood

The EU's strategy to tie Balkan and Eastern neighbours to its own rules system is paying off.

Joining the Energy Community in 2011, and enforcing some liberalising reforms in its gas markets as a consequence, has allowed Ukraine to benefit from investments in the 'reverse flow' of gas on its pipeline route to Europe. This connection, and other gradual partnership work with the Energy Community, can have important long-term consequences despite the late 2013 Association Agreement setbacks. A pipeline project to connect Romania and Moldova began in 2013, a venture not unconnected to Moldova's participation in the Energy Community. The EU's success in this field is linked to the fact that for its partner countries, accepting regulatory 'intrusion' by the EU has a geopolitical imperative: ending their dependency on one single supplier of gas and the risk of political pressures related to this dependency. The prospect of closer political ties – and the hope of future EU accession – also plays an important role.

Vis-à-vis Russia, the EU's rules-based approach has had much greater difficulty in bearing fruit. Ongoing attempts at building four 'Common Spaces' with Russia – mostly based on such rules – are going nowhere. Russia is not prone to accepting what it perceives as encroachments on its national sovereignty: Energy Charter Treaty rules, notably those involving investor-state arbitration, are seen as such encroachments. Despite recent efforts to expand ECT membership and to modernise it, the ECT will likely remain a Europe-centred club of importers and relatively small exporters.

The ECT is the only energy-specific international treaty or organisation of which the EU (European Communities) is a full member apart from IRENA. IRENA, contrary to the ECT, is not an institution that promotes shared rules, but promotes a product. The EU is not a member of the IEA, although the EU Commission tends to work closely with its services.

What implications for EU external energy action?

The geopolitical, market and policy trends described above enable us to draw some conclusions and extract some implications for the nascent 'energy diplomacy' of the EU.

Firstly, the EU will continue on its path of relative economic decline amidst the shift of gravity of energy markets to Asia. This will occur at a quicker pace than is the case with the US, with which there is increasing divergence of energy policy interests post-shale revolution. To be able to promote its interests and shape global rules of the game – open, transparent, liquid and competitive energy markets for all energy

sources – the EU will need to strengthen its ability to act coherently, consistently and as one at international level, and engage in strengthening current multilateral regimes in the energy field. It will need fossil fuels markets to be liquid and work on the basis of predictable market rules, and renewable energy markets to function smoothly to reduce their costs and the risk of political irritants with rising emerging markets.

Secondly, energy security starts at home. The EU still needs to finalise the unification of its gas market and its domestic electricity market – which must adapt to new conditions created by the influx of intermittent renewables. There has been progress, but the countries that are most vulnerable to gas supply disruptions are still lagging behind. Market unification is a precondition for the EU to speak with one voice with energy partners, and remains the basis for an effective and consistent foreign policy towards its energy suppliers in its neighbourhood and beyond.

Finally, priorities for the EU's 'energy security' diplomatic efforts, focused so far on gas, might need to be reassessed as the long-term demand outlook is flattening. Import dependency problems could further be reduced if the EU developed domestic shale gas resources in an environmentally acceptable way. So far, however, individual member states have taken their own decisions, with limited consideration about Europe's energy dependence, economic competitiveness, and climate strategy. Improved coordination at the EU level on such strategic decisions over energy technologies and sources would be more than welcome because they impact on EU supply strategies and climate change policies. Improved predictability about the future of gas in European markets is vital to help investors make decisions on pipelines projects, LNG terminals and generation capacity to ensure supply security at an acceptable price.

V. THE EU IN THE EMERGING ENERGY WORLD

The EU increasingly seeks to address energy issues in its international engagements. The key document summarising the EU's international energy approaches, and on which current policies are based, is the 2011 EU Commission Communication 'The EU Energy Policy: Engaging with Partners beyond Our Borders' (see Annex). The document contains a long list of recommended actions based on a solid assessment of the world's key energy trends, matched with the EU's own policy priorities, and aimed at leveraging the EU's rich policy *instrumentarium* – rules, aid, trade, R&D policies and diplomacy. The aim of the policy discussion that follows is not to add to its recommendations but to highlight where some key priorities will lie in the coming years.

Improve multilateral approaches to energy security

The EU could strengthen its position in the shifting energy world through closer engagement with multilateral organisations that deal with energy. One avenue is multilateral trade policy. Options include:

- encouraging membership in the WTO of petroleum-exporting countries that are still not members (this includes Algeria, Azerbaijan, Kazakhstan, Turkmenistan and Libya). This can encourage them to embrace rules-based trade relations in all sectors and to adopt reforms supporting their economic diversification
- building a coalition towards a 'plurilateral agreement' on energy and sustainable development that involves setting rules for subsidies and investment into energy sectors (renewable and conventional), liberalising energy services sectors to encourage innovation and the deployment of competitive industrial supply chains for renewables and energy-efficiency industries, eliminating tariffs on renewable energy products and regulating hydrocarbon export restrictions; the agreement should be broader than the WTO negotiations on liberalising trade in 'green goods' proposed by the EU, the US and Japan, encompass rules on trade and investment in conventional energy sources, and involve the most important emerging markets
- continuing to support efforts to modernise and broaden the membership of the ECT.

Although politically difficult, the EU should seek to become a formal member of the IEA. Not all EU member states are members of the IEA. A single EU representation would ensure a strong common EU voice in the most important international organisation dealing with energy security. An alternative would be to have the EU join the IEA, alongside other EU member states. Such an arrangement already exists with the Energy Charter Treaty and the International Renewable Energy Agency (IRENA).

Similar steps could be taken to have the EU be represented more formally at the International Energy Forum (IEF).

Another option is to ensure that new energy-consuming powers be adequately represented in international fora, so as to encourage cooperative approaches to tackling fossil fuel import dependency. The EU could support any move by the IEA to engage more closely with China and India and encourage their ultimate membership of the organisation – regardless of whether they become OECD members, the current prerequisite to join the IEA.

Engage deeply with Russia on binding rules for trade and investment

The essential and difficult relationship between the EU and Russia is here to stay. The recently signed 'EU-Russia Energy Roadmap to 2050' lays out areas for bilateral cooperation for the decades ahead. Giving life to this roadmap, and accommodating the challenges that are not addressed within it, will require clear understanding of the incentives and pressures that affect each partner.

The EU is currently enjoying a moment of relative strength in its relationship with Russia and Gazprom because of reduced demand, progress on establishing competition in the EU's internal gas market, and the pressure on Gazprom's market practices by the ongoing antitrust case. This is a good moment for pursuing a deeper conversation with Russia on key issues related to mutual investments in each other's energy sectors – notably the protection of investment in exploration, infrastructure and distribution.

This could include efforts to reach some form of agreement on much of the content of the 1994 Energy Charter Treaty (ECT), long resisted by Russia. It is unlikely that Russia will agree to join the ECT, but it could commit to doing so by other types of treaties, or via the WTO (the latter option could enable Russia to avoid having to sign up to investor-to-state arbitration yet still be liable to legal challenges).

In order to achieve these goals, the EU will not merely be demanding that Russia apply preferred EU rules and regulations. The EU will need to negotiate and be ready to make compromises on issues where Russia can be seen as having legitimate commercial concerns. One could be to clarify the 'reciprocity clause' in the 2009 Gas Directive. As long as Gazprom (or any other Russian energy company investing in EU gas markets) applies – on EU territory – EU unbundling rules, it becomes harder to justify demanding unclearly defined 'security of supply' guarantees, hence risking discriminating against the investor. This presumes that the ongoing antitrust case is properly terminated, that Russia acts on its findings, and that progress on finalising the internal gas market continues.

Cooperate with the US and Japan on market and investment issues

For the EU, the US remains a primary energy partner. Meetings of the EU-US Energy Council have allowed for regular ministerial-level discussions on energy issues. Although US shale gas might not reach Europe in large amounts in future, being exported to Asia instead, ongoing trade discussions may allow for agreement on a trade deal with a strong energy chapter that can then be used as a model for trade and energy relations with other European partners and in the WTO. The TTIP should ideally feature the removal of export restrictions on energy, open and competitive energy service sectors (including related public procurement markets), open investment regimes for infrastructure, and free movement of professionals (consultants, researchers etc). Negotiations will not be easy and will require commitment on both sides to overcome domestic political obstacles. It might be difficult to induce the US to eliminate its export ban on crude oil, or guaranteed access to US service and procurement markets in the energy sector (e.g. utilities and environmental services, among others). The US might make difficult market access demands on the EU in opening up national energy sectors.

A similar approach could be taken with Japan in the context of ongoing bilateral free trade agreement (FTA) negotiations. Japan shares many similarities with the EU in its energy security challenges – a high import dependency rate, growing rejection of nuclear power, relative demographic and economic decline, but also technological sophistication. FTA talks could be leveraged to enable both sides' energy sectors to become more competitive and innovative. This will mean tough choices in Japan, but also in Europe, on opening energy service markets.

Engagement with the US and Japan on how to integrate China, India and other emerging markets into the IEA could be pursued more systematically. The US will continue to be interested in the fate of global oil markets, and hence has a stake in ensuring international institutions such as the IEA stay relevant to tomorrow's energy world. Japan is extremely dependent on the smooth functioning of global oil and gas markets. For all parties involved, IEA outreach or enlargement might be difficult: the US and China, for example, have issues with sharing potentially sensitive data, while Japan's relationship with China is increasingly under strain, not least over territorial issues.

Engage in dialogue and cooperation with China to set the tone for the developing world

Relations with China, in turn, will reflect a balance between cooperation and competition. It will be important to work towards a situation where the competitive aspects of the relationship take place in a context of free markets bound by the rule of law. In comparison with the EU, China has a different energy mix, different preferences

regarding how to make energy deals and a lower dependence on external suppliers, but it is making similar efforts to diversify suppliers and, more slowly, to improve energy efficiency and use renewables. Importantly, China has come to value the smooth functioning of international markets and the role of the WTO in enforcing predictable trade relations. In November 2013, China's Central Committee announced a plan to give a 'decisive' role to markets by 2020. China has proven its ability to adapt to free markets and is opening up sectors such as telecoms. Domestic gas prices are still regulated, but if China seeks to incentivise domestic firms to produce more gas, conventional or unconventional, the gradual application of market price signals is not inconceivable in the years ahead. EU efforts to build and protect open, liquid international energy markets, therefore, may increasingly be pursued not only in partnership with their closest partner, the US, but also with China.

China is increasingly the model that others in the developing world follow, partly due to its development success and partly as a natural outcome of its weight on the global stage. If we want less tightness in oil markets, a 2% improvement in Chinese car mileage efficiency may have a bigger impact than developing a major new oil offshore field. China may be the world's dominant car builder and exporter for the coming decades. Guiding China towards energy choices that can protect the environment and that meet with EU goals of lower demand on international energy markets may be facilitated by several initiatives, including supporting China for IEA membership, working with China on nuclear safety (supporting the Commission's request for a mandate), and continuing working on urbanisation issues. Additionally, it may be advantageous to facilitate investment in energy sectors (via the proposed bilateral investment treaty negotiations and other discussions in the WTO) with a focus on efficient coal technologies and to allow competitive advantages to play out in the renewables industry so as to accelerate the rate of reduction of the price of renewables (e.g. drop antidumping duties on solar panels). Building on the EU-China Energy Dialogue, there are thus multiple avenues by which the dedication of more resources to the EU-China energy relationship can bring benefits to energy markets, climate negotiations and EU energy security.

Importantly, among China's closest economic ties are those with Japan, who is the biggest investor in the country. Japan's businesses strongly influence technological and industrial evolution on the ground in the Middle Kingdom. European efforts to engage with China on energy issues, therefore, may benefit from close coordination with Japan. Expressed Japanese interest in becoming a regional energy hub may allow for joint regional cooperation in developing a system of market signals in East Asia.

Managing global demand: climate policy *is* energy security policy

Any eventual success in agreeing on a global climate deal can be as important for energy security as for environmental sustainability. For the EU, such a deal would also tick the third box in its energy policy list, on competitiveness, by helping other states

to follow their lead in taking on the costs of carbon reduction. Developing new pipelines, LNG projects, or better supplier relations can each shift the supply/demand balance a little bit in the right direction. Speeding up the necessary fundamental changes in how the world uses energy may fundamentally alter that balance.

A major goal of climate policy is to reduce fossil fuel use. Reduced demand for these fuels, in turn, will help add liquidity to global energy markets, improving energy security for all importers by reducing exporter market power and limiting the amount of volatility that can accompany any disruption to the market. EU efforts on international climate negotiations, therefore, should not be seen merely as an environmental niche, but should have the full support of the energy, trade and industry sectors, which will all benefit from bringing partner climate positions closer to the EU's own position. Europe has struggled to convince its international partners that moving towards a less carbon-dependent path can be done in a cost-effective manner without harming economic development goals. Helping countries like India toward a less carbon-intensive growth path will likely involve clear incentives: economic, technical or with respect to local environmental problems. The 2011 EU Commission Communication mentioned earlier, 'The EU Energy Policy: Engaging with Partners beyond Our Borders', lists multiple ideas for helping developing country partners towards a sustainable development path. The challenge will be to develop these ideas so that they are perceived not merely as aid projects, but as growth opportunities. Viewing this activity as important for EU climate, competitiveness and energy security goals may help ensure the further engagement of the full spectrum of EU member states and EU agencies, beyond the development agencies. There has been a relative loss of credibility of traditional EU approaches to international climate accords, as many partners shy away from binding commitments. While such commitments may eventually make sense in some quarters, looking at climate negotiations as an environmental, energy and economic competitiveness challenge may help the search for pragmatic solutions. The language of climate change adaptation can then be as much about opportunities as about costs. This can be done in several ways.

The EU already works on the troublesome issue of excessive energy subsidies. It can pursue both bilateral and multilateral cooperation on these issues, supporting partner country reforms that save governments money and that reduce external payments for energy. Moving discussions of subsidies from the IEA to the IEF, which also includes supplier states, may also be helpful for working on this issue. Improved transparency in collecting and spending energy rents (via financial system reform) can make it politically easier for these countries to cut energy subsidies but can be difficult for external partners to achieve. Directly helping partner states address the social impacts of changing subsidy arrangements can also be important. This may involve development and governance assistance, thus tying development work in with EU climate and energy goals.

Technical modernisation efforts, both in the energy industry (helping reduce leakage and flaring) and in a range of energy efficiency measures across the economy, from buildings to transportation, can more easily play a role. All countries in the developing world express interest in technological modernisation, creating an attractive theme of engagement for EU work with developing countries. Technical work to reduce methane leakage throughout the oil and gas industry, for example, can also pay important economic dividends for major gas producers, who can be supported with investments and technical assistance to reduce flaring and leakage. With a well-designed approach, Russia and Algeria, in particular, could be important partners in this regard.

Expanded use of non-fossil fuels, including renewable energy and nuclear energy, has cut energy use around the world. The costs of renewables have been dropping in recent years, but will need to drop much more for them to become affordable on a large scale in many countries. Nuclear energy, for its part, will likely be limited in the future but can still form an important non-fossil fuel alternative in countries, such as China and India, which will have rising demand, limited domestic energy sources, a political will to use nuclear energy and, crucially, the possibility of using economies of scale to develop very large nuclear programmes. Efforts to improve safety and environmental standards, and transparency in costing and development, can still pay dividends in improving the attractiveness of nuclear energy as a non-fossil fuel alternative.

Just as the EU could more efficiently allocate its subsidies and resources on green energy and renewables if this was coordinated by an EU-level framework, so could green/climate-friendly investment be better allocated globally if there were common frameworks for these investments. Rather than fighting China over solar panel dumping, the EU could work with China to create larger economies of scale for green investments, allocated according to market principles. This engagement could include organising technology transfers, opening up and safeguarding European investment in the energy and coal sectors to protect contracts and intellectual property, and fostering bi- or multinational R&D projects on such technologies in China.

Managing supply: focus on the neighbourhood

Energy partnerships with distant countries may have limited pay-off for the EU because of the internationalisation of energy markets. As distant countries like Australia, Tanzania and others develop their energy fields, their choice of customers will be commercially driven. Asian markets will continue to drive LNG prices for the foreseeable future (especially if Japan does not restart its nuclear plants), pricing Europe out of the market and making payoffs for LNG investments in Europe more uncertain. This, in turn, increases the relative attractiveness to the EU of forging partnerships with pipeline-connected neighbours including Norway, Russia, Algeria, Libya and, to a limited extent, Azerbaijan/Turkmenistan. If the EU is decarbonising, then invest-

ments for which the pay-off will be increased fossil fuel access, but only in the long term (such as with the slow development of Mozambique's offshore gas fields) may yield uncertain dividends. It remains unclear whether LNG imports to Europe will move beyond a niche role.

Priority countries who will be supplying gas to the EU in the coming decades include the usual suspects Russia, Algeria and Norway, plus other players in the extended neighbourhood: Libya, Azerbaijan and Turkmenistan. The LNG suppliers (Qatar, Nigeria, potentially Iran and a host of smaller and more distant suppliers) will provide liquidity and diversity but Asian demand may limit how much volume of LNG will be imported in Europe, depending on the pace of replacing European coal plants with gas plants.

While eastern Mediterranean gas volumes are not massive, the EU would benefit from having the gas of the eastern Mediterranean exported via pipelines rather than by tankers. Once LNG export terminals are built, the gas will be subject to price pressures from Asia and the gas may never contribute to Mediterranean/European regional gas security. Working with Turkey on the energy chapter of the *acquis* may be an important step in helping it become a possible partner for Cyprus and Israel on this. Through its involvement with the Southern Gas Corridor, its initial involvement in the Energy Community, and its location as a current and potential transit state for gas from Central Asia, the Middle East, the eastern Mediterranean and Russia, Turkey is well-positioned to become an important energy partner for the EU. Restarting Turkish accession negotiations for the energy chapter, accompanied by support for Turkey to fully join the Energy Community, may help this process.

The Energy Community of the eastern neighbourhood has achieved a moderate success in engaging the countries of the region and supporting them towards the EU vision of competitive, connected, apolitical energy markets. These countries, all energy importers, have been influenced by potential incentives for accession, the creation of a mechanism for overdue cooperation with their neighbours, and EU money. Creating a similar arrangement for the southern Mediterranean, perhaps in the framework of the Union for the Mediterranean, has long been discussed. If political *rapprochement* with the non-oil exporting countries in the region succeeds, Energy Community-type relations may be developed, preceded perhaps by their joining the ECT. Tunisia, Morocco and, gradually, Egypt are energy importers like the EU and may thus be incentivised to engage in a project together, particularly if there is progress on political openness in these states, leaving the neighbouring exporters to be approached via bilateral mechanisms. Unfortunately, the situation is complicated by the fact that the non-exporting countries are physically separated by Libya and Algeria, each of which has problems with their neighbours (closed Algeria-Morocco border, chaos in Libya).

Libya, Algeria and Azerbaijan are exporters and unlikely to respond to the same incentives. Richly endowed Libya and Algeria are particularly important – in terms of their relative geographical proximity and the size of their reserves – and are likely to remain major energy providers for Europe. Enhanced bilateral engagement that involves open discussions on 'good governance' can pay important energy dividends for Europe in the long run. The uncertain economic climate and the lower demand faced by these suppliers offers an opportunity to more explicitly engage these countries to discuss democratic and institutional reforms without which longer-term regional stability and prosperity will remain elusive.

As was the case with Russia, until recently, Algeria is neither a member of the WTO nor of the ECT. Efforts to negotiate a free trade agreement (FTA), let alone a deep and comprehensive one (DCFTA) with an energy component or anything connected with the European *acquis*, will probably have to wait until Algeria joins the WTO. Algeria, like Russia, is deeply aware of its dependence on oil and gas exports but lags far behind even the Gulf kingdoms in efforts to diversify its economy. It may be appropriate to review the EU's relationship with Russia – its scale, its focus and the resources involved – as a potential model for energy engagement with Algeria. Just as Russia has recently joined the WTO, helping Algeria step through the same process may be important. A similar approach can be envisaged for Azerbaijan, which is not a member of the WTO and whose governance and democratic standards do not match EU criteria.

ANNEXES

EU Commission Communication – September 2011

'The EU Energy Policy: Engaging with Partners beyond Our Borders'

List of recommended actions

Building up the external dimension of our internal energy market:

- Establish a mechanism for increased transparency and information exchange on Member States' bilateral energy agreements with third countries
- Negotiate EU-level agreements with third countries where necessary to achieve the EU core objectives, for example to facilitate large-scale infrastructure projects
- Pursue the implementation of the key infrastructure projects defined in the Commission Communication on 'Energy infrastructure priorities for 2020 and beyond'
- Diversify gas and oil supply sources and routes including by opening the Southern Corridor as a matter of urgency
- Promote viability and continuous functioning of the existing oil and gas infrastructure in the East and support the rehabilitation of the Ukrainian gas transmission network by 2020
- Develop a tri-partite cooperation at political and administrative level with Russia and Ukraine to ensure stable and uninterrupted gas supplies through the Eastern Corridor
- Promote cooperation on renewable energy projects with the Southern Mediterranean countries, notably in the framework of the Mediterranean Solar Plan, with the launching of pilot solar plant projects in 2011-2012
- Conclude the negotiations with Switzerland in accordance with the adopted negotiating directives aimed at full integration of electricity markets.
- Step up energy cooperation with the countries engaged in the EU accession process
- Deepen and extend the validity of the Energy Community Treaty beyond 2016, and focus on effective implementation
- Propose to partners a regional EU-Southern Mediterranean Energy Partnership initially focused on electricity and renewable energy market development in these countries by 2020
- Encourage third countries to implement ambitious energy efficiency and renewable energy policies and carbon pricing, while ensuring a level playing field for the power sector
- Intensify, as a matter of priority, negotiations on the energy aspects of the New Agreement
- Step up implementation of the EU-Russia Partnership for Modernisation with concrete joint projects on clean and efficient energy technologies, research and innovation
- Engage with Russia on the implementation of the EU 2050 Energy Roadmap
- Conclude a technical agreement between the EU, Russia and Belarus on the technical rules for the management of electricity networks in the Baltic region

Strengthening partnerships for secure, safe, sustainable and competitive energy

- Deepen the existing dialogues with major energy suppliers and extend new dialogues with emerging energy producers to include for example renewable energy and LNG. Increase focus in all dialogues on good energy governance and investment, sustainable energy and energy efficiency
- Invite the US, Japan and other industrialised partner countries to pool efforts with the EU to accelerate the development of ambitious policies on low carbon technologies and energy efficiency, including regulatory cooperation, joint R&D projects, researchers' mobility, and joint work on better performing materials and standards for critical and emerging technologies, as already pursued with the US under the auspices of the EU-US Energy Council
- Elaborate long-term low carbon energy roadmaps with key partners such as the US and Japan to support technological, research and industrial cooperation
- Propose a trilateral initiative with Japan and the US on research on critical materials for energy applications, particularly in areas of major technological challenge such as the substitution of rare earths
- Raise the reciprocity principle in the EU energy-related science and technology cooperation as envisaged under the Innovation Union
- Enhance cooperation between US national energy laboratories and laboratories in the EU, including the Commission's Joint Research Centre
- Prepare EU and Member States' joint approaches towards China, India, Brazil, and South Africa, designed to promote policies and technologies in the areas of low carbon energy and demand management, and upgrade existing bilateral dialogues to encompass sustainable modernisation paths and energy security aspects
- Extend nuclear safety assessments to the EU neighbours and strengthen cooperation on nuclear safety to promote convergence on regulatory framework and standards
- Review the use of EURATOM agreements and extend their scope, as relevant, to issues of supply of nuclear fuel, nuclear waste, safety standards, nuclear research and financial assistance on technical cooperation
- Advocate for international legally binding nuclear safety standards in multilateral discussions, including under the IAEA
- Facilitate the creation of regional cooperation fora for offshore regulators, building on the experience of the North Sea Offshore Regulators Forum
- Create a forum with interested partners in the Mediterranean for actively promoting the highest offshore oil and gas safety standards in the region
- Address offshore safety with hydrocarbon producers in the OPEC context
- Set up a Strategic Group for International Energy Cooperation. Promote concrete action on offshore drilling safety, nuclear safety and low emission development strategies in the G-8/G-20 energy agenda and cooperate with third countries to address the volatility of energy prices

Improving access to sustainable energy for developing countries

- Scale up efforts for achieving the EU-Africa 2020 energy targets of reliable and secure supply of energy and increased access to sustainable energy services, as agreed by the EU and African ministers in Vienna in September 2010
- Mobilise regional level action in developing countries, particularly in Africa, to reform legal and regulatory frameworks with a view to creating market-based conditions that attract private sector investments and enhance regional power trade
- Mobilise more resources from EU development assistance to catalyse investment projects both at the small scale for increasing access to energy services in rural areas and at a larger scale for improving energy competitiveness and security through interconnections and major generation projects
- Mainstream energy in all EU development policy instruments, and tailor support schemes and financing instruments to the specific needs of the sector, by privileging capacity development and technology transfer, including through research and innovation, stimulating decentralised renewable power production, promoting private initiatives and maximising the local value added
- Facilitate access of least developed countries to climate financing, notably by contributing in the framework of UNFCCC negotiations to the definition of a new Clean Development Mechanism more adapted to energy access and sustainable development needs
- Mainstream 'energy security, access and sustainability' in the post-2013 EU external financial frameworks
- Promote the alignment of European financial institutions' instruments with EU external energy policy priorities in order to improve visibility and impact of EU intervention in third countries
- Create an information-sharing tool designed to gather and display relevant data on EU and Meber States energy programmes and projects in third countries

Better promoting EU policies beyond its borders

- Exploit further synergies with the International Energy Agency's work on energy forecasts, market analysis and technology collaboration
- Ensure an active EU participation and leading role in the global energy governance debate, through its regular presence in relevant international energy initiatives and frameworks

RUSSIAN ENERGY POLICY – THE SHIFT EAST AND ITS IMPLICATIONS FOR EUROPE

James Henderson[1]

The advent of the shale gas revolution in the US over the past decade, combined with the economic crisis in 2008/2009 and the more than doubling of the oil price since the lows experienced in 2009, have had a dramatic impact on Russian gas policy as the country and its major companies have had to adjust their strategy in a much more competitive global gas market. In the European market, Gazprom's continued policy of pricing its gas relative to oil prices has meant that it has effectively become the high-cost supplier at a time when demand has stagnated due to the economic slowdown and competition has increased due to the diversion of LNG cargoes originally destined for the US. This has meant that Gazprom's sales to Europe have declined from over 180 bcm in 2008 to 150 bcm in 2012. At the same time, the company's high price policy in certain Former Soviet Union (FSU) markets, especially in Ukraine, has also caused a sharp fall in export sales, with overall volumes falling from almost 100 bcm in 2008 to 64 bcm in 2012.

Although rising gas prices have offset the revenue impact of this decline in volumes, this shift in Gazprom's market position has both impacted on the domestic gas market in Russia and caused a rethink on government energy policy towards gas. The decline in Gazprom's export volumes has meant that the company has had more gas available to sell into the domestic market, but an increase in domestic gas prices has encouraged independent producers to increase their gas production. Prior to 2008, the strategy of increasing gas prices was seen as a means to encourage more energy efficiency in Russia, thus slowing demand growth, and to support new supply options that would allow Gazprom to have more gas to export. However, the unexpected decline in export sales has meant that the higher domestic price strategy has caused an oversupply of gas in Russia, with Gazprom again emerging as the high-cost producer. Not only does the company have more remote, and therefore expensive, fields than its domestic competitors, but it is also constrained by the fact that it must sell at the government regulated gas price. Previously, this was a disadvantage to the company because it was so low, but now it is high enough (c.$120/mcm) that its domestic competitors can undercut it and take market share, which they have been doing very successfully. Indeed the share of third-party producers has risen from 10% of total Russian gas production to 27% over the past decade.

A further impact of this changing dynamic in the Russian gas market has been on plans for raising tax revenues for the budget. Historically, taxes from the gas indus-

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try have accounted for only 5-7% of budget revenues compared to 45-50% from the oil sector, but the threat of declining oil production has forced the government to offer tax incentives to oil companies to invest in new fields. This is likely to lead to a decline in oil tax revenues over the next decade as new oil fields with lower tax obligations begin production. The plan had been to replace this lost revenue with higher gas taxes, in particular via the domestic gas royalty, or mineral extraction tax (MET), but this has been undermined by the fact that MET rates are linked in part to the domestic gas price, which now seems unlikely to rise much further. Concerns over inflation and a slowdown in industrial production have led the government to freeze domestic gas prices for 2014 and to suggest that growth will be much slower than anticipated thereafter. Although this may be positive for gas consumers it will also limit the revenue raised from gas MET, a problem that has been acknowledged by the Ministry of Finance.

The decline in Gazprom's position in Europe and the FSU, as well as the need for the Russian government to seek a new source of tax revenues from the gas sector, have encouraged the development of an alternative export strategy towards the growing gas markets in Asia. This re-focus on the East has also been catalysed by domestic political considerations, namely a desire to encourage economic growth in Russia's eastern regions via the development of the energy industry, and by a foreign policy goal to establish a greater Russian presence in north-east Asia. However, Russia and Gazprom's eastern strategy faces a number of problems similar to the issues that it is facing in Western markets. As a result, any decisions made in relation to gas sales to Asia could offer significant insights into Russia's overall gas export strategy over the coming decade. In particular, the issues of gas price formation and price levels, the prioritisation of pipeline or LNG sales, the roles of Gazprom and other domestic producers, the ability of Russia to compete with other global gas suppliers and the likely ending of Gazprom's monopoly over gas exports (initially in LNG only) could all provide EU countries with key indicators as to how Russia might also operate in Western markets as its gas sector strategy develops.

With regard to pricing and price formation, negotiations between Russia (and in particular Gazprom) and potential customers in Japan and China are very instructive. In both countries, importing companies are making losses on gas purchases and are now demanding more competitive pricing, expressing a particular desire for a price formation mechanism that is linked to US Henry Hub prices or another market-based system rather than the traditional oil-linked price formation method. Gazprom's response has replicated its attitude in Europe, and it has to date refused to countenance any change in its pricing policy, which has led CNPC (the Chinese national oil company) to procrastinate over a gas pipeline deal and Japanese buyers to delay decisions about the purchase of LNG from a potential new plant at Vladivostok. It will be very informative to see whether Gazprom ultimately loosens its position and shows some flexibility on price or whether it remains robust in its current stand. The likely tightening of gas markets in Europe over the next two to three years, caused by

a slow recovery in demand and a lack of new global gas developments, may encourage Gazprom to maintain its position as demand for its gas revives. It remains concerned about setting any new precedents with customers in the East. In Asia, the possibility of disappointment in China's shale gas potential may also encourage Gazprom to believe that its gas is well-placed on the marketplace and can therefore command a premium price, but this strategy may be tested by the forecast arrival of a significant number of new LNG projects from 2015/16 onwards, led by the first US LNG exports priced against the Henry Hub marker. Gazprom's response to this new challenge will provide an important indicator of its overall marketing strategy.

Other potential indicators of Gazprom and Russia's future strategy involve more specific decisions about the projects that can provide gas exports to Asia. In particular, the question of whether the company will adopt a commercially logical approach to gas infrastructure development or be driven by political goals is a vital one. Logic would dictate that the Sakhalin 2 LNG project be expanded, providing gas to Asian consumers early and at relatively competitive prices, prior to the possible construction of an LNG terminal at Vladivostok. The latter could then be supplied from new fields in the Sakhalin 3 licence or from fields in East Siberia if a new pipeline has been built to supply the Chinese market. However, Gazprom is currently delaying any final decisions and is confusing potential buyers with its lack of certainty over sources of gas supply and preferred liquefaction plant location, with the delay largely being caused by the related uncertainty over a gas export deal with China.

In the midst of this Gazprom indecision, third-party Russian producers are starting to emerge as real competitors in export markets, and the role that they are starting to take in Asia could ultimately be replicated across the global gas market. Rosneft has announced its intention to develop the gas resources at its Sakhalin 1 licences in partnership with ExxonMobil and to build a 5 million tonne LNG facility to access export markets. Indeed, it has already signed preliminary agreements with Japanese buyers and the trader Vitol to cover the full output of the plant, and the company is now leading the argument for the removal of Gazprom's export monopoly in order that it can gain bank financing for its project. Novatek is the other leading player in this field, with plans to bring its 16.5 million tonne Yamal LNG scheme into operation by 2017 in partnership with Total and CNPC. Again, it needs Gazprom's export monopoly to be removed before it can progress, but the Russian government now appears inclined to support alternative export projects in order to increase export sales in a timely manner, and it is likely that the Gazprom's export privileges will start to be removed before the end of 2013.

From a European perspective, the outcome of the Russia-Asia gas dialogue could prove to be highly significant. Russia and Gazprom may be forced to alter their gas pricing strategy or risk losing a huge market opportunity. They may also be forced to show other forms of flexibility, such as the provision of equity in upstream projects, concessions on contract terms or flexibility in balancing political and commercial

arguments that could also have relevance to activities in other gas markets. Alternatively, we may witness a significant shift in Russian gas sector strategy away from Gazprom as the dominant player and towards a more tripartite export strategy. We have already witnessed such a transformation in the domestic market where, although Gazprom will remain the largest producer and marketer for the foreseeable future, Novatek and Rosneft are set to become major players with significant market influence. A similar strategy may start to emerge in the export market, with Asia being the first example as two non-Gazprom LNG projects appear to be progressing faster than Gazprom's potential developments. If this trend continues, particularly given the Russian government's need for extra revenues from gas exports, it is not impossible to conceive of a situation in which Rosneft, as a state company with significant political backing, could take on an even greater role in the Russian East if Gazprom fails to deliver expanded export sales. In Europe, such an outcome is much less likely in the short to medium term, given Gazprom's entrenched position, but the implications of a change in Asia could nevertheless be important. Novatek is already selling gas to a European consumer (EnBW), although at present it is gas that is bought and sold within the EU market. Nevertheless, the breaking of the export monopoly in Asia could encourage Novatek and others to push for greater access rights across the global gas market, especially as the Yamal LNG project must, by force of geography, sell gas to western as well as eastern markets. If the Russian government could be convinced that an ending of Gazprom's gas pipeline monopoly might reduce EU security of supply concerns and encourage greater volumes of Russian gas exports, rather than a simple displacement of Gazprom gas with other third-party Russian gas, then the example that is starting to be set in Asia could spill over into Europe. It is too early to state definitively that this could happen, but the development of Russia's gas strategy in Asia can provide some important clues. It will demonstrate not only Gazprom's ability to generate new export revenues to support the Russian budget but also the willingness of the Russian government to allow alternative suppliers to play a larger role if its national gas company fails to deliver.

From an EU perspective, the current strategy of encouraging a more competitive market, based on increased gas trading at Europe's hubs and greater interconnectivity between markets, is likely to play an important role in shaping Russian gas policy. On the one hand, Gazprom appears naturally wary of a change to the *status quo*, and has raised some valid issues concerning its ability to fulfil its sales contracts as new legislation on transit is introduced. Furthermore, Russian president Vladimir Putin has so far taken a firm line in refusing to countenance any significant adjustment in its terms of trade for gas exports. However, continued pressure for change in its major export market and the increasing competition it is likely to face for access to the Asian gas market could lead to a different approach, particularly if Gazprom starts to believe that it can benefit from participation in a more actively traded European gas market. The company's position as a very significant source of relatively competitive gas supply, based on cost rather than price, may tempt it to believe that it can benefit from seasonal swings in prices and general volatility without reducing

its overall profitability, and that it could even use its market power to manipulate prices. In this context, it will be doubly important for the EU to encourage alternative sources of gas supply, including third-party production from Russia, alternative pipeline supplies from Central Asia and extra LNG imports by continuing to create a market environment within which commercial returns can be made. In particular, it may be useful, in light of the Russian budgetary requirement for more revenues from gas export taxes, to promote the view that increased Russian gas exports to Europe should be encouraged, and that they need not be seen as a security of supply threat if they were gradually sourced from more than one counterparty, as appears to be the strategy in Asia. Novatek has already set a precedent by starting to sell gas on a market-related basis in Germany and, although this is not physical supply from Russia, it does demonstrate that the Kremlin is prepared to countenance non-Gazprom gas sales in Europe. Further encouragement of this trend, combined with diversification of European imports, could allow Russia to meet its goal of increasing its global gas export revenues, and therefore taxes, while also enhancing Europe's gas security.

NOTE ON EXTERNAL ENERGY SECURITY POLICY IN THE EU

Claude Mandil[2]

Providing energy security for European consumers involves ensuring that they can get the energy they require without interruption, and at an acceptable price – bearing in mind that price trends for energy are inevitably upward.

Although this note is intended to address the topic of energy security from the point of view of external relations, it must be remembered that energy security policy is primarily an internal affair of the European Union, and of its member states. Apart from the significant exception of the Russian- Ukrainian episode, most events that have caused supply disruptions in recent years have been events that were internal to the countries experiencing the disruption: accidents (Fukushima), natural disasters (hurricanes Katrina and Rita), strikes (many examples in Europe), or human error.

The biggest risk for Europe today concerns the supply of electricity: this risk follows from the unchecked expansion of intermittent renewable energy sources that have been given prioritised access to electricity networks in a market that was not designed to accommodate them. This has led to the closure of gas plants, although these are essential as 'backup' for wind farms. The great power failure that threatens to take place some very cold and calm day is not avoidable through the EU improving its foreign policy.

Nevertheless, it is reasonable to assume that European diplomacy should not ignore a set of goods and services – energy – so essential to the economic development and welfare of its citizens, particularly since the EU imports up to 50% of its energy today, and will probably import more tomorrow. But what should be done, and just as importantly, what should be avoided?

First recommendation: analyse the situation in depth and recognise its complexity. There are several forms of energy, corresponding to different uses, and not always interchangeable. To give specific examples, oil is dominant in transport, where it remains irreplaceable for now, at least on the scale required, even if the prospects for gas and electricity are hopeful in the long term. At the same time, oil is a commodity traded on world markets and transported from one end of the globe to the other; even a local disturbance is transmitted to the entire planet. We are thus all 'in the same boat': an oil supply crisis would spare no consumer in the world and would have devastating effects on the entire transport sector. Fortunately oil and refined products are easy to store, allowing for the creation of strategic reserves. Gas, in

2 The author is a former Executive Director of the International Energy Agency.

comparison, remains expensive to transport and store, and the market is much more fragmented than in the case of oil: one could imagine a gas crisis that affects Europe sparing the United States, for example, but gas, unlike oil, can promptly be replaced by another form of energy if so required by market signals or security imperatives: one need only see how quickly Europe today is switching to coal to replace gas for its power plants.

Second recommendation: do not reinvent or duplicate what already exists and works. This applies in particular to oil security which, as we have just seen, cannot be limited to a European vision. Two complementary approaches are needed simultaneously: dialogue with producer countries and the establishment of emergency procedures for using strategic stocks. Regarding dialogue, the tool exists and it works correctly. It is the International Energy Forum, whose secretariat is based in Riyadh. This forum has the advantage that all categories of countries are represented: producers, OECD consumers and non-OECD consumers such as India and, especially, China. Emergency procedures are successfully led by the International Energy Agency (IEA), an organisation of OECD countries in which China increasingly participates. Rather than trying to operate its own system, the EU should support the Agency and play its own role, in particular by 'speaking with one voice', as it likes to say more than to actually do. An additional advantage of the EU is that it can provide a connection to the IEA for those member states that are not IEA members (nine in all, who are not members of the OECD). It is an unwritten rule, but one that has not been broken, that the Executive Director of the IEA is a European. This asset could be exploited.

Third recommendation: do not engage government powers in areas that are the responsibility of private enterprises. As energy is sold to consumers by companies, it is up to them to be responsible for their purchases and investments; it is not the role of member states or the EU to negotiate 'big contracts' for purchasing gas or oil, or to try to impose one pipeline rather than another, even before asking if the decisions to ship the gas have been taken. Nabucco was chosen neither by the Caspian countries, nor by the producing companies, nor by Turkey, who did not want their role to be limited to that of transit. The project that was ultimately selected has one drawback however: it does not serve the Eastern European region. This is now an internal problem for the EU that shall be settled by internal networks and solidarity. As for creating a European agency for gas purchases, assuming that member states accept it and that it works (the precedent of the Caspian Gas Consortium does not bode well), it would provide the worst example to those of our suppliers whom we blame, rightly, for mixing state policy and business strategy and for putting energy policy at the service of foreign policy when it should be the opposite.

What, then, should be the content of an external energy security policy? This content is indeed important, provided that – this fourth recommendation is a corollary of the previous one – the member states and the EU focus on what is their domain. Now this domain is vast and includes important topics: the architecture and regulation

of markets, the harmonisation of regulations, legal protection of investments, conflict resolution, protection of the environment, and energy forecasting. These issues can be part of a road map for dialogue between the EU and its partners: it is a list of tasks reminiscent of the objectives of the Energy Charter Treaty, an imperfectly developed institution which has not been able to accommodate Russia, who was angered that the EU demanded of it what we did not require of Norway: the Transit Protocol. Whatever the reasons, good or bad, that led to this failure, it is probably best to resume talks on a new basis, perhaps within the WTO.

This last remark leads to a fifth recommendation that I believe essential: listen to other points of view. The case of gas is particularly illuminating if we remember that for suppliers such as Russia and Algeria, the European market is vital (or at least it was twenty years ago). During the 1990s, it was, by far, the main source of foreign exchange and tax revenues for these two countries. It is thus not surprising that they felt affected by how we organise the gas market. That disagreement, to say the least, would have been avoided if Europe had agreed to discuss the rules on an internal gas market with its main suppliers rather than present them as a *fait accompli*, even going so far as to suggest to their partners that they apply similar rules at home! Listening does not mean either accepting or silencing criticism, but it involves recognising the sovereignty of the partner.

To conclude, taken as a whole, the energy security of Europe is quite satisfactory: a diversified energy mix without undue predominance of a particular source (except of course oil for transport), many suppliers and none really dominant (not even Russia for gas – it should be remembered that Russian gas represents only 25% of European gas consumption, representing approximately 7% of its total primary energy consumption), multiple supply routes, ports, LNG terminals, gas and oil pipelines. Problems, real and serious, that are experienced by some of its members, especially in the eastern part of the EU, are primarily issues of community solidarity and the reconstruction of an internal gas and electricity market adapted to a completely new situation. All the more reason, then, to engage in an essential dialogue with our major suppliers, at the decision-making level, neither fearfully nor arrogantly, listening, explaining our concerns and trying to address all matters of government responsibility together. It will thus be easier to approach sensitive subjects. In particular, it is not acceptable that member states of the EU are taken hostage by Russia threatening to cut off their gas. The EU should be able to clearly articulate a rule of 'Do not touch my member state', i.e. assert that aggression against a member state is an attack against the whole of Europe which calls for a response in the form of solidarity deliveries (now that networks are capable of fulfilling that function).

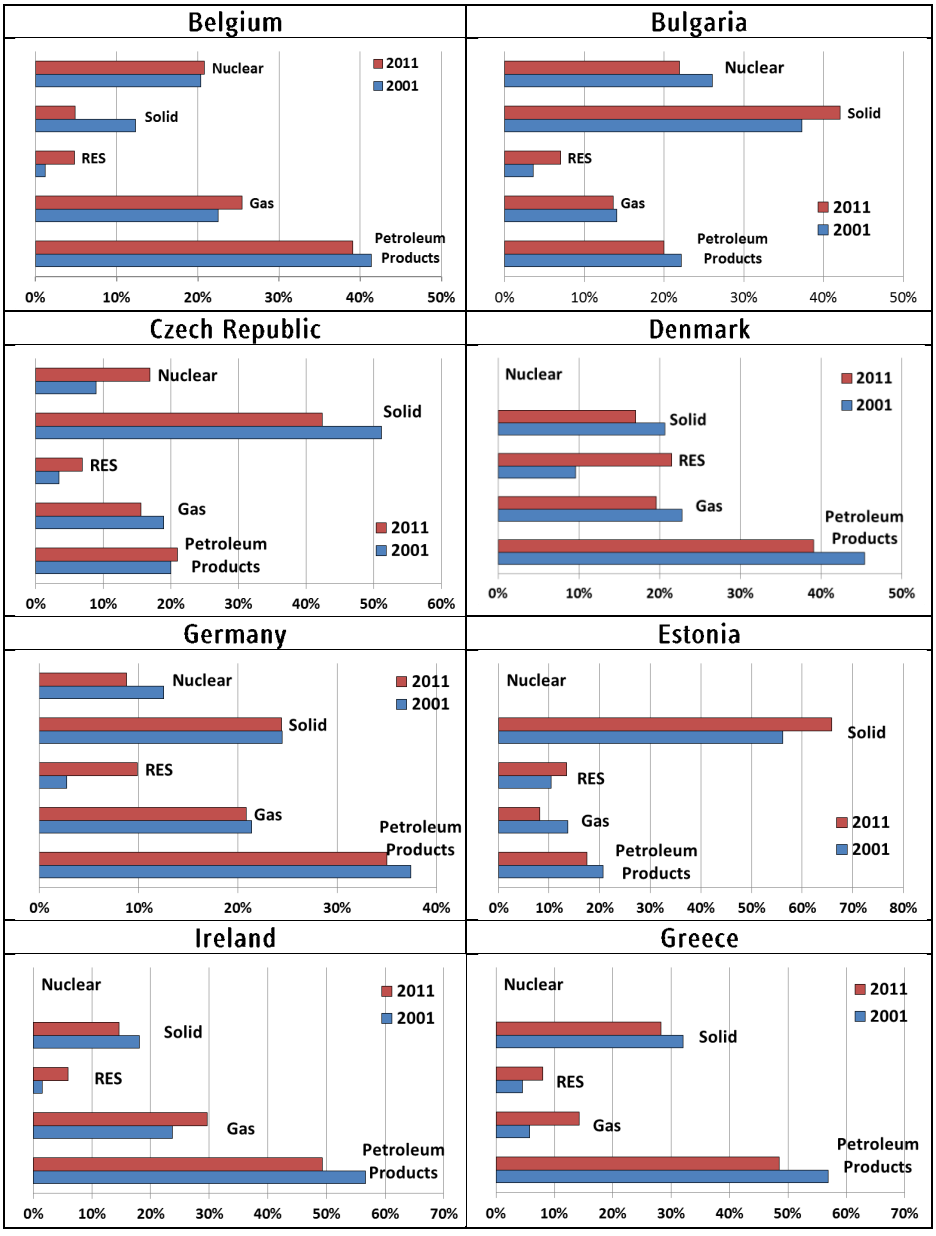
The next test will undoubtedly be the inevitable overhaul of the internal market for electricity and gas. Our major gas suppliers might not understand if we once again refrain from asking their opinion, even if it also involves telling them why we do not always follow their wishes. Another test will be the preparation of UN conferences on

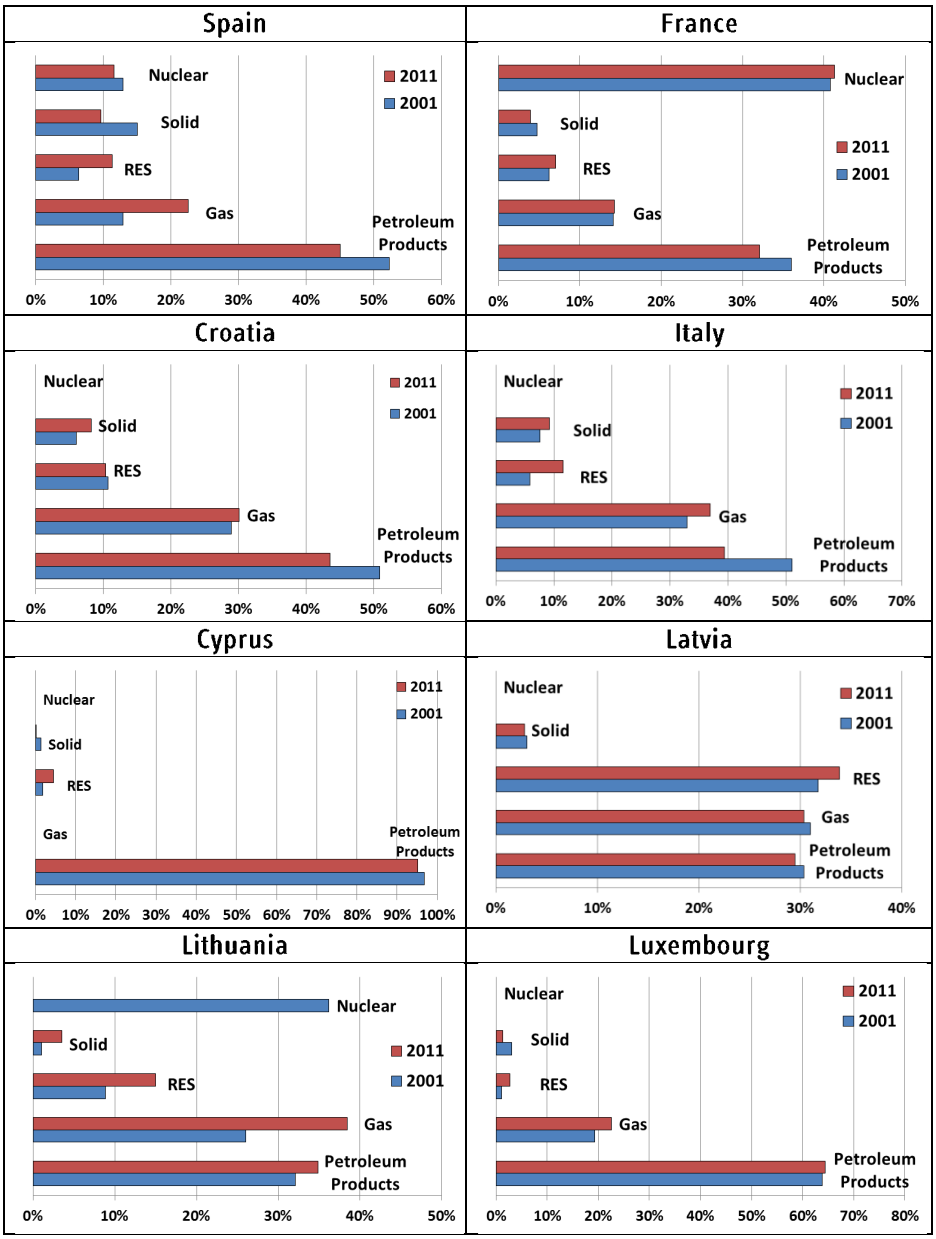
climate change, and in particular the conference due to be held in Paris in 2015. It is not a matter of denying the commitments made by Europe for the environment, but of being consistent: if Europe spends its time saying it wants to reduce fossil energy consumption as quickly as possible, including gas, while the least expensive way to reduce emissions of carbon dioxide would be to replace coal with gas, we cannot expect that gas producers will show much interest in customers with such little promise, while Asia attracts their attention. We cannot both want to avoid using gas and be anxious at the thought of our gas supplies running out.

Consistency, therefore, may be the external energy security policy that is needed most. The idea of 'speaking with one voice', to which I have alluded, does not apply to industrial and commercial activity, but is important when it comes to policy-making. It is a requirement that certainly concerns the different member states, but also the different positions within the Brussels machine. It would be naive to believe this will be easily achieved, but very dangerous to judge it impossible.

EU MEMBER STATE ENERGY MIXES

Gross inland energy consumption by fuel, % share

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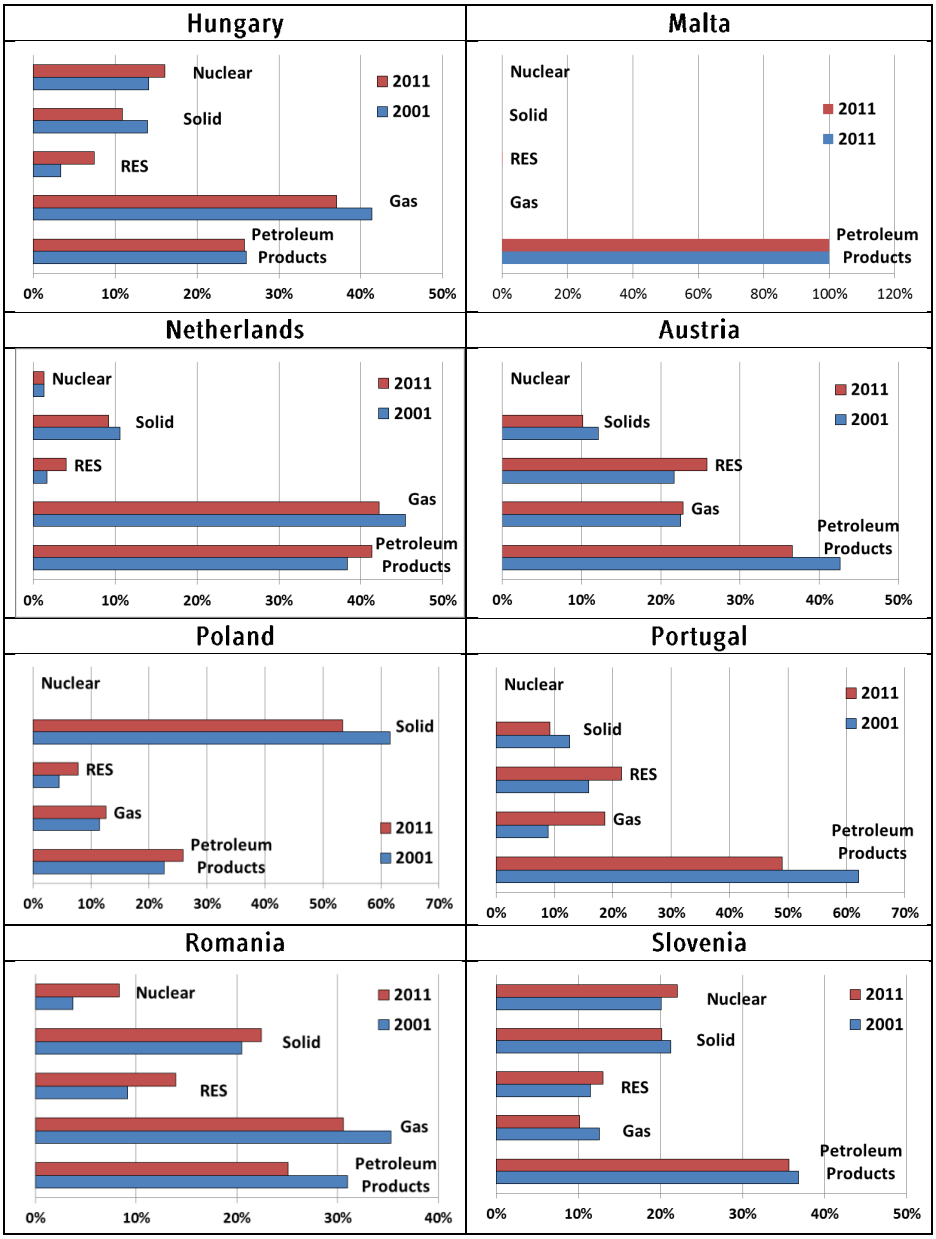
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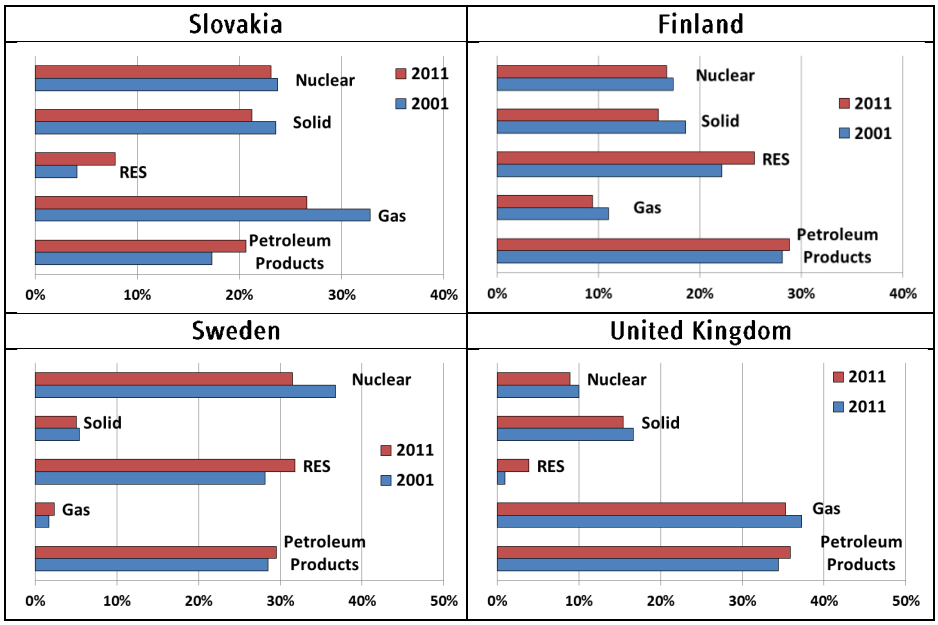

Source for data: Eurostat

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ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
bbl	barrels (of oil)
bcm	billion cubic metres
BP	British Petroleum
BTC	Baku-Tbilisi-Ceyhan
CIS	Commonwealth of Independent States
CNPC	China National Petroleum Corporation
CO_2	Carbon dioxide
DCFTA	Deep and Comprehensive Free Trade Agreement
DG	Directorate General
DRC	Democratic Republic of the Congo
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECT	Energy Charter Treaty
EEA	European Economic Area
EEAS	European External Action Service
EIA	Energy Information Administration
EITI	Extractive Industries Transparency Initiative
EPA	Environmental Protection Agency
ESPO	Eastern Siberia Pacific Ocean
ETS	Emissions Trading Scheme
EURATOM	European Atomic Energy Community
FSU	Former Soviet Union
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GHG	Greenhouse gas
Gt	gigatonne
GW	gigawatt
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
IEF	International Energy Forum
IMF	International Monetary Fund
IRENA	International Renewable Energy Agency
kWh	kilowatt hour
LNG	liquefied natural gas
LTO	light tight oil
mbpd	million barrels per day
MBtu	million British thermal units
mcm	million cubic metres
MET	mineral extraction tax

MOU	memorandum of understanding
mtoe	million tonnes of oil equivalent
MWh	megawatt hour
NOCs	National Oil Companies
NGLs	Natural Gas Liquids
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
OPEC	Organisation of the Petroleum Exporting Countries
SAARC	South Asian Association for Regional Cooperation
R&D	Research and Development
RES	Renewable energy sources
TANAP	Trans-Anatolian Gas Pipeline
TAP	Trans-Adriatic Pipeline
TAPI	Turkmenistan-Afghanistan-Pakistan-India
tcm	trillion cubic metres
TTIP	Transatlantic Trade and Investment Partnership
UAE	United Arab Emirates
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
USD	US dollars
USSR	Union of Soviet Socialist Republics
WTO	World Trade Organisation

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