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European Energy Security Reimagined

Mapping the Risks, Challenges and Opportunities of Changing Energy Geographies

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European Energy Security Reimagined
Mapping the Risks, Challenges and Opportunities of Changing Energy Geographies

Energy security needs to be reimagined in light of the sea change in energy related to the energy transition and changing energy geographies. As new regional energy orders emerge in the Northern Hemisphere such as the EU and the Energy Community, the Eurasian Economic Union and China's new Silkroad Initiative "One Belt, one Road", energy corridors could become more trans-regional and cross-border and a more heterogeneous energy system could develop. Yet, the proliferation of renewables could also result in a localization of energy production, driving trends in the opposite direction.

The trajectory and outcome of the global energy transition remains uncertain. The energy transition could promote greater cross-border connectivity, which in turn could bring potential risks and opportunities over the short and long term. However, the transition from the fossil fuel world to a sustainable energy future is not guaranteed, and there are risks inherent in the uncertainty over the transition's development path. This uncertainty in and of itself breeds risk. These cross-border energy and security dynamics may also reinforce geopolitical risks for Europe.

The shifts in energy and political geographies are a challenge for Germany and the EU, as geopolitical turmoil has come closer to the EU's borders. While geopolitical crises have not yet resulted in an energy (supply) crisis, currently low energy prices and well-supplied markets should not distract from emerging trends and risks related to interconnected energy trade and markets and the nascent energy transition's uncertain outcome.

This 'energy security dilemma' may result in commercial disputes, supply interruptions, and potential energy sector retrenchment in national terms, potentially spilling beyond economic relations to impact political relationships and geopolitical constellations. This dilemma could also elevate the energy security paradigm over climate and environmental concerns, causing parties to lose sight of long-term goals, with severe repercussions for climate mitigation and the EU's competitiveness

The multilateral climate change agreement reached under the UNFCCC process in December 2015, known

as the Paris Agreement, provides the impetus and momentum for a global energy transition. The transition will require international cooperation, sustainable growth models, shifts in investments and the development of disruptive technologies. It may also drive cross-border energy initiatives and require harmonized standards and norms. Policymakers need to rethink regulatory frameworks and incentives, financial and investment practices and energy system structures, while the role of and relationship between markets and states may need re-examining.

Amid this energy transition, the global political landscape is also profoundly changing. China's rise and the pivot from West to East, from the Atlantic to the Pacific, has the potential to reshape regional political relationships, economic patterns and international cooperation. As Europe struggles with internal issues and external relations, developments to its east, including One Belt, One Road, the Eurasian Economic Union and the Shanghai Cooperation Organization, show that the impetus for regional organisations, multilateral institutions and governance is increasingly emanating from Asia. These initiatives also suggest that the Eurasian continent could become interconnected via energy trade, transit and infrastructure, driven in large part by Beijing but also by Moscow. This occurs amid strains in Western cohesion due to Donald Trump's election as the 45th US President. Maintaining a cohesive "Western" governance approach during the Trump Administration will likely be difficult, particularly in climate policy.

This presents a broad challenge for German and European energy security and external energy governance, which should be understood and addressed through the prism of these tectonic shifts across Eurasia. These structural changes in the energy sector and in political alignments could redraw the energy map across the northern hemisphere, while the emergence of "infrastructure(d) geography" impacts economic, political and societal relations. This could cause energy *in*security as simultaneous changes in geopolitics and energy breed uncertainty, which influences the actions and reliability of partners and hinders investment and planning.

At the same time, changing energy geography offers opportunities alongside challenges, which European external governance should be adapted to address. The looming fragmentation of energy spaces and orders has to be transformed into an opportunity for cross-regional dialogue and cooperation rather than resulting in fault lines between (energy) regions and the potential emergence of "competitive regionalism" to emerge between blocs like the EU, the EU/Energy Community and the Eurasian Economic Union and the Shanghai Cooperation Organization. The absence of shared principles amid the proliferation of infrastructure across regions could turn integration into fragmentation, potentially causing energy-related disputes.

Multilateral governance is necessary to increase interconnection in energy and achieve economies of scope and scale. Maintaining European energy security and competitiveness will require a renewed European commitment to external energy governance and a reinvigorated EU appetite for multilateral initiatives and inclusive governance. The EU must simultaneously improve internal coherence, particularly if the Energy Union is to make a substantial progress on integration.

The EU should seek to understand and raise awareness of new energy risks. This includes hard security risks like the physical disruption of flows and cyber threats; complex "soft" risks stemming from social, economic and political factors; and environmental and climate hazards. Acknowledging that there is no one institution to address these risks, energy and foreign policy approaches and existing dialogue platforms, multilateral regimes and international organisations should be adapted to do so. The EU should work with partners across regions to establish dialogue channels and utilize existing mechanisms to undertake risk mapping, confidence building and crisis management through institutions like the OSCE or UNECE.

Ultimately, the EU should promote coherence and establish common principles to avoid fragmentation and facilitate exchange and cooperation. A proactive EU approach to the risks and opportunities of integration and connectivity is essential to ensure a cooperative and level playing field across Eurasia. To foster connectivity and retain competiveness, the EU must shape the energy landscape by engaging in regional governance and promoting a minimum set of rules.

Introducing the Dynamic Energy Landscape

Conceptualising Energy Geography and Energy Security

The EU is working toward an Energy Union, an undertaking that aims in part at making the EU a more political actor with respect to energy.[1] To achieve this, the EU must enhance and strengthen internal and external coherence while positioning itself vis-à-vis the on-going energy transformation and the reconfiguration of oil, gas and electricity markets. The external dimension is particularly relevant given the EU's role as an energy importer and a norm exporter and its geographic position in a wider neighbourhood through which energy imports flow. Simultaneous changes in energy and geopolitics require attention to current and future qualitative changes in energy risks, particularly as the energy transition is only in the beginning stages. This paper attempts to move beyond quantitative assessments and modelling supply and demand to grasp the *qualitative* nature of change and begin re-conceptualizing energy security approaches to account for present risks and uncertainty and change on the horizon.

Energy security can be considered the reliable provision of energy in the form, place and time it is needed.[2] In other words, energy security is "the uninterrupted supply of energy sources at an affordable price".[3] According to the IEA, energy security has both long-term and short-term aspects. In considering energy security, and the durability of this definition amid the discussed changes, the EU should recognize that while other actors may use the same definition, their method or strategy for obtaining energy security could be different and potentially at odds with the EU. The EU must both maintain its energy security and understand how similar efforts by its neighbours might impact its own supply environment.

Energy security is a key concern for the EU, an energy importer reliant on producing and transit countries for supply. The majority of the EU's oil and gas imports originate in neighbouring regions. For gas, the EU relies mainly on Russia, Norway and Algeria, which together provide over 80 percent of imports (see graph 1, p. 8).[4] More than 80 percent of gas supply is transported via pipe/pipelines. For oil, more than 60 percent of EU imports come from Russia, Norway, Algeria, Kazakhstan and Azerbaijan (see graph 2, p. 8).[5] Ukraine, Belarus and Turkey are vital transit countries through which EU energy travels.

Apart from import dependence and transit security concerns, the energy system transition will result in new and shifting energy geographies. These dynamics could enlarge energy markets, as technology and interconnection broadens energy trade across borders. However, the localization of energy production and distributed renewable generation may also slow trends toward a globalized energy world. The energy transition's uncertain character, path and outcome create tension and risks and the changing energy geography and infrastructure require a redefining of European approaches to energy security.

While the EU is and will remain a major importing region, as the nexus of the energy world shifts eastwards the EU's declining relative share of energy consumption could also reduce its market power. Europe's market share has declined to 11.4 percent of gross global domestic/inland consumption and 5.6 percent of global energy production (see graph 3 and 4, p. 8).[6] Given that the EU's security, wealth and prosperity largely depends on securing stable and affordable energy supplies, the EU will have to proactively address

1 This paper is an outcome of the project "Energiesicherheit in der OSZE" lead by Kirsten Westphal. Members of the project team were Indra Øverland (NUPI), Ellen Scholl (SWP), and Katja Yafimava (OIES). Ellen Scholl and Kirsten Westphal would like to thank Indra Øverland and Katja Yafimava for their useful comments. All errors are solely ours.

2 The Clingendael International Energy Programme, *Study on Energy Supply Security and Geopolitics* (The Hague, January 2004).

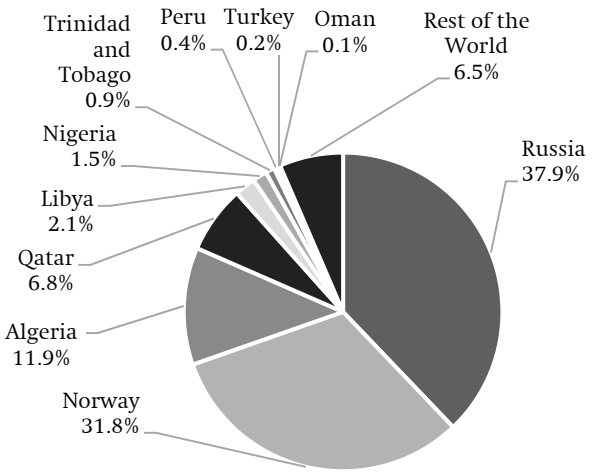
3 IEA Definition, see http://www.iea.org/topics/energysecurity/ (accessed 6 December 2016).

4 EU Commission, *Commission Staff Working Document, In-Depth Study of European Energy Security*, SWD (2014) 330 final/3 (Brussels, 2 July 2014), 45, https://ec.europa.eu/energy/sites/ener/files/documents/20140528_energy_security_study.pdf (accessed 6 December 2016).

5 Ibid, 32.

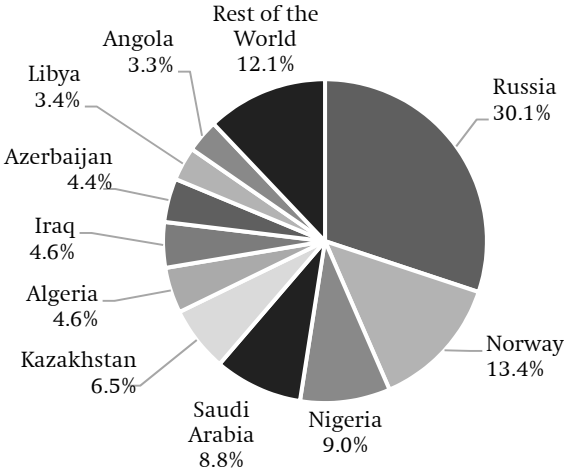
6 EU, *EU Energy in Figures. Statistical Pocketbook 2016* (Brussels: EU, 2016), 10 and 12.

Graph 1
Extra-EU imports of natural gas by country of origin (%); total 2014: 304 bcm



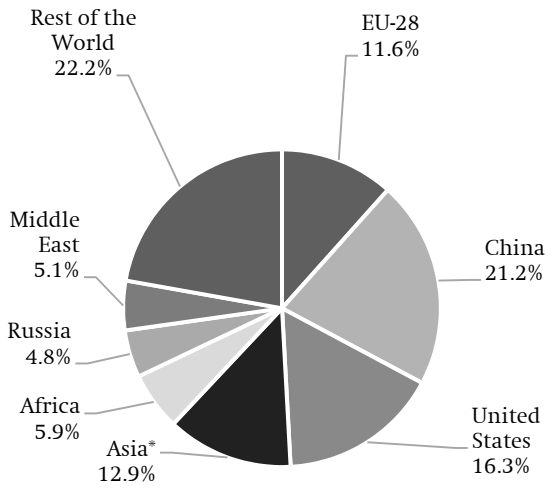
Source: Eurostat, *Energy statistics-imports* (nrg_12), 19 Dec. 2016.

Graph 2
Extra-EU imports of crude oil and NGL by country of origin (%); total 2014: 502 million tons



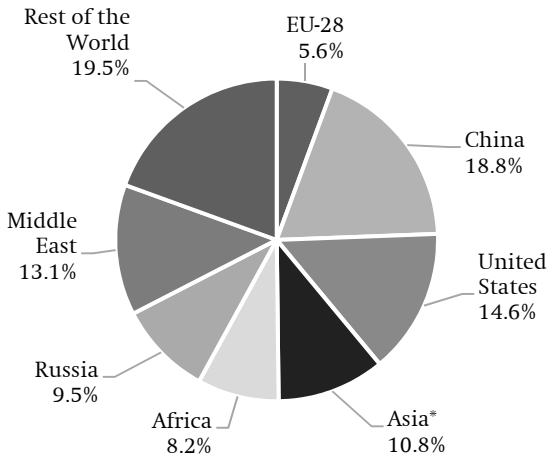
Source: Eurostat, *Energy statistics-imports* (nrg_12), 19 Dec. 2016.

Graph 3
World Final Energy Consumption by Region; total 2014: 9,425 Mtoe



* Excluding China and OECD countries of Asia.
Source: *EU Energy Statistical Pocketbook 2016*, 14.

Graph 4
World Energy Production by Region; total 2014: 13,805 Mtoe



* Excluding China and OECD countries of Asia.
Source: *EU Energy Statistical Pocketbook 2016*, 10.

energy shifts and shape the energy landscape to avoid becoming a mere "taker" of developments subjected to rules set increasingly by others. Given its status as an importer, internal market design and unbundled energy companies, the EU relies on liberalized and free energy trade and liquid and competitive markets.

Bearing these strategic challenges in mind, we examine emerging energy risks in the context of the shifting energy and political landscape. The paper describes developments underway in the energy world and identifies current and future risks on the horizon in order to identify tools and engagement strategies to mitigate or ameliorate them. These new risks, challenges and opportunities are described through the prism of energy landscapes, infrastructure(d) geography and market orders. Changes in the energy world may

reflect changes in the political world – energy systems could become increasingly regional, cross-border and heterogeneous as the political landscape becomes increasingly multipolar. However, it is also possible that more local generation from renewable energy resources, along with the rise of anti-globalization, protectionism and anti-trade sentiments could lead to constriction, rather than expansion, in energy trade. In any case, the rising demand and the need for modernization will go hand in hand with creating new "infrastructured energy geographies" crafted out of production sites, electricity lines and pipelines as well as processing facilities etc.[7] In particular the transition to a low carbon energy system will require "a major expansion of investment in modern, clean, and efficient infrastructure".[8] This involves reconfiguring current patterns and scales of economic and social activity.[9] This is also a temporal process in which the starting points and development stages and duration of the transition to ensure "availability and accessibility of energy services in a carbon-constrained world" will differ.[10]

Informed by the work of Bouzarovski et al.,[11] we highlight that the socio-technical assembly of facilities and networks for energy production, transmission, processing and distribution across national boundaries impact governance and regulatory practices.[12] We thus assume an "infrastructural realm"[13] in addition to the spatial realm of market and/or political orders. Additionally, "fossil fuels and also renewable energy sources like hydropower or wind are increasingly located in remote areas within or outside national borders", necessitating networks that cross borders as a well as jurisdictions.[14] Simultaneously, new corridors are being carved out, creating new multidimensional ties along technical, physical, operational, regulatory, legal and contractual dimensions. We argue in the following that the (real and foreseeable) changes wrought by infrastructure and new regional orders require energy security to be reimagined and the governance approaches and toolbox to be adapted. Should governance approaches along infrastructure corridors or supply chains fail to function smoothly, energy security could be challenged and further aggravated by uncertainty over future outcomes. We ultimately argue that in face of Beijing's "One Belt, One Road" initiative, Germany and the EU have to understand themselves increasingly as part of the broader emerging energy macro-region of Euro-Asia.

In light of this changing landscape, the time is ripe for the EU to consolidate its own gravity and "soft" power by addressing new energy geographies, the diffusion of political power and fragmentation between market orders. To reinvigorate its attractiveness, the EU must reconsider how it can serve as a pole of influence for states in between, particularly given that former levers of influence like the *acquis communautaire* and potential EU accession have become less attractive.

Global Energy Trends

The world is in the midst of a dramatic energy shift. In the Paris Agreement, countries agreed on a new climate regime that subsequently has to be translated into a radical transformation of the energy system(s) and a transition to a new energy paradigm. The ensuing changes in production, trade and transit, supply chain and processing and consumption will create new energy geography, which is frequently enabled and accelerated by technological revolution. Infrastructure, the physical framework for energy regions, is rapidly developing and changing the energy landscape, requiring the EU to (re) position and adapt to new topographies and (potentially) an increasingly heterogeneous and competitive energy environment.

Paris Agreement. The United Nations Framework Convention on Climate Change (UNFCCC) process is a global governance mechanism to address climate change and provides a framework and annual forum for countries to develop work plans and assess pro-

7 Gavin Bridge, Stefan Bouzarovski, Michael Bradshaw, and Nick Eyre, "Geographies of Energy Transition: Space, Place and the Low-carbon Economy", *Energy Policy* 53, (2013): 311–40.

8 Amar Bhattacharya, Jeremy Oppenheim, and Nicholas Stern, *Driving Sustainable Development through Better Infrastructure: Key Elements of a Transformation Program*, Global Economy and Development Working Papers (July 2015), 5.

9 Bridge, Bouzarovski, Bradshaw, and Eyre, "Geographies of Energy Transition" (see note 7), 331.

10 Ibid.

11 Stefan Bouzarovski, Michael Bradshaw, and Alexander Wochnik, "Making Territory through Infrastructure: The Governance of Natural Gas Transit in Europe", *Geoforum* 64 (2015): 217–28.

12 Ibid, 217.

13 Ibid.

14 Martha M. Roggenkamp et al., "The Role of Networks in Changing Energy Markets and the Need for Innovative Solutions", in *Energy Networks and the Law: Innovative Solutions in Changing Markets*, ed. Martha M. Roggenkamp et al. (Oxford: Oxford University Press, 2012), 417–36 (434).

gress. In advance of the COP 21 meeting in Paris, nearly all the world's countries submitted an Intended Nationally Determined Contribution (INDC), which became the basis of The Paris Agreement, signed by over 190 countries and entered into force in November 2016. Even though the INDCs collectively fell short of the original targets, they are the foundation for a new energy future for which the Agreement provides the reference point and targets for a global energy transition. The Agreement also shines a spotlight on the energy sector, which is responsible for two-thirds of global greenhouse gas emissions and thus has to carry the major burden of decarbonisation. However, while the goals are clear, implementation tools and enforcement mechanisms have yet to be identified. Given the scale of the global energy transition, the needs, whether in technical capacity, finance and investment, regulatory and policy architecture or technology and innovation, are enormous. This is necessitating a paradigm shift in investment and changes in existing financial structures. Over half of global infrastructure financing needs are in the electricity sector, and much of this investment is needed in Asia for long distance electric grids, among other infrastructure.[15] Policy certainty will be essential to raise these funds, while policy uncertainty is a constraint for infrastructure developers.[16] Meeting the two-degree target agreed upon in Paris will likely require not only sharing best practices and technologies, but also optimizing resources across national boundaries.

Coal. Currently the world's second largest energy source and widely distributed and liberally traded, coal consumption will need to peak soon and be replaced by other (renewable) resources if the world is to meet the Paris commitments. The phase-out of coal and replacement with intermittent energy sources is a challenge for energy systems, particularly given the need for new infrastructure and back-up capacity. The balance between domestic coal production and imports will likely influence countries' views of coal's future role in the energy mix and drive different energy security narratives and strategies.

Oil. Oil market dynamics are also changing, as unconventional oil production in the US and elsewhere has increased supply, lowered prices and created an environment in which traditional producers' (OPEC and Russia) influence is seemingly waning. The persistence of relatively low oil prices and a supply surplus has resulted in unprecedented cuts in upstream investments.[17] Absent a decline in demand, we may soon witness another boom and bust cycle of high oil price spikes.

The presence of a climate agreement in the absence of a global carbon regime creates uncertainty for future oil demand and investment, challenging traditional market balancing patterns. Lingering questions about oil's future role in the transport sector amid global climate efforts adds further uncertainty in projecting demand growth. The pathway to a 2C carbon-neutral global economy in 2050 will threaten oil rich companies and countries, their growth models and rent-seeking patterns.

For the world to effectively decarbonise, emissions need to peak around 2020. In this case, oil rich companies and countries risk of owning stranded resources rather than stranded assets. The geopolitical implications are unsettling: if oil revenue dwindles and consumption declines, oil regimes may be hard pressed to provide the social programmes their populations are accustomed to, calling into question the social contract between rulers and those they rule. Many countries in the Middle East, including members of the Gulf Cooperation Council, Russia, Kazakhstan, Azerbaijan, Algeria and others remain heavily reliant on oil revenue to maintain stability and fund their budgets. In a world of persistently low or fluctuating oil prices and in light of a potential shift away from fossil fuels, such reliance will become increasingly unviable.

Natural Gas. Natural gas may have the brightest energy future among fossil fuels (provided fugitive methane emissions are addressed) given its potential to serve as a bridge or transition fuel to a sustainable energy future. Natural gas has gained on coal in the US power sector, while opportunities in midstream and downstream gas infrastructure as well as biogas (and Carbon Capture, Storage and Usage) are also possible.

Natural gas trade is becoming increasingly liquid and global, weakening the link between LNG prices and oil long preserved through oil-indexed contracts. This is due to increasing LNG export capacity in Australia and elsewhere and the hydraulic fracturing-enabled resurgence of US hydrocarbon production

15 International Finance Corporation, The World Bank Group, *Infrastructure Financing Trends, Encompass Quick Take* (April 2016), http://www.ifc.org/wps/wcm/connect/99019f 804c66cfb19e63 bfd4c83f5107/EMCompass_note05.pdf?MOD=AJPERES.

16 Bhattacharya, Oppenheim, and Stern, *Driving Sustainable Development through Better Infrastructure* (see note 8), 13.

17 International Energy Agency (IEA), *World Energy Outlook 2016* (Paris, 2016).

and policy changes to facilitate exports. Supply increases will likely enable a more fungible natural gas market, increase spot pricing, sever the oil price linkage and erode price differentials between Asian and European markets. In parallel to the LNG revolution, a "pipelinisation" is also taking place in Asia, driven by China and India for geostrategic reasons to reduce reliance from the Gulf.

Nuclear. While some European countries are moving away from nuclear power, many developing countries in the Middle East and Asia increasingly view nuclear as a fuel of choice. As countries seek to expand energy access while reducing import dependencies and emissions, more are considering nuclear power. There are over 20 reactors under construction in China alone, with 60 reactors under construction worldwide[18] in South Korea, Russia, India and the UAE, among others. China is driving nuclear power demand through domestic construction and consumption as well as becoming an exporter of nuclear technology, reactor design and expertise. The proliferation of nuclear power raises questions about uranium enrichment, safety, environmental impacts and the regional security environment.

Renewables. The renewable energy revolution is real and has tremendous implications for energy systems. The global average cost of solar PV fell by 61 percent between 2009 and 2015, while onshore wind costs have declined by an average 14 percent over the same period.[19] Growth is occurring at an unprecedented pace (albeit from a low starting point) compared to shifts in energy consumption patterns (e.g. those of coal and oil). The *BP Energy Outlook* predicts total installed renewable capacity will triple by 2035,[20] accounting for a third of all power generation growth. The IEA's 2016 *World Energy Outlook* predicts future renewable energy growth will outpace that of other energy sources.[21]

18 International Atomic Energy Agency, accessible at: https://www.iaea.org/PRIS/home.aspx.

19 The Frankfurt School FS-UNEP Collaborating Centre for Climate & Sustainable Energy Finance and Bloomberg New Energy Finance, *Global Trends in Renewable Energy Investment 2016*, 18–19, http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres_0.pdf.

20 BP Energy Outlook, *Outlook to 2035* (2016 Edition), https://www.bp.com/content/dam/bp/pdf/energy-economics/energy-outlook-2016/bp-energy-outlook-2016.pdf.

21 IEA, *2016 World Energy Outlook (WEO)*, Executive Summary, https://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html.

This presents opportunities and challenges for power system stability and management, and necessitates updates to transmission and distribution systems and structural shifts in power system design. As countries implement their commitments under the Paris Agreement, the proliferation of renewables could create new "infrastructured" energy spaces, as renewables enable more decentralised and distributed energy production while at the same time technological advances make cross-border regional energy trade increasingly feasible and attractive. The trend toward globalisation is not guaranteed, and it is also possible that renewable proliferation could lead to "an abrupt re-decentralization" of supply.[22]

Electricity. Electricity demand will increase in both absolute and relative terms[23] as a "carbon-neutral" approach will require electrification across sectors and sector coupling. Demand shifts are occurring simultaneously with the introduction of new (information) technologies and digitalisation, driving changes in grid management, market design and the structure and operation of energy firms. The energy transition is turning conventional wisdom regarding the structure, size and profitability of utilities on its head, while integrating intermittent renewables requires new grid management tools and technologies for manage congestion, reliability and balancing. Amid changes in the power sector, decarbonising the transport, heating and cooling sectors will require sector coupling, making electricity the new "lead energy source" and potentially leading to new grid management strategies, including demand-side management and balancing.

Changes are occurring on a centralised level, as illustrated by the challenges in integrating large centralized wind farms into the power system, as well as on a decentralised and distributed level. New electricity trends enable both distributed or decentralised energy systems and off-grid solutions, as well as regional trade over longer distances, for example through high voltage, direct-current (HVDC) power lines that connect production and demand centres. This could contribute to a globalisation of the energy system as countries seek to trade power over longer distances; however, it could also lead to a localisation of power, as renewable power potential in countries previously lacking resources could reduce the need or desire for expanding global energy trade.

22 Indra Øverland, "Energy: The Missing Link in Globalization", *Energy Research & Social Science* 14 (2016): 122–30 (129).

23 IEA, *WEO 2016* (see note 21).

Demand Shifts. The aforementioned demand for energy infrastructure in Asia illustrates a broader point: rather than OECD countries, non-OECD countries in Asia will drive our energy future. This change is well underway, as China is the world's largest producer and consumer of energy.[24] It is also the world's largest CO_2 emitter and crucial to any shift to a sustainable energy future. Chinese energy demand has driven energy markets over the last decade, and its potential transition to a less energy-intensive growth path will also affect markets. The IEA predicted in its 2015 *World Energy Outlook* that other non-OECD countries, namely India, will become increasingly influential in driving energy trends.

Technology and Digitalisation. Broader changes in technology and digitalisation are also affecting the energy sector, particularly in the power sector and energy efficiency. As with other technological "known unknowns" like hydrogen fuel cells, batteries and storage, digitalisation could fundamentally change the energy system, while demand-side management and more "real-life" balancing will require a digital revolution. A digitised energy world requires different protections, safeguards and methods to guarantee system security, and the risks of cyber disruption or attack necessitate re-examining the security of critical infrastructure. The timing and pace of such changes are unknown, as are some of the potential risks, while many of the known risks are not always well understood or addressed. The pace of change is also unprecedented, as the capacity for research, development, demonstration, and application has enabled swifter and more far-reaching technological change and transformation than ever before.[25]

Global Energy Cooperation and Governance

There has been remarkable progress in global energy governance in including emerging powers and developing countries and addressing pertinent energy trends in recent years. This includes both efforts to expand membership in traditional organisations to include new energy players and to address new energy trends. For example, the IEA has developed working relationships with non-OECD countries and expanded its OECD membership to include new countries. In 2015, the IEA extended Association Status to China, Indonesia and Thailand, and Chile and Mexico are membership candidates. The IEA has also expanded its traditional focus on oil, gas and fossil fuels to include renewables, energy efficiency and energy investment in light of the changing energy landscape.

Other energy governance initiatives responsive to current energy trends and inclusive of developing countries and emerging powers are the International Renewables Agency (IRENA), the Sustainable Energy for All (SE4ALL) initiative and the Sustainable Development Goals (SDGs), namely Goal Number 7, "Affordable and Clean Energy". Established in 2009, IRENA has 149 member countries in all four hemispheres with 27 additional states in the accession process. SE4ALL is a global initiative launched during the UN's 'Year of Sustainable for Energy for All' to achieve the objectives of universal access to modern energy services, doubling the rate of energy efficiency and the share of renewable energy in the global energy mix by 2030. Announced in 2015, the SDGs reinforce commitment to these objectives, as Goal Number 7 calls for ensuring access to affordable, reliable, sustainable and modern energy for all by 2030.[26] SE4ALL provides a forum and a platform to achieve this goal, including advisory committees on energy access, energy efficiency, energy finance and renewable energy.

The proliferation of energy governance initiatives stems in part from the nexus of the energy world shifting from OECD to non-OECD countries. China is key in driving this shift and, compared to a number of years ago, has increasingly taken an active stance on global energy governance – or, in their parlance, global energy architecture. Currently, China has "sought membership in, or established co-operation with, 26 entities" engaged in energy governance, indicating a curiosity, if not commitment to, existing institutional arrangements.[27] China was one of the first countries to activate Associate Status at the 2015 IEA Ministerial and has increased engagement with the Energy Charter Treaty, becoming an observer to

24 IEA, *China's Engagement in Global Energy Governance*, Partner Country Series (2016), http://www.oecdilibrary.org/docserver/download/6116041e.pdf?expires=1472460180&id=id&accname=guest&checksum=550EFB316D2CF6CC48A917FE3FCB284B.

25 Indra Øverland, "Future Petroleum Geopolitics: Consequences of Climate Policy and Unconventional Oil and Gas", in *Handbook of Clean Energy Systems*, vol. 6: *Sustainability of Energy Systems*, ed. S. K. Chou et al. (Chichester: Wiley, 2015), chapter 30, 3517–44 (3519).

26 UN Sustainable Development Goals: http://www.un.org/sustainabledevelopment/energy/.

27 IEA, *China's Engagement in Global Energy Governance* (see note 24).

the Energy Charter Conference after signing the International Energy Charter Declaration in 2015. Chinese leadership has also advocated for the G20 as a component of the global energy architecture.[28]

Much of the impetus in regional or multilateral governance, including the formation of organizations, economic unions and potential free trade zones, is increasingly being driven by Asia. The rise of China and the implications for the global energy architecture further underscore the divergent energy trajectories of the EU and the US, two major supporters of global energy governance.[29] Thanks to unconventional energy production, the US, along with Mexico and Canada, is increasingly energy self-sufficient, presenting a challenge for the transatlantic relationship. The different resource profiles of the US and EU contribute to different positions on energy trade, potentially complicating questions of how to address energy risks. The 2016 US Presidential election and ensuing Trump Administration exposed a rift between the US and EU and a lack of coherence in the West more broadly. In particular, the US President has little appetite for global governance and multilateral institutions and initiatives (like the Paris Agreement) and has expressed a lack of interest in if not disregard for the transatlantic alliance both as an operating principle and forum through which to address global challenges.

Ultimately, Germany and the EU are facing an energy landscape in which a coherent Western approach based on liberal markets and common rules is becoming difficult to maintain and in which the rules of the game will be increasingly influenced by others actors, such as China. This raises questions of which rules will govern energy trade and how these rules will impact markets and competitiveness.

Geopolitical Outlook in EU's Neighbourhood

Energy is intertwined with hard and human security, economic and financial health and environmental concerns. Changes in energy reverberate far beyond the energy sector, while "changes in political, military, diplomatic, and economic policies and strategies directly relate to the energy challenges and opportunities which shape the global energy landscape."[30] This is increasingly relevant for Europe as the political landscape of the northern hemisphere and the geopolitical dynamics in the European neighbourhood threaten stability, prosperity and security in Europe. Beyond global governance, the EU's regional approach also requires adaptation.

Russia has become a major source of concern for the EU given its open disregard for liberal values and support for illiberal movements intended to create dissension. The annexation of Crimea and on-going destabilisation in Ukraine have shaken the European post-Cold War security order, while Russia's military intervention in Syria has aggravated the rift between Moscow and European capitals. For nearly a decade, Russia has enlarged its scope for manoeuver and expanded its toolset to include hybrid warfare and other military options, strengthening its grip on the post-Soviet space, projecting power in the Middle East and asserting itself as a global player. Given that Russia's power rests on military posture, arms deals and energy cooperation, these developments are relevant for energy security. The paradox is that the former "indispensable"[31] energy superpower has lost some of its market power in the wake of the shale revolution, while efforts to engage in energy cooperation (like in the Eurasian Economic Union) and align with OPEC could partially restore this power.

Spheres of influence in the EU and Russia's common neighbourhood overlap. As envisioned in the early 2000s, the EU neighbourhood encompassed the former COMECON and post-Soviet countries to the east, as well as Turkey and North Africa with the aim of expanding and exporting stability and prosperity. The EU's European Neighbourhood Policy (ENP) covered 16 eastern and southern neighbouring countries, and aimed at achieving "the closest possible political association and the greatest possible degree of economic integration".[32] Bilateral policies were accompanied by multilateral initiatives like the Eastern Partnership, the Union for the Mediterranean and the Black Sea Initiative. The Energy Community, estab-

28 IEA, *China's Engagement in Global Energy Governance* (see note 24).

29 Sybille Röhrkasten and Kirsten Westphal, "Energy Security and the Transatlantic Dimension: A View from Germany", *Journal of Transatlantic Studies* 10, no. 4 (2012), http://www.tandfonline.com/doi/abs/10.1080/14794012.2012.734669.

30 Meghan L. O'Sullivan, "The Entanglement of Energy, Grand Strategy, and International Security", in *The Handbook of Global Energy Policy*, ed. Andreas Goldthau (Chichester: Wiley-Blackwell, 2013), chapter 2, 30–47 (43).

31 Fiona Hill, *Energy Empire: Oil, Gas and Russia's Revival* (London: Foreign Policy Centre, September 2004), 27 ff.

32 https://eeas.europa.eu/headquarters/headquarters-homepage/330/european-neighbourhood-policy-enp_en (accessed 15 December 2016).

lished in 2006, originally focused on the Balkans and later expanded to include Moldova and Ukraine (see Map Energy Regions) (see next Chapter), while Turkey was an observer from the outset. This architecture was intended to establish a "ring of friends" and attract countries seeking close relations with the EU. However, this "ring of friends" is slowly turning into a "ring of fire", as geopolitical turbulence has come closer to European borders. Given the (re-)emergence of powers like Russia and China, most countries are pursuing a balancing 'multi-vector' strategy rather than aligning solely with one actor. This has exposed the ENP's limitations in projecting stability within and beyond its borders and highlighted the shortcomings of the EU's external governance and regional crisis management.

Meanwhile, turmoil in the Middle East and North Africa stemming from leadership transitions, civil war, demographic challenges, migration and insurgency threatens to erode existing borders in a region crucial for EU energy supply. Libya has been torn apart by civil war, while security in Algeria and Egypt, the region's largest and most populous countries, is precarious. These countries are important anchors of stability for the EU when it comes to energy as well as migration.

Straddling the Middle East and Europe, Turkey is actively working to establish itself as an energy crossroads and achieve its foreign policy goal of becoming a gas hub. Having realised EU membership is unlikely to be attained, Turkey seeks to exercise influence based on its strategic geopolitical position between an energy-hungry Europe and energy-rich regions to the east and south. However, Turkey's energy policy is driven by geopolitics and domestic power struggles, making it a volatile partner. Turkey also has a complicated relationship with Russia, due in part to diverging interests in Syria and Crimea. However, both countries appear to be seeking a rapprochement in which energy – including nuclear power – is a vehicle for cooperation. Turkey's role as a transit country or gas hub depends on a delicate balance of interests with Russia in the Black Sea, the Caucasus and the Levant, and potential gas supplies via Turkey from Azerbaijan, Kazakhstan and Turkmenistan require Russian benevolence as it can jeopardise gas trade.

Energy is also a substantial lever of cooperation between Iran and Russia, who have established close energy ties based on nuclear technology even while competing over oil (and potentially gas) market shares. This competition could become more pronounced as Iran hopes to restore and ramp up oil production and export natural gas (mostly via pipeline to Iraq and as LNG to global markets). However, while sanctions were lifted following the Nuclear Agreement and Joint Comprehensive Plan of Action (JCPOA), renewed tensions with the US under the Trump Administration cannot be ruled out. These relationships, while mostly bilateral, have far-reaching consequences for the regional energy landscape, particularly in the Caspian Sea and Caucasus region where a north-south transport corridor could link Iran and Russia via the Caucasian countries and both are interested in blocking a potential Trans Caspian gas pipeline. Similar dynamics and uncertainties could have a destabilizing impact on North Africa, the Eastern Mediterranean and the Caspian region, with implications for Europe.

Major energy discoveries are also shaping the Eastern Mediterranean region and could serve as an impetus for negotiation and resolution of the long-standing division of Cyprus and cooperation in finding export markets. However, the on-going tension with Turkey, the sole supporter of the so-called Turkish Republic of Northern Cyprus, will need to be resolved for gas to be exported, while the absence of a political settlement could undermine the commercial viability of offshore gas development. Offshore development in Israel is similarly fraught with (geo-)political obstacles and the need to secure export markets, while Egypt is currently the focus of investment by international firms BP and Eni.

The hydrocarbon-rich Arctic is another area of potential tension in the European neighbourhood. While the cooperative pre-2014 geopolitical environment enabled hydrocarbon exploration activities, this is no longer the case. Under pressure from US and EU sanctions and falling oil prices, Russian Artic offshore production has faltered, and China's increased focus on the region as part of its Maritime Silk Road has heightened Russian sensitivities to its coastal waters and Arctic economic zone. These dynamics have contributed to rising militarisation in the Artic over the past two years.[33] Nevertheless, a set of inclusive governance mechanisms between the Arctic littoral states does exist, distinguishing it from geopolitical tensions afflicting other regions.

Perhaps one of the biggest geoeconomic shifts (and potential causes of geopolitical tension) in the EU's

33 Maria Morgunova and Kirsten Westphal, *Offshore Hydrocarbon Resources in the Arctic*, SWP Research Paper 3/2016 (Berlin: Stiftung Wissenschaft und Politik, February 2016).

neighbourhood is China's emergence and engagement across Central Asia and the Middle East to Europe under the 1 plus 16 framework. While Chinese influence is not new, China's struggle with weakening growth and massive overcapacity is, as is its active engagement with institutions, organisations and countries in its regional orbit. Given that China is an influential actor in its own right and also a primary reference point for other actors, its desire to cultivate ties with other countries and regions could further alter the Eurasian geopolitical landscape. Central Asian countries could choose partnership with China as a bulwark against Russia or attempt to balance the influence of the two along with the EU.

Amid these shifts in energy and geopolitics, the EU is struggling to take coherent foreign policy action and formulate a cohesive response. Its attractiveness as a zone of stability and prosperity is shrinking, while the ability to use EU Accession as a means of influence is also declining as the "carrot" of membership loses its lustre. Subsequently, the EU's ability to export rules and norms is increasingly under strain, threatening its soft power. Russia and China also offer alternative economic and development models that might be more attractive for some political leaders in the neighbourhood.

Infrastructure Corridors, Energy Geographies and Fragmented Orders

The multipolar world in energy, political and economic relations is taking shape. These shifts are not only an opportunity for the EU to exert influence as a new 'pole' but also a wakeup call for the EU to formulate a more strategic approach. The potential emergence of new energy corridors, particularly via China's externally focused economic and energy activities, could challenge the EU's competitiveness and ability to shape the standards and patterns of trade, technology and exchange in the wider neighbourhood.

The outward extension of China's economic ambitions through the One Belt, One Road initiative, comprised of maritime and overland corridors, is a key development. The project, announced in 2013, includes a land-based Silk Road Economic "Belt" through Eurasia, through which China could export its vision for infrastructure and economic activity, positioning itself as the "Middle Kingdom" at the centre of the proposal while competing with the EU by shaping new infrastructure and geopolitical geographies. Through a corridor approach, China is attempting to project its development model outward by transposing it geographically into areas traditionally considered Russia's backyard and onward into Europe. As Europe continues to progress toward the internal energy market, Central Asian countries are increasingly exporting their energy resources to China and looking eastward for investment.

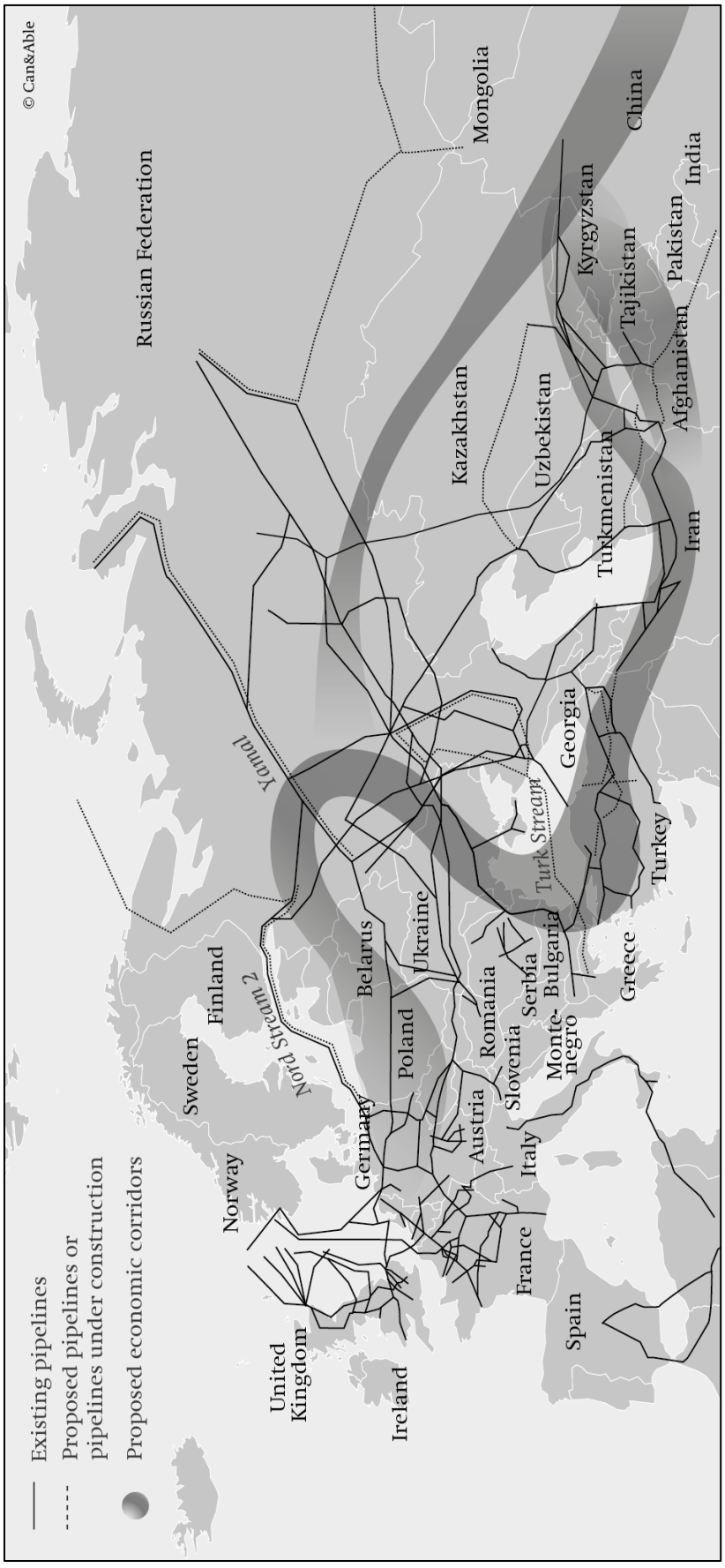
These corridors can be perceived as inroads for operational, technical, contractual and commercial arrangements that may develop into energy regions and/or regional markets in the future. These infrastructure geographies go hand in hand with developing physical flows, operational modes, technical norms, regulatory rules and contractual arrangements. These corridors can also encompass multiple production chains, including the connection between up-, mid- and downstream activities and factories, facilities, and plants, thus carving out energy geographies and establishing socio-economic ties.[34] This can be understood as energy regionalisation from below.

According to a spring 2015 OBOR action plan, while the project's guiding principles are economic and infrastructure integration, energy security, energy infrastructure investment and connectivity are key focus areas.[35] Infrastructure projects will be pursued through bilateral and regional agreements and financed by the Asian Infrastructure Investment Bank (AIIB) which, according to Chinese President Xi Jinping, was founded to "channel more resources, particularly private investment, into infrastructure projects to promote regional connectivity and economic integration"[36] along with the New Development Bank and Silk Road Infrastructure Fund. The AIIB, whose investments will shape the physical landscape, released a draft energy strategy identifying the promotion of

34 See also Margarita Balmaceda and Kirsten Westphal, *Cross-Regional Production Chains, Regional Fault Lines and Competitive Regional Processes in Euro-Asia*, ISA Conference Paper, February 2017.

35 Full Text: "Vision and Actions on Jointly Building Belt and Road", *Xinhua News Agency*, 28 March 2015, accessible: http://news.xinhuanet.com/english/china/2015-03/28/c_134105858.htm.

36 Council on Foreign Relations, "Remarks by Chinese President Xi at the Inauguration of the Asian Infrastructure Investment Bank", published 16 January 2016, accessible: http://www.cfr.org/infrastructure/remarks-chinese-president-xi-inauguration-asian-infrastructure-investment-bank/p37470.



Map 1: Infrastructure Geography: Gas Pipelines and the Land-based Economic Belt

regional cooperation and improvement energy access and reliability while maintaining growth as goals.[37]

OBOR demonstrates that as energy corridors develop they may cut across existing jurisdictions, necessitating a rethinking along these lines. This is increasingly evident when considering the integrated natural gas infrastructure constructed over the past decades by the Soviet Union/Russia and European countries. This infrastructure geography of 'longue durée' has outlasted the Cold War, countries and political systems and, in crisscrossing Europe's new borders and regional fault lines, creates its own 'ecology' and topography.[38] The electricity network infrastructure established prior to the fall of the Soviet Union also created a network architecture that no longer mirrors the political landscape. Estonia, Latvia and Lithuania are connected to the Soviet-era BRELL power system, highlighting that electricity networks do not necessarily follow the contours of politics or newly formed economic blocs. Synchronization with the European system is under discussion, a development that would have severe implication for Belarus, Russia and the Russian exclave of Kaliningrad. The same is also true for Ukraine, where synchronization with the EU would raise geopolitical and security issues regarding Crimea and Eastern Ukraine.

Against the backdrop of the energy infrastructure geography, a proliferation of energy market and political orders is occurring (see next chapter) and regionalism is being shaped from above.[39] However, these processes and their spatial realm do not necessarily coincide. Yafimava has conceptualised four spaces: a space of flows, a space of places, a contractual space, and a legal/regulatory space.[40] In her focus on the EU transit dimension, she highlights that these spaces do not match. Specifically, there is a high level of discontinuity between and within the four spaces,[41] the arenas of energy and financial flows, nation states (places), spaces governed by short and long-term contractual relations and legal/regulatory spaces.[42]

The different (emerging) regional market orders could lead to fragmentation, gaps and overlaps as countries find themselves in between or left out and the boundaries of different regimes collide, while fragmentation increases uncertainty about actors' behaviour and raises transaction costs. With these developments comes the potential for new orders dominated by new actors and, potentially, new rules tailored to particular interests and mercantilist mechanisms. The rules of the game are far from certain, and cooperation between states with authoritarian regimes and a state-dominated energy sector may well limit the EU's influence and economic activities. While Europe continues to look to the Caspian countries as playing a key role in its energy future, this requires increasing interconnection and investment in infrastructure hardware and legal and regulatory software to enable transit, trade and exchange, to ensure the EU remains competitive in this economic space. This challenges the EU's competitiveness and its role as a purveyor of rules and norms and signals a new level of competition that requires a strategic European approach to infrastructure, innovation and technology.

Energy Regions, Market Orders and Competitive Regionalism

The confluence of these developments come at a critical time for the EU, beset by internal issues, mired in crisis management and facing governance fatigue and limits to its legal and regulatory power. The EU has built an identity and competence around exporting norms and the rule of law and has tried to establish a set of rules in the energy sector considered crucial for liberalization and fostering energy market competition. The EU exports the legal framework enshrined in the *acquis communautaire* to the Neighbourhood and the Energy Community, and EU energy law constitutes supranational law, largely distinguishing it from domestic energy laws in other countries.[43] However, the EU's approach to the Neighbourhood has in part contributed to the discontinuity of the four energy spaces

37 The Asian Infrastructure Investment Bank, *Issue Note for Discussion, AIIB Energy Strategy: Sustainable Energy for Asia* (October 2016), accessible: http://euweb.aiib.org/uploadfile/2016/1013/20161013092936280.pdf.

38 Per Högselius, *Red Gas. Russia and the Origins of European Energy Dependence* (New York: Palgrave Macmillan, 2013), 234/235.

39 This view is informed by the intensive debates during the "Workshop on Energy Issues from the Comparative Regionalism Perspective" organized by Kathleen J. Hancock in Berlin, 27–29 April 2016. Grateful thanks to all the participants.

40 Katja Yafimava, *The Transit Dimension of EU Energy Security* (Oxford: Oxford Institute for Energy Studies and Oxford University Press, 2011), 32–39.

41 Ibid., 37.

42 Ibid.

43 Kim Talus, "Internationalization of Energy Law", in *Research Handbook on International Energy Law*, ed. Kim Talus (Cheltenham, UK, and Northampton, MA: Edward Elgar, 2015), 3–17 (12).

as it unilaterally imposed new institutions that fundamentally transformed the energy sector.[44]

The Energy Community disseminates the *acquis communautaire*, which applies to EU member states, members of the European Economic Area (EEA) and the Energy Community. The Energy Community is essentially the promotion of EU energy law beyond the EU border, intended to bring the countries in Southern Europe and the Black Sea Region closer to the EU energy market. There are eight contracting parties: Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Moldova, Montenegro, Serbia, Ukraine and four observers: Armenia, Georgia, Norway and Turkey. Negotiations for Georgian membership are on-going and Armenia was invited to join in 2016.

As the EU projects the reach of the *acquis* outward, limits to external energy governance become more evident, and the degree of implementation among Energy Community member countries is varied as countries liberalize at different speeds. The process of transcribing the *acquis*, unlike the Energy Charter or other multilateral energy initiatives, requires countries to change their domestic laws and essentially transpose EU laws into domestic legislation without a say in the development or substance of the laws themselves. The adoption of the legal code is just the first step in a long and difficult implementation process that requires the fundamental transformation of the energy system and sector. This process of making domestic changes in accordance with EU law regardless of the energy situation is difficult in countries where necessary preconditions for a market and the accompanying hardware do not exist. These challenges are evident in the Balkans, where Bosnia and Macedonia are behind in implementing the Third Energy Package and Ukraine is the real test case. Moreover, the carrot of accession, a staple of the EU's normative soft power and the outward reach of the *acquis* in the Neighbourhood, is no longer an incentive for either side. Countries on the Eurasian landmass are striving to balance the influence of Russia, China, the EU and even the US, while Turkey and Iran are also active players.

Many countries are also increasingly caught between the Energy Community and the Russian-led Eurasian Economic Union (EEU). Moldova and Ukraine are both Energy Community Member States and chose not to join the EEU despite being transit states for Russian gas. Armenia joined the Eurasian Economic Union in 2015 after deciding not to sign an Association Agreement with the EU, while Energy Community observer Georgia, along with Moldova, signed an Association Agreement with the EU in 2014 and declined to join the EEU.

The Eurasian Economic Union was founded by the Treaty on the Eurasian Economic Union in 2014. The project is a creation of the Russia Federation; other members include Armenia, Belarus, Kazakhstan and Kyrgyzstan. The creation of the EEU essentially establishes a second economic bloc in largely the same neighbourhood. This raises questions of whether countries should choose membership in one bloc versus the other, if simultaneous membership could be compatible and how countries belonging to neither are dealt with. The common EEU electricity market is due to be realized by 2019 and concepts for oil and gas are to beimplemented in stages by 2024 and 2025 respectively. The draft programs are based on existing (partly Soviet-era) infrastructure, and progress in integrating energy markets will require dismantling commercial and regulatory barriers. The plans for the electricity market are the most advanced with a proposed electronic trading and information exchange system.[45] Interestingly, the European continental electricity market is the model for the EEU's common electricity market.[46]

Russia is also a member of the Shanghai Cooperation Organization (SCO) established in 2001 as a security organization based on a shared interest in battling "terrorism, extremism, and separatism".[47] The SCO was created to foster trust and cooperation among members in many areas, including energy, and has since undertaken efforts to create a common Eurasian economic space and counter Western influence. The group, comprised of China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, India and Pakistan,

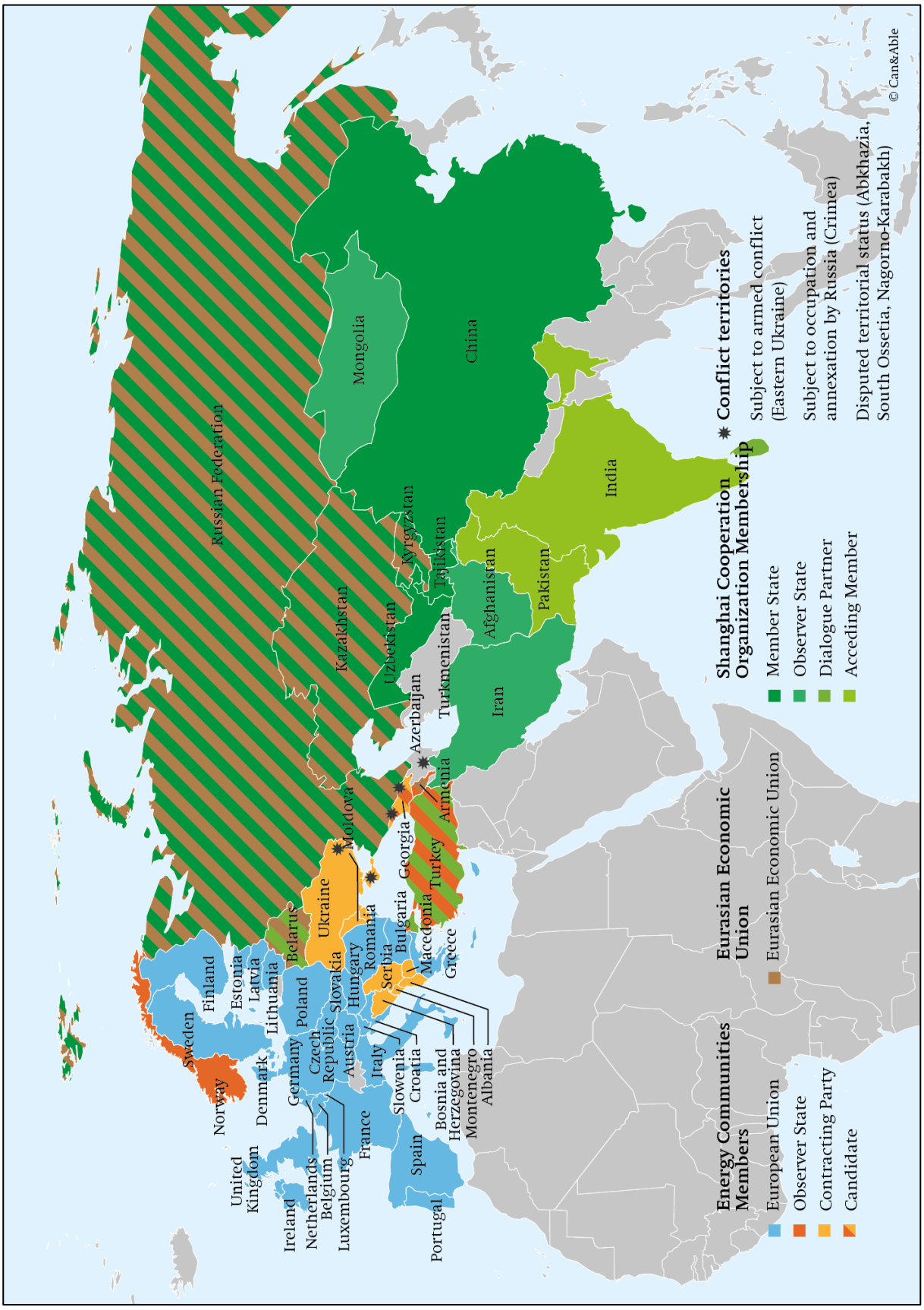
44 See in detail: Kirsten Westphal, "Institutional Change in European Natural Gas Markets and Implications for Energy Security: Lessons from the German Case", *Energy Policy* 74 (2014): 35–43.

45 "The EEC Board approved the program for the formation of a common electricity market of the Union and the Main directions of coordinated (agreed) transport policy of the EAEU", 26 October 2016, accessible: http://www.eurasiancommission.org/en/nae/news/Pages/27-10-2016-1.aspx (accessed 13 March 2017).

46 Kirsten Westphal and Maria Pastukhova, *A Common Energy Market in the Eurasian Economic Union*, SWP Comments 9/2016 (Berlin: Stiftung Wissenschaft und Politik, February 2016).

47 *The Shanghai Convention on Combating Terrorism, Separatism and Extremism*, signed in Shanghai, 15 June 2001, accessible: http://eurasiangroup.org/files/documents/conventions_eng/The_20Shanghai_20Convention.pdf.

Map2: Energy Regionalism and Overlapping Spaces



has plans to establish a free trade zone in products, capital, technology and services by 2020, sparking speculation that its economic impact could be more substantial than the original security purpose. President Putin formally proposed the creation of an Energy Club in 2006, agreed to by SCO energy ministers to "form a unified regional energy space".[48] The SCO Energy Charter focuses on infrastructure construction, development of energy transportation, financing of joint and multilateral energy projects and research and development cooperation focused on technology.[49] The Energy Club includes members of the governmental, business, scientific and research communities in each country.

As its membership includes energy producers and consumers, the Energy Club's significance could be substantial, but diverging interests between energy-producing and energy-consuming members also illustrates that energy concerns can be at odds with the alignments of regional groupings. Many energy deals between SCO members, like the Central Asia-China gas pipeline, occur outside the SCO framework and China's increasing interest in Central Asia puts it squarely in Russia's traditional sphere of influence. That said, OBOR provides an alternative to the EU as well as needed investment.

The possibility of cooperation between regional initiatives, namely OBOR and the EEU, holds real potential for further energy integration in Eurasia. There are reports that the EEU and SCO are working on approaches to a "continental economic partnership",[50] while an agreement to synthesize the EEU's efforts with OBOR's overland economic belt was signed during Chinese President Xi Jinping's May 2015 visit to Moscow. The joint declaration between China and Russia discussed the integration of EEU and Silk Road Economic Belt projects in the hopes of creating a common Eurasian economic space.[51] In May 2015, Moscow and Beijing signed a joint declaration that effectively discussed the integration of projects between the Eurasian Economic Union and the Silk Road Economic Belt in the hopes of creating a common economic space across Eurasia.[52] The focus on international cooperation and connectivity underscores the degree to which China's plans could change the physical and political landscapes, as infrastructure constructed to facilitate trade could create longstanding ties, resulting in "infrastructure geographies" and energy regions that could reorient energy trade and exert influence beyond geoeconomics to geopolitics. These "energy regions" are formed and driven both by old hegemons and new powers. In any case, Russia and China are shaping a flexible energy architecture substantiated by interconnections and infrastructure, which could potentially evolve into an energy region with harmonized rules and norms.

The EU and China included OBOR as a new dimension to their Strategic Partnership at the 2015 EU-China Summit[53] and developed further into the EU-China Connectivity Platform in 2016.[54] Given mutual interests in increasing connectivity, particularly through energy infrastructure in Central Asia, there is potential for fruitful cooperation. However, this largely depends on whether China chooses to play by existing liberal rules or write its own. The role of state-owned Chinese firms and their investments in strategic infrastructure pose questions as to whether there is a level playing field, and whether these companies will serve as tools of China's geoeconomic power and serve mercantilist versus market interests. While OBOR promotes policy coordination between participants, there are few details on specific instruments, areas for cooperation and sets of rules.

The confluence of macro trends, such as new infrastructure initiatives, the energy transition and the

48 Sreemati Gangult, "The SCO: An Energy Alliance in the Making", in *The Shanghai Cooperation Organization and Eurasian Geopolitics: New Directions, Perspectives, and Challenges*, ed. Michael Fredholm (Copenhagen: NIAS Press, 2013), 279, accessible: https://www.diva-portal.org/smash/get/diva2:876570/FULLTEXT01.pdf.

49 Ibid.

50 "EEU, SCO Preparing 'Most Ambitious Trade Agreement'", *Russia & India Report*, 3 March 2016, accessible: https://in.rbth.com/economics/finance/2016/03/03/eeu-sco-preparing-most-ambitious-trade-agreement_572685.

51 "Joint Statement on Cooperation on the Construction of Join Eurasian Economic Union and the Silk Road Projects", 8 May 2015 accessible at: http://beltandroad.hktdc.com/en/official-documents/Details.aspx?ID=470819.

52 "Joint Statement on Cooperation on the Construction of Joint Eurasian Economic Union and the Silk Road Projects", accessible: http://beltandroad.hktdc.com/en/official-documents/Details.aspx?ID=470819.

53 EU-China Joint Statement, "The Way Forward after Forty Years of EU-China Cooperation", 29 June 2015, accessible: http://www.consilium.europa.eu/en/press/press-releases/2015/06/29-eu-china-statement/.

54 http://ec.europa.eu/transport/sites/transport/files/themes/international/european_neighbourhood_policy/european_eastern_partnership/doc/tenth-eastern-partnership-transport-panel/eu-china_connectivity_platform_by_dg_move.pdf (accessed 6 December 2016).

search for new growth models is shaping (energy) geographies. Despite the Paris Agreement there is also a lack of consensus on what the desired final stage of an energy transition looks like,[55] making the heterogeneity of energy regions a possibility should individual pathways become competitive attempts to develop the winning growth model, technologies and solutions. Moreover, the lack of formal enforcement makes adherence to the Paris Agreement far from certain, enabling countries to prioritise short-term goals like energy security and competitiveness in response to domestic political or social pressure, while other countries may continue to adhere to their Paris commitments. Such a divergence of efforts and priorities could cause dissension and rivalry among major powers[56] and result in competitive regionalism and even an 'energy bloc' construction.

55 Bridge, Bouzarovski, Bradshaw, and Eyre, "Geographies of Energy Transition" (see note 7), 332.
56 See Statoil, *Energy Perspectives 2016. Long-term Macro and Market Outlook* (Oslo, 2016); World Energy Council, *World Energy Scenarios 2016 – The Grand Transition* (London, October 2016), https://www.worldenergy.org/publications/2016/world-energy-scenarios-2016-the-grand-transition/ (accessed 21 December 2016).

Surveying and Addressing Energy Risks and Opportunities

Given the potential for countries and regions to grow increasingly interconnected and geography to shift, energy uncertainty is at the heart of current and future risks. The repositioning of actors and reconfiguration of markets and spaces creates uncertainty, and shifting geographies could challenge the needs of the energy transition, namely investments in system modernization, improvements in poor interconnections and enhancement of connectivity. The globalisation of the energy system is also not necessarily guaranteed. While the identified shifts and trends have the potential to bring a continent closer together, they also could create new fractures and increase the likelihood and impact of energy risks.[57] Following an identification of energy risks in the EU's neighbourhood and an analysis of their scope, variety and prevalence, several preliminary conclusions can be drawn:[58]

1. Natural gas trade via pipeline, followed by electricity trade, is most commonly associated with conflict.
2. Energy flows crossing multiple borders, jurisdictions, conflict zones or disputed areas are often a source of tension.
3. Energy risks can be found along the fault lines of divergent regimes, be they regulatory, legal or contractual.
4. Rapid changes or major transitions in energy markets, price levels and policy framework can cause tension and uncertainty.

These conclusions demonstrate that energy-related risks stem in part from cross-border resource trade in a globalising world. As energy resources are widely distributed and the location of resources and demand centres may be different, the very nature of energy production, consumption and trade is at the root of these conflicts. Should the above-described global energy trends drive increases in connectivity and global energy trade, energy risks along regulatory fault lines and overlapping energy orders have the potential to increase.

The prevalence of current risks related to exploration, production and transmission further emphasises the transboundary nature of these challenges and the potential for discrete risks to have a larger impact on global energy supply. Risks to one link in the energy process can have a ripple effect down the supply chain. In the current system where producers rely on consumers and vice versa and both rely on transit, stable relationships, secure infrastructure and governance tools and solutions to mitigate these risks are crucial. This is particularly relevant given the increasingly complex landscape of regional blocs, economic areas and institutions with an interest in energy. Change creates uncertainty and can increase the unpredictability of actors' behaviour, giving rise to misunderstandings, misperceptions and mistrust. This can also reinforce isolationism, self-interest, localisation and neo-mercantilism, all of which contradict the economic rationale to explore economies of scale, competitive advantages and geographical conditions. The possibility for the globalising trend in energy to reverse and for countries to revert to more nationally-based energy systems is enabled by the low cost and increasing proliferation of renewable energy, more widely distributed and locally available than traditional fossil fuels. Thus, rising energy *in*security could be on the horizon.

These risks, broadly conceptualised as hard, soft and environmental risks, are explained in the following sections. Europe will have to adapt to this diverse energy risk landscape, which includes traditional hard security risks along with 'soft' risks related to political, social and economic conditions, and environmental hazards (see Table 1).

Hard Energy Security Risks

Many energy risks, including threats to energy infrastructure and the role of energy in (hybrid) warfare,

57 This is supported by a data collection effort conducted by the authors in partnership with Indra Øverland and the Central Asia Data-Gathering Team (CADGAT) of the OSCE Academy in February/March 2016, to whom we owe many thanks.

58 In a preliminary publication (Indra Øverland, Ellen Scholl, Kirsten Westphal and Katja Yafimava, *Energy Security and the OSCE. The Case for Energy Risk Mitigation and Connectivity*, SWP Comments 26/2016 [Berlin: Stiftung Wissenschaft und Politik, February 2016]), several conclusions were highlighted and worth including here. We thank co-authors Indra Øverland and Katja Yafimava for their contributions to the initial publication.

Table 1
Selected Examples of Energy Risks

Category	*Selected Case Samples*
Hard	▸ December 2015 Cyber Attack on Ukrainian Power Grid ▸ Pipeline Attacks in Turkey by Non-State Actors ▸ Eastern Ukraine Conflict over Resources
Soft	▸ EU-Eurasia Economic Bloc Competition ▸ Disputes over Cyprus EEZ and Offshore and Relevance for Natural Gas Discoveries ▸ Disputed Caspian Sea Status
Environmental	▸ Energy and Water Issues Related to Construction of Rogun Dam (Tajikistan) ▸ Environmental and Safety Risks of Aging/Ageing Nuclear Plants ▸ Competing Water Use in Central Asia (Electricity, Water Supply, Agriculture)

are relevant for hard security as their realization can cause physical supply disruptions. These risks are critical in terms of probability and impact and while many are already present, their relevance and prevalence is likely to grow.

Perhaps the most easily understood and readily apparent risks relate to the security of critical infrastructure. While not a new problem, infrastructure security has come to the fore as the energy system becomes more interconnected and digitally operated. Amid expanding global energy trade, "energy volumes increasingly transit through critical land and sea routes".[59] This raises the profile and importance of the physical security of energy, whether in extraction, production or transport, and requires thinking beyond security of supply to security of supply chains.[60] It also raises questions of responsibility for protecting physical infrastructure that may span hundreds or thousands of kilometres and how to accomplish this.

Energy system infrastructure is an attractive and often accessible target for a range of actors. For non-state actors (including terrorists), energy infrastructure attacks can be a means to an end: to garner attention, strike at a regime or inhibit a country of company's ability to produce energy (and obtain revenue). Energy infrastructure has been attacked in on-going conflicts as both direct target and collateral damage. These risks are relevant across fuel types and supply chain segments and are most salient for electricity, oil and natural gas.

An attack or breach on one link can disrupt the entire supply chain and consequences can extend well beyond the initial target, with second and third order effects on safety, human security and the environment. In case of an electricity outage, risk cascades can also affect food and water supply. Attacks on nuclear facilities could have devastating consequences and the nuclear fuel chain requires particular attention.

In addition to direct physical threats, digitally mediated threats are increasingly a key concern. Cyber-attacks on energy infrastructure can be conducted by targeting Supervisory Control and Data Acquisition (SCADA) systems, tampering with the digital management of electric grids and power stations, wreaking havoc as severe as, if not worse than, physical attacks. The potential impact on the energy sector was demonstrated by the first widely publicised cyber-attack to take down a power grid, if only temporarily, in Ukraine in December 2015. Other relevant cyber-attacks include the attack on Iranian nuclear facilities termed Stuxnet and the infiltration of the Saudi Aramco computer system with the Shamoon virus. The possibility of virtual attack poses significant challenges for infrastructure protection and hardening, including complicated questions of attribution, information sharing and response.

The World Energy Council has raised awareness of the threat posed by digital risks on energy system resilience, noting in a 2016 report that cyber risk is perceived as a potential threat to business continuity and "among the top concerns for energy leaders".[61] The report notes the need for (and absence of) cross-sector collaboration, information sharing and the

59 Mesul Hakki Casin, "Critical Infrastructures: Security and Energy Politics in the Eastern Mediterranean Region and the Role of the OSCE", in *The OSCE's Contribution to Energy Governance in the Mediterranean Region*, ed. Silvia Colombo and Nicolò Sartori (Rome: Istituto Affari Internazionali [IAI], New-Med Research Network, April 2016), chapter 2, 33, accessible: http://www.iai.it/sites/default/files/newmed_energy.pdf.
60 Ibid.

61 *World Energy Perspectives 2016. The Road to Resilience, Managing Cyber Risks* (London, World Energy Council, 2016), Executive Summary, accessible: https://www.worldenergy.org/wp-content/uploads/2016/09/Resilience_Managing-cyber-risks_ Exec-summary.pdf.

development and dissemination of best practices and international cyber security standards, and encourages governments to support information sharing across countries, sectors and within industry and improve international cooperation on cyber security frameworks.

The EU Programme for European Critical Energy Infrastructure Protection (EPCIP) was established in 2006 and expanded in 2013 to include the EU electric grid and gas transmission network. The programme was designed to identify, designate and assess critical infrastructure in the EU, create a Critical Infrastructure Warning Information Network, fund critical infrastructure protection projects and promote an external dimension via cooperation with the European Economic Area and European Free Trade Area.[62] This program goes beyond energy infrastructure, focusing on interrelationships between different systems and "interdependencies" between sectors and states – an important element the Commission noted was previously lacking in infrastructure protection efforts.[63] The program's obvious geographic limitations are problematic given the EU's reliance on energy imports and transportation infrastructure originating and crossing through regions outside the EU.

Several international institutions have a hand – or at least an interest – in critical energy infrastructure protection. Following the 2008 Bucharest Convention, NATO assumed a formal energy security role and supports the protection of critical energy infrastructure as part of its mission.[64] Much of NATO's efforts have focused on raising awareness and supporting education and consultation.[65] According to NATO's energy security agenda, "sharing best practices on the protection of critical energy infrastructure remains NATO's most frequently offered cooperation item with partner countries with respect to energy security".[66] Despite these activities, the prevailing wisdom at NATO is that "protecting energy infrastructure is, however, primarily a national responsibility".[67]

The OSCE has been particularly active in raising awareness of and sharing best practices to mitigate the cyber threat to critical energy infrastructure. The OSCE has conducted cyber simulations and training and produced 'The Good Practices Guide on Non-Nuclear Critical Energy Infrastructure Protection (NNCEIP)' from Terrorist Attacks Focusing on Threats Emanating from Cyberspace.[68] While the report is proactive in addressing future energy system challenges stemming from interconnection and digitization, hurdles remain, particularly in facilitating information exchange and developing tools to mitigate and respond to cyber intrusion and manage potential cascading effects.

While the publication of a guide to raise awareness, identify threats and convey common best practices and strategies to policymakers is an important step, the lack of coordination mechanisms or information sharing platforms relegates efforts to the national level, despite the cross-border nature of energy infrastructure and need for coordination. As the Good Practices Guide points out, "exchanging this data, especially across national borders, quickly leads to legal issues with respect to privacy and data protection".[69] The report concludes, "there is a need for the complex international legal material to be reworked, including explicit regulations stating requirements in relation to the energy industry".[70]

Perhaps the biggest gap in infrastructure protection is crisis management following an attack, whether physical or virtual. In such attacks, particularly ones with cross-border impacts, there is no standing body to serve as neutral arbiter and restore energy flows. However, given the growing use of cyber as a tool by nation states, it is questionable whether the lack of an

62 Accessible: http://ec.europa.eu/energy/en/topics/infrastructure/protection-critical-infrastructure.
63 European Commission, *Commission Staff Working Document on a New Approach to the European Programme for Critical Infrastructure Protection, Making European Critical Infrastructure More Secure* (Brussels, 28 August 2013), accessible: http://ec.europa.eu/energy/sites/ener/files/documents/20130828_epcip_commission_staff_working_document.pdf.
64 Accessible: http://www.nato.int/cps/en/natohq/topics_49208.htm
65 Alessandro Niglia, "Critical Infrastructure Protection (CEIP) with a Focus on Energy Security", in *The Protection of Critical Energy Infrastructure against Emerging Security Challenges*, ed. Alessandro Niglia (Amsterdam et al.: IOS Press, 2015), 5–15 (12).
66 Julijus Grubliauskas, "NATO's Energy Security Agenda", *NATO Review Magazine*, accessible: http://www.nato.int/docu/review/2014/NATO-Energy-security-running-on-empty/NATO-energy-security-agenda/EN/index.htm.
67 Accessible: http://www.nato.int/cps/en/natohq/topics_49208.htm.
68 The Organization for Security and Co-operation in Europe, "The Good Practices Guide on Non-Nuclear Critical Energy Infrastructure Protection (NNCEIP)", in *Terrorist Attacks Focusing on Threats Emerging from Cyberspace* (2013), accessible: http://www.osce.org/atu/103500?download=true.
69 Ibid., 62.
70 Ibid.

international response team (at present, response to international events has been mounted by US CERT teams) this will remain viable. Considering the issue's sensitivity and political prominence and the difficulty in attributing culpability, international cooperation between the US, China, Russia and the EU will likely be limited. However, information exchange could contribute to confidence building and developing response mechanisms. As cyber attacks are a major threat to the energy sector and growing tool of hybrid warfare, and that energy provision is often a means of proving or denying political legitimacy, this is an area in need of common ground and approaches across countries and energy regions.

'Soft' Energy Security Risks

While the majority of identified risks could escalate to hard security risks, many complex risks involve the interplay of political, social and economic factors. These risks, which we call 'soft', are tied in part to cross-border rules for energy governance and trade and have geopolitical dimensions.

This includes the primarily political and economic risks associated with pipeline politics, ranging from abuse of market power to political vulnerability as a function of dependence, with the potential for physical disruption. Related risks stem from the transport of energy via fixed infrastructure and closely (though not exclusively) associated with natural gas transmission via fixed pipeline as oil's fungibility enables a wider variety of transport options, vehicles, routes and countries. This infrastructure can be prohibitively expensive, and pipelines and oil and gas infrastructure "often exhibit natural monopoly features" and are subjected "to stronger forms of political control" than other industries, exposing the midstream sector to risks.[71]

Short-term risks include disputes over tariffs, pricing, transit fees and volumes that affect supply, and perceptions that energy provision and trade could be used as a political tool. Long-term risks include geopolitical tension and competition over current and future cross-border pipeline projects, including how and where resources are transported to markets and consumers and who receives the rents. Risks related to pipeline politics often manifest in concerns, real or perceived, that pipeline owners, suppliers of pipeline-delivered oil or gas or transit states may use their positions as a source of advantage or coercion and that contractual dependencies are vulnerabilities. For planned or future pipelines, the challenge is bringing public and private sector stakeholders together along a proposed route, particularly relevant for the EU in Central Asia and South-Eastern Europe.

In recent years, the EU has designed processes to identify Projects of Common Interest, Projects of Energy Community Interest and Projects of Mutual Interest. However, these processes are largely internal to the EU and the Energy Community, whereas much of planned or expected cross-border electricity and gas pipeline activity is driven by Russia and China in the Central Asian Republics. The development of an EEU energy market and the OBOR initiative will also have structural and systemic impacts on the EU. While there have been discussions about potential cooperation platforms, there is not yet a network planning or exchange platform for interaction between the EU Ten Year Development Plan and third parties planning to build new export pipelines to Europe.

There are also energy risks implicit in on-going territorial, jurisdictional and ownership disputes. Resources can exacerbate or otherwise get caught in the middle of broader geopolitical issues, including disputes over land and maritime borders (e.g. Caspian Sea), Exclusive Economic Zones (EEZs) and offshore resources (e.g. Cyprus) and disagreements over pipeline jurisdiction (e.g. Nord Stream 2 and South Stream). Infrastructure also criss-crosses disputed territories, for example in Eastern Ukraine, Crimea and Georgia.

Not only do these risks involve all energy types, the larger overarching issues and conflicts are notoriously difficult to resolve, as international law lacks clear norms for resolving these cases, let alone for tackling the energy issues embedded within them.[72] Binding and non-binding means of dispute resolution are often designed to resolve the dispute as a whole, rather than grapple with the role of energy within that dispute. Thus, in many instances progress in resolving energy issues is hampered by a lack of progress on the broader dispute. Sometimes, the resources themselves are part of these competing claims, as in the Caspian Sea.[73]

71 Albert Bressard, "The Role of Markets and Investment in Global Energy", in *The Handbook of Global Energy Policy* (see note 30), chapter 1, 16.

72 The Carter Center, *Approaches to Solving Territorial Conflicts* (Atlanta, GA, May 2010), accessible: https://www.ciaonet.org/attachments/17937/uploads.

73 The states surrounding the Caspian Sea have largely argued for whichever definition best serves their interests.

However, energy can also serve as a point of mutual or overlapping interest or a starting point for confidence building measures for future progress.

Many of these risks are located at sea. As offshore energy has grown increasingly accessible and attractive, the number of boundary disputes has grown.[74] Examples can be found in the waters around Cyprus, the Caspian Sea or in the Arctic. The 1982 United National Convention on the Law of the Sea (UNCLOS) governs jurisdiction and trade in maritime areas and is used to resolve maritime boundary disputes.[75] Not all countries are party to the convention, Turkey being a notable exception, while the US recognizes UNCLOS as customary international law but has not signed the convention and Iran has signed but not ratified it. Signatories can also exempt themselves from dispute resolution provisions, an option which Russia, Iran and Ukraine have all exercised. The regime also only applies to international bodies of water beyond the jurisdiction of nation states and provides little guidance in cases where the status of the body of water (as inland sea versus lake) is under dispute, a shortcoming evident in the Caspian Sea. International bodies of water beyond the jurisdiction of any one nation are governed by UNCLOS, while water bodies like lakes are determined under Admiralty Law, adjudicated by national courts versus international arbitration bodies under UNCLOS.[76]

The case of offshore gas in Cyprus' EEZ illustrates another UNCLOS shortcoming – namely, that it is of little assistance if one party to the dispute is not a signatory to the convention. Turkey is the only UN member state that has not signed UNCLOS. It does not recognize Cyprus' agreements under UNCLOS with other eastern Mediterranean countries, nor the legitimacy of the Republic of Cyprus. The Ukraine crisis also illustrates how territorial disputes can call the delimitation of maritime borders under UNCLOS into question. While the ICJ fixed the maritime boundary between Romania and Ukraine in its 2009 judgement in the case, *Maritime Delimitation in the Black Sea*, the Russian seizure of Crimea could result in Russia laying claim to certain parts of the Black Sea.

Major risks also stem from the previously described fragmentation as energy risks arise along regulatory fault lines where differing regulatory jurisdictions, legal regimes, contractual spaces and blocs overlap or come into contact – and potential conflict – with one another. Regulatory disconnect and disagreements stemming from policy or market integration can occur on or between the fault lines of differing economic or political blocs, and countries can find themselves caught between, left straddling or outside of existing spaces and jurisdictions. This includes countries like Ukraine and Moldova, Energy Community members on which Russia relies for energy transit but which declined to join the EEU.

When regulatory/legal spaces interact, it is not always obvious which set of rules will prevail or how to resolve potential conflict, creating uncertainty and potentially stalling investment. Disagreement over the rules of the game and different interests (a bloc of producers and a bloc of consumers) could lead to different desired end states, such as competitive markets versus quotas, price setting or other forms of market management. Specific problems include incompatibility of system operation codes, voltages and frequencies, tariff structures, capacity allocation mechanisms, congestion management procedures and other technical issues, along with different operational procedures, organizational structures and working definitions. These incompatibilities may result in commercial and/or technical disputes that can negatively impact energy flows and exacerbate broader security issues.

This is particularly relevant for cross border electricity transmission and integration of electricity and gas markets. Electricity transmission, particularly between markets and countries, requires physical interconnections and technical arrangements, complementary and cooperative institutional structures, shared technical terms and convergent price structures. Energy system and flow management requires

Azerbaijan would largely benefit from the division of resources based on each respective country's EEZ and has, therefore, historically argued in favour of the Caspian Sea being classified as a sea (and thus under the application of UNCLOS). Meanwhile Russia and Iran have historically argued in favour of being classified as a lake, dating to the 1921 Friendship Treaty between the Russia and Iran, and have argued for division of resources under the condominium principle. More recently, Russia has pursued a bilateral approach with each of the littoral states based on the "common waters, divided bottom" principle.

74 Tim Martin, "Energy and International Boundaries", in *Research Handbook on International Energy Law*, ed. Talus (see note 43), 181–96 (181).

75 UNCLOS establishes sovereign rights and a legal framework for the world's oceans, establishing zones to determine state sovereignty, including the territorial sea, the continental shelf, the exclusive economic zone (EEZ) and the contiguous zone.

76 Hanna Zimnitskaya and James von Geldern, "Is the Caspian Sea a Sea; and Why Does It Matter?", *Journal of Eurasian Studies* 2 (2011): 1–14 (3).

information sharing for network planning, operation and disaster response. While the challenge of 'grid management' is somewhat less salient for natural gas transmission, pricing and tariff issues, along with infrastructure access, are key.

Risks should be thought about in different time horizons, namely short- and long-term. While both should be addressed, action should be taken to prevent long-term risks, particularly given the long lead-time for energy sector projects. Price volatility and boom-and-bust cycles are major looming risks, while stalled investment can have severe long-term effects. This stalled investment can stem from energy sector sanctions levied by the West against Iran and Russia prohibiting technology transfer and access to financing and more direct sanctions on imports and exports. This could delay future investment and call previous investment into doubt, derail private sector partnerships, impede modernization and even result in environmental hazards through reliance on second-best technology options.[77]

More abstract risks stem from the unpredictability of energy development pathways. Should the world continue to become more interconnected, national/regional interests will grow more heterogeneous, necessitating an exchange about supply and demand models and energy paths. Many regimes and countries are still reliant on resource revenue, and domestic energy market governance is crucial for the energy transition. Risks also stem from changing trade dynamics and tensions between market incumbents, along with policy changes that could negatively influence energy investment, production and provision. Given the changing energy landscape, these risks are particularly relevant as policies incentivizing low-carbon energy sources and trade patterns redrawn by changing production dynamics shift political alignments and policy preferences. To address these issues, the United Nations Economic Commission for Europe (UNECE) is conducting a "pathways project",[78] supported by Russia, Germany and the US. UNECE working groups on energy efficiency standards and classification of energy carriers are important contributions to building a common understanding of energy future(s).

77 Morgunova and Westphal, *Offshore Hydrocarbon Resources in the Arctic* (see note 33).

78 https://www.unece.org/fileadmin/DAM/energy/se/pdfs/Booklet_Dec2015/Pathways.to.Sustainable.Energy.pdf (accessed 20 December 2016).

Environmental and Climate Hazards

Energy production, use and consumption can pose risks for environmental integrity via pollution, contamination, leaks and other technical failures. In addition to these traditional environmental risks, awareness of climate risks is increasing. A G7 report labelled climate change the "ultimate threat multiplier," a useful description of how climate change could create new risks and compound existing ones.[79] While the premise of shifting energy landscapes is predicated in part on climate mitigation, the effects of climate change on the energy system, particularly system stability amid growing interconnection, create a new set of risks as climate change has the potential to "transform constants into variables".[80]

Climate change will exacerbate dependencies between different sectors, from water management and energy generation to agriculture and food production, referred to as the energy-water nexus and the energy-water-food nexus. The nexus approach recognizes interdependencies between resources crucial to human and economic development. This nexus, which represents a shift from sector-specific approaches to integrated policies and resource management, has profound implications for environmental and economic security as well as human and hard security.

This is particularly relevant in Central Asia where transboundary water issues are prevalent, hydropower production is prominent and agricultural production is a key economic driver. The Amu Dayra river basin is a case in point.[81] As a crucial source of water for regional agricultural and energy production, it has historically been a political flashpoint. The current quota-based water sharing system has proved less than

79 G7, *A New Climate For Peace: Taking Action on Climate and Fragility Risks* (2015), accessible: https://www.newclimateforpeace.org/#report-top.

80 Achim Maas, *Shifting Bases, Shifting Perils: A Scoping Study on Security Implications of Climate Change in the OSCE Region and Beyond*, Adelphi Research in cooperation with Chatham House, Cimera, commissioned by the Office of the Coordinator of OSCE Economic and Environmental Activities (Berlin, 2010), 1, accessible: https://www.adelphi.de/en/system/files/mediathek/bilder/us_054_-_final_scoping_study_osce.pdf.

81 The Amu Darya is the longest river in Central Asia, flowing from sources mainly in Tajikistan and Kyrgyzstan to Turkmenistan, Uzbekistan, and Kazakhstan. Event Report: *Triggering Cooperation across the Food-Water-Energy Nexus in Central Asia* (New York: The EastWest Institute, December 2014), accessible: http://www.iwa-network.org/wp-content/uploads/2016/06/Food-Water-Energy-Nexus-in-Central-Asia.pdf.

effective and is unlikely to hold amid fluctuating water volumes due to the impacts of climate change (through changing glacier melt patterns, increased rates of evaporation, etc.). Hydroelectric projects and their effect on available downstream water volumes (namely for agricultural production) are a particular source of controversy, as illustrated by the Rogun Dam project.[82]

Water supply can also endanger agricultural production and food supply, political relations, economic development and security in the region. Increased Chinese investment in land and agriculture in Central Asia (and potential Chinese agricultural technology), including in Tajikistan, Kyrgyzstan and Kazakhstan, could exacerbate regional tensions over land and water use.[83] In Kazakhstan, Chinese companies reportedly are considering investing $1.9 billion in 19 agricultural projects as part of the Silk Road Economic Belt. While Chinese investment could improve the efficiency of Kazakh agricultural production and diversify the economy from oil, Chinese land ownership in particular has proved a sensitive topic.

There is growing awareness of the risks related to the 'nexus' between climate, energy, water and food, and many international institutions are raising awareness and addressing the issues.[84] Regional organizations are including the nexus in environmental and economic programming, including the OSCE through its Central Asia programming, while its annual economic and environmental forum has focused on transboundary water management and the relationship between environmental governance and security. The OSCE is also a member of the ENVSEC partnership, a cooperation platform that includes the Regional Environment Center for Central and Eastern Europe, UNDP, UNECE and UNEP. ENVSEC addresses cross-border resource management issues to identify and raise awareness of hot spots or risks, develop regional work programs to address them and support mitigation measures.

Connectivity: Risk, Opportunity or Organizing Principle?

Should energy trends lead to more cross-border, regional and global trade, the risks and opportunities of connectivity will become increasingly relevant. Poor or inadequate grid interconnection can pose risks for system stability, while increasing grid or technical integration and interconnected systems can create new concerns. Connectivity necessitates the establishment of a dynamic market environment in which the EU can remain competitive, and also creates opportunities to seize, like modernizing the energy system, balancing supply and demand, and fostering and perpetuating a new sustainable growth model. However, connectivity is also not assured, and failing to mitigate the risks of integration could push developments in the opposite direction, particularly as technology enables more distributed or local generation.

Increasing connectivity relies on multilateral energy governance, improving international cooperation through existing institutions, strengthening tools and ultimately establishing inclusive patterns for growth. It relies on integration to create markets of scale, opportunities for leveraging resources and investment in the infrastructure undergirding connectivity. While poor grid interconnections are a risk, interconnection can improve affordability, security and sustainability of energy supplies and increase efficiency. Interconnection can also help ameliorate challenges associated with integrating renewables, including back-up capacity, intermittency and grid management.

To ensure connectivity, the EU and others need to consider common energy guidelines, technical standards, regulatory best practices and principles that can be shared across jurisdictions or different energy spaces. While continuity of standards and streamlining of systems can provide certainty and incentivize investment, policy and regulatory dissonance can cause confusion and uncertainty and stymie investment. The EU and its member states must also be aware of the risks that new economic and market orders could pose in offering competing sets

82 The hydropower project would use a tributary of the Amu Darya to produce 13.3 kWh of electricity for Tajikistan, leaving less water for downstream Uzbekistan and inflaming regional tensions over transboundary water management.
83 Jack Farchy, "China Plans to Invest $1.9bn in Kazakh Agriculture", *The Financial Times*, 9 May 2016, accessible at: https://www.ft.com/content/9c84a0f4-15d3-11e6-9d98-00386a18e39d.
84 These risks are in part reflected in the inclusion of energy, water and food-related goals as part of the UN's Sustainable Development Goals (although it should be noted that these issues are represented by individual goals) and the work of SE4ALL, but also focused on in the *World Energy Outlook 2016* by the IEA. The EU, in partnership with the German Federal Ministry for Economic Cooperation and Development has also funded the creation of a global nexus platform and secretariat to serve as a hub for information exchange and support regional dialogues.

of technical norms and standards and preferential trade benefits, some of which could be detrimental to EU competitiveness. Absent common standards, the goal of connectivity could be at risk of devolving into fragmentation between different economic blocs, market orders and regional groups.

Tools and Instruments at Hand to Address Changing Energy Geography

Energy Governance Challenges from a European Perspective

The challenges outlined in this paper demonstrate the need and opportunity to empower existing institutions to assume a greater role in energy and create new tools to address energy-related risks. Most of the new and looming risks are hybrid and crosscutting. Addressing them will require cooperation and pooling tools and instruments across institutions in a way not seen in the past, while connectivity raises questions of which rules, standards and norms will govern these activities and relationships. Current actors and institutions lack the capacity or tools to address these risks alone and the necessary dialogue platforms, cooperation mechanisms, and common standards are missing.

A major challenge remains for Europe. The EU's attractiveness as a "pole" is fading amid internal crisis and BREXIT, while the diminishing appeal of its energy *acquis* as a tool is exposing the limits to European energy governance and gaps between the *aquis* and the Energy Charter Treaty. That is not to say there have not been successes – there has been substantial progress in internal energy market reforms in the EU and the European neighbourhood, and in gas sector reform in Ukraine, although the outcome of broader energy reforms remains to be seen. However, the geopolitical conflict and lack of coordinated policy is affecting the EU and its wider neighbourhood, and in the resulting security dilemma the energy security paradigm could prevail over climate and environmental concerns.

The EU's soft influence as a normative power is vanishing as it is confronted in the neighbourhood by revisionist states aspiring to increase their power. Turkey has drifted from the EU and the danger of "growing disagreement about the rules of the game and a decreasing ability to manage crises" is looming.[85] Multilateralism is in crisis, and the proliferation of states with authoritarian regimes and state-run economies may weaken international institutions and lead to protectionism.[86] The reliability of the US as a major Western partner is also in question given the Trump Administration's thus far sceptical view of international organizations and multilateral engagement and willingness to disregard or upend norms, trends, and precedents in its conduct of international relations.

Institutions, Tools and Instruments

While specific institutions or sets of rules govern different aspects of energy production, transit and trade, many of these regimes and standards are "opt in" and not always binding. Additionally, though a number of institutions, regimes and tools address energy risks at the regional level, there is no overarching regulatory framework, institution or set of standards across all parties. The creation of new structures is not feasible given insufficient political will and limited economic resources, necessitating the utilization of existing institutions, forums, mechanisms and processes for dialogue, confidence building and cooperation.

Multilateral engagement, cooperation through existing institutions and common rules of the game ("code of conduct") are increasingly important amid plans to increase energy trade and connectivity across Central Asia, the Middle East and Europe. It is no coincidence that China has introduced a connectivity framework based on infrastructure (OBOR), expressed interest in regimes like the Energy Charter Process and signed the International Energy Charter. For a country looking outward for trade, economic opportunity and energy, Eurasia offers many obstacles – namely, which rules or regulations apply to projects crossing the EU and the EEU. This question, and the related questions related to engagement with the SCO and responding to OBOR, is critical for the EU.

The Energy Charter Treaty (ECT) is the only multilateral treaty providing energy-specific provisions governing trade, transit and investment protection and has the largest geographical scope of any multilateral investment protection treaty.[87] It covers:

85 Statoil, *Energy Perspectives 2016* (see note 56), 11.
86 Ibid.
87 Angus Johnston and Guy Block, *EU Energy Law* (Oxford: Oxford University Press, 2012), 284.

1. Protection of foreign investment; 2. Non-discriminatory provisions for trade in energy materials, products and energy-related equipment and provisions to ensure reliable cross-border energy transit flows; 3. Dispute settlement mechanisms between participating states and between investors and host states; 4. Promotion of energy efficiency.

However, the ECT has largely stalled following the termination of Russia's Provisional Application in 2009, the EU's preference for the Neighbourhood Policy and the Energy Community[88] and Italy's formal withdrawal in 2015. The fracturing of support, which can be traced to the 2003 introduction of the Second Energy Package, could lead to conflict over which set of rules should serve as a baseline for cooperation moving forward.[89] The ECT has its origins in the neoliberal 1990s when buyers set the rules, and major producers, including Norway and the United States, have abstained from either ratifying or signing it.[90]

The ECT also has substantive shortcomings, including "weak and unclear" provisions governing transit interference.[91] The ECT failed to live up to expectations during the 2006 and 2009 transit crises between Russia and Ukraine, and does not address the restoration or reinstatement of energy flows to pre-crisis levels following a disruption.[92] While there were negotiations on a Transit Protocol, they were suspended in 2011 due to disagreement between the EU, Russia and the Energy Charter Secretariat.[93] There has since been little momentum to address these shortcomings. Turkmenistan has sponsored the only UN resolutions on energy transit,[94] and their 2017 Chairmanship of the Energy Charter Conference could be an opportunity to discuss transit governance gaps.[95]

The ECT outlook is far from positive given the lack of Russian support for modernisation of the Energy Charter Process and the Process' consolidation, expansion and outreach, along with EU external governance fatigue. However, the Energy Charter Secretariat has driven the process forward, producing the 2015 International Energy Charter, which encompasses a range of countries and issues, including those related to the energy transition, and provides common principles. While the Charter is a declaration of intent rather than a legally binding code or commitment, it could serve as the basis for binding shared principles across regions given its reflection of modern energy challenges and the high level of participation in its negotiation.

The OSCE, NATO and United National Economic Commission for Europe (UNECE) are all regional organisations with the role and potential to take on these energy risks and crisis management. Given the degree of institutional capability and capacity across these organisations, the EU should encourage cooperation and coordination between them. While NATO has assumed a role in energy security and critical infrastructure protection, the operationalization of this role in practice remains unclear. NATO continues to see energy as primarily an issue for markets and nation states, an understandable approach as emphasizing the security dimension of energy would likely deepen existing fault lines and run the risk of an energy bloc confrontation.

The OSCE is a trusted honest broker whose traditional competencies in risk mitigation and prevention, awareness raising and crisis management could be used to address energy risks. The OSCE's competency in hard, economic and human security encompasses

88 See in more detail: Kirsten Westphal, *The Energy Charter Treaty Revisited. The Russian Proposal for an International Energy Convention and the Energy Charter Treaty*, SWP Comments 8/2011 (Berlin: Stiftung Wissenschaft und Politik, March 2011).

89 Kim Talus, *EU Energy Law and Policy: A Critical Account* (Oxford: Oxford University Press, 2013), chapter 6: "The International Dimension of EU Law and Policy", 212–68 (243).

90 The ECT is based on long-established practices in bilateral investment treaties as well as WTO trade provisions. It provides two types of investment protection: binding hard law obligations for the post-establishment phase of investments, and soft law obligations for the pre-establishment phase (Talus, *EU Energy Law and Policy* [see note 89], chapter 6, 237). These investment protections include access to binding international dispute resolution mechanisms, both state-to-state and investor-to-state, including access to arbitration forums: the International Centre for the Settlement of Investment Disputes (ICSID), International Chamber of Commerce (ICC) Stockholm, or United National Commission on International Trade Law (UNCITRAL). Disputes can be also be pursued through the WTO dispute settlement mechanism.

91 Katja Yafimava, "Transit: The EU Energy *Acquis* and the Energy Charter Treaty", in *Research Handbook on International Energy Law*, ed. Talus (see note 43), 593–623 (613).

92 Ibid.

93 "Meeting of the Energy Charter Industry Advisory Panel", Beijing, 21 July 2015, 3–4, accessible: http://www.energycharter.org/fileadmin/DocumentsMedia/IAP/20150721/IAP20150721-S2-Notes_on_transit.pdf.

94 The two resolutions are UNRES 67/268 adopted in 2013 and 63/219 adopted in 2008.

95 Rafael Leal-Arcas, Andrew Filis, and Ehab S. Abu Gosh, *International Energy Governance: Selected Legal Issues* (Cheltenham, UK, and Northampton, MA: Edward Elgar, 2014), Part 1, chapter 2: "Energy as a Special Sector in the World Trade Organization", 112.

many of the potential impacts of energy risks and is well suited to addressing the complex and interconnected risks stemming from climate change. The geographical breadth and depth of OSCE membership is relevant for addressing the issues between Europe and its eastern neighbours, while its traditional toolbox and focus on connectivity are pertinent to the challenges at hand. It can also address issues in the Eastern Mediterranean via its fourth dimension.

The UNECE, perhaps in partnership with OSCE, is also positioned to assume more responsibility for mitigating energy risks. In 2004, the UNECE and OSCE pledged to work together on several relevant issues for energy risk, including trade, transport and investment.[96] UNECE also has competence in sustainable energy and environmental policy and convenes experts on natural gas and renewables. It also engages in setting standards and promoting best practices, which, along with its broad membership and economic mission, could enable UNECE to play a stronger role in fostering connectivity and shared principles.

Recommendations for European Engagement and Action

Given the current fatigue in the EU, the lack of interest in multilateral engagement in the US and the strategic use of bilateralism in Russia, there is little impetus for or chance of creating new institutions – thus, the only opportunity is to reinvigorate and expand existing institutions. It is in Germany and Europe's interest to uphold free trade and a liberal, rule-based market order as the EU is an energy importer reliant on external suppliers for more than halfits energy consumption, making.[97] For the EU to remain competitive, rules and norms must provide a level playing field for actors across Eurasia and pave the way for the Germany and other EU member states to export the technology and products needed for the energy transition. This will require the EU to redirect its focus from navel-gazing to horizon scanning.

Based on these identities and interests, Germany and the EU should promote and strengthen existing rules and norms and advocate the spread of common frameworks. EU member states and Brussels should also support and uphold international frameworks they are members of and reaffirm commitments to multilateral institutions and initiatives that establish the baseline for cooperation across Europe and Asia. Otherwise, the EU may find itself outside newly emerging regional dynamics. The EU has to attend to and fulfil its role and responsibility as a driver of technology and innovation and a promoter of norms and governance, meeting the needs and seizing the opportunities of an energy transition in accordance with the Paris Agreement. Falling into the trap of short-term crisis management instead of pursuing long-term goals will become much more difficult if the EU does not 'reimagine' and manage energy security threats and risks.

Existing institutions have to be utilized to coordinate policies to address energy-related risks and spearhead efforts to bridge the divide between differing regulatory or legal spaces. The EU can enhance its assistance to Energy Community countries to develop infrastructure hardware along with the *acquis* software and invest political capital in promoting the Energy Charter Process and the International Energy Charter. The EU should also re-invigorate support for multilateral instruments like the OSCE and UNECE that help facilitate an eye-to eye approach with Russia.

Overall, the EU must promote awareness, dialogue and mutual trust; shape and manage connectivity; enhance crisis management as it relates to energy and engage in the creation and promotion of a common code of conduct across different jurisdictions and regulatory and regional spaces.

- *Promote Awareness and Dialogue:* To improve awareness and establish common ground, the EU will have to support the creation of dialogue platforms to discuss issues that cross national and regional boundaries and require cooperation. Opportunities for dialogue not only to bring together private and public sector stakeholders but also foster coordination amongst different institutional actors that possess the tools necessary to address energy risks but lack the coordination mechanisms necessary to leverage them. Dialogue platforms, specifically for critical infrastructure, trade and transit, can provide a forum for diverse actors to discuss shared interests and challenges and develop rules of the road. Discussion platforms should not be limited to technical, operational or regulatory issues but also address the security climate and facilitate opportunities for cooperation while limiting room for political manoeuvre. The EU could empower

96 As agreed in a December 2004 Memorandum of Understanding between the OSCE and UNECE, accessible: http://www.unece.org/fileadmin/DAM/cefact/mou/MoU-OSCE.pdf.
97 Eurostat, accessible: http://ec.europa.eu/eurostat/statisticsexplained/index.php/Energy_production_and_imports.

existing institutions to convene crosscutting working groups to address these issues or promote cooperation and dialogue between institutions like the OSCE and UNECE. The EU could also explore opportunities for technical and regulatory exchange with the EEU and the SCO.

- *Shape and Manage Connectivity:* In a potential "interconnectivity" paradigm, energy infrastructure planning and protection will require further action. With the energy transition comes new infrastructure investment and construction, and while the EU has internal infrastructure planning mechanisms, there is no standing multilateral forum for public and private sector stakeholders to cooperate on cross-border infrastructure. The OSCE could convene a discussion platform or standing body for planning and emergency response to facilitate cooperation, coordination and information sharing. A multilateral infrastructure initiative could include or be supplemented by efforts to understand and map energy corridors and infrastructure, transport routes and critical network nodes or hotspots. Mapping would help stakeholders visualize, understand and track problems, while a common platform based on energy networks would facilitate communication and coordination across the energy supply chain.
- *Improve Crisis Management:* Despite the current and looming risks, effective energy crisis management mechanisms are lacking. Including and addressing energy risks in crisis management efforts is critical, as is taking both current and potential long-term risks into account. Improved crisis management in the neighbourhood will require new methods of concerted cross-organizational cooperation and enhanced tools to deal with the interface between geopolitics and energy. This is an opportunity to enhance the role of the OSCE, with its crisis management competency and environmental and energy security mandate. The OSCE's traditional toolbox and on-the-ground presence could easily be applied to energy risks under the umbrella of broader crisis management capabilities. In dealing specifically with 'frozen' conflicts, the OSCE could be a facilitator for a *status neutral approach* to ensure continued service provision and uninterrupted energy flows per the OSCE's role in humanitarian issues and human security.[98] The afore mentioned OSCE platform/standing body for planning and emergency response could also include or improve on the cross-border cooperation of CERTs and industrial control emergency response teams by having a standing list of contacts for an emergency along a corridor or integrated system.
- *Bridge Governance Gaps and Fault Lines:* The growing potential for energy fault lines, particularly with the EEU and OBOR, must be alleviated. The EU should be strategic and proactive, rather than ad hoc and reactive, in engaging with new regional blocs. Proactive engagement with the EEU could capitalize on opportunities for technical, operational and regulatory cooperation between the EU, Energy Community and EEU and the potential to develop a minimum set of compatible regulatory and technical guidelines and to bridge the regulatory fault lines. This includes harmonizing network codes and increasing cooperation at intersections or borders, as well as addressing issues like the cost-reflectivity of non-regulated tariffs, technical and regulatory arrangements for congestion management and cross-border capacity allocation and defining regulatory roles and functions. The formulation, dissemination and adoption of common principles would mitigate the risks of regulatory fault lines while fostering connectivity and enabling integration and cross-border energy projects.

Ultimately, connectivity and competiveness are crucial to Germany and the EU's future. Both have an interest in promoting connectivity, along with the rules of the road necessary to achieve this goal and transform risks into opportunities. The EU could offer the code of conduct to countries seeking both to participate in regional trade and guard against encroachment by regional powers and strong state-backed companies. This would also provide a set of standards EU companies could count on when expanding into new markets across the continent. The EU can use the code of conduct as a tool to promote to ensure competition and connectivity on its own terms, to preserve and extend market principles in the pursuit of a level playing field and to conquer open spaces for EU technology in pursuit of the energy transition.

98 Such an approach would leave aside the status of outstanding territorial issues in order to address shared energy challenges and enable cooperation. This is particularly relevant in military conflict or hybrid warfare situations where timely restoration of gas or electricity supply is paramount in order to prevent humanitarian emergency (see Øverland et al., *Energy Security and the OSCE* [see note58], 7).

Abbreviations

ACER	Agency for the Cooperation of Energy Regulators
AIIB	Asian Infrastructure Investment Bank
CEIP	Critical Infrastructure Protection
CERT	Computer Emergency Response Team
COMECON	Council for Mutual Economic Assistance
ECT	Energy Charter Treaty
EEA	European Economic Area
EEU	Eurasian Economic Union
EEZ	Exclusive Economic Zone
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
ENVSEC	The Environment and Security Initiative
EPCIP	European Programme for Critical Infrastructure Protection
GATT	General Agreement on Tariffs and Trade
HVDC	High-Voltage, Direct Current
ICC	International Chamber of Commerce
ICJ	International Court of Justice
ICSID	International Centre for Settlement of Investment Disputes
IEA	International Energy Agency
INDC	Intended Nationally Determined Contribution
IRENA	International Renewable Energy Agency
JCPOA	Joint Comprehensive Plan of Action
kWh	Kilowatt Hours
LNG	Liquefied Natural Gas
Mtoe	Million Tons of Oil Equivalent
NATO	North Atlantic Treaty Organization
NNCEIP	Non-Nuclear Critical Energy Infrastructure Protection
NUPI	Norsk Utenrikspolitisk Institutt/Norwegian Institute of International Affairs (Oslo)
OBOR	One Belt, One Road
OECD	Organisation for Economic Co-operation and Development
OIES	Oxford Institute for Energy Studies (Oxford, UK)
OPEC	Organization of the Petroleum Exporting Countries
OSCE	Organization for Security and Co-operation in Europe
PV	Photovoltaic
SCADA	Supervisory Control and Data Acquisition
SCO	Shanghai Cooperation Organization
SDGs	Sustainable Development Goals
SE4ALL	Sustainable Energy for All
TEN-E	Trans-European Networks
TSO	Transmission System Operator
UAE	United Arab Emirates
UN	United Nations
UNCITRAL	United Nations Commission on International Trade Law
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization