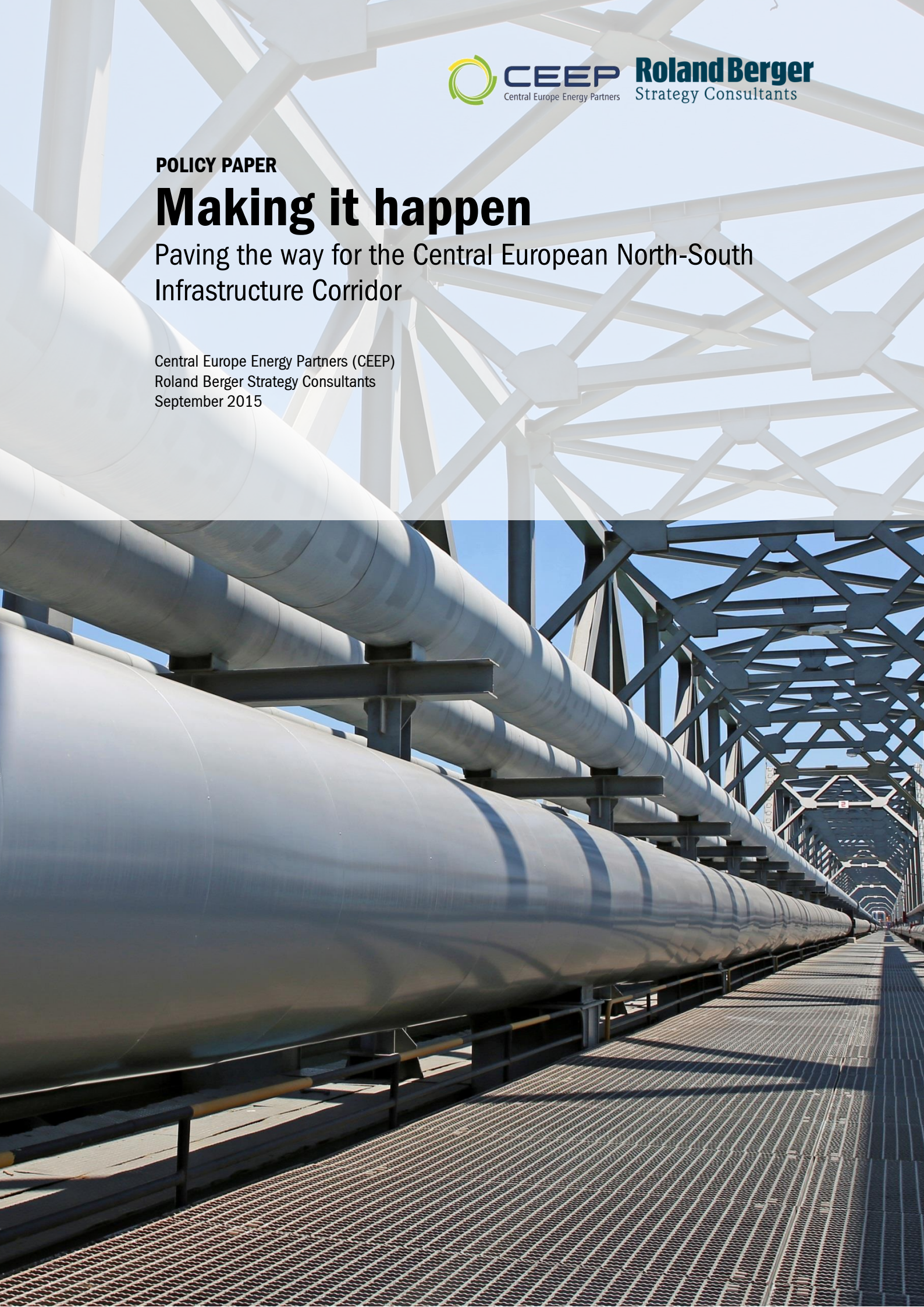


POLICY PAPER

Making it happen

Paving the way for the Central European North-South
Infrastructure Corridor

Central Europe Energy Partners (CEEP)
Roland Berger Strategy Consultants
September 2015



Executive Summary

The Central European North-South Infrastructure Corridor is a key enabler for completing the European integration process by bolstering the connectivity, competitiveness and security of the EU-11 and the European Union overall. Successful implementation of the Corridor would be a historical milestone in European integration, yielding enormous political, economic and social benefits. Of all sectors, highest priority is given to the further integration of Energy infrastructure in Central and Eastern Europe. The North-South Corridor comprises a set of interrelated gas, electricity and oil transmission infrastructure projects which connect Central and Eastern European markets from the Baltic Sea to the Mediterranean and the Black Sea. The Corridor seeks to overcome historically rooted East-West biases in cross-border transmission systems by implementing complementary North-South connections and thereby increasing the density, robustness and competitiveness of overall networks.

At a time when energy security is at the top of the political agenda and infrastructure investments are widely acknowledged as a powerful driver of growth and competitiveness as well as a fundamental pillar of European integration, various grand political plans are discussed in Europe's policymaking circles. However, many of these ambitious plans have little chance of ever becoming reality. The North-South Corridor must not become another such project, for it is too important to Central and Eastern Europe and the EU. Thus, this paper goes beyond reaffirming the sound political rationale of the Corridor and sets out to answer the fundamental question: How can we make it happen?

Our analysis looks at selected specific energy transmission projects which are part of the backbone of the North-South Corridor, i.e. the implementation of a North-South Backbone Natural Gas Pipeline connecting various Central European markets and tapping new upstream supply from e.g. LNG terminals in Poland and Lithuania as well as a future Adriatic LNG hub (e.g. Krk, Croatia). Moreover, we assess the implementation of additional high-voltage transmission lines to connect the energy island of the Baltic States via Poland with other countries, and major oil pipeline projects in the region. To facilitate an understanding of how critical parts of the Corridor can be financed and eventually implemented, the report reviews technical and financial project characteristics as well as the merits of their underlying business cases.

Since energy transmission infrastructures constitute natural monopolies, European Transmission System Operators (TSOs) typically receive returns on their assets via regulated network tariffs levied on consumers. This mechanism forms the regulatory backbone of energy infrastructure finance in Europe – and thus the natural financing environment for realizing the Corridor. However, energy security concerns may in addition call for direct budget support for certain strategic projects – to safeguard security of supply and keep network tariff levels in check for industrial and residential consumers. Consequently, our analysis looks both at market-driven rationales and political energy-security narratives behind key Corridor projects to paint a realistic picture of commercial financing options and private-sector involvement. Based on our assessment, there appears to be a gap between market-based financing potential and political aspirations underlying the Corridor. While the geopolitical case for the North-South Corridor is compelling, the realization of key projects through commercial finance alone will be challenging. As things stand today, new large-scale infrastructure

investments (particularly in the gas sector) may serve as much the long-term objective of energy security as the objective of meeting market demand.

In the gas sector, a Backbone Pipeline transmission system from Poland to Croatia would undoubtedly enhance Central and Eastern Europe's energy security, but insufficient and uncertain supply alternatives as well as little incremental market demand make a major project-financed deal unlikely. Instead, the pipeline with an estimated investment volume between EUR 3 bn and EUR 3.5 bn will probably have to be built piecemeal, as a set of successive TSO-financed interconnectors, likely from North to South given that Polish and Lithuanian LNG are the most concrete alternative supply source for EU-11 markets in the foreseeable future.

In the electricity sector, TSOs require both a more investment-conducive regulatory framework and additional equity finance to be able to finance new interconnectors as part of their regulated asset base. This holds for complementary projects to further connect the Baltic States with Central and Eastern Europe, like LitPol Link Stage 2 (ca. EUR 310 m total investment) which will be added to LitPol Link Stage 1 scheduled for completion by the end of 2015, as well as the reinforcement of the Baltic Corridor (ca. EUR 140 m total investment). Specifically, governments should create investment incentives through appropriate remuneration, enhance the stability/predictability of regulation, align national regulations and smoothen cost allocation in cross-border projects, provide risk-adjusted remuneration to get priority projects started and enable remuneration during the cash-intensive construction phase.

In the oil sector, important bilateral interconnectors to create alternatives to the Druzhba system are moving ahead with commercial finance wherever there is a viable business case. Major new transmission pipelines like the Pan-European Oil Pipeline with an estimated total investment of EUR 2.5 bn struggle to secure financing against the backdrop of stagnating demand and well-established supplier relations.

In conjunction with the findings of our project- and sector-level analysis, we propose a hands-on roadmap to achieve significant progress on the Corridor by implementing key projects by the end of the decade. Building on this momentum, the Corridor as a whole can be completed within the next ten to fifteen years. While there is no single silver bullet to facilitate the implementation of the Corridor, we believe that tackling political, regulatory and financial roadblocks in an integrated manner can pave the way for its implementation. Specifically, the roadmap foresees the following steps:

- > **Establish a regional Corridor co-ordination platform** that monitors the overall vision of the Corridor, supports project development, financing and technical planning, and facilitates the realization of projects that are critical for security of supply but feature a less favorable business case and thus require public support to bridge the financing gap. Existing coordination bodies – e.g. the regional groups for the gas and electricity sector in charge of preparing the selection of projects for the PCI-list – can serve as a useful starting point for the platform. However, to effectively mobilize financing and accelerate the realization of the corridor, we propose to complement existing efforts by adopting a more comprehensive platform which involves public and private sector financiers early on.

- > **Give the Corridor priority in European energy policy.** This needs to include preferred access to funding in order to enable early-stage planning activities as well as using public budgets, e.g. grants from the Connecting Europe Facility (CEF), to tip the balance for parts of the Corridor that will not be feasible through purely market-based mechanisms. Political endorsements need to facilitate access to favorable IFI-financing, most notably from the EIB. In this context, TSOs and governments need to undertake a concerted push to bring their projects into the newly set-up European Fund for Strategic Investments ("Juncker Plan") and obtain financing through the EIB
- > **Start a dialogue with national regulators and lawmakers** in order to create favorable regulatory environments that allow TSOs to prioritize projects in the context of the Corridor and find financial leeway to make them happen without further delay
- > **Realize the Corridor piece by piece** as supply and demand develop in relevant markets – so that major projects are built on a market-based business case and can mostly be financed through national TSOs, serving the respective markets and using established funding and financing instruments

Realizing key components of the North-South Corridor before the end of the decade should be a joint commitment of the European Commission, national Governments and TSOs as well as supporting financiers. It will require not only strong convictions, but very concrete steps to bring the key elements of regional co-ordination, regulatory frameworks and funding commitments into place. The roadmap put forth in this report provides an outlook on the key building blocks required for this joint undertaking.

This report is a result of a concerted effort by Roland Berger Strategy Consultants and Central Europe Energy Partners (CEEP). The authors wish to express their sincere gratitude to Grupa LOTOS S.A., PSE S.A., PERN "Przyjaźń" S.A. and GAZ-SYSTEM S.A., whose experts provided their unique experience to enrich the report's value, and contribute to recommendations.

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1 Background and rationale of the North-South Corridor

The countries of Central Europe have undergone a profound transformational process during the past quarter century. Their successful transition to democratic systems of government and market-based economies remains a remarkable accomplishment, culminating in the successive accession to the EU of currently eleven former communist states since the first Eastern enlargement round was concluded on May 1, 2004. Today, the integration of the new Central European members into the EU and its institutions ranks among the continent's greatest success stories. These new Member States have had to overcome a great number of obstacles, both on their road to and following their accession to the EU, but the integration process has placed them firmly on a trajectory of growth and integration.

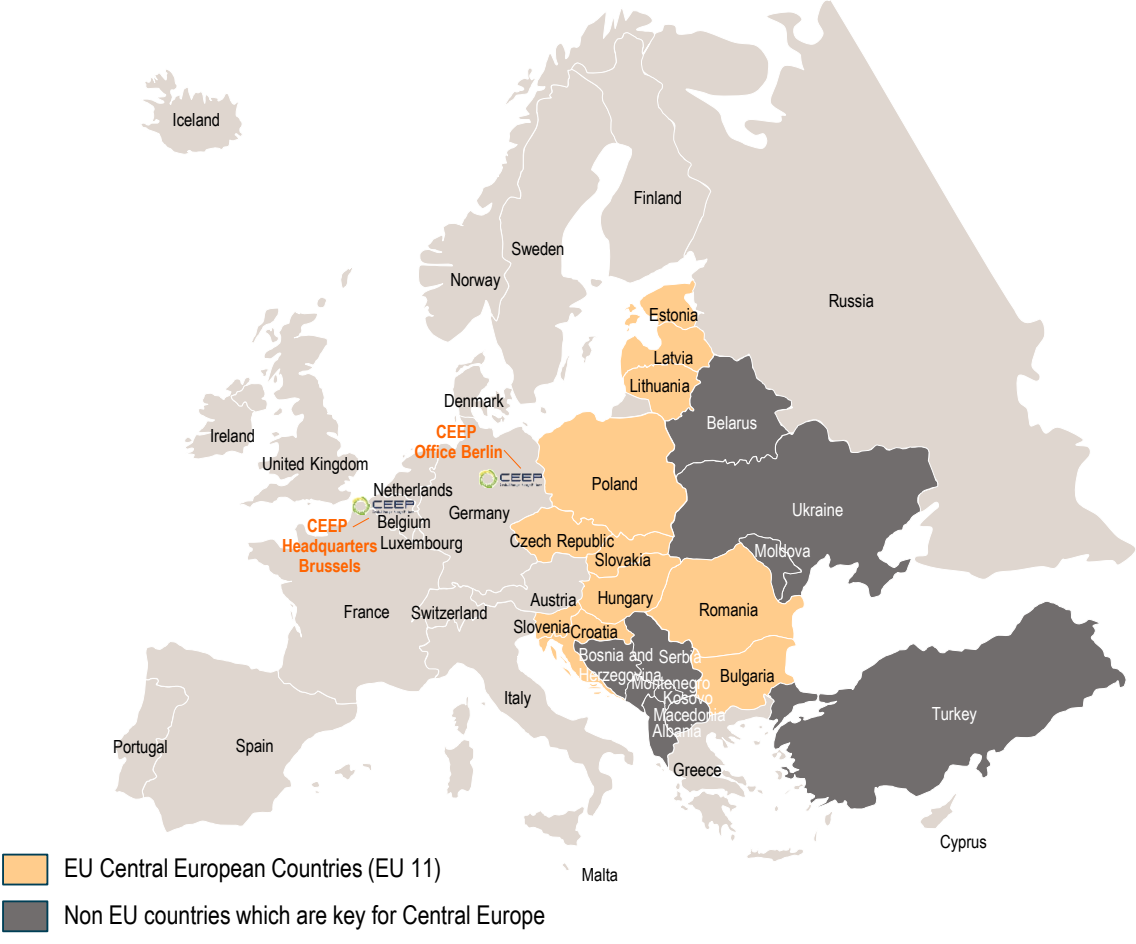
However, more than ten years after the enlargement, the process still remains incomplete – in consequence of both enduring historical legacies as well as current political and economic difficulties. As a result, Central European countries face a set of common challenges on their way toward completing the integration project. Overcoming them together would benefit not only EU-11 countries, but the European Union as a whole, making it more competitive, strengthening its industrial base and improving the ability to co-ordinate policies and politics.

The region of Central Europe spans from the Gulf of Finland in the North all the way down to the Adriatic and Black Seas, and includes the Balkans (Figure 1). Collectively, these countries form a Corridor of strategic importance, whose core consists of what is commonly referred to as the EU-11 – the EU's Central European members, comprising the states of Bulgaria, Croatia, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, and the Slovak Republic.

There can be no doubt about the historic achievement of these Central European countries' integration into the EU, both politically and economically. In political terms, the process has placed them firmly within the community of European nations and created a strong political union across the once-divided continent. In addition, it has led to the strengthening of ties with other Western countries, above all the United States, and the creation of a transatlantic sphere of peace and cooperation.

On the economic front, successive EU enlargement rounds have gradually extended the Single Market – the core of the EU's economic pillar – which now encompasses 28 member states, and has impacted virtually all areas of economic activity within the Union. This process has had a profound and lasting impact on the economic development of the EU-11.

Figure 1: Map of the region and CEEP areas of interest



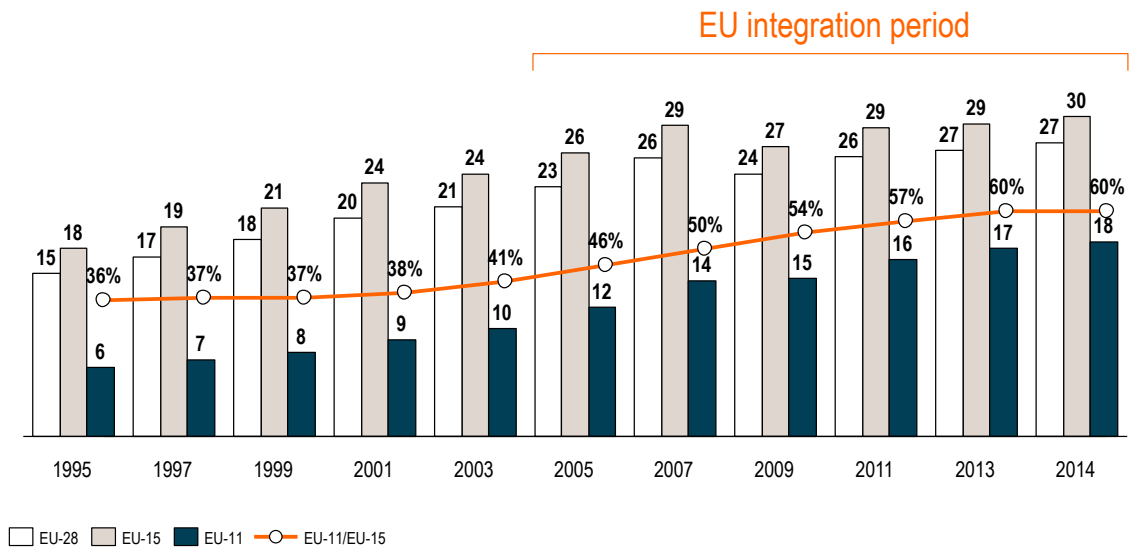
Source: CEEP, Roland Berger

As seen in Figure 2, the EU-11 have consistently moved closer toward the EU-15 in terms of economic development since the beginning of the integration process.¹ The past 20 years have seen a gradual convergence in gross domestic product (GDP) per capita between them. Their relative GDP per capita (i.e. EU-11-to-EU-15) – based on purchasing power parity (PPP) – has increased steadily from just under 37% in 1995 to around 42% before the start of the enlargement rounds in 2004, and currently stands at 60%. Looking at GDP per capita developments in absolute prices rather than based on Purchasing Power Standards (PPS) shows a similar trend of convergence, albeit at a

¹ “EU-15” refers to the 15 EU-members prior to the accession of Central European countries. They include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

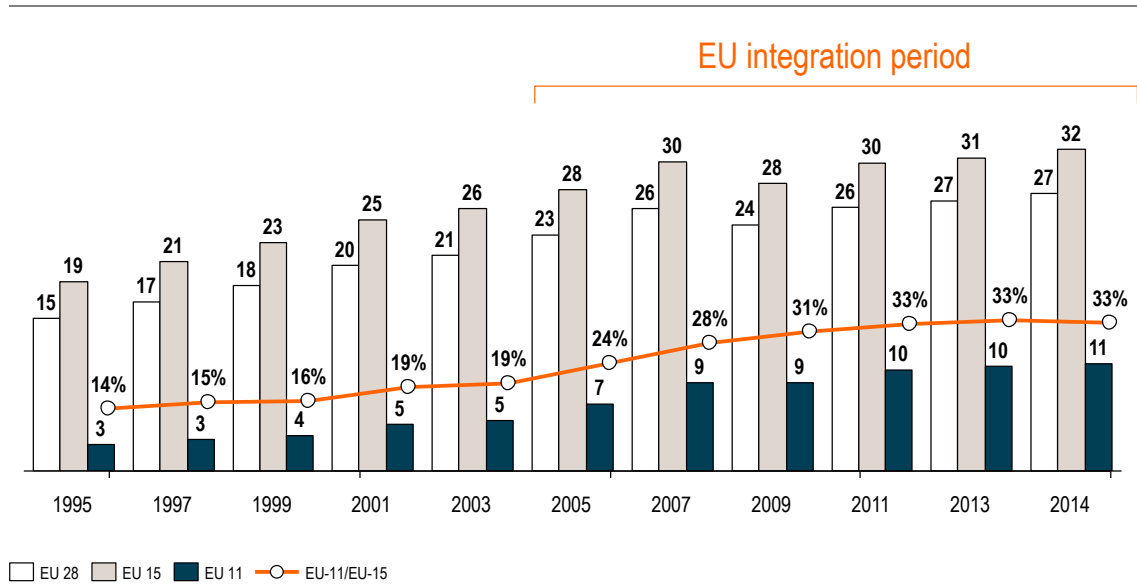
significantly lower level. In absolute EUR terms, GDP per capita in the EU-11 rose from 14% of EU-15 levels in 1995 to around 33% in 2014. The noticeable difference between absolute and PPP-adjusted GDP Figures reflects systematic differences in price levels between the EU-15 and the EU-11 countries which persist to this day.

Figure 2: Convergence of GDP per capita of EU-28, EU-15 and EU-11 ['000 PPS]



Source: Eurostat, Roland Berger

Figure 3: Convergence of GDP per capita of EU-28, EU-15 and EU-11 [‘000 EUR]



A key prerequisite for the successful continuation of this economic development and convergence process is a well-connected, modern infrastructure – above all a secure, competitive and sustainable energy system across the entire EU, including the EU-11. However, this energy dimension is one of the most important fields where integration has been lagging behind. A closer look at the EU-11 energy systems reveals profound common challenges to further economic and political integration, concerning security of energy and the completion of the Single Market in the Central European energy sector – particularly for natural gas. These common challenges facing the EU-11 form the central focus of this study.

Most importantly, while a lot of connections between EU-11 and EU-15 have been planned and completed, interconnectivity within EU-11 lags behind. There is a fundamental lack of connecting infrastructure in transmission systems in the energy sector, creating a need to both upgrade existing links and to build new ones in all three energy subsectors – natural gas, oil and electricity transmission.

In the gas sector, besides the need to upgrade existing infrastructure, there is a particular need for new interconnectors, especially along the north-south axis across the EU-11, both to enhance the region’s ability to better distribute existing energy supplies as well as gain access to new ones. Currently, the existing connectivity across the EU-11 is inadequate, which poses an obstacle to both energy security as well as the completion of the Single Market (Figure 4).

Figure 4: Natural gas pipelines in Central Europe



Source: Roland Berger

The discussion of additional gas transmission infrastructure arises in the context of alternative supplies for the EU-11, particularly non-Russian alternatives (notwithstanding free capacities in Russian pipelines, e.g. Nord Stream). New pipeline supplies could come from Scandinavia (Norway), the Caspian Basin, the Eastern Mediterranean and the Middle East all via the Southern Gas Corridor – or from global markets in the form of liquefied natural gas (LNG). All import sources require significant reception as well as transmission capacities in order to positively change the energy supply balance and enhance energy security. In addition to that, and consistent with the EU's Regulation concerning measures to safeguard security of gas supply (also known as "SoS regulation"), it is important that all new transmission facilities have reverse-flow capability in order to maximize flexibility of new infrastructure, both to be better able to mitigate supply shocks as well as to enable true energy market integration.

Moreover, the electricity sector suffers from both outdated, inadequate transmission links as well as missing connections. The most important shortfall concerns the Baltic States, which remain largely disconnected from the rest of Central and Eastern Europe (Figure 5).

Figure 5: Electricity transmission network in Central and Eastern Europe



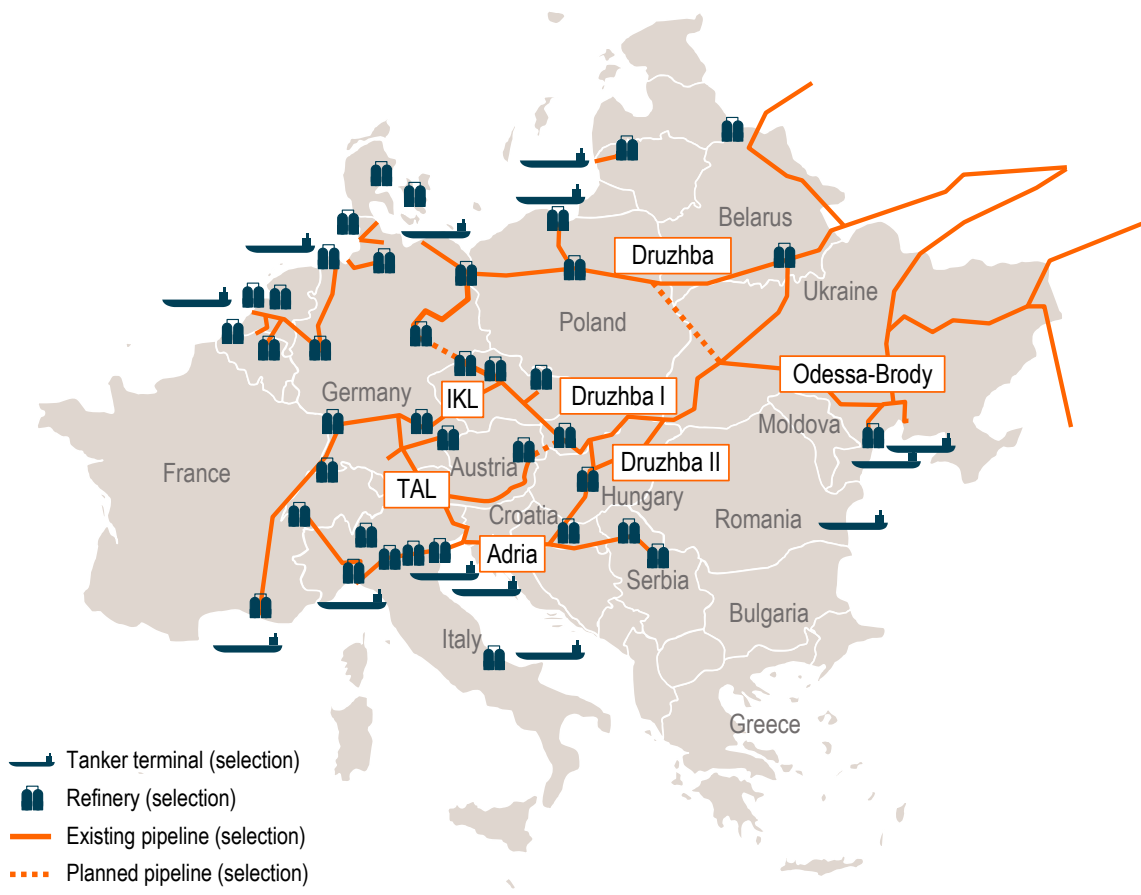
Source: Roland Berger

Consequently, linking the Baltic States to the rest of the continent is considered to be a key priority in this sector. What is more, there is a need to upgrade and extend existing transmission facilities across the entire region in order to allow for greater integration and to help the system better withstand fluctuations, e.g. as a result of the growing share of intermittent supplies from renewables.

While the state of the existing oil infrastructure allows the region to somewhat better withstand supply disruptions in this sector (among others because oil is transportable in more flexible and

interchangeable ways than natural gas), a closer look exposes a number of similar weaknesses as in the case of gas. This includes the need of upgrading existing pipelines, as well as the structural lack of new connections (Figure 6). In their 2014 *In-Depth Study of European Energy Security*, the European Commission identified a need for a cluster of oil projects, which together would serve to create a regional pipeline ring between Ukraine, Poland, Germany, the Czech Republic and Slovakia.

Figure 6: Crude oil pipelines in Central and Eastern Europe



Source: Roland Berger

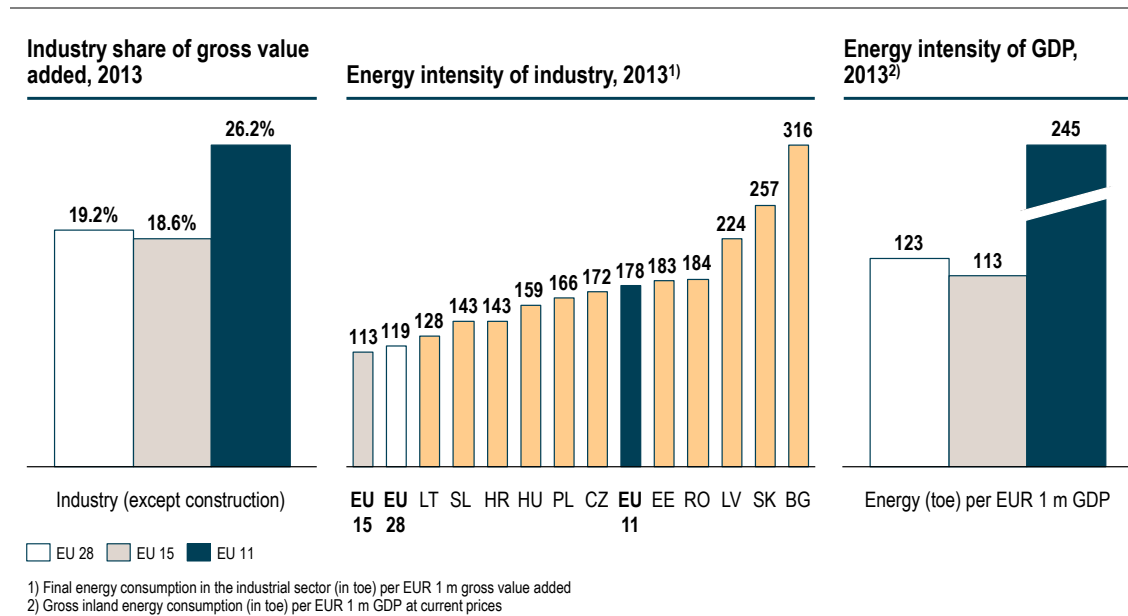
Common challenges, common objectives

As aforementioned, a closer look at the state of the Central European countries in terms of their energy systems reveals a set of common challenges. This paper takes the position that opting for a regional approach and addressing these challenges in an integrated manner is essential for achieving the goals of establishing lasting energy security and successful market integration. The following sections will further clarify the specific challenges experienced by the EU-11 before turning to recommended solutions and a proposed roadmap for the implementation process. The discussion will continue to focus on the broader regional perspective in order to highlight the strategic rationale underlying this study's key implications.

Crucially, the perspective taken here emphasizes the need to understand the broader region of Central Europe as a strategic Corridor, which currently suffers from both weak and missing links, and is in need of comprehensive upgrades of the existing infrastructure. The integrated approach proposed here would lead to a range of benefits by making use of synergies, which would be missed by focusing solely on the energy challenges of individual countries. The resulting synergy effects will enable the Corridor to form the backbone of Central Europe's energy infrastructure, which will further enhance Europe's energy security as well as allow the Single Market to extend across the region. This would promise not only greater competitiveness in the field of energy itself, but also have a positive impact across all sectors of the economy throughout the Corridor and beyond, due to energy's fundamental role as a strategic resource.

While a secure and competitive energy system is a prerequisite for any modern economy, it is a particular priority for the EU-11 as a result of the specific challenges those countries face due to their underlying economic structure. Central European economies are significantly more energy-intensive compared to the EU-15. This can be partly attributed to the EU-11's industrial sector being relatively more important to their national economies. In 2013, it accounted for over 26% of the EU-11's GDP (gross value added), while the comparable figure for the EU-15 was just under 19%. This sector in particular is considerably more energy-intensive across the Central European economies. In 2013, the EU-11's energy intensity measure for the industry sector was with 178 toe per EUR 1 m gross value added significantly higher than the EU-15's average of 113 toe per EUR 1m gross value added.

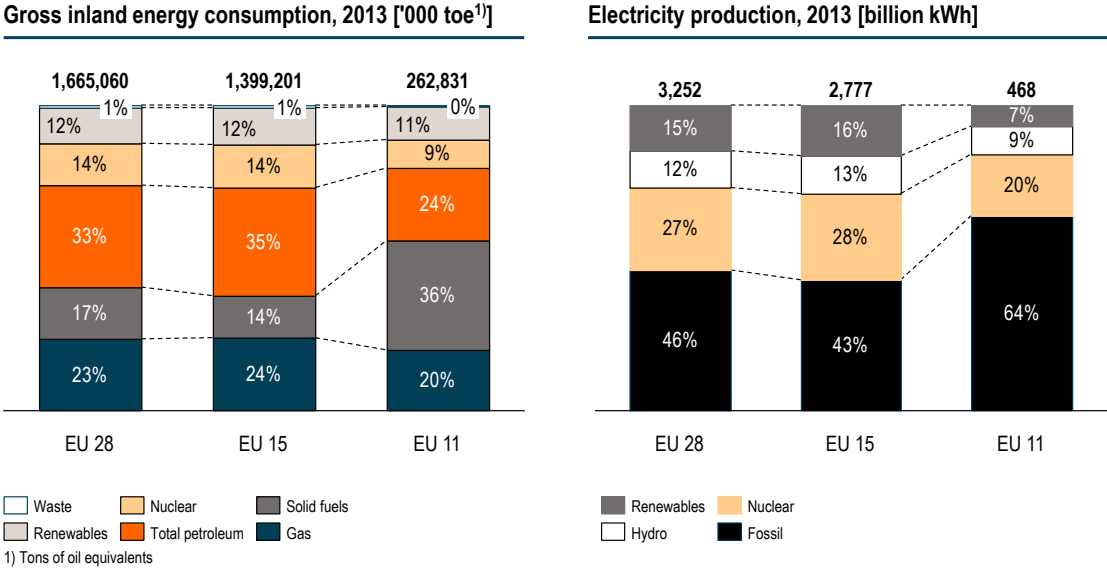
Figure 7: Economic structure of EU-11 economies



Source: Eurostat, Roland Berger

Also, there are important differences with respect to Central Europe’s energy mix. In particular, the EU-11’s economies rely more heavily on coal and lignite as energy sources, resulting in higher carbon intensity of the energy sector. For instance, while the 2013 share of all ‘solid fuels’ – which includes coal – made up 14 % of the total energy consumption within the EU-15, the EU-11’s share was 36%. Additionally, within the solid fuels category, lignite – with a higher carbon density than hard coal – accounted for a share of 40% compared to 24% in the EU-15. Fossil fuels dominate all other resources used in electricity production within the EU-11, where it accounts for a share of around 64%. In contrast, the EU-15 rely on fossil fuels at a much lower rate of 43% for power generation.

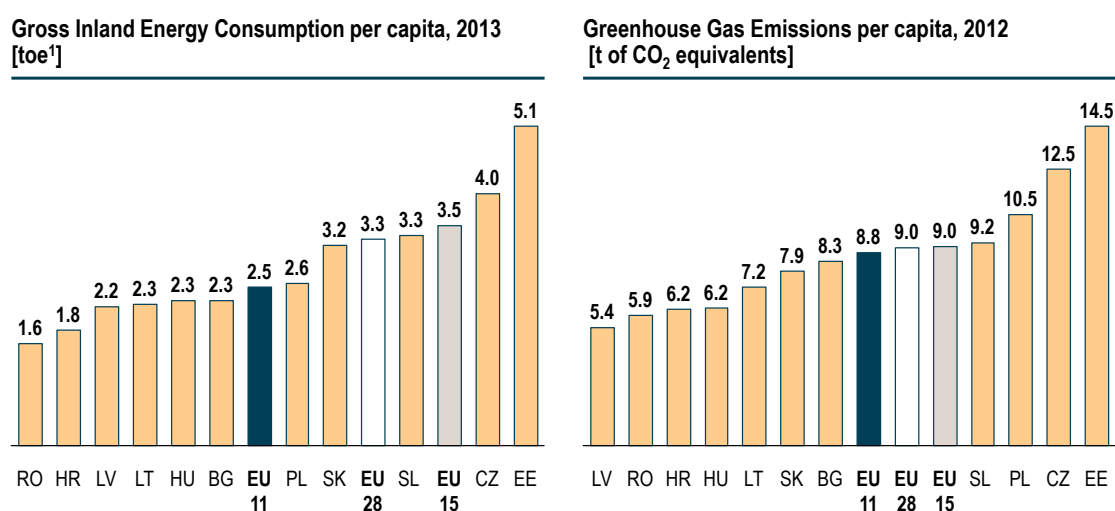
Figure 8: Energy mix of EU-11 economies



Source: Eurostat, Euromonitor, Roland Berger

It should be noted, however, that in absolute terms energy consumption per capita was still significantly lower in the EU-11 than in the EU-15. Specifically, Gross Inland Consumption per capita was at 2.5 toe in the EU-11 in 2013, compared to 3.5 toe in the EU-15. As a result of this lower absolute level of energy consumption, Greenhouse Gas Emissions per capita in the EU-11 countries were at 8.8 tons of CO₂ equivalents in 2013, thus still remaining well below the value of 9.0 recorded in the EU-15.

Figure 9: Energy consumption and greenhouse gas emissions per capita



1) Tons of oil equivalents

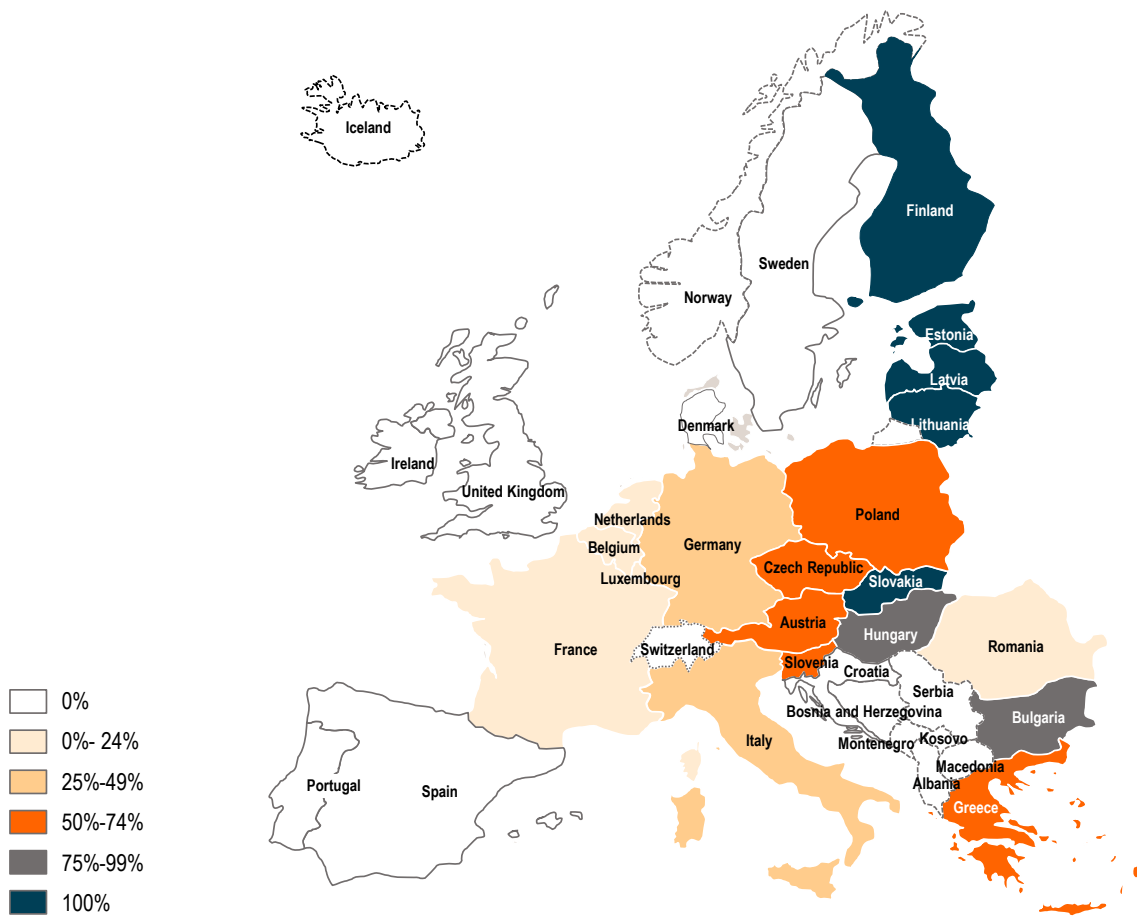
Source: Eurostat, Roland Berger

Moreover, and of fundamental importance from an energy security perspective, the EU-11 are overall significantly more dependent on Russia as a supplier of energy than the EU-15, which is first and foremost a historical legacy of Cold-War economic alliances as well as a consequence of geographical proximity. This is to a certain extent true for oil, but it is particularly predominant in the case of natural gas (Figure 10). While the EU-15 import about 21% of their natural gas supplies from Russia, the EU-11's share is 60% (as of 2013). As a comparison, the entire EU-28 average is about 27%.

However, the dependency on Russian gas supplies within the EU-11 is relatively uneven: Croatia does not import any Russian gas and Romania relies on Russia for about 15 % of their supplies. As of 2013, the Baltic States, on the other hand, were 100% dependent on Russian supplies, while the share of Bulgaria stood 97%. This picture changed only recently and only in the case of Lithuania with dependency on Russian imports dropping below 50% as the LNG terminal in Klaipeda was put into commercial operation and received its first cargoes from Norway. Moreover, some Norwegian gas was traded to Estonia. Nevertheless, the persistently high import ratios reflect the precarious situation the region would find itself in if Russian supplies were cut off for a prolonged period of time, for example as a consequence of the ongoing conflict in Ukraine. The 2009 Russia-Ukraine gas dispute last bore witness to such effects when all Russian gas flows through the Brotherhood

and Soyuz systems were halted for 13 days, particularly affecting the EU-11 and South-East European markets.

Figure 10: Dependency on Russian gas imports as of 2013



Source: Eurogas, Roland Berger

Supply diversification is an important element of energy security. The EU-11's core challenge in this respect is their dependency on a single external supplier of a strategic resource. It is interesting to note that the overall dependence on gas imports is actually higher for the EU-15 (90%) than the EU-11 (72%), but the supplier base is wider in the EU-15 with more diverse pipeline connections to upstream sources and a well-developed LNG infrastructure. The key to improving the EU-11's energy security position is thus to allow for access and distribution of energy sources from additional suppliers.

Energy security issues given the strong dependency on one supplier create a need for additional infrastructure – particularly in North-South directions. Another driver for investment is limited interconnectivity between the concerned countries as such. This limits the possibilities of accessing gas from non-Russian sources due to low integration with western markets, distributing it in the region and being prepared for sudden supply shortfalls.

Concerning the state of the energy infrastructure within the EU-11, one of the most central challenges is the fact that a large amount of the existing facilities are increasingly outdated and inefficient. This, again, is the case for all three energy system subsectors. The EU-11's electricity sector has generally lower efficiency levels compared to the EU-15. It experiences higher losses in both energy production and consumption than in the rest of the EU. Distribution losses in the EU-11 amount to nearly 10% while the comparable statistic is 7% within the EU-15. Losses incurred during the electricity production phase are also higher in the EU-11 with around 8% compared to 6.5% for the EU-15.

In addition to shortfalls in the quality of the existing facilities, there is a lack of electricity transmission infrastructure of adequate capacity, both domestically and in interconnections between the EU-11. Consequently, the region would greatly benefit from the construction of a North-South Electricity Transmission Corridor alongside the proposed developments in the gas system. The most important shortfall in the gas sector is the lack of a robust network of transmission infrastructure, especially along the north-south axis throughout the Corridor. The purpose of most connections built during the Cold War was to provide access to and from the Soviet Union. An effective network of interconnections within Central and Eastern Europe, however, was never put in place at that time. In case of the gas infrastructure, since 2009 the first steps have been made towards integrating the markets in the CEE region. However, despite these efforts the regional gas transmission infrastructure is still characterized by an “east-west-bias” (Figure 4 above). As a result, natural gas supply is not yet as fungible as oil supply, which can more easily be transported and re-routed and for which a single world market with largely harmonized pricing exists.

The EU-11's vulnerability due to its high dependence on a single supplier of natural gas means that the region is in fundamental need of a backbone gas transmission network along the North-South Gas Corridor. Such core connections could lead from Poland via the other members of the Visegrad Group, namely the Czech Republic, Slovakia and Hungary, across the Western Balkans to Croatia in order to serve as a central set of interconnectors along this Corridor central interconnector along this strategic Corridor. Additional connections could run both in eastern and western directions in order to form a resilient network, which would help truly integrate the EU-11's national transmission systems and eliminate remaining “energy islands” in the Baltic States.

Comprehensive development of such a Corridor would enable Central Europe to gain access to additional suppliers and effectively distribute gas resources across the entire region. Poland is

currently completing the construction of an LNG import terminal at its Baltic seaport of Świnoujście that will be put into operation by the end of 2015. In December 2014, a new LNG floating regasification and storage unit terminal started operations in the Lithuanian seaport of Klaipeda. An additional LNG import facility has been proposed for the Croatian port of Omišalj on Krk Island. Implementation of the abovementioned LNG projects together with complementary investments in gas infrastructure (cross-border and internal pipelines) would allow the EU-11 to gain direct or indirect access to LNG imports both via the Adriatic and Baltic Seas. Croatia's Adriatic coast could furthermore become a central hub for the reception and transmission of incoming gas resources arriving via the Southern Corridor, especially if the proposed Ionian Adriatic Pipeline (IAP) is built. IAP would continue the Trans Adriatic Pipeline (TAP) project, which is expected to be completed by the end of the decade and will transport Caspian gas via the Southern Gas Corridor to continental European markets.

Access to additional gas resources would allow the EU-11 to better withstand potential supply disruptions in the event of a crisis. In addition, it would strengthen the single market in the natural gas sector and consequently contribute to a more competitive pricing system across Central Europe, which would also benefit the region's national economies.

A key requirement for additional supplies to provide any effective relief is, however, the existence of a robust transmission network, which currently (and most importantly) lacks appropriate additional north-south connections. Once in place, such a network would benefit the broader region as a whole. But, the scope of such a project of regional importance requires a coordinated and integrated approach, and the support and involvement of all affected parties.

However, its political and economic value due to its potential to simultaneously enhance the EU-11's energy security profile and to provide a boost to further economic integration is widely acknowledged. As mentioned above, the region experienced the consequences of a Russian gas cut-off last in January 2009 because of a pricing dispute between Russia and Ukraine – the most important transit route for Russian gas flows to European markets. During this episode, gas supplies first decreased and eventually were interrupted, affecting large parts of Central and especially Southeastern Europe. Even though it lasted for only about two weeks, the cut-off had severe consequences for the affected countries. Bulgaria, for example, was forced to suspend a number of its industrial processes and Slovakia declared a state of emergency. Overall, this experience revealed both a lack of preparedness as well as the need for new measures to be coordinated and implemented at regional level. This is because supply crises of this kind can neither be contained nor effectively mitigated at a country-level. Instead, what is needed is a regional, systemic approach that further integrates the Central European states by jointly creating a more resilient energy system.

In sum, then, the main rationale and strategic vision underlying the proposed construction of north-south gas interconnections – linking the Baltic with the Adriatic and Black Sea regions – is that it

would strengthen the entire Central European strategic position by providing an effective energy transmission network, thereby helping to simultaneously meet two key energy challenges facing the EU-11. First, it would increase supply security by allowing for diversification of resources. And secondly, it would improve the region's overall competitiveness by strengthening the single market in the energy sector.

BOX 1 – The North-South Transport and ICT Infrastructure Corridor: While improving the energy infrastructure along the North-South Corridor remains the most important objective with regard to geo-political considerations, the transportation and telecommunication infrastructure in Central and Eastern Europe is in need of expansion and upgrading, too.

Quite like the construction of a North-South Energy Corridor, further development of transportation infrastructure along the North-South Corridor aims at better and faster connectivity between the Central and Eastern European Member States and the constitution of strategic links to major markets in Europe and Asia. In the following paragraphs we will outline the main rationales for creating a North-South transportation and telecommunications Corridor in Central and Eastern Europe.

In the transportation sector, implementing infrastructure projects which contribute to completing the Adriatic-Baltic Corridor constitutes the most relevant policy priority in the North-South Corridor Region in Central and Eastern Europe. The Adriatic-Baltic Corridor stretches 2,400 km from Gdynia and Świnoujście in Poland to Ravenna and Trieste in Italy, connecting the Baltic and Adriatic ports, through industrialized areas between Southern Poland (Upper Silesia), Vienna and Bratislava, the Eastern Alpine region and Northern Italy.

Thus, the Adriatic-Baltic Corridor mirrors the course of the North-South Corridor and gains strategic relevance by improving transportation interconnections in Central and Eastern Europe. Its route is one of nine transport Corridors that form the Trans-European Transport Network (TEN-T) as defined by the European Commission. The aim of the European Commission's transport infrastructure policy is to close gaps between Member States' transport networks and remove critical bottlenecks. The TEN-T network comprises railways, roads and ports and emphasizes the promotion of modal integration (particularly at ports) and interoperability. Furthermore, the policy also targets the quality of the infrastructure, especially in the Eastern Member States. The core network comprises, amongst others, the upgrade of 15,000 km of railway lines to high speed and 35 cross-border projects to reduce bottlenecks.

The rationale for completing the TEN-T Corridors is to enable seamless transport for passengers and freight across Europe and hence contribute to the EU's *raison d'être* of completing the Single Market. Among the TEN-T Corridors, the Adriatic-Baltic Corridor constitutes one of the most important trans-European road and railway axes. With 24 m tons of freight per year it is nearly as important a cross-Alpine line as the Gotthard Line in Switzerland (26 m tons of freight per year). The Adriatic-Baltic Corridor runs through five EU Member States (Poland, the Czech Republic, Slovakia, Austria and Italy) and connects regions with a population of more than 40 m. It links the ports of the Adriatic and Baltic Seas to intermodal nodes that integrate the Corridor into the larger TEN-T network, for example via the TEN 17 axis Paris-Vienna-Bratislava and the North Sea-Baltic Corridor Tallinn-Warsaw-Berlin-Rotterdam. By connecting Central and Eastern Europe to the Adriatic ports, the Adriatic-Baltic Corridor also links the Central and Eastern European countries to the Asian markets via the Suez Canal.

While the development of Europe's transport infrastructure enjoys high priority among the EU institutions and the Member States' governments, the telecommunications dimension often seems to be underestimated with regard to interconnections. While it is true that both transportation and telecommunication depend on connectivity, the development of capable telecommunication networks is considered foremost a national task. However, the future economic development and prosperity of the European Union's Member States rests in large parts on a capable digital infrastructure which facilitates effective cross-border exchange and economic activity. Without dependable and high performing broadband connections, businesses in the region face the risk of being disconnected from the growth opportunities of the global digital marketplace. Since the accessibility of digital infrastructure such as broadband connections is scarce in most countries of Central and Eastern Europe, mitigating the digital weakness of the countries along the North-South Corridor should become a prior issue for both the European Union and the Member States. Broadband coverage is especially low in the rural regions of Central and Eastern Europe. This is due to the fact that the economic case for increasing broadband coverage in sparsely populated regions is weak. Private investors face low incentives to invest in these regions, which underlines the case for a stronger financial commitment by both the European Union and the national governments.

Aside from its economic importance, improving the digital infrastructure along the North-South Corridor is essential with regard to global security aspects of the internet. Critical infrastructures heavily depend on both reliable and secure digital integration. Nation states can only deal with global terrorism and cybercrime if they can rely on safe and well developed telecommunication networks. While national security clearly is the responsibility of the national governments, the European Union should contribute to a secure digital infrastructure by orchestrating the Member State's efforts.

Common objectives – Building the North-South-Energy Corridor

The profound common challenges in the region described above have given rise to the strategic vision of a "North-South-Infrastructure-Corridor" – a set of coordinated infrastructure projects in Central European countries linking the Baltic with the Adriatic and Black Sea regions. The need for completing this Corridor and its outstanding strategic relevance, both politically as well as economically, have been widely acknowledged among policy makers in EU member states, Brussels, and Washington.

The report "The Completion of Europe – From the North South Corridor to Energy, Transportation, and Telecommunications Union" jointly prepared and issued by the Atlantic Council and Central Europe Energy Partners (CEEP) in 2014 marked an important milestone in the policy-level discussion. It provided a systematic account of the challenges ahead of the region and discussed a wide range of specific potential infrastructure projects which could serve as building blocks for completing the Corridor.

Many of the specific project ideas put forth in the 2014 report have been under discussion for quite some time. This holds true in particular for a comprehensive set of proposed large-scale, cross-border transmission infrastructure projects in the energy sector, not least due to the paramount role of energy security for the region's overall economic prospects. However, while the need for putting into place strong north-south energy transmission links in the electricity, oil and gas sectors is virtually uncontested, projects have struggled to move from idea to implementation.

The implementation of a project of this scope faces a number of challenges, ranging from effective coordination among the relevant public and private actors involved to tackling technical and administrative obstacles and addressing environmental concerns to secure public support. While some of these factors may contribute to the apparent deadlock, observers agree that financing challenges constitute the key roadblock that needs to be removed to get project ideas off the drawing board and facilitate implementation. Paving the way for completing the Corridor will thus fundamentally hinge on securing the necessary financing to jumpstart the implementation process. Therefore, our study focuses on advancing the discussion on how to finance the energy infrastructure projects which make up the Corridor, seeking to move the Corridor vision one step further.

The time is now for taking the discussion on financing the North South Energy Corridor projects to the next level. The current geopolitical situation and recent EU policy initiatives have created a favorable climate for advancing the Corridor, providing a window of opportunity to take the initiative one step further and launch discussions on financing specific projects:

First, the ongoing conflict in Ukraine has underscored the latent energy security risks that Central and Eastern Europe continues to be exposed to. Previous gas supply cut-offs already had significant consequences across the EU-11, but ramifications would undoubtedly be much greater if supply

disruptions were to continue over an extended period of time. Currently, no viable solution to the root causes of conflict appears to be in sight. As a result, no reliable estimate can be given at this point regarding possible future developments in Russian-Ukrainian relations. This uncertainty further underscores the need to tackle the region's energy security challenges with strategic solutions – and thus with the necessary foresight and vision. Furthermore, building the Corridor could have an important geopolitical signaling effect beyond the EU-11. Delineating a concrete pathway for enhancing energy security and diversification of supply in Central and Eastern Europe would provide a powerful, tangible underpinning of the European Union's solidarity with Ukraine in its current struggle for maintaining independence and national unity.

Second, the timing for promoting the Corridor is favorable with regard to the current EU infrastructure agenda. Shortly after assuming his new position, the current President of the European Commission Jean-Claude Juncker announced an ambitious plan to confront the negative economic climate across much of Europe and the low level of long-term investments by mobilizing private capital for infrastructure investments across Europe. According to its architects, the “Investment Plan will unlock public and private investments in the real economy of at least EUR 315 bn” between 2015 and 2017. Given Central Europe's profound challenges to its energy future, many of the necessary measures of the North-South Energy Corridor would likely be eligible for financing support under the EU's new "European Fund for Strategic Investments" (EFSI)², which is currently being established with the European Investment Bank (EIB). Securing funding via the EFSI could help unlock a number of complementary financing options, both from public and private sources.

What is necessary at this point is to put the North-South Energy Corridor even higher on the political agenda and pave the way for implementation. In fact, many of the necessary measures have already been discussed and outlined before. What matters most now is to highlight the regional approach underlying the proposed project by tying together isolated challenges and providing an integrated solution, which would transform the Corridor from an Achilles heel into a strategic asset. As a result of its political and economic significance, the next step should be to ensure that key projects receive the necessary priority as a matter of public concern.

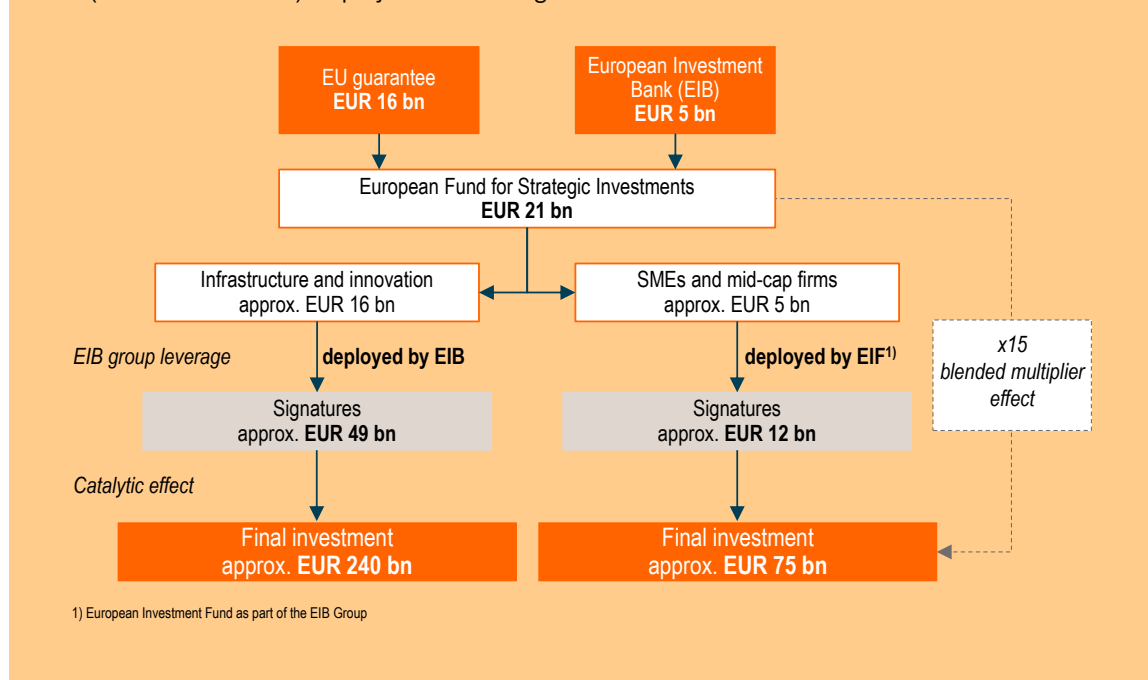
² Our discussion refers to the proposed European Investment Plan and the legislative proposal on the European Fund for Strategic Investments put forth in January 2015 (COM(2015) 10). Please note that the discussion surrounding the EFSI still evolves and is subject to continuous amendments in the course of the ongoing legislative process.

BOX 2 – The European Fund for Strategic Investments (EFSI): The "Investment Plan for Europe"¹ proposed by Jean-Claude Juncker is the European Commission's response to the current deadlock in European infrastructure financing. At the heart of the initiative lies the European Fund for Strategic Investments (EFSI). Its aim is to bridge the gap between the abundant liquidity on the capital markets and the pressing need for investment in infrastructure. The EFSI aims to tackle the issue of low confidence and limited risk appetite on the part of investors by using public funds to absorb some of the risks involved in infrastructure projects. It builds on a guarantee of EUR 16 bn from the EU budget and EUR 5 bn in capital from the European Investment Bank (EIB). This initial contribution of EUR 21 bn will serve as the basic risk buffer, enabling the EIB to then provide financing to infrastructure projects with a high risk profile, primarily through subordinated debt. This initial risk absorption by the EIB which is backed by the EFSI's guarantees, in turn, is expected to catalyze large-scale additional investments from private investors into more senior tranches of infrastructure debt with lower risk exposure. According to estimates by the European Commission, this leverage mechanism is expected to reach a blended multiplier effect of up to 1:15. In other words, every EUR 1 of public funds provided as guarantee for risk protection will catalyze a total investment of EUR 15, adding value in the real economy. Consequently, the initial EUR 21 bn in public contributions is expected to mobilize a total of EUR 315 bn over the next three years (2015-2017). Of this overall amount, approximately EUR 240 bn is earmarked for long-term strategic investments of European significance in infrastructure, most importantly energy, transportation and broadband networks. The remaining EUR 75 bn of the anticipated investment capacity will be dedicated to financing SMEs and mid-cap companies across Europe.

According to Regulation EU 2015/1017, the EFSI will be set up within the EIB Group. All EFSI operations will be implemented within existing EIB Group structures and will be subject to standard due diligence by EIB staff. The overall strategic direction of the fund will be determined by the EFSI's Steering Board, which will be made up of representatives from the European Commission and the EIB. Most importantly, this body will develop general investment guidelines defining which types of projects the EFSI will finance in line with its overall objectives. An independent Investment Committee will be in charge of deciding which specific projects will receive financing support through EFSI guarantees.

The EU Member States endorsed the Regulation for a European Fund for Strategic Investments on March 10th and the European Parliament voted through the Regulation on June 24th, allowing the EFSI to be operational by fall 2015 as planned. On July 22nd, the EIB and the European Commission concluded a series of technical agreements completing the formal establishment of the EFSI. Furthermore, the four members of EFSI's Steering Board were also appointed.

As of August 2015, nine Member States have come forward with contributions to the EFSI via their promotional banks. In February, Germany announced that it would contribute EUR 8 bn to the Investment Plan through KfW. Also in February, Spain announced a EUR 1.5 bn contribution through Instituto de Crédito Oficial (ICO). In March, France announced a EUR 8 bn pledge through Caisse des Dépôts (CDC) and Bpifrance (BPI) and Italy announced it will contribute EUR 8 bn via Cassa Depositi e Prestiti (CDP). In April Luxembourg announced that it will contribute EUR 80 m via Société Nationale de Crédit et d'Investissement (SNCI), and Poland announced that it will contribute EUR 8 bn via Bank Gospodarstwa Krajowego (BGK). In June, Slovakia announced a contribution of EUR 400 m through its National Promotional Banks Slovenský Investičný Holding and Slovenská Záručná a Rozvojová Banka, and Bulgaria announced a contribution of EUR 100 m through the Bulgarian Development Bank. On 16 July, the UK announced that it will contribute GBP 6 bn (about EUR 8.5 bn) to projects benefiting from EFSI finance.



Outlook

Against this background, the main objectives of this study are to sketch an integrated approach to solving the financing challenges for putting into place the North-South-Energy Corridor and to lay out a roadmap for the implementation of major projects or sets of new infrastructure. As approaches to financing and related issues vary across the energy system's most relevant subsectors (gas, oil, and electricity) and also depend on the specific project at hand, the discussion will have to move from the general Corridor perspective to the level of subsectors and concrete projects to analyze the most relevant financing issues and develop potential pathways for resolving them. Building on this rationale, the remainder of the study proceeds as follows:

In Chapter 2, we review and evaluate the set of energy transmission infrastructure project ideas for the Corridor currently under discussion in order to identify specific focus projects in the oil, gas and electricity sector. For each of the three sectors, we single out specific project ideas for our in-depth analysis of financing issues and potential solutions. The selected focus projects are meant to serve as archetypes, which can yield important insights for other projects and entire (sub-)sectors and thus contribute to advancing the financing discussion as a whole.

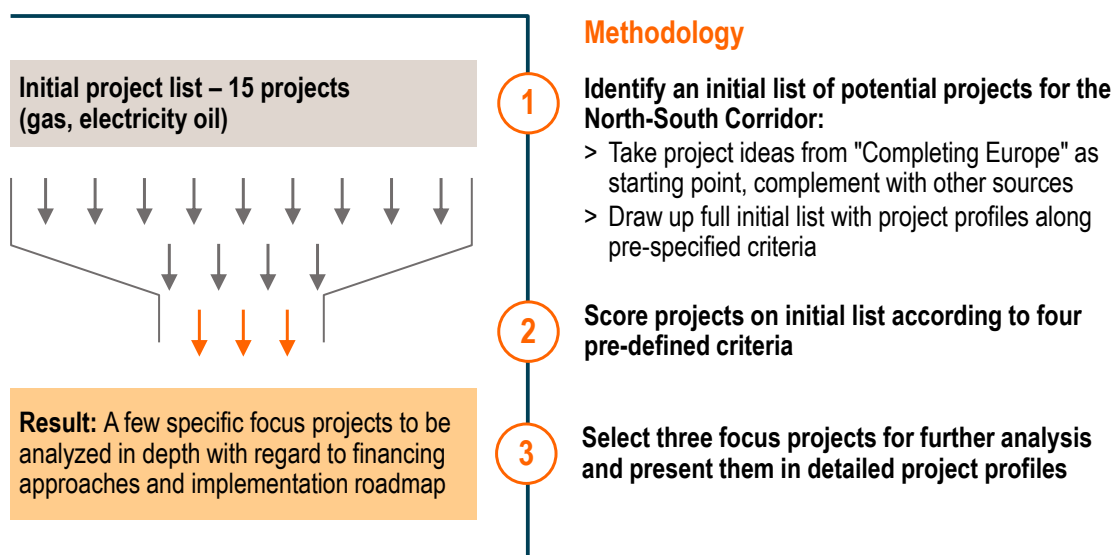
Chapter 3 will initially provide a brief overview of typical financing approaches and models for large-scale energy transmission infrastructure projects and present a check-list of key pre-requisites that have to be met to effectively mobilize financing. Based on this analytical framework, we then assess the financing situation of the focus projects in greater detail to identify the most pressing financing challenges and develop high-level recommendations for solutions.

Building on the insights of the project and sector level analyses in Chapter 3, Chapter 4 then develops a specific policy-level roadmap for advancing the North-South-Energy-Corridor in the years ahead. The roadmap will entail an integrated procedural blueprint for implementing the Corridor, describing the issues to be tackled, the stakeholders needed to resolve them, the formats most conducive to cooperation, and the timing and sequence to be followed to produce meaningful progress.

2 The North-South Corridor: A project-based perspective

To get the North-South-Energy-Corridor off the drawing board, the overarching idea needs to be fleshed out and translated into specific projects. To identify and select a set of promising project ideas for further analysis and discussion, we apply the approach shown in figure 11. First, we build an initial list of potential projects for the North-South Corridor, covering the gas, electricity and oil sub-sectors. In a second step, we score the projects on the list by applying pre-defined evaluation criteria, resulting in a ranking of projects for each of the three sub-sectors. Finally, we select the top-ranked project for each sub-sector as an archetypical focus project for our detailed financing analysis.

Figure 11: Methodology used to select the focus projects



Source: Roland Berger

2.1 Identifying projects

The starting point for building an initial list of energy transmission infrastructure projects along the Corridor is the study "Completing Europe" put forth by the Atlantic Council and Central Europe Energy Partners (CEEP) in 2014 and the projects identified and analyzed therein. "Completing Europe" discusses a wide range of projects deemed essential for closing connectivity gaps in Central Europe's energy infrastructure and fostering security of supply and effective integration into the European Union's energy system. Thus, the projects assessed in the study "Completing Europe" align

with the focus of this analysis and serve as a useful starting point for compiling a first broad overview of key investments.

To make sure that our analysis captures the full picture and takes into account the most recent developments of the energy infrastructure debate in the Corridor region, we cross-check the projects discussed in "Completing Europe" with a number of complementary public sources. First, we review the projects included in the ten-year network development plans (TYNDP) of the European Network of Transmission System Operators for Electricity (ENTSO-E) and Gas (ENTSO-G). Furthermore, we examine which of the projects listed as Projects of Common Interest (PCI) by the European Commission could contribute to our list. Both sources provide valuable details on the respective projects. As a final check we took into account recent studies of major European energy think tanks in order to identify additional projects, which may prove relevant for our analysis. By combining and integrating the relevant information from all of the aforementioned sources we arrive at a comprehensive initial list of potential energy infrastructure projects along the Central North-South Corridor. In the following sections we will present the listed projects for each energy sub-sector (gas, electricity, oil).

2.1.1 Natural gas sector

Our initial list of natural gas projects includes five projects which are presented in Figure 12. The list outlines a non-exhaustive selection of essential infrastructure projects contributing to the North-South Corridor in the natural gas sector, mainly taking CEEP's policy proposals as per the 2014 study "Completing Europe" as a starting point.

The first project is the North-South Backbone Pipeline connecting future LNG terminals in Poland and Croatia, thus providing natural gas along its route through Lithuania, Poland, the Czech Republic, Slovakia, Hungary and Croatia. The project is in fact an agglomeration of several projects that seeks to enable continuous gas transmission between the Baltic, Adriatic and Black Seas, even in the absences of Russian supplies. Some parts of the Backbone Pipeline are already in place or are currently being planned or built as part of several Projects of Common Interest (PCI). The Backbone Pipeline aims at bridging missing links and implementing a full trunk line that connects supply anchors from all directions. "Completing Europe" estimates the total investment for the Backbone Pipeline to be EUR 3-3.5 bn.

Figure 12: Initial list of natural gas transmission projects

| Project Name | Cross-border | Countries involved | Routing (from to) | Investment (est.) | Status |
|---|--------------|--------------------|---|-------------------|---|
| North-South Backbone Pipeline | yes | PL, CZ, SK, HU, HR | Świnoujście (PL) to Omišalj (HR) | EUR 3-3.5 bn | Some sections are in place or in progress |
| LNG main gas transit pipeline Zlobin-Bosiljevo-Sisak-Kozarac-Slobodnica | no | HR | Zlobin (HR) to Slobodnica (HR) | EUR 450-500 m | FEED |
| Ionian Adriatic Pipeline | yes | HR, BA, ME, AL | Fier (AL) to Split (HR) | EUR 580 m | FEED |
| Gas Interconnector PL-LT (GIPL) | yes | PL, LT | Rembelszczyzna (PL) to Jauniūnai (LT) | EUR 558 m | Permitting |
| West-East Corridor: Interconnector DE-PL (beyond FGL304) & Interconnector PL-UA | yes | DE, PL, UA | Schwennenz (DE) to Szczecin (PL) & Drozdowichi (PL) to Bilche-Volytsya (UA) | EUR 440-460 m | Origination |

Sources³: European Commission, ENTSO-G, CEEP, Roland Berger

The second project, the LNG main gas transit pipeline routed from Zlobin to Slobodnica, has a much smaller price tag. The pipeline will cost approximately EUR 500 m and passes only through the territory of the Republic of Croatia. However, it has regional strategic significance since it is the main evacuation gas pipeline from the designed LNG terminal on the island of Krk towards Hungary.

Connecting Croatia's gas transmission system with the Trans-Adriatic Pipeline is the main task of the Ionian Adriatic Pipeline from Fier in Albania to Split in Croatia. Thus, it could both transport gas from the Middle East and Caspian regions to markets in Central Europe and from the planned LNG terminal in Croatia to Albania and Montenegro.

The Gas Interconnection Poland-Lithuania has already gained PCI-status and receives funding under the European Union's Connecting Europe Facility. The main rationale for implementing this pipeline is the integration of the isolated gas markets of the Baltic countries into a single European gas market. The project would help to diversify gas supply sources and routes and improve the security and reliability of gas supplies for the Baltic States.

³ Project proposals as well as investment cost estimates are based on CEEP "Completing Europe" (2014) as well as ENTSO-G's TYNDP 2015 and the European Commission's lists of Projects of Common Interest. FEED refers to a project's Front End Engineering Design.

The West-East Corridor refers to an integrated proposal of strengthening the bidirectional transmission capacities among Germany, Poland and Ukraine – as key complementary infrastructure to the Backbone Pipeline. It is supposed to connect the diversified gas markets in Western Europe with its gas hubs and Non-Russian supplies (e.g. from Norway) with Poland's and Ukraine's gas transmission systems. Thus, the pipeline would be able to connect Ukraine to the Central and Eastern European gas market and the Backbone Pipeline as well as to global gas supply channels via the designed LNG terminal in Świnoujście in Poland. Specifically, it refers to two new interconnectors while otherwise building on existing infrastructure: one from Germany to Poland and one from Poland to Ukraine.

2.1.2 Electricity sector

Four projects have made it onto our initial list of electricity interconnectors as shown in figure 13. The first project, LitPol Link Stage 2, comprises the continuation and completion of the power interconnection between Poland and Lithuania. The interconnector enjoys high strategic priority on policymakers' agendas, as it can help to connect the Baltic energy island to the Continental European electricity market.

The same holds true for the second project, the Baltic Corridor. This project includes several infrastructure investments that will enable better electricity transmission from North Estonia to Lithuania in the south of the Baltic States.

The Mid Continental East Corridor is important to enhance the stability of the electricity network in Romania and the Republic of Serbia. The project helps to integrate significant amounts of electricity from intermittent renewable energy sources into the network and thereby avoids grid overloads.

Finally, the Black Sea Corridor aims at reinforcing the electricity transmission network along the coast of the Black Sea and enhancing European market integration. It comprises various capacity increases in Romania and Bulgaria as per PCI 3.8.

Figure 13: Initial list of electricity transmission projects

| Project Name | Cross-border | Countries involved | Routing (from to) | Investment (est.) | Status |
|-------------------------------|--------------|--------------------|---|--------------------|--|
| LitPol Link Stage 2 | yes | LT, PL | (additional power lines in Poland, additional converter station in Lithuania) | EUR 310 m | Engineering & Permitting (PL) Planning (LT) |
| BalticCorridor | yes | EE, LV, LT | Sindi (EE) to Panevežys (LT) | EUR 120 to 140 m | Origination |
| Mid Continental East corridor | yes | RS, RO | Pancevo (RS) to Resita (RO) | EUR 130 m to 220 m | Engineering & Permitting |
| Black Sea Corridor | yes | RO, BG | various sections in RO and BL (as PCI 3.8) | EUR 173 m to 403 m | Planning/ Engineering & Permitting |

Source: European Commission, ENTSO-E, CEEP, Roland Berger

2.1.3 Oil sector

The oil sector part of our initial list comprises a total of six projects (see figure 14). With an estimated investment of 1.8 to 2.6 bn EUR, the Pan-European Oil Pipeline is the largest project on our initial oil sector list in terms of the required investment volume. The pipeline would connect landlocked destinations in the northern Balkans to refineries in Romania, Serbia and Croatia.

The second project, the Adamowo-Brody pipeline, would include a pipeline of 371 km length, connecting the JSC Ukrtransnafta's Handling Site in Brody (UA) and Adamowo Tank Farm (PL).

Though its routing would only cover Polish territory, the expansion of the Pomeranian Pipeline could make an important contribution to security of supply and market integration in the European Union as a whole. By connecting Naftoport and PERN's storage depot in Gdańsk with bases in the central part of Poland, the project aims at providing main refineries with a more efficient distribution of fuels to other parts of Poland. This line would secure the supplies from the Baltic Sea to Poland, Germany and – once the Litvinov-Spergau link is built (please see below) – further to Czech Republic and Slovakia.

The Bratislava-Schwechat-Pipeline would connect the east-west oil pipeline systems, diversify routes for the transport of oil, and increase the energy security of Austria and Slovakia in case of a disruption of Russian supplies.

In contrast, the Burgas-Alexandroupoli-Pipeline (BAP) would be constructed as an alternative route for Russian and Caspian oil from the Black Sea port of Burgas to the Greek Aegean port of Alexandroupoli.

Furthermore, the Litvinov (Czech Republic) – Spergau (Germany) oil pipeline with a diameter of 700 mm and a length of 160 km will extend the Druzhba crude oil pipeline. Owing to the construction of the Litvinov-Spurgau section, a network of oil pipelines will be created, enabling the transport of crude from Gdańsk, where it arrives by sea, to Płock, and subsequently through the western section of the Druzhba pipeline to Germany, and then southwards to the Czech Republic through Spurgau and Litvinov. Once the Litvinov-Spurgau project is launched, a new oil transportation link will be established between the Baltic and Adriatic Seas. Despite the fact that two countries, the Czech Republic and Germany, are directly involved in this project, it will be of regional importance for other Central European countries, such as Poland and Slovakia as a part of integrated connections between the Baltic and Adriatic Sea. The pipeline connecting the refineries would mean that oil supplies could be routed between the refineries in case of problems on either of the branches of Druzhba. The project will enhance the EU's security of supply by allowing countries to receive oil from a greater number of sources.

Figure 14: Initial list of oil transmission projects

| Project Name | Cross-border | Countries involved | Routing (from to) | Investment (est.) | Status |
|--------------------------------------|--|---------------------------|------------------------------------|--------------------------|-----------------------------|
| Pan-European Oil Pipeline (PEOP) | yes | RO, RS, HR, SI, IT | Constanta (RO) to Trieste (IT) | EUR 1.8 bn to 2.6 bn | Uncertain |
| Adamowo-Brody pipeline | yes | UA, PL | Brody (UA) to Adamowo (PL) | n/a | Origination |
| Expansion of the Pomeranian Pipeline | no (but strategic importance for the region) | PL | Gdansk (PL) to Plock (PL) | EUR 420 m | Design and preparation work |
| Bratislava-Schwechat-Pipeline | yes | SK, AT | Bratislava (SK) to Schwechat (AT) | EUR 100 m to 200 m | Preparation work |
| Burgas-Alexandroupoli Pipeline (BAP) | yes | BG, GR | Burgas (BG) to Alexandroupoli (GR) | EUR 1 bn | Uncertain |
| Litvinov-Spurgau pipeline | yes | CZ, DE | Litvinov (CZ) to Spurgau (DE) | n/a | Feasibility |

Source: European Commission, CEEP, Roland Berger

2.2 Selecting focus projects

Before turning to our detailed project level analysis we selected three focus projects from our initial list, one from each energy sub-sector. Selecting projects helps to concretize the discussion of financing and overall realizing key elements of the Corridor thereby advancing the Corridor as a whole. In order to make the reasons for selecting projects transparent and comprehensible, we scored each project on the initial list along predefined criteria. As seen in figure 15, the scoring is based on four dimensions.

Figure 15: Scoring methodology for selection of focus projects

| Criterion | Indicator | Score | | | | |
|----------------------------------|------------------------------|----------|-------------|--------------|---------|-----------|
| | | 1 | 2 | 3 | 4 | 5 |
| 1 Cross-border project | No. of countries crossed | 1 | 2 | 3 | 4 | 5 |
| 2 Investment volume | Est. investment volume (EUR) | 0 – 250m | 250 – <500m | 500m – < 1bn | 1 – 3bn | >3bn |
| 3 Sufficient concreteness | Qualitative assessment | very low | low | medium | high | very high |
| 4 Strategic relevance | Qualitative assessment | very low | low | medium | high | very high |

- 1** Compute total score across four criteria for each project
- 2** Rank projects by total score within each sub-sector (oil, gas, electricity)
- 3** Select top ranked project from each sub-sector as focus project for analysis

Source: Roland Berger

First, we evaluate the cross-border impact of the projects. This criterion is measured by the number of countries that would be crossed by the proposed infrastructure projects. A higher number of countries covered hints at higher technical, legal and political complexity, as well as higher relevance for regional integration, thus making the project more suitable to the end of this analysis.

The second criterion captures the estimated investment volume, measured by five different categories corresponding to certain ranges of investment volumes in EUR. The main argument for applying this criterion is that larger projects typically cannot be delivered off-the-shelf and can hardly

be taken onto the balance sheets of TSOs. Therefore, larger projects require customized, more innovative financing approaches.

As a third criterion we assess whether the projects prove to be sufficiently concrete, i.e. whether the need for the project has already been established in the EU policy realm and whether first preparatory steps towards implementation have already been initiated or taken (i.e. pre-feasibility or feasibility studies, specific definition of the routing and design, etc.).

The fourth dimension captures the strategic relevance of the projects and entails the extent to which the project's realization would remove systemic bottlenecks and change the dynamics of the sector in the region. Once again, we relied on a qualitative assessment to score each project along this dimension.

After having scored each project along these four dimensions, we were able to rank the projects within each sector by computing their total score. On this basis we selected the top ranked project from each sub-sector as our focus project for further analysis. Our final selection includes the North-South Natural Gas Backbone Pipeline, the closely related electricity projects LitPol Link Stage 2 and Baltic Corridor, and the Pan-European Oil Pipeline.

2.3 Presenting focus projects

This section presents the main characteristics of our focus projects. The focus projects serve as examples or "archetypes" of infrastructure development in each sector and therefore become part of our in-depth analysis to illustrate the fundamental challenges for financing and implementation and to derive a roadmap for moving the Corridor forward. Below, we expand the project descriptions from section 2.1 and provide additional information on the key project rationale, main technical parameters, general routing, rough estimates of the required investment volume and the stakeholder setting.

2.3.1 The North South Natural Gas Backbone Pipeline

Strategic rationale: The Backbone Pipeline connects multiple supply anchors from North (LNG terminals in Poland Świnoujście and potentially Omišalj in Croatia, Norwegian gas via potential Baltic Pipeline), South (Caspian gas via Southern Gas Corridor via IAP), East (Yamal, Brotherhood pipelines) and West (e.g. Germany). Furthermore, the connection between the Czech Republic and Hungary would allow (western) gas from the Baumgarten hub in Austria to enter the pipeline. The Backbone Pipeline could also act as a catalyst for the development of various other key gas interconnectors and network enablers in Central Europe. Finally and most importantly, the Backbone Pipeline could provide long-term energy security in case of a prolonged cut-off from a major supplier – foremost Russia.

Figure 16: Routing of the Backbone Pipeline



Source: Roland Berger

Current status and proponents: Some sections are in place or in progress, being promoted by the gas TSOs of the Region independent from one another. But the overall Backbone Pipeline – as one comprehensive project to enhance energy security in Central and Eastern Europe – is still in its incubation phase. The concept is strongly promoted at the policy level, but has not yet been picked up by the international gas industry, as an integrated solution to the region's gas supply security woes underscored by a strong commercial case.

Main technical parameters and estimated investment volume: In regional and EU policy circles, the Backbone Pipeline is conceptualized as a 42-inch, bi-directional flow pipeline with a capacity of ca. 15 bcm/y as put forth in CEEP's 2015 study "Completing Europe". "Completing Europe" also determines a length of ca. 1,300 km and total investment costs are estimated at EUR 3 bn to EUR

3.5 bn duly considering that some sections and elements of the Backbone Pipeline are already in place.

2.3.2 LitPol Link Stage 2 and Baltic Corridor

Strategic rationale: The overarching rationale of the two closely related projects hinges on the importance of connecting the energy island of the Baltic States with the European network in the North (Finland), North-West (Sweden) and South (Poland). The projects play a key role in the operational integration of the power systems of the Baltic States with the Continental European networks.

LitPol Link Stage 2 is a continuation of the construction of the interconnection between Poland and Lithuania (LitPol Link Stage 1 to be completed by the end of 2015), aimed at achieving the planned bidirectional transmission capacity of 1 GW. It contributes to establishing a link between the Energy Island of the Baltic States and the Continental European Energy system, thus integrating the Baltic States into the internal energy market. The project is a top policy priority at the regional and the EU level. For example, it plays an important role in the Baltic Energy Market Interconnection Plan (BEMIP) initiated by the European Commission.

The Baltic Corridor refers to the reinforcement of the existing 330 kV lines internally in Latvia, Lithuania and Estonia and on the borders of the Baltic States. The main economic and strategic rationale for implementation of the Baltic Corridor is the market integration of the Baltic States as well as the potential for the absorption of electricity from renewable generation facilities between 36,000 MWh and 66,000 MWh, depending on the specific scenario under consideration⁴. Additionally, the project can provide an alternative possibility to transfer electricity from North Scandinavia to continental Europe (up to 1 GW). Furthermore, it contributes to laying the foundations for future deeper integration of the Baltic States with the Continental European grid.

⁴ Assessment of RES integration for project 163 Baltic corridor in the Cost Benefit Analysis (CBA) for the TYNDP 2014; RES integration is defined as the ability of the power system to allow the connection of new renewable power plants and unlock existing and future “green” generation, while also minimizing curtailments.

Figure 17: LitPol Link Stage 2 and Baltic Corridor



Source: Roland Berger

Current status and proponents: On the Lithuanian side, LitPol Link Stage 2 is in the planning phase. On the Polish side it is in the engineering/permitting phase, with the aim of commissioning in 2020. Stage 1 is currently being realized by the construction of a new double circuit 400 kV interconnector between Elk (Poland) and Alytus (Lithuania), together with a 500 MW back-to-back converter station in substation Alytus and strengthening of the internal high voltage transmission grid in Poland and Lithuania to utilize the capacity of the interconnection. The capacity increase in the first stage is 500 MW from Lithuania to Poland, while the capacity in the opposite direction is limited due to restrictions in the internal Polish transmission grid. Stage 1 is scheduled for commissioning in December 2015 according to the latest BEMIP progress report. However, due to difficulties in reaching an agreement between the parties involved regarding the cross-border cost allocation for

the project, no proposal for the first CEF co-financing call in 2014 could be submitted. Consequently, the project did not receive any financial assistance under CEF in 2014. Proponents of the project are the Lithuanian and Polish transmission system operators: Litgrid AB and PSE S.A.

The Baltic Corridor still is mostly in the origination phase and commissioning is not expected until 2030. Out of the nine individual sub-projects included in the overall Corridor project as defined in the EU TYNDP 2014 (project 163), eight are still classified as "under consideration". One project, which foresees the reinforcement of the existing 330 kV overhead line between Paide and Sindi 330 kV substations in Estonia (TYNDP Investment-Index 1004) has progressed to the planning phase. Main proponents of the project are the transmission system operators of the affected countries, namely Litgrid AB (Lithuania), AST (Latvia) and Elering AS (Estonia).

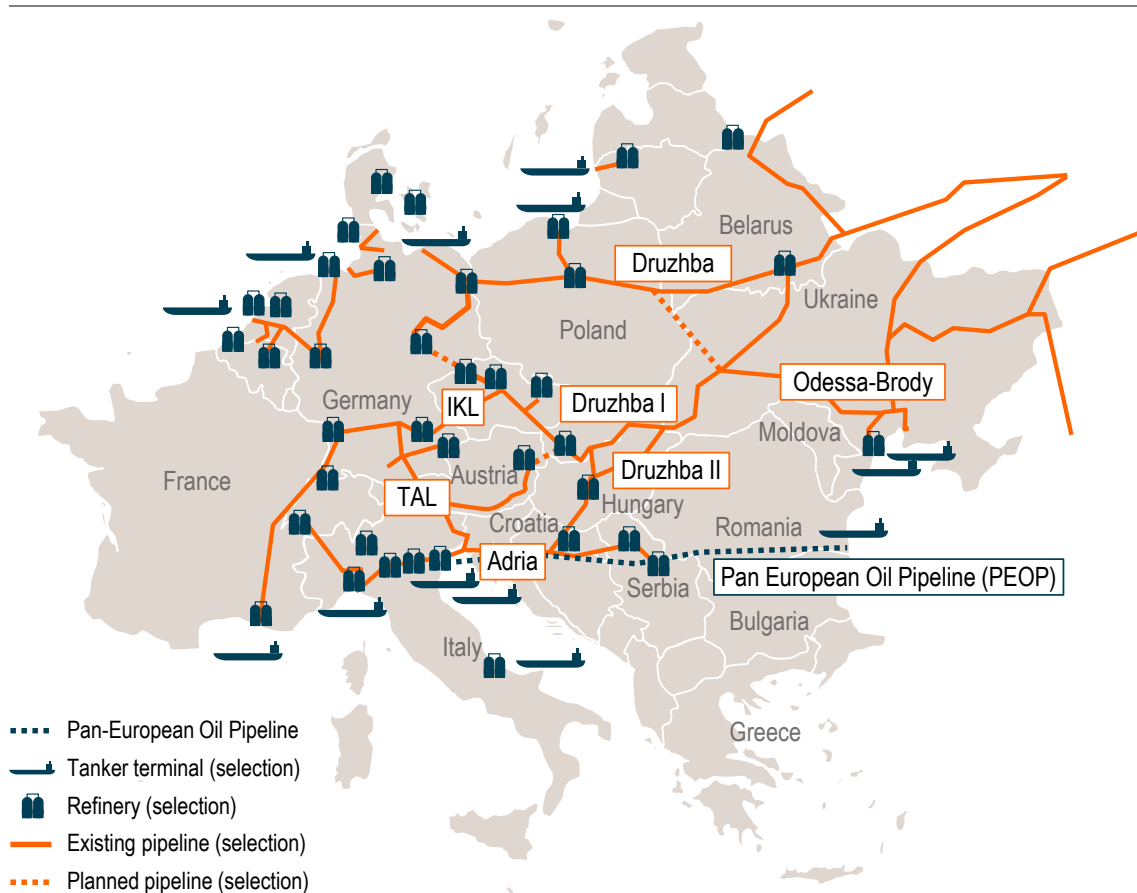
Main technical parameters and estimated investment volume: LitPol Link Stage 2 will comprise two main elements to enhance the electricity transmission links between Poland and Lithuania in order to achieve the planned total bidirectional transmission capacity of 1,000 MW: (1) Three new 400-kV overhead lines on the Polish side and (2) a new-build second converter station in Alytus substation (Lithuania). The investment volume of LitPol Link Stage 2 is estimated at EUR 310 m.

The Baltic Corridor project comprises the reinforcement of existing 330-kV lines in a total of nine individual projects spanning Latvia, Lithuania and Estonia. It is expected that the investments will yield significant increases in the line capacities of up to 50%. Reinforcing the Baltic Corridor 330-kV lines will cost about EUR 140 m.

2.3.3 Pan-European Oil Pipeline (PEOP)

Strategic rationale: The project would implement a direct pipeline connection between the Romanian Black Sea port Constanta and Trieste in Italy. Russian and particularly Caspian oil supplies which are shipped to Romania via tanker routes through the Black Sea would feed into the pipeline. The pipeline would then deliver the oil onto Central and Eastern European markets, crossing Romania, Serbia, Croatia and Slovenia. Thus, the project would provide a new and reliable route for delivering oil to landlocked destinations in the northern Balkans. In Trieste, the Pan-European Oil Pipeline would feed into the Transalpine Pipeline, running to Austria and Germany, thus providing additional supply for key Western European markets. Furthermore, the pipeline would be directly connected to six refineries in Romania, Serbia and Croatia along its foreseen route. With regard to its strategic importance, the pipeline would reduce the destination countries' dependence on Russian pipeline deliveries, thus improving Europe's resilience against disruptions or outright cut-offs in the Druzhba pipeline system.

Figure 18: Routing of the Pan-European Oil Pipeline (PEOP)



Source: Roland Berger

Current status and proponents: A large part of the PEOP's 400 km length is already in place in Croatia (Adria pipeline). Similarly, there are existing pipeline sections in Romania, from Constanta terminal to Pitesti in the west of the country. With regard to the overall project, initial feasibility studies have been conducted, but in recent years there has only been limited progress. A PEOP Project Development Company was founded jointly by Conpet Ploiești (Romania), Oil Terminal Constanța (Romania), Transnafta (Serbia) and JANAF (Croatia). By now, the large-scale proposal has been effectively abandoned after Italy, Slovenia and eventually Croatia withdrew their support one after another. Following Croatia's withdrawal from PEOP, Romania and Serbia have stressed the necessity to create a new concept. A much smaller project proposal now aims to connect the national oil transportation systems of the two countries, from Pitesti (Romania) to Pancevo (Serbia). It is championed by Russia's Gazprom Neft, its Romanian counterparts Conpet Ploiești and Oil Terminal Constanta, as well as NIS Gazprom Neft, Gazprom's fully-owned subsidiary in Serbia. The

pipeline would allow Gazprom to transport Russian crude oil via tankers to Constanta and onwards to its Serbian refineries Pancevo and Novi Sad. A joint feasibility study was started in 2013. Upon its completion, Gazprom intends to announce its plans regarding the project.

Main technical parameters and estimated investment volume: The Pan-European Oil Pipeline was initially conceptualized to be 1,320 km long and its projected capacity was 40-60 mt/y – 60 mt/y optimal configuration. Cost estimates ranged to cost between 1.8 and 2.6 bn EUR. The smaller Romanian-Serbian proposal would just add 324 km to existing pipeline networks to reach Pancevo from Pitesti, nearly 280 km of which will cross Romania. The annual capacity of the pipeline could reach 7.5 mt/y.

3 Financing options: How to secure necessary funding

This Chapter analyses different financing options for key energy infrastructure projects that shall serve as the backbone of the North-South Corridor. We contrast the main approaches to financing energy transmission projects (corporate vs. project finance) and appraise the focus projects/sectors identified in Chapter 2.3 against the requirements for successful financing under each approach.

3.1 Financing large-scale energy transmission infrastructure

In general, there are two principal approaches for financing energy transmission infrastructures: corporate finance and project finance. To lay the foundation for a more detailed discussion of specific financing challenges and potential solutions for the focus projects and the three energy sub-sectors under investigation, we present a brief summary of these two forms of financing and discuss where they are typically applied. For both types, we derive a check-list of key pre-requisites that have to be met to effectively mobilize financing. Based on this general framework, we will then perform a gap analysis by checking the financing situation of the three focus projects/energy sectors against the check-list criteria to identify critical issues for financing and develop potential solutions to overcome the most pressing financing obstacles.

3.1.1 Corporate finance

When using corporate finance, an infrastructure operator finances a specific infrastructure project as part of its overall business portfolio, not on an individual project basis. Financing and implementing the project is typically handled by existing corporate structures without new legal entities being created. Key characteristics of handling a project via corporate finance are:

- > Debt obtained for the project via corporate finance is secured via the project sponsor's general balance sheet, i.e. the operator's assets serve as collateral for creditors and the company's cash flows as a whole are available to cover debt service for the project.
- > Debt raised for a project by an operator with a good credit rating via corporate finance on the group level is typically cheaper than debt obtained via project finance, since the latter is not secured via the corporations' balance sheets.
- > Operators allocate their limited financial resources between competing investment opportunities/projects and follow internal rules about the allocation of financial resources to maximize returns (intra-company project-to-project competition).

To implement transmission infrastructure projects on a corporate finance basis as outlined above, a number of key conditions have to be met by the operator undertaking the project. Since corporate finance involves the project sponsor's business portfolio as a whole, these check-list conditions not

only refer to the specific investment project under consideration, but also to the operator's overall business and financing situation.

Appropriate and predictable cash flows/remuneration: The most fundamental requirement for financing energy infrastructure projects is the existence of stable and predictable revenues from operating the infrastructure. The remuneration which the operator receives for the infrastructure assets put into place must be appropriate to meet equity investors' minimum return requirements (return on equity) and cover debt service for creditors. Ultimately – technical details aside – this will determine the ability to secure financing for the project.

Sustainable leverage and sufficient equity: Just like any other corporation, transmission system operators (TSOs) have a capital structure based on debt and equity. Interest and debt repayment to lenders and returns/dividends to equity investors must be covered through the cash flows generated by the company's business activities. When financing new infrastructure investments via their corporate balance sheets, operators must pay close attention to maintaining a sustainable leverage ratio (debt/debt+equity). Consequently, operators seeking to finance new, sizeable infrastructure projects via their balance sheet have to raise additional equity first, in order to maintain their level of leverage.

Access to debt / credit ratings: Once sufficient equity has been obtained, operators can seek debt financing for their investment projects without jeopardizing their leverage ratio. Credit ratings issued by the leading rating agencies Standard & Poor's, Moody's and Fitch play a key role in this context, as they are an important indicator of the financial health of corporations. An operator's credit rating expresses the risk for financing institutions of lending to that operator, and as such gives an indication of its ability to acquire debt. Given the large volume of investments which will have to be made to meet the ambitious target of putting into place the North-South-Energy-Corridor, it is important that operators as project sponsors have access to significant volumes of capital. A credit rating is an important basis for this, and in some cases – such as for issuing corporate bonds – it is a necessary condition.

In practice, corporate finance is the predominant financing approach used for electricity transmission infrastructure investments. Transmission grid investments by national TSOs are typically handled on a portfolio rather than a single-project basis. Generally, a portfolio of transmission grid infrastructure projects is defined in the context of a mid- and long-term investment plan. Upon approval by the national regulator, projects are included in the "regulatory asset base" (RAB) and financing for these projects is then sought on a portfolio basis. Acquiring investment capital in larger tranches rather than on a single project basis reduces the level of complexity and translates into lower transaction costs. As a consequence, practically all domestic transmission projects included in the regulatory asset base, as well as most interconnectors are financed on a corporate (TSO) level. Project finance approaches are typically only considered for some offshore grid connections and to a

much lesser extent for cross-border electricity interconnectors. Consequently, in what follows, we will apply the check-list laid out above to evaluate the financing situation of electricity transmission infrastructure projects relevant for the North-South-Energy-Corridor.

3.1.2 Project finance

Contrary to using corporate finance, an infrastructure operator may also opt to finance a specific infrastructure venture off balance sheet on an individual project basis – i.e. with project finance. In this case, the operator launches a legally and economically separate venture (potentially with strategic partners) that handles the financing, implementation and operation of one specific project. Key characteristics of project finance are the following:

- > Debt finance is typically obtained as nonrecourse or limited recourse loans, i.e. debt solely or mostly secured by the project itself, not a larger corporate balance sheet. Lenders base credit appraisals solely on the projected cash flows from the operation of the infrastructure.
- > Compared to the corporate finance model, costs of financing capital tend to be higher, as equity investors and lenders alike face greater risk at the project specific level than when diversifying financial risk across a whole project portfolio. Additionally, project finance tends to be more complex in terms of the allocation of risks and rewards among project stakeholders and the associated legal and contractual frameworks.
- > Under project finance, a project does not appear on the corporate balance sheet of the operator, but instead constitutes an asset of a separate project company (a Special Purpose Vehicle – SPV) which is established exclusively for implementing this project.

A number of key conditions have to be met by the one or more operators undertaking the project to implement transmission infrastructure projects on a project finance basis.

Fundamental architecture of the business case

The backbone of successful commercial project finance via limited or nonrecourse debt is the certainty of project cash flows to service the project's debt finance. In the context of large-scale energy transmission projects (such as cross-border oil or natural gas pipelines), these cash flows stem from commercial transportation tariffs (the operator's revenues) that are collected from shippers booking transmission capacity. To secure revenues and thus solvency to service the project debt, the operator will seek binding long-term ship-or-pay agreements with a sufficient number of shippers. These contracts are typically availability-based, where the basis of the shipper's obligation to pay is (generally speaking) independent of whether the shipper actually transports gas or oil

through the pipeline.⁵ Depending on the cost of debt and debt servicing schedule of the SPV, it will have to secure such agreements for a certain share of its capacity (typically at least 70%). To build sufficiently robust and reliable ship-or-pay agreements and secure long-term revenue streams, a number of factors are vital:

- > **Clear attribution of revenues to infrastructure:** Project-financed infrastructure typically requires clearly separate transmission sections as independent infrastructure developments to which distinct revenue streams can be clearly attributed. In contrast, mere additional links in already meshed networks are less suitable for project finance, where – like in most of the EU – deeply integrated and thus inherently complex systems already feature numerous entry and exit points.
- > **Sufficient throughput as per demand side:** Sufficient demand from off-takers along the pipeline or at its final delivery point is a vital prerequisite for long-term ship-or-pay agreements. Demand risk either stems from incremental consumption decrease in the market or from alternative sourcing of consumers. On their part, shippers then typically try to pass on demand risk to their off-takers via take-or-pay agreements (traders, major consumers like utilities or energy-intensive industry).
- > **Sufficient throughput as per supply side:** On the supply side, the size of gas or oil reserves and the predictability of future production volumes determine the viability of a ship-or-pay agreement. Shippers will only enter into binding capacity contracts when upstream supply is sufficiently certain, e.g. as soon as Final Investment Decisions (FID) for upstream projects have been made.
- > **Transparent, certain and robust transportation tariffs:** From a price-perspective, a transportation tariff regime that is transparent, certain and robust complements the capacity quantities guaranteed under the ship-or-pay agreements. In many cases, tariffs will be on a cost-plus or revenue-allowance basis, either fully regulated under national transmission regulation or as negotiated among operator and shippers under an exemption from Third Party Access.⁶

⁵ Additionally and in particular in the case of EU natural gas interconnectors, there is a secondary market for unused transmission capacity (e.g. as initially pre-booked under long-term agreements), e.g. dealt with in the Framework Guideline on Capacity Allocation. Essentially, there is a use-it-or-loose-it principle in EU transmission networks under their governance.

⁶ In the case of EU gas networks and thus EU interconnectors, the Tariff Network Code will be soon implemented in – setting out the principles for tariff determination and methodology in the EU.

Key political and regulatory preconditions

In order to substantiate the aforementioned business case and its formalization via long-term ship-or-pay agreements, a number of political and regulatory preconditions have to be met, especially in an EU-context. They concern key project agreements with or among sovereign states, exemption of the infrastructure from Third Party Access (TPA) and legal unbundling of ownership of transmission infrastructure and upstream assets.

- > **HGAs and IGAs to enable political de-risking** (in the case of large cross-border pipelines): In order to provide sufficient security to lenders regarding state-to-state and state-to-investor risks (e.g. tax treatments), the SPV typically concludes Host Government Agreements (HGAs) with each host country affected while all countries among another enter into a multi-lateral treaty, the so called Inter-Governmental Agreement (IGA).

- > **Unbundling of midstream and upstream business**: The regulatory regime in the EU also requires the ownership and operation of a pipeline to be separated (“unbundled”) from any gas production, electricity generation and gas or electricity supply operations.

- > **If relevant, TPA exemptions for exclusive capacity contracts** (in the case of large cross-border pipelines, especially those that are only partially covering EU territory): In general, EU law requires third parties to be granted access to a pipeline on the basis of non-discriminatory and cost-reflective tariffs. To allow for the exclusive allocation of capacities under long-term ship-or-pay agreements, a pipeline has to be exempt from this TPA requirement. This is indeed possible for a certain period of time, provided that a number of conditions are met: For example, the SPV needs to show that the investment enhances competition in the supply of gas in the EU, tariffs are levied indiscriminately, and the level of risk attached to the investment is such that the investment would not take place unless an exemption was granted.

In practice, project finance is the predominant financing approach used for major oil and gas pipeline investments. This holds true especially for large projects in terms of length and capacity that cross multiple countries. On the other hand, smaller interconnectors aiming to add capacity to an existing network are typically corporate financed. Consequently, in what follows, we will apply the project finance check-list laid out above to evaluate the financing situation of major cross-border natural gas and oil infrastructure projects relevant for the North-South-Energy-Corridor.

3.2 Financing energy transmission projects in the Central European North-South Corridor

In the following sections, we apply the financing check-lists defined above to our three specific focus projects/sectors in order to assess their financing situation, identify the most pressing financing gaps and derive potential remedies.

3.2.1 Gas sector: Financing the Backbone Pipeline

In what follows, we examine the prospects of the North South Corridor's Backbone natural gas Pipeline against the backdrop of fundamental financing requirements, under a project finance approach.

How things stand: Assessing the financing situation

As standard practice in the international oil and gas industry, major cross-border transmission pipelines like the proposed Backbone Pipeline are typically financed on a stand-alone, project-finance basis – not least because comprehensive investments of such magnitude (here estimated at EUR 3-3.5 bn as per CEEP "Completing Europe" (2014) are difficult to shoulder for natural gas TSOs. This part assesses the financing prospects of the Backbone Pipeline in light of the analytical framework (check lists) developed in Chapter 3.1.

Fundamental architecture of the business case

The essential question for the financial viability of the Backbone Pipeline as a single project on a project-finance basis concerns the prospects of any future SPV to build sufficiently robust and tight long-term ship or pay agreements with shippers from the European gas industry, prescribing the fundamental architecture of a viable business case for the infrastructure. The primary origination of the project idea as a strategic enabler of regional energy security already hints at a financing situation that is more driven by political objectives than purely commercial fundamentals. In any event, a bankable investment on a project-finance basis would have to secure revenue streams based on four criteria: Clear attribution of revenues to infrastructure, sufficient capacity demand based on gas consumption needs, sufficient supply to fill the pipeline and a robust tariff regime.

Clear attribution of revenues to infrastructure

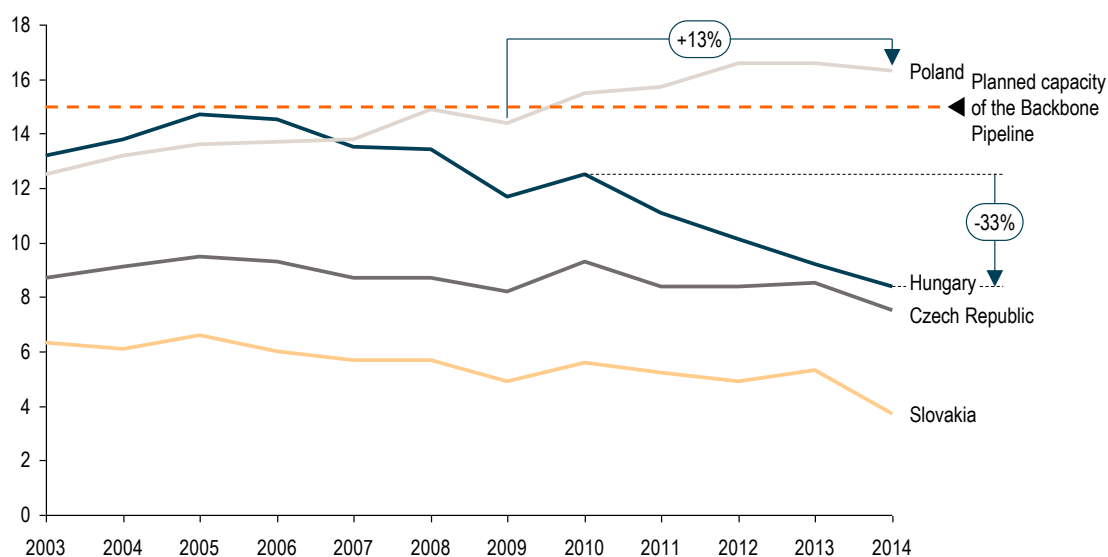
With the fundamental purpose of providing a north-south connection for gas transmission in a region with a historically rooted east-west bias in pipeline infrastructure, the key asset of the Backbone Pipeline would be a network-enhancement function, enabling better connectivity of separate markets that are insufficiently linked today. As envisaged with a routing via Świnoujście-Lwówek-Wrocław-Zdzieszowice-Ostrava-Brno-Lanzhot-Bratislava-Gyor-Sisak-Omišalj, it would primarily function as a set of multiple bi-lateral interconnectors between the markets of Poland, Lithuania, Czech Republic,

Slovakia, Hungary, Croatia and possibly Austria. With the multiple entry and delivery points in the backbone system that is to be created, the project would precisely run into a financing situation where gas transportation streams (and associated revenues) cannot be clearly separated beforehand – thus making an initial, pre-booked long-term sale of capacities for distinct shipments difficult. As planned today, the Backbone Pipeline is not a typical gas transit pipeline in a more narrow sense, i.e. one that brings one upstream export opportunity to distinct downstream markets. Instead, it has effectively two upstream sources at both its ends (as well as options to take on Norwegian gas, gas from EU spot markets and hubs). It may moreover supply a variety of markets along its route – while also serving as systemic add-in to existing east-west infrastructure with established transmission flows. This rather meshed line-up is likely to render clear-cut project finance challenging.

Sufficient throughput as per demand side

Demand for pipeline capacity ultimately results from consumers' gas demand along the pipeline. From a purely consumption-based view, it is questionable whether gas markets along the Backbone Pipeline will – in the foreseeable future – account for sufficient gas demand to justify shippers' commitments to long-term capacity contracts. Globally speaking, European gas markets have been bearish ever since the Financial Crisis of 2008 – exacerbated by fundamental changes in European and world energy markets such as the shale gas boom in the U.S. and the growth of power generation from subsidized renewables in the EU. Although less drastically than in Western Europe, key Central European gas markets have largely stagnated or even shrunk in recent years (Figure 19). Any growth such as in Poland predominantly stems from increasing industrial consumption, while gas-fired power generation has struggled nearly everywhere else, mainly due to a multi-dimensional lack of economic competitiveness. Residential and commercial consumption (for domestic heating) will remain the backbone of regional demand, but likely not see significant growth either. Any recent uptakes in 2015 have yet to prove to be a meaningful turnaround – against the backdrop of the aforementioned structural changes in international gas markets.

Figure 19: Gas demand trends in key EU-11 markets accessed by the Backbone Pipeline [bcm/a]



Source⁷: BP, CEEP, Roland Berger

Against an overall downward trend and with any substantial incremental demand yet to prove sustainable, it is difficult to conceive much market space for additional pipeline imports in the core markets of the Backbone pipeline, especially for sufficient utilization of the planned 15 bcm/a capacity. Moreover, given that incumbent supplies (e.g. from Russia to Central European markets) are well established in terms of infrastructure and delivery contracts and that major new supplies like LNG landing in Poland is not only for single markets (even though initial volumes will predominantly go to Polish consumers), it is equally challenging to imagine a competitive advantage of gas delivered through the Backbone Pipeline that could commercially push alternative gas out of the markets. The case becomes particularly challenging when considering that such gas may be – likely high-price – LNG delivered through an Adriatic terminal. Thus, taking a strict demand-side view, it appears unlikely that an SPV would be able to secure ship-or-pay agreements coming even close to a range of 10-11 bcm/a, which would likely be necessary to project finance the pipeline.

Consequently, overall long term demand along the pipeline route has to be identified. In this context, further opportunities may open up not only from incremental market demand, but from supply substitution, particularly in the medium to long term as gas contracts with Russia expire making

⁷ Demand Figures are based on BP's 2015 World Energy Outlook; the Backbone Pipeline's planned capacity refers to CEEP's "Completing Europe" (2014).

room for other sources. Current long-term agreements with Gazprom expire as follows in major EU-11 markets: for the Czech Republic in 2035, in the case of Hungary in 2020 (as recently renewed for five more years), for Poland in 2022, for Slovakia in 2018, and for Romania in 2030.

Sufficient throughput as per supply side

On the supply side, the uncertainty of sufficient supply volumes represents a further challenge for the architecture of the Backbone Pipeline's project finance case. On the northern end, the Polish LNG terminal at Świnoujście will bring 5 bcm/a to Central European markets from 2015 onwards. In principle, the potential to move gas from Poland to other countries increases energy security and is very important in economic and political terms. The LNG – at least the initial 5 bcm/a with a possibility to expand this to 7.5 bcm/a – will however primarily supply the (growing) Polish market to help alleviate its dependence from expensive Russian gas imports and create an alternative for the 10.3 bcm/a Yamal contract valid through 2022. Moreover, Polish and Lithuanian LNG terminals open up the opportunity for shipments southwards along the Corridor and have the potential to justify new cross-border transmission infrastructure, which in future might be enhanced up to 7.5 bcm/a.

On the southern end, the Backbone Pipeline would seek to take on both Adriatic LNG from a planned terminal on the island of Krk off the Croatian coast, as well as Caspian pipeline gas delivered through the Southern Gas Corridor from the second stage of the then 20 bcm/a Trans-Adriatic Pipeline (TAP) and subsequently from a future 5 bcm/a bidirectional Ionian-Adriatic Pipeline (IAP)⁸. Both supply sources are at much earlier stages in their respective project lifecycle. Adria LNG has just been revived in the wake of recent shake-ups in the European gas supply landscape, but has yet to move through FEED, let alone FID. For IAP, a first major feasibility study has only been completed last year with EBRD support. No project company has been established so far.

Overall, given the rather uncertain supply prospects for the Backbone Pipeline, it is difficult to conceive that an SPV would succeed in filling a pipeline designed with an all-out capacity of 15 bcm/a along the entire envisaged route. The project concept as such appears largely detached from specific upstream opportunities – making viable project finance of the pipeline difficult to attain. However, there is a larger (political) case of increasing energy security that may provide for different – albeit not project-financeable – project rationale.

Transparent, certain and robust transportation tariffs

Given the relative maturity of the affected gas markets and the likely involvement of major international gas players in the project, achieving a transparent, certain and robust transportation

⁸ Additional supply sources may involve further indirectly accessible upstream supply such as Norwegian production or more general opportunities to diversify supply in a better integrated European market, i.e. via (Western) European gas hubs.

tariff regime will most likely not pose a significant obstacle for realizing the project. Demand and supply quantities are clearly the bigger issue to be addressed.

All in all, a classical project finance case for a major cross-border gas pipeline of the capacity envisaged for the Backbone Pipeline is difficult to conceive in the current market environment. Supply and demand fundamentals currently paint a clear picture that lacks a convincing commercial project rationale able to back a major project-financed investment. Consequently, the discussion will have to turn to other rationales for project implementation, most likely involving alternative financing models.

Key political and regulatory preconditions

Based on a first political and legal screening of the project concept and its prospects, we do not see major hurdles for the project's realization that could be anticipated at this point in the project lifecycle.

- > *HGAs and IGAs to enable political de-risking*: Host Government Agreements will not become a major de-risking issue, since the common legal regime provided by the EU *acquis communautaire* and the national legal frameworks offer a welcoming framework.
- > *TPA exemptions for exclusive capacity contracts (as a potential prerequisite for large-scale single transmission projects like the Backbone Pipeline proposal)*: If necessary, the only conceivable legal obstacle to the conclusion of exclusive long-term ship-or-pay agreements may concern successfully obtaining a TPA exemption from relevant EU and national authorities. Exemptions are rare, but nevertheless granted precisely to strategic projects like the Backbone Pipeline that enhance competition in gas supply in EU markets. In the likely absence of any (geo-)political reservations, the legal case that a pipeline of this magnitude can only be implemented on a project-finance basis with exclusive capacity contracts should be compelling enough to obtain an exemption. In case the pipeline is pursued piecemeal as a set of mere additional network interconnectors on a bilateral, corporate-finance basis, TPA exemptions appear not adequate.
- > *Unbundling of midstream and upstream business*: Unbundling issues are not too pertinent for a potential Backbone Pipeline as they would only become relevant if upstream players like the LNG terminal owners/operators were to become directly involved in the SPV.

What needs to happen: Re-approaching the project and tackling financing issues

In summary, the implementation of the Backbone Pipeline as one single 6-15 bcm/a mega-project (and on a commercial project-finance basis) appears challenging, given uncertain throughput from both demand and supply perspectives as well as structural impediments to commit shippers to long-term ship-or-pay agreements. Consequently, it is uncertain whether commercial investors would pick up the idea – especially as Central European gas TSOs and international industry players even hesitate to pick up and commit to projects that only cover fractions of the whole envisaged pipeline. Instead, the "backbone" of the North-South Gas Infrastructure Corridor is primarily an umbrella concept for several (bilateral) interconnectors and presents the first comprehensive answer to the fundamental energy security question that the region faces. Evidently, the political rationale of the proposal (security of gas supply) trumps market considerations (stagnant/deteriorating demand), with profound implications for financing. Ultimately, either public money will have to fill commercial financing gaps directly or find meaningful – and probably rather innovative – ways to mobilize commercial financing in the absence of a straight-forward viable business case.

To make progress on the Backbone Pipeline as a key enabler of energy security for the EU-11 region, we derived a number of conclusions and policy recommendations to address the most important obstacles and pave the way for kick-starting the implementation of the North-South Corridor in the gas sector.

1. Re-state top political priority of the Backbone Pipeline as the main answer to the Central European woes in security of gas supply: An unequivocal political endorsement of the Backbone Pipeline as a key answer to Central Europe's energy security concerns is the fundamental prerequisite of Member State Governments, EU bodies or IFIs stepping up to play a strong financial role the implementation of the Backbone Pipeline. Such an endorsement becomes more and more relevant, given that alternatives to enhance energy security through means other than diversification of supply and new infrastructure are put on the table – most importantly energy efficiency enhancements and a strengthening of renewable energy sources. Even though political commitment is emerging at national, EU and even transatlantic levels, it needs to be fostered and taken one step further to the discussion of specific public financing contributions (e.g. national budgets via gas TSO balance sheets, EU structural funds and the Connecting Europe Facility, EIB and EBRD loans, EIB project bonds, EFSI-leveraged support).

2. Increase certainty on critical upstream projects: In order to substantially reduce uncertainty about the throughput of any backbone gas transmission system in Central Europe, certainty on new upstream supply has to be increased. This will require much more than mere statements of political will. Instead, commercial decisions at project level are needed to move things forward in meaningful way. Foremost, the Krk LNG terminal has to move through FEED quickly to secure an FID as swiftly as possible as the project would only create the southern supply of the Backbone Pipeline. Moreover,

the Ionian-Adriatic-Pipeline has to move beyond publicly financed activities at feasibility stage by being picked up by a dedicated SPV project company, potentially centered on Croatian TSO Plinacro and supported by sponsors from the international gas industry. The political dialogue for both projects is ongoing, but has to be expanded to bring the industry on board and eventually secure specific (equity) commitments for the project companies.

3. Return to individual critical interconnections and domestic network growth – one by one, step by step: At the level of the envisaged transmission infrastructure, the Backbone Pipeline appears to be far from a commercial bankability on a consolidated project-finance basis. Consequently, it should be revisited as a combination of individual bilateral interconnectors and domestic network expansions that should be financed and implemented on a piecemeal basis – the overall project needs to stay in mind and requires good co-ordination, ensuring that all pieces are seen as a part of the strategic project. Triggered by viable upstream projects, we see a gradual north-to-south infrastructure development as the most viable roadmap for implementing the backbone pipelines from here onwards:

- > Polish expansion of the domestic network following the completion of Świnoujście LNG terminal and its likely expansion, namely the sections Świnoujście-Lwówek-Wrocław-Zdzieszowice-Kedzierzyn: the Polish gas market shows the strongest growth trajectory and alternative gas supply is within reach. Pipeline infrastructure of the North-South Gas Corridor should first be pursued here – where financing support will produce the most effects over the short to medium term.
- > Expansion or new construction of interconnectors among Poland, Lithuania and the Czech Republic, notably Kedzierzyn-Ostrava-Libhošt-(Brno-Lanžhot) or PCI 6.1.1 (likely featuring 2.5-3 bcm from a market perspective, but should at least feature 6-7 bcm from an energy security point of view with potential of doubling capacity towards 15 bcm): The expansion of the interconnector would turn the Czech Republic into a second Central and Eastern European gas hub due to its connections to Baumgarten (Austria), Olbernhau (Germany) and the continuations of the Brotherhood/Transgas system.
- > Further interconnectors through to Hungary: The critical next stage will be interconnectors further southwards. There is no concrete project proposal for a connection from Libhošť, Czech Republic to Győr, Hungary on the PCI-list yet – while the role of Slovakia in the Backbone Pipeline is entirely open at this point. Moreover, the involvement of Hungary into the project may be more uncertain than ever due to the country's recent decision to continue the intense supply relationship with Gazprom for five more years. Consequently, the most viable interconnection in the nexus Czech Republic-Austria-Slovakia-Hungary needs to be closely investigated.

- > Southern legs in Hungary and Croatia: Any further interconnectors coming from the south will likely depend on the aforementioned progress on upstream supply through Croatia and should, for now, be de-prioritized in terms of financing support when choosing among different sections of the Backbone Pipeline.

4. Stick with (joint) corporate-financing by TSOs: In view of a return to individual interconnectors, it is vital to acknowledge that corporate finance will most likely be the more viable financing approach in view of deepening the Central and Eastern European gas transmission network. The individual sections comprise a maximum of 300 km each and estimated investments range from EUR 200 m to EUR 500 m, thus posing significant but not insurmountable challenges for balance-sheet financed investments by regional gas TSOs – if they are financially supported.

5. Ensure regional co-ordination and funding: The long-term co-ordination and realization of the Backbone Pipeline through different individual projects requires a permanent regional co-ordination structure. Such a coordinating body could also be used to raise capital that supports the financing of the early stages of infrastructure, where most equity is required. This approach would allow for gradually channeling risk-bearing equity southwards (in a well targeted manner), as the realization of the overall project progresses. It would also allow pooling of technical and management expertise.

6. Meaningfully support TSO balance-sheet financing, especially through equity injection and leveraging support: Nevertheless, regional gas TSOs will require public support in view of their financial means, especially in terms of raising the necessary equity and their ability to take on corporate debt. Such support could include:

- > Raising much needed equity by offloading assets into the EFSI
- > Leveraging the EFSI to gain access to debt funding
- > Using the Connecting Europe Facility to provide funding
- > Supporting TSOs in obtaining credit ratings

For meaningful ways to support TSO corporate financing, please refer to the recommendations presented in Chapter 3.2.2 as well as our roadmap proposal in Chapter 4.2.

7. Promoting regulatory innovation in order to increase the investment attractiveness of corporate financed, fully-regulated gas interconnectors: Levers for investment-enhancing regulatory reform are described in Chapter 3.2.1. For the gas TSO landscape, the following are particularly relevant:

- > Creating investment incentives through appropriate remuneration (i.e. high-enough returns on equity as prescribed in national regulatory codes)

- > Further means include: enhancing the stability/predictability of regulation through longer guaranteed remuneration periods, aligning national regulations and smoothing cost allocation in cross-border projects, providing risk-adjusted remuneration to get priority projects started and allowing remuneration during the cash-intensive construction phase
- > For top-priority energy security projects with correspondingly high capacities (designed after major, prolonged disruption scenarios), investigate all-out capacity-based remuneration models under national regulatory regimes that focus on throughput capacity made available, rather than actual throughput

3.2.2 Power sector: Financing LitPol Link Stage 2 and Baltic Corridor

How things stand: Assessing the financing situation

This section seeks to evaluate the financing situation for electricity transmission infrastructure projects which need to be implemented to realize the North-South-Energy Corridor. Power transmission projects are typically financed by national TSOs on a portfolio basis based on standardized practices rather than through customized project finance approaches. Consequently, addressing sector level issues such as TSO financing capacity and the regulatory framework are paramount for kick-starting electricity transmission projects in the Corridor region. Therefore, our discussion will focus primarily on the sector level perspective. The specific focus projects discussed above, LitPol Link Stage 2 and the Baltic Corridor, will serve as examples to illustrate the most relevant sector level issues.

Appropriate and predictable cash flows

Electricity transmission lines are regulated infrastructures, which upon inclusion in the regulated asset base receive guaranteed revenues via network tariffs defined by the national regulator. The tariffs which are levied via consumers' electricity bills are designed to reflect capital costs, depreciation and operational costs of an efficient TSO. The fact that investments are approved by the regulator means that they will generate predictable revenue streams without being subject to market risks. This, in turn, provides sufficient security for financing institutions to lend to TSOs. From this point of view, there are no fundamental financing obstacles which would hamper the necessary investments into power transmission projects in the Corridor region in general. Obtaining the financing required to implement the necessary infrastructure investments should generally be feasible within this framework.

However, a closer look at the regulatory frameworks suggests that there are a number of specific challenges which hamper the effective and timely implementation of much-needed power transmission investments in the Corridor:

Insufficient level of regulatory remuneration

Regulatory remuneration is at the heart of the business case of TSOs and a key determinant of their investment decisions, as the revenue from tariffs forms the basis for recovering investment costs. While regulatory regimes vary significantly across the EU and the Corridor region and are difficult to compare both between countries and over time due to their complexity and ongoing evolution, most observers agree that there has been a trend towards lower returns on assets and returns on equity allowed by the regulatory frameworks. The regulatory framework continues to focus on optimizing cost efficiency in a low investment environment, although the present energy policy context sets ambitious grid expansion and reinforcement targets which will require substantial capital investments well beyond the levels of the last decade. Low regulatory ROE levels can represent a disincentive for infrastructure investments and discourage TSOs from implementing much needed projects. Insufficient ROE incentives are a particular problem where investments are prioritized within a larger project portfolio in the TSO's holding. Where grid investments compete with other projects that can achieve higher returns, implementation may get delayed or called off altogether.

Limited stability/predictability of regulation

The lifetime of transmission infrastructure assets typically spans multiple decades. Consequently, the business case behind the investment is based on a long term time horizon. However, the regulatory periods is only three to five years long. After this relatively short period, the project is subject to the risk of changes in the regulatory regime, in particular decreasing revenues, which may jeopardize the commercial viability of the investment. This lack of stability represents a severe concern for long term financial commitments, especially from equity investors.

Unclear cost allocation in cross-border projects and heterogeneity of national regulations

Cross-border projects, in particular interconnectors, are among the key strategic building blocks for realizing the Corridor. However, financing these projects proves challenging, mainly because the allocation of costs between the countries involved is often controversial. To date, there is no straightforward, universally accepted method for determining how the burden is to be shared among the benefitting countries. As a consequence, lengthy coordination processes may delay investments and TSOs may shy away from pursuing cross-border projects altogether. The general cost allocation problems are exacerbated by the lack of harmonization between different countries' regulatory regimes, which makes it very difficult for countries to agree on a joint regulatory approach for cross-border projects in their jurisdiction. A case in point is the LitPol Link project, where difficulties to

resolve the cost allocation issue between the parties involved jeopardized access to CEF funding in 2014, as the application could not be submitted on time.

Insufficient incentives for prioritizing risky priority projects

The projects most relevant for kick-starting the implementation of the Corridor are cross-border projects such as interconnectors. These projects tend to be more complex in technical, legal and regulatory terms. At the same time, the remuneration granted by the regulatory framework is uniform across different types of projects with different levels of complexity and risk profiles. This does not provide adequate incentives for prioritizing the projects most needed to initiate the realization of the Corridor. In fact, due to the lack of risk adjusted regulatory remuneration, TSOs are incentivized to choose the least risky investment projects over riskier projects, thus neglecting the strategically most relevant, potentially game-changing network investments.

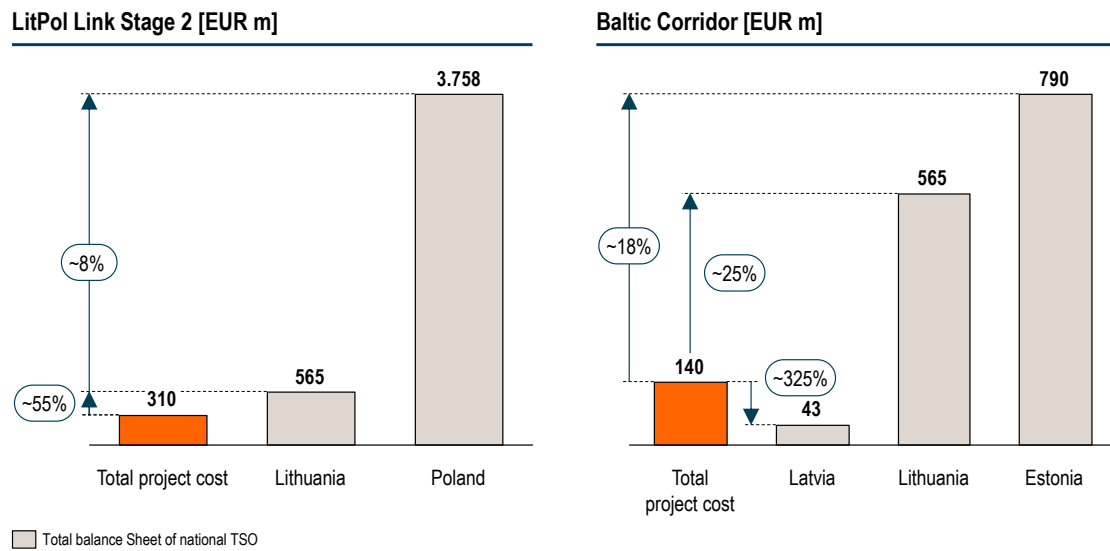
Financing challenges in the construction phase

The construction phase of large scale transmission infrastructure may well span a period of several years. During this construction phase, construction costs have to be covered by the TSO while the infrastructure is not yet operational. In some regulatory regimes, construction costs are only included in the regulatory asset base after the infrastructure has been commissioned. Consequently, there are no cash flows from remuneration for the asset which could serve to cover debt service and provide return on equity in the construction phase. This represents a serious challenge for mobilizing capital.

Sustainable leverage and sufficient equity

In the years ahead TSOs will have to put up substantial amounts of equity to finance the ambitious list of transmission infrastructure projects needed to realize the Corridor. Given the sizeable investment volume required, it is clear that internal equity from retained earnings will not be sufficient to provide what is needed. Instead, significant amounts of equity injections from investors will be needed to finance these investments. A glance at the focus projects underscores this point. Figure 20 provides an overview of the ratio between the investment volumes required for the projects and the size of the balance sheets of the national TSOs expected to finance the projects.

Figure 20: Ratio of project costs vs. TSO's total balance sheets



Source: Annual Reports, CapitalIQ, Roland Berger

The investment volumes required for the projects amount to a substantial share of the balance sheets of the TSOs involved. For example, the total cost of LitPol Link Stage 2 is around 55% of the total worth of the Lithuanian TSOs balance sheet. Financing these projects is therefore by no means a standard exercise for the TSOs. Consequently, substantial increases in equity are required, which can only be achieved through additional equity provided from external sources, i.e. existing or new shareholders.

The need to raise significant amounts of equity puts the focus on the ownership structure of the national TSOs in the EU-11-region. All of the TSOs in the region are majority state-owned. While the national TSOs in Lithuania and Romania have private minority shareholders, the remaining national TSOs are 100 % state-owned (see Figure 21).

Figure 21: Profiles of national electricity TSOs in the EU-11

| Country | Name | Legal form | Headquarter | Ownership | Credit Rating ¹⁾ |
|----------------|--|--|-------------|---------------|-----------------------------|
| Bulgaria | Elektroenergien Sistemen Operator EAD | Subsidiary of the Bulgarian Energy Holding EAD, which is a joint stock company wholly owned by the Bulgarian state | Sofia | Public (100%) | not rated |
| Croatia | HOPS d.o.o. | Limited company | Zagreb | Public (100%) | not rated |
| Czech Republic | ČEPS a.s. | Joint stock company owned by the Czech Republic (Ministry of Industry and Trade) | Praha | Public (100%) | Moody's (A2) |
| Estonia | Elering AS | Public limited company owned by the Republic of Estonia | Talinn | Public (100%) | Moody's (A3) |
| Hungary | MAVIR Hungarian Independent Transmission Operator Company Ltd. | Subsidiary of MVM Hungarian Electricity Ltd. | Budapest | Public (100%) | not rated |
| Latvia | AS Augstsprieguma tīkls | Joint stock company owned by the Republic of Latvia (Ministry of Finance) | Riga | Public (100%) | not rated |
| Lithuania | Litgrid AB | Public limited company | Vilnius | Public (97%) | not rated |
| Poland | PSE S.A. | Joint stock company owned by the Polish state (Ministry of Economy) | Warsaw | Public (100%) | not rated |
| Romania | CNTEE Transelectrica SA | Joint stock company, 59% of shares owned by the Romanian State | Bucharest | Public (58%) | Moody's (Ba2) |
| Slovak Rep. | Slovenska elektrizacna prenosova sustava, a.s. | Public limited company owned by the Slovak Republic (Ministry of Finance) | Bratislava | Public (100%) | not rated |
| Slovenia | ELES, d.o.o. | Limited company owned by the Republic of Slovenia | Ljubljana | Public (100%) | not rated |

1) Only ratings on the TSO-level from Moody's, Standard&Poor's and Fitch are reported; ratings of parent company not taken into account

Source: Annual Reports, Bloomberg, CapitalIQ, Moody's Roland Berger

The state ownership of TSOs with its political implications represents a particular challenge for raising additional equity. Full or partial privatization of infrastructure assets is not a viable political option in the region. This effectively rules out equity injections from private investors in exchange for asset ownership. At the same time, national governments have very limited room to provide additional equity from national budgets due to their obligation to comply with the Maastricht criteria and general pressures for fiscal consolidation. As a consequence, the lack of equity, which in turn could be used to raise debt, has to be considered a key strategic bottleneck hampering investments.

Access to debt and credit ratings

While raising sufficient equity represents a challenge for the TSOs in the region, securing the debt component of financing for transmission grid projects typically poses less of a problem, provided that sufficient equity is available to ensure a sustainable leverage ratio in the TSO's balance sheet. Typically, the most important financing sources of TSOs in the region on the debt side are international financing institutions (in particular the EIB), commercial banks and to a more limited extent corporate bonds.

EIB loans are one of the cornerstones of debt financing for EU-11 TSOs and play a key role in financing power transmission projects in the Corridor region. Small and medium-sized TSOs in Central Europe in particular use EIB loans as a major source of funding on the debt side. The main benefits associated with EIB loans are their favorable interest rates and their long maturities of 15 years and above which represent a perfect match for long term energy infrastructure investments with asset lifetimes of up to several decades. As a general rule, the EIB's contribution to a project's cost is limited to 50% of the overall amount established during appraisal. With its overall annual lending volume of EUR 77 bn (2014) and its commitment to support key EU policy goals in the energy realm, the bank will continue to play a vital role in financing transmission infrastructure in the region. For example, in November 2014, the EIB granted a loan of EUR 182 m to Czech TSO ČEPS, a.s. to finance reinforcement and modernization of the electricity transmission infrastructure in the Czech Republic.

Commercial bank loans are another building block of debt financing for TSOs in the region. They are considered less attractive as a financing instrument since the conditions they offer are typically less favorable than EIB loans. In particular, their relatively short maturities (five to ten years on average) are less compatible with the long term time horizon of energy infrastructure investments, thus requiring more refinancing operations over the asset's lifetime.

Finally, corporate bonds are an increasingly relevant financing instrument, especially for larger TSOs with favorable credit ratings. Relatively long maturities – ten years on average – combined with moderate interest rates, provided that high ratings can be attained by the TSO or its parent company, make corporate bonds a viable debt financing instrument. To expand their debt financing opportunities from relatively unattractive bank loans to corporate bonds, TSOs need a credit rating. Corporate bond markets in particular are virtually inaccessible without a credit rating. Especially given the scale of the investments needed to realize the North-South Energy Corridor, gaining access to this attractive financing source will have to be a critical strategic priority for the smaller TSOs in the region in the years ahead. As of today, eight of the 11 national electricity TSOs in the EU-11 do not have a stand-alone credit rating, i.e. not considering parent-company ratings (see Figure 21). This may limit access to affordable borrowing beyond EIB loans and restrict the TSOs' individual ability to finance the large scale investments needed to implement the Corridor.

What needs to happen: Tackling financing issues

Based on the above analysis of key challenges for financing power transmission infrastructure projects in the EU-11 region, we derived a number of conclusions and policy recommendations to address the most important obstacles and pave the way for kick-starting the implementation of the North-South Corridor in the electricity sector.

1. Create investment incentives through appropriate remuneration: In order to move the Corridor projects from idea to implementation across the region, it will be crucial for regulators to provide returns on infrastructure investments that are high enough to trigger TSO investments and attract and mobilize sufficient capital, while maintaining incentives for operational efficiency. In some cases, governments and regulators may be required to revisit overly restrictive regulatory compensation models and allow higher returns for TSOs. This will be particularly important for raising additional equity from sources other than public budgets, as urgently needed private equity investors can only be mobilized by providing appropriate return on equity.

2. Enhance the stability/predictability of regulation: Ensuring the predictability of regulation for a long term time horizon, i.e. beyond the typical 3 to 5 years regulatory periods, is crucial for mobilizing investment from TSOs, as it reduces the risk of detrimental ex post adjustments of regulatory returns once the investment has been locked in. One potential way to create more long-term transparency for investors would be to extend regulatory periods beyond today's duration or institute clear, quantitative limits to admissible regulatory adjustments in new regulatory periods to preserve the viability of the investment case.

3. Align national regulations and smoothen cost allocation in cross-border projects: Harmonization of national regulations will be critical, both to increase transparency for investors in the region's energy sector and to make regulatory remuneration for cross-border projects less complicated. Furthermore, clear guidelines and an institutionalized mechanism for resolving conflicts between national regulatory agencies over cost allocation of cross-border interconnectors could avoid detrimental delays in transnational transmission projects.

4. Provide risk-adjusted remuneration to get priority projects started: An effective approach to ensure that complex, but strategically important projects involving higher risks (e.g. interconnectors) are not delayed is to create incentives for quick implementation through risk adjusted remuneration. More attractive regulatory returns on these assets, which compensate for risks associated with the projects' higher complexity compared to "standard" grid investments, can effectively channel TSOs' limited financial resources towards the most pressing projects.

5. Provide remuneration in construction phase: Cash flow issues for TSOs in the construction phase, which involves high costs but yields no revenues prior to commissioning of the infrastructure, should be alleviated through forward-looking regulation. Specifically, financing constraints could be effectively avoided by including the capital cost of assets under construction in the regulatory asset base (equity and debt) and adjusting the level of tariffs as soon as costs arise.

6. Leverage the EFSI to gain access to debt funding: The EFSI can play an important role in mobilizing lending for electricity transmission projects of the North-South-Energy-Corridor. Particularly complex projects with a higher risk profile could benefit from EIB subordinate loans backed by EFSI

guarantees. This basic risk absorption could, in turn, catalyze large-scale additional investments from private investors into more senior tranches of debt with lower risk exposure.

7. Support TSOs in obtaining credit ratings: To meet the high financing needs of the transmission grid projects of the North-South-Energy-Corridor, even the smaller TSOs of the region will have to rely increasingly on corporate bond markets to complement EIB borrowing. To facilitate the access of TSOs to corporate bond markets and ensure their capital market readiness, those TSOs which have not obtained a credit rating thus far, should receive EU support in obtaining credit ratings. This should entail technical assistance from EU experts to prepare and navigate the rating process, potentially coupled with financial support if warranted.

8. Recognize strategic relevance of the Corridor projects for European energy policy: Looking at the relevance of these projects for European energy policy (and security), it should be discussed whether all costs are to be carried by consumers in the Baltic States – or whether the EU should make funds available to share the burden of this strategic project.

3.2.3 Oil sector: Realizing critical oil infrastructure in the North-South Corridor

In the following, we examine the prospects of major oil infrastructure projects in the North-South Corridor.

How things stand: Assessing project prospects and financing issues

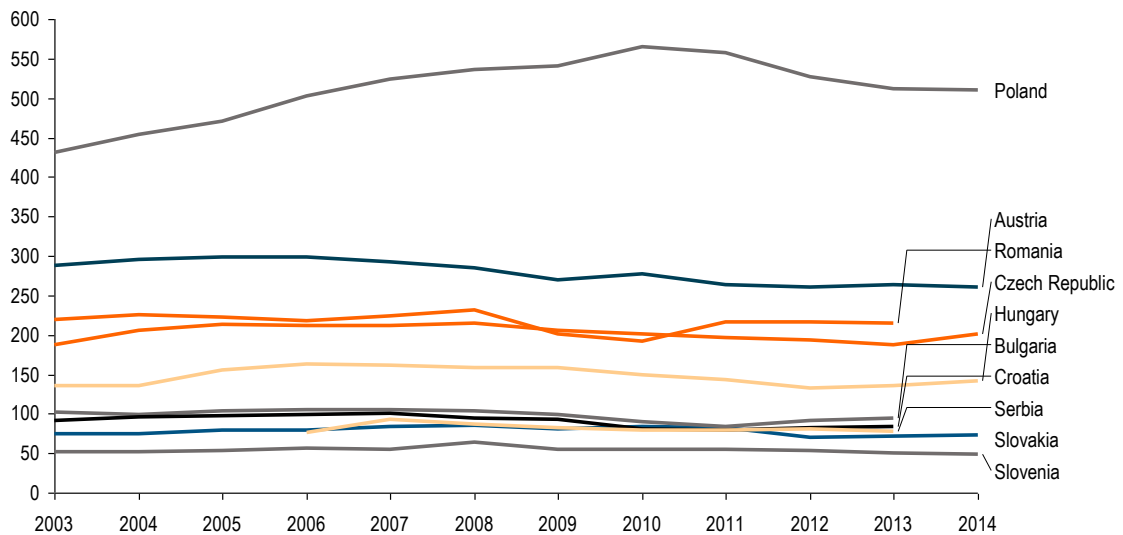
Much more than financing electricity transmission projects and major international gas pipelines, financing oil pipelines is first and foremost a question of commercial finance. Through project-financed deals, oil and gas majors team up to deliver major new pieces of infrastructure – typically backed by loans from commercial banks. In rarer cases, International Financial Institutions become involved as well, even though the threshold to pass for oil (and gas) projects is considerably higher than for electricity investments, due to the evidently more commercial nature of hydrocarbons transmission projects. The underlying foundation of any such project is a reliable business case for transportation services, typically linked to major upstream developments that need export routes to their destination markets. In recent months and years, plunging oil prices have dimmed prospects for such upstream projects – thereby simultaneously reducing chances for major pipeline projects.

Naturally, security of supply concerns may lead to politically-driven infrastructure expansions in the oil sector as well. However, such political considerations oftentimes drive strategic storage capacities to cope with major supply cut-offs, rather than alternative pipeline routes. Because oil supply is generally a more fungible commodity, and as such can be transported in a variety of ways (e.g. tankers, pipelines, trucks, railways), it requires less precautionary infrastructure than gas. Thus, from an energy security point of view, diversified pipeline infrastructure is only one enabler of many.

As for the North-South Corridor and the aforementioned focus project, the Pan European Oil Pipeline (PEOP) was supposed to connect Romania's Constanta to the Italian city of Trieste, via Serbia, Croatia and Slovenia. By now, the proposal has been effectively abandoned after Italy, Slovenia and eventually Croatia withdrew their support – primarily because financing from the international oil industry could not be mobilized. Numerous investment conferences have been held over the past decades – yet none of them produced tangible results in terms of equity commitments to the project company.

With a look from afar, it appears that the PEOP project failed to take off because a business case backing a project-financed mega-deal was deemed not viable enough to be pursued. Once again, difficulties have risen as much from supply uncertainties (pending oil deliveries from Azerbaijan, Turkmenistan and Kazakhstan) as from struggling demand. Recent years have shown little visible upward trends in petroleum demand in regional markets along the route (Figure 22). Consumption of petroleum products decreased, especially motor gasoline and fuel oil. Utilization rates of refineries are down, some even closing. The forecast oil demands (e.g. ca. 1% year-on-year growth for Central and Eastern European markets) over the coming years and decades would likely not justify an investment of this capacity.

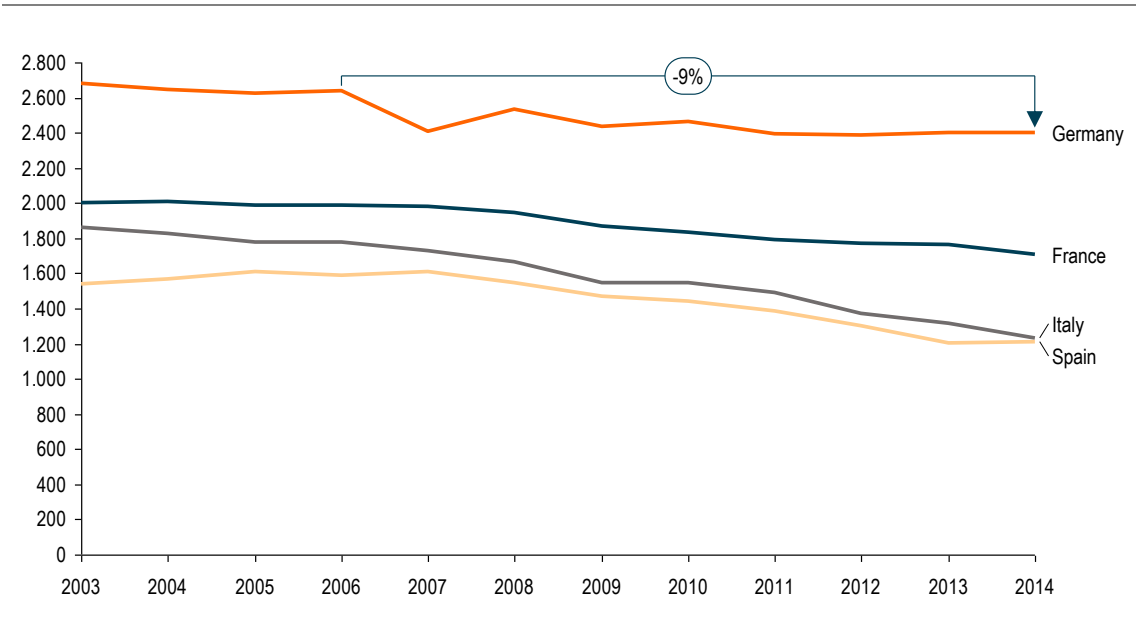
Figure 22: Total petroleum demand trends in key Central and Eastern European markets ['000 bpd]



Source: U.S. Energy Information Administration, Roland Berger

Moreover, key oil markets in Western Europe are struggling as well – for which PEOP was originally destined, i.e. the industrial heartlands of Northern Italy, Germany and Austria (Figure 23).

Figure 23: Total petroleum demand trends in key PEOP destination markets ['000 bpd]



Source: U.S. Energy Information Administration, Roland Berger

Nevertheless, a new concept on the Constanta-Pancevo route now aims to connect the national oil transportation systems of the two countries. Although it is primarily driven by Gazprom's interests to supply its own refineries in Serbia, it should be supported nonetheless as it would already close one of the two remaining gaps among the Adria and the Constanta systems, i.e. the missing link between the Romanian and Serbian pipeline networks. This is especially important given Serbia's determination to become a member of the EU and position itself as a country with strong ties both eastwards and westwards. Closing the links one by one, step by step, would nevertheless ultimately position Constanta as an alternative oil-gateway to Europe – potentially able to take up tanker deliveries from non-Russian suppliers, such as Kazakhstan, Turkmenistan and Azerbaijan.

On other ends of the North-South Corridor, there is more progress in building oil infrastructure. For example, the reconstruction and enlargement of the twenty-year-old JANAF and Adria pipelines connecting Slovakia, Hungary, and Croatia has been largely completed (PCI 9.3). Transformed into an operational bidirectional system, the Adria system can now carry oil northwest from the Croatian port of Omišalj on the Adriatic to Hungary, Slovakia, and the Czech Republic – and also transport it southwards from the Druzhba system to Croatia. The Hungary-Slovakia part of the Adria pipeline has

been successfully upgraded from 3.5 mt/y to a 6-mt/y capacity; it was commissioned in February 2015 totaling an investment of EUR 70 m. In fact, the pipeline has become a full-fledged alternative for oil supply from the Adriatic for refineries in Hungary, Slovakia and part of the Czech Republic. Now, the Bratislava refinery in Slovakia may fully be supplied by tanker deliveries from the Mediterranean.

In addition, a new 80-150 km, 5 mt/y pipeline is planned, to connect the Slovak capital of Bratislava with Austria's Schwechat refinery. This would normally be used to carry Druzhba oil to Schwechat, but could also be operated in reverse mode to provide a backup system for oil delivery to Bratislava's own refinery in event of disruption of Russian supplies. BSP Bratislava-Schwechat Pipeline as a joint venture of Slovak Transpetrol and OMV pursue the project. It currently faces the most difficulties as regards the routing on the Slovakian side due to social and environmental concerns. Financing, however, seems to be secured given the commercial prospects of diversifying crude oil supplies for two major refineries (Schwechat and OMV's refineries on Austrian side) as well as the robust balance sheets of the involved TSOs, Transpetrol and OMV.

What needs to happen: Ways forward for oil infrastructure in the North-South Corridor

Overall, with the exception of the PEOP project as a comprehensive mega investment, key oil infrastructure projects in Central and Eastern Europe to help enable the North-South Corridor and provide alternative supply routes to the Druzhba systems seem to be on track. Recent progress on smaller interconnectors strongly suggests that limited investments are more realistic to be pursued over the medium term – in the current market environment dominated by struggling demand and low oil prices. Consequently, the following considerations are important in order to further advance oil infrastructure along the Corridor:

- > **Support the piecemeal development of the PEOP, focusing initially on a link between Romania and Serbia:** European Union policy makers and other Member States along the route of the initially proposed PEOP should take up the initiative of Romania, Serbia and the Russian Federation to link Pancevo with Piresti and kick-start the connection of Constanta to Central and Eastern European markets. This would mean to secure Third Party Access for the pipeline as a perspective for all future deliveries from Constanta westwards to Croatia – as well as close alignment of technical standards to ensure the compatibility of different networks. Unbundling issues may be of critical importance in this case as well. EU players should play an active role in finding pragmatic solutions that supports the completion of the project. Should the EU deem the investment strategic in terms of security of supply in the oil sector, it should be granted PCI status.
- > **Re-build the overall project pipeline in the oil sector and advance more projects to PCI level:** Evidently, the oil sector lacks a more robust project pipeline, especially as far as projects

with PCI status are concerned. If the implementation of current PCI projects proceeds more or less as scheduled, there will be few projects left in the short to medium term to focus European policy attention on. Consequently, provided there is a structural need for further oil transmission infrastructure development in Central Europe, national TSOs and Governments need to define further projects with a convincing rationale that can enter the political discussion at European level.

- > **Ensure regional co-ordination:** The long-term co-ordination and realization of further oil transmission projects in Central Europe requires a permanent regional co-ordination structure. Like in the gas and electricity sector, a dedicated platform should be set-up to align on project endeavors as public actors and oil companies. The focus of alignment should be on proper coordination and project identification, with public financing likely playing a less important role than in other energy sub-sectors.

BOX 3 – Financing transportation and telecommunication projects along the North-South Corridor: Since a seamless European transportation network serves as a valuable common good, the European Union provides grants and various financial instruments to support the Member States' and the project promoters' efforts of completing the TEN-T Corridors. For the current Multiannual Financial Framework 2014-2020 that covers the current TEN-T policy, the European Union makes 26.25 bn EUR available for co-financing projects along the identified Corridors. These funds are organized under the roof of the Connecting Europe Facility (CEF), which was established along with the recent TEN-T policy.

The regulation that established the CEF (1316/2013) includes a list of so-called pre-defined projects along the TEN-T Corridors. These pre-identified projects are eligible to receive funding as part of the multi-annual work programs that are adopted by the CEF to specify its investment priorities. Between 20 and 21 bn EUR or 80 to 85 % of the total TEN-T budget will be allocated via these multi-annual work programs. The EU-funds organized by the CEF only provide co-funding for eligible projects, mostly around 20 % of the eligible costs. Under certain conditions, the %age covered by European co-funding can be higher, for example for cross-border projects or individual studies. The Central and Eastern European Member States can receive even higher co-financing rates of 85 % because they are eligible for funding under the Cohesion Fund. But even if a project is eligible for substantial co-funds from the EU, the Member States and the respective network managers must raise the remaining funds. Even if Central and Eastern European Member States run lower budget deficits and have amassed less public debt than the EU-average, co-funding projects along the Adriatic-Baltic Corridor nonetheless remains difficult.

With regard to roads, public private partnerships (PPPs) can be a viable solution to mitigate the strain on public budgets. However, combining both different political levels (EU, national, regional) and different sources for funding (public, private) poses extra challenges to the effective realization of PPPs. For instance, it is important to use the EU-funds only for those parts of the project for which they have been made available. But the construction of roads constitutes only a minor part of the pre-identified transportation infrastructure projects along the North-South Corridor. The majority of projects are railway-related and therefore managed by relevant national rail network operators. Especially with regard to strategic rail infrastructure projects, return on investment for individual rail network operators might be too low.

Therefore, the national rail infrastructure managers and the national governments must further prioritize important projects along the Adriatic-Baltic Corridor in order to obtain financial support from the available EU funds, mainly the Cohesion Fund and the Connecting Europe Facility. Only by coordination their efforts the rail infrastructure managers and the Central and Eastern European Member States will be able to prepare and realize high quality infrastructure projects that connect the Eastern Member States along the North-South Corridor and lay the foundations for future economic growth, further prosperity and environmentally friendly freight and passenger transport.

While the implementation of a European network of trans-continental transportation Corridors clearly requires action at the EU-level, the development and enhancement of secure and comprehensive telecommunication infrastructure mainly takes place at the national level. This allocation of responsibility is reflected by the CEF's sparse funds for the telecommunication sector. With 1.14 bn Euros or 4 % of the total transportation budget the CEF Digital will not be able to play a major role in financing Central and Eastern Europe's digital infrastructure. Since the business case for broadband deployment in sparsely populated regions is weak (see Box 1) and the Member States' budgets already run deficits, further actions at the EU-level will be needed to significantly increase broadband access in the Central and Eastern Europe. While raising the CEF Digital's budget for grants proves difficult due to budget constraints, innovative financing approaches which use public funds to catalyze private investments can play an important role in tackling the region's digital infrastructure challenges.

A major opportunity in this vein is the Investment Plan for Europe that aims at unlocking additional investment of at least 315 bn EUR over the next three years by mobilizing private investment via the European Fund for Strategic Investment (EFSI). The EFSI is to be jointly funded by the EU and the European Investment Bank (EIB) and will leverage its initial funding of 21 bn EUR by attracting other public as well as private investors and thereby multiplying the initial investment. The Central and Eastern European Member States should seize this opportunity to invest in the EFSI and use its multiplier effect to create a digital backbone that will improve Central and Eastern Europe's digital security and strengthen Europe's shield against cyberwar and cybercrime throughout the continent.

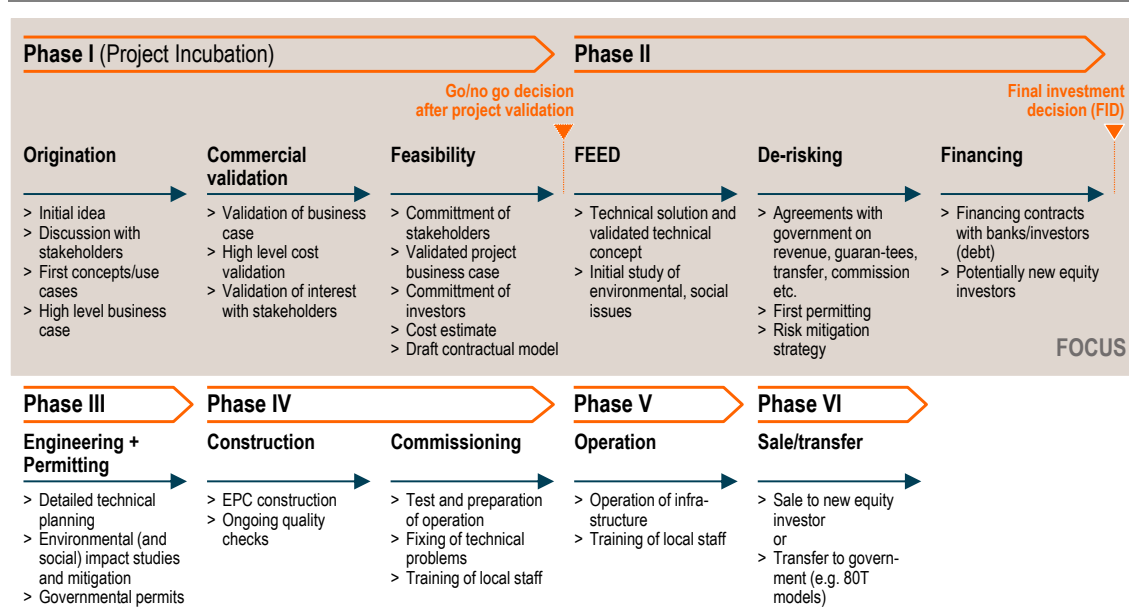
4 The road ahead: How to make it happen

4.1 Where projects have to go from here: Reaching the next stages

In our above analysis, we examined the financing situation and outlook of the study's focus projects. Building on a project-level perspective as our starting point, we also used the focus projects as archetypes which can provide important insights for advancing the financing discussion on a sectorial level – to draw broader conclusions and inform the implementation and financing discussion for the Corridor as a whole.

What we see from our analysis – encompassing electricity, gas and oil projects – is that many of the Corridor projects are currently struggling to take the decisive step from idea to concrete financing solutions. Taking a typical infrastructure project lifecycle as analytical starting point (see Figure 24), many Corridor projects seem to be stuck in the advanced stages of the incubation phase: Initial pre-feasibility studies or feasibility studies exist, the basic technical parameters have been determined and preliminary cost assessments have been produced. However, what is missing is sufficient clarity on the size, predictability and robustness of future revenue streams. This, however, is a critical precondition for moving towards an investment decision and mobilizing financing for projects characterized by high initial capital expenditure, very limited liquidity and long-term asset lifetimes and investment horizons.

Figure 24: Typical lifecycle of energy transmission infrastructure projects



Source: Roland Berger

In a nutshell, developing viable financing solutions seems to be a key challenge for the projects envisaged to build the Corridor in the years ahead. In spite of important differences between individual projects' specific features and conditions, our analysis has produced a clear overall picture from a Corridor point of view:

1. The strategic rationale for the North-South-Energy-Corridor is sound and well established. However, the commercial fundamentals of the proposed projects are in many cases unclear, resulting in profound financing challenges. Against this background, it is unlikely that the required investments will materialize on a purely market-driven basis without being accompanied by sound and well-defined political and regulatory measures.
2. While there is no single silver bullet to remove all of the financing roadblocks at once, our analysis shows that there is a set of promising political, regulatory and financial levers which can contribute to making the Corridor a reality. To maximize impact and ensure success, it is critical that these different levers are used in a coordinated and thought-through way.
3. Accomplishing coordinated efforts to kick-start financing for the Corridor, however, is complicated by the fact that the key levers are controlled by various stakeholders, including financing institutions, national governments, regulatory bodies and infrastructure operators. At the same time,

the Corridor is by definition trans-national, while the relevant regulatory and legal frameworks remain to a large extent in the realm of national jurisdictions.

This complexity underscores the fact that the changes required to facilitate financing for the Corridor projects cannot be expected to just fall into place. Instead, the situation calls for a systematic and coordinated "roadmap"-approach to ensure that the different actors are on board, are fully committed to the cause of advancing the Corridor, and play their timely part in making it happen. In what follows, we will discuss key building blocks of a "North-South-Energy-Corridor roadmap", providing implementation-oriented guidelines, and recommendations for how to move the Corridor from idea to realization in the years ahead.

4.2 What is next for the North-South Corridor: Building a roadmap

As established above, what is needed now is an overarching "Corridor roadmap" which provides a well-defined way forward, assigns clear roles and responsibilities to the relevant stakeholders and thus helps to overcome the stalemate which some of the projects have experienced in the past years.

To be successful, the roadmap needs to capitalize on the favorable current political environment in Brussels. At the moment, there is both heightened attention for strategic energy security issues in Central Europe due to the Ukraine conflict, and a strong interest in boosting private infrastructure investments through the EFSI as one of the Juncker Commission's top political priorities. In this regard, the Corridor is a natural match for the current EU energy and infrastructure policy agenda. The Corridor roadmap should therefore aim at building on existing policy initiatives and seek to incorporate them into the development of viable financing solutions.

4.2.1 Build a regional platform to co-ordinate and co-finance the North-South Corridor

In order to ensure swift and meaningful progress, we propose to establish a "Corridor-Platform" which brings together the relevant actors and decision makers in an institutionalized setting to develop solutions for the most important financing issues and advance project implementation.

As of today, there are already a number of European co-ordination bodies relevant for cross-border energy transmission infrastructure strategy and planning. In terms of co-ordination between national regulatory agencies, the Electricity Regional Initiatives and Gas Regional Initiatives within the framework of ACER are of particular importance. As for TSOs, ENTSO-E and ENTSO-G with their respective regional groupings for the development of the TYNDP play a key role in facilitating the adequate development of the interconnected European energy transmission network. In addition, the Regional Groups established under Regulation (EU) 347/2013, which are in charge of assessing project submissions for the PCI-list, bring together representatives from Member States, the Commission, TSOs, project promoters, and regulatory authorities.

These existing bodies and their co-ordination procedures provide well-established and effective formats for regional co-operation between stakeholders which can play an important role in advancing the corridor. However, against the backdrop of the financing challenges identified in our analysis, we propose to complement the existing bodies with a more comprehensive, holistic co-ordination platform, which also involves potential public and private sector financiers early on. While institutionalized cooperation between TSOs, regulators, and policy level decision-makers is important for promoting the corridor, our findings suggest that what is missing so far is a dedicated working structure which systematically develops viable financing solutions and matches projects with potential investors. The proposed platform aims to close this gap by tackling financing issues both on a policy/program-level and on a project-specific level to mobilize public and private investment into corridor projects. To this end, the envisaged platform should involve public financing institutions, most importantly the European Investment Bank (EIB) with the competent EFSI management, as well as private sector financiers, such as infrastructure funds and commercial banks.

Rather than merely being a consultation body, the platform needs to assume a strong operational role in coordinating the next steps of implementing the Corridor. To fulfill this active role as a working body that pushes projects towards implementation, the platform needs sufficient resources and operational firepower. We therefore suggest putting into place a standing Corridor Platform Project Management Office (CP-PMO), which would be in charge of coordinating the different activities of the platform.

Given that national TSOs (and national governments as their main shareholders) will be in the driver seat for most specific investment projects, national TSOs should assume a leading role in setting up the CP-PMO. However, considering the overarching strategic importance of the Corridor for the region and the EU as a whole, EU-level grant support for establishing and running the CP-PMO should be considered. The Western Balkans Investment Framework (WBIF) with its Infrastructure Project Facility (IPF) as an EC-financed working body that supports the preparation of investment projects could serve as a useful blueprint in this context.

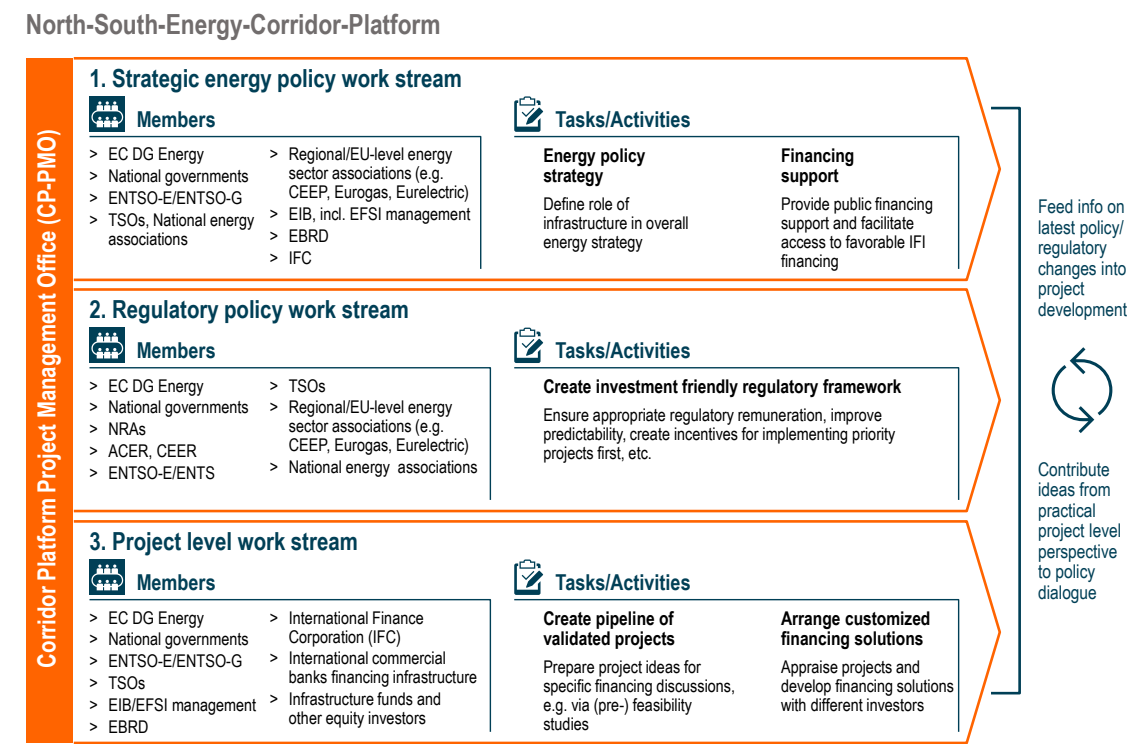
The Corridor Platform, supported by the CP-PMO, should work on financing and implementation issues in three main work streams. Figure 25 gives an overview of the Corridor Platform's proposed structure.

- > **The strategic energy policy work stream** needs to make sure that implementing the Corridor is firmly anchored as a key strategic energy policy priority on the national, European and transatlantic level. This includes reaching a basic agreement (followed by binding commitments) in the European Commission and in member states' capitals that active financing support from public budgets and IFI-involvement is warranted to pursue geopolitical and strategic energy policy goals such as security of supply and diversification.

- > **The regulatory policy work stream** needs to optimize the legal and regulatory frameworks relevant for infrastructure investments in the Corridor region to provide an environment conducive to investment, in particular for TSOs which will be in the driver seat for most of the Corridor projects. This will have to involve regulatory adjustments in terms of EU level legislation, but most importantly by national governments and regulatory authorities.

- > **The project level work stream** will be implementation-driven, focusing on developing a pipeline of investment-ready project proposals and facilitating customized financing solutions for these projects to realize the Corridor step by step.

Figure 25: Proposed outline of the North-South-Energy-Corridor-Platform



Source: Roland Berger

4.2.2 Make the Corridor a European and international priority: The Corridor platform's strategic energy policy work stream

Thus far, the strategic relevance and importance of the "North-South-Energy-Corridor" has been widely acknowledged by policymakers, both in Brussels and in European capitals. However, at this point, the Corridor still requires more concrete political underpinnings and powerful endorsements to

move towards implementation. To achieve this, the strategic energy policy level work stream should bring together, inter alia, representatives from the following institutions and organizations:

- > European Commission DG Energy
- > National Governments of Member States in the Corridor region
- > ENTSO-E/ENTSO-G
- > National TSOs of the Corridor region
- > Regional/EU-level energy sector associations (CEEP, Eurogas, Eurelectric)
- > National energy sector associations
- > European Investment Bank (EIB) with competent EFSI management
- > European Bank for Reconstruction and Development (EBRD)
- > International Finance Corporation (IFC)

To lay the political foundation for swift implementation of the Corridor, the strategic energy policy work stream should focus primarily on the following issues:

Make energy infrastructure investments a key pillar of energy policy

It is important to note that from a systemic point of view, energy infrastructure is only one pillar in the overall energy policy framework looking towards increasing energy security for Central Europe and Europe as a whole. In this sense, energy infrastructure policy has to be aligned with other elements, most importantly the energy mix (both overall and for electricity generation), but also energy efficiency. For instance, European policymakers need to clarify politically, which future role they want to assign to natural gas as primary energy source vis-à-vis renewables, coal, lignite and also nuclear. Only then can the political and strategic relevance of major new gas infrastructure projects, e.g. the Backbone Pipeline, be assessed in a meaningful way. EU-level and national policymakers have to reach a joint understanding of the outstanding strategic importance of trans-national energy transmission infrastructure in the region to withstand external supply shocks and foster European resilience against cut-offs. Only with a shared political will firmly established across Europe will it be possible to flesh out the specifics of financing arrangements for Corridor projects.

Provide public financing support for energy-security projects lacking commercial viability

For projects where commercial viability – and consequently bankability – cannot be achieved on a pure market basis, there may be a case for targeted political support based on systemic energy security considerations. In such instances, it will be inevitable that public budgets (whether national or European) step in and back the larger political case – whenever the political will is strong enough. In this context, it is important to keep in mind the regional relevance of the Corridor as a key enabler for energy security in the EU as a whole. Consequently, there may be a strong case for EU-grant support for strategic Corridor projects lacking stand-alone commercial viability. Available funds

should be assigned to speed up the project development and realization process and to tip the balance towards bankability where that is possible within available budgets. In the context of involving private financing to cover initial capital expenditure, a conceivable revenue model could involve EU-level grants to help with upfront CAPEX, as well as budget-financed availability fees from one or several national governments, depending on the routing of the infrastructure. To secure access to debt financing in such a set-up, it is essential that governments enter binding commitments to provide long-term availability payments to match the long-term investment horizon of energy infrastructure assets and associated debt service obligations. The Connecting Europe Facility (CEF) as the centerpiece of strategic EU contributions for energy infrastructure development represents a useful institutional setting to anchor public financing support for the Corridor via grants. To advance the Corridor in the years ahead, TSOs and governments need to bring Corridor projects into the CEF by meeting the requirements of the well-established PCI process. At the same time, European policymakers should revisit the current funding levels made available via CEF to meet the significant investment needs associated with the Corridor and its strong energy security rationale.

Actively involve IFIs to facilitate debt and equity financing

Provided that national budget items and EU-grants are available to cover gaps in commercial viability, International Financing Institutions, in particular the EIB, can play an important role in providing financing for the Corridor projects.

As previously discussed, putting up additional equity for network investments may represent a challenge for state-owned national TSOs in the Corridor region, effectively hampering investments even with a sound business case in place. This problem should be kept in mind by EU and national policymakers as they flesh out the design and operation of the European Fund for Strategic Investment (EFSI). One potential remedy could be to allow for TSOs to offload operational assets in exchange for equity to be used for new grid infrastructure investments – while maintaining public ownership of assets.

Furthermore, IFIs should play an active role in providing access to debt financing at favorable conditions. Again, the EFSI could be an important route for TSOs to gain access to debt financing, particularly for complex projects with a higher risk profile which could benefit from EIB subordinate loans backed by EFSI guarantees and subsequent senior loans from private investors.

Facilitate capital market readiness for TSOs

Not least, EU funds and technical assistance and expertise should be made available by the European Commission to improve TSOs' capital market readiness. This should involve targeted assistance especially for the Corridor region's smaller TSOs in obtaining credit ratings to facilitate access to corporate bond markets and enable them to meet the high financing needs for investments. EU-level assistance, however, has to be met with reciprocal efforts on the part of

national governments and TSOs. This holds in particular for meeting the strict procedural and documentary requirements which are at the heart of obtaining a credit rating.

4.2.3 Create a regulatory framework that enables North-South Corridor investments: The Corridor platform's regulatory policy work stream

The mandate and main task of the regulatory policy level work stream will be to develop a joint approach for improving the legal and regulatory frameworks relevant for financing energy transmission infrastructure projects in the Corridor region. To this end, the Corridor region's national governments need to step up their efforts to improve, coordinate and harmonize national legal frameworks and regulatory practices throughout the region. Joint guidelines should be agreed among the national representatives to subsequently inform policy making on the national level and bring about meaningful change. In addition, the work stream should also facilitate exchange and policy dialogue with EU level policy makers and play an active advocacy role in Brussels in order to ensure that the importance of the North-South-Energy-Corridor is properly reflected in EU legislation. Considering this mandate, the policy level work stream should bring together, inter alia, representatives from the following institutions and organizations:

- > European Commission DG Energy
- > National Governments of Member States in the Corridor region
- > National Regulatory Authorities of the Corridor region
- > Agency for the Cooperation of Energy Regulators (ACER)
- > Council of European Energy Regulators (CEER)
- > ENTSO-E/ENTSO-G
- > National TSOs of the Corridor region
- > Regional/EU-level energy sector associations (CEEP, Eurogas, Eurelectric)
- > National energy sector associations

As previously discussed, infrastructure financing via TSO balance sheets is expected to play a key role in implementing Corridor projects, first and foremost in the electricity sector, but also to a significant extent in natural gas transmission. The returns which TSOs can realize on their infrastructure investments, which become part of the regulated asset base, are driven primarily by the regulatory remuneration schemes in place. Instituting a regulatory environment conducive to TSO-investments (and thus potentially to the allocation of private capital), which provides strong incentives to prioritize the most urgent Corridor projects, is thus a key lever for making the Corridor a reality.

Creating appropriate regulatory conditions will require hard work by national governments across the region on two different levels: law-making and regulatory practice/implementation. In terms of the statutory foundations of regulatory regimes, legislative adjustments will be necessary to change e.g.

remuneration levels (i.e. guaranteed returns) and regulatory periods. On the level of implementation, regulatory authorities need to be properly instructed to use their discretion to remove regulatory roadblocks and support swift implementation of Corridor projects while staying true to their role as guardians of TSO efficiency and cost containment for consumers. Specifically, our above analysis suggests that national governments should develop solutions to regulatory investment hurdles in the following areas:

- > **Make remuneration more investment-friendly:** Allow higher returns for TSOs to create appropriate investment incentives and facilitate the mobilization of additional equity from sources other than public budgets (i.e. private investors seeking attractive returns).
- > **Improve predictability of regulation:** Reduce the risks to investors of ex-post reductions of regulatory returns, e.g. by extending the duration of regulatory periods for high priority Corridor projects.
- > **Harmonize regulation and simplify handling of cross-border projects:** Align national regulations with regard to TSO remuneration for transmission infrastructure investments and establish an institutionalized conflict resolution mechanism between national regulatory agencies to address cost allocation issues for cross-border interconnectors.
- > **Adopt special regulatory treatment for PCIs:** Expand PCI-legislation from its current focus on permitting issues to remuneration. Make disbursement of PCI funds for a project conditional upon the National Regulatory Authorities applying a simplified "PCI remuneration scheme" for cross border projects, which ensures favorable remuneration and avoids complexity for TSOs.
- > **Accelerate priority projects through risk-adjusted remuneration:** Provide higher regulatory returns for riskier priority projects (e.g. complex interconnectors) to channel financial resources towards the most urgent projects.
- > **Support financing in construction phase:** Provide TSOs with regulatory remuneration for assets under construction to avoid cash flow shortfalls in the construction phase.

4.2.4 Develop the Corridor step by step to complete European integration: The Corridor-platform's project level work stream

The project level work stream should be implementation-driven, tasked with helping individual energy infrastructure projects in the North-South Corridor (mostly put forth by national TSOs) master project incubation and de-risking phases. The work stream needs to focus on developing and maintaining a pipeline of investment-ready project proposals and arranging customized financing

solutions for these projects on a one by one basis. It should concentrate on regional projects, i.e. interconnectors covering at least two Member States. Its primary purpose should be to bring project promoters (chiefly national Governments and TSOs) and project financiers together to find joint solutions for common financing issues (i.e. portfolio financing support) and help project developers overcome individual financing hurdles, building on recently established catalysts for private-sector involvement, especially the EFSI.

Considering this mandate, it should comprise, among others, representatives from the following institutions and organizations:

- > European Commission DG Energy
- > National Governments of Member States in the Corridor region
- > ENTSO-E/ENTSO-G
- > National TSOs of the Corridor region
- > European Investment Bank (EIB) with competent EFSI management
- > European Bank for Reconstruction and Development (EBRD)
- > International Finance Corporation (IFC)
- > International commercial banks financing infrastructure
- > Infrastructure funds and other equity investors

To facilitate the swift implementation of individual Corridor projects, the project level work stream comprises the following tasks:

Create a pipeline of investment-grade projects

To advance investments in Corridor infrastructure projects, a comprehensive pipeline of validated projects is required – a list that presents both IFIs and potential private sector investors with a choice of project proposals that are in principle "ready to invest" and that meet their minimum requirements: e.g. technical feasibility, economic viability, environmental and social impact. Initially, the pipeline should be filled with the critical energy infrastructure projects with PCI status that are currently pursued by national TSOs in the Corridor region, including the list of Corridor projects discussed in Chapter 2.1. To succeed in the pipeline building exercise, the work stream set-up should consider the following:

- > **Equip the work stream with a budget item dedicated to North-South Corridor project origination activities** (e.g. a grant through the Connecting Europe Facility): Ideally, the work stream should have funds at its disposal to help get project ideas off the ground, a typical example being a gas interconnector from the Czech Republic southwards via Slovakia to Hungary to take on the next step of the Backbone Pipeline. Specifically, the work stream should make funds available to pay for pre-feasibility-studies and feasibility studies for promising

project proposals with high strategic relevance for the completion of the Corridor. These preparatory studies should particularly focus on commercial validation of the business case, including a reliable cost estimate and proposing a viable revenue model. Through supportive study work, the work stream should use the money to "fill the pipeline" with projects that are sufficiently mature to enter financing discussions and thereby pre-select projects to be developed further. Moreover, the work stream can serve as an early-stage "quality gate" that eliminates proposals that lack any chance of a viable business case while insufficiently achieving interconnectivity and energy security objectives. Filling the pipeline with validated and sufficiently developed project ideas in close collaboration with national project promoters (TSOs and governments) will be one of the key responsibilities of the CP-PMO. Similar to the Western Balkans Investment Facility, the CP-PMO will screen and evaluate project proposals, select projects to receive funding, and subsequently coordinate their development through feasibility studies, more detailed designs or impact assessments, so that potential investors can make informed investment decisions that will then enable the project to proceed.

- > **Define viable cash flow models and secure projects against the risk of cash flows not materializing:** Defining robust cash flow and revenue models for infrastructure is a prerequisite for developing investment-grade project proposals. Given both market and energy-security rationales behind the Corridor projects (and especially their capacities), various potential sources of revenue can be assigned to projects, i.e. not only transportation tariffs or user fees, but also budget-financed availability fees for projects that are not part of a regulated asset base already – potentially combining such fees with national and EU subsidy programs (e.g. structural funds). Moreover, in an environment of low investor trust, it may be necessary to introduce additional de-risking measures as a buffer against the risk of cash flows not materializing, at least for some tranches of the investment. The work stream could recommend risk-absorbing investments in subordinated debt instruments or "first-loss pieces" by the EIB (and/or national sponsors) within the framework of the EFSI, and potentially state guarantees by sponsoring governments for projects with high risk profiles, funded either by the EU or by national budgets. Risk absorption by the EIB, however, should strictly leave political/regulatory risks in the national domain, e.g. by facilitating national guarantees on agreed revenues to protect against changes in regulation. De-risking should also be limited to senior debt tranches, while equity investors should not benefit from public de-risking in order to maintain sound financial incentives for project owners (and their returns on equity).

Arrange customized financing solutions

With a list of financeable projects at its disposal, the work stream should take these up for discussion one by one in order to advance on concrete financing solutions. From our above discussion, we conclude that electricity, gas and oil TSOs will be in most cases the chief project promoters making their case for financing. The Corridor Platform Project Management Office should assume a strong role as facilitator of project level financing discussions and negotiations. This includes:

- > Preparing the documents required for financing negotiations jointly with national project promoters
- > Screening the market to identify potential financiers for the project at hand
- > Testing the waters for financing solutions with potential financiers
- > Serving as a single point of access and key interface between investors, national governments and TSOs and provide facilitating infrastructure for negotiations

Given its impressive track-record as lead financier of TSO-initiated energy infrastructure projects in the EU-11, we propose that the EIB continues to play an active role in scrutinizing bankability and arranging financing solutions for specific Corridor projects. Specifically, we recommend the following process in the context of individual projects:

- > **Perform an initial project appraisal:** From a financing (especially lending) perspective, the EIB should initially examine the project merits, especially with a view to bankability requirements and associated risks (e.g. regulatory risks). Subsequently, the EIB should articulate whether it sees a role for itself in the financing of the project via anchor financing. EIB scrutiny (as a "quality gate") can be expected to have a powerful signaling effect for other lenders and co-investors. EIB involvement can help to increase the private sector's confidence in the soundness of projects and thus support the effective mobilization of additional financing (especially from commercial banks).
- > **Build project-specific financing syndicates:** Provided successful appraisal, the EIB should take the procedural responsibility as the future syndicate lead-arranger for the subsequent process of arranging a viable financing solution, by approaching private-sector financial institutions as well as other IFIS – depending on the risk-return profile of the project in question.
- > **Negotiate financing agreements and seal the deal:** In front of the dedicated syndicate of financiers, the respective TSO or multiple TSOs pursuing a joint project should then make their case for the project and initiate negotiations on financing solutions with the aim of concluding financing agreements with the syndicate of banks.

4.3 Outlook

As can be seen from the above discussion, the roadmap requires substantial, coordinated efforts from a wide range of public and private stakeholders. Figure 26 provides an overview of the distinct roles and responsibilities which the different stakeholders will have to assume within the framework of the proposed Corridor Platform. Clearly defining these roles at the very outset and ensuring the stakeholders' binding commitments to fulfill their designated roles will be critical for the swift implementation of the Corridor, especially given the complexity and trans-national set-up of the stakeholder setting.

Figure 26: Key stakeholders and their designated roles in the Corridor Platform

| Corridor Platform Project Management Office (CP-PMO) | |
|---|---|
| European Commission (DG ENER) | <ul style="list-style-type: none"> > Define role of additional transmission infrastructure for energy security in CEE > Ensure energy policy priority of key Corridor projects, e.g. via PCI-process, funding under CEF and EFSI ("Juncker-Plan") |
| Member State Governments, regulators | <ul style="list-style-type: none"> > Start dialogue on favorable regulatory framework and regulatory innovation > Ensure budget support for top energy-security infrastructure priorities which lack commercial viability |
| Transmission System Operators | <ul style="list-style-type: none"> > Define critical and viable bilateral interconnectors – in context of Corridor > Commit to timeline and projects in a "systemic approach" > Develop projects to financing stage (successful incubation) |
| EIB, EBRD and other IFIs | <ul style="list-style-type: none"> > Ensure sound project due diligence and maximum market-based development > Catalyze commercial financing and private investment, e.g. by leveraging EFSI > Lend a hand in finding the right financial set-up for important projects |

Source: Roland Berger

While it is certainly worthwhile to already start pursuing Corridor project proposals within today's political and regulatory framework, our analysis clearly reveals that a number of political and regulatory issues will have to be addressed before the Corridor can be implemented in a systematic and integrated manner. Figure 27 provides an indicative overview of the sequence of events as foreseen by our roadmap. A look at this timeline shows that there is no time to waste. The first steps have to be taken immediately, if meaningful progress in building the Corridor is to be achieved before the end of the decade:

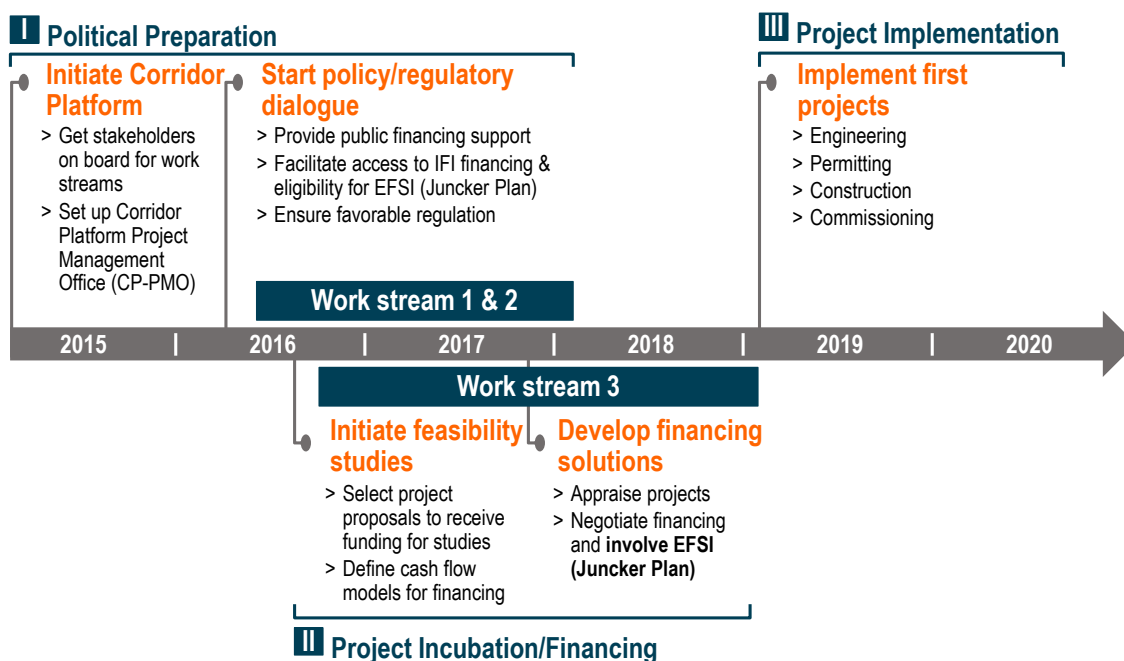
- > Firstly, setting up the **Corridor Platform** and the **CP-PMO** as its operational backbone should be a top-priority. If initiated today, the Platform can be up and running by **2016**.

- > Once the Platform has been set up, it should focus on putting into place the necessary **political and regulatory requirements** for successful implementation of Corridor projects (work streams 1 and 2). With full commitment from national and EU-level stakeholders and highest priority given to the issue, the required political and regulatory adjustments could be fully implemented by **2018**.

- > While working on putting a favorable regulatory environment into place and securing financing support from public budgets and IFIs available, the **project pipeline** should already be stacked with the first tranche of high-priority project proposals. Studies for promising project proposals (work stream 3) to serve as basis for subsequent financing discussions could be commissioned and concluded by **2016/2017**.

- > Project-level financing discussions with investors could then be initiated (work stream 3), with potential financing agreements and formal **final investment decisions** (FID) for the first Corridor projects expected around the end of **2018**.

Figure 27: Indicative timeline for implementation roadmap



Source: Roland Berger

This indicative timeline shows that the pressure is on for starting to implement the first steps of the roadmap as quickly as possible. With geopolitical uncertainties looming large and energy security being one of the top strategic challenges for Europe, turning a blind eye to the sustained deadlock in key energy infrastructure projects in the Corridor region is not an option. What Europe needs today are meaningful, concerted steps to kick-start financing and implementation of the Corridor as the future backbone of energy security and economic and geopolitical resilience for the EU.

The truth is that there is no single silver bullet to overcome all challenges for the Corridor at once. However, our analysis shows that by following a holistic roadmap which addresses political, regulatory, and financial issues in an integrated manner and provides a structured approach for completing key projects one by one, the Corridor can be built. In fact, we believe that, given sufficient determination, political will, and commitment of the actors involved, the Corridor can be completed within the next ten to fifteen years.

Acronyms and Abbreviations

| | |
|-----------------|---|
| BEMIP | Baltic Energy Market Interconnection Plan |
| ACER | Agency for the Cooperation of Energy Regulators |
| bcm | billion cubic meters |
| bn | billion |
| bpd | barrels per day |
| CEEP | Central Europe Energy Partners |
| CEER | Council of European Energy Regulators |
| CEF | Connecting Europe Facility |
| CO ₂ | Carbon dioxide |
| DG | Directorate General |
| EBRD | European Bank for Reconstruction and Development |
| EC | European Commission |
| EFSI | European Fund for Strategic Investments |
| EIB | European Investment Bank |
| EIF | European Investment Fund |
| ENTSO-E | European Network of Transmission System Operators for Electricity |
| ENTSO-G | European Network of Transmission System Operators for Gas |
| EU | European Union |
| EUR | Euros |
| FEED | Front End Engineering Design |
| FID | Final Investment Decisions |
| GDP | Gross Domestic Product |
| GIC | Gross Inland Consumption |
| Gt | gigatonne |
| GW | gigawatt |
| GWh | gigawatt hour |
| HGA | Host Government Agreement |
| IAP | Ionian Adriatic Pipeline |
| ICT | Information and Communication Technology |
| IFI | International Financing Institutions |
| IGA | Inter-Government Agreement |
| IPF | Infrastructure Project Facility |
| kgoe | kilogram of oil equivalent |
| kW | kilowatt |
| kWh | kilowatt-hour |
| LNG | Liquefied Natural Gas |
| m | million |
| m ³ | cubic meter |
| Mtoe | million tonnes of oil equivalent |
| MW | megawatt |
| MWh | megawatt hour |
| NRA | National Regulatory Authority |
| p.a. | per annum |
| PCI | Project of Common Interest |
| PEOP | Pan-European Oil Pipeline |

| | |
|-------|--------------------------------------|
| PPP | Public Private Partnership |
| PPS | Purchasing Power Standards |
| RAB | Regulatory Asset Base |
| RES | Renewable Energy Sources |
| ROE | Return on equity |
| SME | Small and Medium-Sized Enterprise |
| SPV | Special Purpose Vehicle |
| t | ton |
| TAP | Trans Adriatic Pipeline |
| tcm | trillion cubic meters |
| TEN-E | Trans European Network - Energy |
| TEN-T | Trans European Network - Transport |
| toe | ton of oil equivalent |
| TPA | Third Party Access |
| TSO | Transmission System Operator |
| TW | terawatt |
| TWh | terawatt hour |
| TYNDP | Ten Years Network Development Plan |
| WBIF | Western Balkans Investment Framework |

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