

Completing Europe

From the North-South Corridor to Energy,
Transportation, and Telecommunications Union

in coordination with:



and with the support of:
Grupa LOTOS S.A.

Przedsiębiorstwo Eksploatacji Rurociągów Naftowych S.A., PERN "Przyjaźń"

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Completing Europe

From the North-South Corridor to Energy,
Transportation, and Telecommunications Union

A joint report by the Atlantic Council and Central Europe Energy Partners



In coordination with the Central & Eastern Europe Development Institute



with the support of Grupa LOTOS S.A.



and Przedsiębiorstwo Eksploatacji Rurociągów Naftowych S.A., PERN "Przyjaźń"



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The report's individual chapters on energy, transport, telecommunications, and finance were drafted by a team of internationally renowned experts consisting of John Roberts, Krisztina Bárdos, Pál Belényesi, Mark Watson, and Nolan Theisen.

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FOREWORD

Europe is at an inflection point in its history. The vision of a Europe whole, free, and at peace is under pressure from within and outside its frontiers. Centrifugal political and economic forces challenge its cohesion and unity from the inside. At the same time, the EU faces multiple external threats, including a resurgent Russia, growing global economic competition, and geopolitical upheaval. The resilience of the European Union is at stake and this portends serious implications for the transatlantic community. Economic growth and energy security are backbones of that resilience, but both are weak spots in the chainmail of Europe.

The Atlantic Council and Central Europe Energy Partners decided to undertake *The Completion of Europe—From the North South Corridor to Energy, Transportation, and Telecommunications Union* to highlight a critical element in the process of addressing those weaknesses and completing Europe: infrastructure development across Central Europe in the energy, transportation, and telecommunications sectors. As an integrated set of energy, transportation, and digital links spanning from the Baltic to the Adriatic and Black Seas, the North-South Corridor is the starting point to the creation of a single European market, a cornerstone to the vision of a united Europe. The study is structured around those three dimensions of the North-South Corridor and complements them with a fourth: how to address the financial requirements of infrastructure investments.

The chapters on energy and transportation detail the major infrastructure projects in Central Europe, both currently underway and planned, as well as their financial requirements and regulatory environments. They identify those projects whose completion is most urgent to the North-South Corridor. The chapter on telecommunications explores how the North-South Corridor can be leveraged to further bridge the digital divide that continues to exist in Europe. The chapter on finance examines those budgetary and commercial challenges confronting the North-South Corridor, and lays out a menu of financial options that can be leveraged to transform the corridor into reality. Each chapter's recommendations are addressed to policymakers at national and regional levels in the European Union, policymakers in the United States, and decision-makers in the business sector.

We were delighted to have two co-chairmen oversee this report and shepherd our teams in the drafting process. James Jones and Paweł Olechnowicz are two extraordinary leaders. General Jones, former national security advisor to US President Barack Obama has been at the forefront of answering challenges facing the transatlantic community in his various military and civilian capacities throughout his distinguished public service. General Jones serves as the chairman of the Atlantic Council's Brent Scowcroft Center on International Security. Paweł Olechnowicz is a prominent leader in Europe's energy industry. As president of the board and CEO of Poland's Grupa LOTOS S.A., one of the biggest energy sector companies in Central Europe, and chairman of the Board of Directors of Central Europe Energy Partners, he brought to the project a wealth of experience and a deep understanding of the political, economic and infrastructural challenges facing Europe. Together these leaders forged a transatlantic approach to a critical task before our community of democracies—the completion of a united and integrated Europe.



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ACRONYMS AND ABBREVIATIONS

A—Austria

ACG—Azeri-Chirag-Guneshli

ADB—Asian Development Bank

AfDB—African Development Bank

AIIB—Asian Infrastructure Investment Bank

AITF—Afghanistan Infrastructure Trust Fund

BB—broadband

BCM—billion cubic metres

BEMIP—Baltic Energy Market Interconnection Plan

BTC—Baku, Tbilisi, Ceyhan Oil Pipeline

CAPEX—capital expenditure

CE-6—Croatia, the Czech Republic, Hungary, Poland, Romania, and Slovakia

CEEP—Central Europe Energy Partners

CEF—Connecting Europe Facility

CEGH—the Czech Republic and the Central European Gas Hub

CF—Cohesion Fund

CO₂—carbon dioxide

CPI—Transparency International Corruption Perceptions Index

CZ— the Czech Republic

DAC—Development Assistance Committee

DCT—Deepwater Container Terminal

DevCo—Infrastructure Development Collaboration Partnership Fund

EAFRD—European Agricultural Fund for Rural Development

EAIF—Emerging Africa Infrastructure Fund

EBRD—European Bank for Reconstruction and Development

ECB—European Central Bank

ECOFIN—Economic and Financial Affairs Council

EEC—European Energy Community

EEIG—European Economic Interest Grouping

EIB—European Investment Bank

EIP—European Infrastructure Policy

EMFF—European Maritime and Fisheries Fund

ENTSO-G—European Network of Transmission System Operators for Gas

EC—European Commission

EPS—Emissions Performance Standard

ERDF—European Regional Development Fund

ESF—European Social Fund

ESIF—European Structural and Investment Funds

ESM—European Stability Mechanism

ETCS—European Train Control System

EU—European Union

FEED—front end engineering design

FID—financial investment decision

GAVI—Global Alliance for Vaccines and Immunization

GDP—gross domestic product

GHG—greenhouse gases

GSM-R—Global System for Mobile Communications

GWh—gigawatt hours

HU—Hungary

I—Italy

IADB—Inter-American Development Bank

IAP—Ionian Adriatic Pipeline

ICF-DP—Infrastructure Crisis Facility Debt Pool

ICT—information and communications and technology

IFC—International Finance Corporation

IMF—International Monetary Fund

IPCEI—important projects of common European interest

IPTV—Internet protocol television

IWW—inland waterways

JANAF—Jadranski naftovod, a crude oil transportation company in Croatia

JASPERS—Joint Assistance to Support Projects in European Regions

KRG—Kurdistan Regional Government

LNG—liquefied natural gas

LTE—Long-term evolution

MFF—multiannual financial framework

MoU—memorandum of understanding

NAPA—North-Adriatic Ports Association

NGA—next-generation access

NO_x—a generic term for the mono-nitrogen oxides NO and NO₂

OMS—old Member States

NMS—new Member States

OPAL—pipeline—natural gas pipeline in Germany

OPEX—operating expenditure

PA—Partnership Agreements

PBCE—Project Bond Credit Investment

PBI—Project Bond Initiative

PCI—Project of Common Interest

PEOP—Pan-European Oil Pipeline

PIDG—Private Infrastructure Development Group

PKP—Polish State Railways

PKP Cargo—subsidiary of Poland’s PKP Group responsible for freight transport

PL—Poland

PM—particulate matter

PPP—public-private partnership

PPPTAD—Public Private Partnership Transaction Advisory Department

PVO—Finland’s Pohjolan Voima Oy

RABs—Regulatory Asset Bases

RNE—RailNetEurope

SD2—Second Phase of Shah Deniz

SEI—Sustainable Energy Initiative

SFS—Siemens Financial Services

SGC—Southern Gas Corridor

SK—Slovakia

SL—Slovenia

SRS—simple random sample

TAF—Technical Assistance Facility

TAL—Trans-Alpine Pipeline

TANAP—Trans-Anatolian Pipeline

TAPI—Turkmenistan, Afghanistan, Pakistan, India gas pipeline

TAP—Trans-Adriatic Pipeline

Tcm—trillion cubic meters

TEN-E—Trans-European Energy Network

TEN—Trans-European networks

TEN-T—Trans-European Transport Network

TFEU—Treaty on the Functioning of the European Union

TTIP—Transatlantic Trade and Investment Partnership

VfM—value for money

WEF—World Economic Forum

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CHAIRMEN'S

INTRODUCTION

One of the greatest successes of our new century has been the progress made in unifying Europe. The accession of Central Europe's countries to the European Union (EU)¹ has contributed to the end of division that wrought confrontations and conflicts. Yet this task is far from finished. Europe's economic woes, as well as new security challenges along the Union's eastern border add to the urgency of completing and consolidating the European integration project as part of our transatlantic vision of a Europe whole, free, and at peace.

One of the biggest challenges that must be met to complete European integration is the development of infrastructure networks that will bind together the economies of Central Europe with the rest of the European Union. Toward that end, this report is intended to give renewed priority to plans for a North-South Corridor of energy, transportation, and telecommunication routes linking the Baltic, Adriatic, and Black Seas. Reanimating, accelerating, and resourcing this project would initiate the next phase of completing Europe. The North-South Corridor must be a top priority for the European Union and its Member States, as well as the transatlantic community.

EUROPE'S INCOMPLETE INTEGRATION

Since the turn of the millennium, the EU's ranks have expanded with three rounds of enlargement featuring Central European democracies. This enlarged EU has also made great progress toward the completion of a truly single market. Through various instruments, the EU has invested billions of euros to build and upgrade Central Europe's infrastructure.

Yet, the integration of these Central European Member States remains unfinished, as the political and regulatory integration fostered by EU membership has yet to be fully complemented by infrastructural integration, both within Central Europe and of Central Europe into the broader European market space. Central European countries are still burdened by insufficient integration, unsatisfactory infrastructural connectivity with Western Europe, and weak North-South links. This is a legacy from the Soviet era, when Moscow actively prevented intraregional

infrastructural integration in order to maintain high levels of dependency on the Soviet Union.

The detriments of this lack of integration are most evident in the energy sector. Central Europe remains a set of inadequately connected national energy markets, isolated from the rest of the EU and exposed to a supply monopoly. This dependence in Central Europe not only constitutes a supply-security risk; because of insufficiently diversified gas markets and monopoly pricing, it also increases prices in comparison with the Western European market, which is well diversified and more liquid.

The disadvantages of missing links are also manifest in the transportation and telecommunications sectors, in which Central European countries generally lag behind their western peers in terms of connectivity. Moreover, Central European nations that remain outside of the EU—most notably, Moldova and Ukraine—are further disconnected from the EU, and now find themselves vulnerable to economic and political pressure from an increasingly assertive and aggressive Russia.

In the past, Europe's leaders have emphasized development of the North-South Corridor. Real progress has been made in building the Baltic-Adriatic Corridor, a key road and railway network stretching from Poland's Baltic coast through Central Europe, south to the shores of Italy. In 2011, the European Commission identified the creation of the North-South Energy Corridor as a central priority in the effort to create a single European energy market. That year, the nations of the EU-10—with the active support of CEEP—signed a memorandum of understanding reaffirming the construction of that energy corridor as a shared objective.

However, the momentum behind these elements of a comprehensive North-South Corridor has since waned. Europe's weak economy and budgetary constraints have impeded multilateral, governmental, and commercial investment in infrastructure. This has contributed to the dilution of Central Europe's unified resolve, and diminished attention and commitment on the EU level. The EU no longer gives the corridor the political and policy priority it once did.

The need to reanimate the North-South Corridor has been given further urgency by the escalating tensions between Moscow and Europe—with special regard to Russia's invasion of Ukraine, as well as the North American energy boom and its impact on global and European energy markets. Russia's use of energy price

¹ Throughout the report we use Central Europe as a geographic area encompassing the EU Member States from Visegrad Four countries (Czech Republic, Hungary, Poland, Slovakia), the Baltic countries (Estonia, Latvia, Lithuania) and Slovenia and Croatia. Eastern Europe refers to the EU Eastern Partnership Member States (Ukraine, Belarus, Moldova, Georgia, Armenia, and Azerbaijan).

hikes and cutoffs to cripple the Ukrainian economy and intimidate the rest of Europe bring back memories of previous energy cutoffs by Russia over the last decade. This further underscores the need to reinforce Europe's economic resilience, and strengthen its energy security by completing its internal energy market and diversifying its energy supplies.

The North-South Corridor serves the following strategic objectives, which are central to the vision of a united Europe with a single market:

- **Economic Integration:** The North-South Corridor would establish a powerful set of economic arteries including energy pipelines and power lines, highways and railways, and telecommunication links extending from Poland's Baltic coast through the Czech Republic, Slovakia, and Hungary, and to the coast of Croatia. Its spurs would span across the Baltic states and the Balkans, and reach into Moldova, Ukraine, and Turkey. This system would tie Central and Western Europe more tightly together by intersecting and complementing key existing and planned West-East infrastructure. It would increase the exchange of goods and services within Central Europe, and between Central and Western Europe.
- **Energy Security:** The North-South Corridor's liquefied natural gas (LNG) terminals and its networks of gas and oil lines and electricity grids would diversify the sources of energy for all Central European states. This is exemplified by the LNG terminal being completed in Świnoujście, Poland, and the one proposed for Krk Island, Croatia, which would enable Central Europe to tap into an increasingly global LNG market, including prospective shipments from the United States under the right set of regulatory and market conditions. The corridor is crucial to the completion of an effective single European energy market, one that can receive inputs of oil, gas, and electricity from a variety of current and prospective European and non-European suppliers, and distribute them throughout Europe on a competitive basis.
- **Competitiveness and Economic Resilience in a Global Economy:** Completion of the North-South Corridor represents an opportunity to increase competitiveness and resilience in Central and Eastern Europe, providing infrastructure of the type needed to ensure that Europe can compete effectively with economies elsewhere in the world. Furthermore, raising infrastructure-investment rates along the axis of the corridor provides an effective stimulus to economic growth. Thus, the process of corridor development represents an important contribution to solving Europe's current macroeconomic, fiscal, and monetary challenges, which include issues of competitiveness, the risk of deflation, high unemployment, and increasingly sensitive intra-EU migration trends. The North-

South Corridor would foster smart, sustainable, and inclusive economic growth, and would drive the reindustrialization of Europe through lower energy prices, faster transportation links, and modern digital infrastructure.

- **Significant Contribution to Europe's Climate Goals:** The creation of a single market—featuring integrated and efficient infrastructure—is crucial to Europe's climate goals and in building a low-emission economy. The North-South Corridor would contribute significantly to the attainment of these goals by increasing the efficiency of Europe's transportation system and enabling greater use of natural gas.

THE NORTH-SOUTH CORRIDOR AND THE TRANSATLANTIC RELATIONSHIP

Of course, the vision of a Europe that is whole, free, and secure is not solely a European concern. The United States has a vested interest in a strong, integrated, and competitive Europe, and thus should fully support the completion of the North-South Corridor.

Promoting the corridor is an important way for Washington to demonstrate continued commitment to peace and prosperity in Europe, particularly Central Europe. The corridor will also provide critical nodes to maximize benefits flowing from prospective energy trade liberalization in the context of the Transatlantic Trade and Investment Partnership (TTIP) treaty currently being negotiated by Brussels and Washington. For these reasons, it is absolutely essential to phase out outdated US restrictions on exports of crude oil and natural gas, in order to increase liquidity and enhance Europe's energy security.

Supporting the corridor is also a direct way for Washington to help strengthen Central Europe's resilience against Russian intimidation and aggression. It would lay the foundation for a more normalized and vibrant economic relationship between Europe and Russia. Indeed, a prosperous and secure Central Europe fully integrated into a single European market will no doubt be a more important and more valuable trade partner with Russia too.

The preconditions are there for a more active US role in the North-South Corridor. Energy security has long been a top priority of the US-EU relationship, and the US-EU Energy Council has been one of its most active intergovernmental bodies. A central priority of the Council has been to assist the EU in diversifying its energy sources away from an overdependence upon Russian oil and gas. This priority has been vigorously pursued by the US special envoy on Eurasian energy affairs, then by the special envoy and coordinator on international energy affairs and the Energy Bureau at State Department, as well as the US Department of Energy.

WITH A NEW EUROPEAN LEADERSHIP, A NEW OPPORTUNITY

The new European Parliament, European Commission, and European Council leadership presents an opportunity to give the North-South Corridor renewed priority in the European Union and the transatlantic community. This study is intended to provide the conceptual framework that will enable policymakers on both sides of the Atlantic to generate and focus the political and financial capital necessary to revitalize and complete this strategic project.

The research and findings of these chapters have reinforced our strong conviction that the implementation of the corridor can and should be accelerated. This requires renewed political momentum, sustained governmental and regulatory focus, and a stronger coordination of national and EU resources. With regional resolve, EU support, and American political commitment, the North-South Corridor can become a reality in the near future, preferably within the next five years.

Toward these ends, we submit the following strategic recommendations. Detailed recommendations can be found at the end of each chapter.

1. We welcome the European Council Conclusions on October 24, 2014, declaring the North-South Corridor a critical infrastructure project. Consequently, the European Commission should embed this priority into its key policy and budgetary directives and initiatives:

- The European Commission should highlight the corridor as a critical element of the €300 billion plan being developed to leverage public and private investment to strengthen Europe's infrastructure, drive forward economic growth and enhance energy security.
- The corridor should be reflected in the mandates of relevant European commissioners, including, among others: the vice president for jobs, growth, and investment; the vice president for the digital single market; the vice president for energy union; the commissioner for transport and space; and the commissioner for climate action and energy.

2. The North-South Corridor should be approached holistically, guided by a vision that integrates gas and oil pipelines and infrastructure, electricity interconnections, rail and road networks, and telecommunications investments. As a key artery in Europe's economy, the North-South Corridor will have greater impact if it leverages the synergies that can flow from the intersection and overlap of pipelines, power lines, railroads, highways, telecommunication links, and other communication networks.

3. The North-South Corridor should be prioritized in available public funding for infrastructure investment. The European Commission in 2011 found preliminary estimates for total infrastructure-investment needs up to 2020 in the range of €1.5-2 trillion, or an average of €150-200 billion annually. In the energy sector the Commission noted that "public and private entities in the Member States will need to spend around €400 billion on distribution networks and smart grids, another €200 billion on transmission networks and storage as well as €500 billion to upgrade and build new generation capacity between now and 2020."² Five hundred billion euros is estimated to be needed for the implementation of the Trans-European Transport Network (TEN-T) program. Last, but not least, between €38-58 billion and €181-268 billion capital investment is required to achieve the Commission's broadband targets. More recently, the European Commission³ put "overall investment needs for transport, energy and telecom infrastructure networks of EU importance amount to EUR 1 trillion for the period up to 2020." For the European Union, the historical figure of 2.6 percent of GDP implies annual-investment amounts of nearly €500 billion for economic infrastructure until 2030.

Our report focuses specifically on critical infrastructure components that are needed to create the backbone of interconnected Central European energy, transportation and telecommunications markets along the North-South Corridor from the Baltic to the Adriatic and Black Seas. **We found that the total costs of the the projects identified in this report as strategically important and critical to the completion of the corridor amount to an estimated €50.5 billion (€27 billion for energy, €20 billion for transport and €3.5 billion for telecommunications as as detailed in the respective chapters of this report)—a small portion of the enormous infrastructure investment needs outlined above especially in light of the strategic significance of the corridor.**

In these times of austerity, raising new public funds to invest in infrastructure is an unlikely prospect. **The European Union should reprogram and dedicate existing funds to promote and cofund the infrastructure projects most critical to the timely completion of the North-South Corridor as identified and outlined in this report, through the following actions:**

- Reprioritizing available funds in the Connecting Europe Facility-Energy (CEF-E) by tweaking the selection criteria for projects of common interest (PCI) to ensure that the top priorities—the twenty-seven projects in gas and six in electricity that

² European Commission, press release, "The Europe 2020 Bond Initiative," February 28, 2011, http://europa.eu/rapid/press-release_MEMO-11-121_en.htm?locale=en.

³ European Commission, "Long-Term Financing of the European Economy," Green Paper, March 23, 2013, http://eur-lex.europa.eu/resource.html?uri=cellar:9df9914f-6c89-48da-9c53-d9d6be7099fb.0009.03/DOC_1&format=PDF.

the European Commission's proposed European Energy Security Strategy identified as critical for the EU's energy security in the short and medium terms—enjoy priority access to CEF-E funding.

- Prioritizing infrastructure investments in the national development plans of the Member States in the framework of the EU's Multiannual Financial Framework for the period of 2014-2020. Member States in Central Europe should closely coordinate their cross-border infrastructure-development plans, to maximize the availability and efficiency of European funding.
- Earmarking €3.5 billion to a North-South Backbone Gas Pipeline from Lwówek to Sisak from combined sources from CEF-E, the Cohesion Fund and a regional infrastructure investment fund (see point 5 below).
- Streamlining access to the €11.305 billion of the Connecting Europe Facility–Transport (CEF-T) ringfenced for related transport-infrastructure investments in the Member States eligible under the Cohesion Fund to facilitate absorption capacity of Member States along the North-South Corridor.
- Doubling the percentage of Connecting Europe Facility funds allocated to telecommunications infrastructure and leveraging those funds for regional and national projects as opposed to solely pan-European projects. Today, only 3 percent of CEF funds, or some €1.14 billion are directed toward the telecommunications sector. Giving priority for CEF telecommunications funding to those Central European states lagging in digital literacy with the aim to foster public-private partnerships to further develop digital services infrastructure. Leverage the rails, roads, and pipelines of the North-South Corridor as venues through which to build an efficient access network of Central European broadband infrastructure.

Focusing EU resources on key corridor connectors would demonstrate the viability of the North-South Corridor as a whole, and thereby generate additional funding from national governments and commercial entities. In addition, **national governments of Central Europe should consider creating a €1 billion regional investment fund that pools resources to complement the funding provided by the European Union as outlined below.** European funding alone cannot provide for all public investment needs, and Central Europe is the most direct beneficiary of the North-South Corridor and the economic growth and resilience it promises to yield, along with the rest of the EU. A unified posture, backed by financial commitments by the concerned Member States, will be necessary to generate and sustain renewed support for the corridor in the European Commission and among Western European governments.

4. As outlined above, **infrastructure connectors whose acceleration and completion are most critical to completing the North-South Corridor and the integration of Central Europe with the rest of the EU should be prioritized.** Focusing on the corridor's most urgent missing links and bottlenecks is the best way to accelerate the project and to demonstrate the corridor's commercial viability.

Top priorities for the North-South Corridor in the energy sector:

- Development of a 15-billion-cubic-meters-per-year (bcm/y), bidirectional gas pipeline—the Backbone Pipeline—between Lwówek in Poland and Sisak in Croatia, through the Czech Republic, Slovakia, and Hungary, together with 6 bcm/y connections to Poland's new LNG regasification plant at Świnoujście and Croatia's planned LNG regas facility at Omišalj or Krk Island.
- Additional key elements include:
 - o development of linkages to Lithuania, Latvia, and Estonia, to strengthen open-market infrastructure in Northeastern Europe and end the isolation of the Baltics;
 - o development of the Ionian Adriatic Pipeline and bidirectional interconnectors with Romania and Bulgaria, as a means to tap into the Southern Gas Corridor currently under development and to further integrate the Balkans into the European energy market; and
 - o implementation of large-capacity flows to Ukraine to diversify energy supplies and enable Europe to leverage the country's extensive storage facilities.
- Physical reverse flow enabled on the interconnectors between Hungary and Romania, as well as Hungary and Croatia (the latter one being a prerequisite for the Adria Corridor that would provide an alternative supply route into Ukraine from the Mediterranean);
- Strengthening the connection between the North-South Corridor and Western Europe (e.g., a new Polish-Germany bidirectional pipeline) in order to increase the potential number of gas sources for the corridor and its supply elasticity.
- Completing Europe's strategic oil infrastructure by building the Pan-European Oil Pipeline and the extension of the Odessa-Brody oil pipeline.
- New electricity connections between Nordic and continental European markets to adapt to changing generation portfolios in Central Europe and the Baltic region, as well as accommodating

Germany's nuclear phase out plan, as an important alternative route between Nordic and continental Europe, supporting the more efficient use of hydro potential in the North with the thermal and wind dominated RES in the Southern region. A more resilient, interconnected transmission facility will improve security of supply and the distribution of RES generation to meet Europe's 20-20-20 targets with an increasing focus on long-term projects looking toward 2030.

Top priorities for the North-South Corridor in the transportation sector:

- Accelerated completion of the Baltic-Adriatic Transportation Corridor, the North Sea-Baltic Corridor, and the Orient-East Med Corridor with special regard to:
 - o Upgrading and improving multi-modal port interconnections in the Baltic region that integrate rail and road routes the Baltics with Central Europe, and accelerating the implementation of high capacity railway connections along the axis ("green transports"). A high-performance rail connection from West to East and North to South is a necessary precondition for sustainable economic development and cohesion in the regions along the North-South Corridor that has positive economic spill-over impacts over further regions along the interconnection stretches as well. The Rail Baltica Project, linking Helsinki-Tallinn-Riga-Kaunas-Warsaw will enable major regional freight transport to be shifted from road to rail.
 - o Upgrading key intermodal transport connections linking the nations of Central Europe and the region to transportation routes through Austria. Completion of the Central European intersections of the North-South Corridor running from Vienna-Graz-Klagenfurt (including the Koralm line) to Udine-Venice-Ravenna, along with linkages connecting the landlocked "Visegrad capitals" along the North-South Corridor to multimodal ports of Romania and Bulgaria along the Ostrava/Prerov-Žilina-Košice-UA border, Vienna-Bratislava/Vienna-Budapest-Arad-Braşov-Bucureşti-Constanta routes.
 - o Establishing and modernizing routes connecting the Baltic-Adriatic Transportation corridor to multi-modal ports in Romania and Bulgaria and beyond;
 - o Modernization of the five North-Adriatic ports. These provide the cheapest naval route from the Far East via Suez to Central Europe with a distance that is about 2,000 nautical miles shorter than the route to Northern European

ports. These ports form a perfect multimodal gateway to the key European markets. They will form a European logistics platform.

Top priorities for the North-South Corridor in the telecommunications sector:

- Creation of a backbone infrastructure along the corridor the cost of the necessary investments to efficiently upgrade the region's capacities and provide for the development of digital literacy and skills.
- Doubling the percentage of Connecting Europe Facility funds allocated to telecommunications infrastructure and leveraging those funds for regional and national projects as opposed to solely pan-European projects. Prioritizing CEF telecommunications funding to those Central European states lagging in digital literacy with the aim to foster public-private partnerships to further develop digital services infrastructure.
- Leveraging the rail, road and pipelines of the North-South corridor as venues through which to build an efficient access network of Central European broadband infrastructure.

5. The European Central Bank (ECB) should permit limited exceptions to national budget restrictions when funds are to be spent on cross-border projects involving two or more Member States. This would help fund projects whose commercial rationale may depend as much on their benefit to the consumer as to any commercial entity; it would help the ECB to ease spending restrictions by national governments without 'driving a coach and horses' through its current policy; and at a time of low growth and reduced employment prospects, it would help to allocate funds for construction projects that are relatively labour intensive.

6. The North-South Corridor should be a key element of the US-EU agenda. A Europe that is economically prosperous and integrated, and whose energy security is resilient, is a Europe that will be a more capable partner in an age of increasing global turmoil.

As has been the case in the Southern Corridor, the United States can leverage both its newfound energy prowess and its influence to help bring focus and unity to the complex, and often politically charged and controversial, resource decisions that are an inevitable part of vast and complex multinational projects, and create the preconditions for real energy supply diversification.

The North-South Corridor should be regarded as a critical piece of a "transatlantic energy alliance," and thus should become a priority of the US-EU relationship.

- The first meetings between Washington and the new European Commission—whether through the EU-US Energy Council, the initial engagement of the new EU high representative and the US secretary of state, or the next EU-US Summit—should be used to proclaim the North-South Corridor a shared priority.
- As part of its strategy to help drive forward the North-South Corridor, the United States should liberalize its energy markets to allow for the unfettered export of crude oil and LNG, particularly to Europe. The prospect of direct US energy sales to Europe, and the fact that expanded US exports to other regions of the world often push other LNG and crude oil to Europe, will enhance the commercial viability of the North-South Corridor.

7. A North-South Corridor Forum should be established to foster regular consultations and to generate awareness, interest, funding, and political and commercial support. Operating as an independent platform chaired by countries along the corridor on a rotating basis, convened regularly at senior (ministerial and ambassadorial) and working

levels, the forum would facilitate intergovernmental coordination and collaboration among the countries along and adjacent to the corridor, as well as representatives from the EU and the United States. It should feature the robust engagement of the business community for advice and innovation, and serve as a platform to further improve the investment climate in the region. The forum should be used to exchange experience in the development of large-scale interstate infrastructure projects, with special regard to the United States, and foster private sector interest and public-private partnerships that should be key drivers in catalyzing essential elements of the North-South Corridor.

Completing the North-South Corridor offers a unique opportunity to further Europe's integration, enhance its energy security, increase its competitiveness in the global marketplace, and strengthen its economic resilience—all while furthering its climate change objectives. Accelerating the corridor is a critical step to initiating the next phase of completing Europe—and that should make the North-South Corridor both a European and a transatlantic priority.



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1. THE ENERGY DIMENSION

This chapter attempts to furnish an overview of the requirements to create the critical interconnections that would constitute a North-South Energy Corridor, along with the various new or expanded connections that would provide access to the gas, electricity, and oil supplies required to diversify supply sources to improve Europe's energy security and competitiveness. The chapter focuses on the strategic rationale behind such a corridor; the potential supply anchors with special regard to the transatlantic dimensions; the missing links in the wider region; and concludes with a set of recommendations to speed up the development of the corridor.

THE NEED FOR A NORTH-SOUTH ENERGY CORRIDOR AND ITS STRATEGIC IMPORTANCE AND PRACTICAL IMPLICATIONS FOR ENERGY MARKETS

There are two main reasons for developing a North-South Energy Corridor. The most immediate is the role it would play in enhancing Europe's energy security by eliminating "energy islands" in the regions of the European Union that are currently not connected to mainstream European pipelines and grids, and which therefore remain vulnerable to potential single-source supply disruptions. This is particularly important in the case of the Baltic states, given their reliance on energy imported from Russia. However, it also applies to Bulgaria—which is wholly dependent on Russia for gas supplies—and to various countries in the Balkans that are members of the EU's energy affiliate, the European Energy Community (EEC). However, it should be noted that the term "North-South Corridor" is commonly used to refer to connections between the Baltic countries and Poland and countries with coastlines on the Adriatic and Black Seas, notably Croatia and Romania.

The second reason for developing the corridor is its potential role in helping to create an effective, single energy market for the EU—one that can receive oil, gas, and electricity from a variety of current and prospective suppliers and distribute them throughout the EU on a competitive, market basis.

The European Commission has drawn up a list of 248 projects of common interest (PCI)¹ intended to create the necessary connectivity between Member States. Moreover, in order to support projects that may not have an immediate commercial justification, the Commission has allocated €5.85 billion to the Connecting Europe Facility (CEF)—in effect, a fund to ensure the development of infrastructure that might otherwise be considered noncompetitive in the short term, but is critical for long-term energy security. In this context, "noncompetitive infrastructure" generally refers to projects with a strategic significance in terms of their ability to assure supply in the event of a failure along existing pipelines or electricity networks. It might, however, be worth considering whether some projects—notably national grids—should be considered noncompetitive, simply because no private company would voluntarily take them on without securing monopoly control. This is because grids prompt competition of a kind that reduces the profit levels available in areas where there are no effective grids.

The creation of a single energy market that is integrated, efficient, and flexible is considered crucial if the EU is to transform itself into a low-emission economy while maintaining secure supplies at the lowest cost. It is also considered vital if the EU is to maintain the competitiveness of its fully integrated energy market. Although the European Council in February 2011

¹ European Commission, "Energy Infrastructure: Projects of Common Interest," http://ec.europa.eu/energy/infrastructure/pci_en.htm.

committed the EU to completing the single energy market by 2014, and eliminating energy islands after 2015, these goals have not yet been fulfilled—and it is not clear when they will be achieved. The North-South Corridor is essential for completing the single energy market.

In May 2014, then-European Commission President José Manuel Durão Barroso, summarized the European Commission's immediate energy goals, which related more to energy security than to the completion of the single market. Barroso said that by the winter of 2014-15, the European Commission would coordinate an increase in gas-storage capacity with EU Member States, develop reverse-flow capacity, expand the potential for liquefied natural gas (LNG), and create plans for security of supply at both the regional and EU levels.

Three years earlier, after meeting with the then-Polish Prime Minister Donald Tusk, Barroso said that a common energy policy should be the next great European integration project. "We need a safe, secure, sustainable, and affordable energy supply," Barroso declared.² At this stage, the Barroso described this approach in largely commercial terms, as being "key to our economic interests, not only at the internal market level, but also for the European Union as a global player."³

Barroso then added: "This new policy has to ensure that no Member State is isolated from the rest of Europe. This is why we need to accelerate the pace of implementation of the internal market on energy."⁴ He stressed the need for the European Council—the grouping of the EU's heads of government—to agree on key missing infrastructure links, and on how to remove all barriers to a truly European energy market. Barroso singled out one key element needed for this market to succeed—the creation of a North-South energy corridor.⁵ Donald Tusk, then prime minister of Poland, advocated for a "European Energy Union" in an article in the *Financial Times* on April 21, 2014,⁶ emphasizing that "whether in coal, steel, uranium, credit or gas, the principal idea of the EU has always been to bring Europe together, deepening our security and establishing fair rules where the free market is lacking. An energy union, too, would be based on solidarity and common economic interests."

Although this paper is essentially about Europe, there are key elements that involve major external players. In particular, the United States has four main roles to play:

- First, as a provider of energy, making LNG and crude oil available for commercial export to European customers. There is an increasing prospect of large-scale US LNG exports, as a by-product of the shale-gas boom in North America and the availability of gas at prices that are much lower than those in such key markets as Eastern Asia and the European Union. This issue is addressed below.
- Secondly, as a key provider of hard security for the protection of energy infrastructure. It is intensely relevant to European energy security—not least in the context of NATO policy, in the wake of Russian intervention in Ukraine—but that is beyond the scope of this paper.
- Thirdly, the United States can, and should, lend political and diplomatic support to pushing for the realization of the North-South Corridor. The United States should also assist these countries in developing their indigenous resources, and provide expertise on resolving inter-state challenges and disputes with transboundary energy infrastructure.
- Fourthly, US private investment could play a major role in the realization of the corridor, provided that the right investment climate can be created and sustained.

This paper largely focuses on gas. The reason is that, whereas oil is a fungible commodity that is traded globally, gas is still primarily marketed locally and regionally. Gas customers are not only linked to their supplier by pipe, but in many cases have no ability to secure an alternative supply in the event of a cutoff, which would impact heating and cooking as well as electricity. Moreover, Europe is particularly dependent on Russian gas. It typically relies on Russia for some 30 percent of actual consumption, and for a much higher proportion of imports. In 2013, EU consumption stood at 438.1 billion cubic meters (bcm), while Russian gas deliveries to Europe (excluding Turkey, but including non-EU nation Switzerland) amounted to 136.2 bcm (31 percent of total supplies).⁷ In 2014, EU consumption is expected to fall to around 420 bcm.

THE EU'S VISION FOR GAS INTERCONNECTIONS FROM THE BALTIC TO THE MEDITERRANEAN

The European Commission set out its vision of energy interconnections within Europe on October 14, 2013. In a list updated January 9, 2014, it itemized 248 energy-related PCIs that are intended to benefit from faster and more efficient permit-granting procedures and regulatory treatment. Most strikingly, these are

2 José Manuel Durão Barroso, "Statement by President Barroso following his Following His Meeting with Donald Tusk, Prime Minister of Poland," speech delivered at the European Commission, January 31, 2011, http://europa.eu/rapid/press-release_SPEECH-11-55_en.htm.

3 Ibid.

4 Ibid.

5 Ibid.

6 Donald Tusk, "A United Europe Can End Russia's Energy Stranglehold," *Financial Times*, April 21, 2014, <http://www.ft.com/intl/cms/s/0/91508464-c661-11e3-ba0e-00144feabd0.html#axzz3HMunsOVX>.

7 BP, *Statistical Review of World Energy* (June 2014), <http://www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy.html>.

projects that, according to the October 14, 2013, announcement, “may also have access to financial support from the Connecting Europe Facility (CEF), under which a €5.85 billion budget has been allocated to trans-European energy infrastructure for the period 2014-20.”⁸ It should be noted that while this is not an absolute guarantee of access to CEF funding, in reality the proposers of any or all of the priority projects identified below would expect to have access to CEF funds, in addition to commercial and/or national financing.

However, the list itself contains some major weaknesses. Most notably, its basic formulation is in alphabetical order by country, with no attempt to convey any sense of how these parts are intended to create a coherent whole, and with no identification of which projects the Commission considers to be either the most realistic or the most important priorities. The Commission’s criteria for including a project on the PCI list were that it should have significant benefits for at least two Member States, contribute to market integration and further competition, enhance security of supply, and reduce carbon-dioxide (CO₂) emissions.

This attempt is supported by the following points highlighted in the European Commission’s *In-Depth Study of European Energy Security*:⁹

- in the EU, long-term contracts of pipeline gas cover 17-30 percent of market demand, and these come “nearly entirely from Russia”;
- EU import pipeline capacity is not necessarily located where it could prove most useful, with a greater import capacity available in Spain and Portugal than elsewhere—although these countries, with France, are the least vulnerable to potential disruption;
- high LNG prices, and long-term contracts for pipeline gas deliveries, undermine the usefulness of LNG as a tool for increasing resilience. In addition, the consequences of pipeline-supply disruption will include price increases for the entire EU;
- a combination of gas storage and increased scope for reverse flows can help mitigate supply disruption; and
- a well-functioning market sends correct price signals, and will also help steer gas flows and boost storage levels in the event of restrictions to supplies. So EU internal-market, reverse-flow, and gas-storage rules all help to boost EU gas-supply

resilience and ensure that missing gas is being delivered.

Overall, the study concludes, “The state of infrastructure, levels of interconnections and market development expose some Member States in the east to greater disruption than those in the west. According to various analysis of ENTSO-G (European Network Transmission System Operator–Gas), in the case of disruption of transit through Ukraine, those countries exposed to likely disruption of deliveries are Bulgaria, Romania, Hungary and Greece, as well as Energy Community Members Former Yugoslav Republic of Macedonia, Serbia and Bosnia and Herzegovina.”¹⁰

“In the case of disruption of all supplies from Russia over winter (October to March), in addition to the above countries, Finland, Poland, the Czech Republic, Slovakia, Croatia, Slovenia, and the three Baltic States—Lithuania, Latvia, and Estonia—are also exposed to disruption. Interruption of supply to Lithuania may also impact on the level of supply in Kaliningrad.”¹¹

THE CLIMATE FOR DEVELOPMENT OF THE NORTH-SOUTH ENERGY CORRIDOR

On November 23, 2011, representatives from ten countries—Austria, Bulgaria, Croatia, the Czech Republic, Germany, Hungary, Poland, Romania, Slovakia, and Slovenia—signed a memorandum of understanding (MoU) expressing their joint intention (“converged will,” in EU parlance) to further develop electricity, gas, and oil infrastructure in these regions. The MoU was accompanied by the Action Plan for North-South Energy Interconnections in Central-Eastern Europe, which identified the regional priority projects and a list of actions to be taken.¹²

The action plan effectively reduced a list of 248 prospective PCI into some sixty-five electricity-related projects, forty-three gas-related projects, five oil-related projects, and ten internal actions to improve the gas and electricity markets.

In physical terms, the immediate issue is attainment of the N-1 security standard, the need to provide alternative arrangements should the primary energy supply be curtailed for a greater or shorter period. In practice, this standard relates primarily to gas, in view of the dominant role played by Russia as the supplier of a commodity that still largely relies on continuous supply via pipelines. The market is changing, with more gas-on-gas competition impacting even the way in which Russia’s Gazprom does business. Still, Gazprom’s

⁸ European Commission, “Energy Infrastructure: Projects of Common Interest,” http://ec.europa.eu/energy/infrastructure/pci/pci_en.htm.

⁹ European Commission, *In-Depth Study of European Energy Security*, revised edition (Brussels, July 2014), http://ec.europa.eu/energy/doc/20140528_energy_security_study.pdf.

¹⁰ Ibid, p. 10.

¹¹ European Commission, *In-Depth Study of European Energy Security*.

¹² This MoU was preceded and influenced by a joint CEEP-Ernst & Young analysis on Central Europe’s energy sector, “Central Europe Energy Partners: Proposition for the EU-10 Countries,” [http://www.ey.com/Publication/vwLUAssets/Central_Europe_Energy_Partners_brochure/\\$FILE/CEEP%20brochure.pdf](http://www.ey.com/Publication/vwLUAssets/Central_Europe_Energy_Partners_brochure/$FILE/CEEP%20brochure.pdf).

dealings with its customers are essentially bilateral. One of the major causes for the dispute between Gazprom and the European Union has been Gazprom's desire to link gas prices to oil—as opposed to the European Commission's view that Russian gas enters the single European energy market as a commodity that can be freely sold, resold, or exchanged within the EU, without Gazprom playing a role in those inter-EU market decisions. For many EU customers, particularly in Central and Southern Europe, replacing Russian gas *in extremis* would currently be extremely difficult, particularly in the case of a prolonged disruption in Russian supplies.

The N-1 standard applies to oil to a far lesser extent than gas, and only minimally to electricity. Oil remains a fungible commodity. It can be transported in a variety of ways and, if it is not available from one supplier, it can be purchased from another—albeit at volatile market prices. Oil is easier to stockpile, and relatively easy to ration in case of crisis (either by price or by regulation). In contrast, managing gas is far more complicated—not least because the majority of customers require continuous supply, otherwise known as uninterrupted delivery. Thus, any delivery disruption from external suppliers has to be covered either by gas in storage or by rationing for customers—whether generators, manufacturers, or domestic users.

In electricity, the N-1 is primarily confined within the EU to the four Baltic states—Finland, Estonia, Latvia, and Lithuania—which have power systems linked to Russia. This specific issue should be addressed by the development of the Sweden-Lithuania Nordbalt system,¹³ the first stage of which is due to open in December 2015, and the Poland-Lithuania interconnection, which is also due for completion in 2015. It should be noted, however, that Ukraine's reliance on Russian electricity connections is an N-1 issue that may prove relevant to the EU and the development of North-South Corridor connections, in light of the EU-Ukraine Association Agreement ratified by the European and Ukrainian parliaments on September 16, 2014. The role of electricity in overall energy security is far from minimal. In particular, cross-border power supplies—which might be generated by hydropower, nuclear facilities, or coal-burning electric generation plants—can help fill the gap in the event of a disruption to gas supplies.

The emphasis in this chapter is thus very much on gas, because both the likelihood and consequences of gas-supply disruptions are greater than those involving oil. And while disruption to Russian electricity supplies to the Baltic states remains a concern, the provision of alternative supplies is already well underway.

13 NordBalt (also known as SwedLit) is a planned submarine power cable between Klaipėda in Lithuania and Nybro in Sweden. The aim of the project is to promote trading between Baltic and Nordic electricity markets, as also to increase the security of power supply in both markets.

The core issue related to gas is the Bratstvo (Brotherhood) line from Russia, which carries the bulk of Russian gas deliveries to EU customers. However, if gas deliveries using the Brotherhood line ceased or were curtailed because of a political decision in Moscow, such a decision might also apply to other lines, notably the Yamal pipeline through Poland to Germany. Such a prospect demands that priority attention be given to the development of pipelines with sufficient capacity to provide energy from better supplied and diversified countries and/or in the form of LNG to areas impacted by major cutoffs. This does not mean that any of the proposed pipelines, new or expanded, which would comprise the North-South Corridor would need to have the same capacity as the Brotherhood line (which can carry as much as 120 bcm per year) or the Yamal line (which has a 33-bcm/y capacity). With the European emergency-response system based on the goal of providing multiple interconnectors to increase redundancy and flexibility, it simply means that each pipe needs to have sufficient capacity to supply a substantial volume of replacement gas very quickly. In this context, that means ensuring that the main components of a North-South pipeline system have the ability to routinely handle some 7-9 bcm/y, with the overall system able to handle at least 15 bcm/y at key points.

There are several main elements to this agenda. The most general is the question of whether it is sensible to have such dependence on supplies controlled by Russia, a country with a track record of causing energy cutoffs. More specifically, there is the question of whether the transit of Russian gas across Ukraine to European customers—including Turkey and the Balkan states,—might be severed in the near or medium term, either as an accidental hazard of war or as a deliberate act by parties to the current conflict in Ukraine. A third issue is the readiness of the European Union to cope with any disruption of Russian supply. The fourth is the impact of any such cutoff on Ukraine's own energy requirements.

CURRENT EUROPEAN GAS-SECURITY POLICY

Within this context, and in the wake of the Russia-Ukraine gas crises of 2006 and 2009, the European Commission adopted an energy-infrastructure package in November 2010. This was intended to satisfy future demand, to promote energy security and continuity of supply, and to promote market integration and competition. This was to be achieved by 2020, through development of the aforementioned 248 projects of common interest.

In March 2014, the European Council, comprising the heads of government of all twenty-eight Member States, called on the European Commission “to conduct an in-depth study of EU energy security and to present by June 2014 a comprehensive plan for the reduction

of EU energy dependence.” The Council did not specify any countries on which Europe was dependent but obviously had Russia in mind. Again, without specifically referencing Russia and Ukraine, the Council stressed the need for urgency, noting that the “implementation of relevant projects of common interest should be speeded up and available EU resources, including the Connecting Europe Facility (CEF), and the European Investment Bank (EIB) financing capacity, should be swiftly mobilized.” The CEF has €5.85 billion available for disbursement, albeit over a seven-year period from 2014 to 2020, while the EIB can draw on commercial funds for infrastructure development.

The European Commission also conducted a “stress test” of the European gas system the results of which published on October 16, 2014. The stress test looked at the short term resilience of the European gas system and its preparedness for a possible disruption of supplies from the East during the fall and winter of 2014/2015.¹⁴ In addition to this preparation to respond to an immediate crisis, with the real prospect of a major and prolonged cutoff of Russian gas, there is a need both to intensify existing cooperation and to add one major, new project: the development of a full-scale interconnector system to link the Baltic Sea with the Aegean and the Adriatic—notably by connecting Poland’s LNG terminal at Świnoujście with Croatia’s planned Adria LNG terminal at Omišalj on the Adriatic as a top priority.

Curiously, however, the European Commission’s comprehensive plan for energy security (in its revised, published form of July 2014) made no specific reference to the North-South Corridor. It made only one loose reference to the concept, when it stated, “Long term commitments and geography of pipelines in the EU (lack of North-South connections) lead to congestions in the network and are reasons why some of the Member States are more dependent than others from single upstream suppliers.”¹⁵ The point is correct, but it is far from sufficient for a document about energy security and written, in large part, in reaction to concerns about Russian actions in Ukraine and Russian policy toward the EU.

In practice, while implementation of the corridor is specifically endorsed by the Commission as “a priority of EU energy-security and energy-infrastructure policies,”¹⁶ implementation has largely been left to the countries most directly concerned. Specifically, this refers to the four members of the Visegrad Group—Poland, the Czech Republic, Slovakia, and Hungary.¹⁷

14 European Commission, “Communication from the Commission to the European Parliament and the Council on the Short Term Resilience of the European Gas System: Preparedness for a possible Possible Disruption of Supplies from the East during the Fall and Winter of 2014/2015,” October 16, 2014, http://ec.europa.eu/energy/doc/nuclear/2014_stresstests_com_en.pdf.

15 European Commission, *In-Depth Study of European Energy Security*.

16 Polish Institute of International Affairs, *Introductory Letter to North-South Gas Corridor: Geopolitical Breakthrough in Central Europe* (Warsaw, 2013).

17 The Visegrad Group (also known as the “Visegrad Four” or simply “V4”)

SUPPLY ANCHORS FOR THE NORTH-SOUTH ENERGY CORRIDOR

Europe is surrounded by current and prospective gas producers, providing the ability to ensure a radical diversification of European gas supplies over the next decade or so. In particular, new gas supplies from Azerbaijan’s giant, €22 billion Second Phase Shah Deniz (SD2) project will start reaching Turkey in 2018 or 2019, and other European customers a year later via the new Southern Gas Corridor (SGC) pipeline system. But there is also the prospect of increased deliveries from Norway, LNG from a host of countries, new supplies from the United States, and a wide range of existing producers and potential producers (such as Iran), whose output can be piped to Europe via the Southern Gas Corridor.

The Southern Gas Corridor

The EU places continual emphasis on the development of the SGC, which has the potential to intersect with the North-South Corridor at several points, particularly if the planned Ionian Adriatic Pipeline (IAP) is built along with the Greece-Bulgaria interconnector. In essence, the SGC, as it is currently being developed, consists of three infrastructure projects that will convey some 16 bcm/y of gas from Azerbaijan’s offshore Shah Deniz gas field to markets in Turkey and Europe. The three pipeline comprising the SGC involved are:

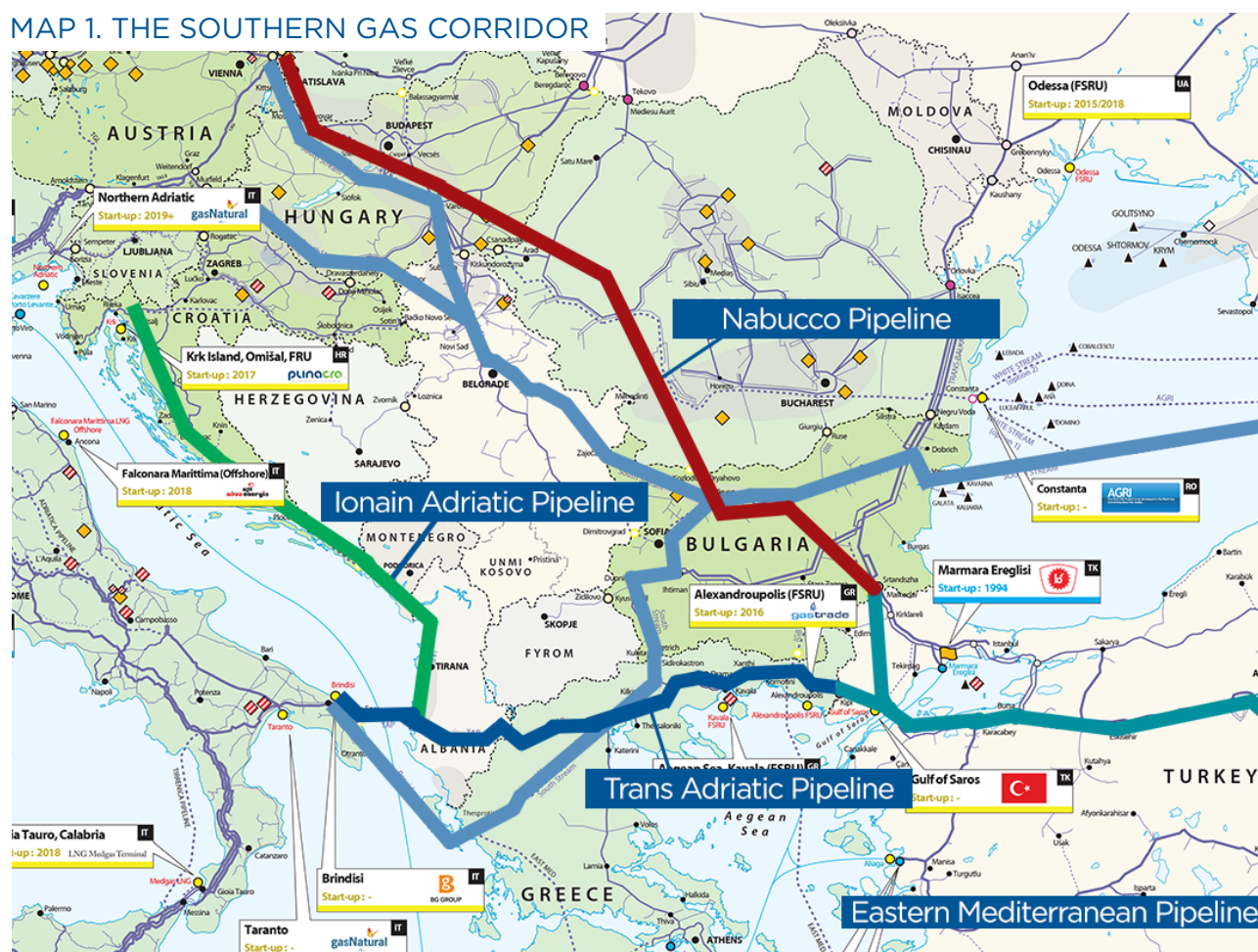
- the expansion of the existing 690-km South Caucasus Pipeline from Azerbaijan’s Caspian coast to the Georgian-Turkish border;
- the construction of a 2,000-km pipeline across Turkey, called the Trans-Anatolian pipeline (TANAP);¹⁸ and
- the construction of the 870-km Trans-Adriatic Pipeline (TAP) from the Turkish-Greek border, through Greece and Albania, and then subsea across the Adriatic to landfall in southern Italy.

The SGC pipelines are scheduled to be completed in time for the first deliveries of Shah Deniz gas to Turkey in 2018 and to the EU in 2019. Although initially predicated on carrying some 10 bcm/y of SD2 gas to Europe and 6 bcm/y to Turkey, the system is designed so that it can eventually carry twice those volumes. In the long run, the eventual goal of the system—and the reason why it has secured so much political support from the EU—is to carry vast amounts of gas from a variety of suppliers to a variety of potential purchasers in the EU. The cost of developing the three pipelines could approach €20 billion.

consists of the Czech Republic, Hungary, Poland, and Slovakia, and reflects the efforts of these four countries to cooperate in a number of fields of common interest within the all-European integration.

18 The construction officially began on September 20, 2014, and is expected to be finished by 2018.

MAP 1. THE SOUTHERN GAS CORRIDOR



Speaking in Baghdad on February 10, 2014, Azerbaijani Foreign Minister Elmar Mamedyarov described the SGC as “a huge project...and it’s open if Iraq is also interested to deliver their own natural gas.”¹⁹ He then added, “The project is there, so if any other countries... want to join the Southern Gas Corridor, including Iraq, who already expressed some interest for this project, we are ready to start negotiations.”²⁰

The availability of gas from Azerbaijan, together with the prospect of additional gas supplies from diverse regional sources, constitutes a significant justification for a large-scale North-South gas interconnector system as it expands the available sources to be fed into that system. Nonetheless, as of 2014 there is still a striking contrast between the relatively limited availability of alternative gas supplies expected before 2020, and the much greater available volumes expected after that point.

Prospective Inputs from the South

Azerbaijan’s Shah Deniz gas field contains 1.2 trillion cubic meters (tcm) of proven reserves, and with

extensive development underway, the supply it provides will almost certainly grow over the next several years.²¹ But while SD2 constitutes the initial anchor for development of the Southern Gas Corridor, there are plenty of additional supplies that could utilize the corridor. Turkmenistan, Iran,²² Iraq, and the eastern Mediterranean all have gas supplies that could be connected to the corridor, while Azerbaijan has additional fields that could be connected.

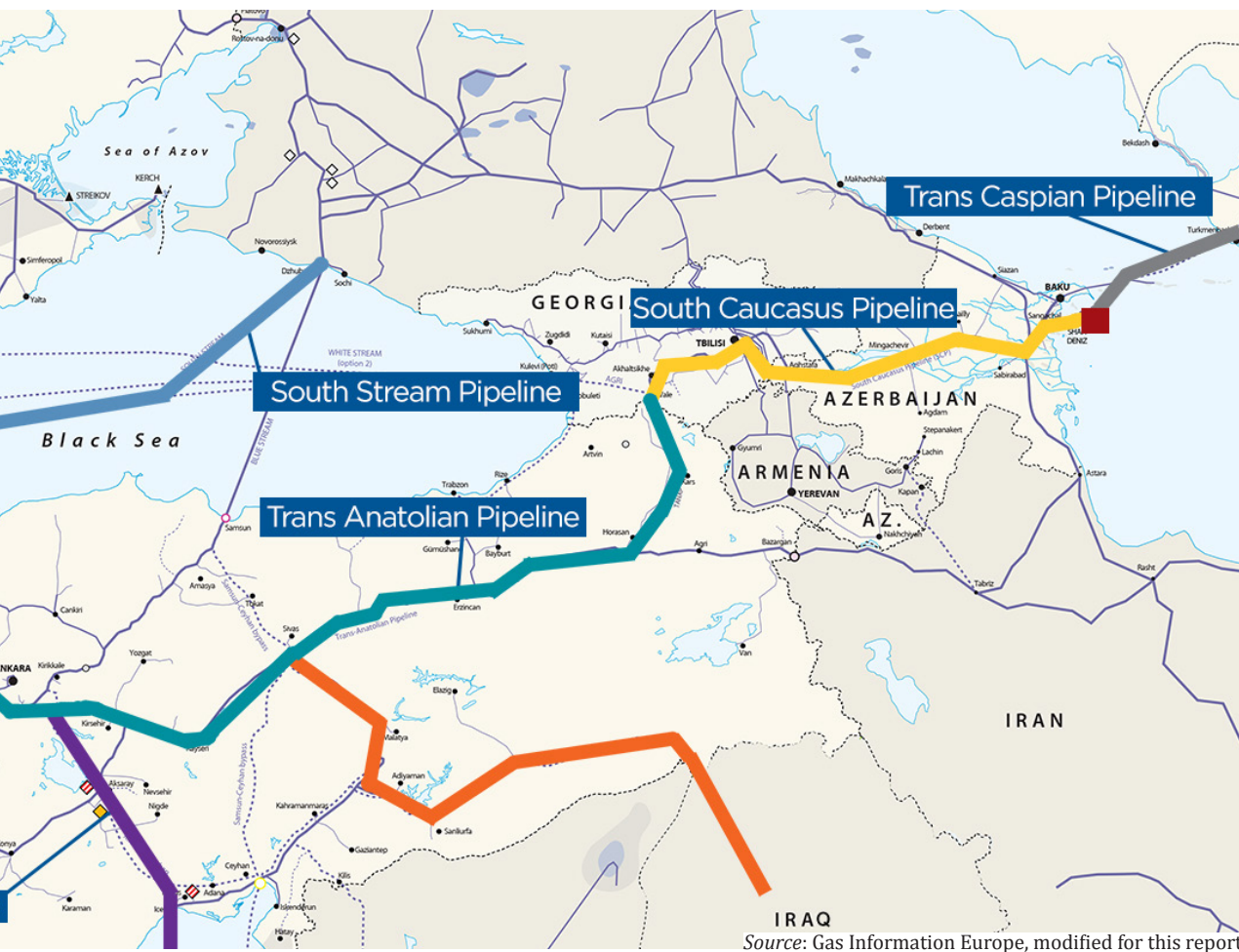
Turkmenistan

There is an increasing chance that Turkmen gas might enter the SGC. This is primarily a consequence of the lack of progress developing the Turkmenistan-Afghanistan-Pakistan-India gas pipeline (TAPI), which is the Turkmenistan government’s favored option for its next main export pipeline. In the Caspian Sea, Malaysia’s Petronas possesses a stranded gas resource that is in an advanced stage of development, and is quite capable of providing 5-8 bcm/y for input into a pipeline system to Europe by 2019—the same year the Southern Gas Corridor from Azerbaijan to Italy is due to enter service. As of August 2014, there were

19 “Azerbaijan Offers Iraq Access to Europe Gas Pipelines,” Agence France Presse, February 10, 2014, <http://www.globalpost.com/dispatch/news/afp/140210/azerbaijan-offers-iraq-access-europe-gas-pipelines>.
20 Ibid.

21 Azerbaijani government officials commonly talk of the field possessing some 2 trillion cm.

22 Provided the dispute over Iran’s nuclear program is resolved and EU and US sanctions are lifted.



Source: Gas Information Europe, modified for this report

active moves to find a way to transport Turkmen gas across the Caspian so that it can enter the system in Azerbaijan, even though Russia remains adamantly opposed to any trans-Caspian pipeline that does not have Moscow's explicit approval.²³

Current development of the SGC to pipe Shah Deniz gas to Europe is not predicated on any input of Turkmen gas. Indeed, current plans for expansion of the key South Caucasus Pipeline will only take capacity to around 23-24 bcm/y. This is just enough to carry the current Shah Deniz volume of 6.6 bcm/y to Turkey, the planned 16 bcm/y of SD2 gas headed for Turkey and beyond, and a little extra to power the line itself and the pump stations on the neighboring Baku-Tbilisi-Ceyhan (BTC) oil pipeline.

Senior Shah Deniz sources have said that Turkmen gas could be carried to Turkey and beyond, but that this would require looping—effectively, the construction of a second physical string—for most of the SCP's

248-km section across Georgia. This is considered a perfectly viable project. However, if Turkmenistan were to become serious about wishing to export its gas to Europe via Azerbaijan, then SOCAR and BP—as the principal owners and operators of the expanded system—would require some two years' notice in order to begin a further expansion of the SCP. This would cost around \$2 billion. In effect, if Turkmenistan wants to use the corridor for its own exports, it should let the pipeline developers know in or around 2017. It should be noted that such an expansion of the Georgian sector will be required anyway if Azerbaijan is to export to Turkey or Europe more gas than the amount agreed to under the existing SD1 and SD2 contracts.

In recent years, Azerbaijan has become far more positive about transiting Turkmen gas, not least as a result of its investment in TANAP. This is because so long as it is confined to carrying the initial 16 bcm/y of SD2 exports, TANAP's 30-bcm/y capacity will be underused. Given the cost of constructing TANAP is estimated at more than \$12 billion, the commerciality of the line in its early days is far from assured. Securing transit fees from carrying Turkmen, as well as Azerbaijani, gas would give TANAP's shareholders a much better chance of recouping their investment. It is also important to note that while the European Union was initially looking to secure some 30-40

23 In the absence of a clear legal regime concerning the Caspian Sea, suffice it to say that Russia and Iran hold that all trans-Caspian pipelines require the explicit approval of all five littoral states. Azerbaijan, Turkmenistan, and Kazakhstan argue that only the states involved in building such a line need to approve the project. Although Moscow often couches its opposition to such pipelines in environmental terms, it has routinely laid its own deep-sea pipelines in the Caspian, including pipes from fields close to the median line with neighboring Kazakhstan.

bcm/y of gas from Turkmenistan (with some early accounts pointing to much larger volumes), senior EU officials now understand that Azerbaijan cannot be expected to transit more gas from Turkmenistan than it would seek to export itself. It thus looks likely that if a trans-Caspian gas pipeline is to be built, it would probably consist of a single line intended to input some 8-10 bcm/y of gas into the Southern Energy Corridor. However, although the logic for such a connection remains extremely strong, its actual implementation is unlikely, partly due to territorial disputes between Azerbaijan and Turkmenistan and partly due to the above referenced objections of Russia (and Iran).

Iran

As far back as the early 2000s, the International Energy Agency envisaged a massive flow of Iranian gas to Europe, possibly accounting for as much as half the projected 160 bcm/y that it estimated Europe would need to import by around 2030. But getting Iranian cooperation will require the success of current efforts to resolve the nuclear imbroglio, as well as extensive cooperation between the Iranian authorities and international companies to develop both the underlying resource base and the intermediate pipeline connections to carry major volumes of Iranian gas to Europe.

How ready is Iran to increase its exports? According to Mansour Moazzami, the deputy oil minister for planning affairs, a number of major gas projects will come on stream in 2014/2015.²⁴ These will include completion of no fewer than five of the currently planned twenty-nine phases of the development plan for the South Pars gas field in the Persian Gulf.²⁵ There are doubts concerning just how much gas will become available for export, as opposed to being required for domestic use or as injection into oilfields to maintain crude oil flows. But there is a very real argument, advanced by analyst Bijan Khajepour, that Iran—for the first time since it began producing gas a generation ago—will, in the next year or so, produce a significant surplus available for export. This surplus, which Khajepour predicts could amount to 13.8 bcm in 2016, could well be much larger than the anticipated export output from either northern Iraq or the eastern Mediterranean.

The view that Iran, the holder of the world's largest gas reserves, is finally about to become a significant net gas exporter is supported by the agreement announced with Oman on March 13, 2014. Under this agreement, Iran will lay a pipeline under the Persian Gulf to Oman, with gas deliveries to start in 2015 and a goal of building up to 10 bcm/y of gas. Iran is also still pushing to sell some 7-8 bcm/y of gas to Pakistan, and perhaps

to India. Turkey's President Recep Tayyip Erdogan has pushed for Iranian gas to move west to markets in both Turkey and the European Union. This will not happen unless the ongoing nuclear talks end successfully.

Northern Iraq

Iraq's stability is of critical importance to both the EU and the United States and gas exports to Europe from the country could act as a significant stabilizing factor in the future. In November 2013, the government of Turkey signed a general sales agreement with the Kurdistan Regional Government (KRG), covering gas exports from northern Iraq to Turkey. The agreement set initial delivery volumes at 4 bcm/y in 2017, then proceeding in annual increments of 2 bcm/y until they reach a plateau level of 10 bcm/y in 2020. The gas will principally come from two fields—Miran and Bina Bawi—that are currently being developed by Genel Enerji, an Anglo-Turkish company.

The gas will be produced, and it will be exported to Turkey, though it is quite possible that both the timetable and the envisaged volumes will change over the next few years. Whether this timetable is met will depend on various factors, including the security situation in northern Iraq and whether Iraq's central government would have the desire or ability to block such exports.

Almost certainly, that gas from northern Iraq will contribute to the development of the Southern Corridor mainly by complementing, and perhaps supplanting, gas delivered to southern Turkey from such suppliers as Iran and Azerbaijan. In other words, gas from northern Iraq needs to be connected into TANAP and the Southern Gas Corridor in order to have a positive impact on the corridor. The same holds true for any gas delivered from the eastern Mediterranean to Turkey. Should substantial volumes be delivered to Turkey, this could free up gas currently contracted for delivery under the Shah Deniz Stage One contract—which is due to expire in 2020—to be delivered to markets beyond just Turkey via TANAP, thus improving TANAP's overall commerciality.

It is also worth noting that the last action on the ground of the Nabucco²⁶ consortium in Turkey was the May 2012 completion of an environmental impact study for a 733-km gas pipeline connection from Silopi—near Turkey's border with northern Iraq—to Sivas, on what was to have been the main Nabucco line in Turkey. Sivas will now be a key staging point on TANAP, which is noteworthy if northern Iraqi gas were to come

24 "Iran Sees a 'Big Jump' in Gas Exports in 2015," *Tehran Times*, January, 19, 2014, <http://www.tehrantimes.com/economy-and-business/113517-iran-sees-a-big-jump-in-gas-exports-in-2015>.

25 South Pars is the world's largest gas field, which holds roughly 40 percent of Iran's proved natural gas reserves.

26 The Nabucco pipeline was to run from Erzurum in Turkey to Baumgarten in Austria (its modified version, Nabucco West from the Turkish-Bulgarian border to Baumgarten) to diversify the natural gas suppliers and delivery routes for Europe, thus reducing European dependence on Russian energy. The original project was backed by several European Union Member States and by the United States, and was seen as a rival to the South Stream pipeline project. The Shah Deniz consortium eventually selected the Trans-Adriatic Pipeline over Nabucco in June 2013 as the preferred initial route to European markets.

on stream in sufficient volumes to exceed any local requirements in southern Turkey.

Eastern Mediterranean

Gas produced from Israeli, and possibly Cypriot, fields in the eastern Mediterranean will probably have only an indirect effect on European markets. It is almost certain that, unless major new discoveries are made in Greek waters, the cost of laying a direct, subsea pipeline connecting Israel and Cyprus with a European landfall in Greece is likely to prove prohibitive. But its indirect impact could still prove significant. Although there are considerable political and transportation problems, Turkey is the most likely customer for such a pipeline. And any gas delivered to Turkey frees up gas from other suppliers to transit through Turkey to customers in the EU or the European Energy Community.

Israel's Leviathan field will eventually produce at a rate of around 15-20 bcm/y, and that the bulk of this gas will be sold as exports (with Israel's own requirements essentially being met with gas from the Tamar field, which started full production in 2013). Leviathan's developers, along with the Israeli government, are currently considering various export options—most notably, exports in the form of liquefied natural gas and a pipeline to Turkey. At this stage, LNG is the most likely outcome, but Israeli officials would like to see at least some gas go by pipeline to Turkey. And, indeed, some gas will also be piped to Jordan and the Palestinian territories.

As for a pipeline to Turkey, this can only be accomplished if there is a settlement to the Cyprus problem. Any pipeline would have to secure the de facto approval of the Cypriot government because it would pass through the exclusive economic zone of the Republic of Cyprus. This remains the biggest obstacle to an Israel-Turkey pipeline.

Azerbaijan

The SD2 project is the biggest new project in Azerbaijan but not the only one. A wide variety of fields constitute a new wave of Azerbaijani gas-field development. These include Umid, now under development; the deep-level gas under the Azeri-Chirag-Guneshli (ACG) oilfield, for which a production-sharing contract is likely to be signed with BP this year; the Absheron field, for which France's Total has a PSA; Zafar-Mashal; and Shafiq-Asiman. There is also the prospect of a third phase of production at Shah Deniz.

Although Umid, the smallest of these fields, is already producing some gas, none of the others can be expected to yield significant volumes for export before 2020. In the case of Absheron, 2025 is a more likely start-up date. The most immediate prospect is deep-level ACG, since this underlying gas system constitutes an already-proven resource; it is simply that the existing ACG oil contract does not cover the underlying gas layer. As of

mid-2014, BP and the Azerbaijani authorities had yet to actually sign a production-sharing agreement for deep-level ACG, although they were known to have concluded the terms of the agreement earlier in the year.

Prospective Inputs from the North

There are four ways in which Norway can play a major role in improving energy security in the Baltic, one of the EU's most vulnerable areas. The first is through export of gas in the form of LNG. This is likely to come about as a result of a February 2014 agreement, whereby the governments of Finland and Estonia—together with a consortium led by Gasum, the Finnish gas-import company—agreed to conduct a feasibility study on the construction of an LNG terminal in the Gulf of Finland, together with a pipeline, the Baltic Connector, between the two countries. The project is largely predicated on Norwegian gas, with the agreement signed on February 28, a few days after Gasum purchased a 51-percent share of the Norwegian company Skangass' LNG distribution business. In June, Gasum and Estonia's Alexeia jointly submitted a formal proposal to the European Commission for an LNG terminal. However, the Commission's initial view was that the project was not eligible for EU financing as a project of common interest. In August, Gasum announced that a revised proposal was under study in Brussels, and that it was proceeding with the feasibility study. The core of the proposal is an LNG terminal to be constructed at Pori in southwest Finland, and for the planned Baltic Connector pipeline to carry the gas onward to Estonia. The project is also linked to Sweden's plan to construct an LNG-import facility at Gavle.

The second way Norway can play a role is a revival of the Baltic Pipe project, which would see Norwegian gas delivered to Poland by way of the Skanled pipeline—around southern Norway to Sweden and Denmark—and then the proposed Baltic Pipe to Poland. But the Skanled project was abandoned in 2009, and efforts by the Polish authorities to revive the Baltic Pipe proposal have yet to yield concrete results.

Nonetheless, the core idea of the Baltic Pipe—a 230- to 280-km submarine pipeline between Redvig in Denmark and Niechorze in Poland, capable of transporting some 3-5 bcm/y in either direction—remains sound. It would contribute to energy security and help contribute to downward pressure in pricing, increasing the flexibility of the nascent European gas grid. In 2008, Poland's Ministry of Economy estimated the project's cost at €300-350 million, essentially unchanged from a 2001 estimate.

The third way Norway would play a role would involve the revival of the Mid-Nordic Gas Pipeline, first suggested between 2000 and 2002. In 2002, Finland's Pohjolan Voima Oy (PVO) estimated it would cost around €1 billion to build a 622-km pipeline from

Skogn, on Norway's Trondheim Fjord, across central Sweden and then—via a subsea line across the Gulf of Bothnia—to Pori. This project has the great advantage of feeding piped gas directly into a currently isolated market. Moreover, the addition of the planned Baltic Connector between Finland and Estonia would enable piped Norwegian gas to reach beyond Estonia to Latvia and Lithuania.

And finally, the fourth way Norway can play a role is through German grid and new interconnection between Germany and Poland—a revival of the Bernau-Szczecin pipeline. It was firstly suggested between 1999 and 2000 but later abandoned in favor of a direct submarine pipeline between Norway and Poland which did not materialize. Capable of transporting some 3-5 bcm/y in either direction a 150- to 160-km pipeline offers direct access to Norwegian gas via connection to Emden-Steinitz-Bernau pipeline. This project has the great advantage of having a construction permission. Moreover, the existing and planned interconnectors between Poland and its neighbors Lithuania, Czech Republic, Slovakia, and Ukraine would enable piped Norwegian gas to reach far beyond Poland.

The need to develop new ways of supplying gas to the Baltic region is particularly great since, as the European Commission argued in its recent *European Energy Security* study, these four states may not have many alternative instruments at their disposal to counteract gas-supply disruptions from Russia.²⁷ The study pointed out that all four states are 100-percent dependent on deliveries from Russia. As far as the ability to mitigate the impact of any cutoff, the study noted that Finland is able to use line-pack and fuel-switching options to provide gas to protected customers; that Latvia can rely on storage capacities higher than its annual demand; that Estonia can use fuel switching, while also partially relying on gas storage from Latvia; and that Lithuania is advancing construction of the LNG terminal at Klaipeda. (Klaipeda is due for completion by the end of 2014.)

The study added, "In the perspective of the next five years together with the interconnector to Poland and the regional terminal i.e. the implementation of the commitments under the Baltic Energy Market Interconnection Plan (BEMIP), the new infrastructure will be able to ensure full diversification of gas sources. Therefore each of the Member States has some options at hand, however only when put together, they allow for a strong regional strategy. Elements which can be used to benefit security of supply of the region are full utilization of storage capacities in Latvia, rapid development of LNG terminals and interconnectors. Moreover the region could benefit from the development of contingency plans. An example of such plans is the one developed in Finland."²⁸

There is a need, however, for some caution concerning Norwegian supply. Norway's gas-production profile is likely to see a modest rise over the next few years, but a falling off in output from around 2020 onward. One reason is that current drilling focuses far more on oil than gas; a related reason is that gas prospects in Norway's new frontier region, the Barents Sea, are frustrating. Gas found to date is at minimal pressure, rendering it largely uncommercial. Moreover, prospects for commercial gas accumulations appear to improve the farther east one goes, meaning the best prospects are likely to be those near Norway's new maritime frontier with Russia, with agreements in place envisaging joint development of any cross-border resources that may be found.

LNG from the United States and Other Suppliers

Global production of LNG will grow substantially in the next four years. Three new LNG trains are due to come on line in 2014, and six projects in Australia should enter production by 2018. Overall, international trade in LNG, which stood at 238.1 bcm in 2013, is expected to increase by more than 50 percent by 2020. One consultant, PFC Energy, anticipates that global demand for LNG, which stood at around 240 mt in 2012, will reach 366 mt in 2020, and 433 mt in 2025.

Such availability could scarcely come at a better time for Europe, given the potential risk to Russian gas supplies as a result of the Ukraine conflict. PFC estimated in 2013 that only 91 mt of an additional 157 mt of LNG capacity projected to come online by 2020 had secured confirmed purchasers. That is a remarkably low rate in an industry that traditionally looks to secure confirmed purchasers for 85 percent of its output before actually starting to produce. For example, Chevron's \$44 billion Gorgon project in Australia, due to start up in 2015, had secured confirmed purchasers for only 65 percent of its output as of August 2014.

The United States is expected to contribute significantly to global LNG supply, but the timing remains hard to assess. As of 2013, only one export-related project was in the construction phase, with the Sabine Pass plant on the Gulf of Mexico expected to see its first 4.5-mt/y LNG train enter service in 2015, and its second start production in 2016. Plant capacity should double shortly thereafter, as the developers have already completed the front-end engineering and design (FEED) studies on two more 4.5-mt/y trains.

In addition, the Oregon LNG project on the US west coast has completed FEED for two 4.5-mt/y trains, while on Canada's Pacific coast, BC LNG has already completed FEED for a small plant consisting of two 0.9-mt/y trains.

As of 2013, however, the overwhelming majority of LNG projects in North America were still at the FEED stage.

27 European Commission, *In-Depth Study of European Energy Security*.

28 Ibid.

Overall, FEED studies were in hand for eleven trains at four locations in the United States—Cameron, Freeport, Corpus Christi, and Lavaca Bay—with a proposed total capacity of 48.7 mt/y. Further north, LNG Canada signed contracts in May 2014 for a full-scale FEED for a train facility at Kitimat in British Columbia, with two initial 6-mt/y trains and an option for two more. Pacific Northwest’s plans for a facility at Lelu Island with two 3.7-mt/y trains were still at the pre-FEED stage in 2013.

Although the developers of half the US capacity have announced that their projects will enter service in 2017 or 2018, the first group of post-Sabine Pass projects has a more realistic timeframe of 2018 or 2019. A timeframe of 2020 to 2024 is realistic for the Canadian projects.

In addition to these, projects for no fewer than twenty-two further LNG trains at thirteen North American locations—with a combined capacity of 109.15 mt/y—have been proposed at various times. Some of these, such as Cove Point in Maryland, are plans for converting existing LNG-import terminals to serve as export facilities; others are expansions to projects already underway, and some are wholly new. While some sponsors announced start dates, there are few clear timelines for actual project implementation. Much will depend on the approach US regulatory authorities take to the prospect of large-scale gas exports, and the impact this might have on gas prices within the United States. Studies indicate that the effect of even unlimited natural gas exports from the United States on domestic gas prices will be minimal.²⁹

Although it will take time for the vast array of in-development projects to mature, their impact is already being felt. The anticipated availability of US gas exports, along with the onset of the new Australian-led wave of LNG projects, is putting significant downward pressure on prices. Even though there is no set global price for gas, gas prices almost everywhere are impacted. The sheer availability of prospective LNG supplies provides one of the major justifications for the development of new LNG-receiving terminals in the Baltic and Adriatic Seas, and possibly in the Black Sea as well.³⁰

EXISTING INTERCONNECTORS

The idea that gas should be able to flow in either direction through a pipeline is key to the EU’s concept of energy security. This is why the Commission wants to ensure that new connections between countries—even if they are routinely intended to carry gas in one

direction—should also be capable of carrying gas in the reverse direction. In theory, the term “interconnector” refers to any line that connects one country or region with another. In practice, however, it is increasingly used to refer to transborder pipelines with a reverse-flow capability, and this paper generally uses the term in that sense.

Some of these projects have already been completed. There are interconnectors between Romania and Hungary, and between Romania and Bulgaria. The Hungary-Slovakia Interconnector has been finalized this year. However, a final investment decision for an interconnector between Greece and Bulgaria—to be used routinely for delivery of Azerbaijani gas to Bulgaria—has still not been made, although it had been expected at the end of 2014. Both the Hungary-Croatia, as well as the Hungary-Romania pipelines remain essentially unidirectional, with only minimal volumes able to pass through the latter, and no physical flow possible on the former, in the direction of Hungary.

A trio of interconnectors is planned to connect Slovenia, Italy, and Austria, while three separate interconnectors are under study between Bosnia and Herzegovina and Croatia. Two interconnectors between Serbia and Croatia are envisaged, with one expected to routinely supply Serbia from Croatia, and the other to supply Croatia from Serbia. Srbijagas, the Serbian state gas company, also envisages interconnectors with four other neighbors: Bulgaria, Montenegro, Romania, and Macedonia. A Greek interconnector with Macedonia is also envisaged. Some of these planned interconnectors are more likely to secure priority status as projects of common interest, because of their role in helping to supply Balkan countries that are currently dependent on gas from a single supplier—Russia.

These are not big lines, and—at least officially—they do not cost very much. Even the biggest of these projects, the Ionian Adriatic Pipeline, was only estimated to cost €580 million for its 540-km length, according to a 2011 grant application for a feasibility study. The 5 bcm/y line should be capable of receiving gas from a variety of suppliers, including Azerbaijan, via the newly chosen Trans-Adriatic Pipeline (currently being developed) and the planned Adria LNG regasification facility at Omišalj, on the Croatian island of Krk, for which a final investment decision, expected by the end of 2013, is still awaited.

Such projects comprise the nuts and bolts of the European Commission’s strategy to develop a gas market throughout Southern Europe and ensure full linkage between key components of its two favored corridors, the Southern Gas Corridor and the North-South Gas Corridor. Moreover, along with improving regional and local energy security, the steady development of these interconnectors will further develop the EU’s internal energy market—making it possible for more trading hubs to emerge, and helping to create the conditions

29 NERA Economic Consulting, *Macroeconomic Impacts of LNG Exports from the United States* (Washington, DC: US Department of Energy, 2012), http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf.

30 Developing liquefaction terminals in the Black Sea is a particularly complex matter. If the terminal is linked to the supply of Caspian gas and shipped via an LNG plant in Georgia, then there is no particular environmental issue; whether such a terminal gets built is simply a matter of commercial economics and, particularly from a Ukrainian perspective, a matter of energy security. If it is intended to rely on LNG shipments from elsewhere, this raises the vexing question of LNG tankers having to transit the Turkish Straits, a development that the Turkish authorities would not welcome. Otherwise, it would have to await the construction of one of Turkish President Recep Tayyip Erdogan’s cherished projects, a canal to bypass the Bosphorus.

MAP 2A. EXISTING INTERCONNECTORS IN THE BALTICS



MAP 2B. EXISTING INTERCONNECTORS IN THE BALKANS



MAP 2C. EXISTING INTERCONNECTORS IN CENTRAL EUROPE



for market-related, gas-on-gas pricing, rather than continued reliance on contacts priced against oil. The countries concerned, under the umbrella of the EU or the European Energy Community, should make real steps toward implementation, overcoming bottlenecks like missing project management skills and short-term political thinking.

The aim, as then-European Commissioner for Energy Günther Oettinger said in hailing the choice of TAP to carry Azerbaijani gas to Europe, is to “create a web of interconnection in southeast and Central Europe.”³¹ But, he noted, more interconnectors were still needed to bring competitive prices to Southern Europe.

THE MISSING LINKS

The North-South Gas Corridor, despite being one of the main delivery mechanisms for the European Union’s energy-security program, is in effect an agglomeration of projects that seeks to ensure the development of bidirectional pipelines that enable gas to flow between the Baltic, Adriatic, and Black Seas. At its northern end, Poland, the Czech Republic, and Hungary can all secure access to alternative supplies by means of pipelines connecting them to countries farther west. What needs to be developed, however, are connections among these three states, and between these three and Slovakia. Farther south, a raft of prospective projects

related to the North-South Gas Corridor are under active consideration.

Polskie LNG is currently constructing the Świnoujście LNG terminal, which is due for completion next year. Świnoujście will initially be able to handle 5 bcm/y of gas imports, with consideration being given to expanding the facility to handle a further 2.5 bcm/y. With Poland producing some 4-5 bcm/y (in 2013 it produced 4.6 bcm), about two-thirds of the country’s current consumption could be supplied from domestic or alternative producers in the event of a cutoff of Russian gas—once Świnoujście comes on line.

However, Poland has only a limited ability to send gas south to assist its Visegrad neighbors in an emergency. It can supply the Czech Republic with 0.5 bcm/y via the existing STORK interconnector. While this helps to improve supplies locally, it does little to change the strategic position for the European Union in general, or the Czech Republic in particular. That requires a much bigger system, one capable of delivering perhaps 3-5 bcm/y of gas, including gas from Świnoujście. That means full implementation of a trunk line from Świnoujście through central Poland to the Czech Republic, Slovakia, and Hungary, which would then connect with Croatia’s planned—and long delayed—Adria LNG terminal at Omišalj on the Adriatic Sea. This is the concept we call the Backbone Pipeline.

31 European Union, press statement, July 1, 2013.

The core element of the Backbone, between Lwówek in Poland and Sisak in Croatia, should possess an initial capacity of at least 7 bcm/y and eventually be capable of carrying at least 15 bcm/y. At Lwówek, it would intersect with the Yamal Pipeline from Russia to Germany, while at Sisak it would intersect with existing spurs to the Brotherhood system. In effect, Lwówek and Sisak would become gathering points for gas to enter the Backbone system from multiple sources. Since the inputs coming from Poland's new LNG regasification facility at Świnoujście and the anticipated new Croatian regas facility at Omišalj would only comprise elements in the overall input, the lines connecting these LNG plants to the Backbone could be of significantly lesser magnitude, commensurate with the capacities of the LNG plants themselves. The authors therefore envisage the Świnoujście-Lwówek and Omišalj-Sisak elements being built to handle a capacity of around 6 bcm/y.

The Backbone would connect with both the Czech Republic and Hungary in a manner that would enable it to optimize current and planned reverse flow capabilities that would ensure that gas reaching the Austrian hub at Baumgarten could enter the Backbone system. This would be particularly important should Slovakia and Ukraine need to receive gas from suppliers further west. Poland also has a role to play in this context and, indeed, in June 2012, Poland's Gaz-System and Slovakia's Eustream appointed Gazoprojekt to conduct a feasibility study for a Poland-Slovakia gas interconnector, within the context of the North-South Gas Corridor.³²

Although the Czech Republic has been well placed to source gas via Germany since the Czech section of the 30-bcm/y Gazelle pipeline from Germany opened in January 2013, it is still looking for alternative options to its predominant reliance on Russian gas imported via Ukraine and Slovakia. In part, this is because Gazelle is essentially an extension of the OPAL pipeline,³³ and mainly carries Russian gas initially supplied to Germany via the Nord Stream system. The Gazelle line primarily uses the Czech Republic for transit to central and Southern Europe, rather than as a destination in itself. But the system is already built and operational, and is therefore—from a Czech perspective—able to serve as an alternative to the Brotherhood system.

However, the Czech Republic still lacks a large-scale interconnector with Poland. In March 26, 2014, Czech Minister of Industry and Trade Jan Mladek said that the two countries were already discussing strengthening their interconnection "because we would wish to be able to use the terminal at Świnoujście."³⁴ Within the

TABLE 1. PEAK DEMAND BY COUNTRY

Peak demand (severe weather), mcm/day

Country	2015	2020	2025	2030
Bulgaria	18.4	18.4	18.4	18.4
Croatia	15.9	18.0	20.7	21.7
Czech Republic	75.2	82.3	82.3	82.3
Hungary	77.3	88.9	95.2	97.7
Poland	82.3	106.1	112.6	119.8
Romania	118.2	124.8	133.2	140.6
Slovakia	39.1	41.0	42.8	44.9
Slovenia	5.7	6.3	7.0	7.5

Source: Booz Allen Hamilton, 2012.

context of the EU's North-South Gas Corridor approach, an interconnector between the Czech Republic and the Central European Gas Hub (CEGH) at Baumgarten, Austria, is also under active consideration. While preliminary studies have been started, this project was envisaged as coming into service in 2019. This estimate predates the situation in Ukraine, which might impact that outcome.

Slovakia's current priority is also the implementation of an interconnector with Poland, capable of enabling it to receive gas from Świnoujście. In June 2012, the Polish and Slovakian gas-system operators, Gaz-System and Eustream, commissioned Gazoprojekt to conduct a feasibility study on a new cross-border pipeline to connect their gas-transmission systems.

By November 2013, when the two companies signed a further cooperation accord on the project, they had determined that the line should have an initial 5.7-bcm/y capacity in Poland, and be capable of delivering 4.7 bcm/y to Slovakia. A second stage would take capacity in Poland up to 9.5 bcm/y. However, the companies said they thought the line would not enter service until at least 2018. The volumes envisaged appear to reflect market considerations, rather than concerns about how best to deliver regional energy security.

Hungary formally opened a new 5-bcm/y capacity interconnector with Slovakia on March 26, 2014. This ensured that Hungary's gas-transmission system was connected to all its neighbors, except Slovenia. In particular, and of considerable potential significance to its Visegrad partners, Hungary already has a 4.4-bcm/y connection to the CEGH. However, key operational issues, such as network codes, have yet to be put in place. Although test runs were due to start on July 1, full operation was not scheduled until January 1, 2015. Hungary also has a 7-bcm/y—but as yet unidirectional—interconnector with Croatia, completed in 2011, and a 1.8-bcm/y interconnector with Romania, completed in 2010, which sees no or only minimal flows in the direction of Hungary due to the need of technical upgrades on the Romanian side. The €395 million

32 According to the Eustream's official statement in July 2014, the project could be already operational in 2018.

33 The OPAL (Ostsee-Pipeline-Anbindungsleitung) is a natural gas pipeline in Germany alongside the German eastern border. The OPAL pipeline is one of two projected pipelines connecting the Nord Stream pipeline to the existing pipeline grid in Middle and Western Europe, the other one being the NEL pipeline.

34 Jan Mladek, speech delivered at the Prague Gas Conference, March 26,

2014. Author's notes.

line from Városföld, Hungary, to Slobodnica, Croatia, has scarcely been used since its opening in August 2011, but would constitute the southern backbone of a full North-South interconnector system. While the Croatian oil and gas company INA has indicated that it would be interested in exporting certain quantities of the natural gas it produces in Croatia, this is currently not possible due to lack of progress on the reverse flow issue on the Croatian side. It is important to emphasize that the reverse flow on this pipeline—an obligation under the EU's SOS Regulation—should not be made contingent on the Croatian LNG becoming operational as a simple pressure management agreement between the Hungarian and Croatian TSOs could allow for up to 1.5 bcm to be transported toward Hungary almost immediately. This interconnector, in the Croatia-to-Hungary mode, could eventually also play an important role as part of an overall system of alternative gas delivery to Ukraine in the event of any prolonged disruption of gas supplies from Russia.

There is a need for a regional approach to both market integration and energy security that should be applied to the development of key infrastructure systems that serve both to complete the European market and to ensure regional energy security.

The weakness of classic thinking concerning the N-1 issue is that it is applied on a country-by-country basis. This is particularly true when considering the issue of gas, as it is the energy system most vulnerable to potential disruption and the one most likely to face it in the near future. For example, the gas supply to Hungary from Ukraine might be cut off, but the assumption is that Slovakia's gas system would still work normally and could therefore provide gas to Hungary at a rate equivalent to 3 bcm/y. But if all gas through the Brotherhood system were to be cut off—whether to Hungary, Slovakia, or Poland (and thus to destinations beyond, such as Germany, Austria, and the Czech Republic—the issue becomes far more problematic. It would then require the provision of about 12 bcm/y to Hungary and 6.5 bcm/y to Slovakia. The situation becomes even more complex if the disruption were to extend to the Yamal system, in view of Poland's 14-bcm/y consumption.

To address these shortcomings in a strategic fashion, a North-South Backbone Pipeline is required to ensure full delivery to Central Europe.

Development of the North-South Backbone Pipeline would, of course, serve to create the conditions for both a regional gas market and its full integration with the rest of the European market, thus contributing significantly to the creation of a single European gas market from the Atlantic to the Carpathians. Of course, this also requires the harmonization of regulations by the various countries served by the new infrastructure.

Capacity Requirement

The North-South Backbone Pipeline needs to be capable, *in extremis*, of

- supplying Hungary and Slovakia with volumes close to peak provision;
- contributing to Czech supply and carrying gas supplied from Germany and Austria to the Czech Republic—and from Italy to Croatia—onward to Slovakia and/or Hungary;
- delivering major volumes of gas from Poland to destinations farther south without causing significant adverse impacts on Poland's own consumption needs; and
- delivering major volumes of gas from Croatia to destinations farther north without causing significant adverse impacts to Croatia's own consumption needs.

The North-South Backbone Pipeline essentially requires construction of a 15-bcm/y capacity, 1,340-km gas pipeline to connect the core elements of the Polish system being developed to serve Poland's new LNG plant at Świnoujście and the planned Croatian LNG terminal at Omišalj. It would serve to connect Poland, the Czech Republic, Slovakia, Hungary, and Croatia, with a specific requirement for construction of a 42-inch line between Lwówek in Poland, where the line bringing gas south from Świnoujście is to intersect with the Yamal pipeline carrying Russian gas to Poland and Germany, and to Sisak in Croatia, where it would intersect with the pipeline planned to carry gas from Omišalj to Croatian markets and with a spur to the Brotherhood system.

The North-South Backbone Pipeline would intersect with the Yamal pipeline; with both the northern and southern branches of the Brotherhood systems; and with a whole range of new or planned cross-border interconnectors enabling gas to flow from west to east from Germany, Austria, and Italy. In particular, the pipeline would be able to carry gas dispatched from the Austrian hub at Baumgarten, either north to the Czech Republic and Poland or east and south to Slovakia, Hungary, Croatia, and destinations farther afield. The ability to handle gas input from a variety of sources in Germany, Austria, and Italy would mean that the pipeline connections to the LNG plants at Świnoujście and Sisak (regasification plants that are not envisaged as handling as much as 15 bcm/y) do not need to carry such volumes, although it is recommended that they be capable *in extremis* of feeding around 6 bcm/y into the system.

Construction of the North-South Backbone Pipeline is not simply an end in itself. One of its main functions will be to serve as a catalyst for the development of various other key gas interconnectors that are required to complete Europe's energy markets and safeguard

TABLE 2. CORE ELEMENTS OF THE NORTH-SOUTH BACKBONE PIPELINE

Country	Elements	Project identification	Length
Poland (1) 6 bcm/y system:			
	Świnoujście-Szczecin	Gas System Phase One of LNG, 2014-5	80
	Szczecin-Lwówek	Gas System Phase One of LNG, 2014-5	c.200
Poland (2) 15 bcm/y system:			
	Lwówek- Odolanow	PCI 6.1.2	162
	Odolanow -Wierzchowice	MISSING (i)	c.25
	Wierzchowice- Czeszów	PCI 6.1.4	13
	Czeszów- Wrocław	MISSING (i)	c.35
	Wrocław- Zdżieszowice	PCI 6.1.6 (& Gas System Phase Two of LNG, 2017-8)	130
	Zdżieszowice-Kędzierzyn	PCI 6.1.7	19
	Kędzierzyn-Hań-Libhošť (Czech R.)	PCI 6.1.1	107.6
Czech R.:	Libhošť-Gyor	MISSING (ii)	c.302
Hungary:	Gyor-Városföld	PCI 6.13.1	210
	Városföld-Slobodnica (19.2mcm/d or 7bcm/y. 205 km in Hungary, 88km in Croatia. Pipeline opened 2010)	PCI 6.5.2	293
Croatia (1) 15 bcm/y system:			
	Slavonski Brod-Sisak (existing oil pipeline. Slobodnica is one km from Slavonski Brod)	PCI 6.5.2	150
Croatia (2) 6 bcm/y system:			
	Sisak-Bosiljevo pipeline	PCI 6.5.2	100
	Sisak-Zlobin	PCI 6.5.2	58
	Zlobin-Omisalj	Part of Omisalj LNG development	c.15
Total Length Lwówek-Sisak:			1,340 kms
(i)	Missing but in practice already incorporated in pipeline planning by Poland's Gas System (albeit, at lower capacities than those envisaged in the Backbone proposal)		
(ii)	Core element required for the North-South Backbone Pipeline for which there are no clearly identifiable elements in the Projects of Common Interest (although there are PCIs concerning west-to-east connections in this area).		

the energy security of both Europe as a whole and the individual Member States of the European Union and its colleagues in the European Energy Community.

The North-South Backbone Pipeline would essentially follow the route: Świnoujście-Lwówek-Wrocław-Zdżieszowice-Ostrava-Brno-Lanžhot-Bratislava-Gyor-Sisak-Omišalj. It would consist of the elements outlined in table 2, most of which are already listed as PCI by the European Commission.

Cost

If it were built from scratch, the construction of a 1,340-km, 15-bcm/y North-South Backbone Pipeline system from Lwówek to Sisak would, at current prices, be expected to cost about €3.7-4.2 billion, based on construction costs for a 42-inch, 15-bcm/y system of about \$3.5-4 million per kilometer (€2.75-3.15 m/km). However, there should be scope for considerable cost reductions, since some elements are already in place—including land acquisition, rights of way, and locations for compressor facilities. Therefore, it is concluded that the North-South Backbone Pipeline from Lwówek to Sisak can be built for a total cost of about €3-3.5 billion.

In order to secure financing for a such a project, a joint application should be made by Poland, the Czech

Republic, Slovakia, Hungary, and Croatia—with the direct support of Austria, in view of the role of Baumgarten as a major gas trading hub—for the construction of the 42-inch, 15-bcm/y North-South Backbone Pipeline from Lwówek to Sisak. The European Commission should consider this the single most important priority project for completion of Europe's gas-energy market.

CORRIDOR PROJECTS IN AND AROUND THE BALKANS

Ionian Adriatic Pipeline (IAP)

Funding submissions to the European Commission describe IAP as “the most important regional project in the South Eastern Europe” that has received the support of the Energy Community and the European Commission. The IAP is intended to connect both the existing and planned gas-transmission systems in Croatia with the Trans-Adriatic Pipeline (TAP), and thus establish a new supply route whereby gas from the Middle East and Caspian regions can head north to markets in Central Europe via the Adriatic coast. It would also contribute to the gasification of Albania and Montenegro including, if necessary, by carrying gas from the Adria LNG terminal south to Montenegro and Albania. The project is currently envisaged as a 540-km line, with a 5-bcm/y capacity. Prospective annual

deliveries, based on entry at the southern end in Albania, are 1 bcm for Albania, 0.5 bcm for Montenegro, 1 bcm for Bosnia and Herzegovina, and 2.5 bcm for Croatia. The estimated cost is €580 million, with a proposed commission date of 2018, though there are a lot of uncertainties about the feasibility of this timeline.

The Omišalj LNG Project in Croatia

In July 2014, the Croatian government stated that it was pressing ahead with plans to construct a 5-bcm/y LNG import facility at Omišalj, on the island of Krk. Regrettably the project has been struggling to get off the ground due to a combination of project management issues, lack of available public and commercial funding, proper regional coordination, and short-term political thinking. The project has been persistently delayed since 2007, and no final investment decision has been made. On July 22, 2014, the Croatian government stated a development permit would be issued the moment the government named the LNG terminal a strategic project. The government added that this would happen very soon, that the terminal could be built by 2019 or 2020, and that it would be cofunded by the European Union up to 50 percent of the required CAPEX. However, there is little apparent progress on the issue and there may be difficulties with the EU cofunding as well given the availability of currently under-utilized LNG terminals in Italy some point to as a cheaper alternative. Current estimates are that the plant itself will cost €440 million, but that an additional €1 billion will be required for associated infrastructure, including pipelines and, possibly, underground storage.

Croatia's LNG Main Fast-Transit Pipeline

The planned Zlobin-Bosiljevo-Sisak-Kozarac-Slobodnica line is an integral part of the overall Croatian LNG project at Omišalj. Plinacro, the state sponsor, described it as “an integral part of the North-South European Corridor” and stated that it would constitute a key element in linking the Croatian LNG terminal with the Polish LNG terminal at Świnoujście. The line itself would be an extension of the existing Hungarian-Croatian interconnection, the gas pipeline Varosföld-Dravaszerdahely-Donji Miholjac-Slobodnica. It is also being designed so that it will connect with the Ionian Adriatic Pipeline (IAP). The estimated €500 million for this line is almost certainly included in the €1 billion associated-infrastructure cost noted in the preceding paragraph. An additional pipeline, following the route Zlobin-Bosiljevo-Sisak-Kozarac, is being prepared as part of the overall Omišalj LNG project, at an estimated cost of €450 million.

Gas Interconnection Croatia-Serbia

Croatia's Plinacro has also developed plans for a 6-bcm/y pipeline along the route Slobodnica-Sotin-Bačko Novo Selo, which would connect the Croatian and Serbian gas-transmission systems. This project, envisaged as part of the European Energy Community's

prospective Southeast European Gas Ring, would make it possible to deliver gas from Croatia's LNG facility to Serbia, or to carry prospective deliveries from new suppliers—perhaps in the Black Sea region—to Croatia. Plinacro considers that the Sotin-Bačko Novo Selo section could be built alongside the planned Pan-European Oil Pipeline (PEOP) from Constanza, Romania, to Trieste, Italy, with an estimated cost of €175 million.

Gas Interconnections between Bosnia and Herzegovina-Croatia

There are proposals for three potential interconnectors:

- One is the Ploče-Mostar-Sarajevo/Zagvozd-Posušje/Travnik project. This is intended to provide a new supply route for Bosnia and Herzegovina, with gas delivered via Croatia's gas-transmission system. There are two variants to this project, one costing €98 million and the other €95 million. In either case, most of the cost would be incurred in Bosnia and Herzegovina.
- The second project is a Slobodnica-Bosanski Brod-Zenica pipeline. It would also enable Bosnia and Herzegovina to tap into Hungary's gas-transmission system, with an estimated cost of €94 million (€10 million from Croatia and €84 million from Bosnia and Herzegovina).
- The third is a link that would enable northwestern Bosnia and Herzegovina to receive gas from Croatia, notably from the Adria LNG terminal. The estimated cost is €49.2 million (€33.2 million from Bosnia and Herzegovina and €16 million from Croatia).

Serbian connections

Serbia's JP Srbijagas is currently proposing five small-scale interconnectors:

- Serbia-Bulgaria. Estimated cost: €67.5 million;
- Serbia-Former Yugoslav Republic of Macedonia. Estimated cost: €8 million; Serbia-Montenegro. Estimated cost: €16 million;
- Serbia-Romania. Estimated cost: €2.5 million; and
- Serbia-Croatia. Estimated cost: €11 million.

Bosnia and Herzegovina Connection from South Stream

The GAS-RES company of Banja Luka in Bosnia and Herzegovina has proposed a high-pressure branch pipeline to enable gas from Gazprom's planned South Stream pipeline to serve Croatia, as well as Bosnia and Herzegovina itself. The line—envisaged as part of the South-Eastern European gas ring—would start near Belgrade, cross the border between Serbia and Bosnia

and Herzegovina at Bijeljina, then head for Banja Luka, and possibly enter Croatia near Novi Grad. This would enable it to connect to Croatia's main Pula-Zagreb gasline at Bosiljevo, which would also enable it to connect up to Slovenian and other EU gas-transmission systems. This interconnector has an estimated cost of €500 million and its planned date of commission is 2015.

Reversing the Brotherhood Gas Pipeline

The European Commission is emphatic that the pipeline system in the European Union should primarily consist of open-access pipelines. However, it fully accepts the need for pipeline developers—whether indigenous, such as the TAP group, or external, such as Gazprom—to defer open access for a finite period, in order to recoup initial investments. It is also emphatic that pipelines should have a reverse-flow capability, so that *in extremis* they can be used to supply customers who might otherwise face isolation should routine pipeline flows be disrupted.

Reversing the direction of the Brotherhood line is the most important single act required to improve the energy security of Central European states that are dependent on Russian supplies (as well as Ukraine). Slovakia, which is currently 100-percent dependent on Russian gas, is naturally concerned that reversing the line might run counter to its obligations to Gazprom. The European Union therefore needs to prepare both the legal grounds for any required reversal of the line, as well as concrete plans to effect such a reversal and point out that resale prohibition clauses in long-term contracts with Russia are not in line with EU legislation.

Meanwhile, Slovakia has conducted successful work on reopening a disused gas connection with Ukraine, and piping gas in reverse flow to Ukraine. On August 16, 2014, it began a successful trial on the Vojany-Uzhgorod line, which connects to key Ukrainian storage facilities, piping as much as 27 mcm per day through the line. That is the equivalent of 10 bcm a year. According to Andriy Kobolyev, CEO of Ukraine's state-owned Naftohaz Ukrainy, his country expected to import as much as 10 bcm/y through the line, which he said would constitute half of Ukraine's gas imports. Slovakia modernized its connection from Velke Kapusany to Vojany in order to serve this line. The Vojany-Uzhgorod pipeline officially opened on September 2.

The West-East Corridor—Deeper Integration of the Region by Extension of the North-South Corridor

The expansion of natural gas transmission infrastructure in Central Europe, particularly construction of the North-South Corridor, provides a unique opportunity not only to further integrate the markets of the region but also to create additional West-East transmission corridors over and above the reversal of Druzhba. The North-South Corridor should be enforced by a West-

East Corridor with enhanced interconnections to well diversified markets in Western Europe, Germany in particular.

The original scope of the North-South Corridor does not cover Ukraine, whose integration with the Central European countries has been, until now, limited to one-way transmission of Russian gas (from east to west). In the light of EU-Ukraine Association Agreement ratified by the European and Ukrainian parliaments on September 16, 2014, this new dimension should be taken into account in planning and implementing the regional initiatives. Securing alternative gas delivery to Ukraine in event of any prolonged disruption of gas supplies from Russia should constitute an important role of new infrastructure.

A new, enhanced West-East Corridor components could include the Interconnector Poland-Germany (FGL 304 pipeline), the LNG Terminal in Świnoujście, the transmission infrastructure in Poland, interconnectors Poland-Czech Republic and Poland-Slovakia and interconnector Poland-Ukraine, as well as Ukraine's strategically significant underground gas storage system. The vast majority of these are already part of the existing infrastructure (such as the USG system in Ukraine) or are being implemented or planned in EU projects on the North-South Corridor (such as Świnoujście). The creation of this corridor thus requires only relatively minor additions to planned infrastructure of a new interconnector between Poland and Germany and the interconnector between Poland and Ukraine.

The Poland-Ukraine interconnector envisioned offers a fixed capacity for deliveries up to 8 bcm/year to Ukraine and reverse capacity of 7 bcm/year for deliveries to Poland. At the same time the new Poland-Germany interconnector is proposed to increase the non-Russian supply capacity of Poland by 5 bcm/year, which together with LNG terminal in Świnoujście and new interconnections with Czech Republic and Slovakia should create flexible and robust system able to cope with problems created by the lack of Russian supplies. The system of underground gas storages in Ukraine could be used to create reserves for customers from Western and Central Europe, Balkan countries, and Turkey, as well acting as a basis for the creation of the East European Gas Hub. The dynamics of filling the storage magazines and the amount of gas stored within them in the past few years indicates that a range between 11 and 15 bcm may be offered for nonresidents.

The West-East Corridor would require the construction of just 260 km of new pipelines—interconnector Germany-Poland and Poland-Ukraine at the cost of approximately €440–460 million. Together, they would:

- integrate Central European gas markets;
- heighten energy security by reducing dependence on Russian supplies (including for Ukraine);

- link Ukraine into the European gas market, and, through the LNG Terminal in Świnoujście, also to the global gas market;
- facilitate utilization of the Ukrainian underground gas storage facilities for the European gas market; and,
- increase the number of gas sources for the North-South Corridor.

Together, the benefits of these two West-East corridors would strengthen the bargaining position of Central European countries and Ukraine and increase the utilization of the infrastructure emerging within the North-South Corridor.

OIL-RELATED PROJECTS

In terms of the consequences of any disruption in Russian oil supplies to Europe, the Commission's 2014 *In-Depth Study of European Energy Security* naturally has a relatively narrow focus, concentrating on the impact on refineries served by the Soviet-era Druzhba pipeline system, which are designed to process Russian crudes.³⁵ This is because oil crises can more readily be addressed by means of stockpiles, and because emergency supplies of basic volumes of oil are much easier to distribute than gas supplies. However, refineries are geared toward handling specific types of crude, so a disruption in supplies from a regular supplier will force a refinery both to import crude oil from elsewhere in order to keep functioning, and to change its operations to accommodate new grades or blends.

The Commission study notes: "The refineries supplied by the Druzhba pipeline would be in a particularly challenging logistical situation: in addition to finding new suppliers, they would need to resort to alternative supply routes. However, in some cases these are not immediately available and/or have insufficient capacity to wholly replace the Druzhba pipeline. Therefore, some or all of the concerned countries (Germany, Poland, Czech Republic, Slovakia, Hungary) would have to release emergency stocks in order to ensure the continuous supply of the refineries before alternative supply routes become operational."³⁶

Dealing with a Druzhba Disruption

The projects identified in the report focus largely on ensuring alternative supplies for refineries currently served by the Druzhba system, particularly by creating new links within the European Union between the northern branch of Druzhba, which runs through Poland to Germany, and the southern, which runs through Slovakia to the Czech Republic. It notably does not consider (or even mention) the long-standing proposal for a 1,320-km pipeline to connect the

Romanian Black Sea port of Constanța with the Italian port of Trieste, a project known as the Pan-European Oil Pipeline (PEOP).

The most important projects addressed in the Commission's energy security study include the extension of Ukraine's existing Odessa-Brody line into Poland, to a terminal at Adamowo within Poland. This 371-km line should serve to connect the southern and northern branches of the Druzhba system and, in concert with other projects—notably an expansion of the Pomeranian pipeline between Gdansk and Plock, and the construction of a new 160-km pipeline between Litvinov in the Czech Republic and the Germany refinery in Spergau—should greatly increase the flexibility of oil distribution in the region. These projects will help to create a regional oil pipeline ring embracing Ukraine, Poland, Germany, the Czech Republic, and Slovakia.

The Brody-Adamowo line is envisaged as a three-stage project which would start with an initial 820-mm (32-inch) pipe capable of carrying 10 million tons a year (200,000 barrels a day). The system would then expand in two stages, first to 20 mt/y (400,000 b/d) and then to 30 mt/y (600,000 b/d). The 160-km Litvinov-Spergau line would be slightly smaller. This project, with a 700-mm (28-inch) pipe ensuring a 7-mt/y capacity, would likewise close the gap between the two branches of the Druzhba but much farther west than the Brody-Adamowo line. Both projects require expansion of the 234-km pipeline system connecting Poland's Baltic coast refinery at Gdansk and its inland terminal on the northern Druzhba line at Plock. In practice, this means adding a new 12-15 mt/y reverse-capacity pipe to the Gdansk-Plock system. This pipe must be capable of shipping oil from a marine terminal at Gdansk into the Druzhba line, then either moving it west to Germany before shipping it south to the Czech Republic via Spergau and Litvinov, or feeding the Gdansk refinery with oil arriving from Brody via Adamowo and Plock.

However, there is a major weakness that the European Commission appears inclined to overlook—the refusal of Russian operators of the Druzhba system in Ukraine to initiate routine operational connections between the Odessa-Brody pipeline and the Druzhba system. Some oil has flowed from Druzhba into Odessa-Brody (it was used for some years as a storage facility for oil produced by TNK-BP, which was a major vertically integrated Russian company). In general, however, it still looks as if the long-term justification for Odessa-Brody will turn out to be as a way of bringing oil from Caspian producers to Europe via the Black Sea, rather than as an additional distribution system for oil reaching Brody via the Druzhba line—regardless of whether such distribution would head south to Odessa or north into Poland via the proposed Adamowo connection.

It should be noted, however, that in the event of any disruption to supplies normally reaching European

³⁵ European Commission, *In-Depth Study of European Energy Security*.

³⁶ *Ibid.*, p. 107.

consumers via the Druzhba system, at least some of the Russian oil imports could be replaced by an increase in imports. These could come from the United States, which—helped by increasing indigenous oil production—has become a major net exporter of oil products.

Two other projects are included in both the EU's energy security and PCI assessments. One is the reconstruction and enlargement of the twenty-year-old JANA and Adria pipelines that connect Slovakia, Hungary, and Croatia. Transformed into an operational bidirectional system, this could either carry oil northwest from the Croatian port of Omišalj on the Adriatic to Hungary, Slovakia, and the Czech Republic, or could carry it from the Druzhba system to Croatia. The Hungary-Slovakia part of the Adria pipeline is currently being upgraded from 3.5 million tonnes to a 6-million-tonne-per-year capacity in order that the Bratislava refinery in Slovakia may fully be supplied from the Mediterranean. This upgraded segment of the pipeline will become operational late November 2014. However, there is some ongoing concern regarding delays in upgrades on the Croatian side of the pipeline, resulting in certain segments operating at lower pressures than normal.

In addition, a new 80-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 used in reverse mode to provide a backup system for oil delivery to Bratislava's own refinery in event of any disruption of Russian supplies.

The Constanta-Trieste Pipeline Project

The Pan European Oil Pipeline (PEOP) project has been around for more than twelve years but has yet to come to fruition. Its backers—primarily the governments of the countries for which it would provide transit—argue that this ambitious 1,320-km pipeline would routinely provide a new way of delivering oil to landlocked destinations in the northern Balkans, while also acting as a replacement system in the event of any disruption in the Druzhba system. As a concept, PEOP certainly seems very attractive. It would connect directly to six refineries: Ploesti and Pitesti in Romania; Pancevo and Novi Sad in Serbia; and Sisak and Omišalj in Croatia. In addition, a seventh potential customer, the Banja Luka refinery in Bosnia and Herzegovina, sits only a few kilometers south of the line's proposed route through Croatia. Moreover, the line would utilize at least 400 km of existing pipe. Cost estimates are around €3.5 billion.³⁷

An initial feasibility study was carried out in 2002 by the US company HLP-Parsons. With further studies following, an official agreement was signed by officials from Italy, Croatia, Slovenia, Serbia, and Romania

on April 2, 2007. This was intended to lead to the construction of a line capable of carrying as much as 90 mt/y (1.8 mb/d) from 2012 onward, with 60 mt/y (1.2 mb/d), regarded as the optimum configuration. The goal was to attract input from Azerbaijan, Kazakhstan, and Turkmenistan, and to deliver it to Europe by means of Croatia's marine terminal at Omišalj, a connection at Trieste to the existing Trans-Alpine Pipeline to Baumgarten, and then via the north Italian grid to markets in Switzerland and France. In a presentation in November 2010, one of the partners, Serbia's Naftogaz, put the project's cost at \$3 billion.

Yet PEOP currently seems moribund, if not dead. A PEOP Project Development Company was formally incorporated in London in June 2008 but appears to have conducted no business since then. The most recent positive reference to PEOP appears to be a comment by Azerbaijani Energy Minister Natiq Aliiev in Bucharest in April 2012—he said that the transportation of Azerbaijani crude through the PEOP system was under review as a project for future Azerbaijani-Romanian energy cooperation.

Enhancing Existing Facilities

Because oil is a fungible commodity, and can be distributed in a variety of ways, it requires less precautionary infrastructure than gas. However, it would be useful to institute a programme to assess reverse flow capabilities along existing pipelines in order to improve oil flows in Central and Eastern Europe in the event of a shortfall or cutoff of deliveries from Russia, or from any other supplier. In addition, a program to assess storage facilities and the ability and willingness of individual EU Member States to release oil in storage for use not only by their own citizens but also by those of neighboring states would also help to resolve the N-1 issue.

One element on which the United States could provide some helpful input would be an assessment as to whether the system of military pipelines developed to provide fuel to NATO forces in Europe could or should be extended eastward into the territory of NATO's newer members in Central and Eastern Europe. In the context of this paper, this is what would be assessed whether military pipelines might, in extremis, also be used to provide core civilian supplies to nations impacted by an oil cutoff from their primary supplier.

ELECTRICITY MARKET INTEGRATION

Building the North-South Electricity Transmission Corridor

Advancement of the EU's three pillars of energy policy—competitiveness, security of supply, and sustainability—in electricity requires new cross-border transmission interconnections, national system resiliency upgrades and market coupling across transparent power trading platforms rooted

³⁷ Ivana Sekularac, "Funds Still Short for Pan-European Oil Pipeline," Reuters, June 4, 2008, <http://uk.reuters.com/article/2008/06/04/balkans-pipeline-idUKL0488037320080604>.

in the coordinated action of Member States and TSO cooperation. Recent developments in the sector, most prominently market mechanisms and integration of large scale RES generation, have already significantly changed system operation conditions across Europe. In addition peripheral regions of Europe, particularly those not sufficiently interconnected with Central Europe, remain the most obvious targets for transmission system development toward a single internal European market. The idea is for Regional Investment Plans and National Development Plans to complement one another in identifying, evaluating and promoting projects that meet the criteria of Pan-European significance.

The Existing Infrastructure

The table below summarizes existing cross-border interconnections of the North-South Corridor that will also see upgrades in the future in order to enhance SoS and better integrate RES and reduce spillage throughout the region.

The Missing Links:

PCIs and PECIs from Scandinavia to the Balkans via the Baltic Region and Central Europe

Baltic Energy Market Interconnection Plan (BEMIP)

In this context one essential Commission priority depicted in the framework of the Second Strategic Energy Review is to connect 'energy islands' with the unified pan-European market, and the Baltic region is the first of six such major infrastructure project undertakings. It is clear that with respect to forging an EU-wide electricity grid, the isolated Baltic region can be the focal point of an upgraded North-South energy highway with the completion of three subsea transmission cables with ex-Nordel countries Sweden and Finland to the north, and with continental Europe via Poland and CEE to the south, in concert with support for internal upgrades and expansion.

This is manifested in three interrelated undertakings referred to as NordBalt, LitPol, and Baltic synchronous. Almost all of the inclusive projects have been identified as PCIs within the 2012 and 2014 TYNDPs and Regional Investment Plans, and are in various stages of planning and development. While the main driver is market integration between Nordic, Baltic, and continental systems, renewable penetration will also be an important feature alongside the inclusion of generation from nuclear units that are planned in Finland and Lithuania.

New connections between Nordic and continental European markets are necessary and beneficial to adapt to changing generation portfolios in Central Europe and the Baltic region, as well as accommodating Germany's nuclear phase out plan. This corridor

will serve as an important alternative route between Nordic and continental Europe, supporting the more efficient use of hydro potential in the North with the thermal, wind dominated RES in the southern portion of the connection.

One of the driving forces behind BEMIP is integrating large scale wind power near the Baltic Sea coastline with the power systems of the Baltic States, the potential of which is estimated to be some 400 to 900 MW. For the Nordic region, improved interconnection with the UK, Denmark, Germany, and the Baltic states helps to ensure security of supply in years of low hydropower generation while also serving to balance changes in wind and solar power fluctuations to the south in times of spare capacity. In the CEE region, the uncertainty facing gas-fired power generation in the midst of falling wholesale electricity prices and stubbornly high gas prices has eroded profitability, stifled new investment and created more of a need for alternative sources from a more robust system of cross-border transmission lines.

In essence, a more resilient, interconnected transmission facility will improve security of supply and the distribution of RES generation to meet Europe's 20-20-20 targets with an increasing focus on long-term projects looking toward 2030.

NordBalt, LitPol, and Baltic Synchronous

The second five-year period of the 2012 TYNDP plan (2017-2022) is expected to witness the completion of a significant number of new transmission line projects, enabling enhanced connectivity and creating a larger market for RES generation potential. The Baltic Sea Regional Investment Plan 2012 and TYNDP 2012 identified the possibilities to transfer power from Northern Scandinavia to Central and Eastern Europe via an alternative corridor from Finland through the Baltic states, which requires the strengthening and reinforcement of existing transmission lines and new infrastructure within the Baltic states to allow for better utilization of the planned interconnectors—NordBalt, LitPool, and Estlink 1&2.

As far as completed projects recognized under BEMIP, the EstLink 2, comprising a new 450 kV connection between Finland and Estonia, was commissioned in 2014. The submarine cable spans 140 km with a capacity of 650 MW, linking a new substation in Anttila with an existing substation in Pussi. With the preexisting 350 MW line between the two countries this brings total transmission capacity to 1000 MW.

While the two current HVDC links between Finland and Estonia reach a transmission capacity of 1000 MW, the LT-SE HVDC link under construction will add 700 MW to this corridor. NordBalt involves multiple projects that support a base connection from Sweden to Latvia. Alongside the LT-SE transmission line, the local reinforcements within the Kurzemes Ring are equally

TABLE 3: EXISTING NETWORK TRANSMISSION CAPACITY ALONG NORTH-SOUTH CORRIDOR (SEASONAL VARIATION)

Flow Direction	Capacity (MW)	Reverse Direction Capacity (MW)
FI > EE	860-1000	1000
LV > EE	329-729	214-750
AT > HU	300	300
HR > HU	600	700
RS > HU	300	300
SK > HU	500	500
UA > HU	455	450
HU > RO	634-663	577-876
LV > LT	338-1,300	563-1,500
PL > SK	98-140	0
PL > CZ	322-511	0
HU > HR	700	600
SI > HR	1350	1150
HR > BA	575-585	500-650
HR > RS	375-400	350-400
BA > RS	100	100
BA > ME	400-475	390-450
RS > ME	425-450	425-450
RS > MK	425	350-375
RS > AL	210-225	205-230
RS > BG	50-300	400-450
ME > AL	210-225	220-225
MK > BG	50-200	425-450

important, connecting Grobina-Venstpils-Dundaga-Tume-Riga with 330 kV autotransformer substations in Ventspils and Tume at an additional capacity of 600 MW.

As part of the NordBalt expansion, it also incorporates an HVDC link between Latvia and Lithuania and further grid reinforcements in the long term phase. The project has received high CBA assessment marks because it connects two price zones with a high price differential, decreases CO₂ emissions and improves resilience and robustness in the Baltic Sea region.

This system will provide the most efficient use of the LT-SE interconnection, particularly in light of wind generation capacity along the Baltic coastline.

Facing south along this corridor, the LitPol (LT-PL) interconnection includes two stages, the first establishing 500 MW connection and the second meant to reach a planned transmission capacity of 1000 MW in both directions by 2020. This is the crucial piece that allows the incorporation of the common Baltic electricity market into the internal electricity market (IEM) via CEE. Not only is it a key for the SoS of the Baltic states, but it helps integrate RES—up to 1200 MW.

Even with this interconnection in place, the vast Polish electricity market will need significant internal

upgrades as well as strengthened interconnectors with its neighboring countries that are currently quite poor. There are a cluster of PCI projects that address this deficiency with a likely commissioning in 2020.

The other key is to improve the internal Baltic market via the Baltic Corridor, combining several investments enabling an increase of 600 MW starting from northern Estonia to the Lithuania-Poland border. The internal Baltic market effort is underscored by PCIs for Estonia/Latvia/Lithuania that will reinforce deeper synchronous interconnections with the Central European network. The weakest internal connection point was identified on the Estonia-Latvia border, where a third interconnector has been labeled a priority PCI in the past two TYNDPs.

Consolidating the V-4 Grid and Market Development

The V-4 countries of Central Europe also have some connectivity weaknesses that will require significant investment for both internal and cross-border upgrades in order to strengthen the regional transmission grid.

Hungary and Slovakia are in the prefeasibility/planning stages of the first phase of a two phase interconnection project that will increase transfer capacity, improve the security and reliability of operations of both transmission systems, and support North-South RES power flows

TABLE 4: SUMMARY OF CORE INFRASTRUCTURE INTEGRATING BEMIP WITH NORDIC AND CONTINENTAL EUROPE

Country	Capacity/ Voltage	Project ID	Length	Substation (y/n)	Cost (million euros)	Status	Estimated Commission
SE-LT (Klaipeda-Nybro)	700 MW/300kV	NordBalt	380 km	y	€690-€1200	Under construction	2015
SE to SE (Ekyhyddan-Nybro/Hemsjjo)	700 MW/400 kV	NordBalt, PCI 4.4.2			€170-€270	rescheduled	2021
LV to LV (Ventspils-Imanta)	150 MW / 330 kV	PCI 4.4.1	210 km				2018
LV to SE	Capacity increase	NordBalt		n		Feasibility/ FEED	2019
LT to PL (Aylutus-Elk)	2X500 MW/400 kV	LitPol, PCI 4.5.1 and 4.5.3 (Second Stage)	154 km	y	€510/€310	Under construction (First stage)	First stage: 2015. Second stage: 2020
EE to EE (Harku-Sindi)	250 MV/330 kV/110 kV	PCI 4.2.2	140 km	n	€105-€195	Permitting	2019
EE to LV (Kilingi-Nomme-Riga CHP2)	500 MW/330 kV	PCI 4.2.1	211 km	y		Permitting	2020
EE/LT/LV synchronous	600 MW/330-400 kV	PCI 4.3		y	€96-€100	Feasibility/ FEED	2020-2025
PL to PL (Plock-Olsztyn Matki)	2X1870 MVA / 400 kV	PCI 4.5.4	180 km			Prefeasibility	2020
PL to PL (Kozienice-Siedlce Ujrzanow)	2X 1870 MVA/400 kV	PCI 4.5.3	90 km			FID	2020
PL to PL (Stanislawow-Olsztyn Matki)	2X1870 MVA/400 kV	PCI 4.5.2	242 km			Feasibility/ FEED	2020

Source: Regional Center for Energy Policy Research (REKK).

across the CEE region. From a technical standpoint, it will enhance system security during outages and maintenance closures on other interconnectors between the countries. As for RES integration, this project promotes power flow from wind and PV in northern Central and Eastern Europe by increasing the grid transfer capability (GTC) between the two countries and thereby improves the overall balancing of the system. Unfortunately, the first phase is currently facing some delays as the involved parties work to determine an agreeable common national border point and the TSOs (SEPS and MAVIR) continue to negotiate terms, but the idea is still to establish a commission date no later than 2018.

The Polish electricity system requires a number of upgrades in order to reasonably facilitate its planned connection between the Baltic ring and CEE neighbors, and most of these are labelled domestic PCIs. At the same time, Poland will still need to increase cross-border transmission capacity with neighboring countries, especially Czech Republic and Slovakia, in order to make the North-South Corridor truly viable for long distance power flows.

Meanwhile, PCI cluster 3.22 between Romania and Serbia will bolster the mid-continental east corridor

and aims to enhance the transmission capacity along the East-West Corridor in Southeastern and Central Europe. This 400 kV double circuit interconnection along with reinforcements along western Romania will provide access to more than 1000 MW of installed new wind generation in the Banat area (south-west Romania and northeast Serbia) as well as a pumped storage plant of more than 1000 MW in north-west Romania.

Further to the east, the upgrade to the Black Sea corridor under PCI 3.8 via reinforcement of internal corridors in Romania and Bulgaria would enhance regional and European market integration by allowing the capacity for the more timely and efficient use of intermittent RES that can be transported to consumption and storage centers at the regional/continental level. The project directly connects 1330 MW of RES, and helps integrate 5000 MW of wind RES from the Black Sea coast.

Czech-Slovakian-Hungarian Market Coupling

As a part of the endeavour to develop an integrated European electricity market by the end of 2014 the coupling of the Czech, Slovakian, and Hungarian day-ahead electricity markets started on September 11, 2012 as the first trading day. The project began on May 30, 2011, when the regulators, TSOs, and market

TABLE 5. CEE (WITHIN N-S CORRIDOR) ELECTRICITY PCI LIST

Country	Capacity/ Voltage	Project ID	Length	Substation (y/n)	Cost (million euros)	Status	Estimated Commission
SK to SK (Velky Dur-Gabcikovo)	2772 MVA/400 kV	PCI 3.16.2	93 km	y	€97-€98	Permitting	2016
HU to SK (Sajoivanka-Rimavska Sobota)	2X1386 MVA/400 kV	PCI 3.17	25 km	y		Prefeasibility	2016
SK to SK (Lemesany to Velke Kapusany)	2772 MVA/400 kV	PCI 3.18.2	100 km	n	€21-€22	Feasibility/ FEED	2018
HU to SK (Kisvarda-Velke Kapusany)	2772 MVA/400 kV	PCI 3.18.1	TBD	n		Prefeasibility	2021
HU to SI (Heviz-Cirkovce)	2X1330 MVA/400 kV	PCI 3.9.1	80 km	n	€240-€360	Permitting	2016
RO to RS (Resita-Pancevo)	2X1380 MVA/400 kV	PCI 3.22	131 km	n	€130-€220	Permitting	2015-2017
BA to HR (Banja Luka-Lika)	504 MW/400 kV	PCI 3.5	155 km	y	€ 150	Prefeasibility/ Planning	2020
IT to ME (Villanova-Lastva)	1000 MW/500 kV	PCI 3.19.1	375 km	n	€ 1,130	Construction	2017
IT to SI (South Udine-Okroglo)	800 MW/400 kV	PCI 3.2	120 km	n	€ 420	Planning	2021
RO to BG (Black Sea corridor)	Multiple internal segments	PCI 3.8	Multiple internal segments	n	€173-€403	Planning/ Permitting	2019-2021
SI to HU to HR (Cirkovee-Heviz-Zerjavenec-Diavaca)	1085 MW/400 kV	PCI 3.9	80 km	n	€240-€360	Permitting	2016-2020

Source: Regional Center for Energy Policy Research (REKK).

operators of the three countries signed a Memorandum of Understanding about the joining of Hungary to Czech-Slovakian Market coupling launched on September 1, 2009.

The method adapted in this trilateral market coupling is price merging based on NTC. This means that the next day bid and ask offers of all participating exchanges (OTE-Czech, OKTE-Slovakian, HUPX-Hungarian) are matched at the same time, taking into consideration the transmission capacities between the various locations as constraints. A central algorithm determines the prices and commercial deliveries for each area. As a result electricity flows from the direction of cheaper markets toward more expensive markets until the prices of different areas become equal, assuming that abundant cross-border capacity is available.

Chart 1 depicts the day-ahead baseload prices of the relevant exchanges before and after market coupling and allows for an evaluation after a one year period from 2013.

As shown, for the first days after the start of market coupling the prices on the three exchanges moved in almost perfect unison. The likely reason for this was that market participants were quite cautious for the first few days and brought lower demand to the day-ahead market, without generating a bottleneck on the Slovakian-Hungarian border. After this initial period lasted for a few weeks Hungarian prices often climbed above the others before prices started to couple again.

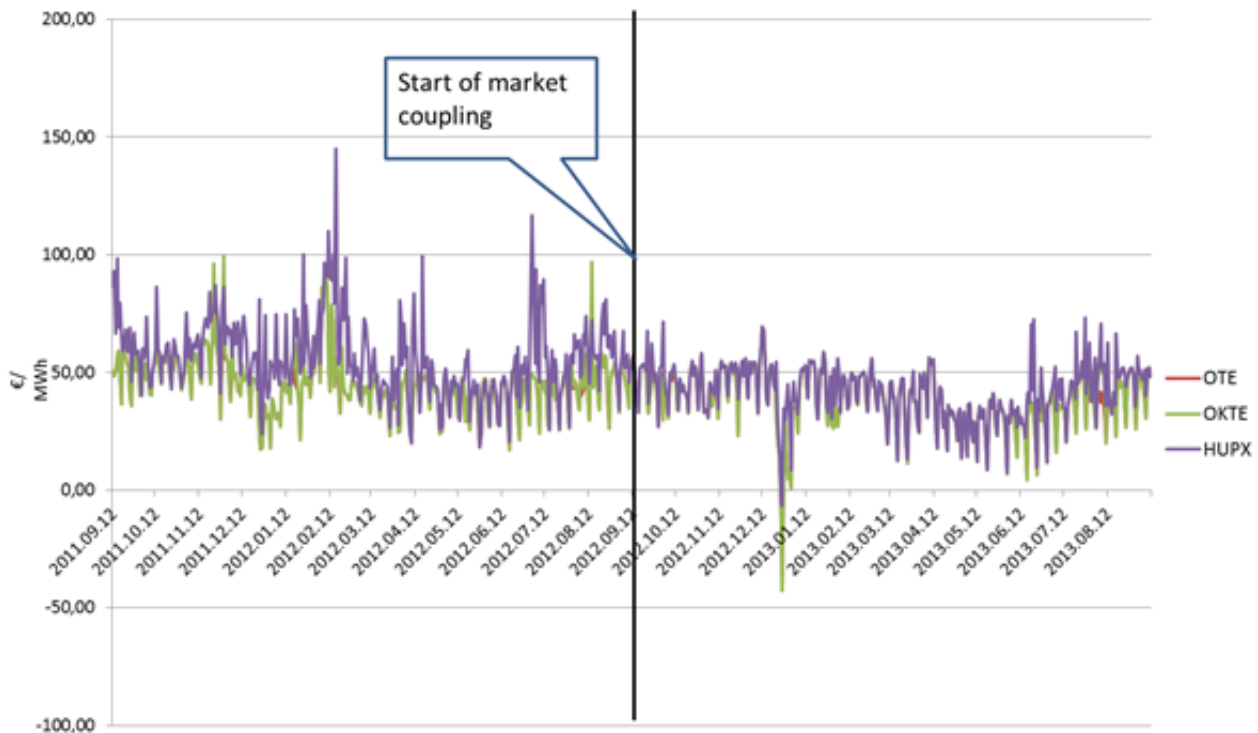
In the first part of the year, although there were periods when higher price differences occurred (mainly when the transmission capacity at the Slovakian-Hungarian border decreased and at the end of December during national holidays), a general convergence between Czech-Slovakian and Hungarian prices was noticeable. Since June higher price differences can be seen mainly on weekends.

The table below quantifies the convergence of day-ahead baseload prices, where the results of the one year period after market coupling will be compared to the results of the one year period before the launch of market coupling. The first two rows show the absolute average difference between the prices of the relevant exchanges, while the last two rows describe the average difference of the Czech and Hungarian exchanges compared to the German exchange.

TABLE 6: THE AVERAGE ABSOLUTE DIFFERENCE BETWEEN REGIONAL EXCHANGE PRICES AND ALSO COMPARED TO EEX PRICES, €/MWH

	Analyzed Period	
	12.09.2011-11.09.2012	12.09.2012-11.09.2013
HUPX-OKTE	11.89	3.48
OKTE-OTE	0.73	0.35
HUPX-EEX	11.99	5.55
EEX-OTE	2.56	2.69

CHART 1. DAY-AHEAD BASELOAD PRICES OF RELEVANT EXCHANGES BEFORE AND AFTER MARKET COUPLING



Source: Regional Center for Energy Policy Research (REKK)

While market coupling has not had any major impact on the relative position of the day-ahead baseload prices on the Czech and Slovakian exchanges, the shift in these prices compared to the EEX and the average of HUPX prices started to converge to the average price level of both the Czech, Slovakian and German exchanges. This convergence also implies that Hungarian day-ahead spot prices dropped in absolute terms on average. The average baseload price since the start of market coupling is €41.79/MWh while this value was €56.32/MWh in the one year period before the start of market coupling. The integration has also positive impact on the traded quantity and price volatility as well.

The impact of market coupling on the level and frequency of the hourly price difference between the Hungarian and the Slovakian exchanges is depicted by Chart 1.

As illustrated, the percentage of hours in which the prices on the Hungarian and the Slovakian exchanges are equal to zero increased from below 1 percent to over 78 percent. Additionally, during the hours with price difference the gap between prices substantially declined. Nevertheless large price differences still take place; for 183 hours the Hungarian exchange was over €50 more expensive than the Slovakian one. Furthermore, the accession of the Hungarian exchange also lowered the average difference between the Czech and Slovakian hourly prices compared to the period before market coupling.

Looking ahead, there are two important developments on the horizon: 1) Romania is set to join this market

coupling from November 19, while Serbia and Croatia have signalled their interest in joining the initiative, which is expected to be realized in 2016, and 2) countries in the Central and Eastern European region are working on a common solution where market coupling would take place based on a PCR solution, with the determination of cross-border capacities taking place from the start with the implementation of the flow-based process—the earliest that this system would launch is two to three years.

Connecting the Balkans to the Pan-European Market

The Balkan Peninsula has a relatively weak transmission grid with limited cross-border and internal transfer capacities that need to be improved in order for regional integration. An enhanced system can also capitalize on the RES potential in the region, particularly the extensive wind capacity on the eastern coastal areas and western borders of Romania and Bulgaria and the immense hydro power from the West Balkans.

In order to facilitate the emerging regional energy markets of Southeast Europe, there are major corridors planned and identified both as PCI's and PECIs according to the ENTSO-E's TYNDP and the Energy Community respectively. The East-West electricity corridor through the West Balkans requires strengthening of internal networks as well as interconnections with EU Member States (e.g., Romania, Bulgaria, Greece, Italy), with none more important than two new subsea cables connecting Albania and Montenegro to Italy and a

TABLE 7. STRENGTHENING BALKAN RESILIENCY AND INTERCONNECTORS: ENERGY COMMUNITY PECLIST

Country	Capacity/ Voltage	Project ID	Length	Substation (y/n)	Cost (million euros)	Status	Estimated Commission
AL to FYR of MK (Elbasan-Bitola)	400 kV	ET001	151 km	Y			2017
IT to AL (Vlora-Bari West)	400 kV	ET024	150 km				
Kosovo to AL (Prishtina-Tirana)	160 MW/400 kV	ET014 (PECL), Project 147: CSE9	238 km	N		Under construction	2016
MD to RO (Balti-Suceava)	325-400 MW/400 kV	ET015		N			2019
ME-RS-BA (Pljevlja-Bajina Basta-Visegrad)	1095 MW/400 kV	Transbalkan Corridor, ET002	160 km	N	€ 85	Permitting	2015-2020
RS to RS (Kragujevac-Kraljevo)	400 kV	ET018		N			2016
RS to RS (Bajina Basta-Kraljevo-Obrenovac-Bajina Basta)	400 kV	ET021/022		N			2018

Source: Regional Center for Energy Policy Research (REKK).

possible third originating from Croatia. Currently, some of the highest generation cost differences on average are about €10/MWh between Italy and Balkan countries, marking the need for better market integration to open internal bottlenecks and even price spreads. The IT-ME interconnection is under construction and will foster this market development between Italy and the Balkans; increasing transmission capacities, making more efficient use of generation capacity and contributing to RES integration in the pan-European interconnected system

Accompanying the new HVDC 400 kV between Italy and Montenegro is a phase 2 reinforcement strategy toward the creation of a Transbalkan Corridor, which aims to support the increase of power transfers from the north-west to the south-east and foster further market integration. The cluster of investments are located in Serbia, Bosnia and Herzegovina, and Montenegro and will span from 2015 to 2020. It is estimated that this project will help connect directly or indirectly some 1000 MW of RES in the Balkan Peninsula.

The other major intra-regional project aims to increase transfer capacity in the North-South direction from Romania, Serbia and Bulgaria toward Greece, FYR of Macedonia and Albania at an estimated cost of €210 million. Most prominently this will enhance the SoS in the south-west region, mostly in FYR of Macedonia.

Cost Assessment

Baltic Sea Region

According to ENTSO-E, for the studied scenarios the investment portfolio was found adequate for the ten year period articulated in the TYNDP of 2012 to increase security of supply to the Baltic states and integrate with the internal European market. However

the ability of this network development to help meet RES 2020 targets remains in question as permitting setbacks and commissioning delays could interfere with the envisioned mid-term trajectory.

There are a number of projects that together form the backbone of this system as a whole, not just the major interconnectors but also notably the new and upgraded internal Baltic, Polish, and German lines. For the complete realization of BEMIP under the ENTSOE Baltic Sea Regional Investment Plan 2014, the total investment costs are estimated to be €55-€75 billion,³⁸ although the largest investment portfolio belongs to Germany, which is not part of this corridor analysis, and the country values are not differentiated. The large scale projects in the Baltics identified in Table 4, as core infrastructure undertakings without incorporated ancillary segments to the southwest, should range from €1.88 billion to €2.59 billion.

Continental Central East Region

The estimate for projects in the Continental Central East Regional Investment Plan 2014 amount to about €50 billion, with projects of pan-European significance estimated by country as follows:

Country	Estimated Cost
Czech Republic	€1.5 billion
Croatia	€0.2 billion
Hungary	€0.1 billion
Poland	€1.9 billion
Romania	€0.6 billion

³⁸ Up from the 2012 TYNDP figures: €45 billion euros—about half (€21.1 billion) in the mid-term, expected to be completed by 2016, and the rest (€23.9 billion) classified as long-term projects concluding in 2022.

TABLE 8: ESTIMATED COSTS FOR PCIS

Country	Estimated Costs
Ukraine	€40 million
Serbia	€20 million
Kosovo	€230 million
Croatia	€25 million
Albania	€25 million
Total	€340 million

Source: Regional Center for Energy Policy Research (REKK).

Continental South East Region

A rough estimate of the total cost for electricity projects of Pan-European significance along the North-South Corridor is €16.8 billion (including Italy). A distribution of costs is provided according to individual project costs, with 26 percent below €300 million and 44 percent in the upper cost scale above €1 billion.

CONCLUSIONS AND RECOMMENDATIONS

It is important to prepare the ground for an eventual large-scale solution to the issue of diversifying transportation systems for gas, oil, and electricity, even if that exceeds the relatively limited immediate commercial requirements. In particular, this means ensuring that permitting, awards of rights of way, land purchases or allocation, and all other legal and technical elements are designed from the start to provide for a relatively large-scale, 15-bcm/y North-South Gas Corridor system with room for appropriate electricity connections. The leading requirement is for a flexible system to connect LNG terminals in Poland and Croatia with each other, and with supply sources reaching Europe via the Black Sea, the Aegean Sea, and the Southern Gas Corridor. This requires both a vision of what kind of system is required and the rapid implementation of a number of specific elements that would collectively constitute an effective system capable of delivering gas from these sources. This means delivering supplies from those regions to customers in Northern, Central, or Southern Europe impacted by disruptions to current gas supplies.

An interconnector system in Central and Southern Europe capable of carrying about 6-7 bcm/y in either direction would prove sufficient to promote real competition between gas suppliers and enable consumers to seek out the best deals from rival suppliers. It would enhance regional energy security by enabling gas to reach some isolated markets in an emergency. But it would not be sufficient to ensure long-term energy security in the event of a prolonged or permanent cutoff of gas supplies from a major producer, such as Russia. That would require a system capable of handling about 15 bcm/y. Therefore, a backbone of the system, notably the

sections connecting Poland, Slovakia, Hungary, and Croatia, should at least be designed with an eventual 15-bcm/y capacity in mind.

Throughout the whole of Central and Southeastern Europe, only three countries—Poland, Ukraine, and Romania—have gas consumption levels exceeding 10 bcm/y. However, these all have coastlines. This enables Poland to build its own LNG import facility at Świnoujście. It enables Romania to develop offshore gas resources that will ensure a revival of its energy self-sufficiency over the next several years. It also creates the possibility of LNG imports via the Black Sea, though this possibility remains remote, despite Ukrainian optimism.

For most European countries, a 6-7-bcm/y system is sufficient to provide alternative supplies for between 80 and 100 percent of demand. But such a system cannot provide year-round support in event of a major crisis, such as a long-term disruption of gas supplies from Russia. In a disruption situation, it is not simply a matter of being able to deliver 6-7 bcm/y of gas to a single country but becomes a matter of transporting much greater volumes to a cluster of countries. In such circumstances, with some gas dropped off in one country while further supplies have to transit that country to reach other stricken markets, a much larger system is required. A system capable of carrying 15 bcm/y—a volume sufficient to cover the demand of any two of the landlocked gas importers of Central, Eastern, or Southern Europe—is the minimum necessary to perform this function, while a 20-bcm/y system would allow for greater flexibility.

This raises a profound question concerning financing. Financing commercial lines should prove relatively straightforward, with senior European banks noting that is precisely the purpose of commercial financing. But what are the extra costs of building larger pipelines to meet energy-security requirements, and how can such projects be financed? Moreover, the fact that there is so far no general 6-7-bcm/y system in operation—and that progress toward achieving such a system is slow—might indicate that the commercial rationale is not quite as strong. The possibility that some subregional actors might wish to preserve local monopolies, and thus serve to inhibit development of such systems, may be one reason why such a system has not yet been achieved.

The regional regulatory environment may also play a role. In terms of securing the extra funds required to bridge the gap between commercial and energy-security requirements, the obvious sources would be national governments and the €5.85 billion Connecting Europe Facility. Institutions such as the EBRD and the EIB are not likely to furnish funding for the energy-security element of such projects.

This points to the need for governments to ensure, either through regulation or direct financing, the completion of at least a basic regional system of interconnectors. One potentially missing element is a regional body capable of directing national investments for a common regional purpose.

Two projects, a new link to Moldova and the planned Poland-Slovakia Interconnector, highlight the quite different roles envisaged for specific pipelines. The new 43.2-km interconnector between Iași, Romania, and Ungheni, Moldova, is an example of a project essentially intended to secure the energy security of a country. The Poland-Slovakia Interconnector should not only bolster national and regional energy security, but also serve to improve the functioning of the whole European market by helping to create a regional grid that promotes competition in an increasingly unified or interconnected market.

The €26 million Iași-Ungheni project is essentially designed to provide Moldova's Ungheni region—currently 100-percent dependent on Russian gas transited via Ukraine—with an alternative import system. Since the whole of Moldova only consumes around 1.1 bcm/y of gas, the pipeline's 1.5-bcm/y capacity is ample. It should be noted, however, that the pipeline needs to be extended to the Moldovan capital of Chisinau in order to be truly effective. This project is currently estimated to cost €70 million, while Romania would need to build some €40-50 million worth of additional compression and boost its own internal distribution system by building a €110 million internal connection from Lețcani to Onești via Gherăești. These are projects for which the EBRD and EIB have already pledged funds.

The planned Poland-Slovakia interconnector has a quite different nature. It is intended to help Slovakia import gas from alternative suppliers should supplies from its current provider, Russia, be restricted or eliminated. But it is also part of a wider system, capable of pushing gas through Slovakia to other countries whose supplies might be impacted—notably, Ukraine. It therefore needs to have a much greater capacity than a single-customer system such as Romania-Moldova. But how big a system? No single pipeline needs to carry all the gas required for a major consumer and importer, such as Ukraine. Nor is it automatically necessary for a system to provide full-scale, year-round capacity from the very start. Much depends on three key factors: the amount of gas held in storage that can be used to boost supply in an emergency; the ability to provide substitutes for domestic gas consumption, in the form of electricity generated from other fuels, either in the affected country or by neighbors with which it has electricity connections; and the ability of gas supplied via new alternative pipelines to keep basic systems going at critical periods, such as four months of a severe winter, while longer-term solutions are reached.

Strategic Recommendations

- The corridor's energy dimension should aim to contribute to the expedited creation of a truly single European market in energy, and should extend to oil, gas, and electricity.
- In the gas sector, the core issue is to get Croatia's long-planned LNG project at Omišalj on Krk Island underway, and to develop a bidirectional pipeline system that would connect it with Poland's new Baltic coast LNG facility at Świnoujście. But while Świnoujście is due to open next year, a final investment decision for Croatian LNG has yet to be made. This does not mean that the interconnector system between Poland and Croatia cannot be developed, but every further year of delay weakens Croatia's crucial role as an anchor in any overall approach to radically enhancing European energy security.
- In the north, the projects to develop the Polish-Lithuania gas interconnector and to improve bilateral links between Lithuania and Latvia need to be accelerated. These projects will help strengthen the overall development of an open-market structure in Northeast Europe and enable Lithuania's new offshore LNG facility at Klaipeda to play its full part in provision of regional, as well as national, energy security. In the south, the development of new pipelines to connect with offtake points along the Southern Gas Corridor, and with LNG facilities in the Aegean Sea, should be prioritized in a manner that will ensure gas connections throughout the Balkans. The most important of these projects is the 540-km Ionian Adriatic Pipeline between Albania and Croatia.
- While the North-South Corridor creates links mainly between countries of Central Europe, the dominance of Russian gas in this region makes it absolutely essential that for the increase of the security of supply the existing links of this corridor with Western Europe should be enhanced and new connections established. For this reason the North-South Corridor should be enforced by a West-East Corridor, including enhanced interconnections between Poland and Germany as well as Ukraine and Poland.
- These elements should form the backbone of the North-South Corridor, so that countries in the region
 - o can help each other in a supply crisis;
 - o have access to spot markets in Western Europe;
 - o can create synergies by jointly using and developing storage facilities;
 - o are enabled to diversify their sources of imports and can tap into gas supplies from a variety of

sources, notably LNG imports reaching the Baltic, Adriatic, and Aegean terminals and piped supplies from the Caspian—and ideally from the Mediterranean, the Middle East, and Central Asia as well—reaching Europe by means of the Southern Gas Corridor.

- The EU should support Member States in exploiting their own indigenous resources, including conventional oil and gas sources, as well as shale gas in Central Europe—developing the North-South Energy Corridor is also critical in ensuring those resources will have a regional impact.
- The European Energy Community needs to be reinforced and extended. Its legal and judicial purviews need to be strengthened, and recommendations from the final report of the High-Level Reflection Group need to be fully implemented.
- The external dimension of European energy policy needs to be further strengthened by considering the setting up of demand-aggregation and collective-purchasing mechanisms for external gas supplies at the EU or regional levels, as a tool to enhance bargaining positions vis-à-vis major non-EU suppliers.
- Consistent implementation of EU energy and competition laws for all market players—including those from third countries—are prerequisites for a functioning, single, European energy market. Strong enforcement of the EU Third Package regulations, along with anti-trust legislation, is required, with special regard to following through with ongoing anti-monopoly investigations against third-country suppliers. The EU should make a renewed commitment to applying its energy rulebook, especially where there is a clear-cut case of specific obligations (such as on reverse flows) not being met.
- Decreasing oil-import dependency is also critical. Support for oil infrastructure and storage capacities, as well as the development of new technologies for the refining sector to increase efficiency, should also receive European financial support.
- The European Union should dedicate existing funds to infrastructure projects most critical to the timely completion of the North-South Corridor. In these times of austerity, raising new public funds to invest in infrastructure is an unlikely prospect. Therefore, existing funds should be identified and made available through the following actions:
 - o Reprioritizing available funds in the Connecting Europe Facility–Energy (CEF-E) by tweaking the selection criteria for projects of common interest (PCI) to ensure that the top priorities—the twenty-seven projects in gas and six in electricity that the European Commission’s proposed *European Energy Security Strategy*³⁹ report identified as critical for the EU’s energy security in the short and medium terms—enjoy priority access to CEF-E funding.
 - o Prioritizing infrastructure investments in the national development plans of the Member States in the framework of the EU’s Multiannual Financial Framework for the period of 2014-2020. Member States in Central Europe should closely coordinate their cross-border infrastructure-development plans, to maximize the availability and efficiency of European funding.
 - o Earmarking significant cofunding, from combined sources from CEF-E, the Cohesion Fund and a regional infrastructure investment fund to the North-South Backbone Gas Pipeline from Lwówek to Sisak.
- National governments of Central Europe should consider creating a €1 billion regional investment fund that pools resources to complement the funding provided by the European Union as outlined above. European funding alone cannot provide for all public investment needs, and Central Europe is the most direct beneficiary of the North-South Corridor and the economic growth and resilience it promises to yield, along with the rest of the EU. A unified posture, backed by financial commitments by the concerned Member States, will be necessary to generate and sustain renewed support for the corridor in the European Commission and among Western European governments.

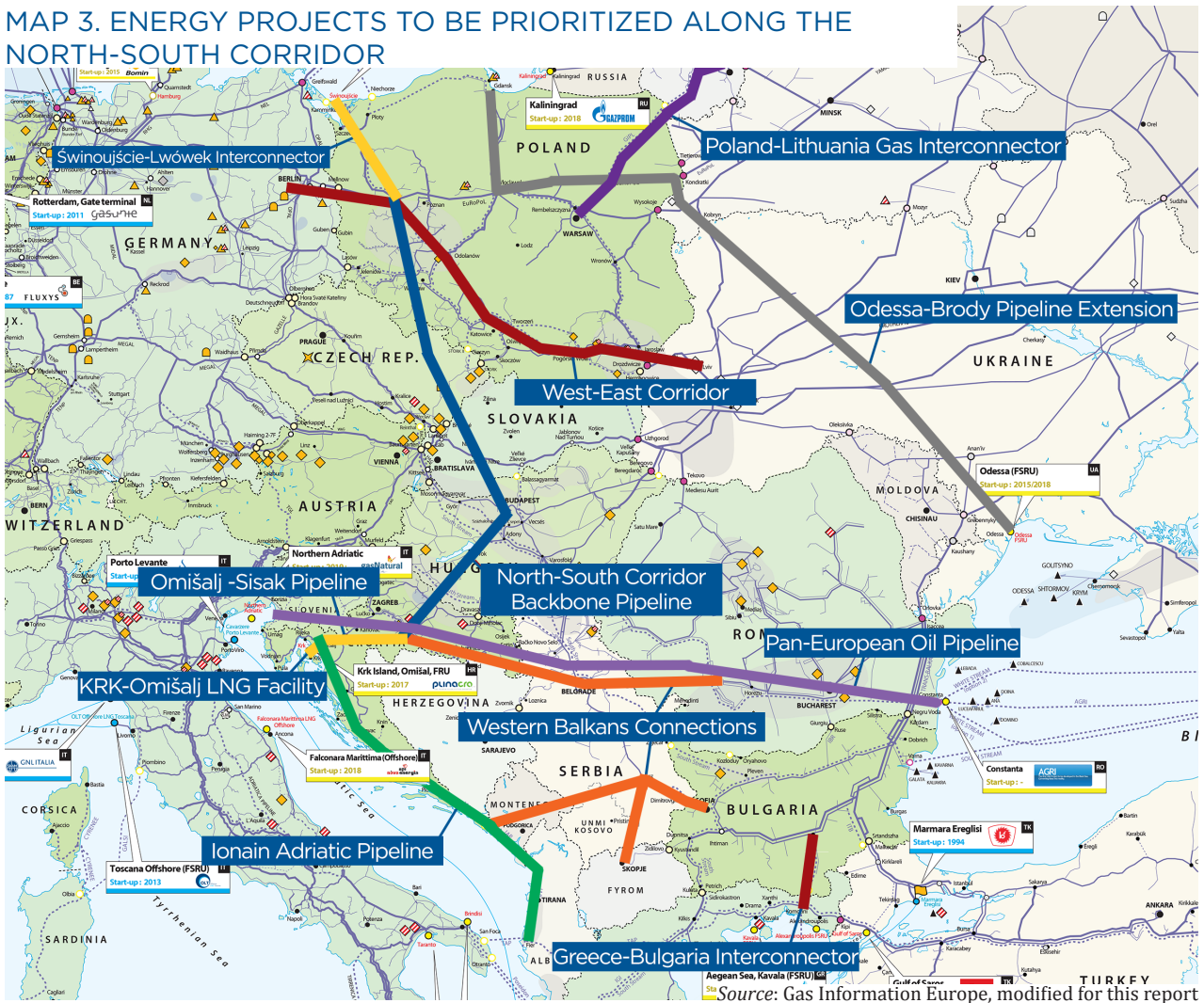
Specific Gas Sector Recommendations

- **Accelerate development of Croatia’s LNG terminal on Krk Island.** The EU’s *Energy Security Strategy* study in May 2014 noted that the project was still at the stage of “feasibility/FEED” and that there were financing issues. This glosses over some key issues. There is no public record of the key financial investment decision (FID) being made, although this was expected in 2013. Nor is it clear whether work on Front-End Engineering and Design (FEED), a process which normally leads almost seamlessly into an actual construction phase, has been started.⁴⁰ Under these circumstances, the EU study’s assessment that the Krk Island LNG project will not open until 2019 appears reasonable and is in sharp contrast to the 2010-11 hopes that it would be ready for use in 2014. Given the importance of the Krk Island project in overall diversification, and in the

39 European Commission, Communication from the Commission to the European Parliament and the Council, *European Energy Security Strategy* (Brussels, May 28, 2014), http://ec.europa.eu/energy/doc/20140528_energy_security_communication.pdf.

40 European Commission, *European Energy Security Strategy*.

MAP 3. ENERGY PROJECTS TO BE PRIORITIZED ALONG THE NORTH-SOUTH CORRIDOR



Source: Gas Information Europe, modified for this report

position of Omišalj as a key interconnection point, there is now an overriding need to build a Croatian LNG facility so that it can play its role in improving market conditions in the northwestern Balkans and improving Europe’s overall energy security, or in the absence of progress with the LNG terminal of Omišalj explore other options to gain access to Italy’s LNG terminals.

- **Ensure reverse capacity for physical flows on the Hungary-Croatia Interconnector** first by signing a simple Pressure Management Agreement between the national TSOs and in the medium term by constructing the missing compressor station on the Croatian side. The EU must ensure that Croatia upholds its obligation under the SOS Regulation.
- **Construct a scalable Ionian Adriatic Pipeline.** Current plans call for the IAP to be a 5.1-bcm/y system. Consideration should be given from the start to ensure scalability, so that it can eventually carry as much as 10 bcm/y.
- **Accelerate interconnectors required to substitute for the Nabucco West project** from Turkey to Austria. In particular, transforming the existing Romania-Hungary line into a genuine

interconnector capable of carrying at least 6-7 bcm/y (and eventually 10 bcm/y) from Romania to Hungary.

- **Develop a large-scale 6-10 bcm/y Bulgaria-Romania Interconnector** to augment the existing 23.8-km interconnector between Ruse, Bulgaria, and Giurgiu, Romania, which is only capable of handling a maximum of 1.5 bcm/y.
- **Accelerate planned Greece-Bulgaria and Turkey-Bulgaria interconnectors** to ensure access to both the Southern Gas Corridor and Aegean LNG facilities.

Specific Oil Sector Recommendations

- **Bolster the capacity of the TransAlpine (TAL) pipeline** between Italy, Austria, and Germany, since this constitutes the prime source of oil entering Europe via tanker deliveries to the Mediterranean, and accessing markets in Central and Northern Europe—notably the Czech Republic and Germany.
- **Investigate emergency procedures for reversing the Druzhba system**, in case it should

become necessary to pump oil from west to east to serve the Czech Republic, Slovakia, and Ukraine.

- **Connect the existing Odessa-Brody pipeline in Ukraine to the Polish network** with a bidirectional system, so that Caspian oil—carried by tanker across the Black Sea to Odessa— can routinely reach markets in North-Central Europe while oil from Northern Europe could be supplied to Ukraine in an emergency.
- **Encourage the PEOP project and ensure it is bidirectional.** The project for a Constanta-Trieste line may well have to be developed piecemeal. There should be collective European scrutiny, possibly by the European Energy Community Secretariat, to ensure harmonization of all elements, notably ensuring that the project's western sections possess a reverse-flow capability.
- **Accelerate synchronization of the Baltic systems with the European Continental Synchronous Area.** This would help end the isolation of the electricity networks of Estonia, Latvia, and Lithuania.
- **Accelerate the synchronization of Ukraine and Moldova with the European Continental Synchronous Area.** This would prevent them from being energy islands in the event of any problem in electricity supplies from Russia, and would enable Ukraine both to develop a better functioning internal market and to play a constructive role in the development of a broader European electricity market.
- **Ensure EU Member States achieve a 10 percent interconnection rate** for their installed electricity-production capacity by 2020 and, where possible, accelerate attainment of this target.

Specific Power Sector Recommendations

- **Accelerate electricity connections between Nordic and continental European markets** to adapt to changing generation portfolios in Central Europe and the Baltic region, as well as accommodating Germany's nuclear phase out plan, as an important alternative route between Nordic and continental Europe.
- **Connect the Balkans to the European market** and supporting the more efficient use of hydro potential in the north with the thermal and wind dominated RES in the southern region.
- **Accelerate the second stage of the Sweden-Lithuania Nordbalt system** (the first stage is due to open in December 2015).
- **Continue implementing the first stage of the Poland-Lithuania interconnection** (the first stage is due to be completed in 2015).
- **Accelerate the construction of the Estonia-Latvia interconnector.**

Strategic Dialogue in a Transatlantic Context

The United States can become a provider of energy sources for the North-South Corridor, making LNG available for commercial export to European customers. To that end, the EU-US Energy Council should identify ways to facilitate natural gas and crude/condensate exports from North America to the EU, and consider how this may best be reflected in the Transatlantic Trade and Investment Partnership. The United States also has a key role as a provider of hard security for the protection of energy infrastructure, and in facilitating major energy-diversification projects in the wider Eurasian space to help improve Europe's energy security. The North-South Corridor, and how to facilitate it, with special regard to US private sector participation in financing and realizing the corridor should be discussed within the framework of the EU-US Energy Council.

TABLE 9. ENERGY PROJECTS TO BE PRIORITIZED ALONG THE NORTH-SOUTH CORRIDOR

Project	Route	Capacity	Tentative budget	Status (planned / in progress)	Deadline (to be completed by)
North-South Corridor Backbone Pipeline	1,340-km from Lwówek in Poland to Sisak in Croatia	15 bcm/y	€ 3.5 billion	Some sections are in place or in progress	2018
Omišalj-Sisak pipeline	73km from Omišalj to Sisak	6 bcm/y	€150 million	planned	2018
Krk-Omišalj LNG Facility	Croatia	6 bcm/y	€500 million	planned	2018
Ionian-Adriatic Pipeline	Western Balkans	5 bcm/y	€580m	planned	2020
Interconnector Greece-Bulgaria	182 km between Komotini in Greece to Stara Zagora in Bulgaria	3-5 bcm/y	€128 million	planned	2015
Polish-Lithuania gas interconnector	532 km	2,6-4,4 bcm/y	€600 million	planned	2018
West-East Corridor	interconnectors Germany-Poland and Poland-Ukraine		€440-460 million	planned	2018
Western Balkans connections	Serbia-Bulgaria		€105 million	planned	2018-2020
	Serbia-Former Yugoslav Republic of Macedonia	Various			
	Serbia-MontenegroSerbia-Romania Serbia-Croatia				
Pan-European Oil Pipeline (PEOP)	1,856 km, Constanța in Romania via Serbia and Croatia to Rijeka and from there through Slovenia to Trieste in Italy	1,2-1,8 mbd	€3.5 billion	Planned	TBD
Odessa-Brody Pipeline extension	490km, Brody-Plock	0.5-0.9 mbd	€500 million	planned	TBD
Electricity projects of pan-European significance along the corridor			€16.8 billion		
TOTAL: €26.823 billion					

2. THE TRANSPORTATION DIMENSION

The aim of the chapter on transportation is to identify the relevance of the Baltic-Adriatic Corridor to European freight (and passenger) transport, investigate the potential of tangible and intangible investments to this corridor, and investigate how it can become a strategic corridor for multimodal transport.

The chapter focuses on the new EU infrastructure policy—the revision of the Trans-European Transport Network (TEN-T) and the identification of new core transport corridors, as well as critical bottlenecks and future challenges for the Central European countries. It outlines the history of the Baltic-Adriatic Corridor, including past and present investments along the corridor that have the potential to interconnect the Central and Eastern Europe region to other corridors and continents.

It analyzes preidentified projects and their economic relevance along the corridor—the efficient use of the European Structural and Investment Funds (ESF) and the Connecting Europe Facility (CEF) in the participating member countries (EU-11). It also provides a risk assessment of the preidentified EU-11 investment projects, as well as their economic, social, and environmental impacts on the participating countries and beyond. Finally, it offers some conclusions and recommendations to speed up the corridor's development.

THE NEW EU INFRASTRUCTURE POLICY—THE REVISION OF THE EXISTING TEN-T AND THE IDENTIFICATION OF NINE CORE CORRIDORS IN EUROPE

Background of the New EU Infrastructure Policy

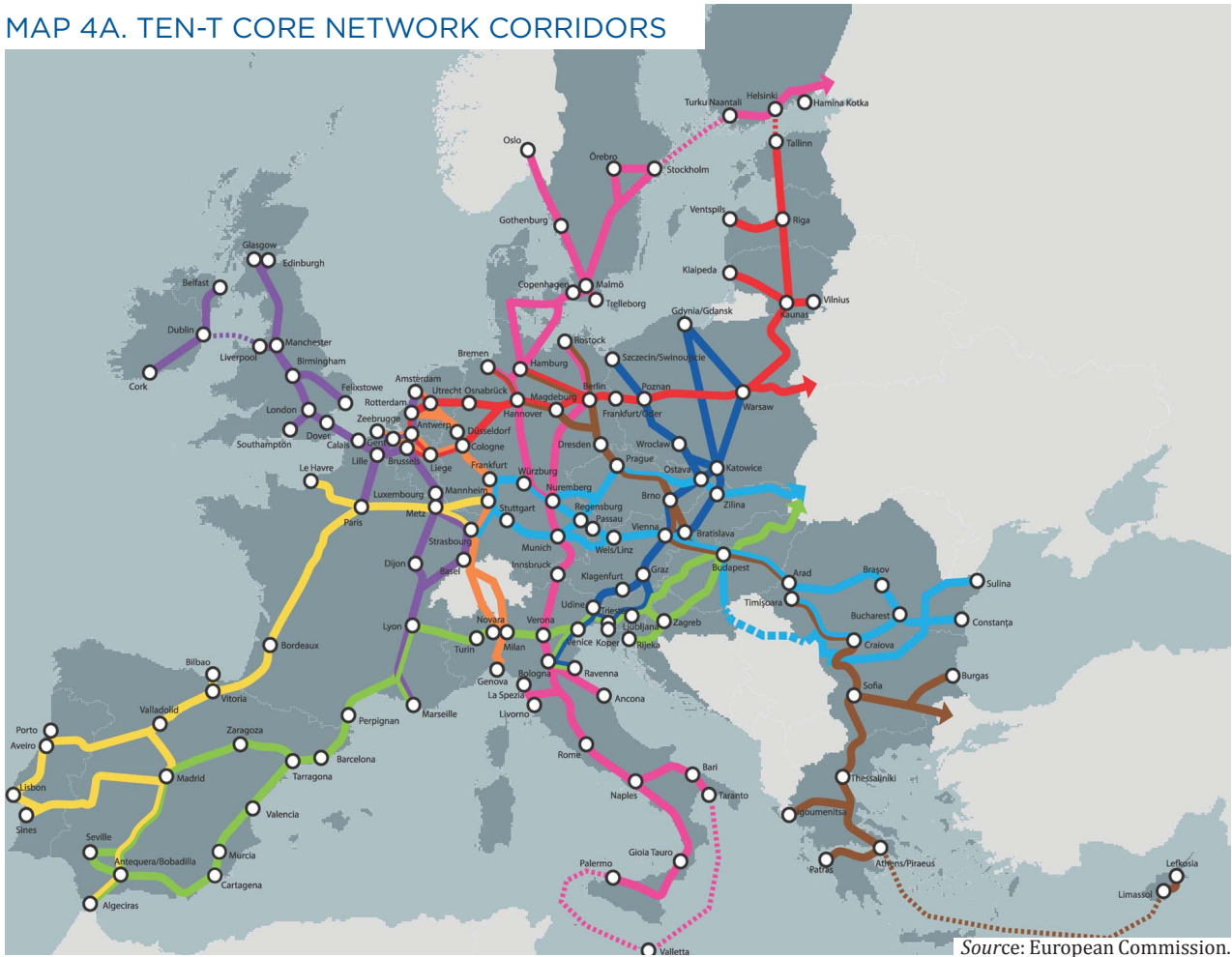
A great deal of progress has been made in Europe during the last twenty years in terms of improving travel

links between Western and Eastern Europe. East-west connections that were completely or partly missing, or restricted to only certain modes of transport, have now been integrated into the new TEN-T. However, within the EU, there is still a considerable disparity in quality and availability of infrastructure between and within the Member States. In particular, the east-west connections require improvement, through the creation of new transport infrastructure and the maintenance, rehabilitation, or upgrading of existing infrastructure (e.g., rail infrastructure, port integration, or multimodal interconnections).

With considerable support from Member States, the focus has now shifted from individual projects to creating a core network of strategic corridors that will join all corners of a vast geographical area—from Portugal to Finland, from the coast of Scotland to the shores of the Black Sea. East-west connections are a central priority for the new EU infrastructure policy. In terms of financing, at least €11.3 billion¹ has been ringfenced for cohesion between countries, and a new instrument has been created to promote the fragmented connections between the east and west of Europe. Altogether, nine corridors have been identified as important cornerstones of the core European transport network. Those core network corridors must each include three modes, three Member States, and two cross-border sections. Out of the nine core network corridors, seven have a real east-west dimension: Baltic-Adriatic, North Sea-Baltic, Mediterranean,

¹ As noted in a European Commission press release, "The European Commission has on 11 September 2014 invited Member States to propose projects to use €11.9 billion of EU funding to improve European transport connections. This is the largest ever single amount of EU funding earmarked for transport infrastructure. Member States have until 26th February 2015 to submit their bids. The funding will be concentrated along 9 major transport corridors which, taken together, will form a core transport network and act as the economic life-blood of the Single Market. The funding will remove bottlenecks, revolutionize East West connections and streamline cross border transport operations for businesses and citizens throughout the EU." European Commission, press release, "€11.9 Billion to Improve European Connections," September 11, 2014, http://ec.europa.eu/transport/themes/infrastructure/news/corridors_en.htm.

MAP 4A. TEN-T CORE NETWORK CORRIDORS



Source: European Commission.

Orient/East Med, Atlantic, North Sea-Mediterranean, and Rhine-Danube. We can now see that, in the future, corridors with multimodal connections will stretch from east to west, and from the geographic periphery to the center of the EU.

The Baltic-Adriatic Corridor crosses or tangents five of the other eight core network corridors, including the North Sea-Baltic Corridor, the Mediterranean Corridor, the Scandinavian-Mediterranean Corridor, the Rhine-Danube Corridor, and the Orient/East-Med Corridor:

Along with better interconnections, the new core networks correct previous niches and gaps in the EU transport networks, namely:

- There was no priority project connecting Poland and Germany. Now, there are three connections in the core network (Szczecin-Berlin, Warsaw-Berlin, and Dresden-Wroclaw). Warsaw-Berlin is also part of the North Sea-Baltic Corridor that stretches between Rotterdam and Tallinn.
- The German ports were not connected by a priority project to the Central European countries (Hungary, the Czech Republic, Slovakia, Bulgaria, and Romania). Now, this link is part of the Orient/East-Med corridor.
- Slovakia and the Czech Republic were not

efficiently connected to southern Germany. Now, the two core network links (Prague-Nürnberg-Frankfurt and Prague-München-Stuttgart) are part of the Rhine-Danube Corridor.

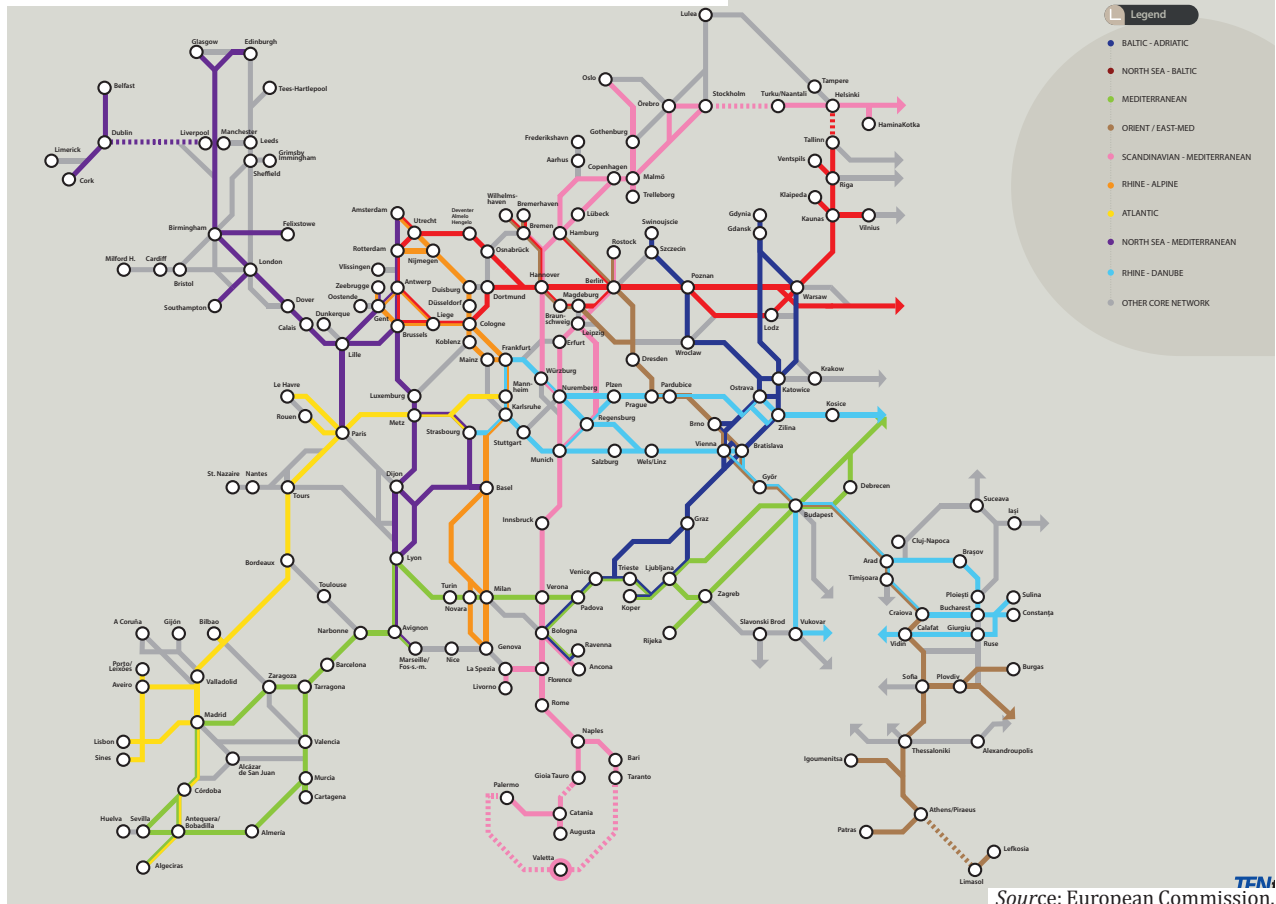
- The Danube was a priority project on its own but limited to the inland waterways. Now, the Rhine-Danube Corridor will cover the Danube, better connect it to other inland waterways such as the Rhine, and include rail and roads to link Central Europe to Germany and France.

THE NEW CHALLENGES ALONG THE CORE CORRIDORS

Currently, along the TEN-T corridors, there are five main problem areas that need to be tackled at the EU level—through improved policies and infrastructure investments—in order to unlock main bottlenecks including:

- missing links, in particular at cross-border sections, are a major obstacle to the free movement of goods and passengers within and between the Member States and their neighbors;
- there is a considerable disparity in quality and availability of infrastructure between and within the Member States, causing bottlenecks. In particular, east-west connections require

MAP 4B. TEN-T CORE NETWORK CORRIDORS



Source: European Commission.

improvement, through the creation of new transport infrastructure and/or maintenance, rehabilitation, or upgrading of existing infrastructure;

- transport infrastructure between the transport modes is fragmented. As regards making multimodal connections, many of Europe’s freight terminals, passenger stations, inland ports, maritime ports, airports, and urban nodes are not up to the task. Since these nodes lack multimodal capacity, the potential of multimodal transport—and its ability to remove infrastructure bottlenecks and to bridge missing links—is insufficiently utilized;
- investments in transport infrastructure should contribute to achieving the goal of reducing greenhouse-gas emissions in transport by 60 percent by 2050; and
- Member States still maintain different operational rules and requirements, in particular in the field of interoperability, which significantly add to the transport-infrastructure barriers and bottlenecks.

Ex-ante analysis prepared by the European Commission determined that future investment will form the backbone for transportation in Europe’s single market. It will remove bottlenecks, upgrade infrastructure,

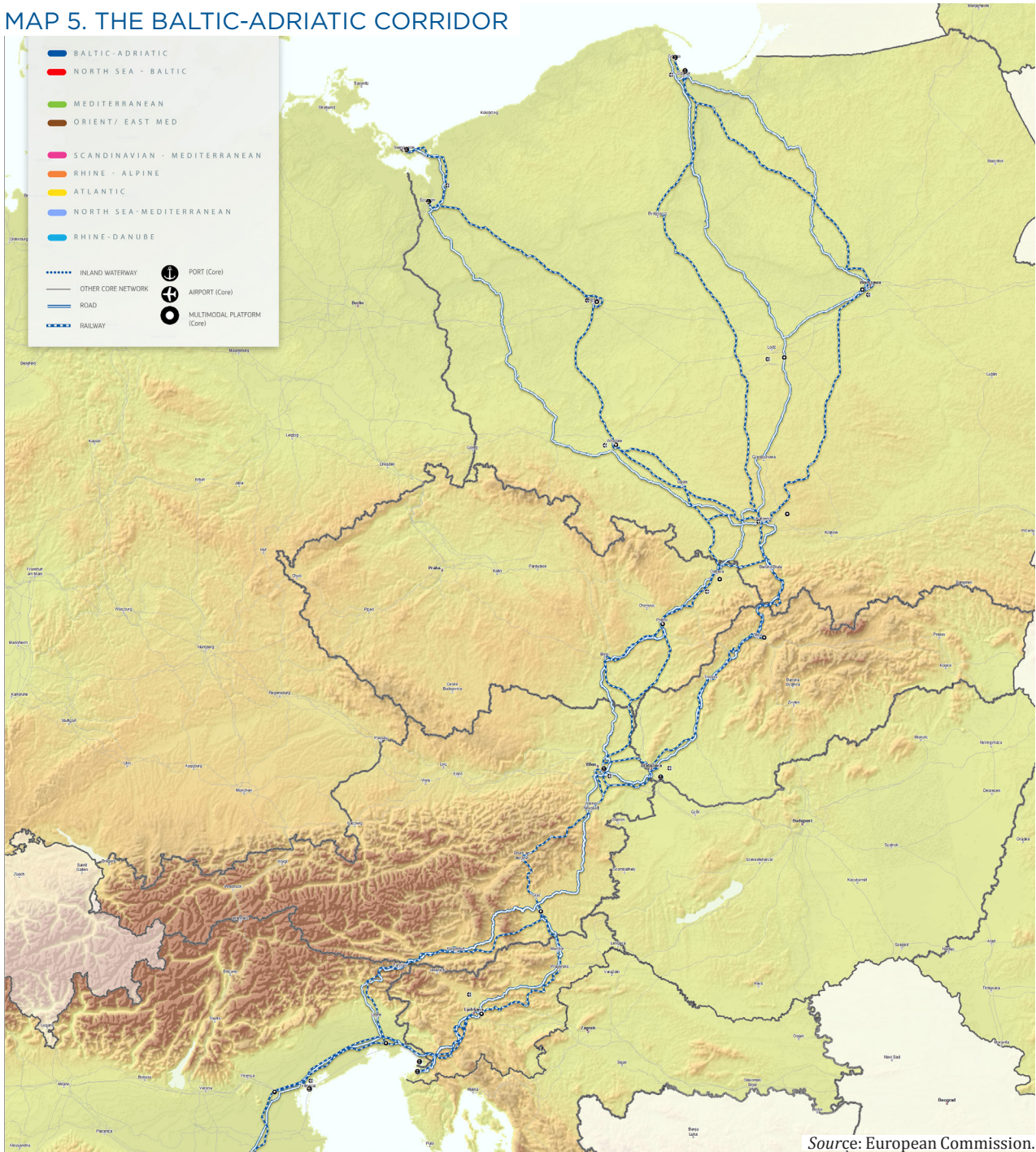
and streamline cross-border transport operations for passengers and businesses throughout the EU. The new core TEN-T will be supported by a comprehensive network of routes, feeding into the core network at regional and national levels. The aim is to ensure that, by 2050, the great majority of Europe’s citizens and businesses will be no more than thirty minutes’ travel time from this comprehensive network. Through the comprehensive network of transport corridors, European freight transport is expected to grow by 80 percent by 2050, and passenger transport by more than 50 percent.

Furthermore, the core network will improve connections among:

- ninety-four main European ports with rail and road links;
- thirty-eight key airports with rail connections into major cities;
- 15,000 km of railway line upgraded to high speed; and
- thirty-five cross-border projects to reduce bottlenecks.

This will be the economic lifeblood of the single market, allowing a real free flow of goods and people around the EU.

MAP 5. THE BALTIC-ADRIATIC CORRIDOR



Source: European Commission.

With regret it must be noted that in Central Europe there are countries without functioning of inland waterway transport. The EU activities in this area are not sufficient. This should be changed because inland waterway transport is both cheapest and environmentally friendly (low GHG emission).

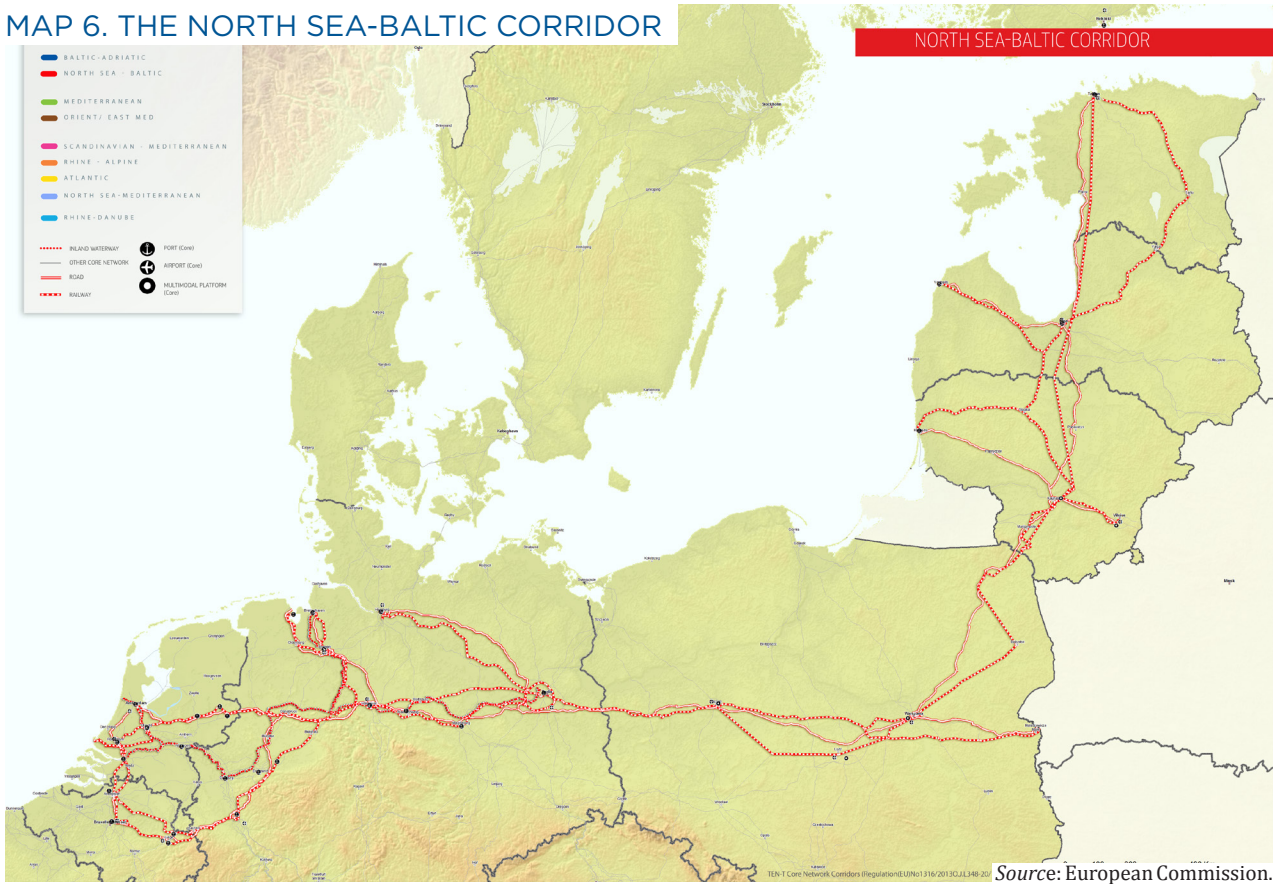
The Development of a Comprehensive Legal Framework

The comprehensive development of the TEN-T corridors (including the Baltic-Adriatic Corridor) aims to reduce emissions from transport 60 percent

by 2050.² At its heart, the TEN-T is a multimodal transport network, facilitating a substantial shift of passengers and freight from road to rail and other transport modes. As mentioned before, the new policy establishes a core transport network built on nine major corridors: two north-south corridors, three east-west corridors, and four diagonal corridors. The core network will transform east-west connections, unlock bottlenecks, upgrade infrastructure, and streamline cross-border transport operations for passengers and businesses throughout the EU. It is estimated that the

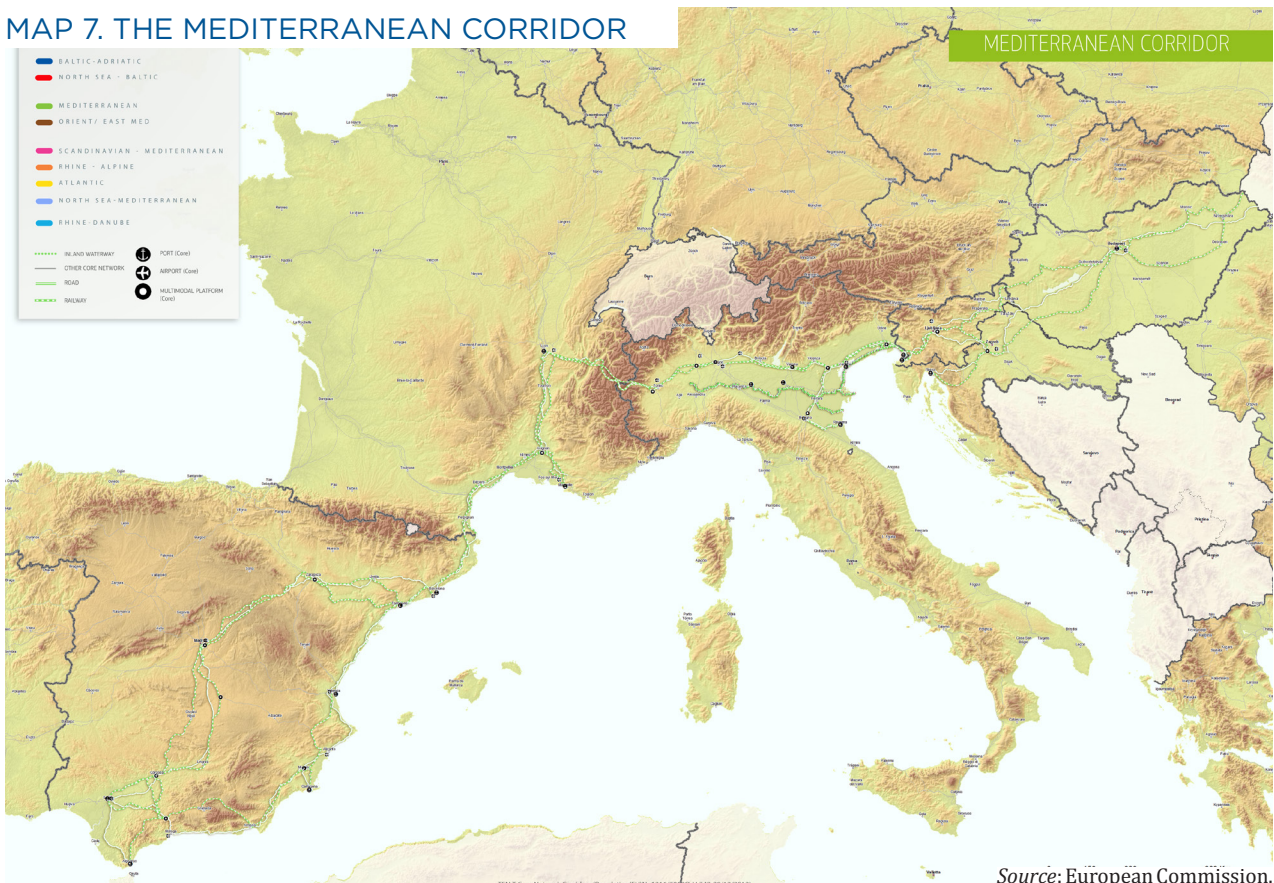
² European Commission, White Paper: Roadmap to a Single European Transport Area—Toward a Competitive and Resource Efficient Transport System (Brussels, March 23, 2011), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN>.

MAP 6. THE NORTH SEA-BALTIC CORRIDOR



Source: European Commission.

MAP 7. THE MEDITERRANEAN CORRIDOR



Source: European Commission.

cost of implementing the first financing phase for the core network for 2014-2020 will cost €250 billion. The core network is to be completed by 2030.

On February 26, 2014, the European Parliament adopted, in a first reading, amended rules for European railways—the so-called Fourth Railway Package. This latest railway proposal came twelve years after the first package of legislation, which was aimed at injecting competition into Europe's market, and creating seamless travel and cargo links across the then-twenty-five EU countries with railways (Malta and Cyprus do not have them).

In the wake of the white paper *Completing the Internal Market*, work began in the early 2000s on a series of legislative packages to create a common framework for an internal rail market. The packages introduced reforms to boost the competitiveness of European railways by means of gradual liberalization. The First Railway Package (2001) laid the foundation for the opening of freight services. The Second Railway Package (2004) aimed at improving interoperability, established the European Railway Agency, and set a common regulatory framework for rail safety. The Third Railway Package (2007) provided for the opening of international passenger transport. In 2012, the European Parliament (EP) and the Council recast the first package to simplify, consolidate, and reinforce existing provisions and establish a single European railway area.

The Fourth Railway Package comprises six legislative proposals, amending most of the existing EU directives and regulations in the railway sector, and focusing on three key areas. On domestic passenger markets and governance, the opening date was kept at 2019. On the subject of the governance model, the text retained strict financial conditions for vertically integrated companies (e.g., separate accounts between entities, no cross-subsidy) but left it to national regulators to define “organizational” conditions (e.g., preventing conflicts of loyalty via a waiting period before staff can move from one company to another).

In relation to the award of public-service contracts, the report adopted in committee maintains the possibility of attributing public contracts directly. However, public authorities have to justify their choices before the regulator. Member States would have until 2022 to phase in the new rule. To ensure that new entrants and smaller operators are able to fulfill public-service contracts, a minimum number of public-service contracts would be set for each Member State, based on the size of the national market. The EP mandate foresees one contract for very small countries (less than 20 million train kilometers), two to three for countries with between 20 and 200 million train/km, and four for countries with more than 200 million train/km. In sum, the European Parliament postponed the competitive tendering procedures for public-service contracts

until 2023, and made them subject to exceptions. The regulation authorizing Member States to pay financial compensation to certain companies was repealed. Under the technical pillar, the EP confirmed the recast of the regulations on interoperability, safety, and the new powers of the European Railway Agency. Gradually, over four years, the national-certification agencies should transfer their competence to the European Railway Agency (ERA), unless mutual recognition is established between certain Member States.

THE HISTORY OF THE BALTIC-ADRIATIC CORRIDOR—CURRENT AND FUTURE INVESTMENTS ALONG THE CORRIDOR WITH THE POTENTIAL TO INTERCONNECT CENTRAL EUROPE

Introduction of the Baltic-Adriatic Corridor

The Baltic-Adriatic Corridor, one of the most important north-south routes in Europe, crosses the Alps, and connects the Baltic Sea with the Adriatic. It runs through Poland, the Czech Republic, Slovakia, Austria, and Italy. The corridor also connects economic regions in three new member countries with economically important agglomerations in Austria and northern Italy. Consequently, it contributes to the European process of growing together. The corridor forms important hinterland connections from the Baltic and the Adriatic to the economic areas Warsaw, Upper Silesia, and Moravia, as well as northern Italy and east and southeast Austria.

In addition, it represents an important connection to other priority axes of the Trans-European Transport Network (TEN-T)—for example, at the Vienna junction with the TEN 17 axis Paris-Vienna-Bratislava. It is thus one of the most important trans-European railway axes, for both passenger and freight traffic. The expansion of the Baltic-Adriatic Corridor opens up significant developmental potential for passenger and freight transportation. Roughly 40 million people live in the agglomeration zone along the axis.

For this strategic reason, the European Commission plans to allocate funds totalling €26 billion for transport investments, especially in the field of railway infrastructure, in the period of 2014-2020,³ under the aegis of the new European Infrastructure Policy (EIP). Many of these funds will be spent on expansion and modernization of the Sixth Pan-European Transport Corridor, which forms a backbone of the TEN-T. The modern road infrastructure—creating good access to ports and logistic centers, as well as transport hubs and upgraded rail lines—is an investment that will provide

³ European Commission Directorate-General for Mobility and Transport, newsletter, October 18, 2013, http://ec.europa.eu/transport/newsletters/2013/10-18/newsletter-2013-10-18-print_en.htm.

economic independence and enhance the progress of civilization.⁴

The Baltic-Adriatic Corridor in its original course

- runs through nineteen regions in five EU Member States;
- connects more than 40 million inhabitants,
- links important intermodal nodes between the Baltic and North-Adriatic ports; and
- connects Europe to the booming markets in Asia.

The History of the Baltic-Adriatic Corridor—Cooperation within Central Europe

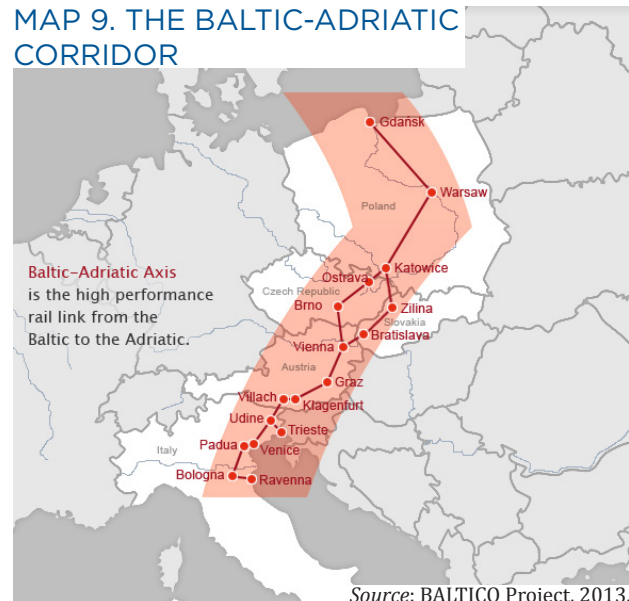
Over the past decade, twenty CEE regions along the Baltic-Adriatic Corridor have been intensifying their lobbying work in Brussels. Since 2007, the declaration on the immediate implementation of the Baltic-Adriatic Transport Axis was supported by representatives from fourteen regions spanning Austria, Italy, Poland, the Czech Republic, and Slovakia.

During the last decade, some road and rail sections along the Baltic-Adriatic-Corridor have been upgraded, renovated, or newly built in Poland, the Czech Republic, and Slovakia. In Austria, the efforts to eliminate bottlenecks or missing links have started, and some are nearly finished, including:

- the building of the new Vienna Central Station is expected to be finished by 2015. The station was already partly opened in 2012;
- work on the 30-km Koralm-Tunnel started in April 2011. This tunnel will provide the first direct rail link between Klagenfurt and Graz in Austria. Once it is operational in 2022, the travel time from Vienna to Klagenfurt will be shortened from four to 2.5 hours. The travel time between Warsaw and Klagenfurt will be reduced by more than three hours, from almost twelve hours now to less than nine hours in 2025;
- the preparatory work on the Semmering Base Tunnel (27.3 km, 230 km/h max) started in April 2012; and
- in Italy, the so-called Pontebbana line was already double tracked, electrified, and drastically improved in the 1990s.

The Baltic-Adriatic Corridor traverses major transport axes, thus providing efficient transport chains to other important economic regions in Europe. The TEN node of Vienna, as the intersection point of the TEN axes 17,

MAP 9. THE BALTIC-ADRIATIC CORRIDOR



18, and 22, continues to gain importance. Furthermore, the corridor provides numerous connection points to TEN axis 1 in Bologna, axis 6 in Venice, and axis 27 in Warsaw—as well as to the Pan-European corridors I in Gdansk-Warsaw, II in Warsaw, III in Katowice, IV in Bratislava, V in Vienna-Trieste, VII in Vienna-Bratislava, and X in Villach.

Priority projects defined by the European Commission are now developing connections for the Baltic-Adriatic Corridor (as well as the participating Central European Member States) to other corridors mentioned above. The rail and road networks include twenty-five of the thirty priority projects, including three multimodal projects. Ten out of these thirty projects are relevant for Central Europe, including seven rail projects, two for roads, and one for an inland waterway. These are priority projects numbers 1, 6, 7, 17, 18, 22, 23, 24, 25, and 27 (see table below).

Developments along the Baltic-Adriatic Corridor

The 2,400-km Baltic-Adriatic Corridor connects the Baltic ports (including Finnish, Estonian, and Latvian ports) toward Poland with the ports of the Adriatic Sea. The actual corridor starts at the ports of Gdansk and Gdynia, connecting to Trieste and Ravenna via strong economic centers like Warsaw, Vienna, and Venice. The corridor has branches from Szczecin to Katowice, from Graz via Udine to Trieste, and via Ljubljana to Trieste/Koper. The corridor will provide better access to Baltic and Adriatic seaports for the economic centers in Poland, the Czech Republic, Slovakia, and Austria. It encompasses the present priority projects 23 and 25 and rail freight corridor 5 (Gdansk-Ravenna).

The corridor forms important hinterland connections from the Baltic and the Adriatic to the economic areas Warsaw, Upper Silesia, and Moravia, east and southeast Austria (Vienna, Upper Styria, Graz, and Klagenfurt-

⁴ Pomorskie in the European Union Association, "The Baltic-Adriatic Transport Corridor in Poland," <http://www.pomorskie-eu.pl/en/the-baltic-adriatic-transport-corridor-in-poland,ps,51.html>.

Villach) as well as northern Italy. In addition, it represents an important connection to other priority axes of the Trans-European Transport Network (TEN-T), such as the junction Vienna with the TEN 17 axis Paris-Vienna-Bratislava. It is thus one of the most important trans-European railway axes for both passenger and freight traffic. In addition, the Baltic-Adriatic Corridor is of key importance for the development of urban areas. For example, Vienna, Bratislava, Budapest, and even Prague are going to benefit from the operation of the axis. Last, but not least, the full-length expansion of the Baltic-Adriatic Corridor offers an improved connection to the North Adriatic ports for Central Europe. In addition to the North Sea ports, this opens another door to the booming Asian markets via the Suez Canal.

Since early 2013, Member States along the corridor have submitted their tentative proposals on investment priorities along the Baltic-Adriatic Corridor. Annex I to the Connecting Europe Facility Regulation lists preidentified projects along the nine TEN-T Core Network Corridors. These preidentified projects have been agreed upon by the European Commission, the Member States, and the European Parliament. The list of preidentified projects needs to be seen as an eligibility list for CEF funding, but it does not mean that every preidentified project will actually be funded by the CEF.⁵

With regard to transport modes, the following investment priorities are defined and—upon the availability of financial resources—planned along the corridor:

- Inland waterways (IWW);
- Maritime ports to be connected to TEN-T rail and road by 2030: Gdańsk (PL), Gdynia (PL), Szczecin (PL), Świnoujście (PL), Venezia (I), Bologna (I), Trieste (I), Koper (SL);
- Inland core network ports: Szczecin (PL), Świnoujście (PL), Bratislava (SK), Vienna (A), Ravenna (I);
- Urban nodes, including their ports and airports: Gdańsk (PL), Szczecin (PL), Warszawa (PL), Łódź (PL), Poznań (PL), Katowice (PL), Kraków (PL), Wrocław (PL), Ostrava (CZ), Bratislava (SK), Vienna (A), Ljubljana (SL), Venezia (I), and Bologna (I);
- Railroad terminals in core network: Gdańsk (PL), Szczecin (PL), Szczecin/Świnoujście (PL), Warsaw (PL), Łódź (PL), Poznań (PL), Katowice (PL), Kraków (PL), Wrocław (PL), Ostrava (CZ), Prerov (CZ), Brno (CZ), Bratislava (SK), Vienna (A), Graz (Werndorf) (A), Ljubljana (SL), Cervignano (I), Venezia (I), Padova (I), and Bologna (I); and
- Airports to be connected to TEN-T rail and road by 2050: Warsaw Okęcie (PL) and Vienna (A).

⁵ Discussion with the European Commission, DG MOVE Unit B4—Connecting Europe.

RESOURCE ALLOCATION AND FUNDS FOR DEVELOPMENTS—THE EFFICIENT USE OF THE EUROPEAN STRUCTURAL AND INVESTMENT FUNDS (ESIF) IN THE PARTICIPATING COUNTRIES

Transport Corridors in the Multiannual Financial Framework

Listed infrastructure-development plans, as well as running projects along the Baltic-Adriatic Corridor, require a considerable amount of resources. For this purpose, the European Commission has allocated two funding buckets in support of Member States and stakeholders. These are the European Structural and Investment Funds (ESIF) and the Connecting Europe Facility (CEF).

The financial assistance from ESIF could become a stimulus similar to the Marshall Plan for Western Europe after World War II. The total budget for the cohesion policy 2014-2020, which is implemented by the ESIF, was already fixed in December 2013. That 2014-2020 budget reaches €351.9 billion in current prices and is 1.3 percent higher than the budget for 2007-2013. CEE-6 (Croatia, the Czech Republic, Hungary, Poland, Romania, and Slovakia) would get about €167.1 billion, about half the total funds earmarked. Compared with the 2007-2013 period, that is 11 percent more. In the best-case scenario, the effective utilization of this huge amount of money will raise the economic and social potential of CEE countries, and the difference between the Western and Central EU Member States will slowly come closer to the end.

Currently, Member States are in the process of signing partnership agreements (PA) with the European Commission on the use of the ESIF. These agreements cover the period of 2014-2020, and apply to the European Regional Development Fund (ERDF), the Cohesion Fund (CF), the European Social Fund (ESF), the European Agricultural Fund for Rural Development (EAFRD), and the European Maritime and Fisheries Fund (EMFF). Until now, the European Commission has adopted the partnership agreements with Germany (adopted May 22, 2014), Poland (adopted May 23, 2014), Greece, and Denmark. With regard to the Baltic-Adriatic Corridor, the chart below shows the allocation of the ESIF is foreseen for the CEE countries, including Baltic countries within the Rail Baltica section.

The CEF-T provides additional resources for transport-infrastructure improvements. With a total of €26.250 billion for the financial period 2014–2020, this triples the financing currently available, while at the same time focusing on transport financing on a tightly defined new core network. Overall, the CEF is to finance EU priority infrastructure in transport, energy, and digital broadband. The facility supports key infrastructure

to underpin the single market. It has a single fund of €33.242 billion for the period 2014-2020,⁶ including €26.250 billion allocated to transport. Out of that, €11.305 billion is ringfenced for related transport-infrastructure investments in the Member States eligible under the Cohesion Fund.

CEF provides supplementary resources to projects being implemented under the ESIF. Overall, the EU contribution to a major transport-infrastructure development is normally around 20 percent of the investment costs for any seven-year budget period. Support for studies and construction work in the case of cross-border projects can be up to 40 percent, and for individual studies can be as much as 50 percent. The rest comes from Member States, regional authorities, or possibly private investors. For the €11.3 billion or more ringfenced for Member States eligible under the Cohesion Fund, the co-funding can go up to a maximum of 85 percent.

The commitment to transport-infrastructure modernization shows a diverse picture among the EU-11 countries:

- Poland has the greatest budget allocated among the EU-28. For instance, according to the PA, it aims to invest a substantial share of ESF in upgrading the railway sector, with the aim of ensuring a real shift to sustainable mobility. Among sources, a total sum of €8.96 billion from the ERDF and a total sum of €14.83 billion from the Cohesion Funds have been allocated for this priority.⁷
- The total allocation from EU structural and investment funds in 2014-2020 for the Czech Republic is €22 billion, which amounts to €299

per capita annually, and 2.1 percent of GDP. The biggest share of subsidies from European structural and investment funds in 2014-2020 should go to infrastructure projects, mainly in the area of transport, where almost 30 percent of the allocation is earmarked.

- The total ESIF allocation in 2014-2020 for Slovakia is €14 billion. Annually, that means €369 per capita and 2.8 percent of GDP. Infrastructure will be the main priority for 2014-2020, as the highway network is still far from complete. This is perceived as a major obstacle to attracting foreign investors to the eastern part of the country. Hence, as much as 26 percent of the total EU funds allocated for Slovakia will be used for infrastructure projects.
- Austria, with the total of €1.32 billion allocated from the ESIF, will further support the already-started Alpine-crossing projects until 2020.
- Italy will allocate a great share of the available €32.82 billion to develop more seamless transport connections with Austria and the neighboring countries.

RISK ASSESSMENT OF PREIDENTIFIED PROJECTS

Risk Assessment

With 24 million tons of freight per year, the Baltic-Adriatic Corridor is among the most important cross-Alpine lines in Europe. This is almost the same amount as the Gotthard Line in Switzerland (with 26 million tons). This high-capacity railway connection from the Baltic Sea to the Adriatic is therefore a necessary precondition for further economic development along the corridor.

A continuous, high-capacity railway connection means enormous potential for the development of passenger traffic. Numerous conurbations are located along the Baltic-Adriatic Corridor. In addition, the people living in areas with comparatively poor infrastructure will

⁶ European Commission, "Multiannual Financial Framework 2014-2020," <http://bookshop.europa.eu/en/multiannual-financial-framework-2014-2020-and-eu-budget-2014-pbKV0413055/?CatalogCategoryID=mpgKABstFogAAAEjblUY4e5K>.

⁷ European Commission Directorate-General for Regional Policy, "Summary of the Partnership Agreement for Poland," http://ec.europa.eu/contracts_grants/pa/poland-summary_en.pdf.

TABLE 11. PROJECTS ENABLING ACCESS TO FURTHER TRANSPORT CORRIDORS ALONG THE BALTIC-ADRIATIC CORRIDOR

Priority Project	Network	Description
1	Rail	Railway axis Berlin-Verona/Milano-Bologna-Napoli-Messina-Palermo
6	Rail	Railway axis Lyon-Trieste-Divaca/Koper-Divaca-Ljubljana-Budapest-Ukrainian border
7	Road	Motorway axis Igoumenitsa/Patra-Athina-Sofia-Budapest
17	Rail	Railway axis Paris-Strasbourg-Stuttgart-Vienna-Bratislava
18	Inland Waterway	Waterway Axis Rhine / Meuse-Main-Danube
22	Rail	Railway axis Athina-Sofia-Budapest-Vienna-Praha-Nurnberg/Dresden
23	Rail	Railway axis Gdansk-Warsaw-Brno/Bratislava-Vienna
24	Rail	Railway axis Lyon/Genova-Basel-Duisburg-Rotterdam/Antwerpen
25	Road	Motorway axis Gdansk-Brno/Bratislava-Vienna
27	Rail	"Rail Baltica" axis: Warsaw-Kaunas-Riga-Tallinn-Helsinki

TABLE 12. PREIDENTIFIED INFRASTRUCTURAL IMPROVEMENTS ALONG THE BALTIC-ADRIATIC CORRIDOR

Transport section	Transport mode	Scope of investment
Gdynia-Katowice	Rail	Works
Gdynia,Gdańsk	Port	Port interconnections, (further) development of multimodal platforms
Warsaw-Katowice	Rail	Works
Wrocław-Poznań-Szczecin/ Świnoujście	Rail	Works
Świnoujście, Szczecin	Port	Port interconnections
Bielsko Biala-Žilina	Road	Works
Katowice-Ostrava-Brno-Vienna and Katowice-Žilina-Bratislava-Vienna	Rail	Works, in particular cross-border sections PL-CZ, CZ-AT, PL-SK, and SK-AT, Brno-Přerov line; (further) development of multimodal platforms and airport-rail interconnections
Vienna-Graz-Klagenfurt-Udine-Venezia-Ravenna	Rail	Partial construction of new lines (Semmering Base Tunnel and Koralm Railway line), rail upgrading; works ongoing; (further) development of multimodal platforms; upgrading of existing two-track line between Udine-Cervignano and Trieste
Graz-Maribor-Pragersko	Rail	Studies and works for second track
Trieste, Venice, Ravenna, Koper	Port	Port interconnections, (further) development of multimodal platforms
The Historic Semmering railway—the very first mountain railway in Europe, opened 1854—which will be replaced by the new Semmering base tunnel by 2024.*		

*Austria will invest up to €10 billion to improve the capacities along the Südbahn, including €5.3 billion for Koralm-Railway and 3.3 billion for the Semmering Base Tunnel.

Source: European Commission, Directorate-General for Mobility and Transport (DG MOVE) TEN-T Country Fiches (extracted from Germany, Poland, the Czech Republic, Hungary, Slovakia, Slovenia, Italy, Croatia fact sheets).

gain improved access to the railway system, which will also ensure fast connections from landlocked Central European countries to the Baltic Sea and the Adriatic ports. After its completion, the corridor will represent an excellent opportunity to relieve the heavily frequented north-south connections from the ports in the north of Europe.

Structural Barriers (Corridor Sections)

The planned developments along the corridor aim to address existing transport infrastructure anomalies such as

- along the Baltic-Adriatic Corridor, further cross-border sections should be improved, as will the Semmering and Koralm tunnels in Austria for the Alpine crossing;
- regarding rail freight, several sections should be improved, including the Gdynia–Katowice–Ostrava/Žilina–Bratislava/Vienna/Klagenfurt–Udine–Venice/Trieste/Bologna/Ravenna/Graz-Maribor-Ljubljana-Koper/Trieste sections. The deadline for making the corridor operational is November 10, 2015;⁸
- the multimodal cross-border connections between Vienna, Bratislava, Ostrava, and Katowice need upgrading;

- traffic-management systems must be developed along the corridor; and multimodal connections with the ports should also be developed; and
- furthermore, there are no actual plans for the extension of the Baltic-Adriatic Corridor in Slovenia and Italy to the ERTMS corridor D and toward Hungary.

Interoperability Barriers (Standardization)

The technical condition of the rail infrastructure is not currently sufficient, which means the Baltic-Adriatic Corridor also needs improvements in integration and interoperability. Disparities between access charges for rail infrastructure and costs of rail transport along the whole corridor should be overcome.

High-quality road and rail systems, which can be further extended, offer efficient, extensive regional connections. Shifting the corridor's transport away from roads and toward environmentally friendly modes of transport, such as railways, is vital for economic development and growth. There is also still a need to improve intermodal services, and this tendency is visible throughout the European transport system. Customers value on-time delivery and facilities for doing business. Proper development of interoperability can fulfill the requirements of stakeholders, while innovation in transport-system solutions and services can improve the competitiveness of the Baltic-Adriatic Corridor within the EU transport system. Interoperability barriers along the corridor (such as gauge standards)

⁸ RailNet Europe, European Rail Freight Corridors Conference 2012, <http://www.rne.eu/rne-news/items/european-rail-freight-corridors-conference-2012.html>.

TABLE 13. ALLOCATION OF THE EUROPEAN STRUCTURAL AND INVESTMENT FUND (ESIF) TO CENTRAL EUROPEAN AND BALTIC COUNTRIES

EU Member State	Allocation (bn eur)	Involvement in the corridor
Austria	1.235,6	Direct
Croatia	8.609,4	Indirect
Czech Republic	21.982,9	Direct
Estonia	3.590	Supplementary through Rail Baltica
Finland	1.465,8	Supplementary through Rail Baltica
Hungary	21.905,9	Indirect (possibility to interconnect existing infrastructure with the Baltic-Adriatic Corridor)
Italy	32.823	Direct
Latvia	4.511,8	Supplementary through Rail Baltica
Poland	77.567	Direct
Slovakia	13.991,7	Direct
Slovenia	3.074,8	Indirect (possibility to interconnect existing infrastructure with the Baltic-Adriatic Corridor)

Source: Schuman Associates, *2014-2020 Playbook, Early Intelligence and Strategic Positioning to Create Business for the Next Financing Period* (2014).

have an overall impact on the planned investments. For example, there are still different electrifications within the CEE countries—namely the three-kilovolt direct current (kV DC) in Poland and Italy, 3kV DC/25 kV 50 hertz (Hz) in the Czech Republic and Slovakia, and 15 kV 16 2/3 Hz in Austria. This same issue is seen in the different standards for train length and axle loads. Further barriers have been identified along the Rail Baltica section, due to the geographical proximity to and interconnections with the Russian Federation, and the break of gauge between the standard European gauge and the broad gauge, with the two meeting in southern Lithuania.

Currently, rail with the European standard gauge (1435 mm) enters Lithuania from across the Polish border and continues to Moscow for 22 km. It is then joined by the broad gauge (1,520 mm), and there is a dual-gauge system between Moscow and Sestokai (at 32 km) on the same track bed. Thus, there are currently two entry points to the European gauge—Moscow and Sestokai. Most of the present freight traffic is timber, which is reloaded from one track gauge to the other at Sestokai. This parallel tracking is a slow and inefficient method of changing gauge.

Infrastructure deficiencies in road, rail, and inland-waterway transport should be addressed in order to improve development of cargo flows along the Baltic-Adriatic Corridor. A crucial factor for regional and national economic growth is better accessibility of the axis. Sustainable development of transport systems along the Baltic-Adriatic Corridor may reduce bottlenecks and create added value for all the involved entities.

Model Integration

Exploiting the multimodal dimension will require further development of efficient, interoperable, multimodal centers along the corridor. This means both railroad terminals and inland-waterways ports should be able to attract private operators and generate additional demand.

FINANCIAL RESOURCES AND AVAILABILITY (FUNDED SECTIONS AND COFINANCING RATES) IN THE EU

Limitations of the CEF

The lists of preidentified projects need to be seen as an eligibility list for CEF funding but that does not mean that every preidentified project will actually be funded by the CEF. It should also be noted that these preidentified projects are not exact descriptions. For example, the list identifies a railway line between several cities along the corridor, while an actual project to be submitted for CEF funding can only be a short section of that preidentified railway line. Therefore, even if the project is listed in the Annex I to the CEF Regulation, it does not mean that this project will actually be implemented, and that it will be implemented in the full scope as listed in the annex. It is up to the Member States, their ministries, and the project promoters (such as railway-infrastructure managers or port operators) to decide on the scope of the project to be submitted. This also means that there is currently no information on the indicative budget of the projects, nor on the milestones. The Member States and the project promoters are responsible for indicating the exact budget of these projects, for setting the realistic milestones, and for carrying out relevant

environmental-impact assessments and cost-benefit analyses.

With regard to the cofinancing rates available, different rates are being applied based on project type and transport mode. Projects will be partly financed by the ESIF and the CEF. The different types of funding, combining funding at the EU and regional levels, would significantly increase the administrative burdens of the given projects (such as reporting and observing public-procurement regulations). Combining EU funds with public-private partnerships (PPPs) is a complex task, for which multiple requirements must be met at the same time. Due to market requirements and the Europe 2020 environmental and climate-change mitigations, the EU is currently seeking easier and more efficient ways of project financing. The main challenges in achieving this goal through blending EU funds with PPPs seem to reflect:

- appropriate use of EU funds in EU-PPP-blended projects, which means using EU funding only to the scope for which it was made available;
- getting the PPPs right, which can also be read as putting more emphasis on a project's quality;
- taxation issues, such as value-added tax (VAT) causing an additional cost, but only on the private-sector side;
- improving the public-sector capacity to enter PPP deals;
- timing issues in grant-application procedures; and
- adjustment in terms of national procurement approaches to reflect the difficulties of securing fully committed funding at the bid stage.

Long-Term Strategic Financing Challenges

Due to the limitations of the CEF, alternative funding streams have been created by the European Investment Bank (EIB) and the European Bank of Reconstruction and Development (EBRD) in order to support the modernization of the entire TEN-T network, including the Baltic-Adriatic Corridor. These new instruments and financing packages provide additional resources to the improvement of the nonselected transport stretches as well.

The 2009 green paper entitled *A Policy Review—Toward a Better Integrated Trans-European Transport network at the service of the Common Transport Policy*, recognized that there has been a lack of progress in certain areas.⁹ These areas cover the bottlenecks in project preparation and in the adoption of policies and

programs. This includes lengthy processes of obtaining planning and other consents and, at times, revisions due to poor economic profitability linked to high project costs and/or insufficient demand. It also highlights that an additional hurdle to overcome is insufficient finance, from both public and private sources—most notably a lack of access to appropriate long-term finance. The lack of access to finance has been due, in significant part, to public-sector budget constraints, which in recent years has led to increasing utilization of alternative, private-sector sources and risk-sharing finance instruments to complement public finance. In the current economic and financial context, however, the aggravation of public-finance constraints cannot be easily compensated by an additional flow of private finance. While the public sector is likely to continue financing most TEN-T investments directly, the urgent strategic need to increase public spending to help the economy overall has limited the growth of resources in national budgets that are available for TEN projects.

EIB Support for TEN-T Investments with Standard and Specialized Loans/ Instruments as well as Equity

The EIB has followed a long-term strategy in collaboration with the Commission, national authorities, and financial institutions, as well as public and private investors. This has resulted in EIB financing for TENs Transport and Energy growing from €7.9 billion in 2004 to €12.8 billion in 2008, totaling €46.5 billion in this five-year period. These results reflect the merits of individual projects appraised on a case-by-case basis within the overall TENs policy framework. In the period of 2014-2020, there is the Project Bond initiative, a joint initiative by the European Commission and the EIB. Stimulating capital market financing for large-scale infrastructure projects in the sectors of transport (TEN-T) is one pillar of the package. The Project Bond initiative is designed to enable promoters of eligible infrastructure projects, usually PPPs, to attract additional private finance from institutional investors, such as insurance companies and pension funds. This testing phase is funded by €230 million of EU budgetary resources from unused budget lines for existing programs. This should enable the EIB to provide financing worth more than €4 billion across the three sectors—energy, ICT, and transport. The bank selects and appraises projects according to its own standards, then structures and prices the credit enhancement instrument for the selected project, and carries out the monitoring—although it will not act as a credit controller. Subsequent decision-making for projects will be formulated on a case-by-case basis by the parties involved.

As part of its overall strategy for financing TENs, the EIB is also considering the utilization of instruments providing improved leverage on the use of EIB, as well as the resources of risk-sharing partners. Such

⁹ Commission of the European Communities, *Toward a Better Integrated Trans-European Transport Network at the Service of the Common Transport Policy* (Brussels, March 4, 2009), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52009DC0044&from=EN>.

TABLE 14. PROJECTS FINANCED BY THE EUROPEAN INVESTMENT BANK ALONG THE BALTIC-ADRIATIC CORRIDOR

Country	Status	Stretches	Total Costs and Approved EIB Financing	Start
Poland	Approved	Construction of several sections of the Warsaw-Lublin stretch of the S17 and S12 expressways.	Total cost: €4.223 billion EIB financing: €415 million	2007
Austria	Under appraisal	The project concerns investments to rehabilitate and upgrade the existing railway infrastructure in Austria. The works are located throughout the railway network. The rehabilitation works will include railway stations, bridges, railway junctions, energy installations, tracks, buildings, and signaling and telecommunication installations.	Total cost: €1.5 billion EIB financing: €600 million	2014
Poland	Under appraisal	The project has three components: (i) rehabilitation of about 415 km of mainline track, (ii) modernization of about 420 level crossings; and (iii) a nationwide passenger information system. The project will be located, in part, on the recently adopted TEN-T rail network (Regulation 1315/2013). The project will increase the quality of rail services provided in Poland, as well as promote travel by rail. The project will thereby enhance sustainable transport in line with EU objectives. The project is also located in a convergence zone and, by facilitating access, promotes regional development.	Total cost: €841 million EIB financing: €175 million	2014
Poland	Under appraisal	The project consists of the modernization of 58 km of an existing dual electrified railway line in the Silesian and Malopolskie regions between Sosnowiec Jezor and Krakow Mydiniiki in southern Poland. The project will be located on the TEN-T comprehensive network, according to the proposed revision of the TEN-T guidelines. The project will increase the quality of rail services provided in Poland, as well as promote longer-distance travel by rail by improving interoperability between Member States. The project will thereby enhance sustainable transport in line with EU objectives. The project is also located in a convergence zone and, by facilitating access, promotes regional development. The project is therefore eligible under Article 309 point (a) projects to develop less developed regions as well as point (c) common interest. The project is expected to be cofunded under the 2007-2013 Operational Program Infrastructure and Environment. JASPERS is supporting the preparation of the application to the OPIE. The project's compliance with the Lending Policy for Transport (Decision CA/452/11) is to be confirmed during appraisal.	Total cost: €413 million EIB financing: €268 million	2014

Source: European Investment Bank.

instruments are considered important as a response—not only in the short term but also for the longer-term development of the market.

Funding from the European Bank of Reconstruction and Development

Along the Baltic-Adriatic Corridor, port integration is the core area of investment. For example, EBRD has supported investments in infrastructure to increase container-handling capacity of the Klaipeda Port. The EBRD has already identified many reasons to provide physical networks and services to the transport sector, such as its ability to increase the access of businesses and consumers to markets and promote regional integration.¹⁰

ECONOMIC, SOCIAL, AND ENVIRONMENTAL IMPACT ON THE PARTICIPATING COUNTRIES AND BEYOND

Calculated results based on these scenarios show that the overall transport volume in the European Union will increase by up to 60 percent upon the completion of the TEN-T core network in 2030. Therefore, the improvement of railway infrastructure—and particularly, the removal of infrastructure bottlenecks—is not only essential but a precondition for maintaining the present share on the modal split of railway freight transport. This means, vice versa, that the share on the modal split of road transport will significantly increase until 2030.

A high-performance rail connection from the Baltic Sea to the Adriatic is a necessary precondition for sustainable economic development in the regions along the Baltic-Adriatic Corridor. By transferring

¹⁰ European Bank for Reconstruction and Development, *Transport Sector Strategy* (2013), <http://www.ebrd.com/downloads/sector/transport/transport-strategy.pdf>.

TABLE 15. RESULTS OF THE NATIONAL ECONOMIC STIMULATION—OPERATIONAL PHASE, 2025-2055

Variable	Unit	Value
Additional GDP (EU)	Present value at start of 2010, billion euros	11.3
Additional employment (EU)	Quantity	46,000
Multiplicator (EU)		1.87
Fiscal degree	in percent	28

Source: Thompson Reuters Datastream, IHS calculations. Assumptions: variable; other values are present values at a real interest rate of 2.5 percent; costs correspond to present value of costs of construction, including reinvestment, and other values at a real interest rate of 3.56 percent; and the financing degree is calculated by dividing fiscal returns and the costs of construction, including reinvestment and other values.

freight-transport flows from road transport to the more environmentally friendly rail transport, the Baltic-Adriatic Corridor provides an important contribution to achieving the green-transport climate goals laid down in international agreements.

Regarding the rail sector, the EU regions along the Baltic-Adriatic Corridor, an additional added value of about €5.8 billion and 31,000 new workplaces are being created. (The total rises to 46,000 new workplaces if Austria is included.) The main point of this positive effect is the connection of the growing industrial regions in Poland, and in the Baltic region, with the traditionally strong economic region of northern Italy. Networking these economic regions, which have historically been separated, will intensify the trade and service flows within the EU.

Preliminary assessments of the economic (mainly macroeconomic) impact of the Baltic-Adriatic Corridor are based on the fundamental assumption that an improvement in traffic infrastructure will lead to a reduction in transport costs, thus stimulating trade between regions (or entire economies). Figures are the following for the involved Member States:

Environmental Impact

The expected increase in road transport, mainly due to the use of trucks, will have significant impacts on the environment and human beings, as this increase goes hand in hand with increases in air pollution (e.g., CO₂, PM₁₀, NO_x) and noise load. Additionally, due to the simple fact that increased road transport means more trucks on the roads, road safety is also expected to be negatively influenced, resulting in more road accidents. This could be avoided by putting greater attention on inland waterways.

In order to increase the share of these transport volumes that apply to environmentally friendly railway, it is of utmost importance that the improvement of railway infrastructure be accompanied by policy measures (road pricing, night driving prohibitions for trucks, etc.) and an increase in the interoperability of the European railway system. In addition, railway operators need to be conscious of the fact that, in order to reach a change in transport behavior and modal choice—for both

passenger and freight transport—the railway needs to become more flexible. This is still far behind road transport by trucks, while new and innovative services have to be developed and implemented. In this way, costs for climate and pollutants of €49 million can be saved by shifting transportation from road to railway. The accident follow-up costs would also be reduced, by €594 million.¹¹ Due to the decrease in generalized traffic costs, it can be assumed that the commissioning of the Baltic-Adriatic Corridor and the associated upgrading of regional site quality is going to benefit the efficiency of resource allocation in the European economy, leading to an increased exchange of goods and services between the regions. Regarding the external costs of transportation (including freight and passenger transport) for the Baltic-Adriatic Corridor, the methodology developed by CE Delft has been applied, which is available for the rail-transport sector.

The travelling time represents a cost factor to be considered when calculating the production costs of a train; the upgrading of the railway lines will reduce both time and costs. The travelling time of a freight-block train running from Gdansk (PL) to Bologna (IT) could be reduced from twenty-eight hours to eighteen hours (not counting waiting times in stations and time for handling in terminals). The production costs for a train ride of a freight-block train running on the Baltic-Adriatic Corridor could be reduced from about approximately €48,000 today by between €3,000 and €4,600.¹²

In freight transport, the logistic terminals, including the ports, are crucial for the shift of transport volumes from road to rail. The Baltic-Adriatic Corridor already provides a well-developed network of logistics centers. The North Adriatic Ports Association (NAPA)—comprising the ports of Venice and Trieste in Italy, the Slovenian port of Koper, and the port of Rijeka in Croatia—represents one of the most important key players for leading transport volumes from the near and far east via the Adriatic Sea to Central Europe. In

¹¹ Sums have been calculated by the CE Delft (ed.), *Handbook on Estimation of External Costs in the Transport Sector*, produced within the study *Internalisation Measures and Policies for All External Cost of Transport (IMPACT)*, version 1.1, (2008), http://ec.europa.eu/transport/themes/sustainable/doc/2008_costs_handbook.pdf.
¹² Based on the BATCO Trans-Tool Model Calculations (2013).

TABLE 16. PRICE ESTIMATES FOR POLLUTION COSTS AND CLIMATE COSTS IN EUROS PER TRAIN KILOMETER, ACCORDING TO CE DELFT

Price estimates according to Delft manual	Costs in euros per train km for “air pollution” at 2010 prices	Costs in euros per train km for “climate change” at 2010 prices
Passenger transport	0.092	0.206
Freight transport	0.137	0.307

Source: CE Delft (ed.), *Handbook on Estimation of External Costs in the Transport Sector*, produced within the study Internalisation Measures and Policies for All External Cost of Transport (IMPACT), (2008), pp. 59 and 86.

order to compete with the Northern European ports (Rotterdam, Hamburg, Bremerhaven, etc.), the NAPA ports need to be upgraded, particularly to meet the requirements of the modern high-sea carriers, and to increase loading and storage capacity. Strengthening the ports in the south of Europe will result in a reduction of the maritime transport route from the Far East via Suez to Europe, saving almost five days. This cuts travel by about 10 percent, significantly reducing the environmental impact by saving approximately 140 kilograms of carbon dioxide per ton of freight shipped.

CONCLUSIONS AND RECOMMENDATIONS

Strengthening efficient transport links enabling better access from west to east and from north to south in Europe is a prerequisite to continued growth and development of the Central European region and the European Union. The North-South Corridor crosses 7 of the 10 Pan-European corridors and 6 of the 30 priority TEN-T axes that further supports the seamless connectivity opportunities of Central European regions, creating a backbone of the transport infrastructure.

In order to accelerate the completion of the Baltic-Adriatic Transportation Corridor, the North Sea-Baltic Corridor and the Orient-East Med Corridor, the following projects should be prioritized:

- As a precondition for economic development and growth, upgrading intermodal transport connections—particularly accelerating the implementation of high capacity railway connections along the axis (“green transports”)—is of critical importance to create seamless cross-border connections in Central Europe. A high-performance rail connection from west to east and north to south is a necessary precondition for sustainable economic development and cohesion in the regions along the North-South Corridor that has positive economic spill-over impacts over further regions along the interconnection stretches as well:
 - o Priority 1: Grodzisk Mazowiecki-Zawiercie-Warsaw-Katowice (PL), Gdynia-Katowice (PL), Warsaw-Katowice (PL), Wrocław-Poznań-Szczecin/ Świnoujście (PL) intersections; modernization of the railway E 65/CE 65; continued modernization international routes CE/E 30, CE/E 20, E 59; modernization of critical sections of corridors for freight CE 59 and CE 65;
 - o Priority 2: completing the Bratislava-Zilina double-track railway section Trenčianska Teplá-Ilava-Beľuša, as part of the TEN-T Priority Project No 23 (Gdansk-Brno/Žilina-Bratislava-Vienna);
 - o Priority 3: improving the Baltic countries’ multimodal port interconnections (Helsinki, Tallin, Riga and port integration of Ventspils, Klaipeda ports into the railway network) and freight volumes with Europe by strengthening intermodal solutions and enhancing the standardization process of gauge toward new, fully interoperable UIC gauge lines. Priority Project No 27 of the Trans-European railway Rail Baltica, linking Helsinki-Tallinn-Riga-Kaunas-Warsaw provides possibility to shift the major freight transport in the regions from road to rail, which for the time being is transported toward Russia and then north by heavy trucks. The Helsinki-Tallin and Tallin-Riga-Kanus-Warsaw intersections shall be completed by 2020 to unlock the mismatch of gauge between the standard European gauge (1,435 mm) and the broad gauge (1,520 mm), which meet in southern Lithuania and continues in Russia.
 - o Priority 4: completion of the Central European intersections of the North-South Corridor running from Vienna-Graz-Klagenfurt (including the Koralm line) to Udine-Venice-Ravenna.
 - o Priority 5: connecting the landlocked “Visegrad capitals” along the North-South Corridor to multimodal ports of Romania and Bulgaria along the Ostrava/Prerov-Žilina-Košice-UA border, Vienna-Bratislava/Vienna-Budapest-Arad-Braşov-Bucureşti-Constanta routes.
 - o Priority 6: the five North-Adriatic ports have a deep impact upon Central European economies, providing the cheapest naval route from the Far East via Suez to Europe with a

distance that is about 2,000 nautical miles shorter than the route to Northern European ports. Due to huge variety of logistic services and the extensive traffic network, these ports form a perfect multimodal gateway to the key European markets. These five ports will form a European logistics platform, servicing

the markets of the Far East as well as Central Europe.

Total costs for the North-South Corridor's critically important transportation projects along the Baltic-Adriatic, the North Sea-Baltic, and the Orient-East Med Transportation Corridors amount to €19.73 billion, as outlined in table 17.

TABLE 17. SUMMARY TABLE OF TRANSPORTATION PROJECTS TO BE PRIORITIZED ALONG THE NORTH-SOUTH CORRIDOR

Objective	Project	Nr.	Tentative budget	Status (planned / in progress)
Upgrading of intermodal transport connections - particularly— in particular, accelerating the implementation of high capacity railway connections along the axis (“green transports”) preferably in Central and Eastern European regions.	a) Grodzisk Mazowiecki-Zawiercie-Warsaw - Katowice (PL),	Priority Project number 23	€ 4.45 billion	in progress
	b) Gdynia-Katowice (PL),			
c) Warsaw-Katowice (PL),				
d) Wrocław-Poznań-Szczecin/Świnoujście (PL) intersections - modernization of the railway E 65/CE 65, the continued modernization international routes CE/E 30, CE/E 20, E 59 and the modernization of critical sections of corridors for freight CE 59 and CE 65 to create seamless cross-border connections Central and Eastern European countries.				
	Bratislava-Zilina (double-track railway section Trenčianska Teplá-Ilava- Beluša), being part of the TEN-T railway network.	Part of the Priority Project No 23 (Gdansk-Brno/Žilina-Bratislava-Vienna) which belongs to one of the priorities in the long-term development program of Slovak railway infrastructure.	€600 million	planned
Improving the Baltic countries' multimodal port interconnections (Helsinki, Tallin, Riga, and port integration with Europe.	Helsinki-Tallin and Tallin-Riga-Kanaus-Warsaw intersections to unlock the mismatch of gauge between the standard European gauge (14351,435 mm) and the broad gauge (15201,520 mm).	Priority Project number 27	€2.59 billion	in progress since 2007
Strengthen efficient transport links of Central and Eastern European landlocked countries to further transport intersections along further corridors.	Completing the Central European intersections of the North- South Corridor running from Vienna-Graz-Klagenfurt (including the Koralm line) to Udine-Venice-Ravenna.	Priority Project number 23 and 25	€11.59 billion	under negotiation
	Connecting the landlocked “Visegrádian capitals” along the North-South Corridor to multimodal ports of Romania and Bulgaria along the Ostrava/Prerov- Žilina-Košice- UA border, Vienna- Bratislava/ Vienna-Budapest- Arad-Braşov- Bucarest-Constanta routes.	N/A	€500 million	planned
TOTAL			€19.73 billion	

3. THE TELECOMMUNICATIONS DIMENSION

STATE OF INTERCONNECTIONS IN THE TELECOM SECTOR

The development of the telecommunications dimension of the North-South Corridor in Central Europe is often overlooked, and its significance is underestimated. Digital services underpin all sectors of the economy, from health and financial services to e-government. Their development can create jobs, boost innovation, and increase the competitiveness of localities, regions, states, and the EU as a whole. As with energy and gas, the expansion of the telecommunications sector depends on connectivity. However, in telecom, national connectivity issues have to be sorted out first, with cross-border connection a secondary problem. This must be kept in mind, when looking at the telecommunication dimension of the corridors. Nevertheless, blockage in the development of national and cross-border services and infrastructure results in consumers lagging behind in competition, and innovation across business sectors also lags.

Though telecommunication infrastructure is fundamentally different from that in the energy and transportation sectors, Member States along the North-South Corridor have various connectivity problems and generally lag in digital literacy. In Europe, digital illiteracy is still an issue, but it is most serious in the eastern part of the continent.

The Digital Weakness of the Countries along the North-South Corridor

Most of Central Europe is still below the EU average in terms of households with Internet access.¹ In this region, fixed broadband takeup has notoriously been

1 EU average: 78.6 percent, while all Eastern European Member States, except for Estonia, are below this average. Hungary, Latvia, and Czech Republic have higher indicators. European Commission, *Digital Agenda Scoreboard 2013* (Brussels, June 12 2013), <http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/DAE%20SCOREBOARD%202013%20-%20SWD%202013%20217%20FINAL.pdf>. In addition, for a partial update, see European Commission, "Scoreboard 2014—Digital Inclusion in the EU 2014," <http://ec.europa.eu/digital-agenda/en/news/scoreboard-2014-digital-inclusion-and-skills-eu-2014> and European Commission, "Scoreboard 2014—Trends in European Broadband Markets 2014," <http://ec.europa.eu/digital-agenda/en/news/scoreboard-2014-trends-european-broadband-markets-2014>.

lower than in other parts of the continent, and this has not changed much: Poland, Romania, and Bulgaria are below 20 percent in terms of the percentages of population with subscriptions, while Slovakia is just above that number.² Ultrafast broadband penetration is generally low in the EU, but the region of the North-South Corridor—with the exception of Latvia and Lithuania—is also below average.³ According to another methodology, which looks at the total standard fixed coverage by country, a recent assessment of the EU Member States showed that in 2012 95.5 percent of households in the EU could access one of the main fixed broadband solutions (though that does mean they did access them).⁴ Countries from Central Europe, along with Iceland, were below average. Next Generation Access (NGA) in the region—a more advanced way of providing access to the Internet—was also lower than the EU average, with the exception of Hungary, Lithuania, and Latvia.⁵

The OECD broadband portal shows another interesting correlation.⁶ Of the researched countries, Slovenia, Slovakia, Poland, Hungary, and the Czech Republic all fit into the lower end of the matrix in terms of

2 European Commission, "Scoreboard 2014—Trends in European Broadband Markets 2014." As it is explained later in the same document, the takeup during the first half of 2014 in these countries remains low, while in some countries (Finland, Sweden) the market is close to saturation.

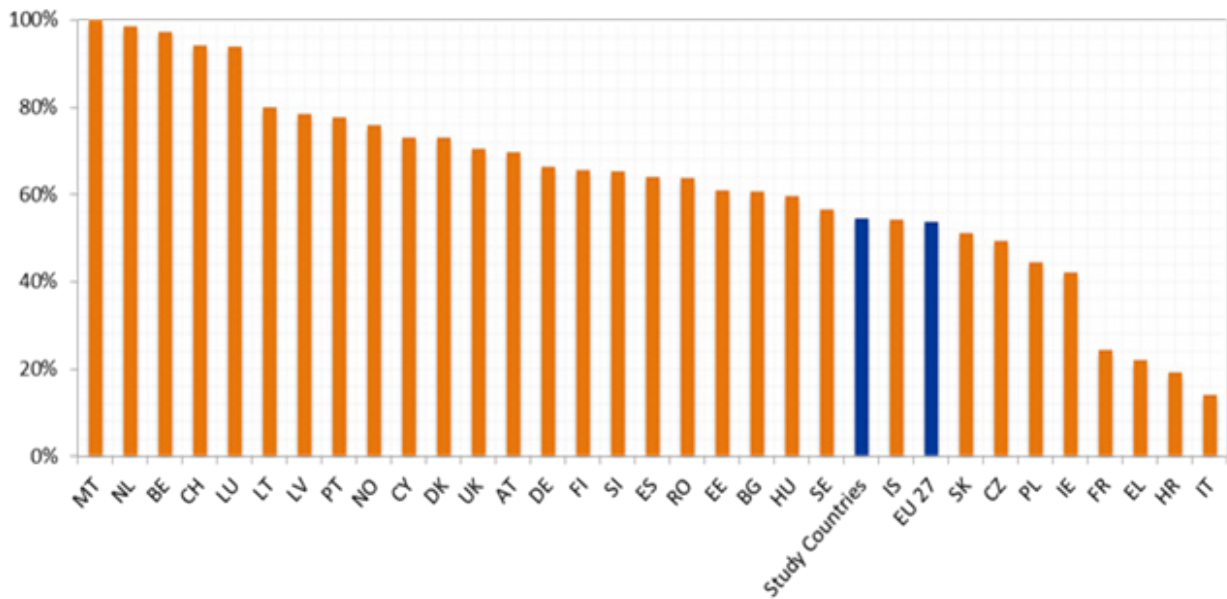
3 Ibid. p. 10.

4 Point Topic, *The European Commission Study on the Member States' Progression Toward the Goals of Digital Agenda* (2013), <http://point-topic.com/case-studies/the-european-commission/>.

5 Ibid., p. 4.

6 OECD, "OECD Broadband Portal," <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm>.

CHART 2. NGA BROADBAND COVERAGE



Source: Broadband Coverage in Europe in 2012, a study by point-topic.com for the European Commission

fixed broadband penetration. Meanwhile, Western European countries like Switzerland, Denmark, and the Netherlands appear at the higher end. The decreasing number of subscribers per one hundred inhabitants is almost directly related to the declining sum of GDP per capita in the countries.⁷ In these countries, mainly rural areas are affected by the broadband gap, which clearly shows the market failure—there is no business interest for private operators to build infrastructure, while public funding is essentially missing.⁸

Digital illiteracy—the ability to use the Internet skillfully—is higher in the region than that EU average.⁹ In these countries, the percentage of individuals with minimal or no digital skills is much higher than in older EU Member States such as Sweden, Luxembourg, or the Netherlands.¹⁰ The percentage of individuals using the Internet for cross-border e-commerce activities is also significantly lower than in the EU-15 Member States.¹¹

7 Ibid.

8 An interesting international practice could be the so-called “PPP4 Broadband” project, which aims to tackle the broadband gap in rural parts of Southeast Europe through new business models. Southeast Europe Transnational Cooperation Program, “Tackling the ‘Broadband Gap’ in SEE Rural Areas through PPP Model,” http://www.southeast-europe.net/en/projects/approved_projects/?id=266.

9 The number of individuals who have never used the Internet, in all countries except for Estonia and the Czech Republic, is above the 20.5 percent European Union average. In Poland, it is above 30 percent, while in Romania and Bulgaria, the figure reaches above 40 percent with respect to the entire population. Ibid.

10 In these countries, at least 40 percent of the population has no or low digital skills. The indicator is almost 60 percent in Poland, 81 percent in Bulgaria, and 85 percent in Romania. European Commission, “Internet Use, Digital Skills, and Online Content,” <https://ec.europa.eu/digital-agenda/en/pillar-6-enhancing-digital-literacy-skills-and-inclusion>.

11 In the EU, more than 12 percent of individuals use the Internet for cross-border e-commerce services, on average. In Luxembourg, this ratio is above 60 percent, while it is still above 30 percent in countries like Finland and Denmark. The same indicator for Hungary is 5.8 percent, and for Poland and Romania, it is less than 3 percent. In these countries, individuals who use the Internet are much less willing to buy products online than in the western part of Europe. Without exception, all these countries are below the European

Union average of 61 percent. Ibid.

Upgrading these states’ networks is of utmost importance to the entire region. The timely construction of a North-South Corridor presents an opportunity to leverage the economic importance of the telecommunications sector, to better integrate the states, and to better incorporate the region into the European Union.

Security Aspect of Digital Infrastructure

It must also be stressed that the countries along the corridor are wary about the global security aspects of the Internet. In order to best protect national security and have a safety net against global terrorism and related cybercrimes, national critical infrastructures must be constructed and well protected against the increasing risk. The construction of the energy and transport corridors could provide a window of opportunity to leverage costs and execute the necessary investment in fixed and wireless broadband networks. A secure grid of backbone shields would also enable EU-US relationships to develop further and strengthen existing ties in the war against terror. The resilience of the existing assets and functions—whether physical or cyber—requires a layered approach that involves individuals and communities, businesses, and schools, and finally, the governments of the region. The European Union must orchestrate a clear understanding of this, but the implementation is up to the Member States.¹²

Union average of 61 percent. Ibid.

12 Best practice could be taken from the United States. See the President’s Executive Order of February, 12, 2013, “Improving Critical Infrastructure Cybersecurity.”

How to Overcome the Problems?

To combat these shortcomings, the European Commission announced the new European Union Infrastructure Policy in October 2013, raising the level of infrastructure-related financing available from European budgetary resources.¹³ As part of the new program, the Council of Ministers adopted the rules for the Connecting Europe Facility (CEF) on December 5, 2013,¹⁴ aiming to help “create high-performing and environmentally sustainable interconnected networks across Europe, thereby contributing to economic growth and social and territorial cohesion within the Union.”¹⁵ As part of the CEF, regulation conditions, methods, and procedures for related projects have been defined.¹⁶ The planning follows the Multiannual Financial Framework, the EU’s seven-year budget. Altogether, some €33 billion were earmarked for the objectives, 80 percent of those funds will support transport-related investments, and 17 percent will support investment in transborder energy networks. A mere 3 percent will be dedicated to telecommunication investments. The European Commission’s plan is to have the projects completed by 2030.

The €1.14 billion allocated for the telecommunications sector from the CEF budget is significantly less than the amount originally requested by the European Commission.¹⁷ Given the high capital sensitivity of the industry, this amount will not be sufficient to finance much-needed trans-European telecommunications projects. Additional public funds will be required, as will the leveraging of private investment. The framework for spending the funds during the project years was published in yet another document, the CEF Telecommunications Guidelines, which was adopted in March 2014.¹⁸ This framework has recently been completed by the EC Communication on Important Projects of Common European Interest (IPCEI). This communication, however, does not include any telecommunications-related investments among its priorities.¹⁹

The guidelines present the key objectives and introduce the financial means to achieve them. It is assumed that national and regional actions would complement

the CEF’s.²⁰ The so-called “preferred projects” should introduce innovative models with high potential for replication. One goal of the guidelines is to reduce the digital divide and increase digital inclusion in suburban, rural, and scarcely populated regions. The EU recognizes that, although European digital networks are more advanced than any other networks in Europe,²¹ the sustained incentivizing of investments in mobile and fixed broadband (BB) networks—through long-term evolution (LTE) and fiber-optic technologies—is necessary in order to maintain Europe’s competitive edge. In addition to the general objectives, the telecommunication guidelines encourage investment in broadband networks as a means to improve the daily lives of citizens and businesses throughout Europe. The promotion of investment in the interconnection of national, regional, and local broadband networks is directed only toward regions with market failure or suboptimal investment levels.²²

ADDRESSING CRITICAL CHALLENGES AND BOTTLENECKS

The Connecting Europe Facility’s emphasis on telecommunication networks is inadequate when compared to its focus on energy and transport.^{23,24} Market needs, legislative intentions, and consumer captivity have not yet been met, and the full-bodied integration of the EU Member States cannot lack a telecommunications dimension.²⁵ To date, no telecommunications-related, cross-border investment projects have been referred to the European Commission under direct financing.²⁶ Given that CEF funds are

20 See, for example, the Romanian initiative, which aims at national developments as a complement to CEF funding in the region (Ro-NET project, with €84 million in funding, in 783 specific areas). “Romania Hopes to Find Support from Bulgaria and Hungary for Common Telecom Infrastructure Projects,” Agerpres, May 15, 2014, <http://www.agerpres.ro/english/2014/05/15/romania-hopes-to-find-support-from-bulgaria-and-hungary-for-common-telecom-infrastructure-projects-10-01-53>.

21 Broadband and digital networks and services are much less developed than in the United States or South Korea. For example, European high-speed mobile communications currently represent less than 4 percent of global 4G subscriptions. European Commission, “Background Paper—Public Information Session on Telecoms Single Market,” June 12, 2013, <http://ec.europa.eu/digital-agenda/en/news/background-paper-public-information-session-telecoms-single-market>. For a recent and critical study on EU vs US broadband rollout and comparative regulation, see Christopher S. Yoo, *US vs. European Broadband Deployment: What Do the Data Say?* (Penn Law and Center for Technology, Innovation and Competition, June 2014), <https://www.law.upenn.edu/live/files/3352-us-vs-european-broadband-deployment>.

22 It is already known that one-third of financing provided by the CEF will target networks with speeds of at least 100 megabytes per second. See Article 5, point 8 of the regulation.

23 It must be pointed out, however, that during the early days of TEN projects in Europe, between 1995 and 2005, the European Investment Bank contributed more than €15 billion for financing cross-border telecom projects in Europe, accounting for 18 percent of the total EIB signatures for Trans-European Network projects. Needless to say, this investment focused on the EU-15 region. European Investment Bank, *Evaluation of Cross-Border TEN Projects—Synthesis Report* (December 2006), http://www.eib.org/attachments/ev/ev_cross_border_ten_en.pdf.

24 European Commission, “Implementation of the EU Regulatory Framework for Electronic Communications—2014,” <https://ec.europa.eu/digital-agenda/en/news/2014-report-implementation-eu-regulatory-framework-electronic-communications>.

25 Ibid.

26 See, as mentioned above, the emerging cooperation initiatives between Eastern European Member States. Also, “to date” refers to the writing of the chapter on June 20, 2014.

13 European Commission, press release, “Transport: New EU Infrastructure Policy,” October 17, 2013, http://europa.eu/rapid/press-release_IP-13-948_en.htm.

14 Council of the European Union, “Council Adopts Regulation on the Connecting Europe Facility,” December 5, 2013, http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/trans/139932.pdf.

15 Ibid.

16 The new rules replaced the existing rules on funding Trans-European networks.

17 The original amount earmarked by the Commission was about €9 million.

18 European Parliament and the Council of the European Union, Regulation (EU) No 283/2014 of the European Parliament and of the Council of 11 March 2014 on Guidelines for Trans-European Networks in the Area of Telecommunications Infrastructure and Repealing Decision No 1336/97/EC, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ%3AJOL_2014_086_R_0014_01&from=EN.

19 European Commission, press release, “State Aid: Commission Facilitates Support for Important Projects of Common European Interest,” June 13, 2014, http://europa.eu/rapid/press-release_MEMO-14-423_en.htm.

significantly lower than in the previous EU budget, it is unlikely that such projects will emerge in the near future without increased, incentivized, and better-targeted public funding.²⁷ Furthermore, the CEF only focuses on pan-EU projects, not on regional ones. Therefore, the framework, in its current form, is unable to provide targeted support for better interconnectivity in Central Europe along the North-South Corridor, which is highly problematic for the region. Project proposals from this part of Europe will not be preferred to other, equally valid projects from more-developed regions of the EU. Given the dissimilarity in infrastructure development²⁸ and digital literacy between the EU-15 and the EU-13, this approach risks being counterproductive and further dividing the EU.²⁹

Furthermore, while the regulations maintain that investments in broadband networks should be undertaken primarily by the private sector, public control will be promoted for projects affecting common interests—including the area of one of the crown diamonds of the EC, the Digital Service Infrastructures (DSIs).³⁰ Such public control is necessary over those investments that have a significant European value, and should ensure interoperability and support the deepening of the internal market.³¹ Yet the concern is that DSI will be easier constructed in regions where broadband infrastructure is more developed, rather than where it is needed along the North-South Corridor.

Funding for regional telecommunication projects is available in the form of CEF financing instruments, and in the form of financial instruments coupled with public grants. Grants and support under public procurements are available for projects in horizontal actions, and for those projects that will improve the digital service. An ex-ante analysis will always be required, in order to assess the cost-effectiveness of a measure.³² Though this is the right approach, the author is worried that the “overly technical support” nature of the funds will not incentivize infrastructure-related investments.

27 Seeing the facilitator’s limited focus on transport, research, and energy infrastructures, the author is unsure how the IPCEI communication would help in this regard.

28 The latest EC publication points out several failures regarding digital development and broadband-related investments in Central European countries: “In Hungary, although a five-year Digital Renewal Action Plan had been adopted in 2010, no implementing measures had been developed until April 2014. Other Member States, such as Poland and Slovenia, have also been lagging behind on implementation. On the other hand, there are Member States, with the Netherlands and Luxembourg in the lead, who are in an advanced stage of implementation.” As for absorption of available finance mechanisms, it is noted that Slovakia, an important country along the corridor, has very low absorption of funds. Poland is no exception in this respect, with particularly low absorption of funds for rural broadband development.” European Commission, *Implementation of the EU Regulatory Framework for Electronic Communications—2014* (Brussels, July 14, 2014), <https://ec.europa.eu/digital-agenda/en/news/2014-report-implementation-eu-regulatory-framework-electronic-communications>.

29 Refer to the country studies of the latest Implementation. Ibid.

30 See Article 4 of the Regulation, plus the suggestions of the IPCEI Communication.

31 By the “deepening of the internal market,” the Commission means the further harmonization and integration of the legal frameworks of the Member States of the EU.

32 See Article 5, point 7 of the regulation.

There is another particularity of the European electronic communications markets. Even more than the inadequacy of public funding, market players are worried about the rising level of global competition and the transformation of market characteristics. Public funding could help to combat these, but regulation and legal certainty are more important for the industry in order to stimulate further investment. The concept of net neutrality³³ will remain the most critical discussion point for the industry in the coming years. Along with the consolidation of the electronic communications markets, this is where industry players could fight the decreasing margins and rapidly declining incomes—in both the fixed and mobile markets. The Commission’s relevant proposals continue to be heavily debated in the European Parliament and elsewhere.³⁴ Industry voices emphasized that the possibility to prioritize among services is the only way to generate quantifiable income in the heavily regulated industry and to secure future investments. As has been stressed by several fixed and mobile industry sources, operators are not worried about the investments in broadband networks made with the support of public money—such as investments that are part of the CEF—mainly because these will not lead to market distortion or changes in the long-term business strategies of the market players. However, without the possibility of making sufficient margins by prioritizing services such as Internet protocol television (IPTV), or premium content in mobile streaming, it is highly unlikely that any long-term investments can be made in the networks.

Another phenomenon that could significantly change the European electronic communications industry, and perhaps make it more competitive globally, is the consolidation of the electronic communication markets. These markets are much more fragmented than other network-based markets in Europe.³⁵ Electronic communication services are also increasingly content-based services, making infrastructure less and less important for service provision. Traditional telecom services—such as SMS, calls, or the Internet—are being driven out by online text messaging (WhatsApp, Viber, Facetime) and Internet-based phone services (Voice over Internet Protocol, e.g., Viber, Skype), thereby scraping serious amounts of profit from operators, and squeezing out longstanding revenue streams.³⁶

33 Net neutrality (also network neutrality or Internet neutrality) is the principle that Internet service providers and governments should treat all data on the Internet equally, not discriminating or charging differentially by user, content, site, platform, application, type of attached equipment, and modes of communication.

34 Very recently, the UK telecom authority (Ofcom) has criticized the EC’s intentions, emphasizing that in case traffic management is not recognized, telecom companies and business customers could be penalized. Daniel Thomas, “Telecoms Watchdog Warns on EU Rules,” *Financial Times*, May 18, 2014.

35 To be fair, this has to be read in light of the fact that the “known” telecom operators—Deutsche Telekom, Telefónica, Vodafone, British Telecom, and Orange—are present in a large number of the Member States, and the market is less oligopolistic than other network industries, such as energy or water.

36 These services provide easy end-to-end connectivity to every data-networking device available. They transmit voice data packages via the Internet.

It is likely that, no matter how much the Commission pushes for net neutrality, the future of the industry will be characterized by clearly separate infrastructure and content-based services and markets. The consolidation of the telecom markets is likely to happen. Therefore, the Commission should carefully examine the proposed mergers—especially in light of the ongoing negotiations concerning the Transatlantic Trade and Investment Partnership (TTIP)—and take into consideration the overall competitiveness of the European markets and operators, with special regard to the underdevelopment in the Central European Member States.

The market realities and the inadequate CEF funding for telecommunications make it even more important that the incoming commissioner put more emphasis on coordinating with the industry to ensure that the limited resources available in the public and private sectors are used to the greatest effect.

For better coordinated investments and constructions—such as the coordination of civil works across utilities, and simplifying measures for operators (single information points, deadlines for permits, etc.)—the EC published its guidance document, while national contact points were also set up. The recommendation is addressed to national regulatory agencies, in order to guide them to consider setting the prices of access remedies on copper and next generation access (NGA) networks of operators with significant market power. The Commission's main objective is to promote competition and investment in high-speed networks, in a coordinated manner that disturbs citizens as little as possible. Indeed, this could have an effect, not only on how the telecom-related CEF funding is spent, but on how other network-related investments are executed in the transport and energy sectors. If this is coordinated well, costs could be reduced and the environmental disturbance could be minimized. In September 2013, the Commission adopted a guiding document for national authorities, to help them provide consistent, nondiscriminatory obligations and cost methodologies. The EC's target was, again, to promote investment in broadband networks.³⁷ In this respect, there should be legal certainty, clear rules, and preferential treatment for investments in the less-developed regions. The authors believe that further integration of the single European telecommunications market is only achievable if local competitive conditions are taken into account at the outset.

Broadband developments—in the form of optical fiber or LTE networks—and DSI are likely to focus on regional, national, or inter-regional projects, especially with regard to islands and scarcely populated areas. It must, however, be reiterated that funding may go anywhere—to countries with higher GDP per capita,

or to EU Member States that are lagging in broadband deployment, service takeup, and digital literacy. There is no preferential treatment for countries where financial indicators are lower or where the need is higher. This means that remote areas, or areas with sub-optimal investment conditions and a longer return on investment, are at a disadvantage. This may further amplify the digital gap between poorer and richer members of the EU.

Another problem that the Commission faces is that, in most of the Member States, procedures for getting DSI in place and working are too bureaucratic. The Commission advocates for immediate and efficient deployment of such networks, possibly using enhanced digital literacy. Some have argued that a central-command approval mechanism should be introduced for faster deployment. However, the details of this are unclear. The lack of self-confidence among stakeholders, including the Member States and the EC, threatens to marginalize the issue. Similarly, although programs and incentives might exist, the EC is concerned that investments of such scope in digital services are not being made. Mitigation of the lack of service needs should be addressed. In addition, there is a need to disseminate knowledge about second-gear digital illiteracy, because citizens neither understand nor are they informed about the positive effects of using digital services.³⁸

The development of ultra-high-bandwidth, mobile-communication infrastructure—also known as 5G networks—is critically important across the EU.³⁹ However, it is uncertain how these will lead to the better integration of the EU's peripheral areas, or help to connect countries along the North-South Corridor digitally. Therefore, a better-targeted approach should also be considered when spending the €700 million of European public funding that the Commission allocated to the rollout of vital, ultrafast networks in Europe with special focus on Central Europe.⁴⁰ The nonpreferential treatment of certain areas in Central Europe, which are still lagging behind in digital literacy and network development could prolong the existing divide within the EU in telecommunications. EU decision-makers should more intensely involve Central European Member States in innovative research—such as the METIS 2020 project⁴¹—as this could bring benefits for

38 In these countries, less than 25 percent of the population have little or no digital skills, whereas in Hungary, this number is above 47 percent; in Poland, it is above 58 percent. Ibid.

39 Alex Barker and Daniel Thomas, "EU and South Korea to Develop 5G Mobile Network," *Financial Times*, June 16, 2014, <http://www.ft.com/intl/cms/s/0/37eed44c-f538-11e3-91a8-00144feabdc0.html#axzz354aLQMFC>, or "EU to team Team Up with South Korea in 5G race," *Race*, Reuters, June 16, 2014, <http://www.reuters.com/article/2014/06/16/us-eu-southkorea-telecommunications-idUSKBN0ER1W20140616>.

40 The money is part of the general Horizon 2020 budget, and will be managed by the Commission. European Commission, "5G Infrastructure PPP: The Next Generation of Communication Networks Will Be 'Made in the EU,'" http://ec.europa.eu/research/press/2013/pdf/ppp/5g_factsheet.pdf.

41 METIS stands for Mobile and wireless communications Enablers for the Twenty-twenty Information Society. The main objective of the project is lay the foundation of 5G, the next generation mobile and wireless communications system.

37 European Commission, "Commission Recommendation on Consistent Non-discrimination Obligations and Costing Methodologies to Promote Competition and Enhance the Broadband Investment Environment," September 11, 2013, <http://ec.europa.eu/digital-agenda/en/news/commission-recommendation-consistent-non-discrimination-obligations-and-costing-methodologies>.

industry, academia, and society.⁴² The Member States in this region need EC guidance, but are capable of contributing significantly to the projects, which are being dominated by partners from the EU-15 bloc.⁴³

National Broadband Plans

Member States also play an important role, when it comes to national infrastructure development. As part of the Commission's Digital Agenda, states are required to draw up their national broadband plans (NBPs), which should reflect how they propose to achieve their targets.⁴⁴ These plans were submitted and then discussed with the European Commission, but it is now time to implement the ambitious targets.⁴⁵ The NBPs are not always streamlined. Poland and Slovakia, for example, aim at full coverage of 30-Mbps Internet connection by 2020, while Hungary wants 80 percent coverage by 2018, with full access to public institutions and enterprises by the same date, with the same conditions. The Czech Republic, being slightly more advanced, would like to bring up all access to 50 Mbps by 2020. Romania gives special consideration to undeveloped and rural areas, aiming to use structural funds of about €84 million as part of state aid measures. In Croatia, while a national state aid mechanism is being prepared, the national strategy focuses on generating demand and supply for broadband services. The European broadband-infrastructure development still looks like a patchwork, rather than a kilt.

The Role of EU Cohesion Policy

The detailed discussion concerning the role of the European Cohesion Policy is outside the remit of this study. Nevertheless, it is important to point out the potential therein. The efficient use of this policy requires coordination, adjustments, and significantly better planning by the Commission and the Member States in the region.

The amount of structural and investment funds⁴⁶ available for the region for the period of 2014-2020

42 METIS, press release, "Deliverables on 'Intermediate System Evaluation Results,'" September 10, 2014, <https://www.metis2020.com/>.

43 Jason Verge, "European Telco Cielat to Spend EUR125M on Data Centers, Fiber, Cloud," Data Center Knowledge, August 20, 2014, <http://www.datacenterknowledge.com/archives/2014/08/20/european-telecom-viavel-investing-e125m-on-infrastructure-expansion>.

44 See Point 2.4.3. of the "Digital Agenda" ("Fast and Ultrafast Broadband Development"). European Commission, communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, "A Digital Agenda for Europe," May 19, 2010, <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52010DC0245R%2801%29>.

45 European Commission, "High Speed Broadband," <https://ec.europa.eu/digital-agenda/en/high-speed-broadband>.

46 The EU S&I Funds consist of five specific funding tools (ERDF, ESF, CF, EAFRD, EMFF). European Commission, "Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013, Laying Down Common Provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and Laying Down General Provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and Repealing Council Regulation (EC) No 1083/2006. HL 347/320. 20.12.2013," <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:32013R1303>.

is €325.1 billion (2011 prices).⁴⁷ This represents a slight increase in available funding compared to the period of 2007-2013. For six countries—Croatia, Czech Republic, Hungary, Poland, Romania, and Slovakia—this forecasts an increase of more than 10 percent compared to the period before. The absorption of the funds depends on national priorities, and efficient execution of administration and planning of the spending.

There are examples of regional cooperation, but these are not inspired by ICT-related developments. As the cohesion policy for the current financial framework has been decided in December 2013, now the national cross-border plans are being finalized. By way of example, the transborder cooperation program for HU-RO for the period of 2014-2020 is the responsibility of the Joint Working Group (JWG). The JWG, which is responsible for the program design, has met several times over the past two years and held public consultations.⁴⁸ It is evident from the document that broadband developments are mentioned in the document as part of "thematic objective 2", requiring an essential contribution from the ERDF funds.⁴⁹ The shortcomings of broadband investments under the 2007-2013 framework include, on the one hand, the limited interest of potential funding beneficiaries, and on the other hand, that a great deal of the projects are driven by existing local needs rather than real cross-border desires.

The Role of Financial Institutions

The challenge to reestablish and sustain growth potential in EU countries is critical. The eastern periphery of the EU is less friendly to investment than the western part. Regulations and legal adversities make it more difficult for foreign private capital to enter there than in other parts of the EU. Structural reforms and infrastructure-related investments are much needed. The pace of the recovery from the economic and financial crisis is slower in Europe than in the United States. Yet, the current conditions—manageable debts positions, low rates—are favorable for increased public sector-led investments in critical infrastructures.⁵⁰ For

47 In commitment appropriations. This price is subject to various adjustments. According to another study, the amount tops €350 billion and could be subject to 8.5 percent decrease if adjusted for price changes.

Erste Corporate Banking, "Cohesion Policy and Other EU Assistance Programs in 2014-2020," March 2014, <https://www.erstegroup.com/en/Downloads/d9699ce5-84df-47d4-ab58-b23c30cbf91b/Report-EU-CohesionPolicy-2014-2020.pdf>.

48 MEGAKOM Development Consultants, KPMG Advisory Ltd., and ICG Ex Ante, *Strategic planning Planning Based on the Analysis of the Eligible Programme Area of CBC Programme between Romania and Hungary*, Common territorial strategy—4th draft (June 18, 2014), http://2014.huro-cbc.eu/uploads/editors/file/Planning%202014+/CTS_AV1_190614.pdf.

49 See "(a) extending broadband deployment and the rollout of high-speed networks and supporting the adoption of emerging technologies and networks for the digital economy (ERDF); (b) developing ICT products and services, e-commerce and enhancing demand for ICT (ERDF); (c) strengthening ICT applications for e-government, e-learning, e-inclusion, e-culture and e-health (ERDF)" in *Ibid.*, p. 87.

50 The IMF uses essentially the same argument for emerging countries in order to ease supply bottlenecks and support general economic development. *Ibid.*

investments related to the North-South Corridor, two financial institutions have key roles in Europe.

Role for the European Investment Bank

The European Investment Bank (EIB) has traditionally played an important role in European infrastructure financing. Its role in promoting investments along the CEF projects is even more evident, yet the telecommunications sector along the North-South Corridor has so far seen little of it.

According to the EIB, between 2008 and today,⁵¹ there were 119 contracts signed with aim to cofinance infrastructure projects in the telecommunications sector.⁵² Of the total, ninety-six projects targeted a country in the EU, for a total value of €12,901 million. Only sixteen projects were aimed at the Central European region, with a total value of €1,889 million. Most of the projects help bridge the digital divide and contribute to the rollout of high-speed networks, both mobile and fixed. By far, the largest contributions were to projects in Italy, Germany, the United Kingdom (UK), and Denmark,⁵³ even though these Member States already have more-advanced networks than the EU-13 countries. There were no contracts signed for Member States in the Central European region in 2014.

The EIB cofinanced Project Bond Initiative⁵⁴—although it could target all large-scale infrastructures in transport, telecommunications, and energy—has so far focused mainly on energy and transport. This particular type of pilot-financing⁵⁵ mechanism uses some leftover money in the EU budget, and kicked off projects with the initial EU contribution of €230 million. The PBIs are expected to generate around €4.4 billion of investments with the help of the EIB.⁵⁶ Project financing works the usual way: after a meticulous examination, the EIB Board of Directors decides about the eligibility of the projects. To date, nine projects in six Member States were approved. However, none were

in the telecommunication sector, and the only scheme in the Central European region was a motorway project in Slovakia.⁵⁷ It could be either because the EIB does not believe such projects show a reasonable prospect for successful closing, that they are not well focused on the objectives, or because the markets where the projects are being developed are not well developed for PPPs or project financing. There might be other reasons for this phenomenon.

Careful analysis of the EIB's activities in the energy and transport sectors identifies the various reasons for the difference in market conditions in Central Europe and Western Europe. Companies in the latter are more used to increasing their asset base by loans and guarantees, while they behave in a more conservative way in Central Europe. Companies usually do not take higher risks. In most cases, local companies that could qualify as network owners⁵⁸ have no history in borrowing, so they do not have valid credit ratings to provide to the EIB. Companies move slowly, and the legal environment is often uncertain. Finally, because of the high rate of digital illiteracy, there is also little demand for costly investments.⁵⁹ All these factors discourage private investors.

In light of the above, if network investments are to be incentivized in broadband networks, the EIB should focus more on Central Europe in general, and regional telecommunications projects in particular.⁶⁰ This could be done by better articulating public-private partnerships.

Role for the European Bank for Reconstruction and Development

Since 2010, the European Commission has taken thirty decisions concerning public funding in the telecommunication sector, in particular in cases concerning the deployment of broadband, costing a little more than €3.7 billion. All state aid applications were found compatible with the TFEU. Out of the thirty projects, however, only one project was approved in the region of the North-South Corridor. The investment in eastern Poland is worth €350 million and is largely financed by the EBRD fund, with Poland contributing €95 million to the project.⁶¹

The EBRD's 2012 Electronic Communications Sector Comparative Assessment, which assesses regulatory and legal conditions in countries where the EBRD

51 That is, until July 23, 2014. This is the date of the last available signed contract.

52 European Investment Bank, "Telecommunications Finance Contracts Signed," <http://www.eib.org/projects/loans/sectors/telecommunications.htm>.

53 The first fourteen EIB largest contributions (range: €300-500 million) are worth €5,400 million.

54 The PBI is designed to enable carefully selected infrastructure projects promoters, usually public-private partnerships (PPP), to appeal for additional private finance from investors, such as insurance companies and pension funds. This is achieved by providing credit enhancement to those promoters, whose debt will effectively be divided into two tranches: senior and subordinated. The subordinated debt, or Project Bond Credit Enhancement (PBCE) can take the form of a loan from the EIB, with the support of the European Commission, and is given to the promoter at the outset as an upfront sum of money. It may also take the form of a contingent credit line, which can be drawn upon if the revenues generated by the project are not sufficient to ensure senior debt service. The EIB's PBCE underlines the senior debt, therefore improving credit quality. The support covers the lifetime of the project.

55 European Investment Bank, "The Europe 2020 Project Bond Initiative: Innovative Infrastructure Financing," <http://www.eib.org/products/project-bonds/>.

56 European Investment Bank, *Debt Instruments for Infrastructure Financing. Update on the EU-EIB Project Bond Initiative*, (Brussels, September 26, 2013), http://www.europarl.europa.eu/stoa/webdav/site/cms/shared/2_events/workshops/2013/20130926/Nicholas%20jennett.pdf.

57 This is, of course, great news for the transport component in CEF.

58 The EIB requires programs to separate networks operators and network owners.

59 The EIB's main business is loans (first- and second-level loans). Contributing to the expenses of the CEF is secondary business. It is possible that for CEF-related telecom network investments, the European Investment Fund (an EIB affiliated program) is more apt.

60 It would be very important for the countries in these regions to have projects with EIB backing, given EIB's reputation in screening, assessing, mitigating, and monitoring project risks.

61 European Commission, "State Aid: Broadband Project in Eastern Poland," www.ec.europa.eu/competition/state_aid/cases/241551/241551_1282401_111_2.pdf.

operates, concludes that in the EU Member States, no regulatory or competitive burdens exist, and international best practices are generally being implemented. These broad conclusions—ignoring the legal and political uncertainties for investors in many of these countries⁶²—mean that no particular focus should be directed toward regions in the EU with lower standards, poorer infrastructure, and more digital illiteracy.⁶³ The author reiterates that this approach disregards market demand, consumer orientation, and global policy recommendations concerning infrastructure-related investments in Europe.⁶⁴ Therefore, more attention and targeted resources for Central Europe should be considered.

CONCLUSION AND RECOMMENDATIONS

The opportunities along the North-South Corridor commonly focus on the energy and transport dimensions. But Central and Eastern Europe must also be connected via modern telecommunications infrastructures, vital to growth and development, and without which the single market will remain fragmented. The following measures are therefore recommended in the telecommunications field:

- Adjusted EC management of the CEF telecommunication funds along the corridor is critical, along with more focus on the peripheral areas of continental Europe that are evidently lagging behind.⁶⁵
- Public funding should be allocated for direct investments in countries where digital literacy and the development of DSIs are lagging behind, as is the case in most of Central Europe. The European Commission should think about further options to promote public-private partnerships, or draw up plans to generate the service needs of DSI. In most of the countries in this region, the availability of e-government and e-business services must be improved. Though this is a task for the national governments, an EC-orchestrated mechanism should be developed because of the European-wide interest in these services.
- The Connecting Europe Facility's digital platform should be geared toward the Central European states lagging behind in digital literacy to close the gap. Preferential deployment of funding for Central Europe should ensure that the North-South Corridor and related investments are

accompanied by a necessary upgrade in the digital networks, including new policies designed to increase the digital literacy of the surrounding region, all of which would help integrate countries along the corridor. This would also enhance other network developments in energy, and in transport along the corridor.⁶⁶

- Public infrastructure investment cannot, however, be done without efficiency in the investment process and attractive conditions for private investors. Efficiency in investment must be accompanied by “comfortable debt positions to mitigate the potential trade-off between higher output and higher public-debt-to-GDP ratios [which] are important to maximize the growth dividend.”⁶⁷ This could be done by better targeting the dedicated structural fund mechanism to regions, which hold up the development of broadband infrastructure.
- The European Commission should develop further options to promote public-private partnerships and draw up plans to generate the service needs of DSI. The enforced development of the PPPs would not work only for the DSI but also for general infrastructure development in the countries. Financial and strategic planning should be detailed to the following phases of the construction and service provision—network setup (building the passive infrastructure), operation of the network (active infrastructure), and service provision (offer, marketing and distribution of the services).⁶⁸ The choosing of the right business model as early as possible is critical to ensuring revenues at all stages of the value chain.
- Simplification of implementing national mechanisms, transparency in project selection, and decreased bureaucracy for the cohesion funds should all be accomplished. The adoption of the Telecom Single Market package should also be a priority, to provide market participants with regulatory and legal certainty. This requires immediate actions at the EU level.
- The implementation of digital-agenda projects should be accelerated. This could be done by more stringent EU monitoring and through a less lenient approach to national administrations that fail to deliver efficient use of the EU funds.

62 E.g., state ownership in the incumbent operator in the Baltic countries or the taxes on media operators and controversial regulatory changes in Hungary.

63 In other words, the EBRD's assessment of the effectiveness of its technical-operation effort are enough as they stand.

64 International Monetary Fund, “Global Prospects and Policy Challenges,” G-20 Finance Ministers and Central Bank Governors Meeting, Cairns, Australia, September 20-21, 2014.


65 The EU-12 refers to the following Member States: Hungary, Poland, Slovakia, Czech Republic, Estonia, Latvia, Lithuania, Romania, Bulgaria, Croatia, and Slovenia.

66 This will not be an easy job, especially in light of the latest developments concerning the “double taxation of telecoms operators.” The European Court of Justice recently held that a network operator might be taxed for the occupation of the land it uses to plant its infrastructure, and can, in addition, be asked for so-called authorization fees for the right to use that land as part of the network. This finding appears in joined cases C-256/13 and C-264/13, Judgment of the Court of September 4, 2014, not yet published.

67 International Monetary Fund, “IMF Note on Global Prospects and Policy Challenges,” September 20-21, 2014, <http://www.imf.org/external/np/g20/091714.htm>.

68 This would help ensure the development of innovative services, the evolution of competitive conditions and regulation monitoring, and would also leave more space to market developments.

- Estimating the costs of a broadband infrastructure is a mechanism that depends on several variables. The choice of the infrastructure, the investment and the business models to go with it, the financial tools to be used and the partnership accompanying the execution and works, all significantly change the variables, which only follow the strategic mapping of the need for the infrastructure. Therefore, even a rough estimation of the required financial contributions has to be considered with caution. The combination of the passive and active infrastructures (fiber, copper, antenna sites, switches, routers), the taking into considerations of the need to develop the backbone and the area networks, and the first mile requirements, it can be assumed that along the North-South Corridor the following characters could indicate the capital requirements for investments that would significantly grade up the existing networks.
- The majority of costs are due to trenching, the price tag of which depends on geological characters of the lands. In this respect, regional, areal and national works should be considered similar, at least for the financial intervention needed. Rolling out the access lines—due to administrative preparatory works—may result in higher costs. First mile construction depends on the density of homes and the technique used to connect the homes. It seems evident that the region lacks in access infrastructure, which may be built up from fix or mobile upgrades in the existing networks.
- Taking all of the above into account, to create a backbone infrastructure along the corridor the cost of the necessary investments to efficiently upgrade the region's capacities and provide for the development of digital literacy and skills, an estimated €3.5 billion are required.



4. FINANCING INVESTMENT INTO CRITICAL INFRASTRUCTURE: HORIZONTAL BOTTLENECKS

OVERVIEW

Infrastructure investment is inherently expensive, long-term and resource intensive. The options for financing the North-South Corridor infrastructure requirements reflect a range of considerations. These include evolving macro-economic circumstances, sources of funding for both capital expenditure (CAPEX) and operating expenditure (OPEX) and sectoral issues related to energy markets, transportation modes and ICT infrastructure and markets. Developing the North-South Corridor to its full potential creates financial challenges, at a time when Europe is recovering from deep recession, when most countries are facing continuing fiscal deficits, where deflation remains a risk and where the banking sector is facing more onerous requirements regarding capital and reserve ratios.

Each investment presents opportunity costs and, thus, must be justified by the benefits will yield in terms of economic growth and employment as well as on social, environmental, climate change and security grounds. Moreover, the sum of these investments must be seen collectively at the corridor level, as the strategic logic rests at regional level. It requires national governments to act collaboratively to maximize benefits at regional level. Completion of the North-South Corridor represents an opportunity to increase

competitiveness and resilience in Eastern Europe, providing infrastructure of the type needed to ensure that Europe can compete effectively with emerging economies elsewhere in the world. Furthermore raising infrastructure investment rates along the axis of the corridor provides an effective stimulus: thus the process of corridor development represents an important contributor to the solving to Europe's current macro-economic, fiscal, and monetary challenges, which currently include issues of competitiveness, the risk of deflation, high unemployment, and increasingly sensitive intra-EU migration trends.

The economic objective of investing in energy connectivity is to create a single market for energy where costs (excluding national taxes, which represent transfer payments) are closely aligned between countries of the region. By connecting to LNG terminals, alternative sources of energy can be accessed in times of need and the world market price of LNG can act as an upper limit (excluding North-South regional transit costs) to the market price in each country forming part of the North-South Corridor. This will represent a great boost to energy security and competitiveness.

Enhanced transport links also play a valuable role in completing the single market. The strategic case rests on the economic potential to minimize the

consequences of being reliant on transit countries for access to marine facilities for both export and imports, and enhanced access for people utilizing ground transportation. Reduced congestion should contribute environmental benefits including supporting greater use of ground transportation rather than aviation, and investment in fuel-efficient systems.

The case for strengthened regional ICT connectivity should be seen as part of a coherent strategy to raise speeds and consumer-uptake at the household and enterprise levels. Uptake in Central Europe has lagged that of Western Europe, the United States, Korea and other advanced countries. The case for improved regional connectivity is partly a case of sound project management: it makes sense to plan for ICT fiber cable ducts alongside new transport and energy connections, and multi-user links is consistent with good planning and value-for-money considerations. This is important along the North-South Corridor, and it is consistent with comparators such as the work being coordinated by UNESCAP to strengthen ICT connectivity and resilience through the creation of the Asia Pacific Information Superhighway.¹

Much of the groundwork to create the necessary enabling environment is already being put in place: the EU and key financing institutions, including the European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD), World Bank Group (especially the International Finance Corporation (IFC)), are supporting strengthening of regulatory structures for infrastructure investment in Central Europe. The rationale for raising additional private finance has been well articulated, and distinctions between private and public goods have been clarified with respect to welfare, although the security dimension (part of the “public goods” case) has been less explicitly articulated.

As demonstrated in preceding chapters of this paper considerable strategic planning has been undertaken in the energy and transportation sectors although there is a need for more to be done with respect to ICT. Promoting the North-South Corridor is consistent with this strategic focus—it is broadly complementary to, rather than competing with, other Member State investment priorities.

There is a substantial body of evidence that finance can be made available if bankable projects can be identified. This is particularly prevalent in the energy sector. It is a greater challenge in the transport sector in which road and rail modes often do not function on an “allocated” full cost recovery model. For example, there has been a low uptake of toll roads in Eastern Europe to date. There, planned toll roads and bridges often duplicating

existing (if inferior) nontolled infrastructure which is a major disincentive to commercial operators and investors. Thus, most transport projects, with the exception of some port and airport investments, require public sector capital and /or operating subsidies.

There are many cases where good progress has been made in the commercialization of existing energy, ICT, and transport operations, enabling efficiencies to be generated. A variety of models for this have been utilized ranging from long-term concession agreements to the outsourcing of operations and maintenance contracts on a term basis. However even with this, the least controversial aspect of infrastructure management, pitfalls have been identified. In particular, a key driver of improved efficiency is risk management. As shown with the establishment of concessions for London Underground and the UK rail network, risk does not necessarily transfer to private operators—regardless of the wording of the legal agreements—if the infrastructure is essential and if the concession operator is loss making. Key infrastructure cannot simply be closed down in the event of poor financial performance, because to do so would adversely impact users and service-delivery standards, meaning risk remains in the public sector at last resort. This is important for financing the North-South Corridor, because lessons learned in the sector in other regions must be reflected in innovative financing proposals intended to bridge the infrastructure gap.

AVAILABILITY OF NONSOVEREIGN FINANCE FOR INFRASTRUCTURE INVESTMENT

The 2008 banking crisis has had profound implications for the availability of long-term, commercial-loan finance for infrastructure investment. European capital investment, including infrastructure and project finance, is traditionally very dependent on bank loans. The impact of the recapitalization of banks and stricter regulation (e.g., Basel III) is being widely felt. In general, European banks have reduced risk by reducing long-term lending, foreign exposure, and lending to risky businesses, and by offloading assets from their balance sheets. The impact on infrastructure finance is:

- reduced availability of bank finance for long-term projects (over seven-ten years);
- stricter credit assessments for new ventures; and
- loan portfolio restructuring, including on-selling of loans to institutional investors.

PPP deals in Europe reached a numeric peak in 2006 and a peak by value in 2007. Since then, they have been declining.

Looking at the broader market by CEF sector, infrastructure financing saw a decline to €18 billion in 2012 from €28 billion in 2011, and fewer transactions.

¹ <http://www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway/publications> United Nations, Economic and Social Commission for Asia and the Pacific, “Asia-Pacific Superhighway: Publications,” <http://www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway/publications>.

Of that, €14.1 billion worth of projects were from the transport sector, €3.3 billion for energy networks, and €0.5 billion from the telecom sector. While transport infrastructure is inherently expensive, this may require rebalancing if the energy needs of the North-South Corridor are to be satisfied.

Europe's development banks, EBRD and EIB, have remained active as infrastructure investors, but face constraints. Three factors are particularly important in constraining EBRD and EIB financing of Central European infrastructure, and include

- the need to protect credit ratings at sectoral level, in terms of risks of nonperforming loans, particularly as governments face acute pressures regarding the introduction of fully commercial utility tariffs and tolling systems;
- national and regional exposure, especially in the light of instability in Ukraine and deteriorating relations with Russia, including the recent introduction of sanctions;
- a potential loss of focus on Eastern European countries, especially as the focus of the EBRD and EIB has expanded to take in the North African region.

In its 2013 annual report, the EBRD notes, “The energy sector emerged as one of the toughest policy areas in the EBRD region. The need for enhanced energy efficiency, investment in renewable energy, and cost-reflective tariffs is well recognized, but politically difficult to implement—particularly under economic and social pressures. As a result, political interference in the energy sector and reform reversals have become more common.”²

The EIB *Activity Report* for 2013 highlights significant emphasis on strategic infrastructure for cohesive growth in Europe.³ This includes €6.4 billion for strategic transport projects in Europe and €5.2 billion for strategic energy projects in Europe.⁴ It has launched revised energy lending criteria, following extensive public consultation. EIB is committed to focusing on financing energy efficiency, renewable energy, energy networks, and related research and innovation.

The new criteria include streamlined lending guidelines for energy-efficiency projects to enhance cofinancing of national energy-efficiency programs. EIB has introduced a new Emissions Performance Standard (EPS) to be applied to all fossil-fuel-generation projects to screen out investments whose carbon emissions exceed a threshold level, in line with EU and national limits. Gas is expected to remain a transition fuel on the

way to a low-emission energy system, and the EPS will ensure that lending is restricted to projects that make a positive contribution to EU economic growth and are consistent with EU climate policy.

There is a further risk if the EIB and EBRD, under pressure from shareholders, impose such onerous safeguards policies (especially with respect to climate change and environmental protection) on individual project-preparation processes that the pipeline of new infrastructure projects along the North-South Corridor diminishes. There has been a precedent for this, with other financiers (World Bank, ADB, AfDB, and IADB), having some prominent examples of clients turning to nontraditional sources of finance—especially China—that might be less concerned about safeguards policies. Superficially, it appears this is less likely to happen in Europe along the North-South Corridor, as environmental and social safeguards have been instituted at least at the EU level, although implementation at the national level still remains uneven. A greater risk is that the implementation of safeguards takes so long that it undermines predictability and deters potential private-sector finance.

Project Bond Initiative

The EIB, working in conjunction with the EC, recently launched the Project Bond Initiative (PBI). The legal base of the Europe 2020 Project Bond Initiative was adopted in the summer of 2012 by the European Parliament and the ECOFIN Council, and the instrument base was signed between the European Commission and European Investment Bank in November 2012. The objective of the cooperation with the EIB is to build on existing experience with joint EU-EIB Group instruments and to utilize the EIB's expertise in EU infrastructure financing.

Project bonds are one of the financial instruments foreseen under the proposed Connecting Europe Facility (CEF), which is part of the wider “Europe 2020” strategy. The aim of the CEF is to provide a longer-term financial framework ensuring that energy, transport, and telecommunications projects are developed and implemented in a timely and effective manner.

Based on a positive interim evaluation in 2013, and subject to the final evaluation of the pilot phase in 2015, the Project Bond Initiative is expected to be fully rolled out within the CEF, forming part of the 2014-2020 Multiannual Financial Framework (MFF).⁵ It is therefore highly appropriate to examine how it will function.

The objective of the PBI is to stimulate capital-market financing for large-scale infrastructure projects in the sectors of transport (TEN-T), energy (TEN-E), and information and communication technology (ICT). The

2 European Bank for Reconstruction and Development, *Annual Report 2013*, <http://www.ebrd.com/downloads/research/annual/ar13e.pdf>, p. 14.

3 European Investment Bank, *Activity Report 2013*, <http://www.eib.org/attachments/general/reports/ar2013en.pdf>.

4 Ibid., p. 19.

5 See <http://www.eib.org/products/project-bonds/index.htm>

Project Bond Initiative is designed to enable eligible infrastructure projects promoters, usually PPP, to attract additional private finance from institutional investors such as insurance companies and pension funds.

Improving credit quality will be achieved by providing credit enhancement to those promoters, whose debt will effectively be divided into two tranches: senior and subordinated.

The subordinated debt, which is the PBCE, can take the form of a loan from the EIB with the support of the EC, and is given to the promoter at the outset. It may also take the form of a contingent credit line that can be drawn upon if the revenues generated by the project are not sufficient to ensure senior debt service. The PBCE underlies the senior debt and therefore improves its credit quality, offering peace of mind to institutional investors.

The bonds themselves will be issued by the promoters—not by the EIB or the Member State in question. The support will be available during the lifetime of the project, including the construction phase.

A pilot phase is ongoing to test the project bond concept during the remaining period of the current multiannual financial framework 2007-2013, before the next multiannual financial framework 2014-2020. Suitable projects will need to reach financial close between now and end of 2016. This testing phase is funded by €230 million of EU budgetary resources from unused budget lines for existing programs. This should enable the EIB to provide financing to infrastructure projects worth more than €4 billion across the three sectors.

The EIB selects and appraises projects according to its own standards, then structures and prices the credit-enhancement instrument for the selected project, and carries out the monitoring—although it will not act as a credit controller. Subsequent decision-making for projects will be formulated on a case-by-case basis by the parties involved.

The first transaction under the Project Bond Credit Enhancement initiative was successfully launched in July 2013, for the Castor underground gas-storage project in Spain. This will provide storage for 30 percent of Spain's daily gas consumption. Approved projects include those outlined in Table 18.

The Superfast Broadband project is interesting because it is the first in the ICT sector. Box 1 (p. 68) presents it as a case study.

Key Findings of the EIB Project Bond Initiative

Overall, the pilot phase of the EIB Project Bond Initiative can provide credit enhancement facilities of approximately three times the EU budget contribution of €230 million. That totals about €700 million,

ultimately supporting senior debt volumes of fifteen to twenty times the EU budget contribution. The subordinated facilities for the eight approved projects evaluated in 2013 exceed €700 million. However, a project bond with PBCE is typically one of several financing options, which the project company and/or granting authority can choose, which will lower use. For example, the motorways in the UK and in Slovakia will be financed without PBCE as, for project-specific reasons, the rating of the projects was sufficient to raise funds in the bond market without the higher ratings provided by PBCE. Nonetheless, the existence of PBCE as another funding option is seen to have helped maintain pricing tension on these two projects, ensuring that the final outcome represents value for money for the procuring authority.

The demand for infrastructure investment in Europe is evident. However, the *Interim Report on the Pilot Phase of the Europe 2020 Project Bond Initiative* expresses concern that the current projects are insufficient to satisfy infrastructure needs in terms of number and maturity.⁶ For projects and sectors that rely on public sector involvement, governments across Europe have an important role to play in committing to unlock new infrastructure investment and in addressing uncertainty over the future supply or pipeline of infrastructure projects. Without a proper pipeline of (suitable) deals, long-term investment cannot be increased. Building investor confidence in transaction flow, so that investors remain willing to commit their funds and invest in building the new capabilities required to analyze finance for infrastructure projects necessitates a greater degree of transparency in the pipeline of projects at the national and supranational levels, as well as long-term planning and commitment on the part of tendering authorities.

It is worth noting that implementation of the Spanish Castor project has been delayed while further environmental-impact assessments are conducted, following some seismic activity in the region of the proposed gas-storage facilities. This highlights the importance of comprehensive preparation, in order to avoid delays in undertaking projects.

Another concern is that, with the exception of the Slovakian motorway PIB, all the projects to be funded under the pilot phase to date are in Western Europe and among EU-15 countries. There is clearly a risk that this valuable facility, which does include a built-in subsidy from the EU, does not benefit North-South Corridor countries in Central Europe. The need is there, but it appears that more needs to be done to create the right conditions for such funding.

In this context, the *Interim Report* notes that sudden

⁶ European Commission, *Interim Report on the Pilot Phase of the Europe 2020 Project Bond Initiative* (Brussels, December 19, 2013), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=COM:2013:929:FIN&qid=1395926421930&from=EN>.

TABLE 18. APPROVED PROJECTS BY EIB

Policy	Project type	Country	Expected size of credit enhancement facility (€ million)
TEN-T	Motorway	Belgium	150
TEN-T	Motorway	Germany	120
TEN-T	Motorway	United Kingdom	200
TEN-E	Grid connections to several offshore wind farms	United Kingdom	150
TEN-E	Gas storage	Spain	200
TEN-E	Gas storage	Italy	200
TEN-T	Motorway	Slovakia	200
TEN-E 200	Grid connections to several offshore wind farms	Germany	170
Subtotal			1,390
Recently announced projects			
TEN-T	Motorway A7 (The main road link between Denmark and Germany)	Germany	170
ICT broadband	Superfast Broadband	France	189

Source: European Investment Bank, "The Europe 2020 Project Bond Initiative—Innovative Infrastructure Financing," <http://www.eib.org/products/project-bonds/index.htm>.

changes in the regulatory approach for specific sectors still represent a major challenge for the effective implementation of project pipelines. Across sectors in general, factors such as lack of standardization, a lack of certainty in the pricing of capital-market issues, and the perceived novelty of such deals in the market at the moment, are seen as challenges faced by bond solutions. Here the PBI can also demonstrate its beneficial role. These observations underline a recurring need with respect to the development of the North-South Corridor development. The "soft" regulatory and management issues are crucial to successfully delivering the hard infrastructure projects, and their subsequent efficient and effective operation.

Another issue that may be identified is that a high proportion of the infrastructure financing through bond issues between 2007 and 2013 relates to existing, and not new, infrastructure. The *Interim Report* notes that, in terms of volumes, more than 90 percent of bonds issued in sectors covered by the CEF were refinancings, and only 6 percent were greenfield investments. A further 3 percent related to acquisitions. In most cases, refinancing is going to relate to existing, functioning infrastructure—such as the High Speed 1 track in the UK, which was refinanced in 2013. This was existing infrastructure, and clearly carried much lower risk than new infrastructure links in Central Europe.

Despite these concerns, there are positive examples of private financing. Some of the best evidence concerning Infrastructure bonds comes from outside Europe, as they are being given significant attention in many developing countries. Sawant (2010) analyzed sixty infrastructure bonds from fifteen emerging markets. Chile created infrastructure bonds

in 1998; these were effectively corporate bonds to finance infrastructure projects of public interest under certain concessions and regulations. Other countries have issued infrastructure bonds (e.g., Peru, South Africa) or structure bonds (Mexico), which have been principally sold to domestic institutional investors. EBRD participated in an infrastructure bond for Turkey in 2013, demonstrating the deepening of experience from outside EU Member States.

FUNDING FROM THE EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT

The EBRD finalized its new Transport Sector Strategy in October 2013, focusing on promoting private-sector involvement in sustainable solutions to the transport needs of the region. Over the past five years, EBRD investment in the transport sector has consistently exceeded €1 billion annually, with projects in the aviation, maritime, rail, road, and intermodal sectors. The bank signed twenty-four transactions in 2013, for a total EBRD investment of €1.1 billion, while loans made in the sector were almost €1.4 billion, as shown in Table 15.

Nonsovereign projects accounted for almost 60 percent of the number and volume of EBRD's operations in the transport sector, a lower share than for the portfolio as a whole, but considerable given sector characteristics. The EBRD is closely involved in restructuring efforts. In the rail sector, EBRD participated in the partial privatization of PKP Cargo, the principal freight operator in Poland, through an initial public offering on the Warsaw stock exchange.

BOX 1. CASE STUDY: PROJECT INFRASTRUCTURE BOND FOR FINANCING HIGH-SPEED BROADBAND

In July 2014, EIB announced the first digital financing through a first project bond in France, involving digital infrastructure. The aim is to speed up the mobilization of private capital for European infrastructure projects, in particular the rollout of fiber optics in sparsely populated areas (“public initiative areas”). This is highly relevant to the North-South Corridor, as uptake of internet within a number of Central European countries has lagged behind the continent as a whole.

This project bond, which has been managed by Natixis, provides a concrete, financial, and industrial response to the challenge of broadband access in sparsely populated areas. This operation is also a first for Europe, as it is the first time that a project bond has been issued in Europe for digital infrastructure. It will provide Axione Infrastructures with €189.1 million in bond finance, enabling it to continue and extend the rollout of fast and superfast digital infrastructure in numerous departments in France.

The EIB’s involvement made the bond solution possible, thanks to a 20 percent senior debt enhancement, which made the placement really attractive to investors. This involvement is fully in line with the EIB’s mobilization of resources in favor of strategic financing operations in the fields of transport, energy, and digital economy.

The promoter, Axione Infrastructures, highlights the linkage between the investment and its potential to generate growth and employment. From a funding perspective, it demonstrates the importance of the bond market for financing infrastructure investment. The Mirova Infrastructure Fund observes that this bond establishes a market benchmark for financing the investment needed for superfast broadband at the national and European level.

In 2013, the EBRD’s largest transaction in the transport sector was a €200 million participation in a €1.2 billion infrastructure bond. It was aimed at optimizing the long-term financing of recently built sections of the R1 motorway in Slovakia, as well as supporting the sustainability of public-private partnerships. This was the first infrastructure project bond in the EBRD region. As noted in the *2013 Annual Report*, “The Bank hopes that the success of the Bond issuance will encourage other transport entities in its region to diversify their sources of funding by accessing capital markets. Other transport projects financed include financing sub-

sections of Corridor Vc and the Banja Luka to Doboj motorway that will link to Pan-European Corridor X.”⁷

A total of twenty-six applications for funding for road projects were submitted to the Commission in 2013, for a total cost of €6 billion, and fifteen were approved at a total cost of €4.5 billion. These figures reflected the expected acceleration of approvals at the end of the 2007-2013 programming period.

The EBRD is heavily exposed to Russia, with 23 percent of loans, and has also had considerable exposure to Ukraine (€2,364 million, or 12 percent of loans out of €19,681 million). Taking account of total loans and undrawn commitments, Ukraine represents €4,075 million out of its €29,220 million portfolio. A concern is that EBRD might have to scale back new investment in the subregion to manage its country exposure, and particularly to protect its credit rating, impacting the availability of finance for North-South Corridor projects.

A further dimension of country risk relates to the broader geographic focus for EIB and EBRD, with reach into the North African region that was previously the focus of the World Bank Group and regional development banks such as the African Development Bank (AfDB). While consistent with EU concerns about supporting neighborhood countries, this has come at a time of increasing political volatility and portfolio risk in several markets, especially Egypt and Tunisia.

It is not all downside risk; European development banks are also gaining expertise about how to prepare successful offerings in challenging markets through syndication. The EBRD recently participated in a Turkish Infrastructure Bond, demonstrating that innovative financing solutions can be delivered in emerging financing markets, despite a political situation in Turkey that shows signs of instability.

The generic point is that it is important to acknowledge that regional and sub-regional political risk, largely related to countries to the south and east of the corridor itself, may have consequences for financing of infrastructure along the corridor. However, a deeper understanding of risk—technical, fiduciary, and governance—may help to offset this. It is therefore appropriate that this paper should urge both EBRD and EIB, together with the EU and national authorities, to invest further effort and resources in strengthening the regulatory environment, enhancing transparency, and helping to build predictable and stable conditions in support of North-South Corridor investment.

⁷ European Bank for Reconstruction and Development, *Annual Report 2013*, <http://www.ebrd.com/downloads/research/annual/ar13ec.pdf>.

TABLE 19. EBRD CONCENTRATION BY INDUSTRY SECTOR (€ MILLION)

Sector	Loans (2013)	Undrawn commitments and guarantees (2013)	Total
Power and Energy	2,113	1,416	3,529
Transport	1,394	391	1,785
ICT	348	24	372
Nonsovereign	16,880	5,984	22,864
Sovereign	2,801	3,555	6,356
Total	19,681	9,539	29,220

Source: EBRD.

PLACING THE NORTH-SOUTH CORRIDOR FINANCING REQUIREMENTS IN THE CONTEXT OF PUBLIC-SECTOR FINANCING OF INFRASTRUCTURE

In 2011, the European Commission found preliminary estimates for total infrastructure-investment needs up to 2020 in the range of €1.5-2 trillion, or an average of €150-200 billion annually (table 18). It noted that, “From now until 2020, €500 billion is estimated to be needed for the implementation of the Trans-European Transport Network (TEN-T) program. In the energy sector, public and private entities in the Member States will need to spend around €400 billion on distribution networks and smart grids, another €200 billion on transmission networks and storage as well as €500 billion to upgrade and build new generation capacity between now and 2020. Last, but not least, between €38-58 billion and €181-268 billion capital investment is required to achieve the Commission’s broadband targets.”

More recently, the European Commission⁸ put “overall investment needs for transport, energy and telecom infrastructure networks of EU importance amount to EUR 1 trillion for the period up to 2020.” For the European Union, the historical figure of 2.6 percent of GDP implies annual-investment amounts of nearly €500 billion for economic infrastructure until 2030.

The overall infrastructure deficit, as identified by the EU, remains acute—yet this is quite low compared to estimates provided from other sources. A survey conducted by Siemens Financial Services (SFS) concluded that almost €4 trillion will be required to meet Europe’s public infrastructure investment needs over the next twenty years. It is likely that this figure included a lot of municipal-level financing needs, especially in relation to renewals, that would have been omitted by the EU studies.

The most conservative figure (historical), with a constant share of (economic) infrastructure spending of 2.6 percent of GDP, would result in an average annual volume of about €470 billion, and a total investment amount of €8.4 trillion until 2030.

From 2006-2009, total (public and private) investment in infrastructure was 3.7 percent of GDP in fifteen old Member States (OMS), and 5.3 percent in ten new Member States (NMS). Infrastructure investment amounted to about €400 billion in the mid-2000s. It fell back after 2007, although government spending rose above €150 billion, but this was not sufficient to compensate for the decline of private finance.

In terms of sectors, transport—including telecom and storage—took the highest share, with 2.1 percent in OMS and 2.9 percent in NMS. Utilities (0.6 percent in OMS and 1.4 percent in NMS) were defined as including energy, water, sewage, and waste management. Social infrastructure—including health, social services, and education facilities that are not relevant to the North-South Corridor’s development—contributed another 1 percent in both subregions. The importance of this is that it highlights a continuing infrastructure deficit across the EU, most prominently in OMS. An exacerbating factor is that a high proportion of infrastructure is already at the end of its economic life, and part of the upturn in investment spending has to include renewals of existing infrastructure. This goes beyond asset maintenance, which is part of operational expenditure.

Research by EIB collated estimates of the scale of Europe’s infrastructure deficit. An infrastructure-financing gap can be defined as the difference between investment needs and resources, or between the funds needed and those available. If infrastructure investment needs are difficult to estimate, infrastructure-financing gaps are even more difficult. To date, hardly any attempts have been made at a proper quantification. The World Economic Forum (WEF) (2012) estimates a global infrastructure gap of about \$1 trillion per year (1.25 percent of GDP). This is the difference between investment needs of \$3.55 trillion and actual spending of \$2.5 trillion.

Polish Finance Minister Mateusz Szczurek, who took office last year, said the EU needs some €700 billion in

⁸ European Commission, *Long-Term Financing of the European Economy*, Green Paper (March 25, 2013), http://eur-lex.europa.eu/resource.html?uri=cellar:9df9914f-6c89-48da-9c53-d9d6be7099fb.0009.03/DOC_1&format=PDF.

TABLE 20. EU COMMISSION ESTIMATES OF INFRASTRUCTURE NEEDS TO 2020

Sector	Investment Needs (€ billion)
Energy (excluding power generation)	1,100
Transport	500
Telecoms	268
Total	1,500-2,000
Annual average	150-200

extra investments—or about 5.5 percent of the bloc's GDP—to reach its full economic potential. Given that national governments have cut back on public investment due to the EU's tough budget rules, and private investors are too concerned about the EU economy to put money into long-term projects, Szczurek has argued that the funds will have to come from the European level.

MACROECONOMIC INVESTMENT AS A COUNTERCYCLICAL TOOL TO ACCELERATE DEVELOPMENT

The current macroeconomic situation in the region is both an inhibitor to and a potential driver for investment. Public finances are severely constrained, limiting fiscal space for investment in the infrastructure needed to facilitate growth, further integration, and security. While much of the momentum relates to the need for innovative financing due to tight public-sector fiscal constraints, there is also a demand aspect. Interest rates have been at extremely low levels since the 2008 economic crash. Overnight deposits with the ECB are now negative. In addition, the ECB is showing an increased willingness to expand the money supply, and is in the process of implementing a form of quantitative easing.

While there are differences across the region, current European macroeconomic conditions reflect national and EU-level budget constraints, meaning that public expenditure for infrastructure is severely constrained and will remain constrained during the period 2014-2020, and is likely to be limited in the planning horizon for the EU's next budgetary round. However, low growth across much of the region—including most of the countries that form part of the North-South Corridor—also creates an environment where the case is growing stronger for a fiscal stimulus that potentially includes accelerated infrastructure expenditure. Pressure for investment is driven not only by the acknowledged need to address an infrastructure deficit, but also by the jobs agenda and as a mechanism to accelerate economic growth.

Very low treasury-bill yields are likely to be the norm for some years, given macroeconomic fragility in both the Eurozone and non-Eurozone countries that form part of the North-South Corridor. This may be seen as an opportunity, as it has the potential to create additional financing through two dimensions—directly, if banks on-lend to project promoters, and indirectly, as low

returns from treasury bills make pension funds and other financial intermediaries increasingly anxious to identify projects with stable, yet positive (above inflation), rates of return.

The political momentum for a fiscal stimulus is also creating an opportunity for innovative funding, and a greater willingness by the IMF and by central banks, including the ECB, to countenance additional on-budget and/or off-budget expenditures and loan guarantees.

AVAILABILITY AND IMPLICATIONS OF EU STRUCTURAL FUNDS

On the supply of infrastructure finance, financial assistance from EU Structural and Investment Funds for CEE makes a solid contribution. The total budget for the cohesion policy 2014-2020, which is implemented by the ESIF, was fixed in December 2013. The amount for 2014-2020 is €351.9 billion in current prices and is marginally (1.3 percent) higher than in 2007-2013. CEE-6 (Croatia, Czech Republic, Hungary, Poland, Romania, and Slovakia) have been allocated € 167.1 billion, which is approximately 50 percent of the total, and 11 percent more than during the previous, 2007-2013 period.

As noted in the transport chapter, EU Member States are in the process of signing Partnership Agreements (PAs) with the European Commission on the use of the European Structural and Investment Fund (ESIF)—covering the European Regional Development Fund (ERDF), the Cohesion Fund (CF), the European Social Fund (ESF), and other dedicated funding streams for the period of 2014-2020. It is anticipated that by the end of 2014 most of the PA will have been completed or will be in the latter stages of refinement. Therefore, the high-level strategic work will have been completed, and this must be respected in terms of prioritizing investment on the North-South Corridor.

There is a caveat to this—much of the work has been undertaken prior to the regional tensions related to the Ukrainian situation. It is likely that uncertainties created by this unforeseen change in circumstances has led both Member States and the EU to reemphasize the need for resilience in the energy, transportation, and communications sectors. As this moves up the agenda, attention should be given to expanding overall infrastructure spending, rather than trying to reprioritize projects that are in the pipeline. This includes, but is not limited to, the North-South Corridor.

PUBLIC-PRIVATE PARTNERSHIPS (PPP)

The best established model of shared investment and management, which can take a variety of forms, is through public-private partnerships. Table 21 (p. 72) summarizes the scale of PPP investment to date.

What Table 21 highlights is that the PPP market remains largely focused on Western European economies, and countries such as Greece do not appear to have had access to PPP funding following the financial crisis. One challenge, therefore, is to identify lessons (both positive and negative) that can be learned from the UK experience and are applicable to the North-South Corridor countries.

The situation regarding PPP investment continues to evolve. In Germany, the overall municipal-financing requirements may accumulate to €704 billion in the period from 2006 to 2020, corresponding to an annual-investment volume of €47 billion. Germany has reported a significant increase in the number of PPPs under preparation, at a time when mature markets such as the UK and Spain had slowed down. A significant contributing factor appears to be the setting up of Partnerschaften Deutschland, reflecting the German government's commitment to establishing an innovative and cost-effective range of mutually beneficial partnerships in Germany. This finding is not fully reconciled by the data in Table 21, and the probable reason for this relates to lags in deal completion.

SUPPLEMENTING EU STRUCTURAL FUNDS WITH COMMERCIAL FINANCE

Innovative financing will require a combination of public and private sources. In order to release this finance, the drivers and inhibitors of existing financial instruments must be understood. All the key players see opportunities for greater use of private finance, including the issuing of infrastructure bonds. New funding instruments have the potential to play a significant role.

Due to their public good and natural monopoly characteristics, infrastructure services require government regulation to ensure that services private firms supply have the right quality and quantity. A first, important, question is whether the regulatory environment is conducive to channeling private finance to infrastructure and, if not, how to change it. In fact, inadequate regulation may stifle the provision of private finance, bias its structure, and make it unduly expensive.

It is important to highlight that infrastructure finance concerns more than providing the money for the upfront capital expenditure on infrastructure; finance is also about who ultimately pays for the infrastructure. Getting the balance right between user charges and

support by current and future taxpayers is far from obvious, and the optimal balance is unlikely to be the same for all types of infrastructure or for all countries.

Particular interest is being paid to how to effectively mobilize relatively untapped sources of finance, such as investment-trust and pension money, to finance infrastructure. Generally, this has occurred on only a limited basis in Europe, with most of the focus on Western Europe—most notably the UK. Much of the momentum has been provided by international banks such as the Australia based Macquarie, and by major pension funds such as the Ontario Teachers' Pension Fund, which has taken substantial equity investments in Western European (primarily UK) infrastructure assets. In March 2014, Macquarie—which promotes itself as the world's largest infrastructure investor—launched the UK's first inflation-linked infrastructure debt fund.

Careful consideration is required of the regulatory and legal dimensions if this model is to be applied in the North-South Corridor. Many of the challenges, explored below, relate to the enabling environment rather than project preparation per se. However, considerable work has been undertaken by European funding institutions, most notably the EIB and EBRD, working in conjunction with the European Commission. Piloting is underway, for example, of the use of infrastructure project bonds.

The treatment of risk—especially whether it can be guaranteed and on what terms—is a key challenge from both a public-finance-management perspective and a sponsor-operational perspective. Clearly, if Member States are willing to guarantee financing, then many of the hindrances to attracting additional finance would disappear quickly. However, the devil lies in the details in terms of the treatment of risk, and there are substantial challenges establishing clear ground rules at a national level. One senior banker observed that, while the principles have been clearly articulated in the EU's Third Energy Package, with respect to the EU Gas Directive, the package still requires secondary legislation at the national level. For regional gas connectivity to be enhanced, the rules of operation need to be harmonized for different countries. There are good indications that progress has been better with respect to such harmonization at the northern end of the corridor than at the southern end, where institutional constraints remain considerable. This is a particular challenge because many of the most-promising investments, together with a high share of potential alternate sources of gas, come from those countries to the south.

Issues of continuity of supply, and building a robust infrastructure capable of adapting to changing circumstances, remain the primary economic and security drivers for the North-South Corridor. However, a key supply-side consideration relates to the EU's

TABLE 21. EU PUBLIC-PRIVATE PARTNERSHIPS (€ BILLION)

	1990-2012	Percent	2011	Percent	2012	Percent
Total EU	308	100	17.9	100	11.7	100
UK	141	46	3.2	18	5.7	49
Spain	34	11	0.3	2	0.2	2
France	32	10	11.0	61	3.9	33
Portugal	21	7	0	0	0.1	1
Greece	14	5	0	0	0	0
Germany	11	4	1.3	7	0.2	2
Italy	11	3	0.9	5	0.2	2
Belgium	6	2	0.7	4	0.2	2
Netherlands	7	2	0	0	0.9	8
Other EU	32	10	0.5	3	0.3	3

Source: Kappeler (2011), EPEC (2012,2013).

strategic objectives and targets with respect to energy efficiency, renewable energy, and climate change. The EBRD's Sustainable Resource Initiative (SEI) reflects these priorities, and builds upon its 2013 Energy Sector Strategy.

There are still risks. Financing of emerging markets grew in response to the 2008-2009 Western recession, yet anticipated tapering of quantitative easing by the US Federal Reserve in 2013 led to a net flow of funds back to Western financial markets.

Other risks relate to currency. If a high share of funding is denominated in US dollars or euros, but infrastructure-revenue streams are denominated in local currency, then major currency-valuation risks remain. Given the long-term nature of infrastructure bonds, currency hedging may not be practical, or may involve considerable costs that must be borne by the promoter.

The application of public-procurement systems remains a hindrance. Lead times remain high, and the burden on the scheme promoter is in many cases excessive, deterring all but the most solid of investment initiatives. The fact that Europe lacks a fully integrated gas market is an indication of the challenges in bringing projects to completion, and ensuring the requisite financing mechanisms are in place, even in the energy sector.

Finally, governance remains a concern, particularly at the southern end of the corridor. A senior banker highlighted the impact of corruption on project costs, as well as on the regulatory environment. The situation varies from country to country, but independent indices, such as the Transparency International Corruption Perceptions Index (CPI) highlight significant problems in some North-South Corridor countries. Given that energy, transport, and ICT are all sectors that are prone to corruption, this will be a significant hindrance to completion of the corridor if it is not addressed.

ENHANCING THE USE OF TECHNICAL ASSISTANCE TO PROMOTE NORTH-SOUTH PROJECTS FOR FINANCING

Institutional constraints often make it difficult for governments to pay for transaction advisory services. Transaction advice is intangible, and the advisers' rates are higher than citizens and government officials are used to paying. Moreover, specialist advisers are generally foreign, and PPP transactions can be controversial. This combination of factors makes it politically difficult for many governments to bear these transaction advisory costs. Governments, including EU Member States, are also constrained institutionally by de facto rate caps, and procurement processes that emphasize the lowest price over the best quality. This also limits the ability of governments to spend what is needed to hire effective advisers.

European financial institutions, including EBRD and EIB, are aware of this challenge. One response has been the creation of the Joint Assistance to Support Projects in European Regions (JASPERS). Established in 2006, it is a partnership funded by the EC, EIB, and EBRD, with external support from KfW. JASPERS has supported 310 projects representing €56.4 billion of investment. As noted in its annual report for 2013, JASPERS supports the preparation of projects for funding under Structural Funds and Cohesion Fund on behalf of fourteen EU Member States and three candidate countries JASPER's priority focus is

- development of key projects under preparation, with the aim of ensuring compliance with the relevant regulations and requirements and improving the quality of the projects prepared and of their justification for EU financing;
- preparation of the 2014-2020 IPA financing period, with the aim of improving programming and, subsequently, the timing and quality of the

actual projects to be implemented during that period; and

- transfer of relevant know-how in areas related to the management of the Structural Funds and Cohesion Fund (such as cost-benefit analysis, environmental-impact assessment, etc.) in line with working practices in EU Member States.

JASPERS has a small staff of less than ninety, which has not expanded since 2010. And while it does outsource work to consultants, the budget for this appears to be limited. One issue is whether JASPERS, and other sources of project-preparation technical assistance, should be expanded to enable them to resource the project-related activities, including PPP-type transactions, on the scale and complexity required to complete the North-South Corridor. This will help to address the risk that, without additional impetus, investments will be primarily directed toward the easier-to-reach project that can be brought to signature and effectiveness more quickly. Typically, these are not regional projects, because regional projects require greater collaborative effort between countries and authorities. All the main international financing institutions (World Bank, ADB, AfDB, IBRD, etc.) report a disproportionately high share of portfolio execution delays relate to their multi-country projects.

OTHER OPTIONS UNDER CONSIDERATION

It may be noted that this list of proposals does not include establishing new financial institutions, such as an infrastructure bank for Eastern Europe. New special-purpose banks have previously been established in Europe. Some countries, including the UK, have established green banks, with the specific purpose of channeling funds for green projects, although they usually act as financial intermediaries. However, there is no evidence that Eastern Europe lacks access to development banks per se, and any proposals to establish a new bank would risk creating understandable resistance from current institutional actors. A bank specifically for the corridor would be even less probable, and has been discounted as a possibility.

Another possibility would be to establish a new trust fund or facility for infrastructure. This could be based on the model of the Global Fund to Fight AIDS, Tuberculosis and Malaria, of the Global Alliance for Vaccines and Immunization (GAVI), both of which are based in Geneva. These were originally established as light-touch financing modalities, although they have subsequently expanded into carefully structured mechanisms based on the Challenge Fund principle. In the infrastructure sector, the Afghanistan Infrastructure Trust Fund (AITF) would be an example. It is managed by the ADB, and channels donor funds to priority infrastructure investments, including overseeing the

application of fiduciary safeguards. This model might be appropriate if it was managed by EIB or EBRD, but it does not appear appropriate as a standalone mechanism—especially taking into account OECD Development Assistance Committee (DAC) guidance about the cost of setting up such facilities. They exist outside established institutions, and can also create difficult governance challenges that are resource intensive to resolve.

China is in the process of establishing the Asian Infrastructure Investment Bank (AIIB) as an international financial institution. AIIB is regarded as a rival for the IMF and the World Bank. It has been developed in part because China considers that these institutions are dominated by developed countries like the United States and Japan. In June 2014, China proposed doubling the registered capital of the bank from \$50 billion to \$100 billion, and invited India to participate in the bank's founding. As of September 2014, this founding process is still underway. It is not yet clear whether it will invest exclusively within the region. In the longer term, it is likely that it will be channeling Asian surplus capital into assets (mining, land, infrastructure etc.) in other regions, such as Africa. It is unclear whether it might invest in Europe, but this seems unlikely in the 2014-2020 planning horizon.

In September 2014, the Polish minister of finance advocated establishing a dedicated European Fund for Investment. Key characteristics of this proposed fund are summarized in Box 2.

Although there is considerable pressure for action, it appears probable that Eurozone countries like Germany and Finland would resist the risks that such a fund would imply. In addition, non-Eurozone countries would resist the coercion of having to participate. The scale of the envisaged scheme also appears hard to countenance; it is not clear that (despite high infrastructure requirements) schemes could be brought forward on the scale required. It is also not clear that the financial markets would respond favorably to a fund on this scale, given that it is untried and its investment strategy would need to be clarified very quickly. There are further risks that Member States would demand investments on a comparable scale to their initial share of contributions; this, in turn, would alter the risk profile and jeopardize the Triple-A credit rating. Despite this, with a powerful proponent and an increasing risk of deflation, some scaled-down version could gain political traction.

Overall, given the substantial uncertainties, it appears appropriate for the Atlantic Council to avoid making such an initiative a centerpiece of the plan to finance the North-South corridor.

Another model worth noting is the Private Infrastructure Development Group (PIDG).

BOX 2. EUROPEAN FUND FOR INVESTMENT, A POLISH GOVERNMENT-PROMOTED INITIATIVE: KEY PROPOSED FEATURES

-Created as a special purpose vehicle; ideally as a special-purpose vehicle under the auspices of the EIB.

-The fund could borrow money on financial markets to invest in pan-European projects linked to transport, energy, information technology, and defense.

-The fund would be the owner of its projects and finance its operations by eventually privatizing them. Any losses at that stage would have to be borne by national governments "in a similar way and on a similar scale" to the European Stability Mechanism (ESM), which has €80 billion in paid-in capital and €622 billion in callable capital from the Eurozone's eighteen Member States, which enables it to raise €500 billion on the market in case a Eurozone sovereign needs emergency financing.

-The fund could then borrow money on financial markets and invest in pan-European projects, especially ones linked to transport, energy, information technology, and defense.

-The investment fund would rely on paid-in capital and guarantees from Member States, this time from the entire EU, not just the currency union.

-The structure was advocated on the grounds that it would be necessary to ensure a Triple-A credit rating.

-The finance minister proposed that all twenty-eight European Union countries should take part in the fund to prevent free-riding.

-The capital spending would start at 0.5 percent of European GDP in 2015, peak at 2 percent in 2017, and be gradually phased out afterward.

Although PIDG was set up to serve a different market, the need to address high infrastructure-investment costs is of note, as are the models of collaboration and market segmentation. Indeed, it is clear that there is more experience of these funding instruments in many emerging and developing countries than in some North-South Corridor countries.

CONCLUSIONS AND RECOMMENDATIONS

The overall challenge is therefore to make corridor investments fundable, in spite of their risks, financing

structures, and revenue potential. The North-South Corridor countries have not, until recently, been at the forefront of the development of innovative infrastructure-funding instruments.

While the new funding initiatives are not specific to the North-South Corridor, they lend themselves to piloting and rolling out to support completion of the corridor. While Member States, pre-accession countries, and neighborhood countries have different per-capita GNP and economic circumstances, there are many similarities in terms of economic fragility and limited traction toward higher growth rates. At the time of paper preparation, a significant drag on economic recovery relates to the imposition of limited sanctions against Russia in relation to Ukraine, and the Russian response to this situation casts significant uncertainty over the region.

- If funding constraints for the North-South Corridor are to be overcome, a number of complementary actions should be taken. These can be grouped into three categories:
 - Measures to strengthen project preparation and management, thereby ensuring that well specified, coherent clusters of projects (energy, transportation, and ICT) along the North-South Corridor are structured ready for investment
 - Increasing the public-sector resource envelope to finance key investments along the corridor; and
 - Mobilizing additional private-sector finance to complement the public-sector resources and to complete the corridor.

Measures to Strengthen Project Preparation and Management

- The prime objective is to strengthen project preparation, in order to build a mature and stable project pipeline. One facilitating step will be the provision of additional technical assistance (TA) in order to reduce lags and to address constraints to getting projects to effectiveness. The major thrust is to ensure that investment is accelerated during the 2014-2020 funding cycle.
- Enhanced clustering of projects is needed, both sectorally and geographically. In sectoral terms, this means ensuring that ICT ducting is provided alongside roads and pipelines, and network advantages are maximized. In geographic terms, it requires close collaboration between counterparties in neighboring countries to ensure that cross-border projects and links are planned and implemented in a joined-up manner.

- Steps are taken to secure long-lead inputs. These include compulsory land acquisition, where needed, as this has been shown to delay many infrastructure projects.
- The regulatory environment should be strengthened, with a particular focus on clarifying operating regulations, as well as capital investment-related issues (such as fiscal measures to enhance the tax treatment of new infrastructure investment).

Increasing the Public-Sector Resource Envelope to Finance Key Investments

- Expanded national investment funding can be achieved by encouraging Member States and pre-accession countries to commit a higher share of their national budgets to infrastructure investment—especially, but not exclusively, in the North-South Corridor—as a means to generate employment and growth, and to stave off the risk of deflation. This can be part of the IMF Article IV policy dialogue, and can also be promoted by the ECB for Eurozone countries and by other central banks for corridor countries.

Mobilizing Additional Private-Sector Finance to Complement the Public-Sector Resources and to Complete the Corridor

- The use of infrastructure and project bonds should be expanded. Creating longer-term and more-tradable infrastructure bonds that can attract pension-fund money and diversify the asset classes available to private investors.
- Private-sector-managed infrastructure asset funds should be created to target North-South Corridor countries. Supporting the development of innovative funding instruments, such as corporate and municipal bonds in the countries and markets of Eastern Europe that are important from a North-South Corridor perspective, drawing, where appropriate on experience from Western Europe and from emerging countries.
- Other securitized debt instruments could include borrowing against future gas-pipeline flows, or earmarking a share of fiscal revenues (such as fuel levies) against specific financing needs (on the model of road (maintenance) funds established in many developing countries).
- The preparation of regulatory asset bases (RABs) developed in privatized-utility models should be considered, in order to ensure that regulatory and political risk is appropriately allocated. Other technical building blocks include bringing asset registers up to date, and strengthening the quality of valuation and arbitration services.

BOX 3. MODELS OF INFRASTRUCTURE FINANCING: PRIVATE INFRASTRUCTURE DEVELOPMENT GROUP (PIDG) AND INFRASTRUCTURE DEVELOPMENT COLLABORATION PARTNERSHIP FUND (DEVCO)

The PIDG was established as a multi-donor organization to encourage private infrastructure investments in developing countries to enhance economic growth and poverty reduction. Since its establishment, the PIDG has established project development facilities (InfraCo Africa, InfraCo Asia Development, InfraCo Asia Investment, and DevCo) and project financing vehicles (GuarantCo, The Emerging Africa Infrastructure Fund (EAIF) and the Infrastructure Crisis Facility Debt Pool (ICF-DP)) aimed at addressing financial market failures that have created constraints to private investment in infrastructure service provision. The PIDG also operates a Technical Assistance Facility (TAF).

DevCo, which was established by the Public Private Partnership Transaction Advisory Department (PPPTAD) of ICF to promote PPP schemes in developing countries. It has been particularly mandated to help lower the high cost front-end of PPP projects in order to stimulate additional private financing of infrastructure. Its geographical brief has been interpreted quite broadly and includes power projects in Kosovo, so there is some overlap with elements of the North-South Corridor.

Source: Private Infrastructure Development Group.

- Expansion of EIB and EBRD funding resources should be supported. One option would be to consider expanding their capital base, in a manner that is consistent with Basel3 obligations.
- Commercial banks should be given incentives to enhance infrastructure loan values and terms, strengthening the supply of longer-term project finance from commercial banks operating in the region, possibly through fiscal inducements.
- Introducing new risk-guarantee mechanisms, through the enhanced measurement of risk, in terms of more effective and credible credit-rating mechanisms (that take on board the lessons from the 2008 financial crash).

BIOS



JAMES L. JONES, JR.

Founder and President, Jones Group International

General James L. Jones, Jr. (USMC Ret.) is a former commander of US European Command and Supreme Allied Commander Europe, where he led all military operations for NATO and later, as national security advisor, he brought clear vision and steady leadership to America's mission in Iraq, the war in Afghanistan, and the country's interests around the world. Jones graduated from the Georgetown University School of Foreign Service and was commissioned into the Marine Corps in January 1967. He served in Vietnam, serving as rifle platoon and company commander. On returning to the United States, he pursued a career in the Marines, attending the Amphibious Warfare School in 1973 and the National War College in 1985, and serving as Marine Corps liaison officer to the US Senate. He was also commanding officer of the 24th Marine Expeditionary Unit in Northern Iraq and Turkey on Operation Provide Comfort; chief of staff, Joint Task Force Provide Promise, for operations in Bosnia-Herzegovina and Macedonia; and commanding general, 2nd Marine Division, Marine Forces Atlantic. He also served as military assistant to the secretary of defense from 1997 to 1999. He became the 32nd commandant of the United States Marine Corps in July 1999. During his NATO assignment from 2003-2006, he advocated energy security and the defense of critical infrastructures as a core part of NATO's future missions. With the Chamber, Jones worked to unite energy consumers and producers for a common goal—to increase the variety of the US energy supply and associated infrastructures, to advance international cooperation on energy issues, to protect national energy security, and to promote better understanding of changes to the global climate and its effects on the environment.

Upon retirement in February 2007, Jones became the president and CEO of the US Chamber of Commerce's Institute for 21st Century Energy and, in 2008, served as the State Department's Special Envoy for Middle East Regional Security. From 2009 until 2010, he served as President Obama's national security advisor at the White House.



PAWEŁ OLECHNOWICZ

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Paweł Olechnowicz graduated from AGH University of Science and Technology in Cracow (the Faculty of Technology and Mechanisation of Foundry Engineering), completed a post-graduate course in Organization, Economics and Industrial Management at Gdańsk University of Technology, MBA INSEAD, Fontainebleau, and attended many specialist courses in management, both in Poland and abroad.

In 1977, Olechnowicz started his professional career in Zakłady Mechaniczne "Zamech" in Elbląg. From 1990 to 1996, he held the position of president of the Management Board and director general of ABB Zamech Ltd. Subsequently, for two years, Olechnowicz worked at the headquarters of ABB Ltd Zurich in Switzerland as vice president for Central and Eastern Europe. From 1999 to 2000, Olechnowicz was vice president and deputy director general of ZML Kęty S.A., and from 2001, managed Paweł Olechnowicz-Consulting.

Olechnowicz has served as the president of the Management Board of Grupa LOTOS S.A. since March 12, 2002. He manages and is responsible for all operations of Grupa LOTOS S.A.



FREDERICK KEMPE

President and CEO, Atlantic Council

Frederick Kempe is the president and CEO of the Atlantic Council. He is an award-winning journalist, best-selling author, columnist, and a regular commentator on television and radio both in Europe and the United States. He is also a visiting fellow at Oxford University's Saïd Business School.

Previously, Kempe spent nearly thirty years with the *Wall Street Journal*, where he won national and international prizes while serving in numerous management and reportorial capacities—editor, associate publisher, columnist, and correspondent. He was most recently assistant managing editor, international, and “Thinking Global” columnist. He was previously the longest-serving editor and associate publisher ever of the *Wall Street Journal* Europe and was European editor for the global *Wall Street Journal* from 2002 to 2005, also overseeing Middle Eastern reporting. As managing editor from 1992 to 1997, he created the Central European Economic Review and cofounded *Convergence*, a magazine on Europe’s digital economy.

Kempe has been published in several languages. His works include *Divorcing the Dictator: America’s Bungled Affair with Noriega*, *Siberian Odyssey: A Voyage into the Russian Soul*, and *Father/Land: A Personal Search for the New Germany*. His latest book, *Berlin 1961: Kennedy, Khrushchev, and the Most Dangerous Place on Earth* (Putnam), was released in 2011 and was a *New York Times* bestseller.



JAN KULCZYK

*Chairman of the Board of Directors, Kulczyk Investments
Founder, Central & Eastern Europe Development Institute
Member of the International Advisory Board, Atlantic Council*

The only Polish entrepreneur to operate globally in over thirty countries on four continents in the sectors of oil and gas, energy, mineral resources, infrastructure and real estate. Jan Kulczyk has played an active role in the transformation of the Polish economy. He participated in some of the largest privatization deals and shareholding restructurings as well as successfully completed major projects based on private-public partnership.

Kulczyk is a cofounder of the Polish Business Roundtable and has been the Honorary Chairman of the German-Polish Chamber of Commerce as well as the Chairman of the Polish-Ukrainian Chamber of Commerce. Since July 2006 he has been a member of the Board of Directors of the Green Cross International and in October 2007 was appointed as chairman of the board. In 2010, he founded CEED Institute, a think tank to promote the achievements of the new EU Member States. In 2014, Jan Kulczyk created the Council of Investors in Africa. He is a member of the Atlantic Council International Advisory Board.

A philanthropist, patron of culture and sport, Kulczyk has been decorated with the Polonia Restituta Order and the Golden Medal of Saint Paul Fathers for special contributions to the Jasna Góra Monastery. He is also a holder of the prestigious Kisiel Award. In 2012, he was awarded the Patron of Culture title by the Ministry of Culture and National Heritage. As one of the world’s foremost entrepreneurs, he was awarded the title of Friend of Nigeria by the Nigerian government. He is the strategic sponsor of the Polish Olympic team, supporting initiatives that unite business, politics, and sports societies to develop amateur and professional sports in Poland.



JANUSZ LUKS

Chief Executive Officer, Central Europe Energy Partners

Janusz Luks is the CEO of Central Europe Energy Partners, AISBL, strategic analyst with special interest in the energy sector and background in Poland’s administration and foreign service. Additionally, Luks is a member of the EUCERS Advisory Board at King’s College London.



IAN BRZEZINSKI

Senior Fellow, Brent Scowcroft Center on International Security, Atlantic Council

Ian Brzezinski brings to the Council more than two decades of experience in US national security matters, having served in senior policy positions in the US Department of Defense and the US Congress. He currently leads the Brzezinski Group, which provides strategic insight and advice to government and commercial clients.

Brzezinski served as deputy assistant secretary of defense for Europe and NATO policy (2001-05). His office formulated, coordinated, and executed bilateral and regional engagement strategies and defense guidance with the Joint Staff, Unified Combatant Commands, and Defense Department elements. His lead responsibilities included NATO expansion; Alliance force planning and transformation; and NATO operations in the Balkans, the Mediterranean, Afghanistan, and Iraq. Key highlights of his tenure include the expansion of NATO membership in 2004; the consolidation and reconfiguration of the Alliance's command structure; the standing up of the NATO Response Force; and the coordination of European military contributions to US and NATO-led operations in Iraq, Afghanistan, and the Balkans.



DÁVID KORÁNYI

Director, Eurasian Energy Futures Initiative, Atlantic Council

David Korányi is an expert on the geopolitics of energy, Hungarian, European and US foreign and energy policy, European integration and the Western Balkans. He is the editor of a book *Transatlantic Energy Futures—Strategic Perspectives on Energy Security, Climate Change and New Technologies in Europe and the United States* published in December 2011 by Johns Hopkins SAIS Center for Transatlantic Relations. Korányi served as undersecretary of state and chief foreign policy and national security advisor to then-Prime Minister of the Republic of Hungary Gordon Bajnai in 2009-2010. He worked in the European Parliament as chief foreign policy advisor and head of cabinet of a Hungarian MEP (2004-2009). Previously he was a political adviser at the Hungarian National Assembly and a junior researcher at GKI Economic Research Institute, in Budapest, Hungary. Korányi is a member of the European Council on Foreign Relations, the Hungarian Europe Society and the International Advisory Board of the XII Project. He was a member of the Hungarian NATO Strategic Concept Special Advisory Group in 2009, the recipient of the German Marshall Fund's Marshall Memorial Fellowship (2010), Marshall Memorial Fellow Selection Board Member (2011), and beneficiary of the French Foreign Ministry's Personalities of the Future Fellowship (2012).



KRISZTINA BÁRDOS

Managing Director, IFKA Public Benefit Nonprofit Ltd

Krisztina Bárdos, MSc, PhD, has been the director of IFKA (Public Benefit Non Profit Ltd for the Development of the Industry) since 2008. After receiving her degree in economics, she carried out her PhD studies both in Hungary and in Newcastle, UK. She started her career at IFKA as a logistics expert in 1997, then as a researcher at the Hungarian Academy of Sciences (2003-2005), before serving in her current capacity. Her research interests include transaction costs, vertical supply chain coordination, and new institutional economics theory in the logistics sector.

In addition to her research profile, she serves as a qualified logistics expert. She leads several R&D&I projects in different sectors at the company level, and she has extensive project management experience at the national and international levels with extended focus. She is responsible for the coordination of the National Midterm Logistic Strategy development approved by the Hungarian government.

She is a member of several professional national and international organizations, such as the European Association of Agricultural Economists, the European Association for the Transfer of Technologies, and the Innovation and Industrial Information as well European Regions Research and Innovation Network. She is a member of the Committee of the Hungarian Innovation Association. She is on the Board of Presidents of the Hungarian Association for Logistics, Purchase, and Inventory Management as well. She also holds a leadership position in Hungarian Investment Council's Logistics Workgroup. She was the professional leader of several study tours in order to visit international companies with well-developed process management throughout Europe. She worked as an external expert to the EU's Leonardo da Vinci European Action Program.



PÁL BELÉNYESI

Professor, John Cabot's University

Pál Belényesi is an EU policy expert and qualified international negotiation professional. He has over ten years of post-qualification work experience in network industries, competition (antitrust, state aid, and mergers) and environmental law. He worked for national authorities in Hungary, for the European Commission, the European Parliament, and blue chip companies in Hungary, Italy, and in the United States. Belényesi is a university lecturer, a competition consultant, and a regular conference speaker in Europe, Asia and America. Currently, he is an adjunct professor at the John Cabot University in Rome, Italy, where he teaches EU economics and competition and negotiation leadership. He also consults clients in strategy, regulatory, and general management, and represents Hungarian industrial interests in the transport and logistics sectors in Brussels.

He holds a JD degree from the University of Debrecen, Hungary, and ILSP Certificate from the University of Antwerp, Belgium. He earned his LLM at the European University Institute in Florence, Italy, and he defended his PhD on water pricing and regulation at the University of Debrecen, Hungary. He has been publishing widely both in academic periodicals and in other journals. He is fluent in Hungarian, English, Italian, French, and Spanish, and is intermediate in German and Russian.



JOHN ROBERTS

Senior Fellow, Atlantic Council

John Roberts is a senior fellow at Atlantic Council's Dinu Patriciu Eurasia Center. He is also a senior partner with Methinks Ltd, a consultancy specializing in the interrelationship between energy, economic development, and politics. He has particular expertise in the development of energy in the Caucasus and Central Asia and in the pipelines connecting or intended to connect the Caspian to China, Russia, India, and Europe.

Roberts is one of Europe's leading energy security specialists. He served as managing editor at Platts for twelve years and previously with Financial Times Energy, focusing on the development of energy and on the impact of energy on development. In assessing global energy security issues, he has regularly toured the Gulf and the Caspian, as well as visiting the Alaskan North Slope, the Athabasca Tar Sands, China, Norway, and Venezuela. He has also testified to UK parliamentary committees on Turkish, Russian, Caspian, and Mideast energy security issues. He is currently researching shale gas development in China and hydrocarbons development in the Eastern Mediterranean and Northern Iraq.

His books include *Caspian Pipelines* (1996), *Visions & Mirages: The Middle East in a New Era* (1995), and *Beyruth: L'Été '82 (Beirut: Summer of '82)* (1983). His latest book, *Pipeline Politics: The Caspian and Global Energy Security*, is due to be published in 2015 by the Royal Institute of International Affairs in the United Kingdom and by the Brookings Institution in the United States.



MARK Q. WATSON

Freelance Economic Consultant

Mark Q. Watson is an economist and institutional development specialist with specialization in policy dialogue, aid instruments, capacity building, and performance monitoring and evaluation. He has been a freelance economist consultant since 2002, which has included projects such as providing advisory services about options for the successor organization of the UK's Strategic Rail Authority, prepared a guidance note for European Commission staff on incorporating civil society support in sector programs, and working as an economist and aid modalities specialist to evaluate EU support to twenty overseas territories.

Previously, he worked as associate director at Jacobs Consultancy from 2001 to 2002, a senior resident representative at Crown Agents from 1995 to 2000, deputy head of the Economics Consultancy Service at Crown Agents from 1991 to 1995, and senior economist at WS Atkins Planning and Management Consultants from 1982 to 1991.

Watson received his BA in economics from University of York in 1978 and his MA in transport economics from Leeds University in 1982.

ABOUT

The Atlantic Council, a leading nonpartisan foreign policy think tank headquartered in Washington, DC, promotes constructive leadership and engagement in international affairs based on the Atlantic Community's central role in meeting global challenges. The Council provides an essential forum for navigating the dramatic economic and political changes defining the twenty-first century by informing and galvanizing its uniquely influential network of global leaders. Through the papers we write, the ideas we generate, and the communities we build, the Council shapes policy choices and strategies to create a more secure and prosperous world.

Central Europe Energy Partners, AISBL (CEEP) is an international nonprofit association, registered on the June 10, 2010, with its headquarters based in Brussels, Belgium. The overriding goal of this organization is to support Central Europe's energy sector integration within the framework of a common EU energy and energy security policy. CEEP is open to all legal entities from the EU's Central European Member States, with the possibility, in the future, to include entities outside the EU, as well as private individuals who are dealing with issues related to this sector. Learn more about CEEP at their website: www.ceep.be.

Central & Eastern Europe Development Institute (CEED Institute) is a think tank whose aim is to promote the achievements and economic potential of Central Europe. CEED Institute supports business initiatives, as well as debates on indispensable reforms in the region, including measures to boost sustainable growth and innovative capacities. The objective of CEED Institute is the dissemination of ideas and projects on how best to improve efficiency and competitiveness of the region. Learn more about CEED Institute at www.ceedinstitute.org.

Grupa LOTOS S.A. is the parent company of LOTOS Group, which is a vertically integrated oil entity focused on crude oil exploration and production, petroleum processing, as well as commodities sales. Moreover, LOTOS Group holds a strong position in lubes, greases and bitumen sales in Poland. Since June 9, 2005, Grupa LOTOS S.A. has been listed on the Warsaw Stock Exchange. LOTOS, throughout its business units located all over Europe (Poland, Norway, Lithuania), employs approximately 5,000 people. LOTOS operates a state-of-the-art refinery (located in Gdańsk). In 2011, using hi-tech solutions e.g., Best Available Techniques (BAT), LOTOS finished a comprehensive upgrade investment project (Programme 10+), whose main goal was to boost refining capacity to 10.5 mtpa. Due to Programme 10+, LOTOS is able to enhance Polish, Northern European, Western European, and Central and Eastern European energy security policy, especially in the range of stable fuel supplies. On the upstream side, LOTOS is present on the Baltic Sea, Norwegian Continental Shelf, and onshore in Lithuania. In 2015, LOTOS plans to produce 1.2 mtpa of crude oil. All the above-mentioned key goals, laid out in the company's corporate strategy for the years 2011-2015, constitute the pursuit of innovative growth in the areas of crude exploration and production, petroleum processing, as well as sales and trading of products meeting the most stringent quality standards in a manner that is environmentally friendly, compliant with energy security policy, and guarantees full satisfaction of customers and ensures the ongoing development of employees' and shareholders' interests. Learn more about Grupa LOTOS at their website: www.lotos.pl.

Przedsiębiorstwo Eksploatacji Rurociągów Naftowych S.A., PERN "Przyjaźń" is a dynamically developing group of companies, which apart from PERN "Przyjaźń" S.A., also includes the following five subsidiaries: OLPP Sp. z o.o., NAFTOPORT Sp. z o.o., CDRiA Sp. z o.o., PETROMOR Sp. z o.o. and Siarkopol Gdańsk S.A. In total, the group, manages nearly 2,500 km of crude oil and fuel pipelines, and owns over 3 million m³ of crude oil storage capacity and 1.8 million m³ for liquid fuels. It also manages a sea terminal handling 34 million tonnes of crude oil, annually. The group also provides services, such as the transport, handling and storage of crude oil, reloading and blending fuels, as well as laboratory testing of petroleum products. The strategy of PERN "Przyjaźń" Group of Companies involves strengthening its position in the area of crude oil storage and transportation, as well as further development in the fuels sector, including, but not limited to, the expansion of storage capacity, pipeline network and infrastructure at the seaport in Gdańsk. PERN's "Przyjaźń" website is www.pern.com.pl.

The Atlantic Council is a nonpartisan organization that promotes constructive US leadership and engagement in international affairs based on the central role of the Atlantic community in meeting today's global challenges.

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