



European  
Commission



# Connecting Europe

The energy infrastructure for tomorrow

Energy



# Foreword



If we are to achieve our energy and climate goals of “20-20-20 by 2020” and ensure the transition to a low-carbon economy by 2050 while fostering growth and jobs, Europe needs to invest in the modernisation of the energy infrastructure in the next ten years. Without the adequate energy

infrastructure, the costs of this transition will increase. The Energy Infrastructure Package along with the Guidelines and the Connecting Europe Facility (CEF) provide a great opportunity to pave the way for the 2020 objectives, as it offers a perspective to develop the networks of the future. This requires a stronger focus on EU-wide priorities, a stable and incentivising investment climate, transparency, and open dialogue with citizens, and more efficient permit granting. Whenever the market cannot deliver on its own, and solidarity is required, CEF can provide financial aid from the Union’s budget 2014-20, be it to connect so-called energy islands or to ensure security of supply. The dialogue with the citizens in the EU, the network operators, the regulators and the investors’ community is at the heart of our strategy. This brochure gives an overview on the elements of the Energy Infrastructure Package, the new priority corridors and areas for the decade up to 2020 and beyond, across the whole energy infrastructure sector.

Realising investments in transmission infrastructure

is expected to create 410 000 additional jobs and increase GDP in the EU by 0.42 percentage points during the period 2011-20. In addition to traditional grants, the Connecting Europe Facility will be the basis for new financial instruments in the energy sector. These equity and debt instruments will be crucial to attract institutional investors and stimulate economic recovery. Already in 2012, the project bonds pilot phase is to be launched to establish a new project financing instrument in the EU.

A handwritten signature in black ink, which appears to read 'G. Oettinger'. The signature is stylized and fluid.

Günther H. Oettinger  
European Commissioner for Energy

# Contents

<b>Investment challenge</b> .....	3
<b>The infrastructure package</b> .....	4
<b>The need for public funding under the Connecting Europe Facility (CEF)</b> .....	5
Electricity: Scale of investment challenge, 2012-2022.....	6
Gas: Scale of investment challenge, 2011-2020.....	7
<b>Investment needs</b> .....	8
<b>Accessing financial support under CEF</b> .....	9
<b>Priority electricity corridors</b> .....	10
<b>Priority gas corridors</b> .....	14
<b>Priority oil corridor</b> .....	18
<b>Priority thematic areas</b> .....	19

# Investment challenge

The EU's energy infrastructure is ageing and, in its current state, not suited to match future demand for energy, to ensure security of supply or to support large-scale deployment of energy from renewable sources. The upgrading of existing, and development of new energy transmission infrastructures of European importance, will require investments of about EUR 140 billion in electricity and at least EUR 70 billion in gas.

This challenge and its urgency are unprecedented, as they combine cyclical reinvestment needs with new requirements – mainly due to rapidly increasing amounts of electricity generated from variable sources – arising from the EU's energy and climate policy objectives for 2020 and beyond. Between now and 2020, investment volumes in the different Member States will be multiplied by two, or even three compared to the last decade.

Such investment will have a significant impact on the cost of transmission, notably in electricity. While network tariffs will only increase slightly in some Member States, they could double in others, thereby fuelling the debate on increasing electricity prices due to the cost of national renewables support schemes. However, lack of interconnections will reduce opportunities for system optimisation, increase the risk of disruption and trigger additional, much costlier back-up and balancing generation investments. Supplying energy and balancing supply and demand will become more expensive, with the corresponding effects on the competitiveness of European industries, consumers and growth.

But lack of investment is exactly what will happen if no measures are taken to accelerate permit granting procedures and to enable new projects that provide high overall socio-economic benefit but insufficient short-term or direct benefit to the investors. Such measures should be first and foremost of regulatory nature. Proper allocation of costs between the Member States concerned by cross-border infrastructure projects, based on a joint understanding of the benefits of that project for each of them, will solve some of the problems encountered today. So will incentives and other regulatory answers covering the specific risks that some projects of European dimension carry, such as the need for anticipatory investment or the investment in first-of-its-kind solutions. And so will also financial instruments, which can facilitate access to long term financing by providing debt facilities or injecting equity into projects. But regulation alone will not be enough. So public support is necessary to enable the implementation of the small, but significant share of projects, which are vital, for example because of the security of supply they provide, but will not happen even with regulatory support. This is why the European Commission is proposing to set up a new dedicated facility allowing co-funding of projects.

# The infrastructure package

In October 2011, the European Commission tabled a comprehensive package to enhance trans-European infrastructure development in the areas of transport, energy and information society. This package includes five legislative proposals: the three sectoral guidelines, establishing the sectoral infrastructure policies and the Connecting Europe Facility (CEF), providing financial aid to the three sectors (EUR 30 billion for transport, EUR 9.1 billion for energy and EUR 9.2 billion for ICT) along with the project bond pilot proposal as a forerunner for other financial instruments. In this context, the term energy infrastructure covers electricity transmission lines, gas, CO<sub>2</sub> and oil pipelines, Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG) reception facilities and electricity and gas storage.

The trans-European energy infrastructure guidelines identify twelve priority corridors and thematic areas that must be implemented in the coming decade to help the EU meet its short and longer term energy and climate objectives. To translate these corridors and areas into concrete projects, the guidelines include a new way of identifying energy infrastructure projects that can receive the label of Projects of Common Interest (PCI), which are necessary to implement these priority corridors and areas. The starting point for project selection will be the Ten-Year Network Development Plans (TYNDP) prepared by the European Networks of

Transmission System Operators (ENTSO) for gas and for electricity. However, in a first phase, projects which are not part of the TYNDPs will also be considered. Lengthy permit-granting procedures and public opposition are the main hurdles for infrastructure development, especially for overhead electricity lines. The guidelines propose to introduce a binding over-all time limit of three years and to concentrate the permit-granting powers or coordination in one single authority (one-stop-shop) and propose that Member States streamline their environmental authorisation procedures. To enhance public acceptance, the guidelines introduce rules on enhanced transparency. The objective is to render the process more efficient while safeguarding the EU's high standards in environmental protection.

The guidelines also propose a cost-benefit analysis (CBA) to clearly demonstrate cross-border benefits and provide the possibility to allocate costs following the benefits. In addition, they propose that national regulatory authorities provide regulatory incentives commensurate to the risks incurred by such projects. Finally, under the CEF regulation, support for studies and innovative financial instruments, such as project bonds, will be available to all PCIs to improve their bankability and reduce their cost of capital.

4

Projects in Ten-Year Network Development Plans (+additional projects in the period 2012/13)

Projects of Common Interest, all eligible for financial instruments and grants for studies

Projects of Common Interest eligible for grants for works

# The need for public funding under the Connecting Europe Facility (CEF)

Although accelerated permitting and regulatory measures will “rescue” many projects, some EUR 60-70 billion of investment will still remain at risk unless public money is provided. Under current market and regulatory conditions some energy projects are not commercially viable, and would normally not make it into investment programmes of infrastructure developers<sup>1</sup>. The lack of commercial viability often stems from the inability to recover all the costs through tariffs. Such projects include the lifting of energy isolation, security of supply or innovative technological solutions. In other cases, the spread of future benefits may be too uncertain to lead to an agreement on cost allocation, and implementation of the project is delayed. The unprecedented investment volumes combined with the current context of the financial markets is yet another root of the investment gap. All Transmission System Operators (TSOs) will need to build more projects than in the past; many of them are expected to step up their investment plans even threefold. For many, it will be a major test of their financial strength and their ability to access long term financing needed for their projects. This is likely to be further aggravated by the increasing cost of financing as a consequence of the credit crisis and the regulatory measures which follow (Basel III, Solvency II).

CEF is engineered to address both groups of factors behind the investment gap. Financial instruments, by bringing in new classes of investors (pension and insurance funds) and mitigating certain risks, will help project promoters to access the necessary financing for their projects. Grants to contribute to the construction costs will be applied to fill in the gaps in commercial viability of the projects that are particularly relevant for Europe.

---

<sup>1</sup> The comparatively simpler and higher-return projects (often of solely national nature) are granted priority

# Electricity: Scale of investment challenge, 2012-2022

The European Network of Transmission System Operators for Electricity (ENTSO-E) table below illustrates the total expected investments cost per

country for projects of pan-European significance until 2022<sup>2</sup>. The total investments costs amount to EUR 104 billion, of which EUR 23 billion is for subsea cables<sup>3</sup>.

	billion EUR
Austria	1.1
Belgium	1.9
Bosnia-Herzegovina	0.0
Bulgaria	0.2
Croatia	0.2
Czech Republic	1.7
Cyprus	0.0
Denmark	1.4
Estonia	0.3
Finland	0.8
France	8.8
FYROM	0.1
Germany	30.1
Greece	0.3
Hungary	0.1
Iceland	0.0
Italy*	7.1

	billion EUR
Ireland	3.9
Latvia	0.4
Lithuania	0.7
Luxembourg	0.3
Montenegro	0.4
Netherlands	3.3
Norway	6.5
Poland	2.9
Portugal	1.5
Romania	0.7
Serbia	0.2
Slovakia	0.3
Slovenia	0.3
Spain	4.8
Sweden	2.0
Switzerland	1.7
United Kingdom	19.0

<b>Total 'ENTSO-E' perimeter</b>	<b>104</b>
----------------------------------	------------

<sup>2</sup> Source: ENTSO-E, Ten-Year Network Development Plan 2012, Project for Consultation, draft version for Public Consultation 1 March – 26 April 2012, page 61.

<sup>3</sup> These figures do not include investment needs for Smart Grids, amounting to approximately EUR 40 billion.



## Gas: Scale of investment challenge, 2011-2020

The table below estimates the costs per infrastructure type broken down per final investment decision (FID) and non-FID projects<sup>4</sup>.

These costs only relate to estimation provided by some project promoters under the framework of ENTSO-G TYNDP 2011-2020. It has to be considered that for confidentiality reasons some promoters have not submitted any cost estimation and that TYNDP makes

no assessment about which projects will be commissioned or not. Additionally many additional investment projects have not been submitted, especially by TSOs, as they are essentially of national relevance or linked to renewal of existing infrastructure and decommissioning of others. Some third party project promoters have also decided not to submit their project to ENTSO-G's TYNDP.

TYNDP Gas 2011-2020	Number of projects	Aggregate cost estimate for infrastructure investment (in billion EUR)
Transmission projects – FID	62	13.711
Storage projects – FID	26	4.260
LNG projects – FID	11	3.570
Transmission projects – Non-FID	97	58.556
Storage projects – Non-FID	22	2.593
LNG projects – Non-FID	20	6.614
<b>Subtotal FID projects</b>	<b>99</b>	<b>21.514</b>
<b>Subtotal Non-FID projects</b>	<b>139</b>	<b>67.763</b>
<b>TOTAL</b>	<b>238</b>	<b>89.304</b>

<sup>4</sup> Source: ENTSO-G, Ten-Year Network Development Plan 2011-2020, page 23

# Investment needs

The table below shows, for each priority corridor and thematic area, the estimated investment needs, the expected investment gaps and the amounts that are needed to stimulate the investment and prevent the gap. Even though the estimates are very conservative, nothing less than EUR 9.12 billion will suffice to make sure

that the infrastructure Europe needs is built in time<sup>5</sup>. The reasons behind the investment gap in each priority corridor vary. For some corridors, proportionally less public money will be required as their problems can be addressed best with financial instruments which are inherently less budget intensive.

Priority corridors	Total investment need (bn EUR)	Estimated Investment gap (bn EUR)	Average co-financing ratio need	Likely need for funding (bn EUR)
Northern Seas offshore grid	30	8	0.10	0.80
North-South electricity interconnections in Western Europe	30	5	0.10	0.50
North-South electricity interconnections in Central Eastern and South Eastern Europe	40	12	0.20	2.40
BEMIP electricity	5	3	0.50	1.50
North-South gas interconnections in Western Europe	20	1	0.10	0.10
North-South gas interconnections in Central Eastern and South Eastern Europe	26	5	0.20	1.00
Southern Gas Corridor	22	8	0.10	0.80
BEMIP gas	3	2	0.50	1.00
Oil supply connections in Central Eastern Europe			0	0.00
Priority thematic areas				
Smart grids deployment	40	20		1.00
Electricity highways	included in electricity corridors			
Cross-border CO <sub>2</sub> network (if technology viable)	2.5	2		0.02
<b>TOTAL</b>	<b>218.5</b>	<b>66</b>		<b>9.12</b>

<sup>5</sup> These are approximate figures, mainly from the European Commission's DG ENER, calculations based on data from PRIMES (as a partial equilibrium model for the European Union energy markets, PRIMES is used for forecasting, scenario construction and policy impact analysis up to the year 2030), European Network of Transmission System Operators (ENTSOs), KEMA etc.

# Accessing financial support under CEF

To be eligible for financial support under the CEF, projects must firstly be identified as Projects of Common Interest (TFEU Art 172). The first Union-wide list of PCIs is being prepared during 2012 and its formal adoption is expected in 2013.

## Identifying potential PCIs

During this preparatory process in 2012, for the purposes of identifying PCIs, the Commission has established ad-hoc working groups, each covering one of the identified priority corridors and their respective geographical area as set out in Annex I of the draft Regulation.

In the future, all potential PCIs will have to be in the TYNDPs of the ENTSO for electricity and the ENTSO for gas. However, for the first Union-wide list of PCIs, the selection process will differ. For projects promoted by an established TSO and included in the latest TYNDP prepared by the ENTSO for electricity (2012) or for gas (2011), the TSO shall submit project information directly to the relevant ad hoc working group. This will include a cost-benefit analysis (CBA) demonstrating the benefits of the project in terms of European added value and its contribution to the EU's energy and climate policy goals, according to the technical criteria defined in Article 4 of the Guidelines. For projects not included in the latest TYNDPs for electricity and gas, the Commission has coordinated a request for this same information on behalf of the working groups.

## Evaluating the submitted projects

When evaluating potential PCIs, ad-hoc working groups will consider:

- the assessment of the CBA submitted by the TSOs and project promoters,
- the results of the public consultation coordinated by the Commission and open for stakeholders' input between June and September 2012,
- the opinion of the National Regulatory Authorities on each of the projects and the quality of the CBA,
- the opinion of ACER on the cross-regional consistency.

## Adopting the Union-wide list of PCIs

Draft regional lists of potential PCIs will be established by the end of 2012, and will be reviewed, if necessary, upon the entry into force of the guidelines. The final Union-wide list will be adopted in 2013.

From 2014 onwards, PCIs will be eligible to submit a request for financial support for studies under the annual call for proposals under the CEF and to contact any of the financial intermediaries in which the Commission has entrusted the implementation of the debt and equity instruments.

PCIs may also be eligible to submit a request for financial support for works under the annual or multiannual call for proposals under the CEF provided they meet the following two conditions:

- the project must demonstrate societal non-commercial benefits through a CBA and business plan,
- the concerned national regulatory authority(ies) has/have provided a positive opinion on the CBA and on the extent of the non-commercial benefits.

## Northern Seas offshore grid

*An integrated offshore electricity grid in the North Sea, the Irish Sea, the English Channel, the Baltic Sea and neighbouring waters to transport electricity from renewable offshore energy sources to centres of consumption and storage.*

Offshore wind capacities in the Northern Seas could reach 40 Gigawatt by 2020 – or the equivalent of about 80 standard combined cycle gas turbines. Their integration in the existing European energy networks and the internal energy market are crucial to enable the EU to meet its broader climate and energy goals. Offshore connections will have to combine with interconnectors between countries to bring the generated electricity to shore, while reinforcements of the existing grid will be needed to transmit electricity to the

major energy consumption centres further inland and to storage capacities in the Alps or Nordic countries. The development of such an offshore grid infrastructure needs strong supranational planning and coordination. In December 2009, nine EU Member States and Norway signed a Memorandum of Understanding to establish the North Seas Countries Offshore Grid Initiative (NSCOGI). The parties are working on grid design, market and regulatory as well as planning and permitting issues, taking into account the ambitious plans for the installation of offshore wind farms.

**Type of projects likely to need financing under the CEF:** projects requiring a high degree of technological innovation, and anticipatory investments involving several countries.

### Projects to be considered as potential PCIs (list is not exhaustive)

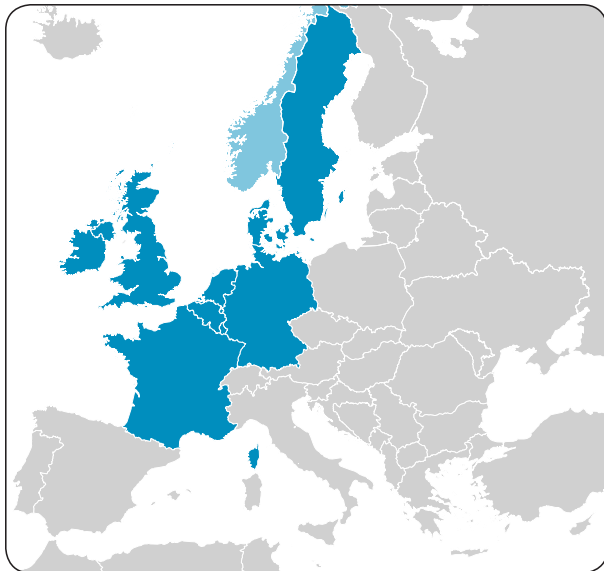
New interconnection between Denmark and the Netherlands

New sub-sea interconnector between France and the UK

New sub-sea interconnector between the UK and Belgium

Sub-sea interconnector and hub between Germany/UK and Norway<sup>6</sup>

AC land link between Northern and Southern Ireland



<sup>6</sup> Norway participates in the Working Group North Seas Offshore Grid, and is a signatory to the NSCOGI.

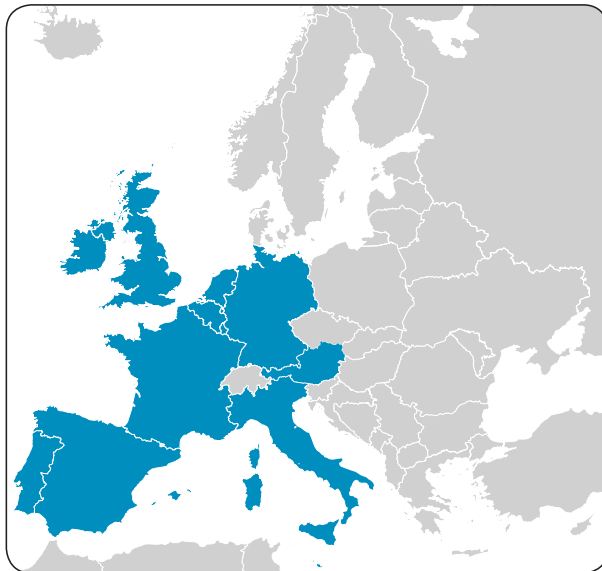
# North-South electricity interconnections in Western Europe

*Electricity interconnections between Member States and with the Mediterranean, notably to connect energy islands and to integrate electricity from renewable sources.*

Over the next decade substantial transmission needs will arise in Western Europe and renewable electricity generation will play a crucial role. In order to exploit the full potential of renewable generation in the region, strong electricity interconnections as well as interconnections with third countries will become increasingly important. The purpose of this priority is the integration of new capacities, mainly from renewables, in Western Europe and their transmis-

sion to consumption centres in other parts of the continent. One central element will be to increase the interconnections between Member States in Western Europe, strengthening the electricity network to ensure that renewable energy generated in the North of this region can flow in a North-South direction. Another element will be to overcome bottlenecks and strengthen connections to allow transmission of renewable energy generation from the Iberian Peninsula to the rest of Europe across the Pyrenees.

**Type of projects likely to need financing under the CEF:** projects that increase security of supply, and address loop flows.



## Projects to be considered as potential PCIs (list is not exhaustive)

New interconnection between Spain and Portugal

New interconnection between France and Spain

New interconnection and upgrade of existing capacity between Germany and Belgium

New underground and subsea interconnection between Ireland and the UK

New interconnection and an upgrade of existing capacity between Italy and Austria<sup>7</sup>

New double line interconnection between Germany and the Netherlands

Upgrade of an interconnection between France and Italy

<sup>7</sup> The Working Group North-South electricity interconnections in Western Europe has invited Austria to participate in the group.

# North-South electricity interconnections in Central Eastern and South Eastern Europe

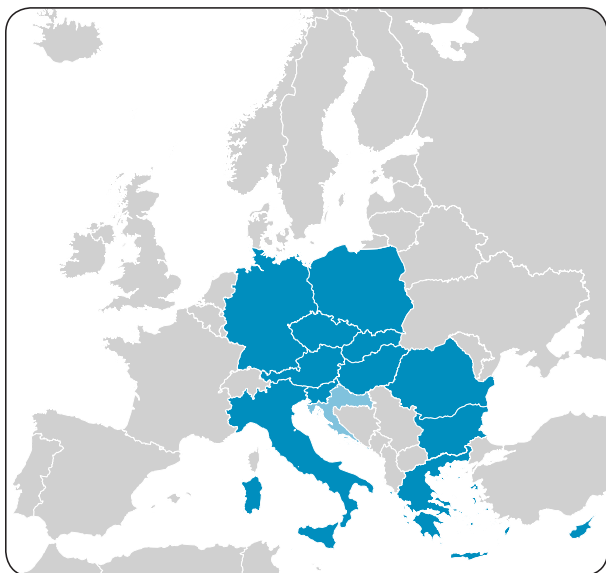
*Electricity interconnections and internal lines in North-South and East-West directions to complete the internal market and integrate generation from renewable energy sources.*

In the coming years, electricity networks in Central Eastern and South Eastern Europe will face some significant challenges such as managing increased electricity flows, and dealing with infrastructure gaps, particularly those related to increasing levels of both renewable and conventional generation. The purpose of this corridor will be to promote the integration of renewable energy sources, improve regional market integration, increase the stability and predictability

of supply and maintain a secure and reliable system. Building on existing political commitment and cooperation in the region, the aim will be to strengthen regional electricity to support an appropriate balancing system and to solve infrastructure gaps. Another challenge will be to develop adequate interconnections to the demand centres in Central-South and Southern Europe and to pumped storage power plants, while also accommodating new generation in Eastern Europe.

**Type of projects likely to need financing under the CEF:** projects that increase security of supply and address loop flows; energy poverty.

12



## Projects to be considered as potential PCIs (list is not exhaustive)

New interconnection between Hungary and Slovakia

New interconnection between Germany and the Czech Republic

New interconnection between Slovenia and Italy

Interconnection upgrade between Bulgaria and Romania, and Bulgaria and Greece

Capacity increases between Germany and Austria, and Poland and Germany

Capacity increase between Slovenia and Hungary/Croatia<sup>8</sup>

Strengthening of North-South infrastructure within Germany

<sup>8</sup> Croatia participates in the Working Group North South electricity interconnections in Central Eastern and South Eastern Europe. Croatia is an acceding state which will join the EU on 1 July 2013, provided that all Member States have deposited their instruments of ratification of the Treaty of Accession before that date. Croatia has ratified the Treaty of Accession in March 2012.

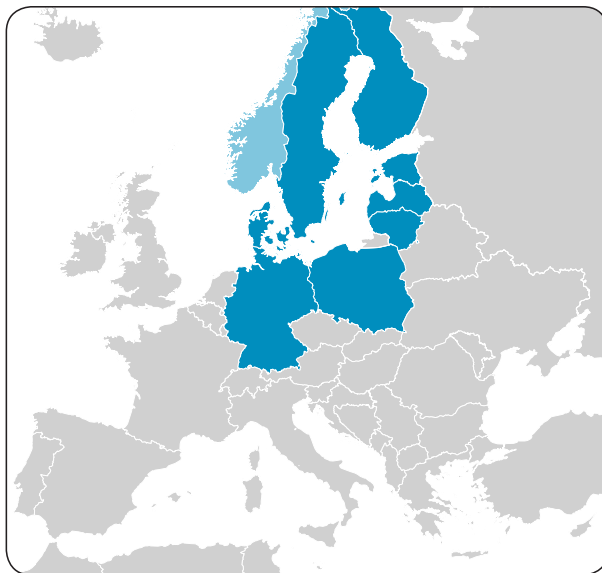
# Baltic Energy Market Interconnection Plan in electricity

*Interconnections between Member States in the Baltic region and reinforcing internal grid infrastructures accordingly, to end isolation of the Baltic States and to foster market integration in the region.*

This corridor will build on the well-established cooperation in this region in delivering the Baltic Energy Market Interconnection Plan (BEMIP), a comprehensive action plan on energy interconnections and market improvement in the Baltic Sea Region. The infrastructure development plans for this whole region are focused, on the one hand, on integrated grids to foster sustainable and secure energy supply, for example by promoting onshore and offshore wind power generation. Another objective in this corridor is to end the relative energy isolation of the Baltic States. The main chal-

lenge is to connect the three Baltic States to neighbouring EU countries and to ensure proper functioning of the market by full implementation of the internal market rules. There are significant efforts to ensure that the Baltic States join the Nordic and the North Western regional markets, as indicated in the cross-regional regulatory road maps which, aim to ensure that regional markets in Europe are taking coordinated steps to meet the milestones to establish a truly functioning electricity market by 2014.

**Type of projects likely to need financing under the CEF:** projects that contribute to ending isolation and that increase security of supply and market integration; energy poverty.



## Projects to be considered as potential PCIs (list is not exhaustive)

LitPol, a new interconnection between Poland and Lithuania

South-West interconnection between Norway<sup>9</sup> and Sweden

New interconnection between Denmark and Germany

Strengthening North-South infrastructure within Finland

<sup>9</sup> Norway has observer status in BEMIP.

## North-South gas interconnections in Western Europe

*Gas interconnections for North-South flows in Western Europe to further diversify routes and to increase short-term deliverability.*

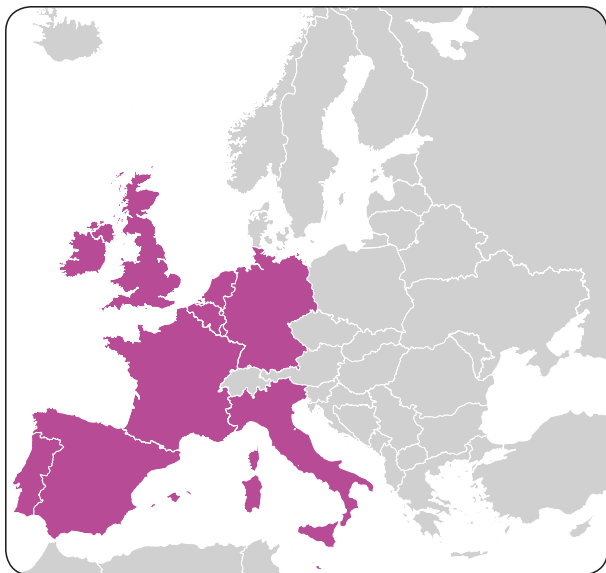
On the axis North-South in Western Europe, the main challenge is to further diversify routes and increase short-term gas delivery to better integrate markets, to contribute to the achievement of the internal energy market.

The purpose of this corridor is to better interconnect the Mediterranean area, and thus supplies from Africa and the Northern supply corridor, with supplies from Norway and Russia. The aim is to increase short-term gas delivery, thereby making full use of possible alternative external supplies and optimising the existing infrastructure, notably LNG terminals. The ambition

of this corridor is also to remove internal bottlenecks which currently prevent free gas flows in the region. Although some progress has been made in recent years, there is still a low interconnection level to the Iberian Peninsula, hindering the best use of the well-developed Iberian gas import infrastructure. As the development of electricity from renewable sources is expected to be particularly prominent in this corridor, the general short-term deliverability of the gas system needs to be enhanced to respond to additional flexibility challenges to balance electricity supply.

**Type of projects likely to need financing under the CEF:** projects that contribute to increased competition.

14



### Projects to be considered as potential PCIs (list is not exhaustive)

New interconnection between the UK and Ireland

New interconnections between France and Belgium, and France and Luxembourg

MIDCAT, a new interconnection between France and Spain

Third new interconnection between Portugal and Spain

Interconnection upgrade between Germany and Austria

Interconnection upgrade between Italy and Malta

Interconnection upgrades between France, Italy, Belgium and Germany



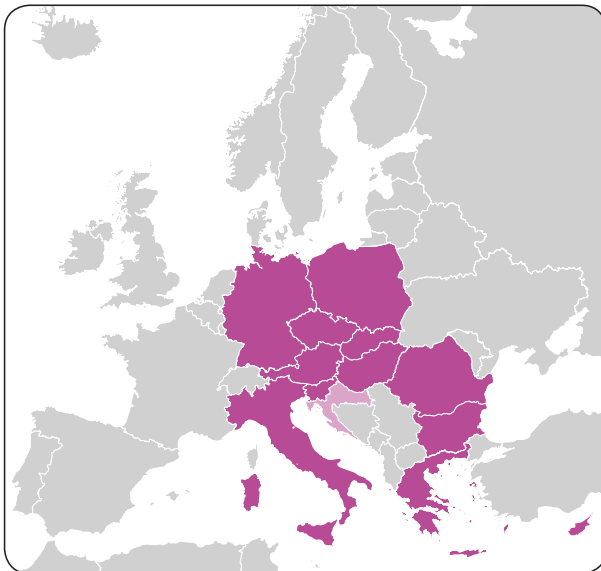
# North-South gas interconnections in Central Eastern and South Eastern Europe

*Regional gas connections between the Baltic Sea region, the Adriatic and the Aegean Seas and the Black Sea.*

Single supply source dependence and the traditionally East to West infrastructure are the main challenges in Central Eastern and South Eastern Europe. The purpose of this corridor is to develop regional gas infrastructure in order to support market integration and to enhance supply diversification through direct access to other sources of gas from the Northern and the Southern Gas Corridor, combined with the development of LNG. The objective is to connect the sources of the Baltic, Adriatic, Aegean and Black Seas and to deliver gas infrastructure projects that improve the intercon-

nectivity of the region in a North-South direction and enhance the responsiveness of the system to potential supply disruptions. These interconnections would ultimately improve the security of supply in countries most affected by the successive gas crises during the previous decade, through access to multiple sources, routes and counterparts.

**Type of projects likely to need financing under the CEF:** projects that contribute to increased security of supply by diversifying networks beyond a single source and route dependency, that promote solidarity by increasing competition; energy poverty.



## Projects to be considered as potential PCIs (list is not exhaustive)

New interconnection between Slovakia and Hungary

Interconnections linking Slovenia, Italy and Austria

Interconnection upgrades between Czech Republic and Poland

New LNG regasification terminal in Croatia<sup>10</sup>

Reverse flow upgrades between Bulgaria and Romania, Hungary and Romania and Bulgaria and Greece

<sup>10</sup> Croatia participates in the Working Group North South gas interconnections in Central Eastern and South Eastern Europe. Croatia is an acceding state which will join the EU on 1 July 2013, provided that all Member States have deposited their instruments of ratification of the Treaty of Accession before that date. Croatia has ratified the Treaty of Accession in March 2012.

## Southern Gas Corridor

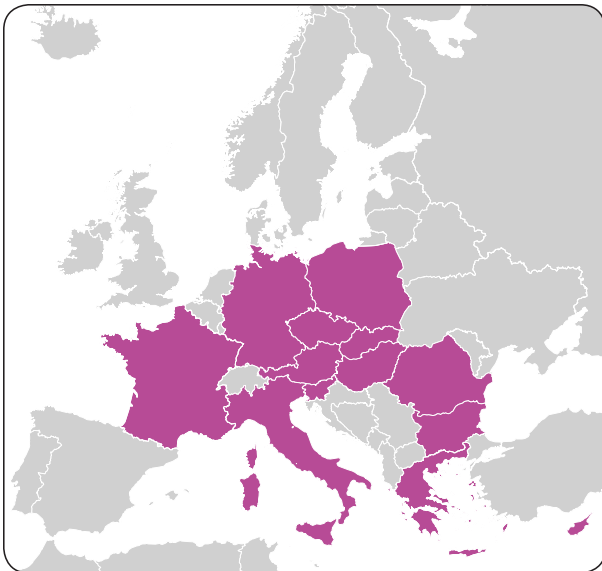
*Transmission of gas from the Caspian Basin, Central Asia, the Middle East and Eastern Mediterranean Basin to the Union to enhance diversification of gas suppliers.*

The major strategic perspective for the Southern Gas Corridor is two-fold: to bring new gas sources to the European Union and to diversify particularly concentrated markets in South East Europe. Diversification of sources generally improves competition and thus contributes to market development whilst at the same time enhancing security of supply. The purpose of this corridor is to directly link the EU gas market to large deposits of gas in the Caspian Region, the Middle East and the Eastern Mediterranean basin. The planned transit routes for these gas volumes are through Tur-

key, the Black Sea and the Eastern Mediterranean. The Southern Gas Corridor pipeline components will also be reinforced by the preparation of options for delivering substantial additional quantities of LNG to Europe, in particular from the Middle East (Persian Gulf and Egypt). Ultimately the Southern Gas Corridor should create an additional supply corridor, in addition to the existing ones from North Africa, Russia and Norway.

**Type of projects likely to need financing under the CEF:** projects that increase security of supply by alleviating single source and route dependencies, and projects designed to overcome the 'first mover' disadvantage, including anticipatory investments.

16



### Projects to be considered as potential PCIs (list is not exhaustive)

Gas transmission infrastructures, including new pipelines across Turkey and/or transmission solutions across the Black Sea, to connect gas producing countries in the Caspian (e.g. Azerbaijan, Turkmenistan) and Middle East (e.g. Iraq) to EU Member States

Gas transmission infrastructures required for connecting EU Member States to gas suppliers in the Eastern Mediterranean and the Middle East

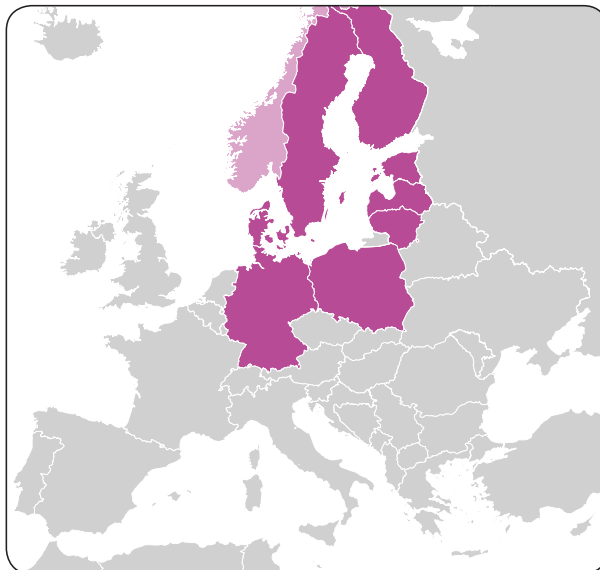
# Baltic Energy Market Interconnection Plan in gas

*To establish an open and integrated regional gas energy market in the Baltic Sea Region, aiming full integration into the European Union's Internal Energy Market.*

This corridor will build on the already well-established cooperation in this region in delivering the Baltic Energy Market Interconnection Plan (BEMIP), a comprehensive action plan on energy interconnections and market improvement in the Baltic Sea Region, both for electricity and gas. The Eastern Baltic Sea region (Lithuania, Latvia, Estonia and Finland) requires urgent action to develop the energy infrastructure in order to ensure security of supply through connection to the rest of the EU. Finland, Estonia and Latvia enjoy deroga-

tions from market opening under the third internal market package as long as their markets are isolated. The isolation of these markets will be eliminated, for example, by the establishment of new interconnections and/or new supply routes. At the same time, new investments in the West-Baltic area are needed to enhance security of supply and compensate for depletion of Danish gas fields. New infrastructure elements would also increase liquidity of the internal market.

**Type of projects likely to need financing under the CEF:** projects that end single source and route dependencies, increase security of supply, and competition; energy poverty.



## Projects to be considered as potential PCIs (list is not exhaustive)

New interconnection between Poland and Lithuania

BalticPipe: Gas interconnection between Denmark and Poland

Interconnection between Norway<sup>11</sup> and Denmark

BalticConnector: Gas interconnection between Finland and Estonia

Regional LNG terminal for the Eastern Baltic region and internal network reinforcements

Interconnection upgrade and reverse flow between Germany and Denmark

<sup>11</sup> Norway has observer status in BEMIP.

# Oil supply connections in Central Eastern Europe

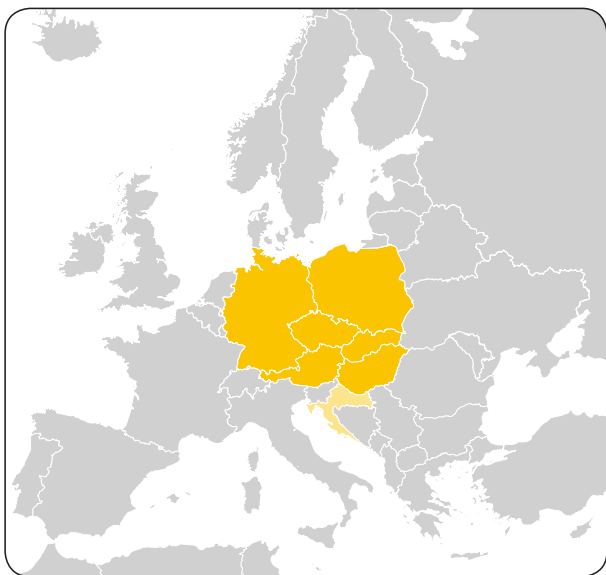
*Interoperability of the oil pipeline network in Central Eastern Europe to increase security of supply and reduce environmental risks.*

Security of supply depends on the integrity and flexibility of the entire supply chain, from the crude oil supplied to refineries to the final product distributed to consumers. Building on established political commitment and cooperation, the purpose of this priority is to ensure uninterrupted oil supplies to land-locked EU countries in Central Eastern Europe, currently dependent on limited supply routes, in case of lasting supply disruptions in the conventional routes. The aim is to create the “Central Eastern European Oil Pipeline Ring” by establishing links between the North and South

Druzhba pipelines both in the West and the East and thereby granting access to the Baltic, Black and the Adriatic Seas. Such connections would result in a high level of interoperability of the regional oil pipeline network, ensuring continuous oil flows to the dependent refineries in case of a supply disruption in the conventional supply route. Diversification of oil supplies and interconnected pipeline networks would also facilitate a reduction in oil transport by vessels, thus reducing the risk of environmental hazards.

The European Commission has proposed that this priority corridor would not be eligible for CEF financing.

18



## Projects to be considered as potential PCIs (list is not exhaustive)

A pipeline between Germany and the Czech Republic, to link the Northern and the Southern branch of the Druzhba pipeline system

A pipeline in Poland to link the Northern and the Southern branch of the Druzhba pipeline system

Pomeranian pipeline in Poland

Reconstruction and capacity increase of the existing JANAF and Adria pipelines (Croatia<sup>12</sup> and Hungary)

New pipeline between Austria and Slovakia

<sup>12</sup> Croatia participates in the Working Group Oil supply connections in Central Eastern Europe. Croatia is an acceding state which will join the EU on 1 July 2013, provided that all Member States have deposited their instruments of ratification of the Treaty of Accession before that date. Croatia has ratified the Treaty of Accession in March 2012.

## Smart grids deployment

*Large-scale deployment of smart grid technologies across the European Union.*

To reach the objectives of the European energy and climate policy, electricity grids must not only be upgraded and extended, they also have to become smarter. Reaching the EU's 2020 energy efficiency and renewable targets will not be possible without more innovation and intelligence in the networks at both transmission and distribution level, in particular through information and communication technologies allowing real-time or close to real-time two-way communication between all users of the grid. The aim of this priority is to provide the necessary framework and initial incentives for rapid investments in a new "intelligent" network infrastructure. These will be essential in the take-up of demand side management and other smart grid services to support a competitive retail market, a well-functioning energy services market, the integration of renewable and distributed generation as well as new types of demand, such as from electric vehicles. Smart electricity grids will facilitate transparency and enable consumers to control appliances at their homes to save energy, facilitate domestic generation and reduce cost. Such technologies will also help boost the competitiveness and worldwide technological leadership of the EU electricity industry.

## Electricity highways

*Development of electricity highways across the European Union.*

Electricity highways are a long-term priority. Their development is closely linked to the development of large-scale renewable generation. For the period beyond 2020 and up to 2050, a solution will be needed to overcome the main challenges electricity networks are facing: accommodating ever-increasing surplus wind generation in the Northern and Baltic Seas and increasing surplus renewable generation (notably solar) in the South Western and South Eastern parts of Europe and also North Africa; connecting these new generation hubs with major storage capacities in Nordic countries and the Alps and with major consumption centres in Central Europe; and coping with an increasingly flexible and decentralised electricity demand and supply. Many questions remain open concerning the appropriate technologies, grid design, regulation and governance of such electricity highways, but first projects are in preparation and could be commissioned by 2020, in view of developing a larger electricity highways system towards 2050.

## CO<sub>2</sub> networks

*Development of a European carbon dioxide transport network.*

CO<sub>2</sub> capture, transport and storage (CCS) technologies will reduce CO<sub>2</sub> emissions on a large scale while allowing for the use of fossil fuels, which will remain an important source of electricity generation over the next decades. The future development of a cross-border network for carbon dioxide transport requires steps to be taken now for European level infrastructure planning and development. Potential CO<sub>2</sub> storage sites are not evenly distributed across Europe and some Member States have significant levels of CO<sub>2</sub> emissions, but only limited potential storage within their national boundaries. Consequently the construction of European pipeline infrastructure will become a necessity. The purpose of this thematic area is to develop carbon dioxide transport infrastructure between Member States and with neighbouring third countries, and to include

the examination and agreement on the technical and practical modalities of a future CO<sub>2</sub> transport infrastructure. Further research, coordinated by the European Industrial Initiative for carbon capture and storage launched under the SET-Plan, will allow for a timely start of infrastructure planning and development at European level, in line with the foreseen commercial roll-out of the technology after 2020.



