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COMMISSION STAFF WORKING DOCUMENT

Annex to the

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS ON THE IMPLEMENTATION OF THE TRANS-EUROPEAN ENERGY NETWORKS IN THE PERIOD 2007-2009

Pursuant to Article 17 of Regulation (EC) 680/2007
and Articles 9(2) and 15 of Decision 1364/2006/EC

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1. INTRODUCTION

This Commission Staff Working Document is the Annex to the Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the trans-European energy networks in the period 2007-2009[1], pursuant to Article 17 of Regulation (EC) 680/2007, laying down general rules for the granting of Community financial aid in the field of trans-European networks ("TEN Financial Regulation"), and Articles 9(2) and 15 of Decision 1364/2006/EC, laying down guidelines for trans-European energy networks ("TEN-E Guidelines").

This Annex provides detailed information on the progress made in the implementation of TEN-E projects in the period 2007-2009, focusing in particular on the implementation of projects of European interest as well as some priority projects as specified in the TEN-E Guidelines. It includes an assessment of the main results achieved with regard to the objectives of the TEN-E policy and summarises the main problems encountered during the implementation of the projects.

In addition, this Annex provides comprehensive information on the main EU financial instruments relevant for the implementation of TEN-E projects such as loans of the European Investment Bank (EIB), the TEN-E funding programme and the European Energy Programme for Recovery (EEPR), as well as on other EU financing sources, including Structural Funds, the Instrument for Pre-Accession Assistance (IPA) and the Instrument for Structural Policies for Pre-Accession (ISPA), and external policy funding instruments (such as the European Neighbourhood Policy (ENPI), the Neighbourhood Investment Facility (NIF) and the Facility for Euro-Mediterranean Investment and Partnership (FEMIP)).

2. PROGRESS MADE IN THE IMPLEMENTATION OF TEN-E PROJECTS IN 2007-2009

In the following presentation of progress made in the implementation of TEN-E projects in 2007-2009, special emphasis will be given to projects of European interest which are of cross-border nature or have significant impact on cross-border transmission capacity. Details will also be given on priority projects, i.e. projects with high European significance that are established along the main corridors known as priority axes. Limited information will also be provided on projects that are not covered by the priority axes, but meet the EU policy objectives (projects of common interest).[2]

The data provided herewith takes into account the information provided by Member States and project promoters in the context of a survey conducted in February/March 2010. In addition, the information includes data provided by project promoters in the submission forms to TEN-E Calls for proposals, results from previous stakeholder consultation on the progress in implementation of TEN-E projects, and the information published by the project promoters.

The amounts of the EEPR and TEN-E grants for individual projects reflect the maximal amount of support allocated, not the real amount disbursed.

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1 COM(2010)xxx

2 For further details on projects classification see Decision 1364/2006/EC

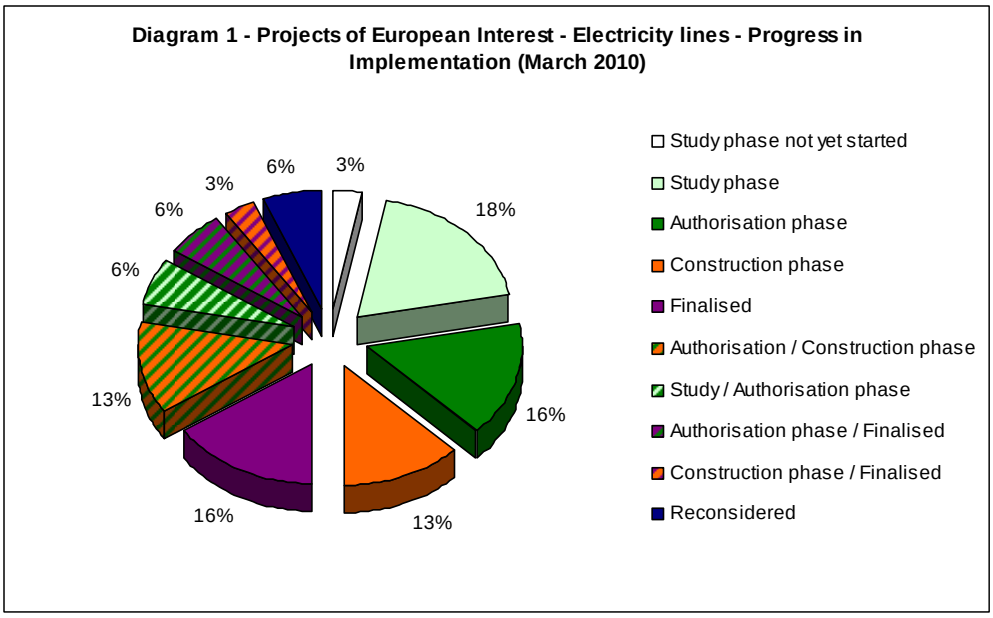
2.1. Electricity network

During the period 2007-2009, some progress was made in the implementation of TEN-E electricity projects.

Of 32 projects of European interest, five have been completely finalised, and for three of them at least one section has been completed. Compared to the status of the projects published in the Priority Interconnection Plan (PIP) in 2006[3], progress has only been achieved on two sections (Status PIP: five projects finalised, one section completed). However, nine projects have (at least partly) entered construction phase, whereas in 2006 only one project was under construction. In contrast to 2006, two projects have been reconsidered. One of them is subject to important re-routing, one has been abandoned.

The diagram below displays the status of the projects of European interest for electricity.

Diagram 1 – Progress with the implementation of projects of European interest, electricity lines



The progress in implementation for each of the 32 electricity projects of European interest is illustrated in Figures A1-A4.

For which concerns priority projects, nine additional projects have been finalised within the period 2007-2009 and 33 projects are currently under construction[4]. Further information on the priority projects finalised and/or under construction is available in Table A5.

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3 COM(2006)846

4 The number of projects under construction includes only those projects for which feedback was provided in the context of the TEN-E Survey 2010.

2.1.1. Description per priority axis

EL1 France – Belgium – Netherlands – Germany

Projects of European interest

Avelin-Avelgem (FR-BE)

The line Avelin (FR) – Avelgem (BE) has existed since 1974. To increase the electricity exchange between France and Belgium, this one circuit 400 kV line has been upgraded with a second circuit.

The electricity line has a total length of 43 km and adds about 1000-1500 MVA additional capacity. The construction works were finalised in 2005 and the line is fully operational. However, the financial and administrative closing of the project will presumably take place in June 2011 only. Some last works might be conducted in June 2010.

In 2004, the project has been awarded a TEN-E grant amounting to up to EUR 1,01 million.

Moulaine-Aubange (FR-BE)

Further to the line Avelin (FR) – Avelgem (BR), the one circuit 225 kV line Moulaine (FR) – Aubange (BE) shall be upgraded by a second circuit to contribute to an increasing electricity exchange between France and Belgium.

The line is 15 km long and will account for additional 400 MVA. It is currently under construction and is envisaged to be operational in 2010.

The project received TEN-E co-financing of EUR 503.450 as well as an EIB loan of EUR 4,0 million.

Priority projects

Within the category priority projects, in Belgium the installation of phase shifters and/or capacitor batteries in different locations was recently finalised. Further information on priority projects can be found in Table A5.

Obstacles noticed
PEI: none reported

EL2 Borders of Italy with France, Austria, Slovenia and Switzerland

Projects of European interest

Lienz-Cordignano (AT-IT)

The construction of the 380 kV transmission line from Lienz (AT) – Cordignano (IT) aims at strengthening the interconnection between Italy and the Austrian-Slovenian corridor.

The planned length of the line is 154 km; it is envisaged to increase transmission capacity by 1000 MVA. The project is still in the pre-study phase and would only be operational in 2015.

There is an increasing sensibility of the population against the project for reasons of optical impact, impairments due to electro-magnetic fields, etc. A new optimised line routing might be necessary.

The project received TEN-E co-financing for studies in 1995 and 2001 amounting to € 82.500 and € 355.000 respectively.

New interconnection between Italy and Slovakia

It was foreseen to increase transmission capacity between Italy and Slovenia through 380 kV transmission lines. However, this project was discontinued as new projects have been identified. The following projects are currently under study: Vrtojba (SI) – Redipuglia (IT) (110 kV), Dekani (SI) – Žavlje (IT) (110 kV), Divača (SI) – Italy (110 or 400 kV).

The length of the transmission line Vrtojba (SI) – Redipuglia (IT) would amount to about 20 km, adding around 500 MVA. For Dekani (SI) – Žavlje (IT) the line's length would be about 5 km, increasing the transmission capacity by up to 1000 MVA. For the project Divača (Sl) – Italy data is not yet available.

A potential date of operation has not been identified yet, neither has it been decided whether the transmission lines will be cable or overhead lines. None of these new projects has benefited from TEN-E grants.

Udine-Okroglo (IT-SI)

This project aims at strengthening the interconnection on the Italian North-Eastern Boarder between Italy and Slovenia. This 400 kV transmission line would be 120 km long and add about 1.500 MVA capacity. The project is still in study phase and faces an important delay of seven years, meaning that the operational date foreseen is now 2018.

The main element of complexity reported is the difficult identification of the cross-border points between Italy and Slovenia as there are two possible crossing points. The Italian crossing point is a very highly populated area, and 35% of the Slovenian territory is devoted to the Natura 2000 programme. The project further faces strong opposition from the local population due to electro-magnetic fields, optical impacts, etc. It was also reported that the realisation of the line depends on the completion of the Berecevo-Krsko line as well as the enhancement of the IT grid.

The project received TEN-E co-financing in 2004 amounting to a maximum of € 467.630.

S. Fiorano-Nave-Gorlago (IT)

This transmission line Fiorano – Nave – Gorlago (IT) was finalised in 2003 without delay. It was reported that the reconstruction of the line Fiorano – Nave was stopped because the real-time monitoring system on the line Fiorano – Robbia improved the capacity significantly. The route Nave – Gorlago was rebuilt with a length of 10 km (due to an archeological site).

No TEN-E grant has been allocated to this project.

Venezia Nord-Cordignano (IT)

This project, also known as the "Trasversale Veneto", initially aimed at establishing a 380 kV transmission line between Venezia Nord and Cordignano (IT). However, the project was subject to re-routing as now it is planned to connect Venezia Nord to Volpago (IT), a city about 40 km West of Cordignano. The line is envisaged to be of 75 km length and to add a capacity of about 1.000 MVA.

The line was planned to be operational in 2014. However, it is still in study / authorisation phase. Currently, consultations with the local authorities are ongoing.

The project did not benefit from any TEN-E grants.

St. Peter-Tauern (AT)

The Salzburg connection as part of the 380 kV ring is a vital factor for the security of supply in Austria, allowing for the integration of the increasing wind energy supply in Eastern Austria. It is as well the shortest connection to the pump storage hydro power plant in Southern Austria and the Salzburg Alps.

The Salzburg connection is divided in two projects: Salzburgleitung Salzach neu – St. Peter and Salzburgleitung Tauern – Salzach neu.

The project **Salzach neu – St. Peter** is currently in authorisation / construction phase and is envisaged to be operational in March 2011. This part of the project will add about 2x1.525 MVA transmission capacity and be of 46 km length. No major difficulties have been reported.

The project received an EIB loan (amount not communicated) as well as two TEN-E grants of € 843.600 and € 1.228.200 respectively.

However, the project **Salzach neu – Tauern (Kaprun)** faced major opposition from the local population. Reasons were among others electro-magnetic fields, impact on the landscape, environmental concerns (impact on protected birds and bugs and forest trees), and difficult terrain conditions. Therefore, in November 2008 a European Coordinator was designated and successfully speeded up the authorisation procedure by bringing all stakeholders involved together. He completed his assignment in July 2009.[5]

The second part of the Salzburg connection will add a capacity of 1.800 MVA and be of about 115 km length. It was reported that the line will be operational only in 2017.

In 2006 this part of the project was granted € 2,66 million by TEN-E.

Südburgenland-Kainachtal (AT)

The so called "Steiermark connection" is, further to the Salzburg connection, also part of the 380 kV ring which is vital for security of supply in Austria.

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[5] The final report of Mr. Adamowitsch is available under: http://ec.europa.eu/energy/infrastructure/tent_e/doc/salzburg/2009_07_23_abschlussbericht_final.pdf

This project was finalised in November 2009 and connects the Südburgenland with the Kainachtal. It increases the transmission capacity by 1.800 MVA and is of 146 km length. As the line is fully operational, no obstacles have been reported.

The project received TEN-E co-financing in 2007 of € 1,46 million.

Austria – Italy (Thaur-Brixen) interconnection through the Brenner rail tunnel

This project relates to a new 380 kV transmission line between Italy and Austria that passes the Brenner rail tunnel.

This transmission line of 57 to 65 km length would add a capacity of 2x1.000 and 2x1.500 MVA. Currently, this interconnection is in study phase and envisaged to operate in 2020-2025. However, there are some obstacles to overcome for the successful realisation of the project. It was reported that crossing the Alps constitutes a major challenge as well as the coordination and integration with the railway project (commissioning time, cost and risk synergies). Further obstacles are the network rationalisation outside the tunnel, and the use of a new technology solution (gas insulated line).

The project cost will amount to around € 300 million in total. It has received TEN-E funding in 2002 and 2005 of € 964.000 and € 449.500 respectively.

Priority projects

Further priority projects along EL2 were reported to be recently finalised:

- The line Rizziconi (IT) - Feroleto (IT) - Laino (IT) was completed in 2005.
- The Turbigo (IT) - Rho (IT) - Bovisio (IT) line was finalised in 2006.
- Italian-Swiss border: The line San Fiorano (IT) - Robbia (CH) was finalised in 2006, adding 1.400 MVA transmission capacity.

Further information on priority projects can be found in Table A5.

Obstacles noticed
- Crossing of densely populated areas and natural barriers
- Coordination with other ongoing projects
- Delay due to the use of new technology solutions
- Environmental constraints (e.g. due to Natura 2000)
- Seasonal constraints
- Opposition of local population due to fear of electro-magnetic fields and optical impact

EL3 France – Spain – Portugal

Projects of European interest

Valdigem - Douro Internacional (PT) – Aldeadavila (ES) line

The project is divided into four parts:

Part A: Extension of the 400 kV from Valdigem towards the littoral: upgrade of the Valdigem – Vermoim 1 overhead line to 400 kV (which is temporarily working at 400 kV). These works were finalised in August 2008.

Part B: Reinforcements of the overhead lines in the Douro Internacional area and of the interconnection between the Spanish substation of Aldeadavila and the Portuguese transmission network in the Douro Internacional; Reinforcements of the 220 kV overhead lines near Douro Internacional and Douro Internacional Substation (renamed Lagoaça).

Part C: Extension of the 400 kV to the Douro Internacional region: overhead lines Armamar (former Valdigem 2 initial Substation) and Lagoaça. The voltage increase of the Armamar – Lagoaça overhead lines from 220 kV to 400 kV implies the same upgrade in the section of the Pocinho – Armamar overhead lines as well as a new segment to be removed from the connection at Pocinho and be connected to Lagoaça. It further was necessary to change the route of two 220 kV overhead lines (Picote – Pocinho and Bemposta – Pocinho) as they cross the new urban area of Torre de Moncorvo. Some deviations were also necessary in the section between the Pocinho and Armamar substations.

Part D: Extension of the 400 kV overhead line to Recarei: Armamar – Recarei. This overhead line includes two new sections, one to connect to the Recarei substation and another to connect to the new Armamar substation. In the middlesection one of the circuits of the Valdigem – Vermoim 4/5 overhead line will be used (Part A).

It was reported that most parts of the project are still under construction and expected to be completed in December 2010. The project will add an additional capacity of about 3.210 MVA and be of 204 km length. The main elements of complexity of the project reported were technical constraints, local Natura 2000 sites in the cross-border point area, and local political concerns.

The project has been allocated a TEN-E grant of € 1.8 million at maximum as well as EEPR funding of up to € 50 million.

Sentmenat (ES) – Bescano (ES) – Baixas (FR) line

This Project of European Interest aimed at the construction of the Trans-Pyrenean interconnection Sentmenat (ES) – Bescano (ES) – Baixas (FR), contributing to security of supply, reliability of networks and an increased exchange of energy as well as the integration of renewables in the region.

However, there was major opposition from the local population (mainly in France), especially regarding the interconnection between Bescano and Baixas, and the project was suspended.

Therefore, both Head of States pointed out the necessity of EU intervention through the appointment of a European Coordinator.[6] After a successful completion of his mission in June 2009, a new interconnection was proposed, now connecting Baixas to Santa Llogaia by a subterranean cable that would follow a terrestrial path based on current infrastructures.

[6] The reports of Mr. Monti are available under: http://ec.europa.eu/energy/infrastructure/tent_e/coordinators_en.htm

The project Baixas – Santa Llogaia which is of 50 to 65 km length is now in authorisation phase and envisaged to be operational in 2014.

In 2008, TEN-E funding amounting to € 882.750 was allocated to the project, and in 2009 a substantial amount of EU funding under the EEPR of up to € 225 million was awarded.

The project on the Spanish side aiming at linking the cities Sentmenat and Bescano through the city Vic is currently under construction and will be operational in 2010.

Priority projects

A number of projects in Portugal and Spain were recently finalised, amongst which:

- On the Mediterranean axis of Spain the new connection Nueva Escombreras - El Palmar was completed in 2007
- The Project Pego (PT) - Batalha (PT) line and Batalha facilities in Portugal was finalised in 2006
- The Portuguese line Valdigem (PT) - Viseu (PT) - Anadia (PT) was finalised in 2006.

Further information on priority projects can be found in Table A5.

Obstacles noticed
- Opposition from the local population
- Crossing of natural protected areas (e.g. Natura 2000 sites)
- Local political concerns

EL4 Greece – Balkan countries – UCTE System

Projects of European interest

Philippi (EL) – Hamitabat (TR) line

The project aims at strengthening the capacity of the "Mediterranean electricity ring" and is an important factor for the synchronisation of the Turkish power system with the UCTE system.

The 400 kV transmission line adds about 2x1.400 and 1x1.200 MVA on the Greek side and is of about 220 km length. It was reported that the project is finalised and fully operational since 2008. However, as now the line commences in Babaeski on the Turkish side instead of Hamitabat, the line is now shorter and connects Babaeski (TR) and Philippi (EL). No obstacles were reported.

The project was awarded TEN-E grants in 1999 and 2000, amounting to a total amount of € 545.000.

Priority projects

Priority projects recently finalised along EL4 include:

- Thessaloniki (EL), Lamia (EL) and Patras (EL) substations and connecting lines, finalised in 2008
- Connection of the regions of Evia (EL), Lakonia (EL) and Thrace (EL), particularly the expansion of the 400 kV system to the area of Thrace with the construction of the 400 kV OHL (double circuit) Filippoi – N. Santa and the 400 kV OHL connection the systems of Greece and Turkey as well as the 150 kV OHL (double circuit) Molai - Astros in the area of Lakonia
- Strengthening of existing connections of the peripherical regions in the mainland in Greece - Enhancement of the connection of the island of Corfu to the mainland, completed in 2007
- Meliti (EL) - Bitola (Former Yugoslav Republic Of Macedonia) line, completed in 2007
- New connections between Greece and Albania, Bulgaria and the Former Yugoslav Republic of Macedonia, namely the OHL Stip – C. Mogila (FYROM – Bulgaria), completed in 2009.

Further information on priority projects can be found in Table A5.

Obstacles noticed:

None reported

EL5 UK – Continental Europe and Northern Europe

Projects of European interest

Undersea cable to link England (UK) and the Netherlands

The project will link the Isle of Grain in Kent (UK) to the city of Maasvlakte (NL) by means of a bi-pole high voltage direct current (HVDC) interconnector with a pair of high voltage electricity cables bundled together and buried at least a metre below the bottom of the North Sea. It will increase both countries' transmission capacities and enable the development and connection of renewable energy sources as well as the integration of remote areas.

The cable will be of 260 km length and add about 1.000 MVA transmission capacity. It is currently under construction and is envisaged to be fully operational in April 2010. The main elements of complexity of the project are technical constraints, commercial and regulatory complexities, as well as difficulties in cross-border cooperation.

The project has received TEN-E funding from 1996 until 2009: a total amount of up to € 10,75 million has been awarded during this period.

Priority projects

No project along priority EL5 has been reported to be recently finalised or under construction.

Obstacles noticed

- Technical constraints
- Commercial and regulatory complexities
- Difficulties in cross-border cooperation

EL6 Ireland - UK

Projects of European interest

Interconnection Ireland – United Kingdom (Wales)

The East-West Interconnector includes two separate projects.

Project 1: The East-West Interconnector project undertaken by National Grid plc (NIE) and Electricity Supply Board (ESB) will connect the Irish power system to the electricity grid in Britain through undersea and underground cables. Connection points would be Meath (IE) and Deeside (UK-Wales).

The connection would be of 256 km length and add 256 MVA transmission capacity. The project is currently in the authorisation phase, however, construction works are planned to begin in mid-2010. Contracts for the construction works have already been signed. According to the project promoter the works shall be finalised in October 2012.

The main elements of complexity reported were finance / credit constraints, technological difficulties, permits and planning issues, non-existence of long-run contracts, and seasonal restrictions on marine activity.

The project has received TEN-E grants amounting to up to € 2,96 million as well as € 110 million EEPR funding and an EIB loan of € 300 million.

Project 2: Another East-West interconnector project undertaken by Imera Power will connect Arklow substation in Co. Wicklow and Pentir Substation in North Wales.

The HVDC cable would be of 135 km length add a transmission capacity of 370 MVA. The project is currently in authorisation phase and expected to be finalised in 2013. Elements of complexity reported were the same as for the above East-West interconnector.

Until today, no EU funding has been allocated to this project.

Priority projects

No project along priority EL6 has been reported to be recently finalised or under construction.

Obstacles noticed

- Financial difficulties due to lack of credits
- Technical constraints
- Difficulties in authorisation procedure (permits, planning issues)
- Seasonal restrictions on marine activities

EL7 Denmark – Germany – Baltic ring (including Norway – Sweden – Finland Denmark – Germany – Poland – Baltic States – Russia)

Projects of European interest

Kassø-Hamburg/Dollern (DK-DE)

The 380 kV transmission line connecting the cities Kassø (DK) and Hamburg/Dollern (DE) aims at optimising the transfer of the increasing amount of wind energy produced in Northern Germany and Denmark as well as in the Baltic and North Sea through the offshore windparks.

The connection would be 215 km long and could add about 2.500 MVA transmission capacity. It was reported that the studies are finalised and the project is now in authorisation phase. The investment is expected to be carried out between 2016 and 2018. The line would thus be fully operational in 2018.

Main elements of complexity of the project relate to the fact that the line passes a densely populated area with numerous land owners. Further, the timing depends on the dynamics of the wind farm installation onshore and offshore with a connection to the grid in Schleswig-Holstein as well as on the development of grid integration of new power plants in the Northern part of the E.ON Netz control zone.

The project has benefited from a TEN-E grant amounting to up to € 150.000 in 1999.

Hamburg/Krümmel-Schwerin (DE)

This project aims at the construction of a 380 kV transmission line connecting Hamburg / Krümmel to Schwerin / Goerries in the Northern part of Germany.

The line will be about 90 km long and add about 2x1.800 MVA transmission capacity. The line is currently in the authorisation / construction phase and will be operational in December 2010. A delay of one year was reported due to additional information requests from the responsible authorities in Mecklenburg-Western Pomerania and Schleswig-Holstein on the impact of the overhead line on nature and landscape.

The main elements of complexity of the project that were reported are a strong opposition from the local population due to the following reasons: fear of electro-magnetic fields, deterioration of the landscape. Time consuming public consultation procedures, the necessary integration of numerous stakeholders, as well as special requirements on detailed documentation by the state authority in Schleswig-Holstein have slowed down the authorisation process.

The project has not received any TEN-E funding.

Kassø-Revsing-Tjele (DK)

The scope of the project is the construction of a new 400 kV double system overhead line from Kassø (close to the German border) to the substation Tjele (Jutland) (DK). The new double overhead line will replace the old single overhead line. In addition, three existing substations (Kasso, Askaer and Tjele) will be extended with extra fields, and one new substation (Revsing) will be built.

This new transmission line will strengthen the overall transmission network to be able to transmit power from offshore windfarms to the overall grid and to connect the continental grid with the Nordic grid. The project is envisaged to add 2.000 MVA transmission capacity with a length of around 180 km. Currently, the project is in authorisation phase and will be operational in December 2014.

A TEN-E grant of about € 1,5 million has been allocated to the project in 2009.

Vester Hassing-Trige (DK)

This project aims at connecting the cities Vester Hassing and Trige (DK) through a 400 kV transmission line which would add about 900 MVA additional capacity and be of 114 km length.

The line is currently under construction and envisaged to be finalised in 2014. Major complexities of the project are opposition from land owners as well as a lengthy restructuring period of authorities. Further, the project depends on other projects, especially between Denmark and Germany (e.g. Kassø – Hamburg / Dollern and Skagerrak IV) and the allocation of the wind power.

The project has not benefited from TEN-E funding.

Upgrading of connections between Denmark and Norway – Skagerrak 4 (DK-NO)

The interconnections Skagerrak 1-3 have been in operation for many years (built 1975, 1976, 1993). However, due to congestions there is a need for a new HVDC interconnection between Norway and Denmark: Skagerrak 4.

Overall objective of the project is to strengthen the transmission network to be able to transmit power from offshore windfarms to the overall grid and to connect the continental grid with the Nordic grid. The HVDC interconnection will either be a conventional Line Source Converter (LCC) or a new type of converter type: Voltage Source Converter (VSC) used only for one DC cable and in bipole operation with Skagerrak 3. From the HVDC substation in Tjele in Jutland (DK) to the Danish coast there will be an underground cable. From this point a submarine cable to the Norwegian coast will be constructed, followed by an overhead HVDC line to the HVDC substation in Kristianssand (NO).

The cable is envisaged to add about 700 MVA and be of 260 km length. Currently, the project is under construction. It was reported that it will be finalised in November 2014. Major complexities of the project reported are difficult terrain conditions for cable landing (subsea), technical constraints and the need to investigate innovative technology solutions.

The project was awarded a TEN-E grant in 2009, amounting to up to € 856.000.

Elk-Alytus link (PL-LT)

The project's overall objective is to increase the security of supply and reliability on both sides of the line, create a connection between the energy systems of the Baltic States and foster the process of creating a true energy market in the region.

The scope of the project covers the double circuit 400 kV overhead line Alytus - Lithuania/Poland border (Elk direction) and the expansion of the 330 kV switchyard at the

Alytus substation for the connection of the 330 kV line Kruonis PSPP – Alytus, of the B2B converter station and the new 400 kV switchyard to connect the B2B and 400 kV line Elk – Alytus.

The line will add a transmission capacity of about 1.000 MVA and be of about 155 km length. Successfully assisted by a European Coordinator, after long discussions the involved parties entered the project agreement through a joint venture company (LitPol Link). The project is currently in study phase and not expected to be finalised before 2015 / 2020. Major elements of complexity of the project are a high population density in some of the areas (property rights), technical constraints, as well as the crossing of natural protected areas. Further, additional reinforcements in the Polish internal grid are necessary before the interconnection can be realised.[7]

The project has been allocated TEN-E funding in 2008 and 2009, amounting to a total of up to € 4,23 million.

Estlink (EE-FI)

Estlink is the first interconnection between Estonia and Finland, aiming at the integration of the future power market of the Baltic Member States and increasing the reliability of the Baltic power systems, while decreasing their dependency on Russian power supply.

Estlink consists of two separate projects: Estlink 1 and Estlink 2.

Estlink 1 is of 105 km length and connects the substations in Harku (EE) and Espoo (FI). The project was already finalised in 2006, adding a transmission capacity of 350 MVA. The project received TEN-E funding of € 670.000.

Estlink 2 is planned as the second direct current interconnection between Finland and Estonia, adding another 650 MVA. The line will be of 165 to 170 km length, connecting the substations Anttila (FI) and Püssi (EE).

Estlink 2 is currently in the authorisation phase. The line is expected to be finalised in August 2014.

In 2010 it has been awarded substantial funding of up to € 100 million in the framework of the European Economic Recovery Plan (EEPR).

Fennoscan (FI-SE)

The Fennoscan (2) project aims at the construction of a submarine cable between Finland and Sweden.

The 500 MW **Fennoscan 1** link was already commissioned in 1989, adding 500 MVA transmission capacity. It connects the shore in Finland south of the town of Rauma, which is connected with the Rauma converter station by a 33 km long overhead line, with Dannebo, the Swedish converter station located at the Swedish East coast.

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[7] More information on the project may be retrieved from the reports of the European Coordinators: http://ec.europa.eu/energy/infrastructure/tent_e/coordinators_en.htm

The **Fennoscan 2** link will add another 800 MW, thus strengthening the Nordic power grid, enhancing the capacity for power trading and improving the security of supply in the region. In parallel with the delivery of Fennoscan 2, the control system of the original Fennoscan link will be upgraded.

Fennoscan 2 is of 300 km length and connects the shore in Finland (as does Fennoscan 1) with Finnböle, a Swedish converter station located further inland. A 70 km DC overhead line connects the station to the submarine cable. Fennoscan 2 is currently under construction and envisaged to be finalised in 2011. A one year delay was reported due to delays experienced by the cable suppliers who were not able to deliver the cables according to the original time schedule. Further complexities with regard to a lengthy authorisation process, the need of environmental permits and Swedish water rights were reported.

The project has received substantial TEN-E funding in the years 1995, 2000 and 2006, amounting to a total of up to € 745.750.

Halle/Saale-Schweinfurt (DE)

The overall aim of the project is to improve the transmission capacity along the North-South corridor in Germany and allow for the transportation of the increasing amount of renewable energy from surplus areas in the north to consumer areas in the south-west. The project, once in operation, will provide relief to existing parallel transmission lines. In total, the line will add about 2x2.400 MVA and be of 205 km length.

The project is divided into five separate sections.

Section 1 Halle Lauchstädt to Erfurt Vieselbach (Thuringia): This part of the project is of about 70 km length and was already completed in 2008. It has been in operation since then.

Section 2 Erfurt Vieselbach to Altenfeld (Thuringia): The second part is 60 km long and is currently in the authorisation phase. The approval for construction and operation is expected for June 2010 and the line shall be fully operational in 2011.

A delay of one year was reported which is mainly based on the longer lasting regional planning procedure (10 months instead of six), the request of authorities to modify the routing due to local concerns and a higher consideration of measures to compensate the impact on nature during the ongoing approval procedure (extra time needed appr. eight months).

Section 3 Altenfeld to borderline Thuringia / Bavaria: This part of the line is currently in authorisation phase and subject to regional planning procedures. The operation date for this subsection is scheduled for end 2012. It was reported that the project faced a serious delay of three years. Since 2006 the project is heavily opposed by local stakeholders, citizen groups and some political stakeholders and parties. Main reason for this is the necessity of building a new overhead line and the environmental impact on the natural resort Thuringia Forest. However, discussions with stakeholders are ongoing and efforts are being made to include viable technical alternatives (overhead lines on short towers and partly buried power cable sections).

Section 4 borderline Thuringia / Bavaria to Redwitz (30 km, Bavaria) and **Section 5** upgrade (voltage conversion) of existing line Redwitz to Schweinfurt Grafenrheinfeld are currently in the authorisation phase. They are envisaged to be finalised in 2013.

The project was awarded substantial EU funding. In 2007, a TEN-E grant of € 290.000 was awarded. In the framework of the European Economic Recovery Program, the project will receive a grant of up to € 100 million.

Priority projects

Recently finalised priority projects along EL7 include reinforcements of the connections between Denmark and Sweden. Further information on priority projects can be found in Table A5.

Obstacles noticed

- Time consuming authorisation and permit procedures
- Crossing of densely populated areas with numerous land owners
- Crossing of natural protected areas and natural barriers
- Dependence on other projects
- Difficulties due to weather conditions
- Difficulties in public procurement due to parallel planning processes in two countries
- General economic situation: credit constraints
- Opposition from local population: Fear of electro-magnetic fields, impact on landscape, no perception of supra-regional or European perspectives
- Technical constraints

EL8 Germany – Poland – Czech Repubic – Slovakia – Austria – Hungary – Slovenia

Projects of European interest

Neuenhagen-Vierraden-Krajnik (DE-PL)

The scope of this project is to build a transmission line to connect Germany and Poland, including the upgrading of the Polish grid. The line will be of approximately 125 km length. One important objective is related to the transport of offshore wind energy through the transmission system of the North and Baltic Sea area.

The project is currently in study / authorisation phase and expected to be operational in 2015.

As for the complexity of the project it was reported that the legal framework in Germany does not allow for expropriations which would be necessary to implement the project as foreseen. Further, concerns are prevailing that pertain to the environmental protection, the routing through a natural reserve, the deterioration of the landscape and the fear of electro-magnetic fields.

The project was allocated TEN-E funding of EUR 283.000 in 2005.

New interconnection between Germany and Poland (including upgrading of the Polish grid according to connection as in the Vierraden (DE) – Krajnik (PL) project)

The link is in the study phase and is scheduled to be operational after 2015. No further information was reported.

Dürnrohr-Slavetice (AT-CZ)

The establishment of a second system on the Dürnrohr (AT) – Slavetice (CZ) 380 kV interconnection between Austria and the Czech Republic aims at easing the congestion on the lines. These are to great extent due to the increased amount of wind energy in Northern Europe.

The line is of 96 km length and adds a capacity of 900 MVA. The project was finalised in 2008 and is now in operation.

No EU funding has been allocated to the project.

Vel'ky Kapusany – Lemesany – Moldava – Sajoivanka (SK)

The project originally aimed at establishing a transmission line between the Slovakian cities Vel'ky Kapusany, Lemesany and Moldava, and interconnecting Moldava with the Hungarian city Sajoivanka.

In the section **Lemesany – Vel'ky Kapusany,** a 400 kV new AC line is envisaged to add 2x1.385 MVA transmission capacity, having a length of 110 km. It is currently under construction and envisaged to be finalised in June 2017.

This part of the project was awarded TEN-E funding in 2008, amounting to up to € 210.000.

The section **Lemesany – Moldava**, a double circuit line of 400 kV, will add 2x1.662 MVA transmission capacity and be of 43 km length.

The first part of the section envisages the construction of a 2x400 kV line from Moldava to Košice. This part of the project was already finalised. The second phase includes the establishment of a 2x400 kV line from the switching substation Košice to Lemešany. It is still under construction and the line is expected to be operational in October 2011. No delay has been reported and no major problems have been encountered so far.

The project has been awarded a TEN-E grant of € 1,4 million in 2009.

However, particular attention should be drawn to the section originally envisaged to interconnect Slovakia and Hungary, **Moldava (SK) – Sajoivanka (HU).** The construction of this section was abandoned. It was reported that due to environmental problems on the Hungarian side the project was not feasible.

A new interconnection between Sajóivánka (HU) and Rimavská Sobota (SK) is now envisaged.

Gabcikovo – Vel'ky Dur (SK)

The domestic 400 kV new AC tin line would connect the Slovakian cities Gabcikovo-Vel'ky Dur at the Hungarian border. It would add 2x1.385 MVA and be of 93 km length.

The project is currently in the authorisation phase. Although no major problems have been encountered and the environmental impact assessment was successfully accomplished, the realisation of the project might be postponed for approximately a decade as the project is

associated with other investments in the Slovak transmission grid. The envisaged operational date would thus be only 2022.

Stupava – South-East Vienna (SK-AT)

The agreement on this project, interconnecting the Slovak Republic and Austria, was originally signed in 1993.

However, due to major obstacles encountered on the Austrian side, the project has now been abandoned. Reasons reported were local opposition due to protected areas and wildlife and fear of electro-magnetic fields. Especially important was the high number of lines in the region of Vienna, such that priority was given to other projects. Further it was reported that the permits issued more than ten years ago have now lost their validity.

Priority projects

Priority projects that were recently finalised along EL8 include the following lines:

- New interconnection between Slovenia and Hungary: Cirkovce (SI) – Hévíz (HU); completion was attained at the Hungarian side
- Ostrów (PL) - Trębaczew (Rogowiec) (PL), completed in 2008
- Tarnów (PL) - Krosno (PL), completed in 2006

Further information on priority projects can be found in Table A5.

Obstacles noticed

- Environmental difficulties
- Dependance on other projects
- Opposition from local population: fear of electro-magnetic fields
- Crossing of protected natural areas and wildlife
- Financial difficulties
- Negotiations with land owners; legal framework: no right of expropriation
- Authorisation procedures

EL9 Mediterranean MS – Mediterranean electricity ring

Projects of European interest

Electricity connection to link Tunisia and Italy

In 2009 an agreement between Tunisia and Italy was signed to conduct feasibility studies on an electricity interconnection between the two countries. Aim of the project is to improve the reliability of the regional electricity systems, to create a regional electricity market and to transport especially the renewable energy envisaged to be generated according to the Tunisian solar plan.

The project includes an under-water cable with a capacity of 1.000 MW. In total, the cable would have a length of 350 km. At the moment, the project is in authorisation phase and is envisaged to be realised in 2015.

It was reported that there is a need of increased investments on the HV grid in Sicily and Calabria Regions as well as a need to increase generation capacity in Tunisia. At this aim, a generation project called "ELMED" (1.200 MW) based on a mix between conventional and RES, will be realised.

Priority projects:

Along EL9, the following priority project was reported to be finalised in 2006: The submarine cable between South Spain and Morocco (strengthening of existing connection Estrecho-Melloussa II). Further information on priority projects can be found in Table A5.

Obstacles noticed
- Uncertainty of the financial results / energy

2.1.2. Impact of the implemented cross-border connections in relation with security of supply

During the past years, substantial progress has been made to build new or upgrade existing interconnections to increase transmission capacity between the Member States. These developments allowed for an increased energy exchange and more competition, contributing to the convergence of average energy prices and stimulating market integration and thus the development of a true internal energy market. They also contributed to the alleviation of serious congestion some transmission pathways faced.

Although a number of projects faced implementation difficulties, eleven cross-border projects have been finalised since 2005, and 18 cross-border projects are currently (at least partly) under construction (displayed in Table A7 in the Annex). For 17 of these projects, implementation has been accelerated by TEN-E or EEPR funding.

Along the priority axis **EL1 (France – Belgium – Netherlands – Germany)**, an important project finalised in 2005 to increase of the transmission capacity between Belgium and France was the 'Avelin (FR) - Avelgem (BE)' line. This project added about 1000 to 1500 additional MVA. Another project, the line 'Moulaine (FR) - Aubange (BE)', is currently under construction and envisaged to add about 400 MVA transfer capacity when operational this year (2010).

Also the interconnections of **Italy with its border states (EL2)** have been subject to important progress. The Project of European Interest 'San Fiorano (IT) - Robbia (CH)' was finalised in 2005, adding 1400 MVA to the transmission capacity. Further important projects to connect Italy and Slovenia (construction of a phase shifter in the Divaca substation), adding 2x600 MVA transmission capacity, as well as at the Italian-French Border, adding 600 MVA transmission capacity, are currently under construction and will be operational in 2012.

EL3 (France – Spain – Portugal): Substantial development is expected this year at the French – Spanish border. The Project of European Interest Valdigem (PT) - Douro Internacional (PT) - Aldeadavila (ES) and the upgrading of the 'Douro Internacional' facilities is envisaged to be finalised in December 2010. Transfer capacity will be increased by 3.210

MVA. Another project to be mentioned is the connection between Southern Portugal and South-Western Spain (Portimão (PT) - Tavira (PT) - P. Gusman (ES) - Guillena (ES) line) which is under construction and expected to be operational in 2011. This line would add another 1.860 MVA to the countries' transmission capacity.

A number of interconnectors linking **Greece and the Balkan countries (EL4)** have been finalised recently. One of the most prominent ones to mention is the Project of European Interest 'Philippi (EL) – Hamitabad (GR)' which due to a re-routing now ends in Babaeski (GR). This line, finalised in 2008, adds 2x1.400 and 1x1.200 MVA transmission capacity.

Substantial progress is also expected along priority axis **EL5 (United Kingdom – Continental Europe and Northern Europe)**: The finalisation of the 'Netherlands – UK Interconnector Project (BritNed cable)' linking the Isle of Grain in Kent (UK) and Maasvlakte (NL) is expected in April 2011, adding 1.000 MVA transmission capacity between the two countries. However, no other projects in this region have reached construction status yet.

Concerning the interconnection between **Ireland and the UK (EL6)** a number of projects has been initiated. However, none of them has yet reached construction status. Nonetheless one important project to point out is the Project of European Interest 'Submarine cable Ireland-Wales (UK)', also known as the East-West Interconnector. It is expected to add 520 MVA transmission capacity and is currently in the authorisation phase. However, construction works are planned to begin in mid-2010 and shall be finalised in 2012.

Along the priority axis **Denmark – Germany – Baltic Ring (EL7)**, out of a number of cross-border projects only one has been finalised: 'Estlink', interconnecting Finland and Estonia, was commissioned in 2006, adding 450 MVA transmission capacity. A second circuit, 'Estlink 2', is currently in authorisation phase and will add another 650 MVA.

Substantial development was reported regarding the interconnection at the Austrian – Czech border (part of **EL8 Germany – Poland – Czech Republic – Slovakia – Austria –Hungary – Slovenia**). The interconnection 'Dürnrohr (AT) - Slavetice (CZ)', a Project of European Interest, was completed in 2008, adding 900 MVA transmission capacity.

In the **Mediterranean Member States (EL9)**, a submarine cable between South Spain and Morocco (strengthening of existing connection) has been commissioned in 2006 and further new connections in the Mediterranean Electricity Ring were finalised in 2009. However, no data is available on the net transfer capacity increase.

These additional lines increase the electricity exchange of the countries concerned significantly.

2.1.3. Impact of implemented projects in isolated regions

Some progress was made to facilitate the integration of less-favoured and island regions. Out of the nine projects identified in the list of Priority Projects in isolated regions (see Annex III of the TEN-E Guidelines), more than half is under construction. However, most of them face substantial delays, and none of them has been commissioned yet. One is still under study. For the remaining no information has been provided.

Substantial progress has been reported in the **UK (Wales) and Ireland** region. For the East-West Interconnector project connecting the Irish electricity grid (connection point Meath) to Wales (connection point Deeside) through undersea and underground cables, construction

works are envisaged to start in mid-2010. Contracts for construction works have already been signed, and the line of 256 km is envisaged to be finalised in October 2012. Transmission capacity between the two regions will increase by 256 MVA. Another undertaking for an IE-Wales Interconnector project is currently planned and has reached authorisation stage. Interconnection points here are Co. Wicklow and North Wales. Transmission capacity would be increased by another 370 MVA; construction works are expected to be finalised in 2013.

Important developments were further reported regarding the **Spanish islands** interconnection projects, such as the Spanish Southern Cyclades to the Spanish interconnected system. The project has recently entered construction phase. However, the project faces a delay of 10 years and the line will be commissioned in 2014. Reason for this delay is a State Council decision to abandon the original project plan as there was local opposition concerning the installation of overhead lines. Progress has also been reported on the new connections in the Balearic and Canary Islands (ES). The electrical connection by a submarine cable between the Balearic Islands and the Spanish mainland network is in construction phase and envisaged to be operational by November 2011. The submarine interconnection between the Balearic Islands Mallorca-Elvissa as well as the Majorca – Ibiza – Formentera power systems submarine interconnection are still in study phase, the former envisaged to be operational in 2015.

Concerning the **Italian islands**, the doubling of the connection Sorgente (IT) – Rizziconi to connect Sicily (IT) to the Italian mainland, adding 2.000 MVA transmission capacity, is currently under construction. However, due to the technical difficulties it will only be operational in 2018. The project was awarded substantial EEPR funding amounting to € 110 million. The submarine link connecting Sardinia (IT) to the Italian mainland is currently under construction and was envisaged to be finalised in 2008. However, no progress has been reported so far.

2.1.4. Impact of implemented projects on the integration of renewable energies

Given that the networks often operate close to their transmission limits already and have not yet been adapted to the variable and highly unpredictable flow patterns of renewable energy, the integration of renewable energy is a particularly acute challenge to the EU.

To tackle this challenge there are a number of projects currently realised that are related to the integration of renewable energy, e.g. offshore wind connections implemented in the Member States located close to the Baltic and North Sea. The high wind penetration in these Member States creates a need for additional infrastructure which is able to connect the offshore wind parks to the onshore grid. Projects of European Interest that are related to the offshore wind connections and that are currently finalised or under construction include: 'Avelin (FR) – Avelgem (BE) line', 'V. Hassing (DK) – Trige (DK) line', 'Estlink', 'Undersea cable link between England (UK) and the Netherlands', 'Fenno-Skan subsea link between Finland and Sweden', 'Hamburg/Krümmel (DE) – Schwerin (DE)', 'Halle/Saale (DE) – Schweinfurt (DE)'. Further projects integrate off-shore wind are under study or in the authorisation procedure.[8]

However, not only the increased availability of offshore, but also of onshore wind energy causes congestion problems in some Member States not necessarily located in maritime regions. Further need to adapt networks due to fluctuations caused by hydro and solar power

[8] See report of the European coordinator available on Europa website: http://ec.europa.eu/energy/infrastructure/tent_e/coordinators_en.htm.

was raised. In e.g. Austria new interconnections are needed to transport the increased amount of energy produced from onshore windmills in North-Eastern Austria to the Southern consumption areas. Moreover, some Mediterranean countries including Portugal, Spain, France report on the need to adapt their networks due to the fluctuations caused by onshore wind energy, hydro and solar power. Examples are the Trans-Pyrenees French – Spanish Connection 'Baixas – Santa Llogaia' or the connection between Southern Portugal and South-Western Spain, and connections in the Basque country, Aragon, and Navarra or Galicia (ES). Tunisia and Italy have agreed to construct an interconnector in view of the Tunisian solar plan.

2.1.5. Results achieved with regard to the objectives of the TEN-E policy

The main achievements made in the electricity and gas sectors with regard to the four main objectives[9] of the TEN-E policy are summarised below.

(1) Encouraging the effective operation and development of the internal energy market

This objective was at the start of TEN-E, and selected projects have made a significant contribution in this area.

During the last years, substantial progress has been made to build new or upgrade existing interconnections to increase transmission capacity between the Member States. These developments allowed for an increased energy exchange and more competition, contributing to the convergence of average energy prices and stimulating market integration and thus the development of a true internal energy market.

Although a number of projects faced implementation difficulties, eleven cross-border projects in various regions have been finalised since 2005, and 18 cross-border projects are (at least partly) under construction (displayed in Table A7 in the Annex). For 17 of these projects, implementation has been accelerated by TEN-E or EEPR funding.

(2) Facilitating the development and reducing the isolation of less-favoured and island regions

Some progress was made to facilitate the integration of less-favoured and island regions in the electricity sector. Out of the nine projects identified in the list of priority projects in isolated regions (see Annex III of the TEN-E Guidelines), four are under construction. However, a number of the projects have faced substantial delays, and none of them has been commissioned yet.

Examples for projects for which substantial progress was reported are the UK (Wales)-Ireland line as well as the Spanish island interconnection projects, namely the Spanish Southern Cyclades as well as the Balearic and Canary islands. Also the interconnection of the Italian islands is progressing (Sicily, Sardinia).

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[9] In accordance with Article 3 of the TEN-E Guidelines (OJ L 262, 22.9.2006, p. 1)

(3) Reinforcing the security of supply

The additional or upgraded interconnectors that were recently implemented have increased transmission capacity between as well as within Member States significantly. In terms of security of supply this contributes directly to the alleviation of serious congestion that some transmission pathways have faced and enable operators to optimally use their networks in a more secure way.

(4) Contributing to sustainable development and protection of the environment

This is a relatively new addition to TEN-E and one where the impact is less conspicuous.

Given that the networks often operate close to their transmission limits already and have not yet been adapted to the variable and highly unpredictable flow patterns of renewable energy, the integration of renewable energy is a particularly acute challenge to the EU.

To tackle this challenge there are a number of projects that are e.g. connecting the offshore wind parks implemented in the Member States located close to the Baltic and North Sea. The high wind penetration in these Member States creates a need for additional infrastructure which is able to directly connect the offshore wind parks to the onshore grid.[10]

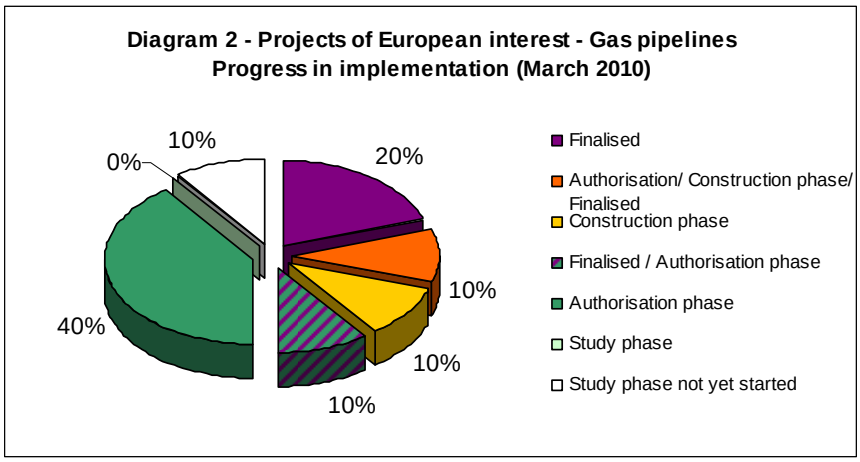
However, not only the increased availability of offshore, but also of onshore wind energy causes congestion problems in some Member States not necessarily located in maritime regions, and a need to further adapt networks due to fluctuations caused by hydro and solar power are reported.

[10] More information is available on Europa website: http://ec.europa.eu/energy/infrastructure/tent_e/coordinators_en.htm.

2.2. Gas network

Some progress has been made in the implementation of the 10 gas projects of European interest as specified in Annex I of the TEN-E Guidelines[11] since 2007[12]. Most of the projects have moved to a next phase of their implementation (See Diagram 2). Up to today, two out of the 10 gas projects of European interest are finalised and one is under construction. Four projects are in the authorisation phase. In addition, there are two projects which include several sections with various implementation phase status: one project is partly in the authorisation phase and partly finalised and the various sections of the second project are either under authorisation, under construction or finalised. No projects are currently in the study phase. However, the study phase for one project (Yamal-Europe II) could not start yet as initially foreseen in 2007.

Diagram 2 – Progress with the implementation of projects of European interest, gas pipelines (10 projects)



The progress in implementation for each of the 10 gas projects of European interest is illustrated in Figures A5-A7.

For which concern the priority projects, 12 additional projects have been finalised within the period 2007-2009 and 13 projects are currently under construction. Further information on the priority projects finalised and/or under construction is available in Table A6.

[11] OJ L262, 22.9.2006, p. 1

[12] For further detail, see Priority Interconnection Plan, SEC(2006)1715/1

2.2.1. Description per priority axis

NG1 United Kingdom – northern continental Europe, including the Netherlands, Belgium, Denmark, Sweden and Germany – Poland – Lithuania – Latvia – Estonia – Finland – Russia

Projects of European interest

North European gas pipeline (Nord Stream pipeline)

The Nord Stream pipeline aims at linking Russian resources to the German gas network through the Baltic Sea. No gas field has been identified as the source for Nord Stream. It is envisaged that more than 50 % of this gas is diverted from existing routes. The gas arriving through the Nord Stream pipeline will be transported to Germany and onwards to neighbouring European countries. The main destinations will be Germany, Benelux countries and possibly France, Denmark and United Kingdom.

The Nord Stream offshore pipeline section Vyborg (RU) – Greifswald (DE) is 1220 km long. The first trunk line, with an initial capacity of 27,5 Bcm/y, is expected to become operational by 2011; the second trunk line, with a further capacity of 27,5 Bcm/y, is expected by 2012. The total capacity of the undersea pipeline is foreseen up to 55 Bcm/y.

The project has received all environmental and construction permits. The authorisation phase is now completed. Construction will commence in the first half of 2010. A comprehensive trans-boundary environmental impact assessment was carried out. The main elements of complexity reported include the complexity of environmental studies and of the environmental permitting procedures that differ in the various countries concerned. The Nord Stream consortium has not requested any TEN-E grant up to date. The cost of the Nord Stream offshore pipeline is estimated at € 7,4 billion.

Upstream, the onshore section connecting the Nord Stream pipeline to Russian gas fields is 917 km long and is under construction. Downstream, the reinforcement of the German gas network (up to 850 km) is in the study phase.

In addition, the Dutch network is being developed to connect with Germany and further to Belgium and the United Kingdom (see below).

Yamal – Europe II natural gas pipeline

Yamal – Europe II aims at doubling the capacity of the Yamal – Europe gas pipeline from Russian gas resources to the European Union through Belarus and Poland along the existing Yamal – Europe I pipeline. The pipeline would be 680 km long with a capacity of up to 43 Bcm/y. The total cost of the Yamal – Europe II project is estimated at € 1.500 million. In spite of the support from the governments of the three Baltic States, the Baltic gas companies, potential partners in the project, did not show interest in the project to date. As a result, no feasibility studies have been undertaken yet. A TEN-E grant (amounting to € 924.000) was allocated in 2004 to the Polish gas company to carry out a study on possible routes for gas pipelines from Russia to the EU, including the Yamal – Europe II and Amber projects. However the study could not be carried out, given that the lack of interest from potential partners would not have allowed performing a sound and consistent analysis.

Natural gas pipeline linking Denmark, Germany and Sweden (Baltic Gas Interconnector)

The Baltic Gas Interconnector would connect the gas networks of southern Sweden, northern Germany and eastern Denmark. The offshore section of the pipeline is 200 km long. The authorisation phase is now completed (respectively in 2004 for Sweden, 2005 for Denmark and 2006 for Germany). The pipeline was expected to enter into operation in 2010 with a capacity of 3 Bcm/y. Initially, the gas was foreseen to come from a gas field in the North Sea which is now in depletion. The source could then also be from Russia. In addition, linking Nord Stream pipeline to the Swedish gas pipeline network is being considered, though energy policy priorities for Sweden are strongly focused on the promotion of renewable energy and as such, the role of gas is expected to remain relatively unimportant in its future energy-mix. Therefore, the objectives of this pipeline are to be reviewed and its implementation is delayed. One additional year is left in relation to the approval received. This project does not feature among the priority projects for the Baltic Sea Region as identified by the stakeholders under the BEMIP[13].

Apart from the change of gas sources, changes in energy policy priorities of Sweden and the diversity of authorisation counterparts in Germany and time-consuming procedures were the main elements of complexity reported. No TEN-E grant has been allocated to this project.

Increase in transmission capacity on the Germany – Belgium – United Kingdom axis

This project will allow importing Norwegian gas to Western European markets, and will be the link to the import pipelines Nord Stream and possibly in the longer term Yamal-Europe II. It requires two new important interconnections: i) connection between the Netherlands and United Kingdom, and ii) connection between Germany and the Netherlands towards Belgium.

i) Connection between the Netherlands and United Kingdom

A major element of this project is thus the **Balgzand (NL) – Bacton (UK) Line (BBL)** linking the Netherlands to United Kingdom. The link is operational since 2006. This offshore interconnector is 230 km long with a capacity of 8 Bcm/y. No delays in the implementation have been reported though the project promoters had to manage natural protected areas and the need to re-route the pipeline. The total cost of the project was € 500 million. Its feasibility study was supported by the TEN-E budget. The BBL pipeline will be reinforced in 2010 with the installation of a 4th compression station in the Netherlands.

The **GWWL pipeline** (Grijpskerk – Workum – Wieringermeer line) is operational since 2007. This interconnection is 110 km long. No major problems during the implementation have been reported. The total cost of the project was estimated to € 350 million. The GWWL pipeline contributes to connect Germany to the BBL pipeline towards United Kingdom.

ii) Connection between Germany and the Netherlands towards Belgium

The other major element of this overall project is the **North-South project Rysum (DE)/ Oude Statenzijl (NL) – Zelzate/'s Gravenvoeren (NL)**, crossing the Dutch territory from the German-Dutch border to the Dutch-Belgium border. This project implemented by Gasunie (NL) – also called **European Gas Roundabout project** – includes a number of new gas

[13] Baltic Energy Market Interconnection Plan (BEMIP)

interconnections and compressor stations and is budgeted at € 1.156 million. This 400 km long project will be a link between Germany and the Netherlands that will allow the development of the European Gas Roundabout project that will bring Norwegian gas (at a first stage) to Germany, the Netherlands and further to Belgium and the United Kingdom. This project has been allocated an EIB loan of around € 500 million.

The Eernstunnel linking Rysum (DE) and Midwolda (NL) is under construction. This interconnection is 4 km long. Its entry capacity is up to 31,8 Bcm/y and its exit capacity is up to 12,5 Bcm/y. It is expected to enter into operation in October 2010. The total cost of the Eernstunnel is estimated up to € 60 million. The project has been allocated a TEN-E grant amounting to a maximum of € 1.931.809 in 2009 (for the German section of the project). No delays have been reported for this project. This section is part of the North-South project.

The transport capacity from Emden / OSZ (German border) to Balgzand (BBL Pipeline) is to be further extended by 10 Bcm/y. The extension pipeline is 100 km long and is expected to be operational in 2014-2015. The project is in the authorisation phase. This section is part of the North-South project.

The pipeline Ommen – Ravenstein (NL) towards the Belgian border is now under construction. The pipeline is 180 km long and has a capacity of up to 20 Bcm/y. The interconnection is foreseen to be operational in October 2012. No delays have been reported for this project. This section is part of the North-South project.

In addition to the above-mentioned projects, a connection linking the LNG terminal GATE near Rotterdam (Maasvlakte) to the Dutch gas network towards CS Wijngaarden is under construction. This 80 km long pipeline has a capacity of 12 Bcm/y and is expected to be operational in October 2011. No delays have been reported to date.

The LNG terminal GATE (Maasvlakte) is currently under construction and is expected to be fully operational in 2011 with a capacity of 9 Bcm. In the longer term, the capacity is foreseen to be increased up to 16 Bcm. The project will be connected to the Dutch gas network as part of the North-South project.

Last, the underground gas storage in Alkmaar is to be connected to Bergermeer. Such connection includes a 2 km long pipeline with a 4 Bcm/y capacity and a 10 MW compression station. This project is in the authorisation phase. No delays have been reported to date. This section is part of the North-South project.

The interconnection Ravenstein (NL) – Vinkel (BE) is operational since 2003. No major problems have been reported during the implementation. This section is part of the North-South project.

The main elements of complexity of the North-South project (axis Germany – The Netherlands – Belgium) as reported are lengthy permitting procedures (including EIA reporting), managing natural protected areas, crossing natural barriers as well as the escalation of contractor pricing caused by limited capacity and increasing costs of energy.

Priority projects

Skanled – European Gas Supply (SEGS)

The Skanled pipeline aims at connecting the Danish and Swedish gas systems to Norwegian gas resources. The planned pipeline will go from Karsto, on the Norwegian West Coast, to Greenland, on the Norwegian East Coast, and to Sweden and Denmark. The pipeline is foreseen to have a capacity of 8,3 Bcm/y and a total length of 1130 km (860 km for the offshore section, 250 km for the Danish onshore section and 16 km for the Swedish onshore section). The total cost of the project is estimated to € 1.245 million. The project has been allocated two TEN-E grant in 2007 and 2008 amounting respectively to 930.000 € and 2.268.000 €. However, though feasibility studies have been performed, the project was suspended in April 2009 due to increased commercial risk combined with the global economic developments that have given an uncertain view on future gas demand.

Baltic Pipe

The Baltic Pipe aims at connecting the Danish and Polish gas systems to Norwegian gas resources. The gas pipeline will be offshore with an approximate length of 38-45 km. The estimated annual capacity is 2,5 Bcm. The total cost of the project is estimated to €450 million. The project concept has to be reviewed following the delays encountered with regard to the Skanled pipeline development. The Baltic Pipe implementation is thus delayed. The project has been allocated TEN-E grants in 1999, 2000, 2008 and 2009, which amount to a total of € 8.196 million. Pre-engineering studies will be funded under the EEPR.

In addition, four priority projects have been completed, including the upgrading of capacity along the north-west axis: Zelzate (BE) - Zeebrugge (BE) completed in 2009. Two further projects are under construction:

– Connections between north-east Germany (Berlin area) and north-west Poland (Szczecin area) with a branch from Schmölln to Lubmin (DE, Greifswald area);

– Zeebrugge (BE) - Eynatten (BE) capacity upgrade (additional capacity up to 10 Bcm/y)

Further information on priority projects finalised or under construction is available in Table A6.

Main obstacles and/or reasons for delay reported:

- Complexity of legal and regulatory framework (numerous authorisation procedures at different administrative levels: federal, regional, local);

- Time-consuming permitting procedures (incl. EIA report) and synchronisation of different public hearings;

- Coordination with upstream pipelines projects;

- Synchronisation of gas transmission grids upgrade along the pipeline route;

- Managing protected natural areas;

- Crossing existing infrastructures (eg tunnels etc);

- Crossing densely populated areas and natural barriers;

- Supply chain price evolution;

- Financing sources scarcity.

NG2 Algeria – Spain – Italy – France – northern continental Europe

Projects of European interest

Algeria – Tunisia - Italy gas pipeline (TRANSMED II)

The TRANSMED II pipeline is operational since 2008 (first phase). Its length is 160 km and its capacity is up to 6,5 Bcm/y. The second phase of the extension is expected to be completed in 2012. The extension realised is less a new pipeline than an upgrading of the Algerian and Tunisian sections which permitted to increase the transport capacity. The project has been implemented according to the initial schedule and no problems have been reported. The total cost of the project is not available. No TEN-E support has been allocated to this project.

Algeria – Italy gas pipeline, via Sardinia and Corsica, with a branch to France (Galsi)

The Galsi project is a new gas pipeline aiming at connecting the Algerian gas resources to the Italian and European markets through a new route via Sardinia Island and the Italian mainland. The overall length of the system is 840 km, of which 288 km concern the Algeria – Sardinia section (El Kala – Koudieth Draouch – Porto Botte) and 563 km concern the Italian section Sardinia – Tuscany (Porto Botte – Olbia – Piombino). The pipeline total capacity is 8 Bcm/y. The Front End Engineering Design has been completed and the authorisation procedures are now at an advanced stage.

Construction is expected to start in 2010/2011 and the pipeline is foreseen to be operational end of 2013 instead of 2011 as planned at the outset of the project. The main elements of complexity reported are the technical constraints linked to the water depth between Algeria and Sardinia (maximal depth exceeds -2.800 m) and the length of the offshore section (70 % of the overall Galsi system is underwater). The project was not allocated any TEN-E grant, but is supported under the EEPR budget up to € 120 million. The total cost of the project is approximately € 3.600 million.

Connecting Corsica Island to the Galsi system is currently under assessment by French authorities.

Medgas gas pipeline (Algeria – Spain – France – Continental Europe)

The **Medgas gas pipeline** connects the Algerian gas resources to the Spanish gas network and further to France and continental Europe. The interconnection is 208 km long and has a capacity of 8 Bcm/y. The project includes a receiving terminal in Almeria, the lending point in Spain, and a compressor station in Beni Saf (Algeria). The construction of the offshore section is now completed and the onshore works are now close to their completion. The testing sequence started end of 2009 and the interconnector is foreseen to be fully operational in 2010. The project has faced a delay of approximately one year in the construction of the onshore terminals, though no specific problems have been reported. The project has been allocated two TEN-E grants (respectively in 2004 and 2007), both amounting to a maximum of € 2 million. The total cost of the project amounts to € 900 million.

Downstream in Spain, several gas interconnections on the Larrau branch of the western axis are under construction: pipeline Tivissa – Paterna, pipeline Tivissa – Castelnou, pipeline Zarza Tajo – Yela, and pipeline Yela – Villar Arnedo, including the Villar de Arnedo compressor station. These four interconnections reach a total length of 681 km and a capacity

of 3,14 Bcm/y. They are foreseen to enter into operation end of 2012. In addition, a new compressor station in Navarra is operational since end of 2009. These infrastructures aim at reinforcing the Spanish gas system and thus creating a bidirectional gas flow capacity between Spain and France with similar capacities in both directions, whereas the Larrau axis was initially designed to allow flows in the direction France to Spain for the capacity associated to a long term supply contract with Norwegian gas suppliers.

However, the full capacity resulting from the installation of this new compressor station should be reached after the completion of the necessary reinforcements in France, expected by 2013. No TEN-E grants have been allocated to this project, but these infrastructures are supported under the EEPR budget up to € 45 million.

The **reinforcement of the French gas network** on the Africa-Spain-France axis is now in the authorisation phase. The interconnections considered concern both the Western corridor along the Atlantic Ocean and the Eastern corridor along the Mediterranean Sea. They are respectively 57 and 215 km long for an additional capacity of respectively 3,5 and 7,4 Bcm/y. They are foreseen to enter into operation respectively in 2013 and 2015. No delays have been reported to date, though the period of administrative implementation and the diversity of administrative authorisations required are seen as possible elements of complexity of the project. No TEN-E grants have been allocated to this project, but it is supported under the EEPR budget up to € 200 million.

Priority projects

Five further priority projects have been finalised:

- New gas pipelines from Algeria to Spain and France and related capacity increase of the internal networks in these countries (2002)
- Increasing transport capacity of the Algeria - Morocco - Spain (up to Córdoba) pipeline (2004)
- Ciudad Real (ES) - Madrid (ES) pipeline (operation date not available)
- Córdoba (ES) - Ciudad Real (ES) pipeline (operation date not available)
- Lussagnet (FR) - Bilbao (ES) pipeline (2005)

Main obstacles and/or reasons for delay reported:

- Complexity of legal and regulatory framework (numerous authorisation procedures at different administrative levels: federal, regional, local);
- Time-consuming permitting procedures (incl. EIA report) and synchronisation of different public hearings;
- Synchronisation of gas transmission grids upgrade along the pipeline route;
- Managing protected natural areas;
- Crossing natural barriers (eg. Mediterranean Sea).

NG3 Caspian Sea countries – Middle East – EU

Projects of European interest

Turkey – Greece – Italy gas pipeline (ITGI/Poseidon)

The ITGI project aims at connecting the Caspian and Middle East natural gas to Italy and the EU through Turkey and Greece. The project implementation is sub-divided into two linked interconnections as described below.

Section 1: the Greece – Turkey interconnector

The **Greece – Turkey interconnector** has been completed in 2007. The pipeline is 295 km long linking Karacabey (TR) to Komotini (EL) and brings an additional import capacity of up to 11 Bcm/y. The main complexity elements noticed during the project implementation relate to natural protected areas and military areas. In addition, the crossing of the Evros River – the State border between Turkey and Greece – required a specific coordination between the two countries and presented some technical difficulties. This project received a TEN-E grant in 2001 and 2002 of respectively 243.500 € and 4.330.000 € for feasibility, technical and environmental studies. The total cost of the project amounts to approximately € 280 million, of which € 82,2 million on the Greek side.

Section 2: the Greece – Italy interconnector

The Greece – Italy interconnector is 800 km long (of which 570 km onshore) and has a capacity of up to 9 Bcm/y. It will link Komotini (EL) to Otranto (IT). The offshore section of the pipeline is called "Poseidon" pipeline. The project is in the authorisation phase. On the Italian side, the detailed engineering has been completed; the authorisation procedures are at an advanced stage. On the Greek side, the design phase is about to start shortly. The preliminary Environmental Impact Assessment approval is expected to be granted in 2010.

The project is currently facing a delay of 3 years and is expected to be operational in 2015. The main complexity elements reported are the technical features of the offshore section (1.370 m depth; HDD method for the construction of the Italian landfall), the authorisation procedures related coordination as well as natural gas sale, purchase and transit agreements.

The estimated total cost of the project amount to € 1.250 million, of which € 800 million for the offshore section of the pipeline. The project has been allocated three TEN-E grants in 2003-2005 for studies amounting respectively to 930.000 €, 3.325.000 € and 3.370.500 €. In addition, the offshore section of the Greece – Italy interconnector (Poseidon) is supported under the EEPR budget up to a maximum of € 100 million.

Turkey – Austria gas pipeline (Nabucco)[14]

The Nabucco gas pipeline is a new interconnector to connect the Caspian region and the Middle East gas resources to the Central and Western European gas market. The pipeline will run from the Eastern border of Turkey through Bulgaria, Romania and Hungary to the gas trading hub at Baumgarten in Austria. Its total length is approximately 3.300 km. The pipeline

[14] Further detail on the Nabucco gas pipeline implementation is available on: http://ec.europa.eu/energy/infrastructure/tent_e/coordinators_en.htm

will be constructed in different phases. The pipeline is expected to reach its first capacity stage, up to 8-10 Bcm/y, in 2014. A first extension of the capacity (up to 15 Bcm/y) is foreseen to be operational in 2016. Last, the pipeline is foreseen to reach its full capacity up to 31 Bcm/y in 2019. The pipeline will include a reverse flow capability. To date, the project is in the authorisation phase.

The lack of harmonisation of legal and regulatory framework along the pipeline route, the environmental permitting procedures and the need to synchronise the project implementation with the development of large gas fields where the gas will be sourced from are the main elements of complexity to be faced. In order to mitigate the inherent complexity of such a large scale project, an intergovernmental agreement has been signed by all the countries involved (five EU Member States and Turkey) on 13 July 2009. This agreement aims at mitigating the regulatory risks and demonstrates the political support from the Nabucco partner countries. In addition, a coordinated Environmental and Social Impact Assessment is currently undertaken in parallel in each of the transit countries.

The Nabucco pipeline has been allocated two TEN-E grants during its study phase, respectively in 2003 with a maximum amount of € 1,7 million, and in 2005 with a maximum amount of € 4,8 million. In 2009, a further TEN-E grant amounting to a maximum of € 3 million has been allocated to this project. In addition, the project is supported under the EEPR budget up to € 200 million. The estimated total cost of the project amounts to € 7.900 million.

Priority projects

Trans-Adriatic Pipeline (TAP)

The TAP pipeline refers to a transit pipeline with the view to transport gas mainly from the Caspian Sea region and the Middle East region to Italy, through Turkey, Greece and Albania. The 520 km long pipeline is foreseen to have a capacity of 10 Bcm/y. This project is in the authorisation phase. Its total cost is estimated up to € 1.500 million. The project has been allocated two TEN-E grants in 2004 and 2005, respectively amounting to 1.026.000 € and 2.000.000 €. One of the main elements of complexity of the project is the need to align the construction with upstream connections developments.

White Stream Gas Pipeline

The White Stream Gas Pipeline will provide a link between the South Caucasus Gas Pipeline (SCP) in Georgia and Romania, across the Black Sea via Crimea. The length of the pipeline is estimated to 1100 km, of which 700 km relate to the undersea section from Georgia to Crimea. During the first phase of implementation, the pipeline may have an initial capacity of approximately 8 Bcm/y. Subsequent phases of implementation are foreseen to make available larger quantities of gas (16 Bcm/y in phase 2) potentially up to 32 Bcm/y when the Trans-Caspian pipeline will start transporting gas from Turkmenistan and other Eastern Caspian countries. At this stage, the White Stream Pipeline will allow supplying further EU Member States (such as Hungary, Slovakia, Czech Republic, Poland, Baltic States, etc) with Caspian gas. The project is currently in the study phase and is foreseen to be operational in 2016. The total cost of the project is estimated to approximately € 4.000 million. The project has been allocated two TEN-E grants in 2007 and 2008 amounting respectively to 300.000 € and 350.000 €.

The Nabucco, ITGI and White Stream projects will contribute to the development of the Southern gas Corridor.

Main obstacles and/or reasons for delay reported:

- Complexity of legal and regulatory framework (numerous authorisation procedures at different administrative levels: federal, regional, local);
- Time-consuming permitting procedures (incl. EIA report) and synchronisation of different public hearings;
- Coordination with upstream pipelines projects;
- Market issues (finalisation of natural gas sale, purchase agreements and transit agreements);
- Synchronisation of gas transmission grids upgrade along the pipeline route;
- Managing protected natural areas;
- Crossing existing infrastructures (eg tunnels, underwater pipelines etc);
- Crossing densely populated areas, military areas and natural barriers (eg. Mediterranean Sea);
- Supply chain price evolution;
- Financing sources scarcity.

NG4 Liquefied natural gas (LNG) terminals in Belgium, France, Spain, Portugal, Italy, Greece, Cyprus and Poland

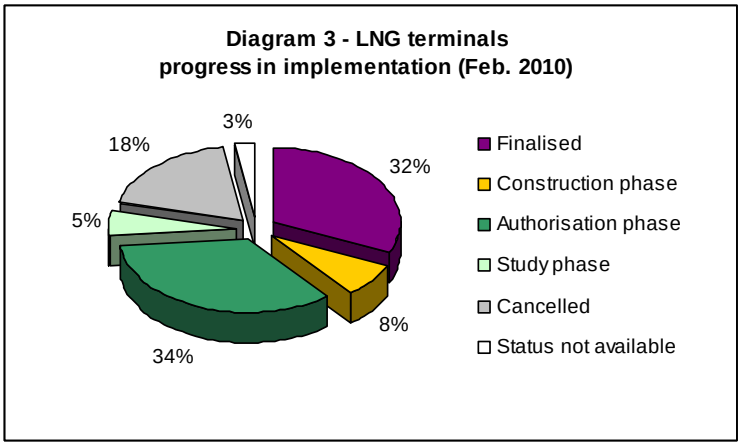
The TEN-E guidelines specified 25 locations as priority for LNG terminals projects in 10 Member States. All – except the LNG terminals located in Malta and United Kingdom – belong to the priority axis NG4 (see Table 1 below).

Table 1 – Number of LNG terminals projects as specified in the Annex III of the TEN-E guidelines per Member State, and related TEN-E projects references

Belgium	France	Spain	Portugal	Italy	Greece	Cyprus	Poland	Malta	United Kingdom
1	2	8	2	6	3	1	1	1	1
8.17	8.1 8.2	6.2 6.3 8.3 8.4 8.5 8.6 8.7 8.8	6.4 6.9	8.11 8.12 8.13 8.14 8.15 8.16	6.13 8.10 8.18	6.11	-	6.15	8.18

A total of 38 sites have been more specifically considered under the 25 geographical areas as specified in the TEN-E guidelines. Diagram 3 gives the progress in the implementation of these 38 sites up to February 2010.

Diagram 3 – LNG terminals progress in implementation (March 2010)



In the period 2007-2009, eight LNG terminal projects as listed in the TEN-E guidelines were completed. In addition, three projects are currently in the construction phase and are expected to enter into operation in 2010. Two projects have been cancelled because of the implementation of an alternative solution for securing gas supply and five following the negative advice from the regional authorities and/or environmental concerns with regard to the site initially considered. Still, for five cases, the project implementation is pursued although in an alternative site. Detailed information on the projects finalised and under construction is available in Table A6.

The state of implementation of TEN-E LNG terminals projects is described per Member State below.

Priority projects

Belgium

The capacity extension of the LNG terminal in Zeebrugge has been completed in 2008. The capacity has thus been upgraded from 4,5 up to 9 Bcm up to date.

A market study related to a further extension of capacity has been launched in 2007. The additional capacity is foreseen to be made available as from 2016. Yet, the actual commissioning date may depend on the level and type of new investments required and on permitting constraints. A phased implementation of the different parts of the project could be envisaged.

France

The capacity extension of the LNG terminal "Fos Tonkin" at Fos-sur-Mer (on the French Mediterranean coast) has been completed in 2007. The terminal has currently a capacity of 7 Bcm/y. The new LNG terminal "Fos-Cavaou" also located at Fos-sur-Mer is under construction. It should enter into operation in 2010 with a capacity of 8,25 Bcm/y.

A new terminal at Le Verdon-sur-mer - located on the French Atlantic coast – is in the study phase. The terminal is foreseen to be operational in 2013 with an initial capacity of 6 to 9 Bcm/y. The capacity could be further extended up to 15 Bcm/y at a later stage.

Spain

Six out of the eight LNG terminals in Spain as listed in the Annex III of the TEN-E guidelines are operational as follows: Cartagena (second capacity extension up to 11,8 Bcm/y finalised in 2008), Huelva (second capacity extension up to 11,8 Bcm/y finalised in 2009), Mugardos (Galicia) (new site operational since 2007, 3,62 Bcm/y), Bilbao (new site operational since 2003 with a capacity of 7 Bcm/y), Sagunto (Valencia region) (new site operational since 2009) and Barcelona (regasification capacity extension completed in 2009, up to 17,08 Bcm/y). Further extensions of the terminals are foreseen in the horizon 2016.

Both LNG terminals in Tenerife (site Arico-Granadilla) and Gran Canaria (site Arinaga) (Canary Islands) are in the authorisation phase. The two terminals are foreseen to be operational respectively in 2013, with a similar capacity of 1,3 Bcm/y. This capacity could be upgraded up to 2 Bcm/y by 2016.

Portugal

The LNG terminal at Sines entered into operation in 2004 with an initial capacity of 5,5 Bcm/y. A further extension of its capacity is foreseen to be completed by 2011.

The construction of an LNG terminal in Madeira Island is under consideration. The project is in the study phase and – if implemented – is expected to be operational in 2014. This terminal would be the first LNG terminal in a peripheral region. Its possible capacity is still under consideration.

Italy

In the north Adriatic Sea, the offshore LNG terminal in Rovigo entered into operation in 2009 with a capacity of 8 Bcm/y. Two onshore LNG terminals are under construction and should enter into operation in 2010, respectively at Brindisi (capacity of 8 Bcm/y) on the South Adriatic coast and at Livorno (site so called Toscana offshore) (capacity of 3,75 Bcm/y) on the Tyrrhenian Sea coast. In addition, eight projects are in the authorisation phase.

Greece

The first extension of the LNG terminal in Revithoussa has been completed in 2007. The capacity of the terminal is currently approximately 5.8 Bcm/y. A further expansion of the LNG terminal's storage capacity through the addition of a 3rd LNG tank is under consideration. This project is still in the conceptual phase but its realization is expected to be completed around 2014.

The implementation of a second LNG terminal in continental Greece has been cancelled.

The implementation of an LNG terminal in Crete is delayed since an alternative option for electricity generation has been developed. The project is in the study phase and is foreseen to be operational in 2016.

Cyprus

The LNG terminal in Cyprus, Vassilikos Energy Center, as specified in the TEN-E guidelines is currently in the study phase and is foreseen to be operational in 2014. The terminal capacity is foreseen to be gradually increased from 0,7 up to 1,5 Bcm until 2035. The total cost of the

project is estimated to € 670 million. The forthcoming construction of this LNG terminal requires the reinforcement of the local natural gas network in Cyprus to accommodate power stations and users. Such reinforcement is supported under the EEPR budget up to € 10 million.

Poland

The LNG terminal in Swinoujscie – located close to the German-Polish border – is currently in the authorisation phase. It is foreseen to be operational by 2014 with an initial capacity of 5 Bcm/y, which could be upgraded up to 7,5 Bcm/y by 2017. Its total cost is estimated up to € 869 million. The project has not been allocated any TEN-E funding but is supported under the EEPR budget up to € 55 million and the EFRD budget up to € 120 million.

LNG terminals in other Member States

Malta

Natural gas in Malta will be used as fuel at the existing and new Combined Cycle Gas Turbine plants. A feasibility study was to be undertaken on the possibility of importing natural gas to Malta using a pipeline or LNG facilities. No further information is available on this project.

United Kingdom

The LNG terminal at Isle of Grain (Kent) is operational since 2005. Its capacity has been upgraded in 2008 from 4,4 up to 13,5 Bcm/y. A third capacity extension up to 20,5 Bcm/y is currently under construction and is expected to be operational in 2010. The total cost of the project is estimated to approximately € 1.100 million.

Main obstacles and/or reasons for delay reported:

- Complexity of legal and regulatory framework (numerous authorisation procedures at different administrative levels: federal, regional, local);
- Time-consuming permitting procedures (including the EIA report and other requirements under the SEVESO regulatory framework) and synchronisation of different public hearings;
- Synchronisation of gas transmission grid upgrades;
- Local opposition to the project (including environmental concerns);
- Technical/technological constraints (eg. implementation of innovative technology, anticipation of seismic risks during the construction phase);
- Integration with other industrial activities in site;
- Managing protected natural areas (including fauna and flora).

NG5 Underground gas storage in Spain, Portugal, France, Italy, Greece and the Baltic Sea Region

The TEN-E guidelines specified 20 underground gas storage projects in 12 Member States, of which 15 belong to the priority axis NG5 (see Table 2). The state of implementation of all these projects is described below.

Table 2 – Number of gas storage projects as specified in the Annex III of the TEN-E guidelines per Member State, and related projects references

Spain	Portugal	France	Italy	Greece	Baltic Sea Region	Austria	Belgium	Ireland
2	1	4	1	1	5	3	1	1
8.26 8.27	8.28	8.22 8.23 8.24 8.25	8.35	8.21	8.30, 8.31 (DK) 8.36, 8.37 (PL) 8.39 (LT) 9.4 (LV)	8.32 8.33 8.34	8.29	8.20

Priority projects

Spain

Serrablo (1,1 Bcm) and Gaviota (2,6 Bcm) are the only subterranean storages currently under operation. There are several new underground storage facilities and/or expansion of existing sites which are under construction such as Poseidón (capacity of 0,25 Bcm; foreseen operation date is 2010), Yela (capacity of 1 Bcm; foreseen operation date is 2011), Castor (capacity of 1,3 Bcm; foreseen operation date is 2012), Marismas (capacity up to 0,9 Bcm; foreseen operation date is 2013) and Gaviota (capacity up to 1,5 Bcm; foreseen operation date is 2015). In addition, two gas storage projects respectively in Barreras and El Ruedo are in the study phase.

Portugal

The underground gas storage in Carriço is operational since 2009 with a capacity up to 1,4 Bcm. The extension of the gas storage capacity is under consideration. The capacity increase envisaged is estimated to approximately 0,5-0,7 Bcm. The foreseen operation date is not available.

France

The underground gas storage in Lussagnet (aquifer type) is currently operational with a capacity of 2,4 Bcm. Its extension up to 3,5 Bcm is currently in the construction phase and is expected to be completed by 2011. This project was allocated a TEN-E grant amounting to a maximum of 1.500.000 € in 2002 during its study phase.

The construction of an underground gas storage in Pécorade (depleted field type) is under consideration. The project is thus in the study phase. The foreseen capacity is approximately 0,75-1 Bcm. Its expected operation date is not available. The estimated total cost of the project amounts to € 300 million. The project has been allocated a TEN-E grant amounting to 4.300.000 € in 1999.

In addition, the extensions of three other existing storage projects (Aquifer type) are in the study phase in the Center Region: Chemery and Soings-en-Sologne UGS (foreseen capacity extension of 0,06 Bcm) and Céré la Ronde UGS (capacity extension not available yet). The extension of the Céré la Ronde UGS is expected to be completed in 2011. Further, the implementation of a salt cavity type storage in the Alsace Region – so called "Alsace Sud project" – is under consideration as well. The capacity foreseen is estimated up to 0,16 Bcm. The foreseen date of operation is not available yet.

Italy

One underground gas storage project is under construction: the Cotignola – San Potito project (depleted gas fields type) which has a capacity of 0,9 Bcm. The project is expected to be operational in 2012. In parallel, five other projects are in the authorisation phase (with a cumulated estimated capacity amounting to 4,36 to 4,76 Bcm). The expected operation dates of these projects are not available.

Greece

For the time being, there are no storage facilities in the Greek natural gas system. The storage capacity is limited to the only existing LNG Terminal on Revithoussa Island, which features tanks with a capacity of 130.000 m3 of LNG, equivalent to approximately 0,08 Bcm.

Baltic Sea Region

Denmark has currently two operational underground gas-storages: Lille Thorup (0,4 Bcm) and Stenlille (0,56 Bcm). The first phase of the extension of the Lille Torup gas storage (LTEGS) (0,2-1 Bcm) is under construction and is expected to be completed in 2013. The full capacity is expected to be made available in 2030. The new storage site in Tønder has been put on hold since 1997: a new gas pipeline from the gas producing fields in the North Sea to shore has been developed to assure gas security of supply without a new gas storage facility.

Poland has seven gas storage facilities, of which two are included in Annex III of the TEN-E guidelines. The extension of the storage at Wierzchowice (additional capacity of 0,6 Bcm) is under construction and is expected to be completed in 2011/2012. The development of a new storage at Kosakowo – close to the LNG terminal at Swinoujscie – is also in the construction phase and is expected to be completed by 2013 (phase 1). Yet, the full capacity (0,25 Bcm) is expected to be made available in 2020.

The stability of natural gas supply in **Latvia** is currently secured by the underground gas storage in Incukalns. The total volume of the storage is 4,4 Bcm, and the active volume 2,3 Bcm. The development of further underground gas storage in Dobele district is being considered.

Lithuania has no underground storage facility thus it uses services of such a storage located in Latvia. However the implementation of two storage projects in Lithuania is currently under consideration: the underground gas storage at Syderiai site is in the study/authorisation phase. The project is expected to be operational in 2015. It has been allocated a TEN-E grant in 2008 amounting to a maximum of 2.000.000 €. The second storage project under study relates to an LNG regasification vessel including a floading storage capacity (up to 2 Bcm). The project has been allocated a TEN-E grant in 2009 amounting to a maximum of 212.000 €. The project is foreseen to be completed by 2011.

Underground gas storage in other Member States

Austria

The annex III of the TEN-E guidelines includes three gas storage projects in Austria which implementation is as follows.

The extension of the existing gas storage at Puchkirchen, including pipeline to the Penta West system near Andorf (AT) is in operation. The capacity has been upgraded from 0,5 Bcm/y in 2003 up to 1,1 Bcm to date. A TEN-E grant amounting to a maximum of € 2.912.000 has been allocated to this project.

The implementation of the gas storage at Haidach (new site, including pipeline to the European gas grid) is divided into two stages. The project is in operation (first phase) since 2007 with an initial capacity of 1,2 Bcm. The second stage of the project is under construction, with a further 1,2 Bcm capacity. The project is expected to reach its full capacity in 2011. The total cost of the project is estimated to € 250 million.

The underground gas storage at Baumgarten has been subject to a feasibility study supported under the TEN-E budget in 1996 and completed in 1998. However, this study did not lead to investment in this new gas storage capacity.

Belgium

The extension of the existing underground gas storage at Loenhout is under construction. The full capacity should be made available in winter 2010/2011. The project has been allocated a TEN-E grant in 1998 up to 3.391.000 €. The total cost of the project is estimate to € 125 million.

Ireland

The only storage facility currently in Ireland is the depleted South West Kinsale (SWK) gas field which has been converted for this purpose. It has a working volume of 0,2 Bcm. It mainly operates as a seasonal storage facility but can also accommodate within-day gas withdrawals and injections. There is potential for expansion of the storage facility.

Main obstacles and/or reasons for delay reported:

- Complexity of legal and regulatory framework (numerous authorisation procedures at different administrative levels: federal, regional, local);
- Time-consuming permitting procedures (including the EIA report and negotiations with land owners);
- Local opposition to the project (including environmental concerns);
- Synchronisation of gas transmission grid upgrades;
- Technical/technological constraints (eg. implementation of innovative technology, anticipation of seismic risks during the construction phase);
- Possible delays of material/equipment deliveries;
- Integration with other industrial activities and/or agriculture/ tourism activity in the site area;
- Managing protected natural areas (including fauna and flora);
- Financing sources scarcity and/or satisfying project progress within budget.

NG6 Mediterranean Member States – East Mediterranean Gas Ring

Projects of European interest

Libya-Italy gas pipeline (Greenstream)

The Greenstream pipeline transports natural gas from coastal facilities in Libya to Italy, via an offshore pipeline (Mellitah, LY – Gela, IT), with associated initial gas compressor station at Mellitah (LY) and a receiving terminal in Gela, Sicily Region (IT). The pipeline is 520 km long and entered into operation in 2004 with an initial capacity of 8 Bcm/y. At a second stage, its capacity has been further extended to an overall maximal capacity of 11 Bcm/y. Apart from natural barriers and technical constraints, no major complexity elements have been reported regarding the project implementation. No TEN-E support has been allocated to this project.

Priority projects

Information on further priority projects under the priority axis NG6[15] is not available.

Main obstacles and/or reasons for delay reported:
- Technical/technological constraints;
- Crossing existing infrastructures (eg tunnels, underwater pipelines etc);
- Crossing natural barriers (eg. Mediterranean Sea);
- Managing protected natural areas (including fauna and flora).

2.2.2. Impact of the implemented cross-border connections

NG1

The implementation of planned TEN-E projects located on the priority axis NG1 directly contributes to securing the supply routes from new and/or existing gas resources in Norway and Russia to Western Europe along the East-West axis.

The Nord Stream pipeline will link Russian resources to the German gas network through the Baltic Sea with an initial capacity of 27,5 Bcm/y (2011) to be doubled up to 55 Bcm/y (2012). No gas field has been identified as the source for Nord Stream. It is envisaged that more than 50 % of this gas is diverted from existing routes. The gas arriving through the Nord Stream pipeline will be transported through Germany onwards to neighbouring European countries. The main destinations will be Germany, Benelux countries and possibly France, Denmark and United Kingdom.

The implementation of the Gas Roundabout in the Netherlands (to be fully operational in 2014-2015) will strengthen the Dutch transport capacity (pipelines, compressor stations, etc) so that it can fulfil future gas transport demands to other countries (United Kingdom, Belgium, France) following the entrance into operation of the Nord Stream pipeline (Russian

[15] TEN-E project n° 9.35 "Gas network from resources in the Middle East to the European Union"

resources). One of its landing point being located near Rysum (Germany) where a larger Norwegian gas pipeline surfaces, the project will also allow securing Norwegian gas supply and contribute to the diversification of gas supplies. Some sections of the whole project such as the GWWL pipeline are already operational. The project will contribute increasing the transport capacity to the Dutch entry (up to 31,8 Bcm/y) and exit point (up to 12,5 Bcm/y) and thus allow more flexible shipping of natural gas and avoid congestion problems. In addition, the project infrastructure is regarded to be sustainable in terms of the possibility of future mixing of e.g. Biogas (Green Gas). The BBL pipeline between United Kingdom and the Netherlands is also operational with a capacity up to 8 Bcm/y.

In addition, the completion of the following LNG terminals respectively in Belgium (Zeebrugge, 9 Bcm) and United Kingdom (Isle of Grain, 7 Bcm) has increased the available gas capacity by some additional 16 Bcm along this axis. The planned construction of LNG terminals in Poland (Swinoujscie, 5 Bcm) and the extension of gas storage projects in Belgium (Loenhout, *capacity not available*), Poland (Wierzchowice, 0,6 Bcm) and Denmark (Lille Thorup site, 0,2-1 Bcm) will potentially bring some additional 5,8-6,6 Bcm by 2014 and thus will further enhance diversification[16] of gas supplies in the wide Northern Europe, provided the timely implementation of key cross-border interconnectors above-mentioned.

NG3

Connections to the Caspian and Middle East natural gas to the EU will be assured by the implementation of the ITGI pipeline and at a later stage Nabucco, the Trans-Adriatic Pipeline as well as the White Stream pipeline.

The Greece – Turkey interconnector – as part of the ITGI pipeline – has been completed in 2007 and brings an additional import capacity of up to 11 Bcm/y. The Greece – Italy interconnector has a capacity of up to 9 Bcm/y and is expected to be operational in 2015. Based on the foreseen operation date of the Nabucco pipeline, this translates into an additional capacity close to 20 Bcm/y to be brought to the EU by 2015.

NG2/NG6

The implementation of several projects of European interest along the priority axes NG2 and NG6 directly contributes to securing gas supply from North Africa resources. In particular, the commissioning of TRANSMED II pipeline in 2008 (first phase) with a capacity up to 6,5 Bcm/y permitted to increase the transport capacity from Algerian resources to Southern Europe Member States via Italy. The Greenstream pipeline transports natural gas from coastal facilities in Libya to Italy with a current capacity of 11 Bcm/y. The Medgas gas pipeline of which commissioning is expected to be completed in 2010 has a capacity of 8 Bcm/y. These connections represent an entry capacity of 15,5 Bcm/y.

Downstream, several gas interconnections on the Larrau branch (Spain) to France that are under construction will further increase the cross-border transit capacity. They are foreseen to enter into operation end of 2012. In addition, a new compressor station in Navarra (Spain) is operational since end of 2009. These infrastructures will reinforce the Spanish gas system and

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[16] Though they are not included in the list of TEN-E projects, the planned connections of the LNG terminal GATE (Maasvlakte) currently under construction and of the underground gas storage in Alkmaar to the Dutch transport gas network will also contribute to the security of supply by making some further 13 Bcm available to the gas market.

thus create a bidirectional gas flow capacity between Spain and France with similar capacities in both directions, whereas the Larrau axis was initially designed to allow flows in the direction France to Spain for the capacity associated to a long term supply contract with Norwegian gas suppliers. The full capacity resulting from the installation of this new compressor station will be reached after the completion of the necessary reinforcements in France, expected by 2013.

In addition, the construction of the Galsi project aiming at connecting the Algerian gas resources to the Italian and European markets through a new route via Sardinia Island and the Italian mainland is expected to start in 2010/2011 and the pipeline is foreseen to be operational end of 2013. The pipeline total capacity will be 8 Bcm/y. Connecting Corsica Island to the Galsi system is currently under assessment by French authorities.

NG4/NG5

LNG terminals successfully implemented in France, Spain, Portugal, Italy, Belgium and United Kingdom make available natural gas from North Africa resources (and beyond) up to approximately 86 Bcm/y. The LNG terminals currently in construction in France and Italy will make gas available up to approximately 19 Bcm/y.

In addition, the implemented gas storage facilities in France, Austria and Ireland can make available to the gas markets around further 4 Bcm/y. This capacity will be increased by approximately further 4 Bcm/y after the entrance into operation of projects currently under construction in Austria, France, Poland, Italy and Belgium.

2.2.3. Impact of implemented projects in isolated regions

As regards Baltic States, Lithuania has no operational underground storage facility thus it uses services of such a storage located in Latvia. However the implementation of two storage projects in Lithuania is currently under consideration. These projects are foreseen to be operational in 2011 (floading storage capacity up to 2 Bcm) and 2015. Furthermore, the development of an underground gas storage in Latvia (Dobele disctrict) is under consideration. The implementation of the Baltic Interconnector Pipeline and Yamal-Europe II pipeline is currently delayed. No major connection to the gas transport network has been completed in the last three years.

As regards isolated islands, three LNG terminal projects (with a cumulated entry capacity up to 3,3 Bcm by 2012-2014) are currently developed in Cyprus (Vassilikos Energy Center) as well as in the Canary Islands (Spain). These projects will directly contribute to enhancing diversification and security of supply in these regions.

The construction of an LNG terminal in Madeira Island (Portugal) is under consideration. The project is in the study phase and – if implemented – is expected to be operational in 2014. This terminal would be the first LNG terminal in a peripheral region. Its possible capacity is still under consideration.

Natural gas in Malta will be used as fuel at the existing and new Combined Cycle Gas Turbine plants. A feasibility study was to be undertaken on the possibility of importing natural gas to Malta using a pipeline or LNG facilities. No further information is available on this LNG terminal project.

The implementation of an LNG terminal in Crete (Greece) is delayed since an alternative option for electricity generation has been developed. The project is currently in the study phase and is foreseen to be operational in 2016.

2.2.4. Results achieved with regard to the objectives of the TEN-E policy

The main achievements made in the electricity and gas sectors with regard to the four main objectives of the TEN-E policy are summarised below.

(1) Encouraging the effective operation and development of the internal energy market

This objective was at the start of TEN-E, and selected projects have made a significant contribution in this area.

The implementation of missing gas interconnections within and/or between the Member States as well as with third countries contributes to the efficient functioning of the internal gas market in the EU by diversifying supply sources and increasing sales possibilities. In particular, the gas interconnections under development – such as the reinforcement of Spanish and French networks as well as transport capacities in Central Europe, links interconnecting Northern Europe countries, and further interconnections to new and/or existing gas supply sources – will help the EU facing the increasing demand for gas, the need for extra throughput and/or distribution capacity and will contribute solving the production maximum capacity bottlenecks.

(2) Facilitating the development and reducing the isolation of less-favoured and island regions

The introduction of gas is currently under way in several isolated regions. In particular, three LNG terminal projects are currently developed in Cyprus and in the Canary Islands (Spain). Furthermore, the construction of an LNG terminal in Madeira Island (Portugal) – which would be the first LNG terminal in a peripheral region – is under consideration. In addition, three underground gas storage projects are under consideration in Lithuania and Latvia. These projects will contribute to enhancing diversification and security of supply in these regions.

Yet, the implementation of other TEN-E gas projects in isolated regions may be delayed following the development of alternative solutions for electricity generation or the need to undertake further feasibility studies.

(3) Reinforcing the security of supply

The implementation of planned TEN-E projects directly contributes to diversifying and securing the supply routes from new and/or existing gas resources in Norway, Russia, North Africa, South Caucasus and beyond, thanks to the development of further LNG terminals in the Mediterranean Sea Region as well as in Northern Europe. In particular, the development of gas interconnectors contribute to strengthening relations with third countries (either transit and/or supplier countries). In addition, the increasing use of gas reverse flow technology for new and/or existing gas interconnectors within and between the EU Member States will reinforce the security of supply in case of gas supply disruption and will contribute to the diversification of supply routes. The security of gas supply in the EU is further reinforced by the increase of gas storage capacity in Austria, Belgium, France, Ireland, Italy and Poland.

(4) Contributing to sustainable development and protection of the environment

This objective has been introduced in 2006 with the adoption of the TEN-E Guidelines currently in force. A few projects are currently being developed (such as the Gas Roundabout project in the Netherlands) to allow future mix of Biogas and natural gas in the gas transmission network, and contributing thus to increase the share of renewable energies in the gas supply sources of the EU.

2.3. Assessment on the main reported obstacles to projects implementation

The information provided in regard to the status of implementation of TEN-E projects confirms that nearly all projects experience difficulties in the implementation, which often cause delays in the planed time schedule. Since each project is different also the reported difficulties and obstacles vary from project to project.

However, there are a number of obstacles that can be seen occurring time and again in many of the projects irrespective of their location and type. The obstacles reported are related mainly to

(1) legal and political framework including complexity of legal and regulatory framework and the lacking co-ordination and support on Member State, federal, regional and local level.

(2) particular problems of the chosen route such as crossing densely populated areas, military areas, natural barriers or existing infrastructure, managing protected natural areas as well as local opposition to the project;

(3) financial and technical constraints such as financial sources scarcity, supply chain price evolution or the risks of the implementation of innovative technology.

The issues mentioned under (1) and (2) are described in more detail in this chapter since there are common obstacles that occur in many Member States and therefore there are best practices that could be learnt from one Member State and applied elsewhere.

Acceleration of authorisation procedures

Obstacles

One of the greatest obstacles to face during the implementation of a project is the unpredictable length of authorisation procedures. From the point of view of the project promoters this hinders making a proper planning including the time schedule and financial matters. From the European perspective this obstacle means that the projects which are needed to ensure e.g. security of supply may not be implemented in a timely manner.

This problem is exacerbated in cross-border projects by the differences in the authorisation systems resulting in different timescales and delays being seen at different points in the process on either side of the border. This obstacle is caused by both the lack of streamlining of authorisation procedures in Member States and the lack of specific and sufficiently detailed cross-border regulation.

In many Member States project promoters have to apply for authorisations from a number of bodies before construction can begin. For each type of authorisation, the project must be consulted on and go through different proceedings.

The cause of delay is often local opposition to the project. It is absolutely necessary that the affected citizens should be given the opportunity to learn about all the impacts of a project through wide consultation and then to register their objections or support. This is normally achieved through the correct implementation of the Environmental Impact Assessment (EIA) procedure. However, if there is no framework or structure within which these consultations and responses can take place the delay to a decision (whether for or against the project) becomes potentially endless, especially when the authorisation applications have to be made to a number of bodies.

Furthermore, there is often no deadline within which planning authorities have to examine a project (e.g. completeness of the necessary documents for the application) before the start of a consultation nor a deadline within which they have to make a decision once the consultations and examinations have been completed.

Interventions

Most, if not all, Member States are aware of these difficulties and some have begun to tackle them through various approaches.

For example, in the United Kingdom, recent legislation[17] has set a consultation period of 28 days before the application is made (so that necessary changes can be made before it is submitted for authorisation), the environmental impact assessment must then be submitted by the local authority within six weeks and comments on this received within 21 days. In addition, the legislation has set a deadline (of nine months) within which the relevant authority, in this case the Independent Planning Commission, must make its decision. This cuts down uncertainty in two crucial areas and, even where the deadlines are missed, reasons for this and a new timetable must be publicised, which gives some certainty to the proceedings. This particular legislation is very new, however, and so its vulnerability to legal challenges (such as judicial review) and other practical problems has not yet been tested.

One advantage of this system is that only one authority needs to give their authorisation thereby simplifying the procedure considerably. Given the significant problems that large, complex infrastructure projects face this is an important simplification that other Member States have also attempted to implement. For example, in Portugal it is possible to assign a project "national interest" status which then means that it only needs to apply for authorisation from one body. Similar streamlining processes have been brought in by France[18], Ireland[19], Italy and Finland for large infrastructure. However, the legislation in the Member States does not define the projects of European interest per se as projects of national interest (see section on political support at national level).

The implementation of one (central) authorising body within a Member State, at least for the cross-border projects, as well as setting of even modifiable deadlines could streamline

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17 The Planning Act 2009

18 Réforme des permis de construire et des autres autorisations d'urbanisme, 2007

19 Planning and Development (Strategic Infrastructure) Act 2006

authorisation procedures considerably and contribute to more certainty for the planning of the projects.

Political support at national level

Obstacles

The difficulties encountered by cross-border projects can, to some extent, be alleviated by good coordination between the authorities on either side of the border. However, such coordination does not always happen because there are not sufficient incentives for it. Cross-border projects often have positive effects on a very large scale (national or even European) but the authorities examining the project are often local and therefore, understandably, do not take account of the wider benefits the project could offer. It could even happen that the costs have to be incurred in one region or Member State whilst the benefits occur in another region or Member States.

The absence of national political support and strategic direction is particularly damaging for projects that have European importance. Since most of the power lines or pipelines do not create direct advantages for the regions they are crossing the local and regional actors often do not hold the possible wide ranging impacts of a project in mind as much as the local and regional impacts. This can cause objections by the local or regional authorities regarding the necessity of the projects of European importance that can substantially delay the implementation. This is an area where the European Coordinators have played an important role.

However, projects of European interest are not yet prioritised by any Member State legislation or strategy and so cannot automatically use any of the measures brought in by those Member States looking to streamline their authorisation procedures for projects of national interest.

Interventions

In Germany, recent legislation has given a very strong national direction for the development of electric power lines. The Power Line Expansion Act (*Energieleitungsausbaugesetz*) has set out the 24 corridors where power line expansion projects have been designated as urgent to complete to meet the goals set out in the Energy Industry Act, meaning that the planning authorities can not object the necessity of those power lines.

Other Member States, for example United Kingdom[20] and Denmark[21], have a more general approach to the definition of the national policy. In all cases, this national policy is consulted on publicly and debated by the parliament before being enacted. This ensures that the justification for the project is present so that it is only the project details that have to go through the full authorisation procedures, avoiding lengthy debate on the need for the project at all. Indeed, in Denmark, the Minister for Environment is obliged to veto municipal plans that do not comply with the national planning strategy.

Strong political support at the national level is an effective way to alleviate this obstacle because it is useful to have agreed the necessity for the project as a whole before the

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[20] National Infrastructure Policy Statements

[21] An Overview of national interests in municipal planning is published every four years by the Minister of Environment.

consultations on its geographical and technical details, as well as its specific environmental impacts, begin.

Nevertheless for the sake of ensuring that the infrastructure projects which are co-financed by the European Union are implemented in timely manner it is indispensable that these projects have the same legal status in the Member States as the projects of national interest.

3. EUROPEAN UNION FINANCIAL INSTRUMENTS

Energy infrastructure projects are implemented by Transmission System Operators (TSOs). Depending on the total cost of a project, the main financing sources (as direct investment needs) for the implementation of such projects are:

(1) TSOs' own resources (amounting to approximately 20-100 % of the total investment required, depending on the scale of the overall investment);

(2) Bank loans (eg. Commercial banks, European Investment Bank, European Bank for Reconstruction and Development): These loans may amount to an average of approximately 40-80 % of the total investment required;

(3) EU co-financing: TEN-E annual Programme, European Economic Programme for Recovery (2009-2010), Structural Funds, ENPI (or previous instruments such as PHARE, etc) and RTD Framework Programme;

(4) Partnerships with companies active in the gas and power sector (possibly other than TSOs).

Member States in most cases do not participate directly in financing projects of trans-European energy networks since these projects are mostly implemented by Transmission System Operators' (TSO) and the costs are recovered through the regulated tariffs according to the users-pay principle.

Further information on EIB loans and EU co-funding sources, in particular regarding the functioning of the TEN-E funding Programme, is described below.

3.1. European Investment Bank (EIB) loans

Since the start of the trans-European networks initiative in the 1990s, trans-European networks in the energy sector remain an important lending priority for the EIB.

The EIB loans related to energy infrastructure cover projects included in the guidelines for trans-European energy networks[22] as well as energy infrastructure projects which are not but comply with the criteria as specified in Annexes I and II of the TEN-E guidelines. The EIB loans signed in the period 2007-2009 amount to € 2.561 million for the electricity sector and € 3.407 million for the gas sector. The EIB has invested € 100 million as an equity investment in the Marguerite Fund, with an approximate allocation of 25-35% for TEN-E.[23] In total,

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[22] The TEN-E guidelines considered in this paragraph and Table 4 are those published in 1996 for projects supported in 2002 and those published in 2003 for projects supported in 2003 and beyond

[23] Approximate allocation to TEN-T: 30-40%, Renewables: 35-45%. The actual allocation depends on suitable investment opportunities.

15,4% of the total amount was awarded to projects of European interest, 18,2% was awarded to priority projects, 15 % to projects of common interest and about 25,6 % to other TEN projects not listed in the Annex III of the TEN-E guidelines but located on priority axis as defined in Annexes I and II of the TEN-E guidelines (see Tables A1 and A2). For 25,7% the loans were allocated to a set of projects of various TEN priority levels. These loans supported large cross-border projects (electricity interconnectors, gas supply pipelines), expansion and/or reinforcement of transmission networks including storage and LNG terminals.

Table 3 – EIB signed loans for energy infrastructure of trans-European interest in the period 2007-2009 (M€)

	2007	2008	2009	2007-2009
Electricity (amounts)				
TEN Projects of European interest	*0*	*90*	*600*	*690*
TEN Priority projects	*140*	*140*	*0*	*280*
TEN Projects of common interest	*16,1*	*300*	*144,45*	*460,55*
Other TEN projects	*558*	*0*	*0*	*557,86*
Loans allocated to a set of projects of various TEN priority levels	*150*	*163*	*260*	*572,5*
Gas (amounts)				
TEN Projects of European interest	*185*	*50*	*0*	*235*
TEN Priority projects	*160*	*375*	*275*	*810*
TEN Projects of common interest	*255*	*183*	*0*	*438*
Other TEN projects	*0*	*642*	*337*	*979*
Loans allocated to a set of projects of various TEN priority levels	*0*	*574*	*371*	*945*
TOTAL AMOUNTS				
TEN Projects of European interest	*185*	*140*	*600*	*925*
TEN Priority projects	*300*	*515*	*275*	*1090*
TEN Projects of common interest	*271*	*483*	*144*	*898,55*
Other TEN projects	*558*	*642*	*337*	*1536,86*
Loans allocated to a set of projects of various TEN priority levels	*150*	*737*	*631*	*1517,5*

The loans allocated may cover one or several interconnections and/or linked projects. Therefore, it may not be possible to link amounts published to a specific TEN-E project. Yet, the EIB loans allocated per project are specified in Tables A3-A6 (see Annexes) where possible.

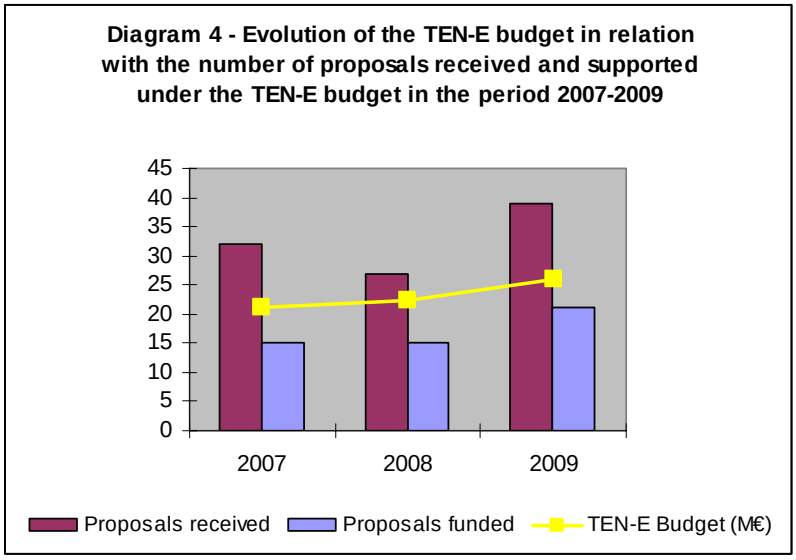
3.2. TEN-E funding Programme

The TEN-E funding represents in most cases a rather limited share (0,01 – 1 %) of the total investment required for the implementation of projects of the trans-European energy networks. The main role of the TEN-E co-financing is to act as a catalyst to lever other investment sources and/or to facilitate the implementation of the project through the TEN-E label.

TEN-E Programme execution in 2007-2009

The total TEN-E budget in the financing period 2007-2013 is € 155 million, of which € 69,5 million for the period 2007-2009. The annual amount available varies between € 20 and 25 million. Diagram 4 (see below) indicates the evolution of the TEN-E budget in relation with the number of proposals received and supported under the TEN-E budget in the period 2007-2009.

Diagram 4 – Evolution of the TEN-E budget in relation with the number of proposals received and supported under the TEN-E budget in the period 2007-2009



From 2007 to 2009[24], the Commission received 96 applications for TEN-E funding, 51[25] of which have benefited from financial support: 31 concerned electricity projects and 20 gas projects. Moreover, 14 out of 51 funding decisions concerned works (11 in the electricity sector, and 3 in the gas sector); the other funded projects were related to studies. Detailed information on the selection process is presented in Table 4.

Table 4 – Details on the selection results for awarding TEN-E funding in the period 2007-2009

	2007	2008	2009	2007-2009
Proposals received	**32**	**26**	**38**	**96**
Electricity	*21*	*12*	*24*	*57*
Studies	*16*	*9*	*17*	*42*
Works	*5*	*3*	*7*	*15*
Gas	*11*	*14*	*14*	*39*
Studies	*10*	*12*	*12*	*34*
Works	*1*	*2*	*2*	*5*
Funding decisions issued	**15**	**15**	**21**[26]	**51**
Electricity	*10*	*7*	*14*	*31*
Studies	*6*	*5*	*9*	*20*
Works	*4*	*2*	*5*	*11*
Gas	*5*	*8*	*7*	*20*
Studies	*4*	*7*	*6*	*17*
Works	*1*	*1*	*1*	*3*

24 Detailed figures for years between 2002 and 2006 are available in the Report on the implementation of the TEN Financial Regulation in the period 2002-2006, COM(2008)770.

25 The list of funded projects is available on: http://ec.europa.eu/ten/energy/studies/index_en.htm

26 The preparation and/or the adoption of the individual decisions 2009 are ongoing. The figures indicated with regard to the number of funding decisions issued are thus provisional only.

In the period 2007-2009, support under the TEN-E budget line of a total amount of about € 69,5 million was awarded. This amount was allocated for 42 % on the gas sector and 58 % on the electricity sector. Further, this amount has been allocated for 65 % on the co-financing of studies (up to 50 %) and for 35 % on the co-financing of works (up to 10 %).

Detailed information on TEN-E commitments in the period 2007-2009 is presented in Table 5.

Table 5 – TEN-E commitments in the period 2007-2009 (amounts in K€)

	2007	2008	2009	2007-2009
TEN-E Budget available	**21.200,0**	**22.260,0**	**26.045,9**	**69.505,9**
Global commitment	**21.200,0**	**22.248,8**	**26.034,3**	**69.483,1**
Individual commitments (total)	**21.200,0**	**22.248,8**	**26.034,3**[27]	**69.483,1**
Electricity	***15.175,5***	***9.781,6***	***15.302,9***	***40.260,0***
Studies	*8.132,6*	*3.930,4*	*10.639,5*	*22.702,5*
Works	*7.042,9*	*5.851,2*	*4.663,4*	*17.557,5*
Gas	***6.024,5***	***12.467,2***	***10.731,4***	***29.223,1***
Studies	*4.024,5*	*9.648,2*	*8.799,6*	*22.472,3*
Works	*2.000,0*	*2.819,0*	*1.931,8*	*6.750,8*

In **2007**, 100 % of the TEN-E budget could be committed. In **2008** and **2009**, some 99,9 % of the TEN-E budget available has been respectively committed.

Concerning the amount allocated to priority projects as defined in the 2006 TEN-E Guidelines and selected for funding in the period 2007-2009, close to **33 %** of the allocated budget was awarded to **projects of European interest**. The electricity and the gas networks received respectively 73 % and 27 % of the amounts allocated to projects of European interest. About **57 %** of the total allocated budget was awarded to **priority projects**. The electricity and the gas sector received respectively 47 % and 53 % of the amounts allocated to priority projects. Last, the electricity and the gas sector received respectively 71 % and 29 % of the amounts allocated to **projects of common interest** (out of a total amounting to 6.838.630 €, which represents close to **10 %** of the total allocated amounts in the period 2007-2009).

Ex-post evaluation of the TEN-E programme (period 2000-2006)

In 2008, the ex-post evaluation of the TEN-Energy programme 2000-2006 has been carried out for the Commission by independent experts.

The main objectives of the ex-post evaluation were to evaluate the impact of studies and projects funded by the TEN-E Programme and to issue practical recommendations to improve the overall efficiency of the Programme.

[27] The preparation and adoption of the TEN-E individual decisions 2009 are still ongoing; the figures specified are thus only indicative.

Conclusions of the evaluation:

- The TEN-E programme contribution to energy network developments has progressed over the survey period in both electricity and gas sectors; in particular, a much larger proportion of co-financed studies resulted in construction of the projects in the second half of the survey period (2004-2006) than in the first (2000-2003);

- In spite of clear limitations in terms of projects and costs coverage due to limited budget resources, it was confirmed that TEN-E co-financing can act as an accelerator and facilitator of projects implementation in both electricity and gas sectors. Further, it plays an important role especially for immature projects and risky studies;

- A greater focus of TEN-E resources on eligible projects of highest priorities would increase the programme impact;

- The TEN-E co-financing has stimulating effects regarding authorisation procedures. The EU label has positive effects on projects prioritisation in national development schemes;

- TEN-E grants often improve cooperation between co-beneficiaries, and the EU label facilitates communication to and collaboration with third parties;

- There is a need for a better consistency between eligible projects as specified in the Annex III of the TEN-E guidelines and latest network development needs. Furthermore, a greater focus of TEN-E resources on eligible projects of highest priorities would increase the impact of the programme;

- Room for improvement is foreseen in terms of information and communication with potential beneficiaries (e.g. application and project administration processes), the use of project monitoring tools and the diffusion of best practices on the handling of obstacles to project implementation, in particular concerning public acceptance issues.

The contractor concluded that furthering the role of the TEN-E funding programme would require an assessment of TEN-E policy, TEN-E guidelines and selection process, in particular relative to the acceptability, utility and impact criteria. Therefore, the contractor proposed further studies to be performed to specifically and fully address these issues.

The recommendations made by the contractor will be further addressed in the revision of the TEN-E instruments to be tabled by the Commission in 2010.

The final report of the ex-post Evaluation of the TEN-E Programme (2000-2006) has been published on Europa[28], except the second part of its annexes for confidentiality reasons.

Anti-fraud measures

In order to prevent fraud, corruption and other illegal activities detrimental to the Union's financial interests in the context of TEN-E, by virtue of Council Regulation (Euratom, EC) No 2185/96 and Regulation (EC) No 1073/1999 of the European Parliament and the Council, and in conformity with Article 14 of Regulation (EC) No. 680/2007, the European Anti-Fraud Office (OLAF) may carry out on-the-spot controls and checks in accordance with the

[28] http://ec.europa.eu/energy/evaluations/trans_european_energy_networks_en.htm

procedures laid down by Community law. Where appropriate, the inspection findings may lead to recovery decisions by the Commission.

3.3. European Economic Programme for Recovery

The basis for the European Energy Programme for Recovery (EEPR) is the global €200 billion European Economic Recovery Plan presented by the Commission on 26 November 2008[29]. Investments in energy interconnections were considered an important tool to support the economic recovery and to respond to the challenges of climate change and security of energy supply. The Plan was endorsed by the European Council in December 2008 where the Commission was invited to present a list of concrete energy projects. The EEPR Regulation[30], which established the EEPR programme and its financing instrument, was adopted the 13 July 2009 and entered into force the 1st August 2009. The EEPR Regulation proposed a significant Union contribution of almost € 4 billion to co-finance specific energy projects within three sub-programmes: gas and electricity infrastructure projects (€ 2.365 million), offshore wind energy projects (€ 565 million), and carbon capture and storage projects (€ 1.050 million). It is worth noting that it is the first time ever that the Union decided to dedicate such an amount to energy infrastructure projects.

The objectives and priorities of the EEPR Regulation to promote and develop the energy networks having the highest Union added value in support of the internal energy market and to diversify the routes and the sources of supply are the same as those established in the guidelines for trans-European energy (TEN-E) networks. Moreover, the majority of the interconnection projects selected in the EEPR Regulation were already part of the TEN-E networks and some received TEN-E funds to co-finance mainly feasibility studies. Therefore, the EEPR programme constituted a timely instrument to contribute to the expenditure related to the implementation of the most mature TEN-E projects in order to speed up and secure investments and accelerate their construction in view of the economic crisis.

Considering the gas and electricity infrastructure projects, the 47 projects selected in the EEPR Regulation include gas and electricity interconnections, Liquefied Natural Gas (LNG) terminals and gas storage facilities. In addition, it includes gas reverse flow projects with the specific objective of helping to prevent potential disruptions to the gas supply in the future. The maximal funding rate foreseen is 50% of the total cost of the projects (including construction works). The amounts allocated per sub-sector are displayed in the following table.

Table 6 – EEPR funding allocated per sub-sector

Electricity interconnections	915.000.000 €
Gas interconnections	1.255.000.000 €
Gas reverse flow projects	80.000.000 €

[29] Communication from the Commission to the European Council 'A European Economic Recovery Plan' COM(2008)800

[30] EEPR Regulation (EC) N°663/2009 of the European Parliament and of the Council of 13 July 2009 establishing a programme to aid economic recovery by granting Union financial assistance to projects in the field of energy (OJ L200, 31.7.2009)

Liquefied Natural Gas	80.000.000 €
Gas storage facilities	35.000.000 €

Further details on the implementation of the EEPR Regulation will be available in the Commission report to the Council and the European Parliament on the implementation of the EEPR to be issued when reporting on the budget (April 2010). In addition, the financial aid allocated to TEN-E projects falling within the scope of this Implementation Report is specified in the description of these projects and/or in the annexed tables.

According to Article 25(1) of the EEPR Regulation the Commission shall ensure that, when actions financed under this Regulation are implemented, the financial interests of the Union is protected by the application of preventive measures against fraud, corruption and any other illegal activities, by effective checks and by the recovery of amounts unduly paid and, if irregularities are detected, by effective, proportionate and dissuasive penalties.[31] Other European Union financing sources

3.3.1. Structural Funds

Following the Community Strategic Guidelines on Cohesion 2007-2013, being the basis for preparing the content of operational programmes, investments from the **European Regional Development Fund (ERDF)** in the energy sector should be directed towards ensuring security of supply and target gas and electricity interconnections, especially in cases of identified market failure.

TEN-E projects in the gas and electricity sector have thus been introduced in the cohesion policy framework for 2007-2013 under the sector codes No 34 and 36. Allocations in those categories have been made in the respective Operational Programmes of four Member States, namely Spain, Greece, Poland and Romania. Further information per Member State is described below.

In **Spain**, some 55.012.432 € have been allocated to TEN-E projects in natural gas for the period 2007-2013.Yet, the list of specific projects concerned is not available yet.

In **Greece** some 58.745.000 € in the electricity sector and 71.150.000 € in the gas sector have been allocated to TEN-E priorities. Yet, the list of specific projects concerned is not available yet.

As regards **Poland**, the TEN-E projects designated to be supported within the OP "Infrastructure and Environment" address the most urgent needs in terms of Polish and EU energy policy – ensuring security of supply and, at the same time, the completion of the EU energy internal market. Approximately € 405,3 million[32] was allocated to support TEN-E projects included in the Operational Programme Infrastructure and Environment within priority X (see also table 7 for further details). The use of the allocation for these projects is

[31] In accordance with Regulation (EC, Euratom) No 2988/95, Regulation (Euratom, EC) No 2185/96 and with Regulation (EC) No 1073/1999

[32] Due to the adding of the LNG terminal to the list of projects co-financed by the progrramme, the amount allocated to TEN-E projects may increase by up to € 250 million – meaning 24% of the total allocation of priority X.

however conditional upon their fulfilment of all merit and selection criteria set by the Polish Managing Authority as well as their approval by the EC.

Table 7 – Breakdown of co-financing allocated per sector within priority X in the Polish Operational Programme "Infrastructure and Environment"*

Electricity (TEN-E)	21,2 %
Natural gas	39,9 %
Natural gas (TEN-E)	20,4 %
Petroleum products	15,7 %
Renewable energy: wind, solar, biomass, hydro, geothermal	2,8 %

* Total allocation for priority amounts to € 974,3 million

Due to the fact that investments in traditional energy sources are in most cases considered as state aid, the possible level of EU support is limited. The co-financing level for this priority was set at a maximum of 57 %. Four TEN-E projects are being prepared for submission to the EC in the 2007-2013. The detailed ERDF co-financing amounts foreseen for the above-mentioned projects are indicated is Table 8.

Table 8 – List of TEN-E projects foreseen to be supported within the OP "Infrastructure and Environment" for Poland

TEN-E project	**Foreseen ERDF co-financing**[33]
Underground gas storage in Wierzchowice	€ 109 million
Underground gas storage in Mechelinki, Kosakowo	€ 28 million
LNG terminal in Swinoujscie	€ 114 million
Poland-Lithuania electricity interconnection (connection Elk-Alytus including the necessary reinforcement of the Polish electricity network)	€ 170 million

For the period 2007-2013 the Operational Programme "Increase of the Economic Competitiveness" in **Romania** has allocated 95.771.306 € in order to support TEN-E projects through the European Regional Development Fund. However, no commitment has been made by now for any specific project as the list of the projects concerned is not available yet.

The Structural Funds (ERDF) may also finance infrastructure projects in the gas and/or electricity sectors including interconnections which are relevant for the TEN-E, in Bulgaria, Cyprus, Germany, Greece, Italy, Lithuania, Poland, Portugal, Romania, Spain and United Kingdom under the sector codes "Electricity" and "Natural Gas" (respectively No 33 and 35). As an example, the ERDF for **Bulgaria** will allocate € 51 million[34] for the construction of the Nis (Serbia) - Sofia (Bulgaria) gas interconnector[35].

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33 The implementation of the two underground gas storage projects has encountered delays due to the infringement procedures related to the non respect by Poland of the gas Directive 2009/73. The approval of the projects by the EC is therefore pending upon solving of the infringement cases and issuing a state aid decision for the projects.

34 The national participation foreseen amounts to € 9 million

35 The agreement on this interconnector is expected in 2010 and works are foreseen to start in 2011/2012

The priorities defined for the **Cohesion Fund (CF)** are not relevant for energy infrastructure projects.

3.3.2. IPA / ISPA instruments

Currently there are no TEN-E projects financed under the pre-accession assistance instruments (IPA/ISPA) in any of the three candidate countries (Croatia, Turkey and fYROM).

3.3.3. European Neighbourhood and Partnership Instrument (ENPI)

Since 2007 EC assistance to the countries of the European Neighbourhood Policy is provided under the European Neighbourhood and Partnership Instrument **(ENPI).** It is designed to financially support the agreed priorities in the ENP Action Plans (as well as the Strategic Partnership with Russia).

EU support to regional energy cooperation in the Eastern neighbourhood countries and Central Asia is provided through the **INOGATE programme**, which has its secretariat in Kiev with a branch office in Georgia (Tbilisi)**.** The INOGATE programme is addressing the political priorities as defined under the Baku Initiative:

(1) **Converging energy markets** on the basis of the principles of the EU internal energy market taking into account the particularities of the involved countries

(2) **Enhancing energy security** by addressing the issues of energy exports/imports, supply diversification, energy transit and energy demand

(3) **Supporting sustainable energy development**, including the development of energy efficiency, renewable energy and demand side management

(4) **Attracting investment** towards energy projects of common and regional interest.

Besides, the INOGATE Programme also supports the political priorities of the Eastern Partnership.

Projects supported under the INOGATE programme mainly involve Technical Assistance. The programme has however supported a number of projects targeting infrastructure development enhancing the security supply situation of the region and Europe. Notable for the TEN-E are:

- **IFI Technical Assistance Support Fund for Facilitating Investments in Energy Projects, completed in May 2008, € 2,62 million**: This project provided technical, financial, legal and environmental expertise to energy Investments in Eastern Europe and the Caucasus with a view to preparing sound investment projects for financing by IFIs. Support was provided to 8 investment projects including in the field of oil, gas storage facility, electricity, CNG, LPG terminal in Ukraine and Armenia as well as the **feasibility Study for a Trans Caspian Black Sea Gas Corridor**.

- **Pre-investment project for the implementation of the Trans-Caspian - Black Sea Gas Corridor, € 5 million:** Cooperation via Multi-Donor Trust Fund with World Bank and EIB looking into possibilities of joint purchasing mechanism, Caspian Development Corporation (CDC), and for studies required before construction of infrastructure.

Other projects focus on regulation and legislative reforms as well as capacity building in the areas of internal market convergence, sustainable energy and energy security including the enhancement of the investment environment. Between 2002 and 2009, the EC committed a total of about € 70 million to INOGATE, under the Tacis Regional programme, the ENPI-East regional programme and the DCI Central Asia regional programme.

Support to energy cooperation in the South is led by the political dialogue held within the framework of the Euro-Mediterranean energy cooperation. Notably at the 5th Euro-Mediterranean Energy Ministerial Conference that took place in Limassol a Priority Action Plan 2008-2013 for the Euro-Mediterranean cooperation in the field of energy was adopted. Furthermore support is provided contributing to the objectives of the Mediterranean Solar Plan as one of the priority actions under the Union for the Mediterranean.

The project support under the regional energy cooperation mainly involves technical assistance. Projects of importance to the TEN-E concern:

- **Study on the "Mediterranean Electric Ring"** that was launched in 2000. The study aimed at analysing in detail the behaviour of the system as a whole; assessing the potential energy exchanges between the countries; proposing solutions to increase the reliability of the system; training experts and operators on system management and energy trading. An update of the study was carried out from July 2009 until February 2010;

- **EAMGM – Euro-Arab Mashreq Gas Market Project**: The Euro-Arab Mashreq Gas Market (EAMGM) The project is run by the Euro-Arab Mashreq Gas Cooperation Centre (EAMGCC), established in Damascus. The overall objective of this project is to contribute to the integration of the gas markets in the four beneficiary countries in order to create a regional gas market in the Mashreq, which would be a first step towards integration with the EU gas market. The project has contributed to the development of the Euro-Arab gas pipeline with pre-feasibility studies, network analysis and a regional gas Master Plan. A first phase of the project was finished end 2009 involving € 6 million EU co-finance. A second phase (€ 5 million) will be launched in 2010.

- **Paving the way for the Mediterranean Solar Plan** (€ 5 million): This is an upcoming project which is expected to start in the first half of 2010 for a period of three years. It will assist the partner countries in establishing favourable conditions for the development of Renewable energy and Energy Efficiency including legislative reforms, institutional capacity, technological development and improvement of the business climate.

Other projects in the field of regional energy cooperation in the South focus on regulation and legislative reforms as well as capacity building in the areas of internal market convergence and sustainable energy.

Energy infrastructure development could possibly also be financed through the **ENPI Cross-Border Cooperation (CBC) programme** since it is foreseen that support for CBC on the EU's external border will draw on funds from both the external and the internal headings of the EC budget. This is an important innovation. The programmes under the ENPI-CBC are planned to receive € 1,18 billion between 2007 and 2013.

Besides regional support, the EU is also providing support to the neighbouring countries through bilateral assistance.

3.3.4. NIF / FEMIP

The **Neighbourhood Investment Facility (NIF)** is an innovative financial mechanism aimed at mobilising additional funding to cover the investment needs of the Neighbouring region for infrastructures in sectors such as Transport, Energy, the Environment and Social issues (e.g. construction of schools or hospitals). The Facility will also support the private sector particularly through risk capital operations targeting Small and Medium Enterprises (SMEs). It is intended to provide Community and Member States' grant support for lending operations led by European multilateral development-finance institutions and by bilateral development finance institutions of the Member States.

The NIF combines 2 sources of funding: the EC Budget and Member States' direct contributions though the NIF Trust Fund.

During the period 2007-2013, the Commission intends to set aside a total amount of € 700 million for the NIF. Regarding the NIF Trust Fund, Member States have pledged in 2008 and 2009 € 47 million of additional contribution.

The NIF has supported a number of investments that are relevant to the TEN-E and the security of supply of the neighbourhood region and Europe in general. For example support is being provided to the Black Sea Energy Transmission allowing the link between the power supply systems of the Southern Caucasus countries with Turkey and Europe. Furthermore support has been granted to reinforcement of the electricity network in Ukraine improving the energy security and reliability in Ukraine while also contributing to regional integration in the field of energy, including cross-border links with the European Union.

In case of the countries of the South and Southeast Mediterranean, the NIF is providing support to 200 MW Wind Farm project in the Gulf of El Zayt. Furthermore, the NIF is financing a feasibility study for Concentrated Solar Power in Tunisia, contributing to the Mediterranean Solar Plan as priority action under the Union for the Mediterranean.

Furthermore, the European Union contributes with € 32 million per year (2007-2013) to the **Facility for Euro-Mediterranean Investment and Partnership (FEMIP)**, managed by the EIB. The facility is among others financing a study on the Financing of Renewable Energy Investments in the Southern and Eastern Mediterranean region that will be presented in May 2010.

3.3.5. Research and Development related Programmes

The European Union supports the electricity grid policy through ambitious and highly innovative technology development. The electricity grid receives the highest priority in the Strategic Energy Technology plan[36] of the EU. The electricity grid forms the centre piece of all European Industrial Initiatives of the Strategic Energy Technology plan. Since a few years the electricity grid has also become the centre piece of the seventh Research Framework Programme (FP) and the "Intelligent Energy – Europe" (IEE) Programme. These programmes encourage the key trans-European energy networks objectives such as an increased security and diversity of energy supply. In particular, these programmes both support projects related to large scale electricity storage and massive market penetration of large scale centralised

[36] COM(2009)519

renewable electricity, such as for example the short term construction of 150 GW off-shore wind turbines in the North Sea (400 GW total).

Under the 7th Framework Programme[37] (FP7), more than EUR 50 million of EU grants has been allocated to several demonstration projects (up to commercial scale) and studies with the aim to support the strategic TEN-E dimension, as for example:

- SUSPLAN – Development of regional and Pan-European guidelines for more efficient integration of renewable energy into future infrastructures
- REALISEGRID – Research, methodologies and technologies for the effective development of pan-European key GRID infrastructures to support the achievement of a reliable, competitive and sustainable electricity supply
- IRENE-40 – Infrastructure roadmap for energy networks in Europe
- TWENTIES[38]
- EWIS – European Wind Integration Study
- SUPWIND – Decision Support for Large Scale Integration of Wind Power
- WINDGRID – Wind on the Grid: An integrated approach
- NORSEWIND – Northern seas wind index database
- DINEMO – Distribution Networks Modernization Incentives in Pre-accession Countries

In addition, the 6th Framework Programme[39] (FP6) supported the GROW-DERS[40], IS-POWER[41] and VSYNC[42] projects which include a TEN-E dimension as well.

Last, the "Intelligent Energy – Europe" Programme[43] supported projects like:

- GREENNET-INCENTIVES – Promoting grid-related incentives for large-scale RES-E integration into the different European electricity systems
- RESPOND – Renewable Electricity Supply interactions with conventional POwer generation, Networks and Demand

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37 Detailed information on FP7 projects can be found on http://cordis.europa.eu/fp7/home_en.html

38 This project aims at large scale demonstration of the benefits and the impacts of several critical technologies required to consolidate the wind power generation into the European electricity system and to improve the pan-European transmission network

39 Detailed information on FP6 projects can be found on http://cordis.europa.eu/fp6/projects.htm

40 Grid Reliability and Operability with Distributed Generation using Flexible Storage

41 This project aims at developing technical and regulatory frameworks for improving the performance of insular energy systems (reliability and supply guaranty) and for making easier the integration of renewable energies and other distributed generation

42 Virtual synchronous machines for frequency stabilisation in future grids with a significant share of decentralized generation

43 Further information on the IEE projects can be found on http://ec.europa.eu/energy/intelligent/index_en.html

- TRADEWIND – Wind Power Integration and Exchange in the Trans-European Power Markets
- OFFSHOREGRID – Regulatory Framework for Offshore Grids and Power Markets in Europe: Techno-economic Assessment of Different Design Options
- WINDSPEED – SPatial Deployment of offshore WIND Energy in Europe

Annexes

Table A1: List of the electricity projects of European interest as specified in Annex I of the TEN-E Guidelines

Table A2: List of the gas projects of European interest as specified in Annex I of the TEN-E Guidelines

Table A3: State of implementation of projects of European interest in the electricity sector

Table A4: State of implementation of projects of European interest in the gas sector

Table A5: List of priority projects in the electricity sector finalised and under construction

Table A6: List of priority projects in the gas sector finalised and under construction

Table A7: List of cross-border projects in the electricity sector finalised and under construction

Table A8: List of cross-border projects in the gas sector finalised and under construction

Table A9: State of implementation of LNG projects as listed in the Annex III of the TEN-E Guidelines

Figure A1: Progress of electricity projects of European interest – EL1, EL5 and EL6

Figure A2: Progress of electricity projects of European interest – EL3 and EL9

Figure A3: Progress of electricity projects of European interest – EL2, EL4 and EL8 (partly)

Figure A4: Progress of electricity projects of European interest – EL7 and EL8 (partly)

Figure A5: Progress of gas projects of European interest – NG1

Figure A6: Progress of gas projects of European interest – NG2 and NG6

Figure A7: Progress of gas projects of European interest – NG3

Table A1: List of the electricity projects of European interest as specified in Annex I of the TEN-E Guidelines[44]

Priority axis	Project of European interest title	Ref. Annex III of TEN-E guidelines
EL1	Avelin (FR) – Avelgem (BE) line	2.2
	Moulaine (FR) – Aubange (BE) line	2.1
EL2	Lienz (AT) – Cordignano (IT) line	2.16
	New interconnection between Italy and Slovenia	2.35
	Udine Ovest (IT) – Okroglo (SI) line	2.36
	S. Fiorano (IT) – Nave (IT) – Gorlago (IT) line	3.8
	Venezia Nord (IT) – Cordignano (IT) line	3.9
	St. Peter (AT) – Tauern (AT) line	3.60
	Südburgenland (AT) – Kainachtal (AT) line	3.61
	Austria – Italy (Thaur-Brixen) interconnection through the Brenner rail tunnel	2.18
EL3	Sentmenat (ES) – Bescanó (ES) – Baixas (FR) line	2.10
	Valdigem (PT) – Douro Internacional (PT) – Aldeadávila (ES) line and 'Douro Internacional' facilities	2.14
EL4	Philippi (EL) – Hamidabad (TR) line	4.9
EL5	Undersea cable to link England (UK) and the Netherlands	2.21
EL6	Undersea cable to link Ireland and Wales (UK)	1.1
EL7	Kassø (DK) – Hamburg/Dollern (DE) line	2.22
	Hamburg/Krümmel (DE) – Schwerin (DE) line	3.48
	Kassø (DK) – Revsing (DK) – Tjele (DK) line	3.2
	Vester Hassing (DK) – Trige (DK) line	3.2
	Submarine cable Skagerrak 4: between Denmark and Norway	4.27
	Poland – Lithuania link, including necessary reinforcement of the Polish electricity network and the Poland-Germany profile in order to enable participation in the internal energy market	2.29
	Submarine cable Finland – Estonia (Estlink)	2.30
	Fennoscan submarine cable between Finland and Sweden	2.15
	Halle/Saale (DE) – Schweinfurt (DE)	3.49
EL8	Neuenhagen (DE) – Vierraden (DE) – Krajnik (PL) line	2.28
	Dürnrohr (AT) – Slavětice (CZ) line	2.33
	New interconnection between Germany and Poland	2.32
	Veľký Kapušany (SK) – Lemešany (SK) – Moldava (SK) – Sajóivánka (HU) line	2.26/3.75/3.76
	Gabčíkovo (SK) – Vel'ký Ďur (SK) line	3.77
	Stupava (SK) – south-east Vienna (AT) line	2.27
EL9	Electricity connection to link Tunisia and Italy	4.25

[44] OJ L 262, 22.9.2006, p. 1

Table A2: List of the gas projects of European interest as specified in Annex I of the TEN-E Guidelines[45]

Priority axis	Project of European interest title	Ref. Annex III of TEN-E guidelines
NG1	North European gas pipeline	9.3
	Yamal – Europe gas pipeline	9.16
	Natural gas pipeline linking Denmark, Germany and Sweden	7.24
	Increase in transmission capacity on the Germany – Belgium – United Kingdom axis	7.17
NG2	Algeria – Tunisia – Italy gas pipeline	9.34
	Algeria – Italy gas pipeline, via Sardinia and Corsica, with a branch to France	9.34
	Medgas gas pipeline (Algeria – Spain – France – Continental Europe)	9.6
NG3	Turkey – Greece – Italy gas pipeline	7.12/9.22
	Turkey – Austria gas pipeline	7.16
NG6	Libya – Italy gas pipeline	9.20

[45] OJ L 262, 22.9.2006, p. 1

Table A3: State of implementation of projects of European interest in the electricity sector

Ref. Annex III 2006	Axis (2006)	Countries involved	Project specification	Sub-section/ routing/more specific title	Known project status (March 2010)	Additional capacity (MVA)	Length (km)	Esti-mated total cost (M€)	(Indi-cative) In opera-tion date	Delay on initial schedule	Elements of complexity of the project	EIB loan (M€)	EEPR max con-tribu-tion (M€)	TEN-E grant(s) allocated (€)	Applica-tion for TEN-E grant (ref.)
2.1	EL1	BE, FR	Moulaine (FR) - Aubange (BE) line	-	Construction phase	400	15	11 (FR)	2010	na	none	4	-	503.450	E205/05
2.2	EL1	BE, FR	Avelin (FR) - Avelgem (BE) line	-	Finalised	1000-1500	43	21,5	2005	5 years	None. Additional delay (prolongation till June 2011) will be needed for the financial and administrative closing of the project. The line is operational. Last works will be achieved on June 2010	na	-	1.005.900	E191/04
2.16	EL2	AT, IT	Lienz (AT) - Cordignano (IT) line	-	Pre-Study phase	1000	154	140	2015	na	Increasing sensibility of population against new line projects, optical impact and EMF. A new optimised line routing is necessary	na	-	82.500 355.000	E011/95 E136/01
2.18	EL2	AT, IT	Austria - Italy (Thaur - Brixen) interconnect-tion through the Brenner rail tunnel	-	Study phase	2x1000 2x1500	57-65	300	2025	na	Crossing the Alps, coordination and integration with Railway project (commissioning time, cost and risk synergies), network rationalisation outside the tunnel, use of HVDC or a new technology solution: gas insulated line (more references needed)	na	-	964.000 449.500	E158/02 E202/05

2.35	EL2	IT, SI	New interconnections between Italy and Slovenia	Vrtojba - Redipuglia (110 kV); Dekani - Žavlje (110 kV) Divača - Italy (110 or 400 kV)	Study phase	ca. 500 MVA (110 kV) or ca. 1000 MVA (400 kV)	20 km 5 km	20 (110 kV)	na	na	Previous project has been deleted, now identification of new projects in 110 kV or 400 kV voltage levels between: Vrtojba – Redipuglia, Dekani - Zavlje	na	-	-	-
2.36	EL2	IT, SI	Udine Ovest (IT) - Okroglo (SI) line	-	Study phase	1000-1500	120	80	2018	7 years	Difficult identification of the cross border points between Italy and Slovenia (two possible crossing points), highly populated area on Italian side, definition of the routing: 35% of SI territory is devoted to Natura 2000 programme, opposition of local population: EMF, landscape view, pre-condition on SI side: completion of Berecevo-Krsko line and interconnection to HU, need to enhance IT grid	na	-	467.630	E194/04
3.8	EL2	IT	S. Fiorano (IT) - Nave (IT) - Gorlago (IT) line	-	Finalised	na	10	10	2003	none	The reconstructing of the line Fiorano - Nave was stopped because the real-time monitoring system on the line Fiorano-Robbia improved the capacity. The route Nave - Gorlago was rebuilt on 10 km due to an archeological site	na	-	-	-
3.9	EL2	IT	Venezia Nord (IT) - Cordignano (IT) line	now Venezia Nord (IT) - Volpago (IT)	Study/ Authorisation phase	1000	75	25	2014	na	Consultation with local authorities ongoing	na	-	-	-

3.60	EL2	AT	St. Peter (AT) - Tauern (AT) line	380-kV-Salzburgleitung Tauern - Salzach neu	Authorisation phase	1800	115	380	2017	na	Opposition of local population: EMF, landscape view, protected birds and bugs, forest trees may be cut in defined seasons, difficult terrain	na	-	2.660.400	E217/06
3.60	EL2	AT	St. Peter (AT) - Tauern (AT) line	380-kV-Salzburgleitung Salzach neu - St. Peter	Authorisation/ Construction phase	2 x 1525	46	70	2011	na	None, project is under construction	yes	-	843.600 1.228.200	E184/04 E256/09
3.61	EL2	AT	Süd-Burgenland (AT) - Kainachtal (AT) line	-	Finalised	1800	98	146	2009	na	None	90	-	1.462.900	E228/07
2.10	EL3	ES, FR	Eastern Pyrenees connection between France and Spain	Sentmenat (ES) - Becano (ES) - Baixas (FR) line	Authorisation/ Construction phase (re-routing for some part)	na	257	104,8	2010-2013	na	Local population opposition, natural protected areas	na	-	220.000 394.150	E035/96 E118/00
2.14	EL3	ES, PT	Valdigem (PT) - Douro Internacional (PT) - Aldeadavila (ES) line and 'Douro Internacional' facilities	400 kV Douro interconnection Aldeadávila (ES) - Lagoaça (PT)	Construction phase	3210	204	88	2010	na	Technical constraints, local Natura 2000 sites in the cross-border point area, local political concerns	na	50	1.807.650	E196/05
4.9	EL4	EL, TR	Philippi (GR) - Hamitabat (TR) line	-	Finalised	2x1400 1x1200 (EL)	220	70	2008	none	na	na	-	195.000 350.000	E106/99 E129/00
2.21	EL5	NL, UK	Submarine cable between South-Eastern England and central Netherlands	Netherlands - UK Interconnector Project (BritNed cable) (Isle of Grain in Kent (UK) - Maasvlakte (NL))	Construction phase	1000	260	600	2011	none	Technical constraints, commercial and regulatory complexities, cross-border cooperation	na	-	500.000 2.053.000 2.000.000 800.000 1.625.000 1.000.000 1.028.585 2.669.000 1.075.000	E044/96 E117/00 E132/01 E155/02 E160/03 E190/04 E197/05 E212/06 E262/09
1.1	EL6	IE, UK	Submarine cable Ireland-Wales (UK)	East-West interconnector, Co. Wicklow - North Wales	Authorisation phase	370	135	244	2013	none	Finance/ credit problems, technology, permits/ planning issues, short run financed, non-existence of long run contracts, seasonal restrictions on marine activity	na	-	-	-

1.1	EL6	IE, UK	Submarine cable Ireland-Wales (UK)	Meath (IE) - Deeside (UK-Wales)	Authorisation phase	520	256	600	2012	none	Finance/Credit problems, technology, permits/Planning issues, short run financed, non-existence of long run contracts, seasonal restrictions on marine activity	300	110	350.000 610.000 2.000.000	E097/99 E193/04 E226/07
2.15	EL7	FI, SE	Connections north of the Gulf of Bothnia and Fennoscan submarine cable between Finland and Sweden	Fennoscan subsea cable between Finland and Sweden	Construction phase	800	300	300	2011	1 year	Time consuming permit process (environmental permits): Swedish water-rights, delays experienced by the cable suppliers to deliver the cable according to the original time schedule	na	-	75.000 75.000 120.750 475.000	E002/95 E005/95 E114/00 E209/06
2.22	EL7	DE, DK	Reinforcement of connections between Denmark and Germany, e.g. the Kasso - Hamburg line	-	Authorisation phase	3500	215	na	2018	na	Densely populated area: numerous land owners. Foreseeing a very large amount of wind power to be transmitted between DE and DK. Time schedule for grid reinforcement and extension depends on dynamics of wind farm installation onshore and offshore with connection to grid in Schleswig-Holstein as well as on the development of grid integration of new power plants in the northern part of the E.ON Netz control zone	na	-	150.000	E099/99

2.29	EL7	PL, LT	Poland - Lithuania link (Elk - Alytus)	Connection of Poland and Lithuania, enabling the participation of the Baltic States in the internal energy market	Study phase	1000	154-156	261	2015-2020	none	Rights of the land (population density), technical constraints, natural protected areas. Additional reinforcements in the Polish internal grid are necessary before the connection between Poland and Lithuania	na	-	1.900.000 2.366.508	E243/08 E263/09
2.30	EL7	EE, FI	Submarine cable to link Finland and Estonia (Estlink)	Estlink	Finalised	350	105	110	2006	na	Weather conditions	na	-	670.000	E095/99
2.30	EL7	EE, FI	Submarine cable to link Finland and Estonia (EstLink 2)	EstLink 2	Authorisation phase	650	165-170	300	2014	na	Parallel planning process in two countries: difficult public procurement procedures. Complicated general economic situation: investments into grid reinforcements are limited and higher risk involved in subcontracting. Positive development in market opening in Baltic countries necessary. Processes for receiving different permits (cross-border project) and different environmental aspects.	na	100	-	-
3.2	EL7	DK	Connections on the Danish north-south axis	Vester Hassing (DK) - Trige (DK) line	Construction phase	900	114	160	2014	na	Depends on other projects especially between DK and DE (e.g. Kasso-Hamburg/Dollern and Skagerrak IV) and wind power allocation, difficult acceptance from land owners, restructuring period of authorities	na	-	-	-
3.2	EL7	DK	Connections on the Danish north-south axis	Kasso (DK) - Revsing (DK) - Tjele (DK) line	Authorisation phase	2000	180	200	2014	na	Public acceptance for OHL, natural protected areas	na	-	1.498.000	E253/09

3.48	EL7	DE	Hamburg/Krümmel (DE) - Schwerin (DE) line		Authorisation/ Construction phase	2x1800	90	85	2010	1 year	Opposition from local population: routing, fear of EMF, deterioration of landscape view, perception of supra-regional or European perspectives is low, time-consuming public consultation procedures, numerous stakeholders, special requirements on detailed documentation by state authority in Schleswig-Holstein	na	-	-	-
3.49	EL7	DE	Halle/Saale region (DE) - Schweinfurt region (DE) line	Section 1 (Lauchstaedt - Vieselbach) Section 2 (Vieselbach - Altenfeld) Section 3 (Altenfeld - Border Bavaria) Section 4	Authorisation phase/ Finalised	2x2400	205	350	2013	3 years	Managing the different administrative areas crossed by the projects (three Federal States of Germany), authorisation procedures, technical constraints and use of new technology, public acceptance, crossing large wooden areas	na	100	290.000	E224/07
4.27	EL7	DK	Upgrading of connections between Denmark and Norway	Skagerrak 4	Authorisation phase	700	260	375	2014	none	Difficult terrain conditions for cable landing (subsea), technical constraints and innovative technology solutions to be investigated	na	-	856.000	E266/09
2.26	EL8	HU, SK	Moldava (SK) - Sajoivanka (HU)	now Rimavská Sobota (SK) - Sajóivánka (HU) (see project 2.25)	Cancelled	2x1385	11	60	2017	na	Through environmental problems on the Hungarian side this interconnection is not feasible	na	-	-	-

2.27	EL8	SK, AT	Stupava (SK) - south-east Vienna (AT) line	-	Cancelled	1400	50	80	> 2015	na	Depends on strengthening the Austrian grid from north to south. High number of lines in the region of Vienna. Level of EMF. Protected area and wildlife. Priority given in AT to other projects	na	-	-	-
2.28	EL8	DE, PL	Neuenhagen (DE) - Uckermark/Vierraden (DE) - Krajnik (PL) line	Conversion of existing 220-kV double circuit line into a 400-kV line together with phase shifting transformers installation on 400 kV lines: Krajnik (PL) - Vierraden (DE) and Mikulowa (PL) - Hagenwerder (DE)	Study/ Authorisation phase	na	125	439+ 47	2015	na	Study phase: depends on strengthening the Polish grid according to the development studies and results of PL - DE bilateral WG study Poland states:Problems in financing, necessary substantial support from EU	na	-	283.000	E199/05
2.28	EL8	DE, PL	Neuenhagen (DE) - Vierraden (DE) - Krajnik (PL))	New connection including upgrading of the PL grid according to connection as in the Vierraden (DE) - Krajnik (PL)	Study phase	na	65	260	2015	na	Legal frame on DE-side prevents relevant expropriations for the interconnection. Study phase: depends on strengthening the Polish grid according to the development studies and results of PL-DE bilateral WG study. Poland states: Problems in financing, necessary substantial support from EU	na	-	-	-
2.32	EL8	DE, PL	New connections to link the UCTE and CENTREL systems	New interconnection between Germany and Poland	Study phase	na	na	na	>2015	na	na	na	-	-	-
2.33	EL8	AT, CZ	Dürnrohr (AT) - Slavetice (CZ) line		Finalised	900	96	9	2008	na	none	-	-	-	-

3.75	EL8	SK	Lemesany (SK) - Moldava (SK)	First phase: 2x400 kV line Moldava (SK) - Switching substation Košice (SK) Second phase: 2x400 kV line Switching substation Košice (SK) – Lemešany (SK)	Construction phase/ Finalised	2x1662	43	60	2011	none	No major problems encountered so far	na	-	1.039.034	E272/09
3.76	EL8	SK	Lemesany (SK) - Vel'ky Kapusany (SK)	-	Study phase	2x1385	110	86,3	2017	na	Negotiation with land owners, permitting procedures	na	-	210.000	E242/08
3.77	EL8	SK	Gabcikovo (SK) - Vel'ky Dur (SK) line	-	Authorisation phase	2x1385	93	100	2022	11 years	No major problems encountered. Environmental Impact Assessment successfully accomplished. Project is associated with other investments in Slovak transmission grid and therefore its realisation is/could be postponed	na	-	-	-
4.25	EL9	IT, Tunisia	Electricity connection to link Tunisia and Italy	-	Authorisation phase	1000	350	500-700	2015	na	Need of increase investments on the HV grid in Sicily and Calabria Regions. Need to increase generation capacity in Tunisia. At this aim, a generation project called "ELMED" (1200 MW) based on a mix between conventional and RES will be realised.	na	-	-	-

Table A4: State of implementation of projects of European interest in the gas sector

Ref. Annex III 2006	Axis (2006)	Countries involved	Project specification	Sub-section/ routing/more specific title	Known project status (March 2010)	Additional capacity (Bcm/y)	Length (km)	Estima-ted total cost (M€)	(Indica-tive) In operation date	Delay on initial schedule	Elements of complexity of the project	EIB loan (M€)	EEPR max con-tribu-tion (M€)	TEN-E grant(s) allocated (€)	Applica-tion for TEN-E grant (ref.)
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Eemstunnel Rysum-Midwolda (part of North-South project Rysum/Oude Statenzijl - Zelzate/'s-Gravenvoeren, NL)	Construction phase	Entry= 31,8 Exit= 12,5	400	1156	2010	na	Lengthy permitting procedures (incl. EIA report), protected natural areas, crossing natural barriers, escalation of contractor pricing caused by limited capacity and increasing costs of energy	500	-	2.819.004 1.587.056	G157/08 (NL) G163/09 (DE)
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	GWWL pipe line (Grijpskerk-Workum-Wieringermeer lijn)	Finalised	na	110	350	2007	na	Nothing reported	na	-	362.825	G108/04
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Bacton (UK) - Balgzand (NL)	Finalised	8	230	500	2006	na	Protected natural areas (re-routing needed)	na	-	-	-

7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Extension of transport capacity from Emden / OSZ (German border) to Balgzand (interconnector to the UK) - Integrated Open Season Gasunie (NL) PART I	Authorisation phase	>10	100	300	2014	na	Lengthy permitting procedures (incl. EIA report), protected natural areas, crossing natural barriers, escalation of contractor pricing caused by limited capacity and increasing costs of energy	na	-	-	-
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Extension of transport capacity from Emden / OSZ (German border) to Balgzand (interconnector to the UK) - Integrated Open Season Gasunie (NL) PART II	Authorisation phase	>10	100	300	2015	na	Lengthy permitting procedures (incl. EIA report), protected natural areas, crossing natural barriers, escalation of contractor pricing caused by limited capacity and increasing costs of energy	na	-	-	-
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	LNG West: Connection LNG terminal GATE towards CS Wijngaarden	Construction phase	12	80	191	2011	na	Lengthy permitting procedures (incl. EIA report), protected natural areas, crossing natural barriers, escalation of contractor pricing caused by limited capacity and increasing costs of energy	na	-	-	-
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Pipeline Ommen-Ravenstein towards Belgium border	Construction phase	20	180	550	2012	na	Lengthy permitting procedures (incl. EIA report), protected natural areas, crossing natural barriers, escalation of contractor pricing caused by limited capacity and increasing costs of energy	na	-	-	-

7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	UGS Alkmaar – Bergermeer connection (Pipeline and 10 MW compression)	Authorisation phase	4	2	60	2013	na	Lengthy permitting procedures (incl. EIA report), protected natural areas, crossing natural barriers, escalation of contractor pricing caused by limited capacity and increasing costs of energy	na	-	-	-
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Integrated Open Season Gasunie Germany (Pipelines and 25 MW compression station)	Authorisation phase	12	100	450	2014	na	Lengthy permitting procedures (incl. EIA report), protected natural areas, crossing natural barriers, escalation of contractor pricing caused by limited capacity and increasing costs of energy	na	-	-	-
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Ravenstein (NL) - Vinkel (BE)	Finalised	na	na	na	2003	na	Nothing reported	na	-	-	-
7.24	NG1	DE, DK, SE	The Baltic gas interconnect-tor between Denmark - Germany - Sweden	Baltic gas interconnector (BGI)	Authorisation phase completed	3	200 (off-shore)	300	na	3 years	Diversity of authorisation counterparts in Germany, time-consuming procedures; implementation delayed due to considerations for linking Nord Stream to the Swedish gas pipeline network	na	-	1.750.000	G051/99
9.3	NG1	RU, DE	North European gas pipeline: Russia, Baltic Sea, Germany	Nord Stream (offshore section)	Authorisation phase	27,5 (2011) 55 (2012)	1220	7400	2012	na	Protected natural areas, opposition of some Member States in the Region (eg. Sweden)	na	-	-	-
9.16	NG1	DE, PL, BL	Yamal - Europe II natural gas pipeline	-	Pre-study phase	43	680	1500	na	na	Lack of interest from potential partners, studies not yet started	na	-	924.500	G103/04

Table A5: Priority projects in the electricity sector finalised and under construction

Ref. Annex III 2006	Axis (2006)	Countries involved	Project specification	Sub-section/ routing/ more specific title	Addi-tional capacity (MVA)	Length (km)	Esti-mated total cost (M€)	(Indica-tive) In operation date	EIB loan (M€)	EEPR max contri-bution (M€)	TEN-E grant(s) allocated (€)	Application for TEN-E grant (ref.)
Finalised												
2.5	EL1	DE, FR	Vigy (FR) - Uchtelfangen (DE) line	-	na	na	na	2002	na	-	230.000	E085/98
3.58	EL1	BE	Installation of phase shifters and/or capacitor batteries in Belgium	Different locations	na	na	57	na	na	-	2.000.000	E219/07
2.6	EL2	FR	La Praz (FR) phase transformer	-	na	na	13	2002	na	-	344.200	E098/99
2.7	EL2	FR, IT	Further increase of capacity through existing interconnection between France and Italy	Phase shifter in Rondissone	na	na	23	2004	na	-	-	-
3.14	EL2	IT	Rizziconi (IT) - Feroleto (IT) - Laino (IT) line	-	na	na	80	2005	na	-	296.300	E090/98
3.6	EL2	IT	Turbigo (IT) - Rho (IT) - Bovisio (IT) line	-	na	31	40	2006	na	-	-	-
4.1	EL2	IT, CH	New interconnection Italy - Switzerland	San Fiorano (IT) - Robbia (CH) line	1400	196	77	2005	na	-	249.000	E135/01
2.11	EL3	ES, PT	Connections between northern Portugal and north-western Spain	Cartelle-Lindoso II	na	na	na	2004	na	-	-	-
2.12	EL3	ES, PT	Sines (PT) - Alqueva (PT) - Balboa (ES) line	-	na	na	39	2004	na	-	125.000 538.500	E064/97 E065/97
2.9	EL3	ES	New trans-Pyrenean interconnection between France and Spain	Vic phase shifter	na	na	na	2002	na	-	-	-
2.9	EL3	ES, FR	New trans-Pyrenean interconnection between France and Spain	Hernani-Argia (upgrade)	na	na	na	2002	na	-	-	-
2.9	EL3	FR, ES	New trans-Pyrenean interconnection between France and Spain	Cantegrit-Mougerre (220kv)-(Arkale)	na	na	na	2002	na	-	-	-
2.9	EL3	ES, FR	New trans-Pyrenean interconnection between France and Spain	Installation of a 225 kV phase displacement transformer at the Pragneres substation (FR)	na	550 (FR-ES)	na	1998	na	-	100.000	E068/97
2.9	EL3	ES, FR	New trans-Pyrenean interconnection between France and Spain	Pirineo connection substation electricity line; Restructuring of the network around Baixas	na	na	na	1997	na	-	140.000	E027/95

3.18	EL3	ES	New connections on the North axis of Spain	Boimente - ln/Aluminio-Puentes I y II	na	na	na	2003	na	-	-	-
3.19	EL3	ES	New connections on the Mediterranean axis of Spain	La Eliana - La Plana II	na	na	na	2003	na	-	-	-
3.19	EL3	ES	New connections on the Mediterranean axis of Spain	Litoral - Rocamora II	na	na	na	2003	na	-	-	-
3.19	EL3	ES	New connections on the Mediterranean axis of Spain	Nueva Escombreras - El Palmar	na	101	22,2	2007	150	-	-	-
3.20	EL3	ES	New connections on the Galicia (ES) - Centro (ES) axis	Cartelle - ln/ Castrelo-Velle	na	na	na	2002	na	-	-	-
3.21	EL3	ES	New connections on the Centro (ES) - Aragon (ES) axis	Trillo - Magallón	na	na	na	2002	na	-	-	-
3.25	EL3	ES	New connections in Andalucia (ES)	Pinar - Estrecho II	na	na	na	2002	na	-	-	-
3.28	EL3	PT	Picote (PT) - Pocinho (PT) line (upgrading)	-	na	na	4	2004	na	-	-	-
3.30	EL3	PT	Pego (PT) - Batalha (PT) line and Batalha facilities	-	na	na	18	2006	na	-	347.630	E150/02
3.31	EL3	PT	Sines (PT) - Ferreira do Alentejo (PT) I line (upgrading)	-	na	na	3	2005	na	-	-	-
3.33	EL3	PT	Pereiros (PT) - Zêzere (PT) Santarem (PT) lines and Zêzere facilities	-	na	na	28	2004	na	-	-	-
3.34	EL3	PT	Batalha (PT) - Rio Major (PT) I and II lines (upgradings)	-	350	11	5,4	2003	na	-	-	-
3.35	EL3	PT	Carrapatelo (PT) - Mourisca (PT) line (upgrading)	-	na	na	4	2005	na	-	-	-
3.36	EL3	PT	Valdigem (PT) - Viseu (PT) - Anadia (PT) line	-	na	na	28	2006	na	-	1.194.720	E171s/03
3.43	EL3	ES	Connections in the north-east and west of Spain, in particular to connect to the network wind-power generation capacities	Magallón - ln/ Serna-Peñaflor	na	na	na	2002	na	-	-	-
3.43	EL3	ES	Connections in the north-east and west of Spain, in particular to connect to the network wind-power generation capacities	Santurce - Zierbana	na	na	na	2002	na	-	-	-
3.43	EL3	ES	Connections in the north-east and west of Spain, in particular to connect to the network wind-power generation capacities	Cartelle - Trives II	na	na	na	2003	na	-	-	-
3.43	EL3	ES	Connections in the north-east and west of Spain, in particular to connect to the network wind-power generation capacities	Meson - Cartelle II	na	na	na	2003	na	-	-	-
3.38	EL4	EL	Thessaloniki (EL), Lamia (EL) and Patras (EL) substations and connecting lines	Thessaloniki X substation	na	na	4,5	2008	na	-	-	-

3.39	EL4	EL	Connection of the regions of Evia (EL), Lakonia (EL) and Thrace (EL)	Expansion of the 400 kV System to the area of Thrace with the construction of the 400 kV OHL (double circuit) Filippoi – N. Santa and the 400 kV OHL connection the Systems of Greece and Turkey (see Project 4.22)	na	na	na	na	na	-	-	-
3.40	EL4	EL	Strengthening of existing connections of the peripherical regions in the mainland in Greece	Enhancement of the connection of the island of Corfu to the mainland	na	44	32	2007	na	-	-	-
4.20	EL4	BG, TR	Connections in the Black Sea Electricity Ring: Russia – Ukraine – Romania – Bulgaria – Turkey – Georgia	Maritsa East 3 - Hamitabat	na	na	24	2002	na	-	-	-
4.3	EL4	EL, FYROM	Meliti* (EL) - Bitola (Former Yugoslav Republic Of Macedonia) line	*The project has substituted the initially scheduled OHL Amyntaio – Bitola	na	18	5 (GR)	2007	na	-	125.000	E059/96
4.6	EL4	BH	Mostar (Bosnia and Herzegovina) substation and connecting lines	Kakanj - Prijedor	na	na	1	2003	na	-	-	-
4.6	EL4	BH	Mostar (Bosnia and Herzegovina) substation and connecting lines	Mostar - Gacko	na	na	4	2004	na	-	-	-
4.6	EL4	BH	Mostar (Bosnia and Herzegovina) substation and connecting lines	Mostar - Sarajevo	na	na	7	2005	na	-	-	-
4.6	EL4	BH	Mostar (Bosnia and Herzegovina) substation and connecting lines	Tuzla - Visegrad	na	na	4	2006	na	-	-	-
4.7	EL4	HR, BH	Ernestinovo (Croatia) substation and connecting lines	Ernestinovo - Ugljevik	na	na	11	2003	na	-	-	-
4.7	EL4	HR, FRY	Ernestinovo (Croatia) substation and connecting lines	Ernestinovo - Mladost	na	na	11	2003	na	-	-	-
4.7	EL4	HR	Ernestinovo (Croatia) substation and connecting lines	Ernestinovo - Zerjavinec	na	na	2	2003	na	-	-	-
4.8	EL4	GR	New connections between Greece and Albania, Bulgaria and the Former Yugoslav Republic of Macedonia	Florina Amyndeo / Amyntaio	na	na	na	2003	na	-	-	-
4.8	EL4	EL, AL, BG, FYROM	New connections between Greece and Albania, Bulgaria and the Former Yugoslav Republic of Macedonia	OHL Stip – C. Mogila (FYROM – Bulgaria)	650	na	50	2009	na	-	-	-
3.41	EL6	IE	Tynagh (IE) - Cashla (IE) line	-	na	na	33	2003	na	-	685.000 550.000	E069/97 E084/98
3.53	EL6	UK	Connections in the North-West of the United Kingdom	Isle of Man Submarine link	na	105	410	2000	na	-	435.000 1.015.000	E043/96 E071/97
3.54	EL6	UK	Island Magee-Coylton (MOYLE)	-	na	na	225	2002	na	-	-	-

2.23	EL7	SE, DK	Reinforcement of the connections between Denmark and Sweden	na	na	na	35	2006	na	-	-	-
4.13	EL7	PL	Connections for the Baltic Electricity Ring: Germany - Poland - Russia - Estonia - Latvia - Lithuania - Sweden - Finland - Denmark - Belarus	Dobrzen- Wielopole	na	na	46	2003	na	-	-	-
4.14	EL7	FI, RU	Southern Finland - Russia link	Kymi-St.Petersburg II	na	na	300 - 1000	na	na	-	240.000	E055/96
4.15	EL7	SE, NO	New connections between North Sweden and North Norway	Reinforcement of the existing connection and a new transformer was installed in Grundfos, Sweden	na	na	na	2004	na	-	-	-
4.17	EL7	NO	Borgvik (SE) - Hoesle (NO) - Oslo region (NO) line	Oslo West Line	na	na	na	2005	na	-	-	-
3.65	EL8	PL	Ostrów (PL) - Trębaczew (Rogowiec) (PL)	-	na	110	95,3	2008	na	-	-	-
3.67	EL8	PL	Tarnów (PL) - Krosno (PL)	-	na	75	25	2006	na	-	-	-
4.12	EL9	ES, MA	Submarine cable between South Spain and Morocco (strengthening of existing connection)	i.a. Estrecho-Melloussa II	na	31	69,2	2006	na	-	637.500 1.127.000	E003/95 E131/01
4.22	EL9	GR, IT	New connections in the Mediterranean Electricity Ring: France – Spain – Morocco – Algeria – Tunisia – Libya – Egypt – near-eastern Countries – Turkey – Greece - Italy	Ipiros-Puglia	na	na	na	2002	100	-	-	E191/04
4.11		NL, NO	Eemshaven (NL) - Feda (NO) link	NorNed cable	na	na	565	2007	na	-	1.500.000 4.215.000 3.000.000	E052/96 E088/98 E198/05
4.19		HU	Connections and interface between the extended UCTE system and Belarus, Russia and Ukraine, including relocation of HVDC conversion stations operating previously between Austria and Hungary, Austria and the Czech Republic, and Germany and the Czech Republic	Györ-Szombathely	na	89,9	60	2006	na	-	-	-
4.29		HU, RO	Békéscsaba (HU) - Oradea (RO)	Now Békéscsaba (HU) - Nadab(RO) - Arad(HU) as due to problems with land owners a small part between Nadab and Oradea could not be constructed	na	na	18,5	2008	na	-	435.000 1.580.000	E203/05 E237/07
4.7		HR	Ernestinovo (Croatia) substation and connecting lines	Szombathely-Hévíz interconnection (HU)	na	77,8	47	2009	na	-	691.250 2.000.000	E208/06 E238/07
Construction phase												
3.4	EL1	FR	New connections in south-western France	Upgraded 400 kV and 225 kV lines	na	na	na	2014	na	-	-	-

2.31	EL2	SI	Installation of flexible alternating current transmission systems linking Italy and Slovenia	Phase Shift Transformer - PST, Divača Substation - 400 kV, 2x600 MVA	2x600	-	52,8	2012	21,5	-	1.054.400	E268/09
2.7	EL2	FR, IT	Further increase of capacity through existing interconnection between France and Italy	-	600	200	102-114	2012	na	-	588.000	E183/04
2.8	EL2	FR, IT	New interconnection between France and Italy	Piossasco (IT) - Cornier (FR)	600	100 (IT)	na	2012	na	-	-	-
3.12	EL2	IT	Tavarnuzze (IT) - Casellina (IT) line	Tavernuzze - Casellina - Santa Barbara	na	37	120	2010	na	-	-	-
3.13	EL2	IT	Tavarnuzze (IT) - S. Barbara (IT) line	-	na	35	120	2010	na	-	87.500	E014/95
1.6	EL3	IT	Submarine cable Sardinia (IT) - Italy Mainland	-	1000	420	750	2010	na	-	725.000	E181/04
1.9	EL3	ES	New connections in the Balearic and Canary Islands (ES)	Electrical connection by submarine cable between the Balearic Islands and the Spanish peninsular network	400	250	419,3	2011	na	-	856.000	E161/03
2.10	EL3	ES	Eastern Pyrenees connection between France and Spain	Sentmenat - Bescano - Vic	na	na	na	2010	na	-	-	-
2.13	EL3	ES, PT	Connection between southern Portugal and south-western Spain	Portimão (PT) - Tavira (PT) - P. Gusman (ES) - Guillena (ES) line and Tavira facilities (400 kV South interconnection Guillena (ES) - Tavira (PT))	1860	301	90,9	2011	na	50	-	-
3.18	EL3	ES	New connections on the North axis of Spain	Cantabrian Sea: Penagos - Gueñes electricity line	na	150	46	2010	na	-	150.000	E023/95
3.18	EL3	ES	New connections on the North axis of Spain	Cantabrian Sea: Soto - Penagos electricity line	na	178	79,9	2011	na	-	90.000 55.000	E025/95 E076/97
3.20	EL3	ES	New connections on the Galicia (ES) - Centro (ES) axis	Tordesillas-San Sebastian de los Reyes	na	380,8	103,62	2010	na	-	-	-
3.20	EL3	ES	New connections on the Galicia (ES) - Centro (ES) axis	Trives-Tordesillas	na	476,6	150,8	2011	na	-	-	-
3.20	EL3	ES	New connections on the Galicia (ES) - Centro (ES) axis	Arcos-Cabra	na	289,2	86,4	2010	na	-	-	-
3.20	EL3	ES	New connections on the Galicia (ES) - Centro (ES) axis	Cabra-Guadame	na	148	36,8	2010	na	-	-	-
3.43	EL3	ES	Connections in the north-east and west of Spain, in particular to connect to the network wind-power generation capacities	Abanto - ln/ Penagos - Güeñes	na	36,4	11,5	2011	na	-	-	-
3.43	EL3	ES	Connections in the north-east and west of Spain, in particular to connect to the network wind-power generation capacities	Abanto - Zierbana	na	10,4	3,6	2010	na	-	-	-

3.38	EL4	EL	Thessaloniki (EL), Lamia (EL) and Patras (EL) substations and connecting lines	New Thessaloniki (Lagadas) EHV Substation (Air Insulated Substation - AIS)	2 x 202	80	43	2010	na	-	-	-
3.39	EL4	EL	Connection of the regions of Evia (EL), Lakonia (EL) and Thrace (EL)	150 kV OHL Polypotamos – S. Evia and 150 kV OHL and submarine cables Polypotamos - N. Makri (Attica)	na	73	42	2011	na	-	-	-
4.8	EL4	EL, AL, BG, FYROM	New connections between Greece and Albania, Bulgaria and the Former Yugoslav Republic of Macedonia	Zlatitsa-Karlovo-Plovdiv	na	na	15	2010	na	-	-	-
3.1	EL7	DK	Connections on the Danish east-west axis: connection between Denmark's western (UCTE) and eastern (NORDEL) networks	Great Belt sea cable from Funen to Sealand	600	26+32	169	2010	na	-	-	-
4.15	EL7	SE, NO	New connections between North Sweden and North Norway	Järpströmmen-Nea	na	na	66	2010	na	-	-	-
4.16	EL7	SE, NO	New connections between Mid Sweden and Mid Norway	na	na	na	66	2010	na	-	54.700	E115/00
3.64	EL8	PL	Ostrów (PL) - Plewiska (PL)	-	na	145	71,3	2010	na	-	-	-
3.72	EL8	SI	Krsko (SI) - Bericevo (SI)	-	1000	80	62	2013	29,3 (tbc)	-	3.616.612	E245/08
4.22	EL9	FR, ES, MA, DZ, TN, LY, EG, TR, EL, IT	New connections in the Mediterranean Electricity Ring: France – Spain – Morocco – Algeria – Tunisia – Libya – Egypt – near-eastern Countries – Turkey – Greece - Italy	na	na	na	55	2009	na	-	-	-
1.2		EL	Connection of southern Cyclades (EL) (to the Interconnected System)	na	na	na	300	2014	na	-	250.000	E111/99
1.8		IT	Connection Italy mainland - Sicily (IT): doubling of the connection Sorgente (IT) - Rizziconi	New 380 kV AC submarine cable between Sicily - Continental Italy (Sorgente - Rizziconi)	2000	104	700	2013	200	110	-	-
2.34		MT	Submarine electricity connection to link Malta (MT) and Sicily (IT)	Extension of the onshore network (MT) to the submarine electricity interconnector Italy-Malta	250	14	10	2012	na	5	-	-
4.31		HU, HR	Pécs (HU) - Ernestinovo (HR)	-	500	86,4	43,6	2010	na	-	2.234.611	E246/08

Partly in construction phase												
3.59	EL1	BE	Upgrading of 380 k V grid in Belgium to increase import capacity	Development and upgrade of the 380 kV belgian grid on the northern border Belgium-Netherlands within Antwerp Region (BRABO) (2 phases)	400 + 1600	38	120	2012 (1st phase) 2016 (2nd phase)	na	-	-	-
4.2	EL4	EL, BG	Philippi (GR) - Maritsa 3 (Bulgaria) line	-	na	na	10 +30,3	2012-2015	na	-	450.000 150.000	E060/96 E079/98

Table A6: Priority projects in the gas sector finalised and under construction

Ref. Annex III 2006	Axis (2006)	Countries in-volved	Project specification	Sub-section/ routing/ more specific title	Addi-tional capacity (Bcm/y)	Length (km)	Esti-mated total cost (M€)	(Indica-tive) In operation date	EIB loan (M€)	EEPR max contri-bution (M€)	TEN-E grant(s) allocated (€)	Application for TEN-E grant (ref.)
Finalised												
7.10	NG1	AT	Bad Leonfelden (AT) – Linz (AT) pipeline	-	na	na	23	2005	na	-	-	-
7.22	NG1	DK	Connection between offshore facilities in the North Sea, or from Danish offshore to United Kingdom onshore facilities	-	na	na	na	2004	na	-	-	-
7.27	NG1	BE	Upgrading of capacity along the north-west axis: Zelzate (BE) - Zeebrugge (BE)	-	10	na	82,6	2009	-	-	-	-
9.19	NG1	DE, CZ, PL	Increasing transport capacity of the STEGAL gas pipeline for transport of additional gas from the Czech-German border and from the Polish-German border through Germany to other Member States	-	na	na	190	2006	na	-	-	-
7.4	NG2	FR, ES	Lussagnet (FR) - Bilbao (ES) pipeline	-	0,5-3	na	25	2005	na	-	911.350	G061/00
9.6	NG2	DZ, ES, FR	New gas pipelines from Algeria to Spain and France and related capacity increase of the internal networks in these countries	Network in Andalucia	na	na	na	2002	na	-	-	-
9.7	NG2	DZ, MA, ES	Increasing transport capacity of the Algeria - Morocco - Spain (up to Córdoba) pipeline	-	na	na	na	2004	na	-	-	-
9.8	NG2	ES	Córdoba (ES) - Ciudad Real (ES) pipeline	-	na	na	na	na	na	-	-	-
9.9	NG2	ES	Ciudad Real (ES) - Madrid (ES) pipeline	-	na	na	na	na	na	-	-	-
9.22	NG3	EL, TR	Greece-Italy interconnection pipeline	Interconnector Turkey-Greece-Italy (ITGI) Branch Greece-Turkey	11	295	82,2 (EL)	2007	na	-	4.330.000	G082/02
8.20	NG5	IE	Developping underground gas storage facilities in Ireland	-	0,25	25	na	2002	na	-	318.000 4.950.000	G016/96 G030/97
8.28	NG5	PT	Storage in Carriço (PT), new site	-	1,4	-	110	2009	na	-	-	-
8.30	NG5	DK	Storage at Stenlille (DK) and Lille Torup (DK), extending existing site	Storage at Stenlille	na	-	na	na	na	-	1.712.000 2.546.000	G018/96 G036/98
8.32	NG5	AT	Storage at Puchkirchen (AT), extending existing site, including pipeline to the Penta West system near Andorf (AT)	-	1,1	na	na	2007 (phase I)	na	-	2.912.000	G029/97
8.34	NG5	AT	Storage at Haidach (AT), new site, including pipeline to the European gas grid	Storage at Haidach (stage I)	1,2	-	390	2007	na	-	741.000	G047/99

6.1		IE, UK	Developing gas network from Belfast towards the north-west region of Northern Ireland (UK) and, if appropriate, to the western coast of Ireland	-	1,7	na	86	2004	na	-	-	-
6.1		IE, UK	Developing gas network from Belfast towards the north-west region of Northern Ireland (UK) and, if appropriate, to the western coast of Ireland	Pipeline to the western coast of Ireland	na	na	383	2002	na	-	-	-
6.7		EL	High pressure branch to Thrace (EL)	Extension of gas network to Komotini	na	na	54	2000	na	-	770.000	G006/95
6.8		EL	High pressure branch to Corinth (EL)	-	na	na	23	2007	na	-	770.000	G006/95
7.1		IE, UK	Additional gas interconnection pipeline between Ireland and Scotland	-	na	na	292	2002	-	-	150.000	G001/95
7.2		IE, UK	North-South interconnection, including Dublin-Belfast pipeline	Gormanstown, Dublin in Republic of Ireland to Antrim in Northern Ireland	1,46	156	108	2006	-	-	250.000 575.000	G033/98 G050/99
7.6		PT, ES	Increasing transport capacity of gas pipelines supplying Portugal through South Spain and Galicia and Asturias through Portugal	-	na	na	na	na	na	-	-	-
8.26		ES	Storage on the North-South axis of Spain (new sites) in Cantabria, Aragon, Castilla y Leon, Castilla - La Mancha and Andalucia	Serrablo (Aragon)	1,1	-	na	na	na	-	-	-
9.28		DE	Increasing transport capacity of the TENP gas pipeline running from the Netherlands through Germany to Italy	Pipeline extension and repowering of compression units	na	na	348	2005	na	-	-	-
9.29		FR, CH	Taisnieres (FR) - Oltingue (CH) gas pipeline	-	na	na	na	na	na	-	-	-
9.36		NO, UK	Gas pipeline from Norway to United Kingdom	Nyhamna (NO) - Sleipner(NO) - Easington (UK)	25	1200	2,3	2007	na	-	-	-
Construction phase												
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Eemstunnel Rysum-Midwolda (part of North-South project Rysum/Oude Statenzijl - Zelzate/'s-Gravenvoeren, NL)	Entry = 31,8 Exit = 12,5	400	1156	2010	500	-	2.819.004 1.587.056	G157/08 (NL) G163/09 (DE)
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	LNG West: Connection LNG terminal GATE towards CS Wijngaarden	12	80	191	na	na	-	-	-
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Open Season 2012: Pipeline Ommen- Ravenstein towards Belgium border	20	180	550	2012	na	-	-	-

7.18	NG1	DE, PL	Connections between north-east Germany (Berlin area) and north-west Poland (Szczecin area) with a branch from Schmölln to Lubmin (DE, Greifswald area)	-	3	160	260	2013	-	-	-	-
7.26	NG1	BE	Zeebrugge (BE) - Eynatten (BE) capacity upgrade	Opwijk – Raeren	10	170	345,5	2011	110	35	1.184.500	G137/07
9.13	NG2	ES, DZ, FR	Algeria - Spain submarine pipeline and pipelines for the connection to France	MEDGAS gas pipeline	8	208	630- 800	2010	*500*	-	2.000.000 2.000.000	G115/04 G134/07
8.22	NG5	FR	Storage at Lussagnet (FR), extending existing site	Aquifer type	2,4->3,5	-	4,5	2010-2012	na	-	1.500.000	G080/02
8.26	NG5	ES	Storage on the North-South axis of Spain (new sites) in Cantabria, Aragon, Castilla y Leon, Castilla - La Mancha and Andalucia	Yela (Castilla-La-Mancha)	1	-	na	2011	na	-	-	-
8.26	NG5	ES	Storage on the North-South axis of Spain (new sites) in Cantabria, Aragon, Castilla y Leon, Castilla - La Mancha and Andalucia	Marismas (Andalucia)	0,9	-	na	2013	na	-	-	-
8.27	NG5	ES	Storage on the Mediterranean axis of Spain (new sites) in Catalonia, Valencia and Murcia	Castor (Valencia)	1,3	-	na	2012	na	-	-	-
8.29	NG5	BE	Storage at Loenhout (BE), extending existing site	-	na	na	125	2010-2011	na	-	3.391.000	G035/98
8.34	NG5	AT	Storage at Haidach (AT), new site, including pipeline to the European gas grid	Storage at Haidach (stage II)	1,2	-	250	2011	na	-	-	-
8.35	NG5	IT	Developing underground gas storage facilities in Italy	Cotignola - San Potito	0,9	-	na	2012	na	-	-	-
8.36	NG5	PL	Storage at Wierzchowice, extending existing side (PL)	-	0,625	-	584	2011-2012	Pending	-	-	-
8.37	NG5	PL	Storage at Kosakowo (PL), developing underground storage	-	0,25	-	190	2013 (phase 1)	Pending	-	-	-
7.13		EL	Compression station on the main pipeline in Greece	-	na	na	34	2011	na	-	980.000	G034/98

Table A7: Cross-border projects in the electricity sector finalised and under construction

Ref. Annex III 2006	Axis (2006)	Countries involved	Project specification	Sub-section/ routing/ more specific title	Addi-tional capacity (MVA)	Length (km)	Esti-mated total cost (M€)	(Indica-tive) In operation date	EIB loan (M€)	EEPR max contri-bution (M€)	TEN-E grant(s) allocated (€)	Application for TEN-E grant (ref.)
Finalised												
2.2	EL1	BE, FR	Avelin (FR) - Avelgem (BE) line	-	1000-1500	43	21,5	2005	na	-	1.005.900	E191/04
2.5	EL1	DE, FR	Vigy (FR) - Uchtelfangen (DE) line	-	na	na	na	2002	na	-	230.000	E085/98
2.7	EL2	FR, IT	Further increase of capacity through existing interconnection between France and Italy	Phase shifter in Rondissone	na	na	23	2004	na	-	-	-
4.1	EL2	IT, CH	New interconnection Italy - Switzerland	San Fiorano (IT) - Robbia (CH) line	1400	196	77	2005	na	-	249.000	E135/01
2.11	EL3	ES, PT	Connections between northern Portugal and north-western Spain	Cartelle-Lindoso II	na	na	na	2004	na	-	-	-
2.12	EL3	ES, PT	Sines (PT) - Alqueva (PT) - Balboa (ES) line	-	na	na	39	2004	na	-	125.000 538.500	E064/97 E065/97
2.9	EL3	ES, FR	New trans-Pyrenean interconnection between France and Spain	Hernani-Argia (upgrade)	na	na	na	2002	na	-	-	-
2.9	EL3	FR, ES	New trans-Pyrenean interconnection between France and Spain	Cantegrit-Mougerre (220kv)-(Arkale)	na	na	na	2002	na	-	-	-
2.9	EL3	ES, FR	New trans-Pyrenean interconnection between France and Spain	Installation of a 225 kV phase displacement transformer at the Pragneres substation (FR)	na	550 (FR-ES)	na	1998	na	-	100.000	E068/97
2.9	EL3	ES, FR	New trans-Pyrenean interconnection between France and Spain	Pirineo connection substation electricity line; Restructuring of the network around Baixas	na	na	na	1997	na	-	140.000	E027/95
4.3	EL4	EL, FYROM	Meliti* (EL) - Bitola (Former Yugoslav Republic Of Macedonia) line	*The project has substituted the initially scheduled OHL Amyntaio – Bitola	na	18	5 (EL)	2007	na	-	125.000	E059/96
4.7	EL4	HR, BH	Ernestinovo (Croatia) substation and connecting lines	Ernestinovo - Ugljevik	na	na	11	2003	na	-	-	-
4.7	EL4	HR, FRY	Ernestinovo (Croatia) substation and connecting lines	Ernestinovo - Mladost	na	na	11	2003	na	-	-	-
4.8	EL4	EL, AL, BG, FYROM	New connections between Greece and Albania, Bulgaria and the Former Yugoslav Republic of Macedonia	OHL Stip – C. Mogila (FYROM – Bulgaria)	650	na	50	2009	na	-	-	-

4.9	EL4	EL, TR	Philippi (GR) - Hamidabad (TR) line	-	2x1400 1x1200 (EL)	220	70	2008	na	-	195.000 350.000	E106/99 E129/00
2.23	EL7	SE, DK	Reinforcement of the connections between Denmark and Sweden	-	na	na	35	2006	na	-	-	-
2.30	EL7	EE, FI	Submarine cable to link Finland and Estonia (Estlink)	Estlink	350	105	110	2006	na	-	670.000	E095/99
4.14	EL7	FI, RU	Southern Finland - Russia link	Kymi-St.Petersburg II	na	na	300 - 1000	na	na	-	240.000	E055/96
4.15	EL7	SE, NO	New connections between North Sweden and North Norway	Reinforcement of the existing connection and a new transformer was installed in Grundfos, Sweden	na	na	na	2004	na	-	-	-
2.33	EL8	AT, CZ	Dürnrohr (AT) - Slavetice (CZ) line		900	96	9	2008	-	-	-	-
4.12	EL9	ES, MA	Submarine cable between South Spain and Morocco (strengthening of existing connection)	i.a. Estrecho-Melloussa II	na	31	69,2	2006	na	-	637.500 1.127.000	E003/95 E131/01
4.22	EL9	GR, IT	New connections in the Mediterranean Electricity Ring: France – Spain – Morocco – Algeria – Tunisia – Libya – Egypt – near-eastern Countries – Turkey – Greece - Italy	Ipiros-Puglia	na	na	na	2002	100	-	-	E191/04
4.11		NL, NO	Eemshaven (NL) - Feda (NO) link	NorNed cable	na	na	565	2007	na	-	1.500.000 4.215.000 3.000.000	E052/96 E088/98 E198/05
4.29		HU, RO	Békéscsaba (HU) - Oradea (RO)	now Békéscsaba (HU) - Nadab(RO) - Arad(HU) as due to problems with landowners a small part between Nadab and Oradea could not be constructed	na	na	18,5	2008	na	-	435.000 1.580.000	E203/05 E237/07
Construction phase												
2.1	EL1	BE, FR	Moulaine (FR) - Aubange (BE) line	-	400	15	11 (FR)	2010	4	-	503.450	E205/05
2.7	EL2	FR, IT	Further increase of capacity through existing interconnection between France and Italy	-	600	200	102-114	2012	na	-	588.000	E183/04
2.8	EL2	FR, IT	New interconnection between France and Italy	Piossasco (IT) - Cornier (FR)	600	100 (IT)	na	2012	na	-	-	-
2.31	EL2	SI	Installation of flexible alternating current transmission systems linking Italy and Slovenia	Phase Shift Transformer - PST, Divača Substation - 400 kV, 2x600 MVA	2x600	-	52,8	2012	21,5	-	1.054.400	E268/09

2.13	EL3	ES, PT	Connection between southern Portugal and south-western Spain	Portimão (PT) - Tavira (PT) - P. Gusman (ES) - Guillena (ES) line and Tavira facilities (400 kV South interconnection Guillena (ES) - Tavira (PT))	1860	301	90,9	2011	na	50	-	-
2.14	EL3	ES, PT	Valdigem (PT) - Douro Internacional (PT) - Aldeadavila (ES) line and 'Douro Internacional' facilities	400 kV Douro interconnection Aldeadávila (ES) - Lagoaça (PT)	3210	204	88	2010	na	50	1.807.650	E196/05
4.8	EL4	EL, AL, BG, FYROM	New connections between Greece and Albania, Bulgaria and the Former Yugoslav Republic of Macedonia	Zlatitsa-Karlovo-Plovdiv	na	na	15	2010	na	-	-	-
2.15	EL7	FI, SE	Connections north of the Gulf of Bothnia and Fennoscan submarine cable between Finland and Sweden	Fennoscan subsea cable between Finland and Sweden	800	300	300	2011	na	-	75.000 75.000 120.750 475.000	E002/95 E005/95 E114/00 E209/06
3.1	EL7	DK	Connections on the Danish east-west axis: connection between Denmark's western (UCTE) and eastern (NORDEL) networks	Great Belt sea cable from Funen to Sealand	600	26+32	169	2010	na	-	-	-
4.13	EL7	SE, LT, LV	Connections for the Baltic Electricity Ring: Germany - Poland - Russia - Estonia - Latvia - Lithuania - Sweden - Finland - Denmark - Belarus	Interconnection Sweden-Baltic States, and strengthening of the grid in Baltic states (Nordbalt)	700+600	440+380	750	2016	na	175	-	-
4.16	EL7	SE, NO	New connections between Mid Sweden and Mid Norway	-	na	na	66	2010	na	-	54.700	E115/00
4.22	EL9	FR, ES, MA, DZ, TN, LY, EG, TR, EL, IT	New connections in the Mediterranean Electricity Ring: France – Spain – Morocco – Algeria – Tunisia – Libya – Egypt – near-eastern Countries – Turkey – Greece - Italy	-	na	na	55	2009	na	-	-	-
4.31		HU, HR	Pécs (HU) - Ernestinovo (HR)	-	500	86,4	43,6	2010	na	-	2.234.611	E246/08
Partly in construction phase												
4.2	EL4	EL, BG	Philippi (GR) - Maritsa 3 (Bulgaria) line	-	na	na	10+30,3	2012-2015	na	-	450.000 150.000	E060/96 E079/98
2.32	EL8	AT, HU	New connections to link the UCTE and CENTREL systems	Wien - Györ	1100	120	30	2011	na	20	-	-

Table A8: Cross-border projects in the gas sector finalised and under construction

Ref. Annex III 2006	Axis (2006)	Countries involved	Project specification	Sub-section/ routing/ more specific title	Additional capacity (Bcm/y)	Length (km)	Estimated total cost (M€)	(Indicative) In operation date	EIB loan (M€)	EEPR max contribution (M€)	TEN-E grant(s) allocated (€)	Application for TEN-E grant (ref.)
Finalised												
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	GWWL pipe line (Grijpskerk-Workum-Wieringermeer lijn)	na	110	350	2007	na	-	362.825	G108/04
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Bacton (UK) - Balgzand (NL)	8	230	500	2006	na	-	-	-
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Ravenstein - Vinkel (NL-BE)	na	na	na	2003	na	-	-	-
7.22	NG1	DK	Connection between offshore facilities in the North Sea, or from Danish offshore to United Kingdom onshore facilities	-	na	na	na	2004	na	-	-	-
9.19	NG1	DE, CZ, PL	Increasing transport capacity of the STEGAL gas pipeline for transport of additional gas from the Czech-German border and from the Polish-German border through Germany to other Member States	-	na	na	190	2006	na	-	-	-
7.4	NG2	FR, ES	Lussagnet (FR) - Bilbao (ES) pipeline	-	0,5-3	na	25	2005	na	-	911.350	G061/00
9.34	NG2	DZ, TN, IT	Algeria - Tunisia - Italy gas pipeline	TRANSMED II	6,5	160	200	2008	500	-	-	-
9.6	NG2	DZ, ES, FR	New gas pipelines from Algeria to Spain and France and related capacity increase of the internal networks in these countries	Network in Andalucia	na	na	na	2002	na	-	-	-
9.7	NG2	DZ, MA, ES	Increasing transport capacity of the Algeria - Morocco - Spain (up to Córdoba) pipeline		na	na	na	2004	na	-	-	-
9.22	NG3	EL, TR	Greece-Italy interconnection pipeline	Interconnector Turkey-Greece-Italy (ITGI) Branch Greece-Turkey	11	295	82,2 (EL)	2007	na	-	4.330.000	G082/02
8.10	NG4	EL	LNG at Revithoussa (EL), extending existing terminal	1st extension	5,3	-	50	2007	na	-	800.000	G074/01
8.12	NG4	IT	LNG offshore in the north Adriatic Sea (IT)	Rovigo (Porto Levante	8	-	1000	2009	na	-	-	-

				offshore)								
8.17	NG4	BE	LNG at Zeebrugge (BE, second phase of capacity extension)	LNG terminal Zeebrugge/Dudzele extension, Including the doubling of the regasification capacity and a fourth tank	4,5 -> 9	-	na	4/2008	na	-	-	-
8.18	NG4	UK	LNG at Isle of Grain, Kent (UK)	2nd phase of implementation	13,5	-	190 (total £ 1Bn)	2008	na	-	-	-
8.2	NG4	FR	LNG at Fos-sur-mer (FR)	Extension (Fos-Tonkin)	7	-	400	2007	na	-	-	-
8.3	NG4	ES	LNG at Huelva (ES), extending existing terminal	LNG Huelva II	11,8	-	72	2009	na	-	-	-
8.4	NG4	ES	LNG at Cartagena (ES), extending existing terminal	LNG terminal Cartagena I	na	-	na	2002	na	-	-	-
8.4	NG4	ES	LNG at Cartagena (ES), extending existing terminal	LNG terminal Cartagena II	10,5	-	79	2008	na	-	-	-
8.5	NG4	ES	LNG at Galicia (ES), new terminal	Mugardos	3,6	-	416	2008	na	-	-	-
8.6	NG4	ES	LNG at Bilbao (ES), new terminal		7	-	280	2003	na	-	-	-
8.7	NG4	ES	LNG in the Valencia region (ES), new terminal	Sagunto	8-9	-	340	2009	225	-	-	-
8.8	NG4	ES	LNG in Barcelona (ES°, extending existing terminal	-	na	-	72	2005	na	-	-	-
8.9	NG4	PT	LNG in Sines (PT), new terminal	Gas sources= Algeria, Nigeria	5,5	-	na	2004	na	-	934.500	G049/99
9.20	NG6	IT, LY	Gas pipeline from Libyan resources to Italy	Greenstream (Mellitah (LY) - Gela (IT))	8	520	1400	2004	na	-	-	-
9.20	NG6	IT, LY	Gas pipeline from Libyan resources to Italy	Extension of capacity	3	na	na	na	na	-	-	-
6.1		IE, UK	Developing gas network from Belfast towards the north-west region of Northern Ireland (UK) and, if appropriate, to the western coast of Ireland	-	1,7	na	86	2004	na	-	-	-
6.1		IE, UK	Developing gas network from Belfast towards the north-west region of Northern Ireland (UK) and, if appropriate, to the western coast of Ireland	Pipeline to the western coast of Ireland	na	na	383	2002	na	-	-	-
7.1		IE, UK	Additional gas interconnection pipeline between Ireland and Scotland	-	na	na	292	2002	-	-	150.000	G001/95
7.2		IE, UK	North-South interconnection, including Dublin-Belfast pipeline	Gormanstown, Dublin in Republic of Ireland to Antrim in Northern Ireland	1,46	156	108	2006	-	-	250.000 575.000	G033/98 G050/99
7.6		PT, ES	Increasing transport capacity of gas pipelines supplying Portugal through South Spain and Galicia and Asturias through Portugal	-	na	na	na	na	na	-	-	-
9.28		DE	Increasing transport capacity of the TENP gas pipeline running from the Netherlands through Germany to Italy	Pipeline extension and repowering of compression units	na	na	348	2005	na	-	-	-
9.29		FR, CH	Taisnieres (FR) - Oltingue (CH) gas pipeline	-	na	na	na	na	na	-	-	-

9.36		NO, UK	Gas pipeline from Norway to United Kingdom	Nyhamna (NO) – Sleipner (NO) - Easington (UK)	25	1200	2,3	2007	na	-	-	-
Construction phase												
7.17	NG1	DE, NL, UK	Interconnecting pipelines between United Kingdom, the Netherlands and Germany, linking the main sources and markets of North West Europe	Eemstunnel Rysum-Midwolda (part of North-South project Rysum/Oude Statenzijl - Zelzate/'s-Gravenvoeren, NL)	Entry = 31,8 Exit = 12,5	400	1156	2010	500	-	2.819.004 1.587.056	G157/08 (NL) G163/09 (DE)
7.18	NG1	DE, PL	Connections between north-east Germany (Berlin area) and north-west Poland (Szczecin area) with a branch from Schmölln to Lubmin (DE, Greifswald area)	-	3	160	260	2013	0	-	-	-
9.3	NG1	RU, DE	North European gas pipeline: Russia, Baltic Sea, Germany	Onshore section in Russia	na	917	na	na	na	-	-	-
9.13	NG2	ES, DZ, FR	Algeria - Spain submarine pipeline and pipelines for the connection to France	MEDGAS gas pipeline	8	208	630-800	2010	500	-	2.000.000 2.000.000	G115/04 G134/07
8.13	NG4	IT	LNG on the south Adriatic coast (IT)	Brindisi	7,6+ 16	-	500	2010	na	-	-	-
8.15	NG4	IT	LNG on the Tyrrhenian coast (IT)	LNG terminal at Livorno (Toscana offshore)	3,75	-	250	2010	na	-	-	-
8.18	NG4	UK	LNG at Isle of Grain, Kent (UK)	3rd phase of implementation	20,5	-	190 (total £ 1Bn)	2010	na	-	-	-

Table A9: State of implementation of LNG projects as listed in the Annex III of the TEN-E Guidelines

Ref. Annex III 2006	Axis (2006)	Countries in-volved	Project specification	Sub-section/ routing/ more specific title	Addi-tional capacity (MVA; Bcm/y)	Length (km)	Esti-mated total cost (M€)	(Indica-tive) In operation date	EIB loan (M€)	EEPR max contri-bution (M€)	TEN-E grant(s) allocated (€)	Application for TEN-E grant (ref.)
Finalised												
8.10	NG4	EL	LNG at Revithoussa (EL), extending existing terminal	1st extension	5,8	-	50	2007	na	-	800.000	G074/01
8.12	NG4	IT	LNG offshore in the north Adriatic Sea (IT)	Rovigo (Porto Levante offshore)	8	-	1000	2009	na	-	-	-
8.17	NG4	BE	LNG at Zeebrugge (BE, second phase of capacity extension)	LNG terminal Zeebrugge/Dudzele extension, Including the doubling of the regasification capacity and a fourth tank	4,5 -> 9	-	na	2008	na	-	-	-
8.18	NG4	UK	LNG at Isle of Grain, Kent (UK)	2nd phase of implementation	13,5	-	190 (total investment for 3 phases is € 1,1 Bn)	2005	na	-	-	-
8.2	NG4	FR	LNG at Fos-sur-mer (FR)	Extension (Fos-Tonkin)	7	-	400	2007	na	-	-	-
8.3	NG4	ES	LNG at Huelva (ES), extending existing terminal	LNG Huelva II	11,8	-	72	2009	na	-	-	-
8.4	NG4	ES	LNG at Cartagena (ES), extending existing terminal	LNG terminal Cartagena I	na	-	na	2002	na	-	-	-
8.4	NG4	ES	LNG at Cartagena (ES), extending existing terminal	LNG terminal Cartagena II	11,8	-	79	2008	na	-	-	-
8.5	NG4	ES	LNG at Galicia (ES), new terminal	Mugardos	3,6	-	416	2007	na	-	-	-
8.6	NG4	ES	LNG at Bilbao (ES), new terminal		7	-	280	2003	na	-	-	-
8.7	NG4	ES	LNG in the Valencia region (ES), new terminal	Sagunto	8-9	-	340	2009	225	-	-	-
8.8	NG4	ES	LNG in Barcelona (ES), extending existing terminal		17	-	72	2009	na	-	-	-
8.9	NG4	PT	LNG in Sines (PT), new terminal		5,5	-	na	2004	na	-	934.500	G049/99

Construction phase												
8.13	NG4	IT	LNG on the south Adriatic coast (IT)	Brindisi	8 (phase 1) 16 (phase 2)	-	500	2010	na	-	-	-
8.15	NG4	IT	LNG on the Tyrrhenian coast (IT)	LNG terminal at Livorno (Toscana offshore)	3,75	-	250	2010	na	-	-	-
8.18	NG4	UK	LNG at Isle of Grain, Kent (UK)	3rd phase of implementation	20,5	-	na	2010	na	-	-	-
8.2	NG4	FR	LNG at Fos-sur-mer (FR)	LNG Fos-Cavaou	8,25	-	600	2010	na	-	-	-
Authorisation phase												
-	NG4	PL	LNG terminal in Poland	Swinoujscie	5	-	869	2014	-	55	-	-
6.2	NG4	ES	LNG terminal in Santa Cruz de Tenerife, Canary Island (ES)	Tenerife (Arico-Granadilla)	1,3	-	na	2013	na	-	800.000	G109/04
6.3	NG4	ES	LNG in Las Palmas de Gran Canaria (ES)	Gran Canaria (Arinaga)	1,3	-	152	2013	na	-	-	-
8.11	NG4	IT	LNG on the north Adriatic coast (IT)	Trieste zaule	8	-	600	2013	na	-	-	-
8.13	NG4	IT	LNG offshore in the north Adriatic Sea (IT)	Falconara Marritima (Marche region)	4	19,5	158	03/2012	na	-	618.657	G164/09
8.14	NG4	IT	LNG on the Ionian Coast (IT)	Priolo (Siracusa) (Sicily Region)	8+4	2,7	700-800+ 200	12/2015	na	-	500.000	G147/08
8.14	NG4	IT	LNG on the Ionian Coast (IT)	Taranto	8	-	600	na	na	-	-	-
8.14	NG4	IT	LNG on the Ionian Coast (IT)	Rada di Augusta, Siracusa	8	-	na	na	na	-	-	-
8.15	NG4	IT	LNG on the Tyrrhenian coast (IT)	Gioia Tauro / San Ferdinando Rosarno (Calabria) (LNG Medgas)	12	-	924	12/2014	na	-	1.610.000	G143/07
8.15	NG4	IT	LNG on the Tyrrhenian coast (IT)	LNG terminal at Rosignano	8	-	650	2015	na	-	1.372.000	G076/02
8.16	NG4	IT	LNG on the Ligurian Coast (IT)	Panigaglia LNG terminal (Portovenere)	4,5		na	2014	na	-	-	-
8.4	NG4	ES	LNG at Cartagena (ES), extending existing terminal	LNG terminal Cartagena III, extending existing terminal	14,5	-	60	na	na	-	-	-
8.6	NG4	ES	LNG at Bilbao (ES), new terminal	Extension (2 additional tanks)	12,3	-	na	2011	na	-	-	-
Study phase												
6.11	NG4	CY	LNG in the island of Cyprus, Vasilikos Energy Center		0,7-1,5 (gradual increase until 2035)	-	670	2014	na	-	-	-

6.13	NG4	EL	LNG in the island of Crete (EL)		-	-	-	2016	na	-	970.000	G017/96
6.4	NG4	PT	LNG in Madeira (PT)		na	-	80	2014	-	-	-	-
8.1	NG4	FR	LNG at Le Verdon-sur-mer (FR, new terminal) and pipeline to Lussagnet (FR) storage		na	-	400	2013	na	-	-	-
8.10	NG4	EL	LNG at Revithoussa (EL), extending existing terminal	2nd extension (3rd tank - current capacity 5,3 Bcm/y since 2000)	na	-	na	na	na	-	-	-
8.11	NG4	IT	LNG offshore in the north Adriatic Sea (IT)	Trieste offshore	8	-	580	na	na	-	-	-
8.17	NG4	BE	LNG at Zeebrugge (BE, second phase of capacity extension)	Current capacity = 9 Bcm/y	na	-	1000	12/2016	na	-	1.610.350	G160/09
8.2	NG4	FR	LNG at Fos-sur-Mer (FR)	Fos Foster LNG Terminal	6-9	-	na	2013	na	-	-	-

Figure A1: Progress of electricity projects of European interest – EL1, EL5 and EL6

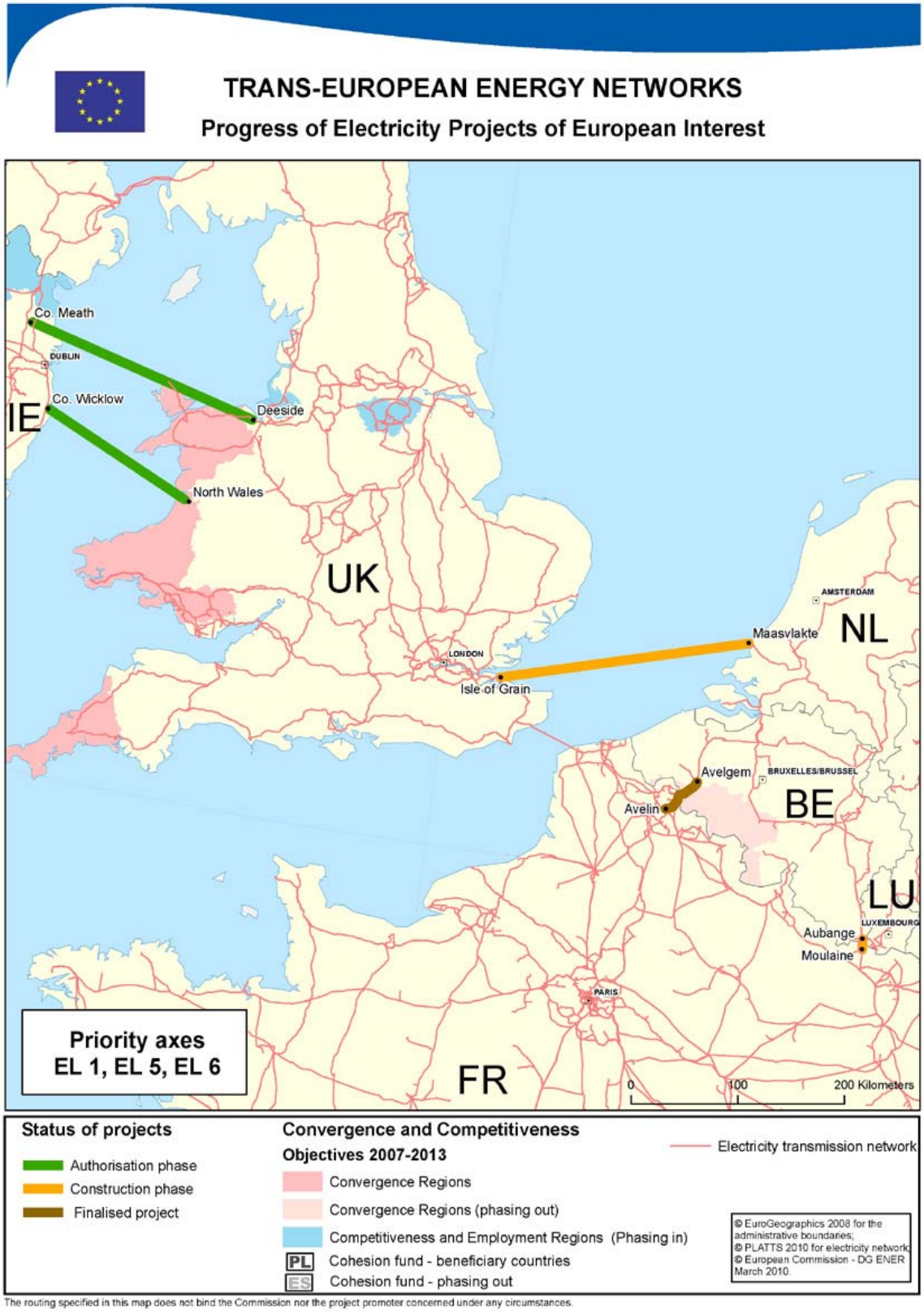

Figure A2: Progress of electricity projects of European interest – EL3 and EL9

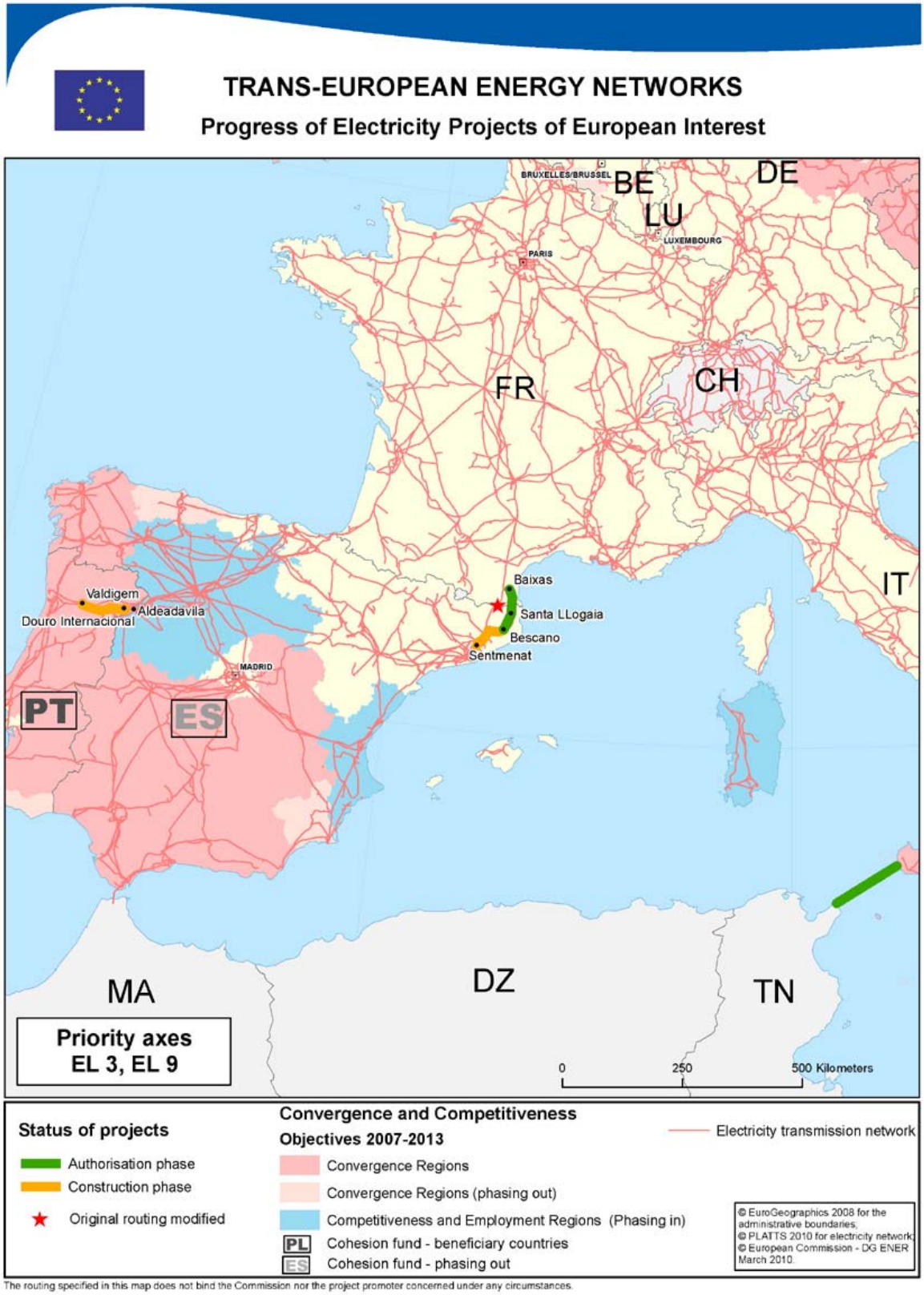

Figure A3: Progress of electricity projects of European interest – EL2, EL4 and EL8 (partly)

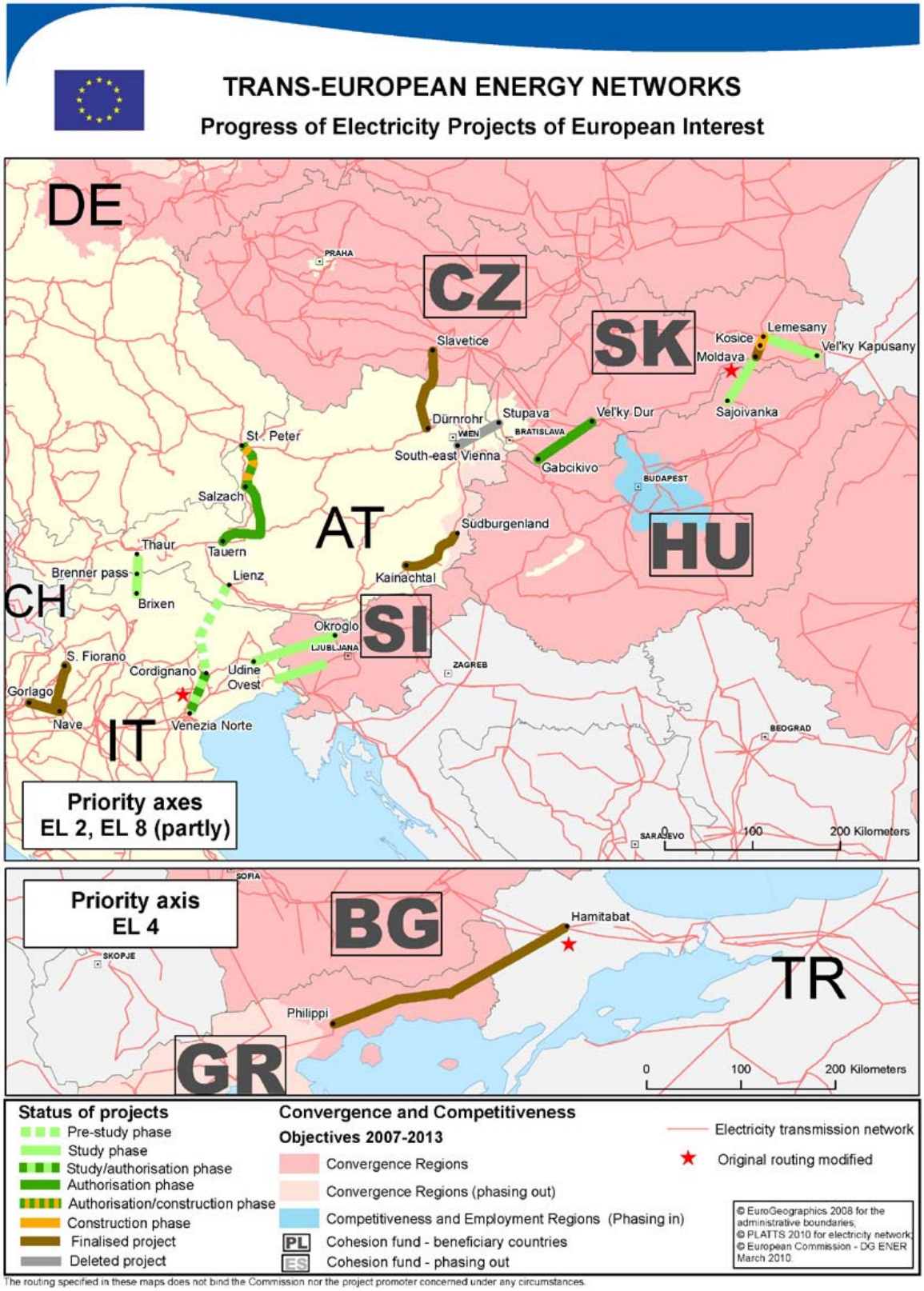

Figure A4: Progress of electricity projects of European interest – EL7 and EL8 (partly)

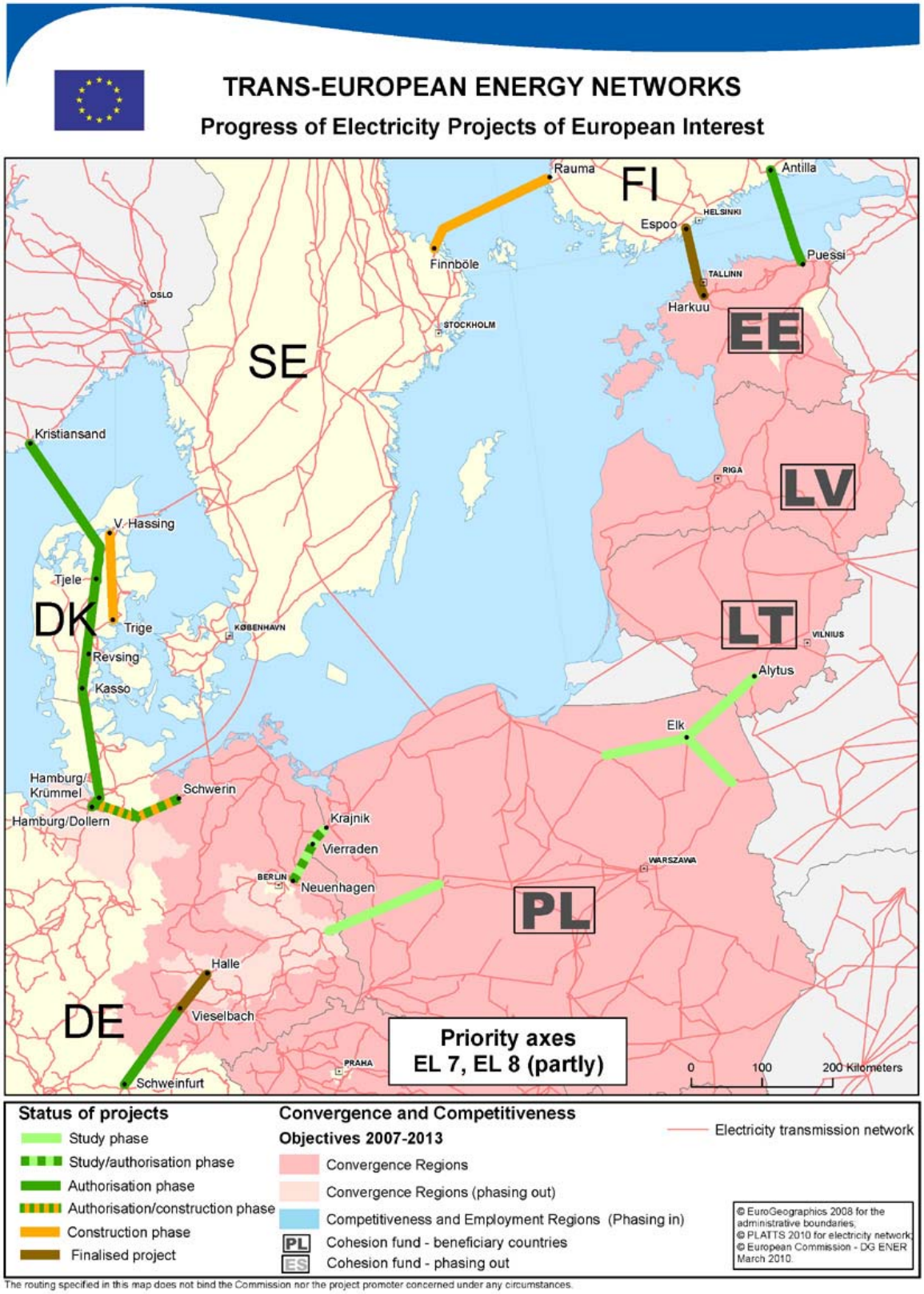

Figure A5: Progress of gas projects of European interest – NG1

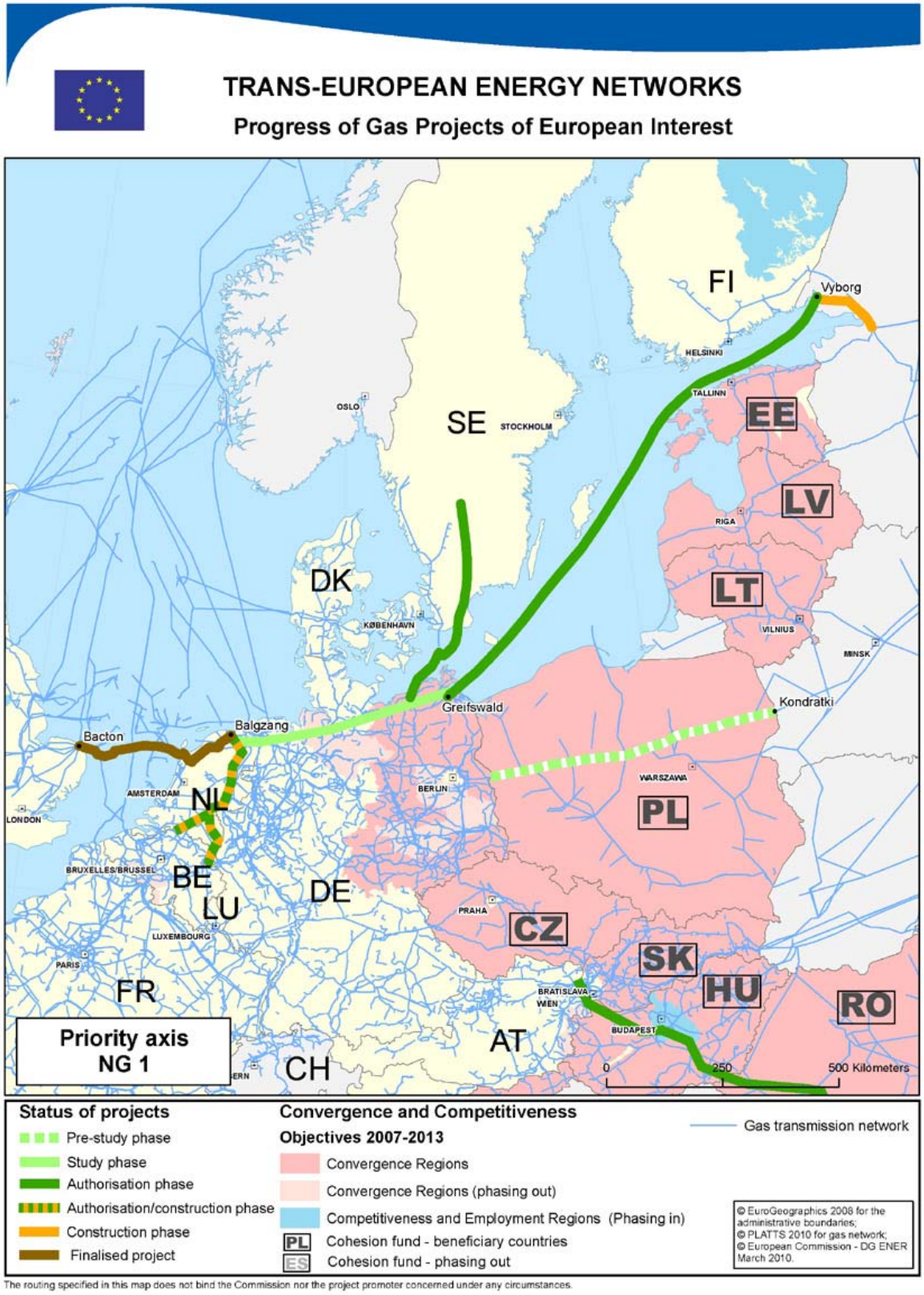

Figure A6: Progress of gas projects of European interest – NG2 and NG6

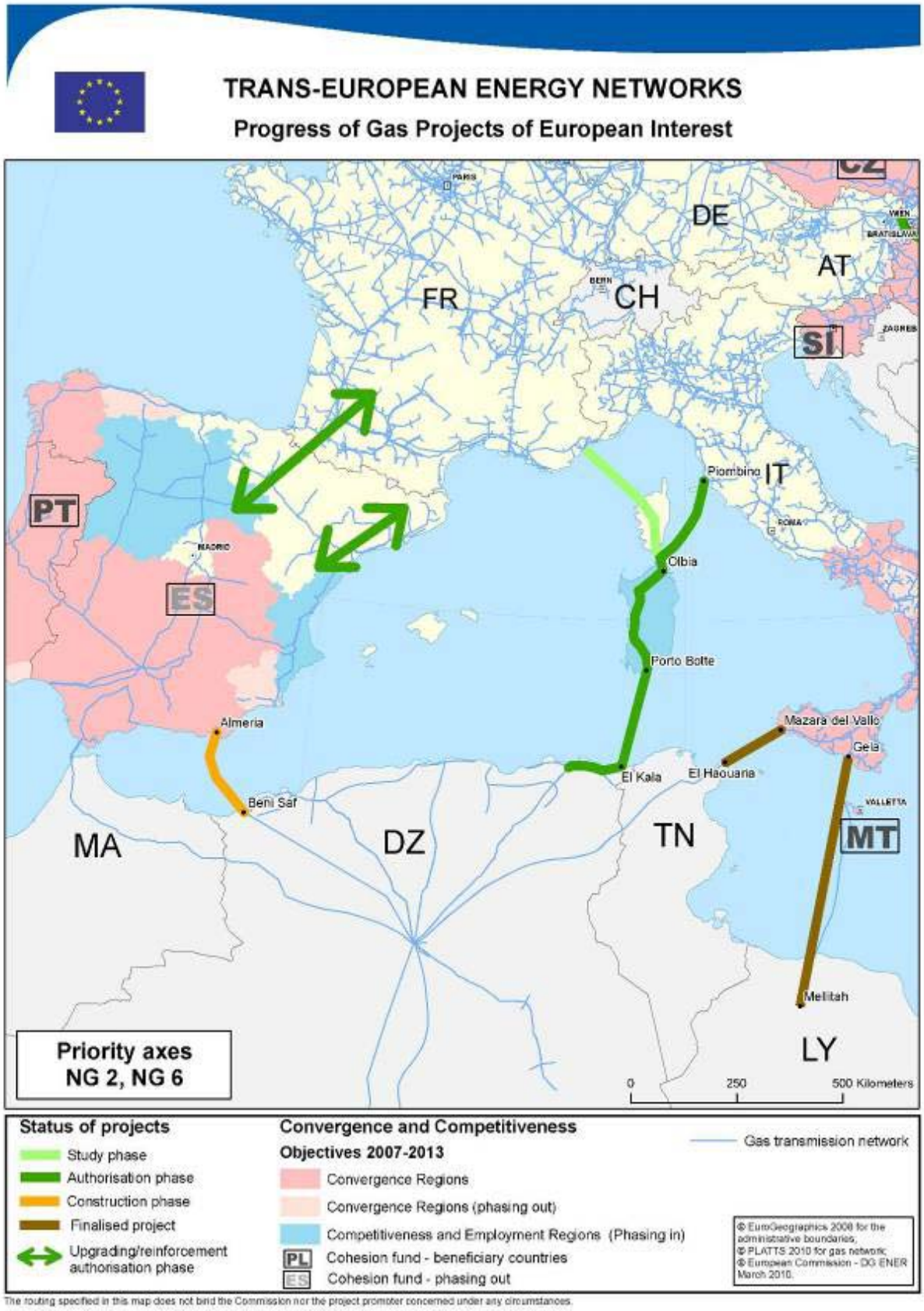
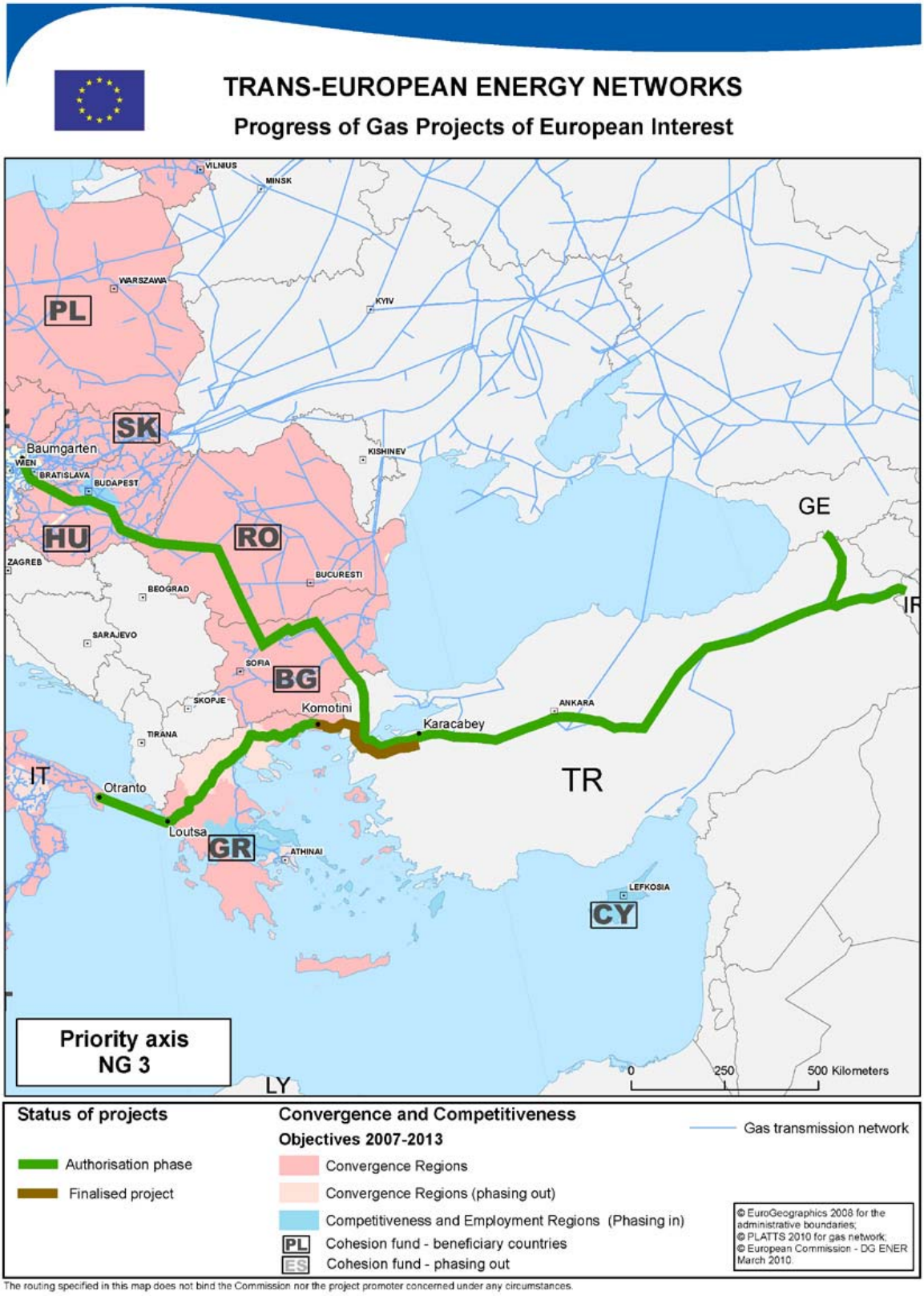
Figure A7: Progress of gas projects of European interest – NG3