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DECISION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

laying down guidelines for trans-European energy networks and repealing Decisions No 96/391/EC and No 1229/2003/EC

Extended Impact Assessment

{COM(2003) 742 final}

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1. GENERAL INTRODUCTION

In the energy-intensive economy the adequate energy supply and distribution are essential for the functioning and well being of society. The demand for energy emerges from all sectors, in particular industry, transport and households. Energy infrastructures are key assets. Infrastructure development and market development are inherently linked. The move towards integration of markets and regional markets in Europe and in neighbouring countries requires linked progress in market development and infrastructure development.

Energy infrastructures tend to have natural monopoly characteristics to some degree. Their use is normally regulated for various reasons, notably fair competition, effective functioning of the market, integrating environmental objectives, as well as operational safety and security. In consequence, the rules for the opening of the electricity and gas internal market have been proposed by the Commission in March 2001 and have been agreed in June 2003 by the European Parliament and the Council. Furthermore, politics set the framework for constructing the appropriate size and quality of the energy infrastructure as well as for stimulating investment. Thereby, it contributes substantially to the realisation of a favourable context regarding investments in energy networks.

On the European level it concerns the interconnections between states, the corresponding priorities for routes and the needed investments.

A. WHAT ISSUE IS THE PROPOSAL EXPECTED TO TACKLE?

1. Introduction

The development of the Trans-European Energy Networks (TEN-E) aims at supporting the EU energy policy objectives: reinforcing security of supply and competitiveness as well as protecting the environment. The effective operation of the internal energy market, providing for the cohesion in the Union and the climate change targets are in the centre of these policies.

Electric energy cannot easily be stored and is, therefore, in contrast to natural gas or crude oil not a primary energy source, but an energy carrier. The electric system throughout Europe is based on a synchronous system, where all elements are tied by electro-magnetic links. Therefore, security of supply in the electricity sector entails both generation adequacy and network adequacy.

2. Need for further action

A new revision of the guidelines is needed to take into account the priorities of **the enlarged European Union,** in particular the competitive operation of the internal energy market and the improvement of the security of energy supply for the 25 Member States. An important target is thus to fully **integrate the new Member States** in these guidelines and lists of projects.

Measures are needed to respond to **structural problems** affecting the development of the electricity markets, notably congestion and lack of interconnection and to facilitate construction of new gas pipelines.

The power cuts and electricity blackouts that occurred in the U.S. and repeatedly in Europe in the year 2003 demonstrate the need to strengthen energy networks in Europe, to balance the supply and demand for electricity and most importantly to provide alternative transit routes so that isolated incidents are less likely to have negative consequences on a larger scale.

2.1. Risks inherent in the initial situation

A high risk is given by uncoordinated or contradictory energy network planning and operation in the Member States or neighbouring countries, which will hinder the integration in the internal market and will have adverse effects on the economy as well as on environment protection and cohesion.

Insufficient integration of new Member States in the energy sector can create obstacles in economic performance.

Without long-term measures (well-developed European energy networks, in combination with sufficient gas and oil stocks), Member States will not be able to carry out joint actions in case of shortages, accidents and (terrorist) threats.

In view of substantial regulatory, technical and financial obstacles to the construction of the energy transmission lines, there is the risk that pessimism predominates in investor decision-making. This is aggravated by the existing lack of electricity generation capacity and similar obstacles to the construction of power generators.

2.2 Time-scales

The completion of new electric power generators and/or electricity transmission capacity, including the planning, authorisation and construction phases, takes at present typically ten years and even longer in case of strong public objections. The completion time for pipeline infrastructure, once the decision for construction has been taken, is in general shorter compared to that needed for electricity infrastructure, since pipeline projects generally raise fewer objections. However, pipelines are very costly investments, thus the preparation of the financial package takes often a long time.

2.3. Security of supply

As highlighted in the Commission's Green Paper on Security of Energy Supply, the European Union faces the challenge of insufficient internal natural gas and crude oil resources in the European Union with the consequence that the external dependence for energy is high and is further increasing. Today, the European Union already imports almost two-thirds of its fossil fuel requirements (oil, gas and coal). These fuels represent 80 % of the European Union's energy consumption. On the basis of present trends, by 2020 this is expected to increase to 90 % of the European Union's oil consumption, and 70 % of gas consumption. The electricity consumption still increases in all member states, highlighting the importance of demand management and energy efficiency. Gas consumption is forecasted to increase even much more rapidly.

The main lessons that have emerged from the debate of security of supply were that there is a strong need for better organisation and co-ordinated use of oil and gas stocks and further, the need for a debate on the future of nuclear energy. In particular, better co-ordination of the use of existing resources would imply for Member States to have a minimum capacity of gas storage and oil security stocks systems better harmonized ensuring their quality and

credibility. It is emphasised that the corresponding action areas have important implications for the network infrastructure.

The decision on nuclear energy is largely made by individual Member States. The increase, continuation or early decommissioning of nuclear power plants has a very important effect on the network infrastructure. Given the anticipated trends in energy consumption and supply, the more intensive use of the existing energy interconnection infrastructure cannot solve alone the above mentioned challenges. Consequently, additional infrastructure and interconnection capacities will be needed in the future. Since not all bottlenecks can be solved by additional transmission capacity, sufficient increment in the generation capacity is essential. In addition, it is necessary making energy efficiency an integral part of the internal market for energy.

It is emphasized that stability and transparency of the legal framework including a well formulated comprehensive regulatory framework for new infrastructure rewarding is a necessary prerequisite for speeding up new infrastructure development to secure reliable operation of the grid.

2.4. Internal market

The amended directives for the Internal Market for Electricity and Gas have been agreed by the Council and the European Parliament in June 2003. To reap the full benefits of the Internal Market, sufficient transmission capacities are needed within and between national energy networks. This is important in order to enhance cross-border competition, to avoid supply interruptions due to transmission limitations and to optimize the use of generation capacity.

A new revision of the guidelines is needed to take into account the priorities of the enlarged European Union**,** the internal energy market for the 25 Member States. A full integration of the new Member States to the Internal energy market is only possible with developing interconnectors. It has to be recognised that until recently the electricity networks were not synchronously connected and only the main feed-in pipelines from Russia crossed the borders between new and present Member States.

The heads of state in Barcelona in March 2002 agreed for electricity the target for Member States of a level of electricity interconnections equivalent to at least 10% of their installed production capacity by 2005.

2.5. Neighbouring countries policy

The Communication from the Commission to the Council and the European Parliament on the Development of Energy Policy for the Enlarged European Union, its Neighbours and Partner Countries (COM (2003) 262 final/2) has highlighted the following areas of action:

- The progressive creation of a real integrated European electricity and gas market.
- The integration of the South-East Europe electricity market.
- The acceleration of the concrete discussions regarding the creation of Euro-Med electricity and gas markets.
- The deepening of the energy dialogue with Russia.

- The close involvement of neighbouring countries and partners in developments regarding the technical harmonisation and interoperability of gas and electricity networks.

- The construction of the new infrastructure.

- The strengthening of the Northern Dimension in energy issues.

- The potential role in some cases of pipeline transport of oil as safer alternative to maritime transport in particular through to environmentally sensitive areas.

With respect to gas, it is forecasted that existing import capacity of 330 bcm will need to be increased by nearly 200 bcm by 2020. In order for these investments to take place, it is vital to ensure that the European Union plays an active role to facilitate and to create a favourable context.

The main suppliers of natural gas are at present Norway, Russia and Northern Africa. In the future the Caspian Sea, the Middle East and the Gulf region will become important gas suppliers, in addition. These sources define the natural transit routes. Neighbouring countries become key partners for the transit of primary energy to the European Union.

At this stage no substantial import of electricity from sources outside the EU25 (e.g. from Russia or Ukraine) is feasible or foreseen. Electric energy is generated mainly within the European Union and is transmitted in and between the Member States through the interconnected electricity grids. The 1999 TACIS study indicated a possible level of 32TWh imports per year if the Russian network would be synchronously connected with the Central European network operated by the Union for Co-ordination of Transmission of Electricity (UCTE). This represents about 1% of the consumption of the enlarged EU. A Working Group has been established by Eurelectric and the Russian electricity operator to further study the issue of how to interconnect the two systems.

Rising public objections to building of overhead high voltage electric transmission lines and substations should stipulate development of, at present more costly, underground lines utilising motorway and train routes including tunnels and, possibly of Gas-Insulated Transmission Lines (GIL).

2.6. Sustainable development

In the Kyoto Protocol, the EU committed itself to reducing its emissions of the six Kyoto gases by 8% below their 1990 level by 2008-2012. In order to comply with the Kyoto Protocol, more stringent measures and policies from Member States are of utmost importance. This includes initiatives to reduce emissions from the power sector and to make optional use of the incentives included in Council Directive 2003/96/EE, restructuring the Community framework for the taxation of energy products and electricity. Emissions trading is a new environmental instrument, which will have a large impact on the energy market. There will be important consequences for the whole sector, since the location of generation and load can change significantly over time placing new challenges to the network development.

The Community has set ambitious targets to increase the share of renewable energies from its current level of 6% of total energy supply to 12% by 2010. In particular, the Directive on electricity from renewable energy sources (RES) is an important measure promoting the use of RES and supporting the electricity market. It leaves flexibility for Member States to select

the instruments to reach the national targets for increasing the share of domestically produced green electricity.

Most of the increase in renewable electricity generation will come from wind and biomass. Especially off-shore wind generation requires important investments in infrastructure, in the network, in the control systems and in the complementary generation units required for balancing the variable power output of the wind generators.

Further, the Green Paper proposes a strategy to reduce energy consumption in Europe, through improved energy efficiency, and to increase the use of renewable energy sources. Improving the trans-European energy networks is a crucial element in the overall strategy for improving the efficiency of Europe's energy systems, increasing security and flexibility of energy supply and transmission networks, and supporting economic and social development across the Union.

3. Technology drivers

Technology development is the ultimate driving force for the long-term energy network development. Different technology options have different consequences regarding the development of energy transmission infrastructure. A key aspect is the centralisation versus decentralisation of the generation and the regional balance between generation and load.

In the current power system, electricity generation takes place predominantly in big units and the power is distributed through the transmission system and the distribution network to the consumers. In the future there will be increasingly more generation in the distribution networks. There are strongly varying views about the development of the share of distributed generation in the future. The penetration of promising distributed generation technologies like micro turbines and fuel-cells will depend strongly on their economic viability.

Wind generated electricity, in particular off-shore wind parks, creates a particular challenge to the network, since the electricity has to be transported to load centres usually located far away. The balancing of the variation of the output of the wind generation is another network challenge.

Future decisions on nuclear and coal policy will have a significant effect on the needs of network infrastructure. Capital intensive nuclear power plants tend to maximise their running time and can sell base load electricity with low marginal costs.. Decisions, especially in France, but also in other present and future Member States, regarding continuation of the nuclear programme will largely define whether these nuclear based exports will continue in the future. It is emphasised that the nuclear option has the prerequisite of finding a solution to the problem of waste management and reinforcing safety. In consequence, the costs related to waste management and decommissioning need to be included in the total costs. Moving increasingly to gas based generation with Combined Cycle Gas Turbines will potentially locate production closer to load. In the European context it is generally cheaper to transport gas than electricity. The fact that the electricity network is often more congested than the gas grid provides thus an incentive to locate the generation into deficit areas in order to avoid congestion charges. Marginal costs of CCGT plants do not normally differ very much between generators, so major long distance exports are less attractive.

4. Safety concerns and environmental protection

Harmonised safety standards at the ports and related import facilities for natural gas need to be set. Neighbouring countries to the European Union play a vital role in the Union's energy policy. Therefore, these countries should progressively adapt such harmonised safety standards, too.

Tools need to be in place for monitoring the production, the need and the optimal flow of gas and electricity. These tools are required for identifying the bottlenecks and missing links, especially cross-border, within the electricity and gas networks.

5. Financing

An estimate has been derived for the investment costs of energy networks along the yet decided and further envisaged Priority Axes for the electricity and natural gas sectors. In total, for the construction of the Trans- European Energy infrastructure considered necessary in the next decade an amount in the range of 28 billion Euro will be needed - 20 billion Euro for investments inside the European Union and 8 billion Euro for investments outside the European Union. These figures are obtained by aggregating data supplied by the operators and estimates.

The construction of new gas pipelines to supply the Community's future needs will necessarily originate from, or will transit, areas where political risk insurance is a precondition for attracting finance. Such insurance can be expensive. The participation of the European Union in such costs, for projects clearly in the European Union's interest, can be a real catalyst and incentive to the development of these networks. It appears, therefore, necessary to focus on such contributions more in the future. This will be possible under the Community financial regulation for TEN projects (EC No 2236/95), which should be exploited to its maximum possibilities or adapted accordingly when needed.

The present level of European Union support under the TEN-E budget line – mainly given for studies in the initial phase – amounts to about 23 Mio. Euro per year. Other substantial contributions to the financing of TEN-Energy projects have come from the European Investment Bank (EIB) in form of loans or from the Structural Funds in form of aid. In this context, it is essential to make adequate use of all Community Support schemes for the implementation of TEN-E priority projects including EIB and Structural Funds.

The proper level of European Union budgetary resources to be dedicated to energy network infrastructure is the subject of a separate debate addressing the New Financial Perspectives for the period 2007-2013.

The financing of power generation capacity is determined by the market. The Community is involved only as far as influencing the rules that apply to the market. In consequence, the major task of the legislator and regulator is to set up a consistent frame that gives investment certainty.

As a rule, the interconnection and energy network projects should get financed by the operators, making use as appropriate of the loan and aid instruments of the Community .

6. Creating a favourable context

6.1. Regulatory Obstacles

The presently observed insufficiency of progressing completion of needed priority projects of energy infrastructure is correlated to regulatory obstacles and technical complexities in standardisation and interoperability. Rising public objections to building of overhead high voltage transmission lines and substations delays construction of infrastructure in the electric sector considerably. The expected time span for the permit process including appeals and for licensing varies between 3 to 15 years. This time span tends to increase as a result of public and political interest in projects. For the same reasons the construction of electricity power plants take usually 5 to 10 years. Similar experience is made in the construction of gas pipelines.

Specific practices of various countries, such as Environmental impact studies, Public consultation meetings, Compensation to landowners, Right of Way, Special solutions i.e. compact designs etc., exhibit considerable interrelated complexities. The actions to be tackled, their status and progress made can be represented only in quite involved logistic-type flow charts of the permit procedure.

In consequence, there is the need to streamline authorisation procedures for cross-border projects of high European interest, when several Member States are involved.

6.2. Initiative for increasing investment

It is observed that there is a lack of investment in energy transmission infrastructure. The reason for the corresponding low expectation on return of investment is given by the regulatory obstacles as well as by the risk assessment for projects involving partners outside the EU. In collaboration with the European Investment Bank (EIB) increased investments in TEN's is an unavoidable component of the overall financing solution.

In consequence, there is the need to accelerate the volume of investments in energy infrastructure, in particular for projects of high European interest and improve the investment climate.

B. WHAT MAIN OBJECTIVE IS THE PROPOSAL EXPECTED TO REACH?

1. Revision of the TEN-E guidelines

The guidelines for TEN-E is the piece of EU legislation which identifies the actions regarding energy transmission infrastructures, e.g. the implementation of projects of common interest, and the conditions for these actions, e.g. the need for projects to display potential economic viability.

The objectives of the European energy policy are to:

- Enhance the security of energy supplies of the European continent,
- Strengthen the Internal Energy Market in the enlarged European Union,
- Support the modernisation of energy systems in our partner countries,

- Increase the share of renewable energies, in particular in electricity generation,

- And facilitate the realisation of major new energy infrastructure projects.

The main reason for the revision of the TEN-E guidelines is the integration of the new Member States in the guidelines. New priority axes together with updating the projects of common interest covering the needs for the electricity and gas interconnectors need to be proposed. It will also provide for increased exchange of electricity with neighbouring countries.

The revision of the guidelines will further identify appropriate actions for developing an adequate gas import infrastructure (supply pipelines from external sources, terminals for receiving liquefied natural gas and facilities for the storage of natural gas) in combination with adequate interconnection capacity.

As a rule, the interconnections and energy network should get financed through the competitive market

2. TEN-E guidelines currently in force

The current TEN-energy policy is based on the following main action lines:

- The European Commission identifies projects subject to Community support together with the Member states and the stakeholders.

- Projects of European interest which fulfil the criteria set out in the guidelines are proposed for the TEN-Energy guidelines and are approved by the Council and the Parliament in the co-decision procedure. Technical changes for the projects are possible through the comitology procedure.

- Companies, with the support of the Member states, submit a request for Community financing for projects, which are in the guidelines.

- The yearly budget of about 23M€ allows funding of 10-20 projects a year, spent mainly for the design and initial study phase.

The TEN-E guidelines contain a list of priority projects, which have a priority for Community funding. The available budget is sufficient to support feasibility studies and various studies at the development phase of the project to the extent of 50% of the costs of such phases. In exceptional cases a small percentage of financing can be granted to the construction phase.

The influence of the TEN-E financing has a relatively minor effect to the overall budget of the project, but can act as an important stimulator at an early and risky stage of the project. The recognition as a project of European interest has also generally positive effects regarding project financing and acceptance by authorities and other parties involved. These indirect effects might be often much more important than the direct financial input.

3. Security of Electricity Supply Directive

The European Union is in the process of creating the largest competitive market for electricity and gas in the world. This integration of energy markets will both lead to greater efficiency and contribute to security of supply. A truly functioning, integrated market requires significant investment both in transmission and generation.

This Directive establishes measures aimed at ensuring the proper functioning of the EU internal market for electricity by safeguarding security of electricity supply and by ensuring an adequate level of interconnection between Member States. It establishes a framework within which Member States shall define general, transparent and non-discriminatory security of supply policies compatible with the requirements of a competitive single EU market for electricity as well as defining a common procedure for decisions to be taken on new interconnectors. It thereby clarifies the general roles and responsibilities of the different market actors and implements specific non-discriminatory procedures to safeguard security of electricity supply.

Concerning network security, Member States, in consultation with their neighbouring jurisdictions, may impose minimum operational standards on transmission system operators. Further, the regulatory authorities in Member States shall set published performance standards for transmission and distribution system operators.

Concerning adequacy of generation, Member States shall take appropriate measures to ensure that adequate generation is available to meet all reasonable demands for electricity.

Concerning interconnector construction, Member States shall make the utmost effort to ensure that key projects within the Axes for Priority Projects laid down in current guidelines in place for trans-European energy networks are rapidly implemented.

C. MAIN POLICY OPTIONS AVAILABLE

1. Introduction

The objectives stated in the previous sections entail the main policy options for community actions that are available. This sets the frame for suitable action at community level with subsequent implications for the infrastructure development and management. The "no policy change" and "free market" options are briefly addressed below, where it turns out that these option should not be pursued in depth. It is noted that corresponding issues, which are considered relevant are included in the option O1.

In this document, four options are considered including minimum action and progressing from balanced co-ordination to a fully regulatory approach:

O1: Minimum co-ordination

O2: Balanced Co-ordination - Continuation of current TEN-E Policy

O3: Increased Co-ordination in Network Development

O4: European Regulatory approach

Consequences of a "no policy change" scenario

Without continuing guidance for further development of the energy networks the situation will get fragmented. The new Member States may get excluded leading to lower level of cohesion. The consequences for regions in social and environmental terms are far reaching. In conclusion, this option appears as being not compatible with the enlargement process of the EU.

Consequences of a "free market" scenario

The envisaged option of an unstructured evolution of the energy networks is in fact quite restricted, since far reaching political decisions have recently been taken concerning the liberalisation of the internal energy market, and measures in the framework of the combat against climate change

2. The main policy options

2.1. O1: Minimum Co-ordination

This option builds on the strength the free market, private industry and freely moving capital taking into account environmental legislation and the adoption of the 'acquis' in the enlarged Union. The TEN-E guidelines in force are applied only to the necessary extend. It is imagined that a completely liberalised market with competition, profit optimisation and acceptance by customers as the main driving forces will generate the funds for building the major gas and electricity interconnections with desired quality and safety.

2.2. O2: Balanced Co-ordination - Continuation of current TEN-E Policy

The current TEN-energy policy is based on the following main action lines as **described** in detail in section '2. TEN-E guidelines currently in force'.

2.3. O3: Increased Co-ordination in Network Development

The arguments described in detail in the chapter "Need for further action" call for more concrete common actions in the network development. Increased co-ordination should provide the driving forces for optimising the use of existing networks and stipulating new investments. In addition, it is the appropriate instrument for linking strongly the objectives of the security of supply directive with the axes for priority projects in the TEN-E guidelines.

In this "Increased co-ordination" option a small part of the TEN-Energy funds would be used for network planning, in form of studies covering the entire European network as well as regional parts of it. The aim is to develop a European-wide plan for energy networks. The need for European-wide plans arises from the objective to creating truly integrated electricity and gas markets where a national perspective is not enough to plan and justify network investments. A co-ordinated approach is also necessary for the gas supply pipelines in order to avoid over- investment or under-investment.

Integration of renewables to the networks will also be increasingly a pan-European issue, as large off-shore wind production is connected to the transmission grid. In addition, measures for making energy efficiency an integral part of the internal market for energy rely on optimising the actual flow of energy to the end users. This option would take full benefit of existing network organisations like the Union for Co-ordination of Transmission of Electricity and / or for Gas Transmission in Europe, it would add a co-ordination element in the network planning to make sure that European interests are fully considered in the network planning.

Furthermore, this "Increased Co-ordination" allows tackling problems that affect the full implementation of the TEN-E Policy and the effective realisation of the TEN-E Financed Projects more efficiently. At present, a lack of action exists for creating a real link between the TEN-E Guidelines and the effective procedures for the implementation and the realisation of the projects. Consequently, the success of the EU Guidelines for the development of

transmission lines could be evaluated through the degree of effective realization of those projects – particularly cross border interconnections - listed in the TEN-E Guidelines.

2.4. 4: European Regulatory approach

Increasingly integrated and global energy markets in conjunction with the disappearance of the national borders regarding the networks might call for a stronger European regulatory approach for network investments. The envisaged long-term objective of the 'hydrogen economy' will make possible a vast redistribution of power, with far reaching consequences for society. Today's centralised, top-down flow of energy, controlled by global oil companies could become obsolete.

The gradual transition from the present energy mix to increased use of renewable sources thereby preserving the compatibility of industry is a difficult route. It is envisaged that the corresponding transition from centralised power generation to distributed generation requires increased regulatory measures and sensible tarification. The role of the Community in monitoring and administering the regulations concerning CO2 emission targets and use of renewable energies will increase. Related revenues in form of energy taxes or transmission fees could be used for needed constructions in transmission capacities and new grid structures. Furthermore, there is the scenario of replacing imports of gas and oil by renewable energy sources and appropriate energy savings. In this context, financial or fiscal incentives are needed throughout the Union. The Council has recently adopted Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity (Council Directive 2003/96/EC of 27 October 2003 – Official Journal L 283, 31/10/2003 P. 0051-0070) providing fiscal incentives for promoting the use of environmentally friendly energy products and electricity. In addition, considerably stricter limits to acceptable levels of pollution are set, in conjunction with measures for reaching a sufficiently large component of renewable energy in the energy mix. Further, adequate savings are imposed by legislation, taxation and tariffs – in consequence leading to a more strongly regulated energy market.

The "European Regulatory Approach" can influence the economic viability of new technologies such as the 'hydrogen economy' by lowering costs during the transition period in favour of sufficient market penetration. The acceptance of new technologies by the market as well as by customers is a prerequisite for success.

D. WHAT ARE THE IMPACTS – POSITIVE AND NEGATIVE – EXPECTED FROM THE DIFFERENT OPTIONS IDENTIFIED?

The likely positive and negative impacts of the selected options, particularly in terms of economic, social and environmental consequences are addressed. The issues of security of supply and construction of new infrastructure are of crucial importance and, therefore, included explicitly.

The scope of impacts to be assessed comprises:

1. Security of supply

The import of natural gas with increasing volume is facilitated by means of new and upgraded pipelines and LNG terminals. Private enterprise is seen as capable of organising and financing major supply routes from neighbouring countries and inside the Union. The projected major lines are expected to get financed through the market and, eventually by the consumer. The

option of balanced co-ordination, increased co-ordination and the regulatory approach should perform equally well.

Concerning regional cohesion the minimum co-ordination approach (in the context of liberalised markets) will exhibit the weakest performance, since not all regions will display similar profitability. Thus, the different co-ordinated approaches will be more successful.

Concerning electricity generation adequacy, the market based on economic expectations will decide about construction. Since the investments in generation and transmission have to complement each other on the regional, but also increasingly on the European scale, a significant amount of co-ordination is required.

Concerning the electricity transmission network, it has been stated already that the present level of co-ordination is not sufficient for constructing an adequate amount of new interconnections. Building interconnections is not the only way to resolving congestion; the construction of new generating plants in areas of high demand constitutes often a cost-effective alternative. Balancing the corresponding construction of power generation and grid extension, an increased level of co-ordination is asked for. The minimum co-ordination as well as the regulatory approach is not appropriate.

This discussion reveals that the option building on the strength of the liberalised market has its merits. Therefore, the positive features should be adopted by the other options to the right extent when appropriate. In addition, there is a need for quick and consistent decision making within a framework where both Member States and other stakeholders take part.

2. Environmental Impact

As specified in the EC Treaty, guidelines for the development of Trans-European networks are drawn at the Community level, while measures for implementing individual projects are decided at the Member State level. Any project has to fulfil the environment standards of the region where they become operational and, in addition, European-wide set standards.

According to Council Directive 92/43/EEC of 21 May 1992 (Official Journal L 206, p.7) a coherent European ecological network -the **NATURA 2000 network**- shall be established, including flora-fauna-habitats and bird protected areas regulated in Directive 79/409/EEC. Although the whole NATURA 2000 network will be finalised in 2005, the corresponding restrictions are respected already today when lists are available.

The overwhelming balance of scientific research results shows no evidence of long-term health effects from exposure to power-frequency of electromagnetic fields (EMF).

Short-term environmental damage during the construction phase is expected to be offset by environmental benefit of a more efficient pan-European energy infrastructure network. The increased use of natural gas that is replacing in many Member States the use of other, more carbon intensive fossils leads to a significant reduction of CO2 emission. In conjunction with cogeneration the efficiency is increased substantially. Eurogas made a recent study on the effects of increased natural gas utilisation on the reduction of CO2 emissions. It has established that a 1% increase in the share of natural gas replacing more polluting fossil fuels in European Union primary energy consumption between 2000 and 2010 could result in more than a 2% reduction in total CO2 emissions.

The long-term negative effects on the environment are expected to be very small; some debate is ongoing with regard to High-Voltage electricity overhead lines. The visual impact of electricity lines, in particular high masts, on the land scale is sometimes of great concern to the inhabitants of the region. This indicates the need for a serious debate between all stakeholders leading to an accepted "optimum solution". In some cases this acceptable solution will require higher costs, for example when alternate routes are chosen or underground cables are used in very sensitive parts of the route.

To be successful, the construction of new transmission projects requires the full support not only of all market participants but also of governmental and local authorities. Eventually, a European panel of co-ordination is called for.

CO2 Emission Reduction

2.1 Energy Mix

About one quarter of Europe's primary energy consumption is based on natural gas. All recent indicators reflect that its use is set to grow to an estimated gas demand outlook of nearly 500 millions tons oil equivalent [MTOE] in 2020, compared to the current 350 MTOE in the current 15 Member States. In EU25, the consumption of natural gas could reach some 630 MTOE by 2030.

In consequence, there will be an increased percentage of natural gas in Europe in the energy mix of the European Union. The corresponding gas import capacities (70 BCM of additional gas import capacity until 2013) are taken into account in the Trans European energy networks.

According to the Report entitled 'European Energy and Transport – Trends to 2030' (European Commission January 2003), renewables, especially wind, are the fastest growing energy source. The EU has a target of reaching 12% renewable energy in 2010. Still, efforts need to be stepped up to reach that target.

Natural gas, since it contains more hydrogen in relation to its carbon content than other fossil fuels for the same amount of energy produced generates less CO2 emissions. Based on the chemical composition of natural gas, the CO2 produced by gas consumption is 25-30% lower than petroleum products and 40%-50% lower than coal. Other physical qualities of gas which guarantee its environmental friendly characteristics are widely recognised. Producing very low particulate matter and SO2 and less NOx generally than other fossil fuels on combustion, natural gas is well placed to contribute to air quality and climate change objectives. The physical qualities of gas bring additional advantages. The absence of solid residues and the nature of the combustion process have enabled the design of highly efficient gas fuelled appliances and plant, so reducing emissions further.

Over the last 3 years' period the natural gas demand in Western Europe increased by more than 6%. The continuous increase of gas users in all sectors confirms the environmental and economic benefits of natural gas, which remains the preferred fuel in the energy market. An important factor is the reported firm increase in gas consumption for power generation in many countries, both by electricity companies and by industrial users for auto-production of electricity.

Let us assume now that this 6% increase has substituted the use of coal and oil. For the same amount of energy supplied, natural gas generates less CO2 than other fossil fuels. Whereas

lignite produces 101 kg CO2 per Giga Joule of energy, natural gas produces 56 Kg CO2 per Giga Joule. In relative figures, natural gas produces 41 % less CO2 than hard coal, 28 % less CO2 than heavy fuel oil (HFO) and 24 % less CO2 than heating oil.

In total the above mentioned substitution has lead to a reduction of about 33.6 MT CO2 emissions in the reported 3 year period relative to a situation where this energy increase would come from coal and oil.

2.2. Increased Efficiency

Compared with conventional power stations, gas fired power stations and CHP plants are much more efficient and in addition offer very economically attractive means to construct and then to operate than centralised power stations. Combined cycle gas turbine stations (CCGT) technology allows part of the waste heat from the initial gas turbine electricity production cycle to be used for the production of additional electricity in a steam turbine cycle. Based on the lower heating value of the fuel, efficiencies can be increased from 38% of a conventional power station to approaching 60 %. Combined Heat and Power (CHP) technology, in which most of the waste heat is recovered from the electricity generation process driven by gas engine or turbine and used to produce steam or hot water for heating/cooling or for direct use in industry, can achieve even higher overall efficiency rates, especially by smaller decentralised systems. Gas CHP attracts innovative approaches, e.g. in combination with decompression stations.

In conclusion, natural gas makes a positive and important contribution to sustainable development.

2.3 Renewables

In the EU-15 by end of 2002 the installed wind power capacities have reached 23.000 MW. The countries that have installed the largest part are Germany with 12.000 MW, respectively Spain with 4.830 MW and Denmark with 2.880 MW. As wind power is a fluctuating source the actual amount delivered is considerably smaller, typically in the order of 20 %.

In Germany, 8.750 MW were installed at the end of 2001 corresponding to 7.5% of the total installed power. This has produced 10.5 TWh or 1.8% of the German electricity production. This is presented in the report by EON Energie in the paper of 23.07.2002 entitled “Kosten der Windenergienutzung in Deutschland“.

When the wind generated power increases – typically beyond 10% of the total installed power – additional generators will be required for network stability. This is in particular relevant for off-shore wind parks that have the potential for supplying substantial power.

Concerning the transmission infrastructure, the TEN-E guidelines are concerned with wind parks where the power needs to be transported on the high-voltage grid to the load centres in some distance.

The TEN-E guidelines take into account the additional lines required by off-shore generation when the TSO’s or the Member States authorities have proposed it.

3. Social and Economic Impact

In our context, the following types of social impacts deserve special attention:

- Volume and quality of employment;
- Social protection;
- Equal treatment and the protection of citizen rights;
- Cohesion;
- Lisbon Strategy.

At the Lisbon European Council (March 2000), the European Union set itself a new strategic goal for the next decade: *to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion*. The strategy was designed to enable the Union to regain the conditions for full employment and to strengthen cohesion by 2010.

It is difficult to quantify the relation between infrastructure and economic growth. Since the first oil crisis in the 1970's, economic growth has not been directly linked with growth in energy demand in the industrial sector, whereas in the transport sector increased mobility still leads to proportionate increase in energy consumption.

Electricity is the most important energy source in the European Union. The electricity industry is one of the biggest sectors of the economy in Europe, with production of some 2500 terawatt-hours per year and annual turnover totalling around EUR 150 billion.

Estimates exist for the question of the extent of economic damages that result from an electricity breakdown, i.e. the relation between insufficient infrastructure and economic losses. Estimates made for Germany range between 100 and 500 Mio. Euro. This indicates that on the EU level yearly economic losses can occur in the order of a Billion Euro. This figure is low compared to the damages that were caused by the energy crisis in California in 2000-2001. Rolling electric power blackouts that culminate in 20 hours of electricity outage have significant adverse implications for growth of the state economy and result in lost jobs. A study released May 9 (2001) by the California Alliance for Energy & Economic Stability reveals that electricity blackouts in summer 2001 would conservatively cost California businesses $21.8 billion in lost productivity, reduce household income by another $4.6 billion and take jobs away from 135,000 Californians. These experiences in the highly regulated US energy industry indicate that the regulatory approaches applied alone cannot adequately cope with growing demand or with the need to replace installations.

The recent electricity blackout of 14 August 2003 in the North-east of the US (with an estimate of $ 6 billion for related damage) has underlined the danger given by an obsolete generation and distribution electricity system that is overloaded beyond its capacity limits.

One major conclusion for Europe should be to ensure the availability of sufficient surplus capacity at any time.

This recent minor and major blackouts have raised the awareness for the reliability of the electric infrastructure and the size of economic damage caused by failures. This fact has stipulated several evaluations at regional and national level of economic damages caused by breakdowns. However, as confirmed by the feedback from TSO's there was not published recently any consolidated quantitative usable information about evaluation of non-delivered MWh.

But, it is emphasised by the available qualitative information that one non-delivered MWh is many times more "costly" (direct and non-direct losses on the side of customers) than timely investment in the infrastructure.

3.1 Relation between Energy Infrastructure and Employment.

Good energy infrastructure, in the geographical sense, is of special importance for social issues including employment. Infrastructure development and market development are inherently linked. Energy infrastructures, their organisation and operation, can be understood as fixed assets, which underpin the provision of energy services to the population, to business, SME's and bigger industries and support economic growth. Important factors are the relationship between GDP growth and employment growth and the link between quality in work and productivity.

Short to medium term job creation is expected as construction of projects get under way, particularly in accession countries.

The process of opening the markets should take into account employment prospects in the industry. A comprehensive assessment must cover not only the restructuring or even job losses in the sector itself but also the positive effects on economy and employment as a result of greater competitiveness and lower costs, particularly in energy-expensive industries. The key question is whether this job creation is sustainable and, more important whether high-tech jobs are generated.

Indicators of energy infrastructure might be developed for qualitative and quantitative modelling the link between the standard of energy infrastructure and economic performance in terms of GDP, employment, productivity, quality of jobs and environmental impacts. These indicators, comprising for example the total length of transmission line, total cross-border capacity, exports, imports, the general levelling of electricity prices all over the European market, etc, could be employed to highlight specific aspects of such a complex matter. The link between these values and economic performance in terms of GDP, employment etc. could be interesting. However, the feedback obtained from TSO's clearly indicates that this is an extremely complex topic, where it is important to refrain from simplified analysis in order to avoid misunderstandings and confusions.

3.2. Relation between Future Energy technology and economy

The future of the coal and nuclear options will rely strongly on technical progress concerning sequestration of CO2, respectively nuclear waste management. This requires significant efforts in research and development. The transition from the present energy mix to renewable sources, like bio energy, wind and intensive use of solar energy, as well as distributed power generation and distribution, will depend strongly on the technological strength of Europe. Concerning the electric grid, progress in new transmissions could be made when more expensive technologies, like underground cables, Gas-Insulated Transmission Lines or HVDC transmission were utilised in modular form when advantageous. This requires strong co-ordination of technical and authorisation issues as well as of financial feasibility. Remote generation, like off-shore wind parks, relies on substantial grid extension. Of great value would be a direct connection to storage facilities. Hydrogen can contribute to storage and distribution and allows for application of novel technologies like fuel cells. The coupling to a second renewable source would create a win-win situation. The corresponding development will again require a high level of co-ordination, definitely on European level.

The envisaged actions for improving the functioning of the interconnected gas and electricity networks within the internal market and, in particular, adapting the methods of forecasting and operating, and equally the actions for improving the functioning, the safety and the environmental protection of the oil transportation system, will depend again strongly on technological progress and co-ordination.

In conclusion, the realisation of adequate energy infrastructure will depend on RTD support and the interrelation between the two sectors. However, the forecast of necessary financial inputs for setting off these new technologies in a sustainable manner is risky. Again it is questioned whether a qualitative and quantitative modelling can deliver sufficiently unambiguous results.

3.3. Initiative for Growth

The European Council last October (Presidency Conclusions, European Council, 16-17 October 2003, SN 300/03) called on Member States to maintain sound macroeconomic policies, accelerate structural reforms and promote investment in networks and knowledge. It highlighted the importance of speeding up the roll out of European transport, energy and electronic communication networks and of increasing investment in human capital. These are crucial steps to boost growth, better integrate an enlarged Europe and improve the productivity and competitiveness of European businesses on global markets. The European Initiative for Growth responds to that call.

This Initiative seeks to mobilise investment in areas that will reinforce on-going structural reforms, stimulate growth and create jobs. Energy and transport links are needed to bind together an enlarged internal market and to promote greater geographical and social cohesion. Broadband communications can provide a physical backbone for bringing the knowledge economy to every part of the Union. Boosting our ability to generate and use knowledge – be it through science, skills or people - is the key to ensuring that European businesses can continue to innovate and compete and that our citizens can participate more fully in society.

The projects that are of European interest as defined in the revised Ten-E guidelines, in particular the projects on priority axes, come to play. In the 'Quick Start' Programme a specific set of projects has been singled out for immediate actions under this umbrella with an envisaged budget in the order of EURO 10 billion.

4. Completion of needed infrastructure

There are major concerns caused by the obstacles to the construction of new energy transmission and the corresponding lack of investments. Cost efficiency and the regulatory regime are regarded as the essential factors determining profitability in the transmission and distribution business. With respect to regulation, the length of the regulatory cycle is essential for the profitability of the transmission and distribution sector. The quest for increasing energy efficiency and modernising power plants entails the corresponding construction of appropriate generation. But the power generation sector faces similar obstacles.

For certain major cross-border projects on the identified priority axes, it should be feasible to install a single level of co-ordination dealing with all issues in the countries involved simultaneously. As a complementary measure, all existing as well as new financing instruments, including those of the EU, the EIB and EBRD should be co-ordinated accordingly and co-operation between these institutions should be strengthened. The developments of the markets has shown that a bad regulatory framework can quickly erode

the industry's potential and attention should be given to the quality of regulation notably with respect to simplicity, transparency and investor-friendly legislation. There are strongly varying views to what extend the energy industry can secure adequate energy supply and also, on the other side, strong concerns are expressed about the potential extend of centralist planning that is feared to produce overly bureaucratic burdens.

The feedback from stakeholders gives the Commission a clear mandate for creating a real link between the TEN guidelines and the effective procedures for the implementation and the realisation of the projects. This includes establishing an adequate dialogue with the Member States and TSO's and stakeholders for defining the projects high "European significance". Furthermore, it implies a certain co-ordination of the authorisation of the authorisation process.

The full liberalisation of the market is the dominant pre-requisite for efficient use of existing and development of new infrastructure. Therefore, the focus should be on using the signals emerging from trade as an indicator to highlight the need for new investment. It has been observed that only by modelling demand and supply within the existing infrastructure network, the needs for new infrastructure will be correctly identified. This can be well achieved within the frame of establishing a European consolidated plan for energy networks.

5. Quantitative Analysis

Some quantitative estimates are introduced for the discussion of the importance of the envisaged revision of the TEN-E guidelines. These estimates comprise the relations to the GDP, the security of energy supply and the energy internal market.

5.1 Relation to GDP

In the present global economy, innovation and effective development are keys to success in the market place. This is reflected in the efforts to create a European Research Area to facilitate Research & Development and, in the expressed intention at the meeting of The European Council in Barcelona on 15-16 March 2002 to raise to 3% by 2010 the proportion of GDP devoted to R&D. This is a substantial increase for most Member States but acknowledges that to catch up and compete with the United States, the proportion of GDP devoted to R&D should be higher than that in the USA (currently 2.9%). The human capital deployed in the creation of new products, services and facilities emerges as a crucial element in this economic strategy.

The energy sector corresponds roughly to 3 to 4 % of the GDP. In terms of Gross Value added the energy branch accounted in year 2000 for EURO 265 billion, which corresponded to 3.3 % of the total. This fraction will remain in the same range for the next decade. This underlines the fact that small fractions in energy efficiency improvements correspond actually to large sums, which can be made available for adequate investment in the energy sector.

These figures underline that both R&D and energy sectors play a crucial role for the competitiveness of Europe in the global markets and are addressed, therefore, both in the 'Initiative for Growth'.

The investment envisaged for major TEN-Energy projects (around EURO 3 billion per year) is small in comparison to the Gross Value added in the energy branch (1.1 %), but will have significant impacts on security of supply and on the internal market.

5.2 Relation to Security of Supply

Short Term

The 'Quick Start Programme' addresses interconnections that can be built relatively quickly, i.e. within five years. The financial volume for gas and electricity infrastructure concerned is close to EURO 10 billion, out of which close to 80 % will be spent on gas networks and 20 % on electricity networks.

The short term investment needs for electricity interconnections are thus in the area of EURO 2000 million. This amount of investments considered urgent is on the same level as the damage that is inflicted by a single large 'electricity blackout'. The transmission capacity will be increased by up to 12.800 MW. This additional transmission capacity corresponds to 2.3 % of the total generation capacity in the UCTE system. In relation to the UCTE cross-border load flows of 25.747 MW reported for 18 December 2002 at 11 hours, the additional transmission capacity can contribute up to 50 % of the present total cross-border load flow in the UCTE system. These percentages confirm that the programme can influence the operation of the electricity internal market and the security of electricity supply in the coming years.

Concerning gas transport the investments proposed can increase the import capacity by about 28 bcm. This corresponds to about 10 % of today's' import capacity and 5 % of today's' gas consumption. This estimate confirms that the programme can influence the operation of the gas internal market and the security of gas supply in the coming years, in particular as gas consumption is expected to continue to increase and the gap between demand of natural gas and indigenous production will grow strongly after the year 2005.

Medium Term

The Table presented in the Annex gives the overall amount of EURO 28 billion for the envisaged investment along the Priority axes of TEN-E for the period up to 2013, i.e. for the coming 10 years,.

For electricity transmission, the increase in capacity is 23.000 MW, which corresponds to 5 % of the total generation capacity in the UCTE system. Further, the additional installed capacity can contribute to about 20 % of the actual UCTE cross-border energy flow (here related to the yearly average in terms of GWh). Within 10 years the demand of electricity is expected to grow by 10 to 20 % (depending on the overall energy scenario). In the same period some outdated transmission and generation capacities will need to be replaced. Thus, significant transmission and generation capacity has to be installed.

For the gas sector the investment till 2013 will entail an increase in capacity of 70 bcm per year. This capacity increase may be sufficient to cope with demand.

In consequence, a realist figure of around EURO 30 billion can be expected to be invested in the next ten years in the main trans- European electricity interconnections and gas networks.

However, this does not represent all investments envisaged for energy networks and a further EURO 30 Billion need to be invested in the remaining electricity and gas networks (those having an impact mainly at the level of the regions) with the related improvement of the security of supply at the level of the regions.

5.3 Relation to the Internal Energy Market

In the following analysis the assumption is made that there is a certain probability of an interruption in supply affecting 10% of the EU population (around 35 million) and businesses for a period of 24 hours. Using the above data recorded for the California experience, such an incident might be expected, as a conservative assessment, to have a negative impact of approximately €10 billion. A second assumption is that the policies proposed might reduce the likelihood of such an event from a "once in five years" event to a "once in ten years" event. This implies an annual saving of **€1 billion** (or 0.01% of EU25 GDP in each year).

In a second step we discuss possible economic effects related to improved interconnection.

Economic Impact: Benefits of greater competition

The effect of a higher level of transmission connection on competition will have two main beneficial effects. The first will be the immediate possibility to reduce prices in the high price regions of the European Community as far as electricity is concerned. The table below illustrates the scope for this.

Table 1 Recent Wholesale Electricity Price Data.

Month in 2003 **price €/MWh**	**OMEL (Spain)**	**EEX (Germany)**	**Nordpool (DK, FI, S, NO)**
August	**46**	**31**	**33**
September	**45**	**30**	**32**
October	**42**	**34**	**35**

Generally speaking, electricity prices in "northern Europe", including both France and the UK are currently in the range €30-35/MWh. Prices in Spain are more like €45/MWh with those in Italy reaching the equivalent of €50-55/MWh. Increased interconnection will allow for the reduction of such price differences and the associated benefits to customers.

Similarly, as a longer term effect, the increase in cross border transmission of electricity will also allow for more competition in the end-user supply market. This will have the effect of driving down customer service costs and reducing the retail supply margin. Currently, this margin can be around 20% of a typical domestic customer's bills of around €100/MWh.

Thus, we can make the assumption that increased transmission interconnection will improve the scope for competition in such a way that prices are reduced by around €3/MWh in the low cost countries and around €10/MWh in the higher cost countries. This might imply an average benefit of €5/MWh or around 5% of total electricity bills. With the estimate that electricity supply is around 1% of the GDP of the European economy, this overall benefit would be 0.05% of GDP in every year or **€5 billion.**

Economic Impact: Benefits of increased interconnection

German electricity prices fell by 25% in 2001, with industrial electricity consumers profiting the most, but are still amongst the highest in Western Europe, consulting company Cap Gemini Ernst & Young said in a study. The high level of prices is caused by the eco tax and the high prices electricity grid owners are legally obliged to pay to the producers of alternative energy, the study said. In Sweden, prices fell by 18% and in the UK by 12% in 2001. Both countries' electricity markets are the most liberalised in Europe, the consulting firm added in its study. On the contrary, in a strongly regulated market such as Ireland, electricity prices rose by 18%.

Deregulation was a decisive factor in lowering electricity prices, but other points were also important.

Let us discuss for illustration the situation of Italy. The UCTE statistics indicate that the consumption in year 2002 was 310 TWh with 51 TWh imported (corresponding to 16 % of overall consumption). Let us assume for simplicity that the price of the imported electricity is one half of the domestic price. Thus importing 10 % (20 %) of the total consumption, the imports amount to 5% (10 %) of the total portfolio. In consequence, the total price will reduce by the factor 0.95 (0.9). In agreement with the above estimate that can amount for Italy to EURO 700 Mio per year.

Following the black-out in the USA a renown Austrian expert, Prof. Brauner of the Technical University of Vienna, calculated the cost for each not delivered kWh with an average of € 8 with peak values of € 20 in the field of transportation, followed by € 10 in the fields of industry and services and € 4 in agriculture and forestry. Households rank lowest with € 3. Using the estimate of an overall damage of EURO 9 per kWh for 1/1000 of the yearly consumption yields an indicative amount of EURO 2.7 billion, which corresponds to one half of the economic damage quoted for the recent blackout in North-Eastern US.

Economic Value from the proposal

In conclusion, the investments included in the projects of European interest are relatively small compared to the potential benefits outlined above. It has been shown that the annual savings calculated in the analysis above compare favourably to the construction costs of the proposed electricity projects.

For natural gas, the economic value is derived from the need to import more gas from external sources, as consumption is increasing but domestic production of gas is decreasing.

It is emphasised that the savings estimated in this section provide society with substantial additional means to invest in environment friendly technology and in adequate grid structure.

6. Conclusions

This assessment comes to the conclusion that the need for action in conjunction with matched support for authorisation procedures and accelerating investments call for **increased co-ordination** from side of the Commission, as well as action on the demand side.

The creation of a more favourable context for investment in energy networks is an essential cornerstone as the construction of new transmission projects requires attention of not only all energy markets participants but also of governmental and local authorities. In this context, the European Commission will promote cooperation between Member States with a view to enhancing authorisation procedures for projects on Trans-European energy networks and will

promote technical cooperation projects between the operators responsible for the management, monitoring and control of the Trans-European energy networks. As a first priority the selection of truly important projects from a large list of eligible projects needs to be addressed. These projects have to satisfy the following two criteria: they are cross-border interconnections or they have significant impact on cross-border transmission capacity. For this objective there is a need to set up an appropriate instrument, e.g. a forum, for the decision to attribute to individual priority projects the highest level of priority, through a **Declaration of European Interest**. It is emphasised that this declaration is the consequence of defining priority axes on the highest level (Annex 1 of decision) in the recently adopted guidelines and the extensive list of projects on a lower level (Annex 3 of decision).

For establishing a more favourable context it is also essential to ensure that regulation will develop in a harmonised and consistent way so that it will not introduce market distortions at national level. These risks can be avoided if high-level dialogue and co-operation between regulators are established. Co-ordination between regulators and TSOs are crucial to enhance the coherence of the market. The appropriate co-ordination employed by the Commission need to be dynamic and problem oriented and not static and formal. Expertise from all sectors involved needs to get heard and the corresponding experts invited. Involvement of both the Member States concerned and the Commission, each within its own range of competence, is indispensable for carrying out the priority projects especially cross-border projects. In particular, the Commission may designate **a Coordinator for a given priority axis or for an individual priority project**.

The third component in the endeavour for progressing in the completion of needed infrastructure is given by the co-ordinated European-wide planning which will establish the tools for developing studies and simulations covering the entire European network. The action has two phases, consultation and execution. The exchange of findings and expertise in the process of consultation with Member States, including key stakeholders, constitutes an important aspect in the first phase. The objective is to agree on a detailed plan for network construction together with the corresponding investment. The second, i.e. execution phase can be described by a predictor-corrector scheme, where the TSO's report annually on their investment strategy and the regulatory authorities give feedback concerning existing and planned generation, transmission and distribution. This feedback can incorporate measures for correcting the course of action when obstacles or delays occur.

In this fashion the positive features building on the economic viability of the energy sector and the strength of the liberalised markets are integrated. The minimum co-ordination option was otherwise not found appropriate for mastering the challenges.

At several occasions the possible insufficiencies of simply continuing the current TEN-E policy, i.e. the balanced co-ordination option, have been elucidated. One might argue that the proposed option of increased co-ordination is basically the relevant adaptation of the current TEN-E policy. We can agree to this view as a possibly natural evolution.

Concerning the European Regulatory Approach option, one can summarise the arguments by saying that the time is not yet ripe for really drastic regulatory measures. There are many concerns expressed with regard to the consequences for industry, employment and society in general. Again it is argued that certain appropriate measures are incorporated in the future TEN-E policy actions.

Put briefly, the option called '**increased co-ordination'** aims at incorporating strong elements of both the market strength and the regulatory supervision in the future TEN-E policy. This

'**increased co-ordination'** entails two new instruments, namely the **Declaration of European Interest** for the selection of important projects and the Commission-designated **co-ordinator** for a given axis or project for finalising new infrastructure. This new policy should be put into effect by developing dynamic actions in conjunction with variable arrangements for guidance and co-ordination, tailored to specific and quite different challenges and needs.

The third component in the strategy aiming at the completion of needed infrastructure is given by the **European consolidated planning** with consultation and execution phases respectively.

E. HOW TO MONITOR AND EVALUATE THE RESULTS AND IMPACTS OF THE PROPOSAL AFTER IMPLEMENTATION?

1. How will the policy be implemented?

The construction of energy network infrastructure follows the principle of subsidiarity and is, therefore, the responsibility of the Member States. The construction is facilitated by the private sector and paid for in the end by the consumer. However, certain principles defined within the internal energy market, and by environment legislation need to be obeyed. Within the TEN-E Guidelines the main beliefs of solidarity between Member States and hence of cohesion are stated. In the context of the guidelines a project can be considered of common interest, if it corresponds to the objectives and priorities and displays potential economic viability.

Possible actions on behalf of the European Commission have been proposed in the context of the "increased co-ordination" option. This option constitutes a comprehensive scheme for promoting supporting actions on political, technical and financial level. It comprises the following two components.

1.1 Revision of TEN-E guidelines

The revision of the TEN-E Guidelines – as described in Section B.1 carries in the proposed policy option 'Increased Co-ordination' three new elements. These essential new elements comprise the establishment of a European consolidated plan for energy networks , the Declaration of European Interest for the selection of important cross-border projects and the installation of a Commission-designated co-ordinator for finalising new infrastructure.

1.2 Security of Electricity Supply Directive

In addition, the Communication from the Commission to the Council and the European Parliament on Energy Infrastructure within the European Union (COM (2003) xxx) has highlighted the following areas of action, namely network security, adequacy of generation and interconnector construction. These actions are specified in the Directive of the European Parliament and the Council concerning measures to safeguard security of electricity supply and infrastructure investment.

2. How will the policy be monitored?

The TEN-E Committee, which is composed by experts from the Member States, supervises the implementation of the guidelines on the political and technical level and, in particular, approves the funding of projects, respectively specific phases.

Every two years the Commission shall draw up a report on the implementation of the projects of common interest as listed in the TEN-E Guidelines, which it shall submit to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. In this report, attention shall also be given to the implementation and progress made in the carrying out of priority projects, as well as the modalities of their financing, especially as regards the contribution of Community funding, which concern cross-border connections

The measures outlined in the directive 'security of supply' and in the communication on 'energy infrastructure' as described under paragraph 1 comprise the following actions

ACTION on "Security of Electricity Supply and Infrastructure Investment" Directive which:

– set indicative individual targets on Member States relating to electricity interconnection, taking into account, in particular, market structure in the Member State concerned;

– put a requirement on each TSO submit an (multi)annual investment strategy to its national regulator with the opportunity for the regulator to make additions of amendments to the programme included;

– require Member States to have defined standard to be met relating to the security of supply provided by the transmission and distribution networks;

– require Member States to set targets for reserve generation capacity;

ACTION on Completion of the **Directive on "Gas Security of Supply"** which will

– require Member State to have a defined standard to be met relating to the security of supply provided by the transmission and distribution networks and its measures to ensure such standards are met;

– require Member States to place obligations on gas undertakings to ensure that these objectives are met.

These actions will be of great use for monitoring the quality of the energy networks and the progress in energy infrastructure construction.

3. What are the arrangements for any *ex-post* evaluation of the policy?

The evaluation of the TEN-E mechanism is foreseen through the TEN-E Financial Support Legislation. In this framework, it is foreseen to award a contract for a mid-term evaluation of the TEN-E Programme (2000-2006) to be undertaken by external independent experts. The main objective is to analyse the overall implementation, achievements and impact of the actions co-financed by the TEN-E financial line.

A second study will be conducted for the analysis of the electric network capacities and possible congestion of the electricity transmission networks within the Accession Countries.

F. STAKEHOLDER CONSULTATION

1. Consultation

The Internet-based Consultation in view of the Revision of TEN-E Guidelines was published on the EUROPA TEN-Energy page on 25/07/2003 with the deadline set at 15/09/2003. The Commission services in that way gave all stakeholders and interested parties the opportunity to communicate in writing their positions and concerns related to the envisaged TEN-E revision (including e-mail).

This consultation comprised three documents, three maps and one table.

Content of public consultation:
Doc-1: Internet-based Consultation In view of the Revision of TEN-E Guidelines: "Key Issues".
Doc-2: Overview of the Guidelines in Force for Trans-European Energy Networks (TEN-E)
Doc-3: Priority Axes and TEN-E Projects: "Priority Axes as decided in the recently adopted TEN-E Guidelines with extensions and additions as envisaged in the Revision of these Guidelines".
Doc-4: Maps and Table
Maps displaying TEN-Energy Priority Axes:
Map 1: Electricity Priority Axes in the European Union and in Neighbouring Countries
Map 2: Gas Priority Axes in the European Union and in Neighbouring Countries
Map 3: Oil Priority Axes in the European Union and in Neighbouring Countries
Table: Envisaged investment along the Priority Axes of TEN-Energy for the period up to 2013

In particular, the replies addressed a table of key questions presented at the end of Doc-1 ("Key issues"). Until 26-09-2003 this consultation has prompted 17 replies. Out of the replies, 13 refer to the electricity sector, 5 to the gas sector and one to oil networks. Two statements covered both the gas and oil networks, respectively the electricity and gas sectors.

Basically three different types of feedback have been received, namely comments on the TEN-E Guidelines in general, replies to the questions raised and a range of objections.

The comments in two replies made respectively by the Union for the Co-ordination of Transmission of Electricity (UCTE) and by GRTN, the Italian TSO for Electricity, address general issues in addition to the specific questions raised in the document Doc-1 "Key Issues". It is pointed out that in the replies explicit comments were also made to the document Doc-3 "Priority Axes and TEN-E Projects" and to the recently adopted guidelines published on 15/07/2003.

A certain number of replies raised strong objections against the upgrade of a specific electric High-Voltage Line connecting Lienz in Austria with Cordignano in Italy.

It is emphasised that despite the limited number of replies a wide range of essential arguments has been raised in favour and against the TEN-E Policy and the interconnections listed in the Guidelines. Therefore, the feedback received is viewed as useful.

The consultation was published on the TEN-E WEB page:
http://europa.eu.int/comm/energy/ten-e/en/index.html
DG TREN will publish the 'most representative comments' in due time, also on internet.

2. Overview and summary of replies

2.1 General feedback on TEN-E policy

i) **UCTE** welcomes the EU policy to fully integrate the new Member States in the guidelines and fully agrees with the medium-term objectives of the EC concerning neighbouring countries policy. UCTE fully supports the community objective concerning the development of electricity from Renewable Energy Sources (RES).

Concerning Horizontal actions for electricity networks, UCTE is very much aware of the importance of forecasting and in-time modelling. UCTE has successfully introduced a "Day Ahead Congestion Forecast - DACF" methodology to prevent congestions at the interconnectors.

The requested possible synchronous connection of UCTE (Western and Central Europe) and IPS / UPS (Russia and Baltic States) systems would mean a project of an unprecedented scale worldwide; it would imply the definition of a different approach for this project leading to an inter-area agreement based not only on technical feasibility but also on contractual / legal and organizational conditions.

ii) From a general point of view, **GRTN**, the Italian TSO for Electricity, believes there are some problems that affect the full implementation of the TEN-E Guidelines and the effective realisation of the TEN-E Financed Projects:

- The first aspect is related to the lack of any real link between the TEN-E guidelines and the effective procedures for the implementation and the realisation of the projects.

- The second is related to the inadequacy of the financial resources budgeted for the TEN-E Programme; this aspect is going to become more and more critical in the forthcoming perspective of including within the Programme the projects presented by the Accession Countries.

It is argued that the TEN-E Guidelines and Programme could be very helpful for the Member States and the TSO's in order to implement effective national harmonised procedures aiming at fostering the development of the new infrastructures.

2.2 Answers to questions within the consultation

We note that the detailed replies to all questions raised in the document Doc-1 are listed in the paper entitled "Internet-based Consultation In view of the Revision of TEN-E Guidelines: OVERVIEW and SUMMARY of REPLIES" (see annex).

3. Summary of replies

In general terms the consultation gives a positive feedback concerning the TEN-E Policy and the TEN-E Programme and the essentials of further revising the TEN-E Guidelines. It is emphasised that several replies gave strong support for the increased utilisation of renewable energy sources. Those objecting to a specific electricity line claimed that regional energy issues could stop cross-border interconnections and, even further, rejected any transmission of electricity generated by nuclear power stations.

The detailed feedback from the replies can be summarised as follows together with some preliminary assessment:

1.) It is suggested that the Commission should facilitate a dialogue of all stakeholders to achieve consensus on interconnection projects, to harmonise procedures and to support the authorisation procedure. It is emphasised that projects declared of "common European interest" should also be prioritized at national level. Furthermore, the effective realisation of these projects should be monitored and supported more strongly.

Assessment:

The corresponding actions proposed in the option "increased co-ordination" can address these issues and, in consequence, can reduce delays in implementing the projects.

2.) It is argued that stability and transparency of the legal framework are essential.

Assessment:

This constitutes an issue for the internal energy market and not only for TEN-E. This principle is taken into account by the Commission. The directives for the Internal Market for Electricity and Gas adopted in June 2003 will help significantly in this direction.

3.) Financial support should be increased. Support should be given to projects related to security of supply and strengthening the single market development. Further, it is recommended to support projects with a long pay-back time or with higher risk.

Assessment:

(i) The recommended criteria for giving financial support are already applied for identifying eligible projects and for deciding on TEN-E financial support.

(ii) The future envelope of the TEN-E budget line will be discussed during the preparation of the next financial perspectives. Strong arguments in favour of raising the level of TEN-E funding have been given in the previous assessment.

4.) The priority axes and priority projects proposed in the consultation papers found basically approval and some clarification is proposed. Internal lines were seen as an essential part of cross- border interconnections.

Assessment:

Agreement with regard to the proposed and agreed electricity and gas networks.

4b) For oil networks, careful consideration of the actions proposed for a more secure transportation of oil should be given on the basis of technical and economical evaluations.

Assessment:

This will be reflected in the actions to be supported by the TEN-E Programme, if oil pipelines are included in the guidelines, by means of extensive consultation with all stakeholders.

5.) The axes for priority projects (annex 1 in the guidelines) and the additional criteria for projects of common interest (annex 2 in the guidelines) should not specify Member States by name, thereby enabling a faster inclusion of new projects.

Assessment:

The European Parliament has expressed a clear view of controlling this topic. It will be difficult to initiate additional flexibility.

6.) Concerning gas and electricity infrastructure, extended modelling of supply and demand on a European level and its application for decision making is proposed.

Assessment:

This could be performed within Community actions aiming at accelerating the construction of highly needed cross-border transmission.

7.) Concerning the economic impact of energy cuts the feedback states that economic damages could be substantial. Security of supply is given high priority. It is proposed to initiate a benchmarking study among Member states to quantify real values of electricity breakdown and rolling blackout impacts on all stakeholders.

Assessment:

The economic damages induced by electricity blackouts or, generally, by lack of supply constitute an important element in the impact assessment. Sufficient surplus capacity and a network capable to react quickly to perturbations are crucial. Actions to accelerate necessary constructions need to be pursued further in consultation with stakeholders. The suggested benchmarking study appears appropriate.

8.) Concerning indicators it is pointed out that the link between chosen indicators and economic performance in terms of GDP, employment etc. is quite complex and needs to be analysed very carefully in order to avoid misunderstandings.

Assessment:

Appropriate use of selected indicators for the purpose of qualitative and quantitative modelling the impact of energy infrastructure on economic performance could be made with the inherent limitations. Due to the complexity of the theme such a study is not pursued with priority in near future.

9.) Impact on environment.

The majority of the replies support explicitly the proposed policy (a further development of energy network infrastructure, including the Accession Countries, with a view to security and diversification of energy supply, increased competition in the internal energy market and increased use of renewable energy sources) with respect to environmental measures

Assessment:

This in line with the agreed TEN-E Policy.

9.b)Local groups raised objections to a specific electricity interconnection between Austria and Italy claiming that regional energy issues and dangers or risks for health, nature and local economy associated with high-voltage lines could stop cross-border interconnections.

Assessment:

(i) Local arguments need to be balanced with national and European interest.

(ii) There are no arguments on how to reduce the negative impact, i.e. by building underground lines in some parts or suggesting alternative routes etc.

(iii) Not the entire local population is opposed. For example, a survey conducted by local radio Cortina has received 57.5% NO and 42.5% YES replies to the question "Are you in favour of the electricity line Lienz-Cordignano?", even if the statistical value of the survey needs to be considered with care.

4. Conclusion

The feedback from key stakeholders and interested parties expressed strong support to the TEN-E Policy and the TEN-E Guidelines. This is seen as a confirmation for the policy option based on "co-ordination", such as "balanced co-ordination", which is presently employed.

The highest priority in the context of the effective operation of the internal European energy market and, in particular, concerning the development of energy infrastructure is clearly given to security of supply and measures tailored to maintain and even increase standards. In consequence, action lines were proposed where the European Commission should facilitate a dialogue of all stakeholders to achieve consensus on interconnection projects, to harmonise procedures and to support the authorisation procedure. In particular, the following two support schemes were asked for, firstly that projects of common interest declared of "common European interest" should also be prioritized at national level and, secondly that the Commission gives visible support throughout the entire authorisation process. These requests are exactly met in the "increased co-ordination" policy option strongly recommended in the impact assessment.

The request to increase funds to appropriate level was made less rigorously and was given substantially lower priority. This question is addressed in the impact assessment repeatedly, but cannot be solved within the envisaged revision of the TEN-E Guidelines.

The critical comments based of human health and environment protection were viewed as elucidative and important. These arguments underline the efforts made within the TEN-E Policy to improve health and environment standards and to match agreed levels. It also

underlines the necessity for dialogue with the objective of weighting arguments in order to find a "best solution" acceptable to all parties involved in the process.

In conclusion the feedback from key stakeholders and interested parties is in full agreement with our analysis and gives additional support for the proposed policy option.

G. COMMISSION DRAFT PROPOSAL AND JUSTIFICATION

1. What is the final policy choice and why?

The Community policies as formulated in the TEN-E Guidelines and in the Security of Electricity Supply Directive are closely interlinked, both establishing complementary measures aiming at the proper functioning of the EU internal energy market by safeguarding the security of supply and by ensuring the adequate level and standard of transmission.

This interlinking is underpinned by the fact that the directive is concerned with key projects within the Axes for Priority Projects specified in the TEN-E guidelines.

The impact assessment has revealed that the co-ordination of the TEN-E Policy needs to accomplish, in particular, the following three action lines for creating a real favourable context:

(1) There is the need to create a strong link between the TEN-E Guidelines and the effective procedures for the implementation of the priority projects.

(2) There is the need to streamline authorisation procedures for projects of high European interest, in particular when several Member States are involved.

(3) There is the need to accelerate the volume of investments in energy infrastructure, in particular for projects of high European interest and improve the investment climate.

This impact assessment comes to the conclusion that the need for action in conjunction with matched support for linking the TEN-E Guidelines with the implementation of the priority projects, streamlining authorisation procedures and accelerating investments calls for **increased co-ordination** from side of the European Commission.

This '**increased co-ordination'** entails three new instruments, namely the establishment of **European consolidated planning** for energy networks as well as safety and efficiency optimisation, the **Declaration of European Interest** for the selection of important projects and the **Commission-designated co-ordinator** for a given axis or project for finalising new infrastructure.

It is argued that the present level of co-ordination, the option of "balanced co-ordination", will not grant sufficient success on the three action lines stated above.

The impact assessment, supported by feedback from key stakeholders and involved parties, has further come to the result that the "European Regulatory Approach" policy option carries many risks with regard to the consequences for industry, employment and society in general. Keeping in mind that the "hydrogen economy" will not be realised within the next decade, it is evident that today's revision of the TEN-E Guidelines is not the instrument for the corresponding really strong regulatory measures.

The proposed option constitutes the relevant adaptation of the current TEN-E Policy.

Envisaged investment along the Priority Axes of TEN-Energy for the period up to 2013

PRIORITY PROJECT		ADDITIONNAL CAPACITY INSIDE/INTO THE EU	INVESTMENT INSIDE THE EU	INVESTMENT OUTSIDE THE EU
EL 1	Fr - Be - NL - DE	2500	300	-
EL 2	Borders Italy	4000	600	-
EL 3	Fr - Es - Po	3000	400	-
EL 4	Gr - Balkans - UCTE	2000	100	300
EL 5	UK - Continental Europ	2000	1100	100
EL 6	Ir - UK	500	300	-
EL 7	Baltic Ring	3000	700	100
EL 8	Central Europe	3000	500	-
EL 9	Mediterranean Ring	3000	1000	500
TOTAL PRIORITY PROJECTS EL		**23000** Mega Watts	**5000** Millions Euro	**1000** Millions Euro
NG 1	Russia - NL - DE - UK	10	4000	1500
NG 2	Algeria - EU	20	4500	1500
NG 3	Casp. MO - EU	10	1000	1500
NG 4	Terminals LNG	20	2500	-
NG 5	Underground stock	-	2000	-
NG 6	East Med. Ring	10	1000	2500
TOTAL PRIORITY PROJECTS GN		**70** Billions m³/year	**15000** Millions Euro	**7000** Millions Euro
OVERALL TOTAL			**20000** Millions Euro	**8000** Millions Euro
			28000 Millions Euro	

Source: Estimates of the European Commission Services (DG TREN/B2)

TABLE 1

Source: Estimates of the Europ
Services (DG TREN/B2