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REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

on progress concerning measures to safeguard security of electricity supply and infrastructure investment

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I. INTRODUCTION

This report fulfils the requirements as set out under Article 9 of the Directive 2005/89/EC (the "Directive") of 18 January 2006 concerning measures to safeguard security of electricity supply and infrastructure investment. It outlines the progress made by Member States on the implementation of the Directive and key changes in monitoring electricity security of supply.

The Directive's purpose is to establish measures to safeguard the security of electricity supply, to guarantee an adequate level of generation capacity to guarantee an adequate balance between supply and demand and to set up an appropriate level of inter-connection between EU countries. Further, the Directive establishes a framework within which Member States are to define transparent, stable and non-discriminatory policies on security of electricity supply that are compatible with a competitive internal market for electricity. The Directive complements the measures already in the Electricity Directive 2003/54/EC and the Regulation 1228/03 on Cross Border Electricity Exchanges. Taken together, the provisions in these pieces of legislation provide a set of coherent basic rules on those important issues that contribute to ensuring generation and transmission adequacy.

II. DETAILED FINDINGS

ARTICLE 3: MAIN PROVISIONS

The provisions of the Directive aim at ensuring a high level of security of electricity supply by establishing a favourable investment climate and by defining the roles and responsibilities of the competent authorities and all relevant actors. In doing so, Member States must take into account factors such as the need for a stable regulatory environment, the promotion of renewable energy sources ("RES") and the need for regular maintenance and renewal of electricity networks.

Overall, Member States have adequately transposed this article either through new legislative requirements or by using provisions of other directives that cover the same objectives. The provisions of the Directive will be reinforced through the Third Internal Energy Market package (the "Third Package"), which requires transmission operators to strengthen their cooperation in a number of areas, in particular with regard to investment planning. The Third Package also establishes the European Network of Transmission System Operators for Electricity (ENTSO-E) whose tasks are to elaborate network development plans, undertake integrated network modelling and develop scenarios and assessments concerning the resilience and deliverability of the integrated system. The development plans should be sufficiently forward looking so as to allow for the early identification of investment gaps, in particular with regard to cross border capacities.

However, some important obstacles still exist in the European market. Price risk is a key issue concerning the feasibility of investment projects. Coexistence of open energy markets and regulated energy prices is still quite common among EU Member States: more than half of the Member States

have regulated prices[1]. Systems of regulated prices that are of a general character and are not transparent and targeted exclusively to vulnerable customers are not considered as indispensable. Regulated tariffs often do not reflect wholesale price levels, which can be detrimental to investments in new generation capacities. In the medium term, this may compromise the security of electricity supplies.

Updating or renewing generation and network assets, particularly in relation to achieving RES targets, will require considerable investment over the coming years. These investments will need to be financed, which means that investors must be confident that they can recover the long run marginal cost. The majority of this funding will almost certainly come from the market. How measures with regard to RES targets interact with the overall electricity market and how transmission system operators develop the grid will become increasingly important. A deep and liquid integrated European electricity market can help reduce price volatility and bring forward investment that will enhance the integration of the internal electricity market.

ARTICLE 4: OPERATIONAL NETWORK SECURITY

For operational network security, the Directive specifies that Member States or other competent authorities must ensure that the transmission system operators ("TSOs") set minimum operational rules and obligations on network security and that system operators must comply with these rules. In particular, the Member States shall ensure that interconnected transmission and distribution system operators ("DSO's") exchange information relating to the operation of networks. Amongst other requirements, obligations are also placed on the achievement of quality of supply and network security performance objectives.

Electricity network operators are at the centre of solving possible disturbances in electricity supply. Transparency and information sharing with other grid operators is very important. Improved co-ordination reduces the risk of blackouts and protects European consumers. Interconnection capacity between TSOs plays a very important role in maintaining and enhancing system security during generator outages. The network failures and electricity black-outs in 2003 and 2006 were caused or exacerbated by insufficient coordination of network operation and missing links in the electricity networks. They clearly showed the limit of voluntary cooperation.

In most EU Member States, the network operational rules are drawn up by the TSO from a technical perspective with some form of approval system that involves regulators and/or government. In all Member States, the operational network security criteria for emergency operation procedures are defined in advance and provisions for cooperation with adjacent TSOs in issues of relevance for operational security exist. For example, in the Czech Republic, Luxembourg, Portugal and the Slovak Republic, the government has an explicit role in the fulfilment and development of operational security.

The 2005/89/EC Electricity Directive requires that TSOs and, where appropriate, DSOs set and meet quality of supply and network security performance objectives. In 2008, the CEER carried out a benchmarking exercise on the quality of electricity supply[2]. The survey noted that all Member States monitor unplanned interruptions of more than three minutes and overall the continuity of electricity supply in Europe is improving with customer minutes lost per year decreasing almost continually since 2002. The survey also noted that most Member States collect some information on the cause of

[1] http://ec.europa.eu/energy/gas_electricity/benchmarking_reports_en.htm

[2] 4th Benchmarking Report on Electricity Quality of Supply Ref. C08-EQS-24-04, 10 December 2008. The survey did not provide information on Ireland, Greece, Bulgaria, Cyprus, Latvia, Malta or the Slovak Republic.

interruptions. As one would expect, the continuity of supply is better in urban rather than rural regions. However, work is continuing with the European Committee for Electrotechnical Standardisation (CENELEC) on the development of harmonised continuity indicators, so as to improve the effectiveness of continuity of supply monitoring schemes.

The Commission convenes biannual Electricity Cross-Border Committee meetings, where summer or winter electricity outlooks are discussed. The purpose of the meetings is information sharing so as to raise awareness with regard to potential supply issues. The seasonal (summer or winter) outlook report is prepared at European level, presenting the summary of the national or regional power balances between forecast generation and peak demand on a weekly basis for the coming summer/winter period. Should the situation require so, the Commission can establish ad-hoc "cellules de vigilance" for the critical periods, in order to ensure quick information sharing between neighbouring countries and transmission operators. Such a "cellule de vigilance" was established during the summer months of 2007-2009. The main conclusion from the meetings held during 2007-2009 is that national generation-load balances in most countries are generally considered adequate for secure system operations under normal conditions. During severe weather conditions or other identified periods with potential risk for power shortage, mitigation measures are put in place – the necessary imports are achievable with the existing interconnection capacity.

The Third Package has augmented the duties of regulators to include monitoring compliance with, and reviewing, the past performance of network security and reliability rules and setting or approving standards and requirements for the quality of service and supply or contributing thereto together with other competent authorities. The regulators also have the duty of ensuring that TSOs and DSOs adhere to their responsibilities under the Directive, including ensuring that networks are capable of meeting reasonable demands for electricity. In addition, at the transmission level, regulators have the duty of monitoring TSOs investment plans and their consistency with the Community-wide network development plan, which includes a generation adequacy outlook that will be produced by the ENTSO-E.

ARTICLE 5: MAINTAINING BALANCE BETWEEN SUPPLY AND DEMAND

In order to maintain a balance between supply and demand, Member States must take appropriate measures to maintain a balance between the demand for electricity and the availability of generation capacity. This must be done by encouraging the establishment of a wholesale market framework that provides suitable price signals for generation and consumption and by requiring TSOs to ensure that an appropriate level of generation reserve capacity is available for balancing purposes and/or to adopt equivalent market based measures.

Electricity Demand

Electricity demand trends as presented by the European Commission in the 2nd Strategic Energy Review[3] show an increasing demand for electricity, which is consistent with what European electricity industry stakeholders have forecasted, albeit at a somewhat lower level. The Commission estimates that under current trends and policies the annual increase in electricity demand will be around 1% for the next 20 years[4]. The recently published ENTSO-E system adequacy forecast[5] for 2010-2025 indicates that electricity demand is expected to increase, with most Member States reporting quite strong load growth post 2015.

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3 http://ec.europa.eu/energy/strategies/2008/doc/2008_11_ser2/strategic_energy_review_wd_future_position2.pdf

4 Trends to 2030- update 2007; http://bookshop.europa.eu/is-bin/INTERSHOP.enfinity/WFS/EU-Bookshop-Site/en_GB/-/EUR/ViewPublication-Start?PublicationKey=KOAC07001

5 www.entsoe.eu/fileadmin/user_upload/_library/publications/entsoe/outlookreports/SAF_2010-2025_final.pdf

ENTSO-E annual average load growth	2010 to 2015	2015 to 2020	2020 to 2025
January 7 p.m.	1.32%	1.45%	1.21%
July 11 a.m.	1.49%	1.66%	1.32%

Data source: ENTSO-E System adequacy forecast report

These forecasts have to be put in perspective with the recent economic crisis, which has caused sharp decreases in demand for electricity across Europe. Year on year, EU monthly electricity consumption dropped by more than 5%, 10%, 6% and 5 % in March, April, May and June 2009 respectively. The European electricity consumption even decreased to a historically low level in June 2009, i.e. -23% compared to the beginning of the year[6]. The fall in electricity consumption levelled out and some growth returned, however, levels remained substantially lower compared to the previous years.

A number of countries, such as Germany, France, Poland and Portugal, foresee an influence of energy saving programs and higher technological efficiency on their energy consumption growth. Others noted that the transition towards low carbon energy systems can increase electricity use, especially with regard to consumption by heat pumps and electrical vehicles.

Direct energy savings and investments in energy efficiency are one of the most cost-effective ways to counterbalance future demand increases. Following obligations of the Directive 2006/32/EC on energy end-use efficiency and energy services, all Member States have prepared their National Energy Efficiency Action Plans (NEEAPs) with a comprehensive listing of actions and measures. As the analysis of NEEAPs carried out by the European Commission shows, apart from direct financing measures such as grants or loan schemes, a number of Member States are planning or have already implemented tax rebates for investments in energy efficiency in certain sectors (e.g. housing, industries, etc) and are using energy taxation to directly incentive energy savings in other cases. In the medium term, effective implementation of measures such as these will be crucial to ensuring the security of supply in electricity.

In the long run, electricity's role in final energy consumption is likely to continue to grow. The decisions taken today are of key importance in ensuring that we can deliver the reductions in carbon emissions necessary after 2020 to effectively tackle the climate challenge. The challenge for policy makers is to ensure that the energy markets in Europe, both regulated and unregulated, can deliver an environment which allows investors to undertake the major capital investments required. Appropriate support will also be necessary to develop technologies to deliver low-carbon or carbon free solutions in the electricity sector.

Generation Adequacy

Between 1997 and 2007, EU-27 installed generation capacity increased by 18% at 779 GW. The installed capacity of thermal power plants grew by 16%, hydro capacity rose by 5% and there was an eleven fold growth in RES generation[7]. According to the latest data of the European Wind Energy Association[8], renewable power installations accounted for 61% of all new installations in 2009, which

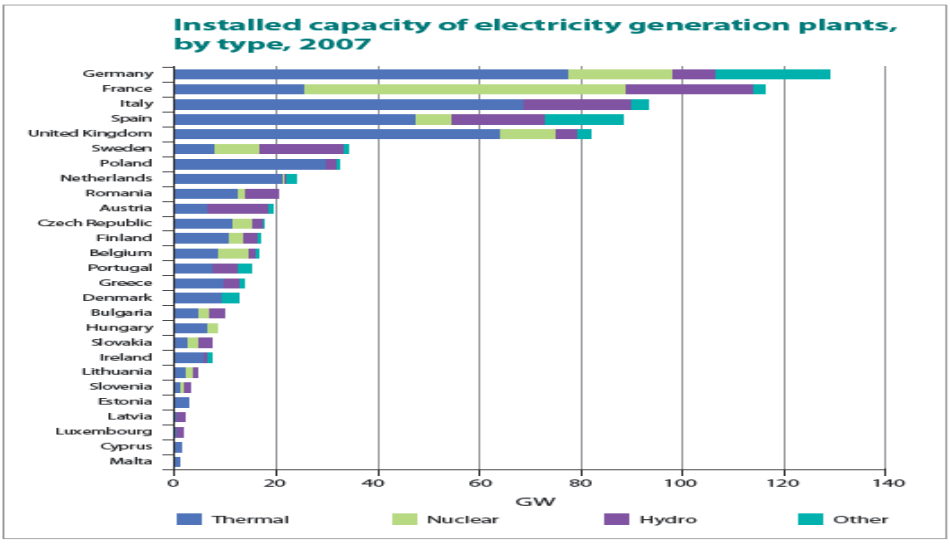
6 For detailed analysis, see the Quarterly reports on European Electricity Markets at the following address: http://ec.europa.eu/energy/observatory/electricity/electricity_en.htm

7 For details, see also 2009 Annual Report of the Market Observatory for energy of the European Commission, SEC(2009) 1734

8 http://www.ewea.org/fileadmin/emag/statistics/2009generalstats/

is the second consecutive year that RES accounted for the majority of new power installations. Investment in EU wind farms in 2009 was €13 billion, which corresponds to about 10,2 GW of new wind power capacity or 39% of all new generation capacity. The incorporation of large scale off-shore wind generation will present the internal market with considerable issues with regard to infrastructure development, balancing and cost recovery.

Notwithstanding the increase in RES, thermal generation continues to provide the majority of electricity across the EU. In 2007, the majority of EU-27 total installed capacity was provided by thermal power plants (58%), followed by hydro plants (18%) and nuclear plants (17%), while the capacity of other RES (excluding hydro) had a 7% share in 2007 compared to 1% in 1997.



(GW)

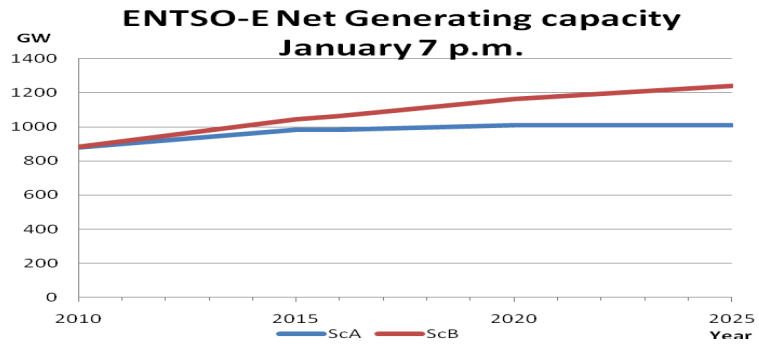
EU-27	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total	***658***	***671***	***683***	**695**	**704**	**716**	**728**	**737**	**747**	**762**	**779**
Thermal	386	393	400	407	410	412	424	427	432	440	449
Nuclear	133	136	138	137	137	138	137	136	135	134	133
Hydro	134	134	136	137	139	142	137	138	139	140	140
Other	*5*	*7*	*10*	13	18	24	29	35	41	48	57

Data source: Eurostat

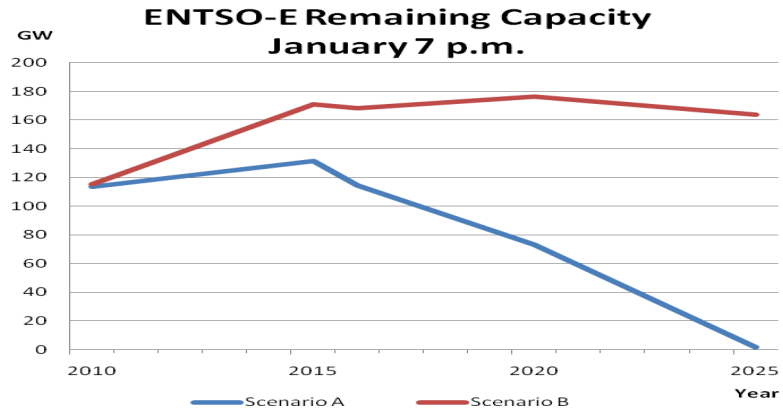
To date, EU generation capacity has kept pace with steadily growing demand. A detailed analysis performed by ENTSO-E in its system adequacy forecast suggests that there will be sufficient generation capacity for the period between 2010 and 2025. However, national reports submitted by Member States indicate that national generation adequacy depends on important assumptions, in particular extending the lifetime of existing units. Without replacing existing generation units, additional capacity of 100-300 GW between 2009 and 2025 would be required.

ENTSO-E's system adequacy report suggests that net generating capacity will increase in both (conservative (ScA) and best estimate (ScB)) of its scenarios as presented in the figure bellow[9]:

[9] This includes EU-27 plus other ENTSO-E members



Generation adequacy can be assessed by comparing the difference between demand and reliably available capacity, which is referred to as Remaining Capacity. The table below shows that Remaining Capacity is positive, however, given a low level of new generation development under Scenario A, the level declines sharply after 2015.



It is clear that generation adequacy will vary across Member States and within each jurisdiction there will be different circumstances for base, mid-merit and peak generation segments. It is important not only to consider new generation installations but also the age of existing generating plants.

The 2nd Strategic Energy Review provided a detailed overview of the age of operational generation capacity. In summary, as of end of 2008, the majority of European gas generators were less than 5 years old. However, the majority of coal and nuclear plants was more than 21 years old. Many of them are approaching the date of decommissioning, which is around 40 or more years after the start of operations, depending on the generation type. Combining the need for replacing aging plants with the increasing share of RES based generation, notably on- and offshore wind, as a result of 2020 commitments, and of the Large Combustion Plant Directive 2001/80/EC, presents a significant challenge to system operators over the coming years both in terms of balancing and network adequacy. After 2015, additional investments in generating capacity would be required to maintain the level of adequacy at an appropriate level. ERGEG has expressed concerns that the financial crisis might delay necessary investments that are already under consideration as the economic viability for these projects is put into question due to lower electricity demand.

Most countries leave generation adequacy to be achieved by the market. The Directive 2005/89/EC does, however, set out a range of possible measures that Member States may use to ensure security of supply. Such interventions may be considered in addition to the tendering procedure included in the Directive 2003/54/EC. Article 7 of Directive 2003/54/EC already notes that the tender procedure should be considered as a last resort in the event that the authorisation process has failed to bring about sufficient capacity to meet demand.

Tendering constitutes a major intervention in the market, which can create distortion between existing

and new capacities, and can bring about failure of the investment cycle where generators are likely to be reluctant to invest if a subsequent tender could substantially reduce the value of their investment. National approaches nearly always have some effects on neighbouring markets. A tender for new generation capacity near the border of a neighbouring country can influence investment behaviour there too (relocation of planned investments) and have effects on cross border trade. Therefore, tendering must be used only as the final measure to avoid physical shortage in supply when there is absolutely no other way to ensure the necessary capacity at the indicated time of the potential shortage. Several Member States (Spain, Italy, Greece, Denmark and Ireland) have employed different schemes for provision of generation capacities.

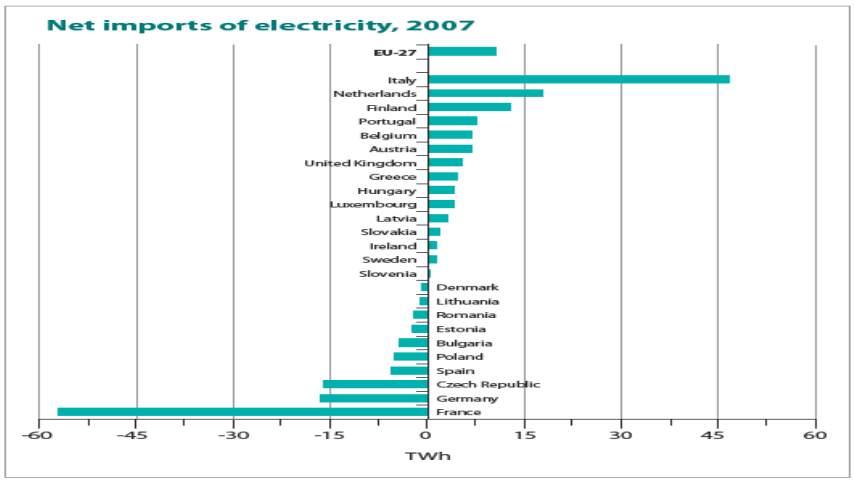
The situation with regard to tenders is different however, when it comes to RES production capacity, which is still in most cases not economically viable without particular incentives. Therefore, tendering procedures are often used by Member States. Wind based generation is becoming a noticeable addition to the EU's electricity generation mix and the use of tendering procedures for its promotion should in general go hand in hand with a careful assessment of the effect on the market.

ARTICLE 6: NETWORK INVESTMENT

Member States are required to establish a regulatory framework that provides investment signals for both transmission and distribution system network operators to develop their networks in order to meet feasible demand from the market. The framework must also facilitate investment and network renewal, where necessary. With the exception of the Netherlands and Romania, Member States did not have to modify existing energy legislation to give effect to this provision.

Grid reinforcement can be necessary to allow power plants to generate at their maximum levels and transport electricity from generators to consumers. The winter of 2009 highlighted the fragility of existing electricity grids when coping with increased consumption of electricity. However, grid reinforcements can be adversely affected by long national planning and permitting procedures. In most Member States, network operators are obliged to develop and maintain the network according to the needs and requirements to ensure operational and long term security of supply, either by legislation or by licence when costs of investments are recovered through transmission or distribution tariffs. The Directive requires that transmission and, where appropriate, distribution system operators set and meet quality of supply and network security performance objectives. This implies the introduction of regulatory incentives to invest in efficient and effective networks. As reported by Member States, this requirement has been implemented by most since 2008.

Electricity is usually produced short distances from consumption. However, the physics of electricity means that it can be transmitted long distances instantaneously, thus facilitating cross border trade. National policies on generation capacity combine with existing interconnection capacities. Some Member States have chosen not to invest into local generation, but rather rely on interconnection and supply contracts with neighbours:



(TWh)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
EU-27	2.9	-0.9	11.2	19.6	4.8	12.5	-1.7	-7.3	11.3	3.5	10.5
Top-5 exporters	-74.7	-67.8	-72.3	-87.4	-87.9	-91.8	-100.0	-95.4	-96.3	-111.7	-99.3
Top-5 importers	79.0	75.7	86.7	93.6	95.1	94.9	81.4	82.0	99.1	95.5	88.4

Data source: Eurostat

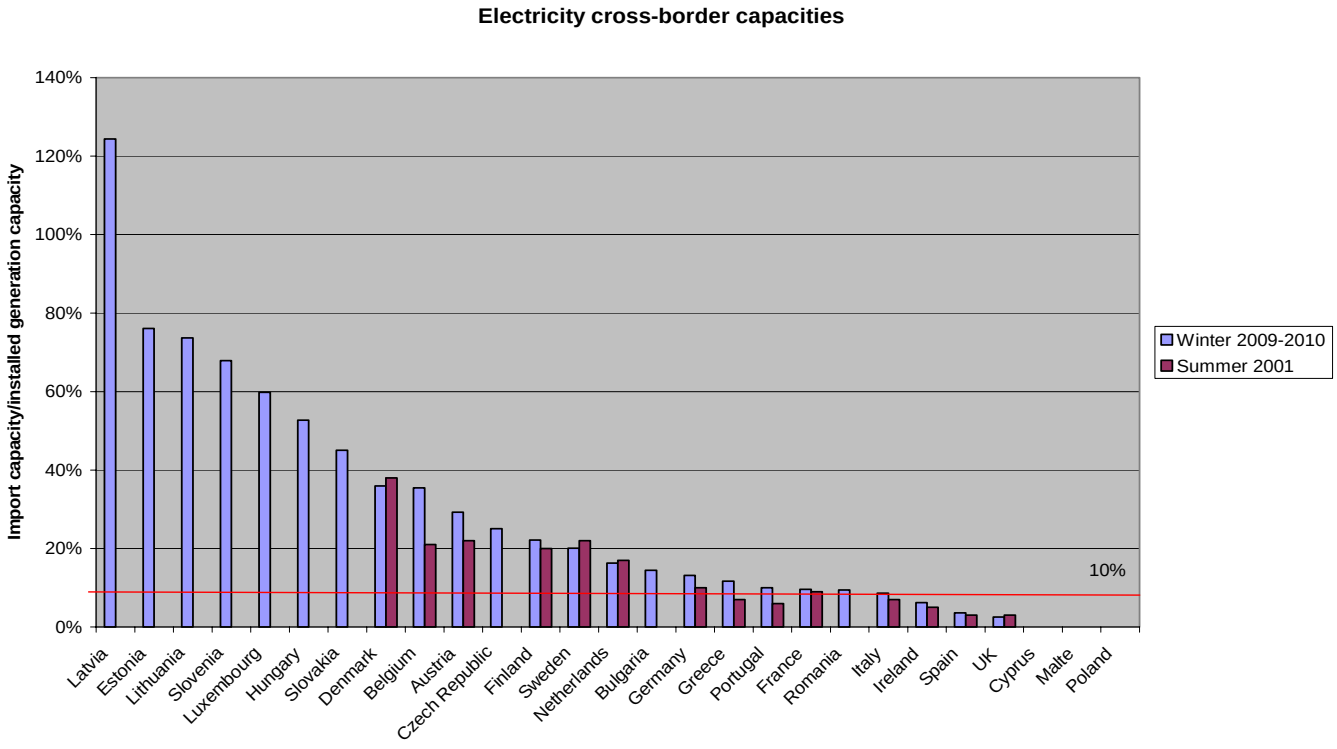
In the last ten years, EU-27 net imports of electricity were relatively stable; however, large differences can be noted amongst the Member States. In 2007, net imports of electricity in the EU-27 amounted to 10.5 TWh. Among EU-27 Member States, France has traditionally been the largest net electricity exporter, while Italy was the largest net importer. For countries, in which domestic electricity generation capacity will not be sufficient to cover the electricity consumption during peak consumption periods, interconnection capacity is usually sufficient to meet demand.

Adequacy of interconnection capacity is not defined in European legislation and Directive 2005/89/EC did not introduce a specific level of interconnection required between Member States. However, a target interconnection level of at least 10% of installed generation capacity was agreed at the European Council in Barcelona on 15 and 16 March 2002. Low levels of interconnection have the effect of fragmenting the internal market and are an obstacle to the development of competition. The existence of adequate physical transmission interconnection capacity, whether cross-border or not, is crucial, however it is not a sufficient condition for competition to be fully effective. The complete list of cross-border interconnection lines is provided in the ENTSO-E statistical yearbook[10].

Physical values of cross-border interconnection lines differ considerably from the actually available capacity in the highly meshed interconnected transmission networks in Europe. For planning purposes, Total Transfer Capacity (TTC) and Net Transfer Capacity (NTC) values are needed for market actors to anticipate and plan their transactions. The graph below illustrates the actual cross-border transmission capacity for the 2009 winter period[11]:

[10] http://www.entsoe.eu/index.php?id=55, Statistical Yearbook, Tie-lines data Table T9.

[11] ENTSO-E transmission NTC values for winter 2009-2010 have been used by summing import values per country, and taking into account overall import limitations when they have been declared. For installed generation capacity Eurostat 2007 values have been used.



The implementation of the 2020 renewable energy target will require further development and reinforcement of grid infrastructure, including intelligent networks and interconnections. Directive 2009/28/EC requires Member States to take the appropriate steps for ensuring these necessary developments and to accelerate authorisation procedures for grid infrastructure and to coordinate approval of grid infrastructure with administrative and planning procedures for the further development of electricity production from renewable energy sources. As regards cross-border interconnection projects planned in the near future and reported by national authorities (or known otherwise), a list is provided in Annex 1 of this report.

ARTICLE 7: REPORTING

Monitoring and reporting of security of supply is already an obligation imposed by Article 4 of Directive 2003/54/EC. According to this article, Member States are obliged to produce a biennial report with specific reference to the supply/demand balance on the national market for the next five years, planned new investment for the next five or more years, capacity, quality and level of network maintenance; and measures to cover peak demand and potential shortfalls. The content and scope of the monitoring report is further explained in Article 7 of the Directive 2005/89/EC.

Most Member States provide reports with information on consumption and generation forecasts as well as generation and investment network needs with timeframes of more than 20 years. The general conclusion from the national reports on power system adequacy is that it is to remain similar to the current situation.

The quality of reporting varies across Member States. Some Member States publish comprehensive data and cover all items identified by the Directive (for example Finland), while some reports could be improved by providing more detail. The reports from less mature electricity markets, for example, do not sufficiently describe how the functioning of their wholesale markets will contribute to generation and transmission adequacy.

The Third Energy Package has brought important changes for monitoring arrangements. The ENTSO-E System Adequacy Forecast report for 2010-2025 was the first attempt to evaluate electricity system adequacy at European level. The new 10-year development plan will cover all aspects that are relevant for monitoring the security of supply – both on the side of generation and transmission adequacies.

The Commission has proposed to improve the current regulatory framework that imposes reporting obligations on Member States on energy infrastructure via a draft Regulation concerning the notification to the Commission of investment projects in energy infrastructure within the European Community.

CONCLUSIONS

Member States have effectively implemented the provisions of the Directive either through the creation of new legislative provisions or the use of existing provisions emanating from other European legislation. Over the short term, there appears to be sufficient network capacity and generation to cope with European electricity demand. However, the picture becomes less clear over the medium and long term. Aging generation plants will have to be replaced. For this to happen, there needs to be clear market signals for new investment, and Member States should be mindful of the delays that their planning procedures could cause. Access to funding may also be more difficult in the current economic climate.

Member States should fully consider and prepare for the effects of introducing large amounts of RES, in particular on- and offshore wind, into their systems. As penetration levels increase, such integration will require changes to balancing rules and procedures in addition to considerable network investment that over time will be needed in order to accommodate the new profile of generation. Similarly, changes in demand patterns may need to be factored in as energy efficiency measures including Smart Meters take effect. As supported by the regulators, incentive based schemes should be employed to facilitate new network investment, and consideration should be given to the utilisation of Smart Grid technology.

The Third Energy Package will bring important changes for monitoring security of supply. ENTSO-E's obligation to produce a biennial 10 year development plan that covers all aspects relevant for monitoring of security of supply – both on the side of generation and transmission adequacies, is a significant step forward. Although non-binding in nature it will provide an appropriate basis for ENTSO's network codes on network security and reliability.

As the EU approaches its 2020 climate targets, Member States should be increasingly vigilant of potential security of supply issues and take early enough appropriate measures to modernise and adapt their systems to the new challenges so that consumers can enjoy a high quality, low carbon and continuous supply of electricity.

This report explained some of the future evolutions in the European electricity system, notably with regard to the integration of massive amounts of electricity from renewable energy sources and the need to curb greenhouse gas emissions in the energy sector: fuel shift towards electricity in the overall energy mix; increasing distance between production and consumption due to higher reliance on renewable energy sources; intermittency of the major renewable sources (wind and solar photovoltaic), increasing the need for balancing capacity, be it conventional or renewable; potentially increased role of electricity imports from outside the EU, due to high "green electricity" potential in neighbouring regions. These evolutions will require massive investments and appropriate incentive schemes for delivering these investments in a timely manner, while ensuring competition, sustainability and security of supply. The European Commission is therefore currently preparing an Energy Infrastructure Package, whose role will be to encourage the development of European energy

infrastructure. This new package will build upon the current TEN-E framework and establish a complete set of policies, taking into account existing procedures and financing for infrastructure development.

Annex 1

List of reported cross-border interconnection investment intentions

for the next five years

1. France-Belgium;
2. France-Spain;
3. France-Italy;
4. Bulgaria-FYROM;
5. Denmark-Norway;
6. Estonia-Finland;
7. Estonia-Latvia;
8. Finland-Sweden;
9. Sweden-Norway;
10. Sweden-Lithuania;
11. Lithuania-Poland;
12. Greece-Turkey;
13. Germany-Poland;
14. Germany-The Netherlands;
15. Ireland-United Kingdom;
16. United Kingdom-The Netherlands;
17. United Kingdom-Belgium;
18. United Kingdom-France;
19. Romania-Serbia;
20. Slovakia-Hungary;
21. Slovenia - Italy;
22. Austria – Hungary;
22. Austria - Italy;
23. Malta – Italy;
24. Portugal-Spain.

The European Economic Recovery Programme also envisages support to grid integration of offshore wind energy. The two offshore grid integration projects are the Baltic-Kriegers Flak and the North See Grid.