



# **ERGEG's Assessment of the Development of the European Energy Market 2007**

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## 1. Introduction

Under the Electricity Directive 2003/54/EC (Article 23) and the Gas Directive 2003/55/EC (Article 25), national energy regulatory authorities are required to publish an annual report on the outcome of their monitoring activities related to the functioning of the electricity and gas markets. The 2007 National Reports by national regulatory authorities are mainly an update of the 2006 reports. This EREG Assessment of the European Energy Markets 2007 (C07-URB-05-03) draws some conclusions from the reports of the national energy regulators and from several additional sources. The national reports of each EU country and the overall EREG Assessment reports, for each year since 2005, can be found on the EREG website<sup>1</sup>.

This 2007 EREG Assessment focuses on unbundling, competences of regulators, regional integration and security of supply. It should be emphasised that this is the first report covering a period when legal implementation of the EU directives should already have been transposed into national law<sup>2</sup>. The report tries to identify general tendencies, without prejudice to possible exceptions in individual cases.

In order to ensure appropriate coherence and consistency among the national reports, and to provide an input to the Commission's own assessment, the European Commission invited the EREG to:

- a) ask its members to follow a common structure for their national reports;
- b) coordinate the preparation of the national reports and to ensure consistency of data;
- c) cooperate in the analysis of the individual reports in order to enable an overall assessment of the functioning of the internal energy market
- d) report mainly on changes since last years' reports;
- e) focus in particular on unbundling.

In preparing their national reports, energy regulatory authorities have received the support of several national institutions.

## 2. Main Developments

### 2.1. Full Market Opening – Did it work?

In July 2007, in most Member States full market opening became effective so that in principle the second legislative package on electricity and gas market liberalisation has now been completed. National regulators report that **in principle the process of market opening went quite smoothly with only some technical problems**. There are nevertheless a variety of detailed network access-related issues on the agenda of the regulators which represent obstacles to the development of competitive markets. Any impetus of full market opening on retail markets may

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<sup>1</sup> [http://www.ereg.org/portal/page/portal/EREG\\_HOME/EREG\\_DOCS/NATIONAL\\_REPORTS](http://www.ereg.org/portal/page/portal/EREG_HOME/EREG_DOCS/NATIONAL_REPORTS)

<sup>2</sup> In line with the exemptions in the 2003 directives implementation of "legal" unbundling was in many Member States only realised in July 2007. Whilst Member States could delay the obligation to legally unbundle (i.e. create a separate company) for larger DSOs until 1 July 2007, such a possibility did not exist with regard to the obligation to unbundle in "functional" terms.

only be visible in the years to come. A major challenge will be to allow for a quick but at the same time socially acceptable transition from regulated prices to competitive prices in those countries where energy price control is still in place. Some countries such as Spain foresee an end to regulated prices, however, mainly for industrial and commercial customers. Households in Spain (small customers) will still have the choice between a regulated last resort tariff and the competitive market. It is essential that countries in a transition period draw up an individual road map. **The EREG<sup>3</sup> calls on Member States to rapidly remove regulated prices and to outline (by 1 July 2008) a roadmap towards competitive markets by removing regulated prices. This is because regulated end-user energy prices distort the functioning of the market (see Electricity Market; National Markets section below) and jeopardises both security of supply and the efforts to fight climate change, and in the EREG's view therefore should be abolished.**

Market opening in itself cannot guarantee a sufficient degree of supplier choice and competition. The EREG and the European Commission continue their efforts to further enhance regional market integration and introduce effective unbundling so as to bring fair and dynamic competition to Europe's energy consumers.

## **2.2. Cross border integration – Encouraging elements to the puzzle of an integrated market**

Development of regional integration is still rather diverse. Many bilateral or multilateral projects of improved cross border market integration already exist, such as the Pentilateral Forum, and new ones took shape during 2007 (e.g. wholesale electricity market integration on the Iberian market from 1 July and on the island of Ireland from 1 November, and the signing of Memorandum of Understanding in some regions, and the appointment of 4 European co-ordinators for 4 important energy projects). In November 2006, the trilateral market coupling project linking France, Belgium and the Netherlands became operational. This not only dramatically increased the efficiency of dispatch of power production in the region but its importance goes well beyond the narrow regional effect. This model of better market integration will certainly serve as a blueprint for future activities. Further market coupling is planned for the Danish-German border and ultimately to connect the NordPool market and Germany. According to a memorandum of understanding in the Central West region of the Electricity Regional Initiative (signed in June 2007) 5 countries (France, Germany and the Benelux countries) will be linked together by January 2009, creating the widest electricity market cooperation agreement in Europe. Market coupling uses existing cross border power capacity efficiently and links together separate markets into a single market in a region. **The EREG therefore urges stakeholders to quickly widen the coverage of market coupling to other interconnections and Member States where possible.**

The EREG's Regional Initiatives play a key role in uniting these local or regional projects under a common umbrella. Preconditions for advanced models of market integration such as the trilateral market coupling are often not fulfilled<sup>4</sup>, so that other issues may have to be prioritised. Based on concrete results in the regions, it is clearly visible that the **Regional Initiatives are facilitating significant progress towards single energy markets in electricity and gas**. Separate EREG public consultations on coherence and convergence of the gas and electricity Regional Initiatives

<sup>3</sup> End-User Energy Price Regulation – An EREG Position Paper (E07-CPR-10-03), 18 July 2007.

<sup>4</sup> In many markets no reliable price indicator exists so that allocation of network capacity based on wholesale prices is not possible.

were held in 2007 to ensure proper coordination across the regions so that the different regions come together to fulfil the single market goal.

### **2.3. Unbundling: Current separation of network and competitive business is not effective**

In most Member States, where legal unbundling had to be implemented by 1 July 2007 at the latest for large DSOs, legal unbundling has been set up by vertically integrated distribution companies and compliance officers have been appointed<sup>5</sup>. Timely implementation, in line with the deadlines of the directive, has been more apparent in electricity than in natural gas, where some 50% of regulators report no significant change in unbundling.

For the reference period 2006, regulators mainly report formal compliance with the “legal” and “functional” unbundling requirements of the 2003 Directives. In the EREG’s view, ownership unbundling is in principle necessary for the monopoly networks to facilitate effective competition in gas and electricity markets. Legal unbundling as it is defined in the relevant articles of the electricity and gas Directives today restricts the control of the vertically integrated company to those elements of a mere financial investor, i.e. the holding company is only allowed to control the budgeting process of its subsidiary in order to achieve an adequate rate of return on its investments. Reports from national regulators as well as the responses to the EREG’s 2007 public consultation on Draft Guidelines of Good Practice on Functional and Informational Unbundling (April – June 2007) clearly show some areas where the industry is often not compliant with the directive, in the letter or in the spirit of the rules.

It is notable that **it is mainly “functional unbundling” which is still heavily disputed by major European companies**, who argue for the need to involve network managers in the management of the integrated companies, and even of incentives for those managers related to the success of the integrated company as a whole. This is an unexpected behaviour as these criteria are mainly structural and therefore relatively easy to oversee – regulatory difficulties are much more related to informational unbundling which in day-to-day terms can include myriads of business activities. **The EREG’s view is that this quite open resistance to implement functional unbundling according to Art 15 of the Electricity Directive and Art 13 of the Gas Directive respectively only leaves one conclusion – the directives and their transposition into national law are not clear enough as regards the unbundling provisions.**

Member States did not succeed in clearly transposing the directives into national law, so that companies face contradicting statutory obligations concerning unbundling and for instance company law. Accordingly, it is very often up to the regulated companies to decide how to interpret and prioritise conflicting national laws. This is certainly not acceptable<sup>6</sup>. **The EREG therefore concludes that a stricter unbundling regime at transmission level is necessary at EU level,**

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<sup>5</sup> Legal, functional and accounting unbundling was already required for TSOs. An exemption was possible for the “legal” unbundling of large DSOs (above 100,000 customers) until 1 July 2007. Thus until July 2007 DSOs were obliged to unbundle the network activities in “functional” terms without being obliged to create a separate (“legal”) company.

<sup>6</sup> Regulators are attempting to correct for the weaknesses of the unbundling provisions by developing Guidelines of Good Practice. Visit the EREG website ([www.ereg.org](http://www.ereg.org)) to see the EREG Guidelines of Good Practice on Regulatory Accounts Unbundling (E05-CUB- 11-02) of 30 April 2007 which followed a public consultation in 2006. A public consultation was held on draft Guidelines of Good Practice on Functional and Information Unbundling from 30 April – 26 June 2007.

**as proposed by the Commission's 3<sup>rd</sup> package of legislation. The EREG therefore also welcomes that binding Guidelines for the interpretation of existing unbundling provisions are foreseen for distribution network operators.**

In general, unbundling provisions intended to change company behaviour either need a very long time to become part of a company's governance culture or are not implemented at all, where strong adverse economic incentives make compliance very costly. Regulation against adverse economic incentives will always be intrusive and needs effective legal and financial enforcement measures. Furthermore, there needs to be a sufficient *ex ante* deterrent to influence the behaviour of the integrated companies and of their employees.

Once again, as was the case last year, in most countries the network operators are hard to distinguish from the integrated company, thereby allowing integrated companies to benefit from the reputation of the network company.

### **3. Independence of some National Regulatory Authorities endangered**

In 2006, several national regulators report that the scope of their competences has been enlarged, mainly as regards investment planning for TSOs. Regulatory oversight of the wholesale and retail markets, which is partly included in the European Commission's proposals of 19<sup>th</sup> September 2007 for a 3<sup>rd</sup> energy liberalisation package, is only rarely - and if so very recently - covered by national regulators. Such powers are however necessary not only in terms of informing the general public or policy makers, but also for a more efficient regulatory process focused on safeguarding the public interest. Well-functioning competition and thereby efficient and secure supply of final customers are the ultimate objectives of independent regulation. Therefore assessing the extent of competition is a key task for regulators.

**At a time when some regulators' powers are enhanced, political interference in energy regulation remains a concern.** Rising energy prices have tempted some countries to use political control over prices as a remedy for presumed insufficient competition or to reach diverse social goals, presuming that as long as the regulated prices are not below competitive levels it still allows market entry. This, however, undermines the credibility of competitive markets. **Political influence has not been exerted in a transparent way but through increased direct influence by ministries or parliaments on some national regulatory agencies, in terms of appointment or even individual decisions.**

## **4. The Gas Market**

### **4.1. Regional Integration**

In 2006 The EREG set up the Gas Regional Initiative, where three regional energy markets (REM) have been defined: North-West (N-W), South (S), and South South-East (S-SE). **All three regional energy markets have now moved towards the implementation phase of their priority plans.** Examples of the progress made with respect to capacity include the assessment of the feasibility of day ahead auctions (N-W); an improvement of congestion management & capacity allocation (N-W); the development of standard bulletin board for trading (S-SE); and the establishment of a coordinated plan for new investment (S). All three regions also identified improved transparency as a key factor to facilitate market integration and are looking at issues

relating to interoperability. There are significant differences across the 3 regions in terms of how to develop hubs, but the development of gas hubs is a key priority for all. Coherence of the diverse initiatives is less important as the gas system is less integrated. Therefore harmonisation of rules within the regions is the most urgent need.

**At present, regulatory gaps for cross-border cooperation between regulators or market participants remain a concern as one of several factors potentially hindering market integration.** The existing voluntary guidelines for gas balancing, gas storage, access to LNG facilities and open season procedures do not deliver a harmonised approach to these issues as they are not uniformly applied by market participants in all countries. More support from Member States is needed to overcome these obstacles towards the creation of fully functioning regional markets, which in turn is the stepping stone towards the realisation of the single gas market in Europe.

## 4.2. National Markets

Market structure on a national scale is still highly concentrated. In addition, incumbents often control essential infrastructure facilities further increasing their market power. After the cold winter in 2005/2006 some countries undertook to build up storage and to maximise the usage of import capacity. Italy for instance opened “ship or pay” contracts, so that shippers could opt-out of transportation capacities if not needed in order to increase physical use of capacities.

The share of LNG is rising in many countries allowing diversification of sources but also in principle entry of new market players if access to critical infrastructure is non-discriminatory.

Retail markets in natural gas are not yet well developed although all markets are now, at least in theory, open to competition. It is however clear that significant barriers to progress remain – not least the lack of effective unbundling in the majority of markets.

The distorted price relation between households and industry (households cheaper than industry) which was found in some countries last year no longer exists. It can thus be concluded that also in the new Member States household prices have been brought somewhat in line with the typical expected relationship from 2005 to 2006. But it is still remarkable that in some countries gas prices for industry are still comparable to the price level for households, despite the much higher load factor of the industry in comparison to households.

## 4.3. Unbundling

Only a few countries reported improvement of unbundling in integrated gas companies. So the critical assessment of the situation reported last year is still relevant. **The main conclusion was that national transposition did not bring about network companies acting independently and with their own identity.** The most important reason found was a vague implementation of the unbundling obligations in national law in most Member States. **Main developments reported cover “legal” unbundling of Distribution System Operators (DSOs).**

**In the case of TSOs, regulators reported some improvements concerning transparency, where more important information on the system is published. However the extent of information provided as a whole is still not satisfactory.** Additional structural measures such

as ownership unbundling have not been taken. The following table shows the number of ownership unbundled TSOs in 2006.

<i>Gas</i>		
	<i>Number of TSO</i>	<i>Number of ownership unbundled TSO</i>
AUSTRIA	7	0
BELGIUM	1	0
CYPRUS	NAP	NAP
CZECH REPUBLIC	1	0
DENMARK	1	1
ESTONIA	1	0
FINLAND	1	0
FRANCE	2	0
GERMANY	22	0
GREECE	1	0
HUNGARY	1	1
IRELAND	1	0
ITALY	2	1
LATVIA	1	0
LITHUANIA	1	0
LUXEMBOURG	1	0
MALTA	NAP	NAP
NORWAY	NAP	NAP
POLAND	1	1
PORTUGAL	1	1
ROMANIA	1	1
SLOVAK REPUBLIC	1	0
SLOVENIA	1	0
SPAIN	8	1
SWEDEN	2	1
THE NETHERLANDS	1	1
UNITED KINGDOM	1	1

\* NAP = not applicable

## 5. The Electricity Market

### 5.1. Regional Integration

In February 2006, the ERGEG launched the Electricity Regional Initiative creating seven electricity regions in Europe. **Real progress has been made through the identification of priorities and finding and implementing practical regional based solutions.** Common priorities include congestion management, transparency and balancing. "Tri-lateral market coupling" between France, Belgium and the Netherlands, since November 2006, is a practical example of regional based achievements. It is an efficient capacity allocation mechanism for day-ahead which guarantees energy flows in the right direction in relation to spot prices. Maximal use of existing capacity will be the next step via load flow based capacity calculation. According to the Memorandum of Understanding signed in June 2007 it is intended to extend the market coupling to the entire Central West region of the Electricity Regional Initiative by January 2009, thereby (linking France, Germany and the Benelux countries together into one region). In the France-UK-Ireland

region, intraday trading and reciprocal access to balancing markets between France and England will be introduced in 2008. This will extend the few existing cases of intra-day allocation and balancing market integration.

The other major continental initiative "Central-East" is going for a load flow based capacity calculation first as exist reliable price indicators do not exist for the different markets in the region. Finally, both regions will have the same mechanism of capacity calculation and its allocation. The structure of the EREG Regional Initiatives is efficient so far as it allows different levels of market development to be taken into account while moving toward the common ultimate goal of a single electricity market in Europe.

The "Northern" region tries to integrate the Continental and the Nordic Markets. Est-Link and Nor-Ned are two DC cables providing additional infrastructure and the day-ahead market coupling between Denmark and Germany will establish an efficient market link between the two regions. At the same time, the Nordic market improves its well advanced integration further into the retail market.

**Some improvement from better use of existing infrastructure** can already be seen today in the data<sup>7</sup>. The data identify two regions which exhibit significant price correlation. The first market is The Netherlands, France, Germany, Austria and the second is the Nordic market comprising Finland, Sweden and Norway<sup>8</sup>. The effect on price correlation of the market coupling projects will only be seen in the next reports. The improvement of price correlation occurred while prices in general rose, inter alia due to increasing CO2 prices and fuel prices since late 2005.

**Still a lack of co-ordination between TSOs** can be concluded from the blackout which happened on November 4, 2006. During the event, which started in Germany, the synchronous area of the UCTE was split into three sub-regions with severe power imbalances and frequency deviations. **The November 2006 blackout showed that there is an urgent need for a more stringent legal framework under which TSOs operate the European electricity system as well as for more precisely defined rules for co-ordination. Today's voluntary measures without effective monitoring do not suffice to guarantee a proper state-of-the-art power system control for the synchronous area.**

## 5.2. National Markets

Market structure has not changed remarkably in 2006. In Italy, however, the CR3 (= market share of the 3 biggest suppliers to big industrial customers) has risen by a fifth from 40% to 48%. Regulated retail tariffs are still a major concern. In France for instance the regulated tariff not only may endanger new investment projects but also reduces liquidity at the wholesale market, which in principle covers a sufficiently big market for the establishment of a liquid power exchange. The power exchange is therefore not able to set a real reference price for the French market. In Hungary, some 30% of customers in the competitive market switched back to regulated prices, which are below market level. Also in Spain the share of customers in the free market has been reduced due to low regulated prices. Certainly such prices undermine the credibility of market liberalisation itself and reduce incentives for further investment in efficient power production and as

<sup>7</sup> See the annex for a table of correlation between daily base load prices in 2006; a correlation of more than 0.66 is significant at the 5% level. Note that price correlations are only a very rough measure of market integration and may only be taken as a first indicator.

<sup>8</sup> Denmark, which is in part integrated with the Nordic market, does not show significant correlation coefficients with Norway, as the figures represent the average prices of the two Danish price areas.

far as they are distorting competition they should be abolished. However in some countries where supply competition is in an early stage of development or for structural reasons regulated reference prices have been set, for a temporary period of time, in order to grant small consumers and household further protection.

In electricity there exists an inverse price relation between households and industry in a few countries. This may be due to rising prices where the hedging strategy of suppliers allows locking in lower prices for stickier household customers than for more flexible industrial customers. In circumstances of rising prices along the forward curve (contango), certainly retail competition in the segment of household customers will be limited as new entrants will have to procure energy at higher prices for their new customers.

Switching for households and small commercial customers is at a high level (roughly 10% or above) in UK, Norway and Sweden. In most other fully liberalised countries, however, the rate was remarkably lower. In many cases, the annual rate was even only at about 1% or below. However, in addition to switching rates other indicators also need to be taken into account for a complete picture. In particular, it is important whether switching rates react according to market developments, such as changes in the possible gains of switching, or whether new entries occur because of increasing margins of retailers, etc. Combinations of low switching rates with high potential gains from switching are of concern, indicating sticky customers or major entry barriers and therefore potential market power of suppliers.

Intense discussion on automatic meter reading (AMR) is mirrored in some national reports where a full scale roll out of this technology has already been finalised or is in its implementation phase. AMR not only allows customers to get better and more up to date information on their individual consumption but also allows suppliers to develop new products and may be an essential step for a future energy service market which is less input but more output oriented.

### 5.3. Unbundling

**There are no major improvements with respect to unbundling for electricity TSOs in Europe.** There are two notable developments in 2006. The Hungarian Independent System Operator (ISO<sup>9</sup>) - MAVIR - has been re-integrated with MVM, the state-owned main producer. The restructuring process foresees a holding with different subsidiaries for transmission and production. The regulator prohibited the initially foreseen contractual control of the holding company over the transmission subsidiary. Still control via the General Assembly representing share holders' interest is possible.

On the other hand, Poland introduced a hybrid system where elements of ownership unbundling and ISO are combined. In this model the ISO leases the grid assets from the Transmission Owner (TO). By doing that operation and maintenance are in one hand. Such a model will not solve the problems relating to new investment because the TO is potentially still in a very strong position to delay or even prevent investment if it wants to. The following table shows the number of ownership unbundled TSOs in 2006<sup>10</sup>.

<sup>9</sup> Under an ISO model the Transmission System Operator (TSO) function is split from the Transmission Owner (TO) of the asset and the TO remains as part of the Vertically Integrated Utility).

<sup>10</sup> In England and Wales the TSO is ownership unbundled while in Scotland there is an ISO system with two different TOs. In 2007 one of the grids in Luxembourg has been redefined as an industrial grid so there is only one TSO left.

<i>Electricity</i>		
	<i>Number of TSO</i>	<i>Number of ownership unbundled TSO</i>
AUSTRIA	3	0
BELGIUM	1	0
CYPRUS	1	0
CZECH REPUBLIC	1	1
DENMARK	1	1
ESTONIA	1	0
FINLAND	1	1
FRANCE	1	0
GERMANY	4	0
GREECE	1	0
HUNGARY	1	0
IRELAND	1	0
ITALY	9	1
LATVIA	1	0
LITHUANIA	1	1
LUXEMBOURG	2	0
MALTA	NAP	NAP
NORWAY	1	1
POLAND	1	0
PORTUGAL	3	1
ROMANIA	1	1
SLOVAK REPUBLIC	1	1
SLOVENIA	1	1
SPAIN	1	1
SWEDEN	1	1
THE NETHERLANDS	1	1
UNITED KINGDOM	1	1

\* NAP = not applicable

In 2006 and mainly in 2007 most of the remaining Member States implemented “legal” unbundling for DSOs which certainly improved the situation. **However the reports from national regulatory agencies show that many distribution companies which are part of a vertically integrated company are not set up to act independently.** Companies argue in favour of giving incentives to the management of the network companies which are linked to the economic interests of the integrated companies. Likewise they support some relationship of the management in the network company with the management of the integrated company. It seems to be evident from the national regulators reports that they are not given the instruments to enforce effective unbundling in these cases – regulators are mainly forced to use “sunshine regulation”, i.e. they just report on those cases without any legal possibility to change the behaviour of the companies. More and more the picture drawn in past EREG assessments (2005 and 2006) of the national regulators’ reports is supported, namely that **many Member States do not really allow regulators to enforce unbundling properly.**

## 6. Transparency

**In gas as well as in electricity national regulatory agencies report some progress concerning transparency as regards TSOs.** In the areas of gas storage and electricity production only some improvements have been reported. Furthermore, the **EREG's monitoring of compliance with the Electricity<sup>11</sup> and Gas Regulation<sup>12</sup> shows that most network operators in the electricity and gas sector do not meet their statutory transparency requirements and duties of disclosure satisfactorily.** In major continental markets incumbents voluntarily publish some information ex-ante on electricity production capacity and ex-post on production.

While the EREG welcomes these initiatives of increased transparency, we however point to the necessity to guarantee comprehensive information on supply and demand as laid down in Congestion Management Guidelines (which came into force in December 2006). The EREG has developed (August 2006) [Guidelines for Good Practice on Information Management and Transparency \(GGPIMT\) for wholesale markets](#) and advised the European Commission that these voluntary guidelines should be implemented in a legally binding way. Furthermore, the EREG has advised the European Commission that the current transparency requirements in gas are insufficient and has proposed several amendments to the Gas Regulation and made some recommendations beyond the existing regulation on LNG, storage and balancing<sup>13</sup>.

## 7. Security of Supply

**As already pointed out last year there are encouraging signs of a new investment cycle.** This certainly leads to rising prices of project costs for equipments as well as human resources. This constitutes an important part of potential project risks and thus may reduce investment activities by smaller investors who are less able to hedge this kind of risk.

Italy, constituting the major sink in the European power sector, has increased its available capacity by almost 9000 MW between 2003 and 2006, thus turning the negative supply balance into a positive. The prospects for the years ahead seem to point to the same direction for the electricity system as a whole in line with the EREG's assessment last year and the UCTE adequacy report.<sup>14</sup> Delays in announced projects in generation or networks cause some concern for individual regulators. Supply and demand balances may change for several countries turning former net exporters into importers. For example, in Germany neither the construction of conventional power plants nor the expansion of the electricity network is progressing as required or planned. Without concerted efforts on this issue, the security of supply could be affected.

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<sup>11</sup> See "Compliance with the Electricity Regulation 1228/2003 – An EREG Monitoring Report" (E07-EFG-23-06), 18 July 2007.

<sup>12</sup> See Compliance with Transparency Requirements of the Gas Regulation 1775/2005 – An EREG Monitoring Report" (E07-TRA-02-03), 18 July 2007 and "EREG's Gas Transparency Requirements –An EREG Additional Monitoring Report" (E07-TRA-02-03b), 9 October 2007. The latter is additional monitoring by EREG, requested by the European Commission, which explains why compliance by TSOs with the legally binding requirements of the Regulation is so unsatisfactory.

<sup>13</sup> See EREG' "3<sup>rd</sup> Legislative Package Input – Transparency Requirements for Electricity and Gas – a coordinated approach", (C06-SER-13-06-6-PD), 5 June 2007.

<sup>14</sup> See UCTE System Adequacy Report 2007-2020, 16 January 2007, at [http://www.ucte.org/library/systemadequacy/saf/UCTE\\_SAF\\_2007-2020.pdf](http://www.ucte.org/library/systemadequacy/saf/UCTE_SAF_2007-2020.pdf)

Investments in infrastructure either in gas or in electricity face new challenges. The first stems from agglomerated investment in renewable electricity production (such as wind) which necessitates high capacity transport infrastructure to adapt the system to capacity pockets of several thousand MW. As these investments are not even yet in the pipeline the electricity system remains under stress.

A second challenge arises as the cycle in electricity is dominated by gas power stations. Gas infrastructure thus becomes instrumental also for the electricity system. One of the critical factors is therefore that realisation dates will be met. Delays in authorisation procedures for gas projects therefore constitute a major risk to security of supply in gas as well as in electricity.

ANNEX: Table 1

2006 Correlation Daily Base load Spot Prices

	AUT	CZE	DNK	ESP	FIN	FRA	GER	ITA	LITHU	NL	NOR	POL	ROM	SWE
<b>AUT</b>	1.00													
<b>CZE</b>	0.68	1.00												
<b>DNK</b>	0.52	0.40	1.00											
<b>ESP</b>	0.50	0.23	0.29	1.00										
<b>FIN</b>	0.21	0.23	0.71	0.12	1.00									
<b>FRA</b>	0.91	0.57	0.37	0.53	0.08	1.00								
<b>GER</b>	0.87	0.60	0.44	0.42	0.17	0.80	1.00							
<b>ITA</b>	0.74	0.53	0.49	0.30	0.25	0.66	0.60	1.00						
<b>LITHU</b>	-0.14	0.05	0.29	-0.19	0.58	-0.27	-0.14	0.02	1.00					
<b>NL</b>	0.83	0.57	0.40	0.39	0.11	0.81	0.74	0.59	-0.24	1.00				
<b>NOR</b>	0.07	0.20	0.64	-0.07	0.89	-0.09	0.06	0.13	0.71	-0.01	1.00			
<b>POL</b>	0.35	0.42	0.45	0.16	0.30	0.25	0.30	0.41	-0.02	0.29	0.27	1.00		
<b>ROM</b>	0.23	0.27	0.14	-0.18	0.09	0.15	0.19	0.43	0.25	0.10	0.12	0.14	1.00	
<b>SWE</b>	0.15	0.23	0.73	0.01	0.95	0.00	0.13	0.22	0.67	0.06	0.97	0.30	0.12	1.00

Remarks:

- Denmark: Average over east and west region
- Norway: Average over three regions