

## Security of gas supply for Europe

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## **Abstract**

During the last two years security of gas supply to Europe has returned several times to the spotlight after decades of a steady and apparently peaceful growth of natural gas markets. At the turn of the century energy security made its back as a priority in the agenda of the main political leaders opening an era of energy events and of new threats on the future energy demand and supply balance and possible supply disruption risks; most supply security concerns are now focused on natural gas following the commercial and political tensions which occurred between Russia and some of its neighbouring customers in 2006 and 2007.

This article underlines the changing environment of the European gas markets which has already and will have a long lasting impact on gas supply security: growing share of natural gas in total primary energy requirements in the European Union and growing dependency on imports, competition with other importing areas in a more and more global market, new approach of internal security of supply in an integrated and liberalized gas market, closer links between electricity and natural gas markets, new EU energy and climate change policy objectives will increase uncertainty and risks. Nevertheless number of lessons can be drawn from the past and many existing tools already allow market players to reduce the risks of short term supply disruption.

More has to be done in the field of geo-political risks in order to secure the future required investments in infrastructures along the gas chain and the longer term supply to European markets.

The present article shows that there are promising tracks for an improved relationship between producing and consuming countries with a new approach taking more into account the effects of the globalization process and of climate change constraints. Such a process will require a deep

involvement of all stakeholders (European and international institutions, governments, industry, NGO) to agree on a new sharing of responsibilities and of benefits.

The example of the long term relationship between European importing companies and producers inside or outside the European Union shows perfectly that contractual and commercial agreements can survive in sometimes difficult political circumstances as long as politicians are not direct stakeholders in this part of the negotiations; transparency of the role of each stakeholder is a key condition for limiting the risks associated to some conflicting commercial or contractual discussions. As far as market opening in the EU has significantly increased the number of parties involved in the gas market a clear definition of the role of the different bodies or companies is absolutely necessary. At the final stages, that will allow those who are practically responsible for security of gas supply to manage their business in the most efficient way.

## **1. Security of gas supply, a changing and multi-faceted concept**

### **1.1. The domestic security of natural gas supply**

Security of energy supply has been for a long time one of the key concepts of the national energy policies even in countries where market rules and instruments were playing the first role; it is in fact an evolving concept, from one period to the other, from one country to the other, depending mainly on few basic factors: level of indigenous sources of supply, dependency on imports, share of imported energy in the national energy balance, role of the state in the national energy policy, power of private companies, level of geo-political risks.

As far as European gas market is concerned, security of supply has been described during decades as the guarantee of gas volumes able to meet at any time the demand of firm customers at a reasonable price in an area which had changing borders or definitions depending on whether we were talking about EU 15, EU 25 or EU 27. This explains to a large extent why the concept of European security of gas supply remains a subject for debate and studies.

Since the beginning of natural gas era in the early sixties, Western European gas markets experienced a 40 years period of a remarkable degree of security in gas supply without any major disruption [2]. National markets have been developed firstly with supplies from indigenous fields and then through imports from few producing countries on the basis of long term transport and sales contracts. Studies produced before the end of the nineties on security of supply emphasized the good track record of the gas industry [3]. The responsibility was mainly in the hands of national companies considered as (*de jure* or *de facto*) local or national monopolies until the opening of gas markets in the EU [4]. In a liberalized internal market, security of supply has to be managed on a different basis and shared between different market players, the public authorities and regulatory bodies.

According to the framework of the 2003 directive, security of supply policies have to be compatible with the well-functioning of the internal market and have to be transparent and non discriminatory.

Therefore the directive of April “2004 concerning measures to safeguard

security of natural gas supply” [5] defined a common framework for policies to be decided at the Member States level which “should not impose unreasonable and disproportionate burden on gas market players”. Following this framework security of gas supply is under the responsibility of governments. The April 2004 Directive states also “the completion of the internal gas market necessitates a minimum common approach to security of supply, in particular through transparent and non-discriminatory security of supply policies compatible with the requirements of such a market, in order to avoid market distortions”.

The Gas Co-ordination Group [6], set up under the same Directive, worked efficiently during the commercial and political tensions between Belarus and Russia in the first days of 2007 showing concretely the benefit of a greater co-operation among the Member States and the representatives of the gas industry and of a more formal exchange of information.

Nevertheless during this short crisis it was obvious that like during the January 2006 crisis between Russia and Ukraine the elements of the problem was fully out of the hands of EU [7]. It was also illustrating that such a crisis affecting one of the major sources of supply of the European gas market could have been detrimental to many of the 27 Member states in case of a longer disruption in particular for the East European countries which are highly dependent on Russian gas, even those supplied through the Ukrainian corridor. One lesson which could be drawn from this disputes relating to gas prices or to transit arrangements is that a conciliation body and (or) procedure should be likely the best way to go out of the bilateral disagreement when no solution is rapidly found by the parties.

In these two cases of disputes, even if we cannot exclude a strong historical and political background, the final solution was for Russia and its CIS customers to shift towards “international market prices”. It was also an opportunity for EU and some governments in the EU Member States to know better the context of international gas trade and of transit agreements. It could be also a good case to elaborate on the following question: why is it today so difficult to build and launch international pipeline projects crossing several transit and likely consuming countries?

## **1.2. The external dimension of security of gas supply for Europe**

These 2006 and 2007 disputes and the uncertainty on future long distance international projects shows how the external dimension of gas supply to Europe and of its security in the long run has shifted towards a more global and interdependent approach.

With the enlargement of the European Union towards Eastern European countries, the building of an internal market depending more and more on non-European supplies and simultaneously an increased competition to get access to energy resources, it is no more possible to limit security of supply policy to the only choices of each Member State. This is particularly valid for natural gas which has to go through dedicated and less flexible infrastructures (especially when it comes to international transit corridors).

The external dimension of European gas market relies in fact on three pillars:

- the commercial and the contractual framework established between producers, importers and transit operators in accordance both with EU rules and with international business agreement and arbitration practices,
- the context of bilateral and multilateral relationship between EU Member States, EU Commission and international organisations like IEA, UN on one side and producing countries, exporting companies and organisations of producers on the other side,
- strategies of emerging countries in the field of control, ownership and management of their energy resources.

Such a complex scheme of relationship requires a high level of dialogue between EU Commission and EU Member States in order to define clear positions and responsibilities towards third countries, trying to avoid inconsistencies which could be at the end of the day detrimental to European interests.

## **2. A new environment for the European gas market**

We must not ignore that a number of fundamental changes have modified the European energy scene since the early nineties:

- a steady gas demand increase significantly boosted by the requirements of the electricity sector which had to cope with both new environmental regulations and anti-nuclear policies in several Member States,
- new gas sources and routes, a strong investment cycle in new production, transport and storage infrastructures (both for LNG and pipeline routes),
- a growing conviction that climate change becomes the first priority for energy deciders with a great number of uncertainties for the whole energy world during the decades to come.

### **2.1. A fully opened market towards a single market**

Legally all electricity and gas markets of all EU Member States with the exception of few temporarily exempted regions or states are now opened to competition; the way could be still long to achieve the goal of a *single electricity and gas markets* which requires more market integration. A well functioning market is one of the key factors of security of supply especially for gas - more than 60% of natural gas volumes delivered to European consumers are crossing at least one border and with the increasing dependency on imports figures will be much higher in the future.

#### **2.1.1. On July 1<sup>st</sup> 2007 electricity and gas markets are fully opened to competition**

All types of customers (industrial, professional and residential) in the European Union are free to choose their gas and electricity supplier. Referring to the experience of Member States which already opened their markets several years ago it is uneasy to suggest which proportion of the new “free customers” will be ready to leave their present supplier now or during the next five years. The result is very different from one country to another, UK being at the top with more than 44% of customers having

chosen a new supplier around ten years after the full opening of gas and electricity markets.

In any case there is no way to go back to the former status for EU Member States. This no return situation did not prevent the debate which is now widening in the Union: how attractive are the offers of the newcomers at a time where price expectations suggested by the level of energy prices in the world is not encouraging customers to speculate on significant future gas or electricity price decrease which could be expected from competition?

The DG Competition report on energy sector inquiry [8] presented on 10<sup>th</sup> January 2007 underlined the role of international energy prices in the current increase of European electricity and gas prices but “aimed at assessing the prevailing competitive conditions and establishing the causes of the perceived market malfunctioning”. DG competition underlines in its summary that “the Energy Sector Inquiry has focused on identifying areas where competition is not yet functioning well and those areas which need to be addressed the most rapidly in order for liberalization to bear fruit”.

The current debate on the type of unbundling to be included in a new directive is once again the cornerstone of the new Commission’s proposal. Incumbents are suspected to show a limited enthusiasm to try to find customers outside their country; the wholesale market remains too limited to national area; but the main criticism is focused on the present level of unbundling which is reported as “having negative repercussions on market functioning and on incentives to invest in networks”. Therefore the ownership unbundling leading to the establishment of completely independent entities for commercial and regulated activities is the preferred solution proposed by the EU Commission in its “third legislative package” [9] presented on 19 September 2007.

The debate is now launched and very tough discussions will take place on a solution which could be a compromise safeguarding the objectives of the Commission and calming the fears of the main European integrated gas players.

If it is obvious that EU gas and electricity markets cannot be described as fluid, transparent and fully non discriminatory markets, and it is not surprising: after decades of monopolistic and state controlled organization at a national level, few years are not enough to change not only the structure

of the companies and the management style but also, what was too frequently misunderstood or even ignored, the purely technical organization and its risk management which was inherited from the time where network and capacity building were the top priority. On the way to a system focused on the customer, offering transparent and non discriminatory choices, there are obvious cultural and practical obstacles which are progressively disappearing.

In a market where gas flows are increasingly coming from non-European exporting companies more and more interested and even involved in the markets of several Member States, the control of transmission networks becomes a strategic goal and therefore makes the debate on unbundling much more than technical. Producing companies, which are frequently dealing with gas and oil, are looking for downstream integration in order to diversify their risks and to get additional parts of the rent at the same time, their counterpart on the buyers' side could have to withdraw from their midstream assets if the ownership of the infrastructures should be transferred to new entities fully independent from the commercial ones.

Such a situation is obviously weakening their business position and their bargaining power while market conditions are giving again to the producers a true advantage against their customers, it could also make all parts of unbundled companies more vulnerable to possible takeover bid.

Possible limitations imposed EU legislation to investors from producing countries do not appear for European gas players as the relevant tool to overcome fears about the future context of relationship with their usual counterparts: the requirement for foreign investors to be established in a Member State before taking shares in an unbundled transmission company is not sufficient in a world where financial markets globalization is always innovating.

Such a rule should be also a subject for in depth analysis to have some evaluation of possible consequences on the policies of producing states and (or) companies in negotiations rounds for future large import projects or for investments of the European companies outside Europe.

### **2.1.2. A growing demand and a declining domestic production conditions for a rapidly increasing dependency on external sources**

While the liberalisation debate is continuing on the legislative scene natural gas demand continues to follow its upward trend supported both by its environmental qualities and by its attractiveness for electricity producers finding in the new gas generated plants very efficient and profitable instruments with relative short term visibility and therefore limited risks.

Facts and figures summarize clearly the present picture of the EU- 25 natural gas market [10].

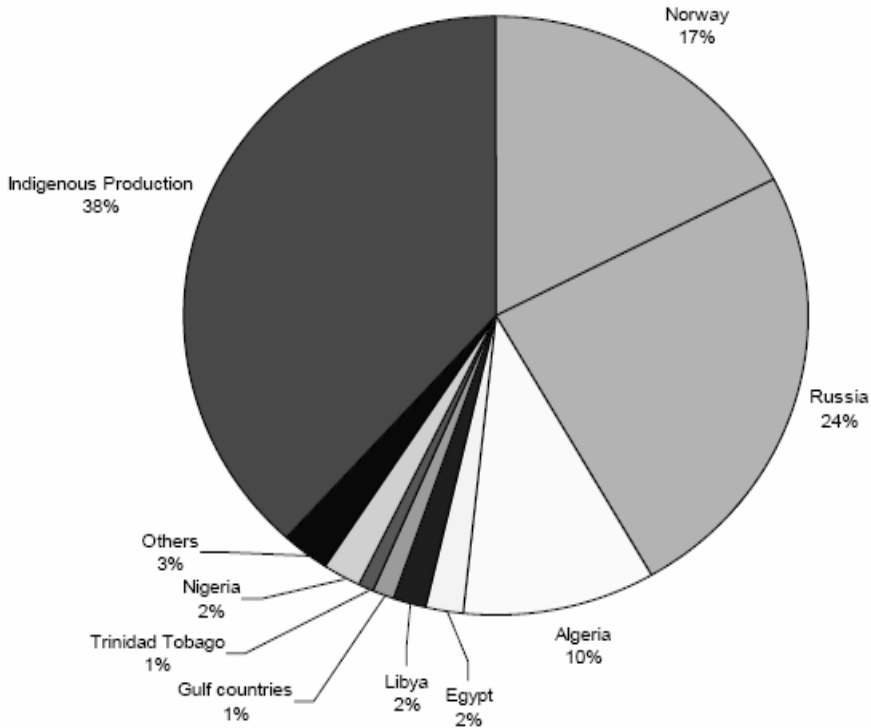
- In 2006, gas demand reached 408 Mtoe in 2006 against 260 Mtoe in 1990 while the domestic production was growing from 140 Mtoe to 194 Mtoe leading to an increase of imports of more than 90 Mtoe per annum
- Indigenous production of EU25 represented 38% of total net supplies in 2006. As shown in the chart hereunder a number of new non-European suppliers appear on the European gas market besides the former main contributors: Russia (24%), Norway (17%) and Algeria (10%).

The diversification of supplies is coming from South America (Trinidad and Tobago), North Africa (Egypt) and Middle East (Gulf countries).

European indigenous production confirmed last year its declining trend with a 4.9% decrease. UK gas production was especially hit with a 9.6% decline confirming that UK resources are now declining and that the huge UK gas market will need more and more imported gas

On the demand side the increase of natural gas consumption in the power sector covered half of the total market growth during this 16 last years period and its share in the total gas consumption is now higher than 25%. Natural gas is very close to solid fuels (coal and lignite) which remain the first fuels in terms of electricity generation capacity but gas should likely take the lead in the next years.

### 2006 EU25 Supplies

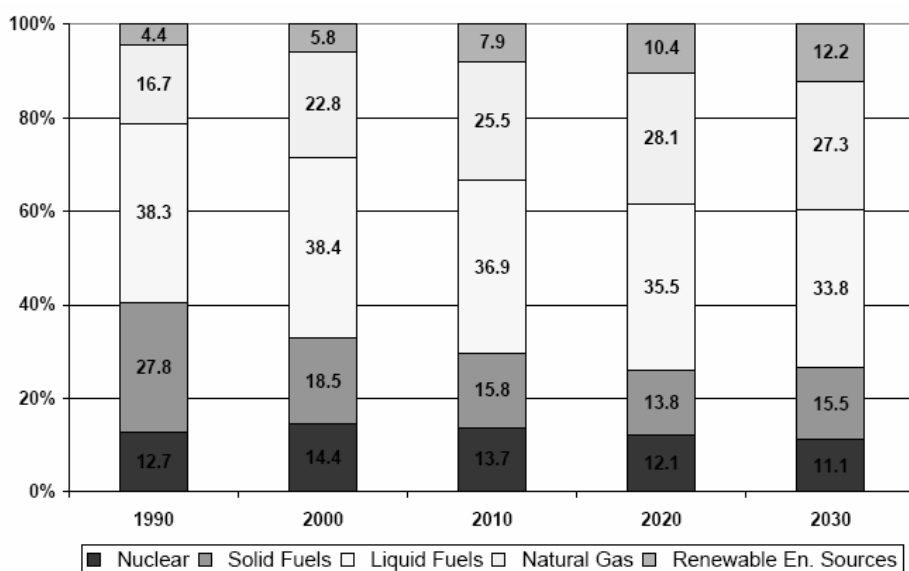


Source: Eurogas, Natural gas consumption in EU25 in 2006, 26<sup>th</sup> February 2007

Taking into account this trend, the prospects produced by international institutions, the European gas industry or the European Commission are expecting that natural gas demand will continue to grow significantly during the coming decades, even if differences are significant between the various forecasts. According to the 2005 update of its “Energy Trends to 2030, the European commission anticipates an increase of gas share in primary energy requirements from 24% in 2005 to 27% in 2030. Natural gas consumption should reach 635 billion cubic meters (BCM) in 2030 against 483 BCM in 2005; as a consequence of a strong decline of EU indigenous production by 60% from 2005 to 2030, net EU gas imports could double on an annual basis compared to 2005 level.

If such prospects could be considered as a tremendous business opportunity, it represents also many tough challenges to overcome: access to gas sources and volumes, huge investments to be achieved in due time in production, transport and distribution infrastructures, a new context for security of gas supply for European markets including more and more stakeholders located outside the European Union.

### Structure of primary energy demand in EU 25 [11]



Source: PRIMES.

## 2.2. Huge investments required for future supply infrastructures in a changing framework of commercial and contractual relationship with producers

In its action plan presented on 10<sup>th</sup> January 2007, the EU Commission mentioned as one of its priorities the need to develop new infrastructures in EU 27 [12] and in particular the Trans-European Networks (Projects of European Interest) already identified as priority projects in order to meet the future growth of electricity and gas demand and to improve interconnections and thus security of supply.

In fact the challenge includes also the transportation infrastructures which will have also to be built outside the territory of the EU 27. According to the estimates of the industry published by Eurogas, “almost all of the additional growth in gas supplies will have to be met through new, long distance pipelines or in the form of LNG” and mainly on the basis of gas flows from the east (Middle East, Caspian Basin) or from the south (North and West Africa).

Not far from 500 billion euros will need to be invested in gas supply infrastructures in EU countries [13] while more than 190 billion euros will be used to build production, treatment and transport facilities in the producing and transit countries. Investment will be made only if the associated risks (market risks and geopolitical risks) are properly mitigated.

### **3. What is natural gas security of supply in the new context?**

#### **3.1. Setting the scene of security of gas supply in EU27**

The new gas market situation in the European Union could be summarized as follows in terms of security of supply:

| <b>Figures on natural gas market in EU25 (2006)</b>                    |
|--|
| 105 million gas customers at the end of 2006                           |
| Domestic consumption : 486 billion cubic meters                        |
| Share of domestic production in total net supplies: 38%                |
| Imports from Russia, Norway and Algeria represents 51% of total supply |
| 14 LNG terminals   |
| 120 storage facilities with a max working volume of 70 BCM             |
| Storage withdrawal capacity : 1.5 BCM/day                              |
| Total pipeline length: 1.8 million km                                  |
| <i>Sources: Eurogas, GIE (Gas Infrastructure Europe)</i>               |

From 1<sup>st</sup> July 2007, most of the 105 million customers are free to choose their supplier among number of existing companies or new entrants in the market. The definition of security of supply remains the same: to show operational capability to match demand and supply with different constraints depending on whether it means short term or long term security of supply. But the market size, the number of customers and of involved countries, the huge development of infrastructures, the growing need to have access to external sources and the changing environment outside the EU make the challenge of securing gas supply more complex and more uncertain. In the former gas market organization when talking about security of supply, producing and importing companies in individual European countries were generally supposed to take care at national level, in relation with public authorities, about short term and long term security of supply.

In the new context, all the parties involved in the market have some concern on both short and long term aspects which are in fact more and more interrelated in particular because of the new extensive and competitive definition of their market area combined with the long lead time required by most of the investments in gas production, transport and storage infrastructures and the associated risks. Strategies of individual market players need to take into account a broader vision at least at the regional if not at European level.

One of the key elements of short and long term security in the European gas market has been the progressive implementation of a security system including the commercial aspects (types of contracts, flexibility, price review clause, interruptible supplies ...) and the technical ones (pipelines, interconnections, storage facilities) at a pace compatible with the evolution of supply and demand balance.

If we want to avoid unpleasant surprises in the field of security of supply for gas we need to continue to apply such principles in the future, even in a much more uncertain context than it was in the past decades: there will be a market for gas at any time in the future if gas volumes are made available for end consumers through adequate infrastructures at a competitive price and with a sufficient level supply security in conditions compatible with environmental requirements.

### **3.2. A set of existing efficient instruments**

Among the usual instruments contributing presently to security of supply system, interruptible contracts with end consumers, fuel switching, withdrawal from storage facilities or development of more integrated and more integrated networks have proved to be efficient and reliable.

Other instruments are more recent because they were developing along the process of market opening with the intervention of new market actors: such are hubs with the possibility of spot contracts, the establishment of transactions on futures and finally new regulations on access to storages and the creation of new bodies (EASEE gas) [14] where all market participants meet and define transparent and standard criteria for their business.

#### **3.2.1. The decisive role of the diversity of supply sources and transit routes**

In the more mature and large markets in European countries diversification of supply sources and routes has been for a long time one of the main strategic objectives of gas companies; depending on the geographic location and on the economic conditions of the access to given gas resources such diversification may be limited.

The strong development of new LNG sources and of receiving terminals brought in some cases a very useful and efficient alternative for an improved security of supply (Spain, Italy, France, Belgium and Greece).

The bulk of gas supplies to Europe will remain transported through high pressure pipelines from the main present sources (Russia, Norway and Algeria), even if new producers could appear with new routes (Azerbaijan, Kazakhstan, Turkmenistan, Iran, Iraq and Egypt).

According to the latest industry estimates' [15], almost 25% of the gas quantities expected to be required by the European market in 2020, between 140 and 160 BCM have still to be contracted mostly among non-European gas producers to fill the supply gap at that date.

New routes from existing suppliers are planned or under construction in order to meet the future needs of the market and to improve security of

supply by laying new onshore or offshore pipelines reducing the risk attached to each specific line in the total supply.

Among the main supply projects planned until 2010-2015 the following ones will probably play a key role in the future gas supply flows to Europe.

- In 2007, coming on stream in Norway of the Ormen Lange [16] field for export to UK of 20 BCM/year,
- The Nord Stream [17], a large pipeline project from Russia to Germany across the Baltic Sea is expected to transport 27.5 BCM/ year in its first phase and to be doubled later,
- Two sub sea pipelines, Medgas and Galsi, are respectively under construction and under study to carry gas to Spain and to Italy (eventually with a leg to France), both with a capacity of 8 BCM/year,
- The Nabucco gas pipeline project [18] is an ambitious project aiming at improving significantly the diversification of European gas supplies through connections with sources in the Caspian region, Middle East and Egypt via Turkey. This project is supported by the European Commission.

It is interesting to note that excepting Nabucco line all projects of transport infrastructures are linking directly the exporting country to the importing one without transit in a third one improving security of supply by avoiding any potential transit dispute and trying to achieve a line as direct as possible.

This short list of large projects which represents investments ranging between 1.5 billion euros and more than 4 billion euros (depending on their individual size) illustrates the weight of the financial commitments which have to be decided now to meet market requirements in about ten years and further.

### **3.2.2. The need for more integrated and more interconnected networks will grow with market expansion**

It is useful to remind the impressive expansion of the European gas grid which is appearing in the comparison of its 1970 status versus the 2007

situation; the natural gas market growth would have been impossible without the massive investment flows engaged not only by the producing and the supply companies, which took the major part of the responsibilities attached to the large import/export projects, but also by national and(or) international financing institutions and specialized service companies contributing to the completion of this grid system.

With the continuing increase of gas outlets, the changing nature of gas customers using more and more natural gas to produce electricity –that was in contradiction with EU legislation 20 years ago, and the need to avoid bottlenecks or congestion, detrimental to the achievement of a fluid and transparent market, continued technical and financial efforts have to be made on the day to day basis to keep the system suitable with the flows required by the market.

In that respect the international lines laid in order to carry imported gas to the consuming countries plays a key structuring role for the European grid as well as the increased number of new entry points into the EU, LNG terminals and landfall pipelines, which are connected by new onshore lines to the main network and(or) to storage facilities.

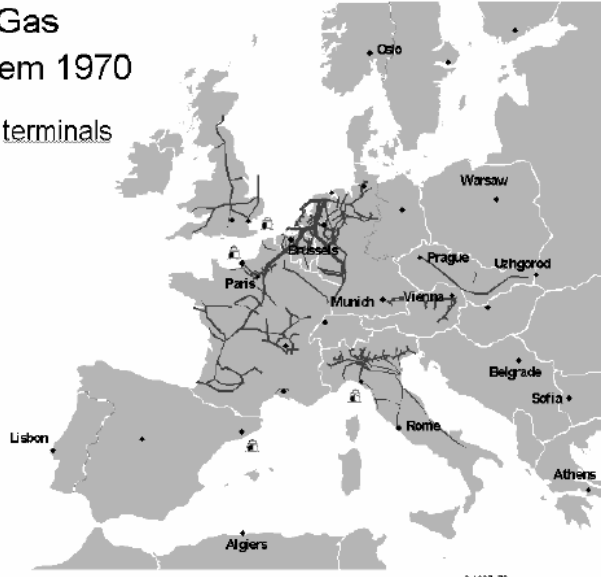
Besides network operators are committed under the control of the regulation authorities to build the necessary equipments to meet the market needs and to anticipate future demand growth in order to plan in due time the building of new capacities and the corresponding capital to be invested in the required infrastructures.

A debate has been opened at the coming into force of the first gas Directive by the large consumers' organizations and by traders' association on the lack of transparency and on the discriminatory behaviour of network operators. The suspicion climate and even repeated accusations against the network operators, the reports of the regulators showing that existing regulations are not properly applied and asking for a more constraining legislation and the critical results of the Commission's inquiry give a general feeling that the gas directive 2003/55/EC cannot be successfully implemented and cannot bring to the final customers the expected benefits of the liberalization process. Jointly with an unstable legislative framework such a climate is not encouraging investments in new facilities and support from the financial institutions.

## European Natural Gas Transmission System 1970

pipelines/LNG receiving terminals

- natural gas pipelines in European grid
- other pipelines
- 📍 LNG receiving terminals

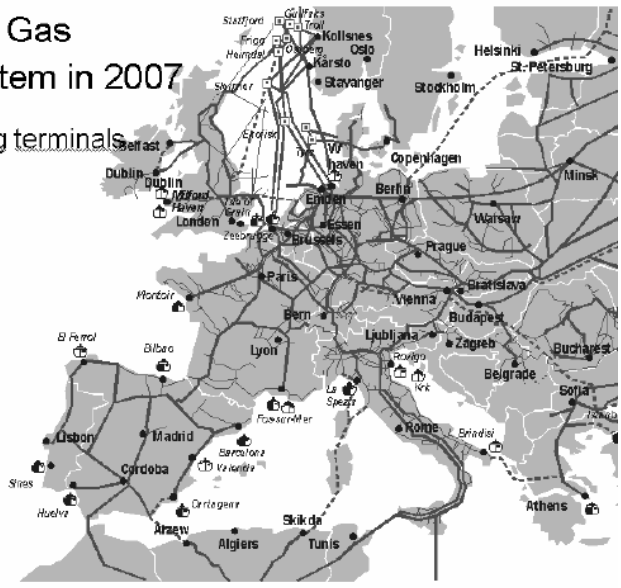


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## European Natural Gas Transmission System in 2007

pipelines/LNG receiving terminals

- existing
- - - planned or under construction
- 📍
- 📍



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Source: Eurogas

During years the liberalization process of electricity and gas markets in Europe suffered of a lack of dialogue between the market stakeholders, the European Commission and the competition authorities. That is still a pending subject of misunderstanding even if now everybody is recognizing that the external dimension of the gas business has much more impact on the internal market than assumed before. Time has come now to build common rules in a balanced and fair way together around the same table in order to make progress towards a marketplace offering truly a win-win perspective to all market players.

Therefore it is crucial that a stable framework has to be established giving the right incentives for investment in new infrastructures in the EU network. All countries or regions in the EU are not in the same situation especially the Member States which joined recently the Union. To solve eventual congestion problems or insufficient interconnections it is better to act in a pragmatic way and through the involvement of all the concerned parties to find the optimal solution. In any case the decision of building a new interconnection line has to be taken on the basis of the analysis of the present market structure and trends and of detailed forecasts of possible demand increase in the medium and long term [19].

### **3.2.3. New instruments improving the liquidity of the market hubs, spot markets, futures**

Trading hubs are new for European gas markets except in UK where the market liberalization started much earlier than on continental Europe; they are well developed since many years in the US, thanks to the conditions prevailing in the US market: large supply and demand base, a strong transmission system and several thousands domestic producers [20].

There are already several physical interconnection points or areas in Europe which are developing trading hubs aiming at boosting the development of wholesale gas markets and further spot quotations. Trading hubs are contributing to improve transparency of gas transaction prices and liquidity which means that no single company can sustain undue influence on the traded gas prices. Ideally physical hubs should be located at the confluence of several pipeline systems supplied by several sources and connected to storage facilities; an efficient co-operation of the concerned transmission system operators is necessary to guarantee the efficiency of the transactions of the trading hubs.



The progressive creation and development of hubs in Europe will at the same time improve the exchanges between market actors and give a positive example of what can be done by market stakeholders without constraining legislative regulation. It cannot be contested that hubs will be a key element in the future security of supply system through its contribution to supply and demand balancing in the short term and its role in the price building process.

#### **3.2.4. Interruptible supplies and fuel switching necessary as security of supply tools**

Interruptible contracts are based on the principle that the customers can stop their activity or have quantities of another fuel and related equipments able to replace the missing gas supply. They were until gas market opening used more as a commercial opportunity to negotiate separately alternative or back up gas supplies with another supplier than to solve short term demand and supply imbalances or supply disruptions caused by technical problems in the network.

It remains clearly a well adapted answer in case of supply disruption when it is coupled with fuel switching. The duration of the technical disruption or supply crisis (due to accidents or meteorological disorders) will have to be taken into account especially regarding availability and pricing of the alternative fuels (mainly coal and fuel oil). The efficiency of such interruptible supplies requires that an alternative system can be rapidly activated at any moment in particular during the peak demand period when most of the capacities are already used. The supplier and the customer have to include such possibility to interrupt supplies in their emergency plans which need be prepared and tested in advance. The recent examples in electricity or oil supply problems showed that the efficiency of the answer and the rapidity of the fuel switching have a crucial role in the limitation of consequences of the crisis.

In that respect the development of multi-fuels combined heat and power plants and of district heating is an excellent way to increase the flexibility of the energy supply system with substantial benefits for energy savings and reduction of energy dependency on imports. Such solutions which are already well developed in Northern European countries have still to be promoted in the main energy markets in Europe

### **3.2.5. A specific issue: storage facilities, opportunities and constraints**

Storage plays a traditional and important role as one of the pillars of gas security of supply with transport infrastructures. Storage capacities always needed to be increased along the growth of gas markets, in particular because of the dominant share of heating in gas demand.

Firstly storage is a tool for balancing seasonal variations in consumption and covering demand peaks. It may be also used to secure gas supply when one link in the gas chain, production, transport or supply cannot work at its required level. Storage is also a means to optimize network operation and to improve the cost effectiveness of the gas transport.

According to industry estimates storage volumes need to expand by 3BCM/year until 2025. The gas storage database of GSE (Gas Storage Europe) [21] in its update of July 2007( ) was mentioning projects for 36.6 BCM of new storage capacities in 16 EU Member States to be built until 2015.

The main gas markets in Europe, Italy, UK, Spain, Germany, Austria, the Netherlands and France will be investing in new or extended storage sites; it is worth to remind that underground storages are long lead projects: for a new site, identifying an adequate site, obtaining the necessary authorizations, drilling the wells and filling the reservoir could take 7 to 10 years.

Storage has been a very tough subject for debate in the context of the EU Directives- Gas Directive and Gas security of supply Directive-, storage being a strategic tool generally owned and managed by the incumbents before the coming into force of market opening.

Significant changes have occurred in the conditions of management of access to storage in a way more favourable to short term operations and involvement of new entrants in the market. In any case the solution at the European level should be a compromise between, on one side, the need to guarantee the overall security of supply of the European gas system with huge investments to be planned and achieved and, on the other side, to give sufficient access to storage in a commercial purpose as a necessary complementary instrument in short term operations to a maximum of

market players; over-regulation could be counter-productive in this field as in many others in energy market.

The issue of strategic gas storage remains a conflicting point insofar as some experts recommend, by analogy with oil strategic reserves and strategic storage management rules, to build or to dedicate some gas storage volumes to be used in case of serious supply crisis, aiming at giving reassuring signal to consumers and at avoiding speculation on prices. Such strategic stockpiling would obviously lead to huge additional investments not only in new storage facilities or capacities but also in transmission lines to transport the required gas volumes to the consuming areas concerned by supply disruption or restriction.

It is probably more efficient for market stakeholders and public authorities at the national, regional and (or) at the EU level when necessary to carefully prepare emergency schemes and plans with simulations of some typical supply disruption crises and to optimize eventual investments when they are necessary to improve the efficiency of the emergency answers [22][23].

#### **4. New approaches for new threats: the way forward**

Fortunately, the review of the present situation of the security of supply system in the EU does not confirm the exaggerated fears mentioned in the media some months ago. Nevertheless we need to take into account very carefully several increasing threats which could in the coming decades undermine our level of security or our ability to manage new risks.

##### **4.1. Uncertainty on future gas demand and supply balance in Europe**

The difficulty to forecast future gas demand is one of the new factors which make more complex the security of supply issues: changes in the organization of the market, unbundling of the companies, increasing role of natural gas in the electricity generation inputs, high gas prices and the policies to be decided to meet energy savings and environmental objectives are significant elements which will impact the visibility of future market trends and gas consumption itself.

The progressive globalization of LNG business boosted by the trade in the Atlantic area could lead LNG prices at levels which could open good opportunities for coal in the European electricity generation market and push investors to postpone some of their projects of gas-fired plants [24].

Uncertainties exist also on possible new projects of nuclear plants which are true alternatives if carbon prices reach much higher levels than to-day.

Inter-fuel competition and interactions between the different markets (oil, coal, gas, renewable and electricity markets) leads to have an integrated approach. When there is an electricity blackout there are interferences and also positive contributions from the other energy sectors.

The new EU energy strategy [25] will have in this field a critical impact; it is worth to remind the three main objectives for 2020 in the field of energy demand and supply:

- Reduction of greenhouse gas emissions by at least 20%
- Improvement of energy efficiency by 20%
- Increase of the share of renewable energy to 20%

It is too early to know whether the strong political message sent by the European Commission in January 2007 on climate change and the need to reach the EU objectives will be followed by the expected actions and results of the Member States. In any case, these new guidelines will have a deep impact on the behaviour of the consumers, on energy consumption and on the competitive position of the different energy sources and finally on global security of energy supply.

Therefore it is time now to try to work on models and forecasts which could reflect the complexity of choices and options in the energy market with the objective to have an efficient economy in Europe respecting environmental policies.

Security of gas supply for Europe has to be conceived in this more global approach including future new interactions, in particular with electricity market. Representatives of the different organizations (European professional associations, independent experts, university teams, NGOs) involved in works on energy forecasting in co-operation with EU Commission will get more efficient results in defining together possible

scenarios for the future and relevant strategies to face and possibly limit the new risks.

#### **4.2. A changing context for relationship with producing countries and (or) companies**

Many events and trends have deeply influenced the role and strategies of gas producing countries and (or) companies during the last decade:

- The fast growing gas demand in particular in the electricity generation sector with attractive export prices and opportunities for joint ventures in the different parts of the world.
- Significant progress in technology in the LNG chain (size of the liquefaction trains and of LNG tankers), reduction of costs and growing interest of natural gas exporters and importers for direct delivery chain between buyer and seller.
- Other tensions between industrialized and emerging countries on the way to manage international trade through WTO and also through bilateral relations. Many countries with significant reserves oil and gas reserves or even other raw materials are requiring a new sharing of the benefits drawn from the operation of the extraction or from their export flows; we are at a turning point, in a context of globalization, which is presently emerging through re-nationalization of some companies or resources, of unilateral changes in production contracts and in some extreme cases of restriction of access for foreign investors in areas which were previously open to external operators.

All these elements are showing how much the management of the relationship between EU market stakeholders and institutions vis-à-vis producing countries and companies has to take into account this new reality which is crucial for future EU security of supply [26]. There is no doubt that competition between energy importing countries will increase in a period of high economic growth and renewed expanding energy needs in particular in emerging countries. Natural gas resources will be one of the most disputed.

## 5. Concluding thoughts

Security of natural gas supply for Europe remains one of the pillars of European energy strategy. It will have to be managed in a new perspective taking into account the new conditions of European and world energy markets:

- The existing EU legislation will be achieved through the building of a more liquid and transparent market, with more integrated and interconnected networks, involving a growing number of participants acting in physical or virtual regional hubs. The dispute on dogmatic concepts like ownership unbundling must not prevent to keep in mind that the opening of gas and electricity markets is not the final objective but has to remain a way to improve the efficiency of European economy and the security of supply of EU consumers.

The third legislative energy package is adding a new layer to an extensive set of legislative, regulatory or voluntary directives, codes and guidelines which will still increase the regulatory burden on the market; do we hope that finally the result of the present starting debate could be the clarification of the role of the different stakeholders and of the different bodies involved directly or not in gas business?

Despite this new field of possible conflicts they will have to work together and to maintain a high level of security of supply in a more uncertain environment and to restore climate of co-operation which is essential for preventing or solving supply crises or building the appropriate emergency plans at national, regional and EU level.

- The new EU energy strategy giving priority to climate change and energy efficiency challenges will directly impact the already anticipated energy balances and the strategies of all Member States and market players in the medium and long term and further security of supply approach. The unknown remains how and when the objectives will be translated into actions at the different levels. Significant energy savings, improved security of electricity supply and a new energy mix for a sustainable future will not be achieved without clear guidelines for the coming years, in particular without precise and convergent priorities; we had already in the past a good example with national decisions on

nuclear plants in the nineties which had huge consequences on the whole European gas market and on its supply feature.

All market participants have to work together, to review in details possible impacts on existing forecasts and to built different alternative scenarios which will be very useful for updating supply and demand figures and optimizing investment plans. Natural gas is the preferred fossil fuel in the present context of transition towards a sustainable energy world. Nevertheless natural gas demand could be significantly reduced by strong energy savings in the residential sector and the competition with more diversified fuels for electricity generation in a period of high prices. Such a trend could influence the future level of import dependency and thus reduce external risks for security of supply.

- The improvement of the relationship between the European Union and foreign producing countries and companies is a priority. More than 10 years ago, a dialogue was initiated mainly concerning oil market. Since 2001 events and the worsening of international relations on one hand and more conflicting interests between emerging and industrialized countries on the other hand, such dialogue meets some true obstacles including political ones which makes uneasy if not impossible any discussion in depth on future prices and balance between demand and supply. It is absolutely necessary for world stability in the coming decades that permanent and serious studies, discussions and agreements should be achieved on issues like climate change, access to electricity, energy development, trade and consumption and water resources. Long term security of gas supply has to be seen in this framework because of its international dimension and its key role in primary energy balances.

EU initiated number of specific co-operation frameworks with some oil and gas producing countries or areas looking for partnership agreements; such agreements and permanent contacts are essential with the condition that EU will not try as it was sometimes the case in the past to extend the EU model and rules outside its territory against the positions of the other party. The world competition to get access to resources requires probably to-day a more pragmatic and a more balanced approach to secure the commercial position of EU companies. Some large production and transit gas projects will need a strong support of the governments of the involved countries and agreements on common rules. At the same time, it has to be clear that, in their

contacts, EU authorities must remain in the domain of international relations without any interference in the private commercial negotiations and contracts.

Natural gas got a strong position in energy markets in Europe thanks to a robust industrial basis of large companies able to invest and to take long term risks. In a more uncertain context security of gas supply for Europe can only be maintained by creating a true market place in a non discriminatory and co-operative spirit between all players in order to meet successfully climate change and security of supply challenges for the benefit of all consumers.

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