

The Security of Gas Supply

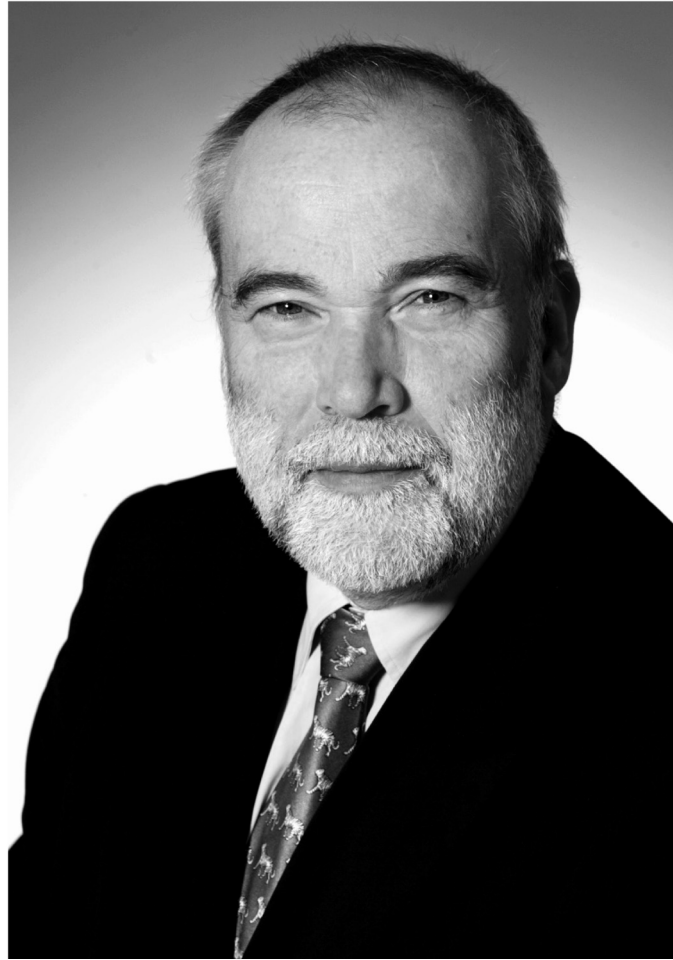
A Critical Issue for Europe?

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The Security of Gas Supply A Critical Issue for Europe?

(Hellmuth Weisser)

Natural Gas has seen unprecedented growth in the European Union over the last decades. It is challenging the supremacy of oil as the leading source of energy and reached a dominant position in electricity generation. There is general agreement that this trend will continue if not accelerate (1).

Up till now there have been no major interruptions of gas supplies in the European Union and many argue that any concern about security of gas supply should therefore be put to rest. It is enlightening, however, to remember that the oil industry and policy makers took a similar stance regarding the security of oil supplies prior to 1973, which is remembered for the first oil shock.

– As Henry Kissinger noted in his memoirs the crisis took everyone unprepared.

But why should security of supply be a concern? – “As the gas and electricity systems become more closely inter-linked the reliability of the two systems has to be assessed in combination”.

(International Energy Agency, 2004. Security of Gas Supply in Open Markets)

“The projected high dependence of power generation on imported gas might create a domino effect on the power sector in case of gas supply shortages” *(ibid.)*.

(1)	EU 30 (!)	approx. million tons	oil	gas
	1990		680	300
	2000		700	430
	2030		870	660

EU Green Paper: Towards a European Strategy for the Security of Energy Supply 7 Com (2002) 321 final

Though not caused by gas supply shortage the Californian electricity crisis (2000/01) and the Italian blackout (2003) demonstrated in a sort of “preview” that a gas supply interruption could have as devastating an effect as the oil shock of 1973. As the past oil crises demonstrated the cost of a supply disruption by far exceeds the cost of the directly concerned market participants. Cost goes far beyond the economic measures of national accounts. Consequential costs include inter alia inflation, trade and payment imbalances, high unemployment and weak consumer confidence. These social costs – or externalities – of a supply disruption generate the need for protective action by government. (*Market-based Options for Security of Energy Supply*, E. Egenhofer et al, March 2004 / *Social Cost of Energy Disruptions*, V. Constantini & F. Gracceva, March 2004) (2)

Discussing and arguing Security of Supply Dependence is often complicated by a lack of clarity about the risks involved. It has been shown helpful to look at four separate risks , i.e.

- Source Dependence
- Transit Dependence
- Facility Dependence

(Security for Natural Gas Markets, What it is and What it is not, G. Luciani, March 2004)

- Structural Risks

It is also helpful to analyse the various drivers that could trigger a supply crisis in the above category such as

- natural disaster
- political blackmail
- Terrorism, war, civil unrest etc

(H. Weisser, Strategic Stockpiling: Best Practices, Pitfalls and Lessons, December 2004)

(2) The interruption of the Interconnector - UK for all of July 2000 demonstrated at least the extreme price sensitivity in case of unforeseen supply interruptions (MJM ENERGY Consultancy Network, MZINE, March 2005)

The **Source Dependence** of OECD Europe will increase from 36 per cent in 2002 to 69 per cent in 2030 and raises the legitimate concern of technical and political reliability. (*International Energy Agency, 2004. Security of Gas Supply in Open Markets / European Commission, Towards a European Energy Strategy for the Security of Energy Supply, Com 2000 – 769 final*).

The bulk of the supply will be concentrated on Russia (33%), North Africa (27%) and the Middle East (17%) (*IEA interview quoted in Reuters Dec. 3, 2002*).

It is almost inevitable to wonder whether these levels are in harmony with the sensible EU policy goal of energy supply security (*European Commission, Towards a European Energy Strategy for the Security of Energy Supply, Com 2000 – 769 final*).

This concern is exacerbated when taking the monopolistic non-market-driven structures in these three regions into account (*IEA interview quoted in Reuters Dec. 3, 2002*).

Looking at Russia, by far the biggest supplier, for analysing the security of supply equation one has to account for the fact that this country's energy policy is not only determined by economic interest but at least equally by geopolitical, foreign policy and security considerations (*A. Nötzold, Konrad-Adenauer-Stiftung, April 2004, Die Europäische Strategie zur Energieversorgungssicherheit*). (3)

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- (3) Though the political situation was and certainly is different it should not be forgotten that Gazprom significantly reduced Belarus' gas supplies for 30 hours in 2004 (*Die Welt, April 20, 2004*) –

Closer to home is the recent threat to Russian Oil supplies for Mazeikiu Refinery in Lithuania – a EU member – in the aftermath of the Yukos affair (*Energie Informationsdienst 13/05*).

Further: "... it's self-evident that energy diplomacy is something that many countries use and with our resources we think ... we can strengthen our position." (*unnamed high Russian official quoted in the Financial Times, Russia to Seal Gas Deal with Germany September 7, 2005*)

The Gas Exporting Countries Forum (GECF) which was founded in 2001 and represents 53 per cent of world gas trade (*International Energy Agency, 2004. Security of Gas Supply in Open Markets*) portrays itself as a technical club, very similar to the formerly nascent OPEC. It is argued that these countries depend on the revenue of gas exports, are bound by long-term contracts and thus do not wish to interfere for political reasons with their delivery obligations. This is very reminiscent of the prevailing thought about oil security prior to 1973. Events proved these arguments as not sustainable.

We need to take to heart the lesson learned in the oil industry that even small supply cuts cause disproportional price spikes (*INDES, Insurance against Disruptions of Energy Supply, May 2004*). It is quite disturbing, therefore, that the EU and many member governments seek their future energy security by ever increased reliance on Russian sources (*IEA Executive Director C. Mandil as quoted in the Financial Times, December 3, 2004*). Even without going into the worthwhile discussion of political stability in and reliability of Russia it is worth noting that even the United States were/are not immune to exert economic pressure towards their Nato Partners in case of severe political differences (4)

Coming to **Transit Dependence** of the European Union the situation is not free of concerns. The large majority of gas supplies is pipeline bound and concentrated on few trunk lines (*Beicip-Franlab 2003*). They are nearly fully booked to capacity and to a large part not interconnected or reversible (i.e. cannot change the direction of the gas flow) (5) (*The Security of Supply for Natural Gas Markets, What it is and What it is not, G. Luciani, March 2004*). Particularly the eastern countries of the European Union are dependent on one single and exclusive trunk line for a major part of their gas and therefore also increasingly for their electricity supply.

(4) e.g. the US pipeline embargo against the USSR and pressure applied to Germany / 1963
e.g. the attempt by the Reagan administration to curb further growth in the USSR's gas export to Europe after the USSR's invasion into Afghanistan

In an era of international terrorism this dependence should preclude any complacency. (The political dependence on various transit countries applies equally as with source dependence as discussed above.) (*Petroleum Intelligence Weekly, December 6, 2004*)

Gas supply logistics in Europe – having their root in former monopoly regimes – tend to have little facility flexibility thus creating **Facility Dependence**.

If one piece in the chain is blocked – by whatever reason – the strain on the system is severe. Unfortunately this is not only true for traditional natural gas supply but also for the emerging LNG market unless pre-emptive measures are taken by the EU or member states' governments. (*Market-based Options for Security of Energy Supply, E. Egenhofer et al, March 2004 / INDES, Insurance against Disruptions of Energy Supply, May 2004*).

The **Structural Risks** in the gas supply chain are twofold:

- i) An overwhelming share of the gas supply to the European Union is pipeline bound. For some good reason this is seen by many as a big advantage of gas (6). At the same time it is the Achilles' heel as it leaves the system without flexibility. – Not import dependence (*INDES, Insurance against Disruptions of Energy Supply, May 2004*) alone should be the driver in the discussion on Security of Supply but also the degree of optionality. It is the degree of viable alternative options that in the end defines the security of the supply chain.

(5) The recent prorating in France and Spain in the winter of 2004/2005 is illuminating in this respect (*Bulletin de l'Industrie Pétrolière, March 2005*). Prorating is also a common feature for industrial gas clients with disruptable contracts in Germany.

(6) environmentally friendly, no shipping risk ("Erika effect"), technically highly reliable, not beholden to adverse weather conditions etc.

Sea bound LNG import is a positive development in providing optionality in addition to the old pipeline structures. Due to the high capital cost of these projects they tend to be captive single customer/supplier facilities thus creating the same singularity as the old pipe systems, albeit creating a bigger total pool of facilities. (*Market based Options for Security of Energy Supply, E. Egenhofer et al, March 2004 / INDES, Insurance against Disruptions of Energy Supply, May 2004*).

- ii) In the old monopoly systems Security of Supply was a question to be solved by the monopolist and its supporting government. – In the newly liberalised gas markets the prime responsibility for Security of Supply has on first sight shifted away from governments to the market players (*Indes Stakeholder Workshop, Oct., 2003 as quoted in INDES, Insurance against Disruptions of Energy Supply, May 2004*).

However, in the heat of competition the concern of Security of Supply will decrease in importance for the liberalised business units (*Security of Supply for Natural Gas markets, What it is and What it is not, Luviani, March 2004 / INDES, Insurance against Disruptions of Energy Supply, May 2004*). Therefore low probability events (such as supply interruptions) may not necessarily be valued by the market itself (*International Energy Agency, 2004. Security of Gas Supply in Open Markets*). High capital costs for security stocks by industry are not sustainable in a competitive industry (*Oil Security, Short- and Long-Term policies, V. Constantini & F Gracceva, March 2004*).

The concern about Security of Supply in a liberalised market is on one side anchored on the false assumption that the business units will take charge of the responsibility while on the other side business cannot take the financial burden and in addition Security of Supply is regarded as an externality or a public good. These factors merit special attention when realising that there is an asymmetrical cost structure in a supply crisis between industry and stakeholders at large.

While the monopolies were already short on slack in the system the competitive

environment will increase the day to day efficiency of the industry and shave away whatever slack (and optionality) there was (*Transport Energy Security – the Unseen Risk, D. Fisk, March 2004*).

It has been demonstrated that there are indeed many compelling reasons which mandate a serious set of public policies (be that on multilateral, EU or national level) to mitigate the risks that are inherent in the Gas Security of Supply equation. The idea that governments could simply retreat from the scene and leave it to competitive markets is an illusion. Energy is too important to the economy and society at large given the existing market failures, one of which is the Security of Supply equation (*Oil Security, Short- and Long-Term Policies, V. Constantini & F. Gracceva, March 2004*). Governments thus retain a key role and the overarching responsibility for Security of Supply. (*International Energy Agency, 2004. Security of Gas Supply in Open Markets*).

What should be done?

- i) The greater creation of public awareness of the inherent risk to the Gas Supply Chain is the prerequisite for any betterment. There is no denying that the discussion has considerably advanced over the last 25 years but the EU's Council Directive 2004/67/EC as well as the IEA recommendations (*International Energy Agency, 2004. Security of Gas Supply in Open Markets*) remain rather soft in substance if not in language.
- ii) Both IEA and the European Union (*International Energy Agency, 2004. Security of Gas Supply in Open Markets / EU, Council Directive 2004/67/EC, concerning measures to safeguard security of natural gas supply*) come to the conclusion that Security of Supply questions for gas are best left to national governments as there is not yet a truly international market and because industry so far managed to keep the system going. A couple of arguments should help us realise, however, that the gas markets will quickly become more international and will defy the old (and cosy?) bilateral long term

relationship between supplying and receiving country:

- > global gas trade will increase from 22 per cent today to a forecasted 40 per cent of world wide consumption in 2030.
- > cost reductions in LNG train investments will lead to a more global market as the break-even distances decline
- > 50 per cent of the 2030 gas trade will be in LNG
- > LNG trade will be done up to 30 per cent on spot basis
- > Gas contracts start to be shorter term
- > The US, starting from nearly zero, will be the second largest LNG importer in 2010 and the biggest in 2015
- > prices in global gas markets are set on conversion
- > The Nymex gas contract is the fastest growing contract on that exchange ever
- > the energy systems of Europe will more and more integrate into a single market

The oil industry has been surprised by the crisis in 1973 and multilateral systems like the IEA have been created belatedly putting the consumer economies to severe strain. In the coming global gas market we still have the chance to create multilateral systems to be prepared in due time and avoid duplicating old mistakes.

- iii) Governments should encourage and even incentivise the increase of optionality including required specified sourcing limits and additional slack in the supply chain (*Transport Energy Security – the Unseen Risk, D. Fisk, March 2004*) (7) (*International Energy Agency, 2004. Security of Gas Supply in Open Markets*)

(7) *ibid.* “The key arguing in favour of socialising the cost of supply flexibility is to point to the encouraged competition. As such they are assumed to be a systematic priority.”

- iv) It has been suggested that gas customers be divided into priority and interruptible customers. (*Security of Supply for Natural Gas markets, What it is and What it is not, Luciani, March 2004 / INDES, Insurance against Disruptions of Energy Supply, May 2004*).

The latter being those that have the possibility to switch to other sources of energies. If the gas consumed by priority customers is smaller than the quantity used by interruptible customers the system could withstand a 50 per cent supply cut without serious supply damage. The IEA takes a similar line suggesting that fuel switching might be a more cost effective measure than gas security storage (*International Energy Agency, 2004. Security of Gas Supply in Open Markets*). As a matter of fact this advice is widely followed in industry suggesting – albeit erroneously so – that the Security of Supply aspect has been successfully dealt with.

The argument for interruptible contracts is not without elegance as it suggests an increase of optionality and that other sources of energy are readily available. However, looking at overlapping source dependence for much of our oil and gas supply this line of thought seems to be a dangerous placebo. It only makes sense when the energy consumed by interruptible customers is integrated into existing crises mechanisms (which it is not!). Thus gas supplies under interruptible contracts need to be subjected to the IEA crisis mechanism i.e. the equivalent oil reserves for interruptible contracts need to be held. This argument is further supported by the language of the Council Directive 26 April 2004 demanding transparent and non-discriminatory security of supply policies .

Fuel switching may also be seriously restricted by environmental concerns (*International Energy Agency, 2004. Security of Gas Supply in Open Markets*). A review of this issue for crises situations should therefore be seriously considered.

- v) Dual fuel power generation should be encouraged as pure market forces will not allow for the extra capital expense to increase optionality (*Security of Supply for Natural Gas markets, What it is and What it is not, Luciani, March 2004*). (8)

This again is only a sustainable option, if the alternative fuel is included in an alternative security regime (see iii above)

- vi) LNG growth, especially in the spot market, is seen as essential to improve the EU's security situation in the gas sector given the wider range of sourcing and greater transportation flexibility (thus creating further optionality) and the assumed quadrupling of the gas trade till 2020. The critical path in terms of supply security in LNG is, however, the growth in the necessary import infrastructure. Subsidies and other incentives are suggested (*Market-based Options for Security of Energy Supply, E. Egenhofer et al / INDES, Insurance against Disruptions of Energy Supply, May 2004*). From the author's experience these measures will only bear fruit if truly independent third party operators can be enticed to enter this market.
- vii) After the first oil crisis in 1973 OECD countries created the International Energy Agency and agreed on a series of measures to mitigate future crises. The measures institutionalised – fair sharing, demand restraint and security stocks – proved highly effective not in preventing the next oil shock – but in better coping with and significantly mitigating the effects.

(8) The increasing use of combined-cycle gas turbines which require middle distillate fuels in the alternative operation mode creates an additional economic hurdle for dual power generation (International Energy Agency, 2004. Security of Gas Supply in Open Markets)

It has been argued above that it is desirable to come to a multilateral framework on gas Security of Supply. Whether the IEA should be copied, or co-opted is for the time being not so material. The IEA can, however, be used as a frame of reference.

As the IEA is very often identified with its stockpiling policy a few words on stocks:

- > As argued above gas supplies delivered under interruptible contracts should be mandated to join the IEA/EU security system for oil.
- > It is suggested that security stocks are a useful tool to mitigate short term interruptions (only) (*Security of Supply for Natural Gas Markets, What it is and What it is not, G. Luciani, March 2004*). It is nearly a tautology that stockpiling cannot mitigate a permanent shortfall. But the real existence of security stocks – be they 90 days or whatever (not built on working stocks) – would afford industry and policy makers the necessary breathing space to find alternative solutions and withstand political arm twisting (*Oil Security, Short- and Long-Term Policies, V. Constantini & F. Gracceva, March 2004*). The IEA example clearly demonstrates that such a notion is robust and successfully crisis tested independent of whether the duration of the interruption is known or not.
- > If stockpiling is seen as a possible option it needs to be realised that stockpiling is in the interest of the public domain and should be funded accordingly (*E. Egenhofer et al, March 2004 / INDES, Insurance against Disruptions of Energy Supply, March 2004 / Strategic Stockpiling: Best Practices, Pitfalls and Lessons learned, H. Weisser, December 2004*) either by the treasury or a levy at point of entry. Here successful stockpiling systems in the oil industry could help to chart the path (CORES/Spain, COVA/The Netherlands, EBV/Germany) (9).

(9) It is interesting to note that Spain recently introduced mandated gas security stocks as of February 2005 (35 days of consumption), EID October 25, 2004

- It is suggested that a more just and market oriented system would be based on the source of the gas and its corresponding risk factor (*Security of Supply for Natural Gas Markets, What it is and What it is not, G. Luciani, March 2004*). Besides of being very cumbersome and subject to rapid change (see Iran 1979/80) or to very subjective judgement (thus inherently un-transparent) such a system would tend to reduce the liquidity of the market and consequently reduce the corner stone of a secure supply system i.e. optionality.
- > An often heard argument against specific measures to increase security of supply is the involved cost factor. We saw that this argument wins the day for individual companies in the liberalised market. In a competitive environment and given the keen intra fuel competition this argument is difficult to accept. It is in the public interest that the full externalities of each energy source – and this includes the externalities in case of supply disruptions or the prevention thereof – is considered in the final price of consumption.

The cost for physical gas storage are assumed to be the cost of oil storage multiplied by a factor of 10 (*International Energy Agency 2004. Security of Gas Supply in Open Markets*) – certainly a cost factor that demands for the search of cheaper alternatives. But the case for some degree of physical stock protection beyond working stocks (and the EU directive factually goes no further) has been presented.

Conclusion

- Gas is competing with oil for being the dominant energy source.
- In electricity generation gas is to play as pivotal a role as oil in transportation. The security equations of gas and electricity are heavily intertwined
- Energy disruptions have considerable influence on the national accounts far beyond the direct cost of market participants (asymmetry).
- The present gas supply to the EU depends dangerously on too few sources and venues. – There is a decided lack of optionality.
- Power supplied under disruptable contracts must be introduced into the security regime of the alternative fuel. Free riders are not permissible in a fuel competitive system.
- The EU directly or through its members needs a clear proactive policy on “Security of Gas Supply” within a strong multilateral framework. The days of national gas markets with national solutions will rapidly disappear. The EU directive 2004/67/EC is a step in the right direction but much too timid.

Hellmuth Weisser

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Abstract

Gas is competing with oil for being the dominant energy source. –

In electricity generation gas is to play as pivotal a role as oil in transportation.

The security equation of gas and electricity become inseparably interrelated. –

Energy disruptions have considerable influence on the national accounts far beyond the direct cost of market participants (asymmetry). –

The present gas supply to the EU depends dangerously on too few sources and venues. There is a decided lack of optionality. –

The EU directly or through its members needs a clear proactive policy on “Security of Gas Supply” with a strong multilateral direction. –

The measures developed for the oil industry over the last 30 years can at least serve as a starting point for a constructive debate. When discussing Security of Supply dependence it is useful to clearly define the various risks one wishes to protect against. Free riders relying on alternative fuels without participating in their security systems are not permissible.

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