

# Perspectives on security of supply in European natural gas markets

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# 1

## Introduction

Perceptions about the functioning of world energy markets are gradually shifting. Throughout the 1990s, import-dependent countries generally expected economic principles to increasingly structure world-wide investment and trade in energy. Foreign direct investment in oil- and gas-producing countries would, they thought, open up undeveloped resources. Security of supply policies could then explicitly make use of market mechanisms. However, over the past few years, oil- and gas-rich countries have tightened their grip on the resource sectors by enhancing and increasing state participation in the exploitation of those resources and by restricting foreign investment. Concurrently, rising demand and lagging expansion of production capacities have led to increasing oil and gas prices. Concerns are coming to the fore that geopolitics will gain importance vis-à-vis economics when decisions are made about energy investments and trade flows.

It is against this backdrop that the largest supplier of natural gas to the European Union's gas markets, Russia, has suffered a severe deterioration of its reputation of being a reliable natural gas provider, since in the beginning of 2006 its gas supplies to the Ukraine were suspended for two days in a dispute about gas prices and transit fees. The issue of security of European gas supplies had been on the table before, but the recent uproar in Western media about alleged Russian misbehaviour is now propelling the issue to the top of the European policy agenda. Energy supply in general, and natural gas supply in particular, belong to the very controversial points between new and old Member States (MS) of the European Union. Some new Member States perceive a lack of solidarity from old Member States in addressing security of supply concerns originating from the large dependence of Central and Eastern European countries on Russian energy supplies.

Apart from fears of being cut off from gas supplies for political reasons, concerns have become stronger that major gas suppliers might cooperate more in the future with a view toward increasing prices to above competitive levels. It has also been suggested that the current liberalisation of European gas markets, with its encompassing rules and regulations, makes those markets more susceptible to the exercise of producer power.

In this paper, we provide a general overview of the current discussion on the European Union's gas market. Demand and supply trends and uncertainties will be presented, and we will examine the adequacy of infrastructure investments in bringing new gas to EU gas markets. We will review the notion of natural gas deliveries and investments being means to exert political or economic pressure and look at some of the incidents that have comprised curtailments of gas deliveries.

We argue that there is little reason to believe that producers have used or will use energy deliveries against the European Union and its Member States as a means to achieve political objectives on a large scale. Economic objectives have been and will likely remain the main drivers of producers' behaviour towards the European Union. This does not diminish the reality that the risk of political and economic pressure exerted by producers is unevenly distributed across European Member States and that perceptions about the threat vary accordingly. With a view toward de-politicising energy issues and allowing markets to work more efficiently, a community framework that would aim at increasing the robustness of the Union's gas markets and at spreading this risk more evenly should be seriously considered.

# 2

## Demand uncertainties, investments and supplies

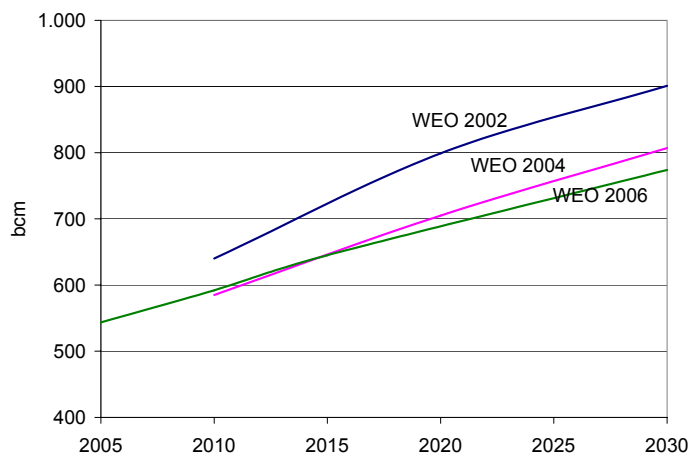
Security of supply is very much related to the presence of adequate infrastructure for meeting demand. The establishment of large-scale gas infrastructures is generally very capital-intensive, with construction costs for upstream projects, LNG plants and pipelines running into billions of US\$. The economic risk is substantial, and investors need to estimate well what the future development of demand and supply from competitors will be. Making this estimation, however, has become increasingly difficult; rising oil and gas prices have led to a lowering of demand expectations, whereas the consequences of (especially European) energy policies are difficult to assess at the moment.

Thus, in order to gain a better understanding of the current situation with respect to the level of investments relative to demand developments, we will begin our analysis by briefly outlining the major demand and supply trends for the European Union's gas market. Uncertainties surrounding demand developments will be briefly discussed before we look in more detail at the adequacy of supply developments and the related infrastructures for meeting import demand.

### 2.1. Natural gas demand uncertainties in the European Union

Natural gas demand in the European Union is expected to keep increasing; mainly driven by increased use in the power sector, but also by rising gas use for space heating and in the industrial and commercial sectors. Yet major uncertainties about the extent of natural gas use in the EU power sector exist, stemming from a variety of factors, which complicate the medium- to long-term outlook for gas demand. For example, the competitiveness of natural gas in the EU power sector has been increasingly questioned against the backdrop of natural gas prices having strongly risen since 2003. Indicative of this development are the demand

**Figure 1: Projections of European (OECD) demand for gas<sup>1</sup>**



Sources: IEA 2002, 2004, 2006

projections of the IEA's World Energy Outlook for the European Union. In recent years the IEA has adjusted its modelling to account for higher expected gas prices.<sup>2</sup> However, the outlook remains uncertain. In addition to price concerns, uncertainty about government policies is now strongly affecting investment decisions about power generation.

Another reason for questions about the demand for natural gas use in future EU markets is that another major fuel option for power generation, i.e., coal (black coal and even lignite), is regaining attention and interest. Price considerations and the supply security interest of diversification of fuel

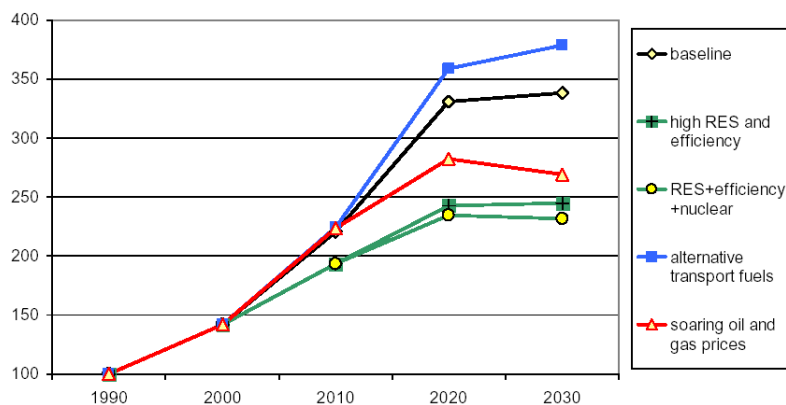
<sup>1</sup> Comparable data for the EU-27 is not available. Forecast reductions should, however, be of comparable magnitude.

<sup>2</sup> The IEA's most recent projection is very much in line with a study done by the Oxford Institute for Energy Studies. The IEA's forecast is basically an outcome of a modelling exercise, while the OIES employed a bottom-up approach (counting planned generation projects) for assessing the likely gas consumption of the European Union by 2015. The OIES arrives at the likely gas demand by the EU-25 of 601 bcm by 2015, whereas the IEA projects 609 bcm. IEA, 2006; Honoré, 2006.

supplies are again making it more attractive. An important reason for the serious consideration of coal as fuel source is CCS (Carbon Capture and Storage), which might become a viable technology for mitigating factors of climate change related to the use of coal. A number of large-scale demonstration facilities for this technology are currently being planned. CCS could, in the long run, open up more opportunities for the use of coal in power generation, reducing the need for imported gas. The future of nuclear policies is another dominating factor in the EU; uncertainties about the use of nuclear power exist in Germany, Belgium and Sweden, where actual decommissioning decisions are dependent on political power balances. Other countries such as the UK and Italy seem to be reconsidering the nuclear power option; whereas France, Finland and some of the new MS in the EU have no doubts about continuing this option. This makes it difficult to formulate a coherent view at the EU level.

Coherency does exist, however, in EU policy concerning the role of renewable energy. There is a strong political EU-wide commitment to significantly increase the use of renewable resources in energy production. In its meeting in March 2007, the European Council adopted ambitious targets with respect to energy policies of the European Union.<sup>3</sup> Apart from strengthening coordinated EU relations with producing countries, the policy as outlined in the Presidency Conclusion includes binding targets of reducing the EU's greenhouse gas emissions by at least 20% by 2020<sup>4</sup> and a contribution by renewable energy of 20% to the total primary energy supply by the same year. Also by 2020, the policy strives for a 20% increase in energy efficiency. Nonetheless, there are quite substantial uncertainties about the implementation of the policy proposed. A negotiation process is about to start, which will aim to set targets for the individual Member States. This process is likely to be rather cumbersome. Even if targets can be agreed upon, there are naturally no guarantees that they will be met, and it is also not very likely that strong punitive measures will be established for Member States that do not achieve their targets.

**Figure 2: EU-27: net gas imports: baseline and scenarios 1990 =100**



Source: Decker, Manfred, EU – Trend and Energy Policy Scenarios. EU – OPEC Roundtable on Energy Policies, 30 May 2007, Brussels. Converting the index numbers to cubic meters, the high RES and efficiency scenario would reduce the required EU imports by 2015 by about 100 bcm/a as compared to the reference scenario.

rights for the power sector, the increasing liquidity of the carbon market and its relation with the power market, the role of the CDM- and JI mechanisms, and – a very strong influence – the question as to what extent the US and the large Chinese and Indian markets will join.

In economic terms, the major factor of government policies that will influence fuel choices in power generation is the development of the European Emission Trading Scheme (ETS). Again, the political direction of the EU is clear, i.e., continuing a strong climate policy beyond 2012 when the Kyoto Protocol expires. Emission trading is expected to be the major element in this policy, but a number of modalities are still largely under discussion. These include the allocation of emission rights at the EU level, the auctioning of the

<sup>3</sup> Council of the European Union, Presidency Conclusions of the Brussels European Council, 8/9 March 2007, 7224/07.

<sup>4</sup> As compared to 1990 levels.

All of these uncertainties about future fuel mixes in power generation have large impacts on the development of gas demand in the EU, and hence on imports.

The possible consequences of the renewable energy and energy efficiency policies as proposed by the European Council on European gas import needs are illustrated in Figure 2. In this calculation by the European Commission, implementation of the suggested policies (renewable energy sources [RES] and efficiency) might already reduce import needs of the European Union by about 100 bcm/a by 2015. Although the realisation of such targets is, from our point of view, rather unlikely, it is stipulated policy and should therefore influence strategies of gas producers and pipeline companies, which will wonder to what extent they need to factor in this kind of policy scenario. Security of demand as seen from the producer interest will therefore become a factor that must be recognised by EU policies that focus on security of supply.

## 2.2. New gas to Europe: Supply availability

This section explores the availability of natural gas to European markets in the medium term. In general, there seems to be widespread agreement that EU domestic gas production will diminish over time, mainly due to declining British and Dutch gas production. The situation is different in Norway, where a further increase of gas production and exports is anticipated. Numbers for domestic EU production and Norwegian imports can be estimated with rather high certainty on the basis of operator forecasts, the availability of infrastructure and the knowledge of the reserve base that supports production.

Regarding Algeria, the outlook is slightly less certain. Algeria has repeatedly stipulated the objective to export 85 bcm/a as of 2011. Based upon the current outlook of project execution, we do not expect LNG export capacity to exceed 31 bcm/a by then, whereas the construction of new pipelines to Spain and Italy is likely. Doubts about the viability of the export level aspirated have become louder,<sup>5</sup> but we are still confident that Algeria will be able to export about 50 bcm by pipeline to EU markets by 2015.

Much uncertainty, however, is present about the future role that Russia and LNG will play in European gas markets, and we will briefly examine this uncertainty in the following.

### Russia

Analysts, with the IEA being the most prominent organisation among them, have stated at length that there would be very significant uncertainty about the Russian gas industry being able to meet both domestic and export demand in the next decade.<sup>6</sup> Concerns focus on:

- The level of upstream investment being insufficient to compensate for the decline in three out of four major producing fields, and related to this;
- The spending of funds on:
  - ‘Transit avoiding’ pipelines such as Nord Stream or South Stream;<sup>7</sup>
  - Investments in non-gas industries within Russia; and
  - Acquiring downstream undertakings in export markets instead of on new production;
- Domestic demand increasing faster than official forecasts; and
- Russia’s inability to effectively acquire more gas from Central Asian producers in order to compensate for any shortfall in Russian production.

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<sup>5</sup> Cf. e.g. ‘Algerian LNG slide spurs Skikda deal.’ *World Gas Intelligence*, 11 July 2007. Cf. for a more general overview CIEP, 2004, Natural gas supply for the EU in the short to medium term. Clingendael Energy Paper.

<sup>6</sup> Compare IEA, Natural Gas Market Review 2007. Security in a globalising market to 2015, Paris: IEA/OECD, 2007, pp. 129-142.

<sup>7</sup> Nord Stream under construction from Russia under the Baltic Sea to Germany, avoiding Belarus and Poland; South Stream under discussion to run under the Black Sea to Bulgaria, avoiding Ukraine and Turkey. Cf. Gazprom’s pipe politics, *World Gas Intelligence*, 27 June 2007.



However, it is also recognised that there is significant potential for Russian supply to remain solid:

- The Russian resource base seems to be without question, rating Russian gas reserves as the world's largest with approximately 25% of the total resource base.
- Domestic prices for industrial users, which are currently set administratively at very low levels are supposed to gradually increase. This should trigger significant gas savings.
- Independent gas producers as well as oil producers could very significantly increase their contribution to Russian gas supplies once they receive better prices for their gas production and/or access to Gazprom's pipeline system. Very optimistic outlooks state a potential of tripling the current contribution of non-Gazprom production to over 300 bcm/a by 2015.<sup>8</sup>
- Central Asian producers might indeed be able to satisfy increasing demand from Russia as well as other markets, as local governments show strong confidence in their ability to increase production.

Among analysts and industry experts, views diverge widely as to whether the threats or the opportunities for Russian supply dominate. We avoid taking a strong stance on the issue and will for further analysis focus rather on the question of how much Russian import would be needed to meet European demand.<sup>9</sup>

## LNG

A number of LNG liquefaction projects around the globe are currently suffering from delays due to cost increases combined with a limited availability of contractor capacity, caused by a general upturn of investment activity in the energy sector. Concurrently, demand for LNG is believed to be high around the globe and regasification capacity to be amply available.<sup>10</sup> Figure 3 shows the build-up of global LNG liquefaction capacity. This diagram takes into account expected project delays, the likelihood of the project coming to fruition and the availability of gas resources to fill the plants to capacity. Major projects included in the planned/possible category, which make up the difference between the likely and possible liquefaction scenarios as displayed in Figure 3 and Table 1, are, among others situated in Nigeria (Brass, OK, NLNG 7plus), accounting for a possible increase in capacity by 2015 of 26 bcm/a.

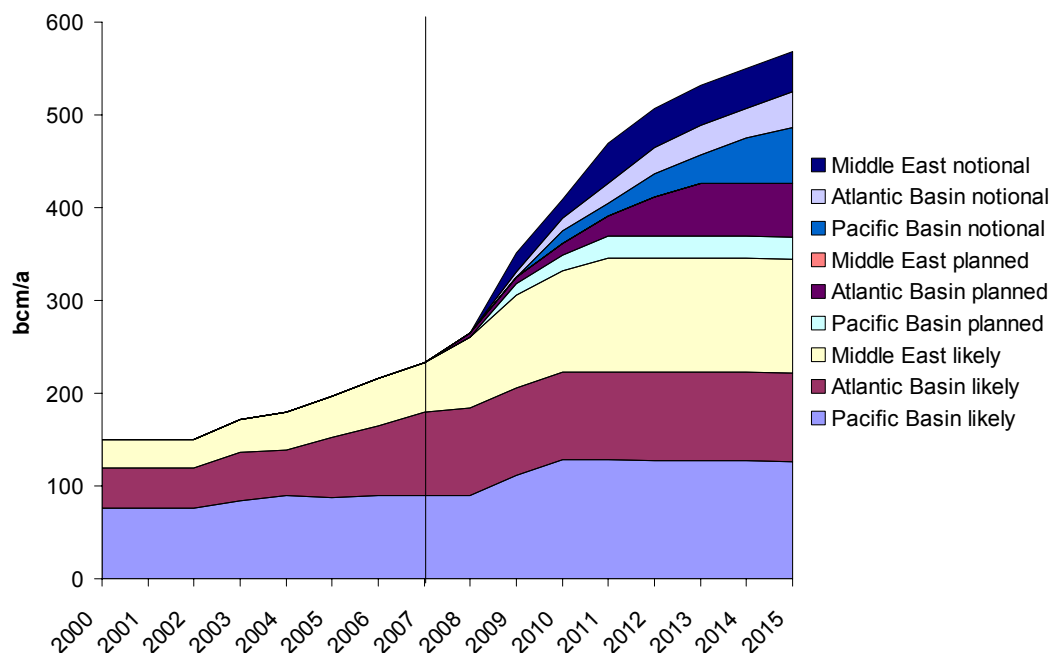
A possible gas demand and supply scenario is given in Table 2, where the demand projection is based upon the IEA's World Energy Outlook 2006. Building upon these numbers, we expect a requirement for Russian gas deliveries to EU-27 markets in the order of 100 to 130 bcm/a by 2010, strongly increasing to between 170 to 250 bcm/a by 2015. As indicated earlier, the latter figures are deemed ambitious targets for Russian export levels to the EU-27 by 2015. Naturally, this exercise does not forecast the actual EU-27 gas market in 2015, but gives an indication of market conditions. Security of supply in a physical sense will not necessarily be compromised, even if Russian investments fall short of the requirements of the scenario as outlined in Table 2. Prices, however, might be bound to rise in order to be able to attract additional LNG, while demand reductions might contribute as well to supply security.

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<sup>8</sup> IEA 2007, op.cit., p. 135.

<sup>9</sup> We note, however, that in 2005/06 alone Gazprom has concluded agreements with EU companies that require the delivery of 98 bcm/a through 2020 and beyond (see Appendix I). Those agreements mostly concern the extension and reallocation of existing contracts but give an indication of the minimum level of gas exports that Russia is confident to be able to supply in the long run to European markets.

<sup>10</sup> IEA, op.cit; CIEP, Summary CIEP Gas Market Seminar 'LNG impacts on North West Europe', 3 February 2006.

**Figure 3: Global LNG liquefaction capacity**

Source: Company information, WGI, Petroleum Economist; capacities are shown at 95% of nameplate capacity

**Table 1: Global LNG market 2006 – 2015, bcm/a**

	2006	2010	2015
Liquefaction (likely)	216,4	331	344
Liquefaction (possible)		362	426
LNG imports			
US	16	51	85
Japan	82	94	106
Korea	35	44	45
Taiwan	10	11	12
Turkey	5	5	5
Mexico	1	4	6
Dominican Republic	0,3	0,5	0,5
Puerto Rico	0,8	1	1
China	1	4,4	12,5
India	8	15,0	25,0
Remaining (possibly for EU)			
Base case	52	101	46
Possible		131	128

The category 'remaining' should not be read as actual flows to EU markets. Rather, it gives an indication of how difficult it might be for the European Union to attract LNG in general and avoid diversions of contracted LNG to other markets.

Source: CIEP, EIA, IEEJ/METI, Mocie, IEA

**Table 2: EU-27 supply and demand through 2015, bcm/a**

	2006	2010	2015
<i>Demand</i>	532,0	580,0	629,0
<i>Supplies from</i>			
UK	83,4	68,0	40,0
NL	77,7	70,0	60,0
Other EU	56,1	58,0	48,0
Norway	85,5	105,1	120,0
Algeria by pipe	36,0	45,0	52,0
Libya by pipe	7,7	8,0	8,0
<b>LNG</b>	<b>52</b>	<b>100 – 130</b>	<b>50 – 130</b>
<b>Call on Russia</b>	<b>130</b>	<b>96-126</b>	<b>171-251</b>

Based upon CIEP, IEA, BP, UKOOA, NPD, WGI

We can conclude from this that, based on the demand figures in the table, the supply uncertainties seem to concentrate around the options for LNG-imports, which will be translated into calls upon Russian imports. This will further add to the demand insecurity aspects as seen from Russian suppliers. The increasing demand for imports also highlights the need for additional gas infrastructures. Therefore, it will be appropriate to take a closer look at the LNG-receiving and regasification infrastructures as well as the development of long-haul pipelines that bring new supplies to the EU market.

### 2.3 New gas to Europe: Infrastructure

There is no doubt that the European Union will depend increasingly on imports as domestic production declines. Market parties will react to this, and new infrastructures will be constructed to bring additional gas to the market. Tables 3 and 4 give an overview of current and future LNG infrastructures bringing gas to EU gas markets. The likely case would in itself already be sufficient to bring to the EU market the amount of LNG that we forecasted in Table 1. Adding the possible case of Table 4, where we should note the explosive developments possibly taking place in the Netherlands and France, another 100 bcm/a capacity is added in 2015. Although we expect that global regasification capacity will also in the future very significantly exceed liquefaction capacity as arbitrage and seasonal demand variations require spare capacity on the regasification side, it is unlikely that all regasification terminals currently planned will be able to secure sufficient minimum commitments to enable their actual realisation.<sup>11</sup> Therefore, the possible case in Table 4 is rather unlikely but gives an indication that there is positive potential for infrastructure and that more countries could host LNG import terminals.

**Table 3: LNG regasification capacity EU-27; likely, bcm/a**

	2007	2010	2015
Belgium	6,5	9,1	9,1
France	15,6	23,9	26,4
United Kingdom	9,0	44,0	49,7
Netherlands	0,0	1,0	17,0
Italy	3,5	16,5	23,5
Spain	50,5	57,3	64,3
Portugal	5,5	5,5	5,5
Greece	2,6	2,6	2,6
<b>Total</b>	<b>93,2</b>	<b>159,8</b>	<b>198,0</b>

Source: CIEP analysis, based upon company information, WGI, IEA

**Table 4: LNG regasification capacity EU-27, possible, bcm/a**

	2007	2010	2015
Belgium	6,5	9,1	9,1
France	15,6	23,9	59,4
United Kingdom	9,0	44,0	54,7
Netherlands	0,0	1,0	27,0
Italy	3,5	16,5	47,5
Spain	50,5	57,3	64,3
Portugal	5,5	8,5	8,5
Greece	2,6	2,6	2,6
Ireland	0,0	0,0	2,5
(Croatia) <sup>12</sup>	0,0	0,0	(10,0)
Germany	0,0	5,0	10,0
<b>Total</b>	<b>93,2</b>	<b>167,8</b>	<b>299,5</b>

Tables 5 and 6 give the pipeline pictures. Table 5 indicates a total existing import capacity of 344 bcm/a, whereas based on Table 6 an additional capacity of some 100 bcm/a is “in the pipeline”, bringing total pipeline import capacity to some 450 bcm/a. Table 6 would indicate further that more seems to be coming, especially when the southern corridors are included, where plans were announced for the Nabucco-pipeline, the extension of the existing Blue Stream pipeline into the Blue Stream II project, both transiting Turkey, and the South Stream pipeline, directly connecting Russia through the Black Sea to Bulgaria. This might even bring total import-pipeline capacity to a level of more than 500 bcm/a.

<sup>11</sup> The IEA expects worldwide total regasification capacity in 2015 to be 1000 bcm/a, whereas their projection for liquefaction capacity in 2015 is “only” about 570 bcm/a. IEA, op.cit.

<sup>12</sup> Not an EU member; however, terminal could be serving EU markets.

**Table 5: Capacities of pipelines to EU (27) gas markets as of 2006**

<i>From</i>	<i>To</i>	<i>Capacity (in bcm/a)</i>
<b>Total</b>		<b>344</b>
Russia	EU (27)	176
	Slovakia	112
	Hungary	15
	Poland	33
	Baltic States	~ 6
	Finland	7
	Greece	3
Norway	EU (27)	128
	Germany	56
	Belgium	15
	France	19
	UK <sup>13</sup>	38
Algeria	EU (27)	40
	Spain	13
	Italy	27
Libya	Italy	9

**Table 6: New gas pipelines to EU (27) markets under construction or planned through 2015**

<i>From</i>	<i>To</i>	<i>Capacity in bcm/a</i>
<b>Likely</b>		<b>92 (to 112)</b>
Algeria	Spain	13
	Italy	13
Russia	Germany	55
Norway	UK	11
Norway	TBD	up to 20
<b>Notional</b>		<b>61</b>
Norway	Sweden/DK	8
Russia	Bulgaria	30
Iran/Caspian	Bulgaria	23

Sources: GIE, WGI, Company information

By 2015, the EU will likely have infrastructure in place that would theoretically allow it to import over 600 bcm gas annually, of which more than 60% should be covered by pipelines. Adopting an even more optimistic view on the viability of a number of other projects currently under discussion, that capacity could even increase up to above 750 bcm/a. However, neither LNG terminals nor pipelines will be run at full capacity, among other factors due to maintenance requirements, seasonal patterns in consumption and limited availability of supplies. In recent years, major import pipelines to the EU have been operating at more than 80% of nameplate capacity.<sup>14</sup> Using this number as a rather careful assumption for future availability leads to an estimate of likely pipeline import capacity of around 360 bcm by 2015.

Building upon the numbers given in the preceding tables, we could conclude that investment in LNG terminals underway will be sufficient to accommodate expected LNG imports. For long-haul pipelines however, especially those supporting the East-West flows, there might be a problem as early as 2015. Requirements for Russian gas deliveries to EU-27 markets could strongly increase to a range of 170 to 250 bcm/a by 2015 (see Table 2). While there will be sufficient pipeline capacity in place to supply 170 bcm/a of Russian gas to EU markets, achieving 250 bcm/a would require significant investment; one which is not yet clearly visible through 2015. If Russia were to want to capture these market opportunities in EU markets and additional investment in new pipelines did not come forward quickly, there would appear to be only limited scope for diverging current gas transit flows from the traditional pipeline routes. However, as noted above, doubts about the ability (and perhaps willingness, see below) of Russia to provide such quantities to European markets are more important than pipeline

<sup>13</sup> The Langed pipeline is currently not yet fully connected to the Ormen Lange gas field. Thus, although the pipeline increases transport capacity, this is not yet backed by sufficient production capacity. Full connection to Ormen Lange is scheduled for the second half of 2007.

<sup>14</sup> Based upon data by GIE and IEA Monthly Natural Gas Balances and Trade.

developments. If gas availability allows for such export levels to European markets, infrastructure development will probably follow.

The analysis in this paper is only concerned with the construction of import infrastructure. Yet in order to facilitate the increasing imports, the internal European gas infrastructure needs to be adapted as well. The analysis of internal infrastructure development is beyond the scope of this paper. However, we note that a recent example from The Netherlands suggests that regulation aimed at increasing the efficiency of the operation of existing networks can hamper investments in new infrastructure.<sup>15</sup> Moreover, there are concerns that investment in new storage capacity would be insufficient to ensure sufficient gas availability in cold winters.<sup>16</sup> Close attention must be paid to the development of domestic infrastructure, as the level of supply security naturally is determined by the weakest link between well and burner.

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<sup>15</sup> Cf. Ministry of Economic Affairs, Reguleringsmodel gastransport landelijk netbeheerder GTS. Letter to the Chairman of the Second Chamber of Parliament, 29 March 2007. Dutch network operator GTS could convincingly demonstrate that it was not economical to extend the national network in order to accommodate additional gas flows under the regulated network tariffs as envisaged by the Dutch regulatory system. In consequence, the regulatory system is currently under review with a view toward making new investment possible.

<sup>16</sup> Compare IEA, *op.cit.* and CIEP, *The European market for seasonal gas storage*, February 2006.

# 3

## European gas supply security: Politics and economics

There are a number of security of supply risks relating to the EU's position in international gas markets that dominate European policy discussions with respect to natural gas:

- The perspective of natural gas exporters threatening to curtail committed gas shipments if political demands are not met;
- The possibility that natural gas exporters individually or in cooperation will exert market power and increase prices to European users;
- The notion that investments and international gas trade might be influenced by political considerations beyond international economic policy; and
- Concerns that investment in gas production is insufficient to meet even existing contractual commitments, let alone growing demand, due to the internal institutional problems of major gas-producing nations.

While we refer for the last point to the work of the IEA<sup>17</sup> and the remarks made in Chapter 2, in the following sections we will develop a wider framework for assessing political and economic risks for the EU's gas supply. For this purpose, we will briefly present general considerations with respect to the political perceptions relevant to European natural gas markets, review some recent energy supply disturbances to Europe against the notion of energy being employed as a political pressure tool and, finally, assess the perspectives of increased producer cooperation with a view to increase international gas prices.

### 3.1. Changing perceptions on global energy markets

In the beginning of the 1990s there was a general perception, especially in Western Europe and the US, that the world economy would increasingly become globalised and that oil- and gas-producing countries would try to reap the benefits of free markets, join the WTO and try to attract more foreign direct investment in order to access better technology and cheaper capital.<sup>18</sup> Energy markets were characterised by relatively low prices, stemming among other factors from the availability of spare supply capacity and competition in oil markets. However, in the meantime, and especially since the beginning of this millennium, we have witnessed the production of and infrastructure capacities of various energy carriers, foremost oil, having difficulties in keeping up with rising demand in world markets, leading to a strong increase in energy prices and a shift of bargaining power towards the providers of energy. Concurrently, a trend has emerged of producing countries reasserting their ownership in natural resources through, although not banning, at least restricting foreign direct investments and privatisation of upstream sectors. We note in this context that government ownership has its advantages when the government capacities to effectively monitor the distribution of economic rents are limited in a private setting with weak political and social institutions, as is the case in many energy exporting countries.<sup>19</sup>

Not only changing ownership structures in producing countries, but also the apparently rising importance of consumer governments' involvement in tapping into new energy supplies, has contributed to the perception that economic arguments need to be augmented by strong political support. For instance, the way in which China has secured oil and gas investments by bilateral political

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<sup>17</sup> E.g. IEA, *op.cit.*, pp. 129-142.

<sup>18</sup> Cf. Van der Linde, Coby, *The art of managing energy security risks. EIB papers* (12) no. 2/2007.

<sup>19</sup> Van der Linde, Coby, *The geopolitics of EU security of gas supply. CIEP working paper. Forthcoming.*

deals in countries such as Iran, Venezuela and Sudan is frequently quoted as an example for a stronger politicisation of energy deals.<sup>20</sup>

The perception that energy markets are becoming politicised means a number of challenges for the European Union: the Union as such is primarily an economic project, and a coherent common effective foreign and security policy appears to be still far away.<sup>21</sup> Moreover, the energy systems of individual Member States and the structure of external dependency vary significantly, making the development of a common external energy policy even more difficult. This weakens the EU's position vis-à-vis other major consuming regions such as the US or China, which might be better able to support their energy supply politically. Considering a possible inability of Russia to satisfy the needs of multiple export markets simultaneously, EU energy markets might in this respect especially fear competition from China. Diversification of demand makes as much sense for Russia as diversification of supply makes for Europe, and now there are economically viable options emerging that can create diversity of demand for Russia. There is so far little indication that political competition between importing countries has altered the priority of natural gas investment projects; economic considerations appear to remain of paramount importance.<sup>22</sup> Energy investments aimed at European markets or made by European companies rely primarily on the support that the respective individual Member State government can offer. In economic terms, this leads to a bias of competition in favour of those companies whose home countries are able to provide good bilateral political relations with important energy-exporting countries.

In political terms, fears have arisen that energy suppliers, in particular Russia, will be able to divide the European Union politically and pursue their political objectives towards individual Member States by undermining political solidarity among EU member states. Some discussion about this has been caused by the construction of the 'Nord Stream' pipeline, running under the Baltic Sea from Russia to Germany, avoiding the primarily transit countries of Belarus and Ukraine, but also EU member states Poland and the Baltic States. Pursuing the establishment of this pipeline has also been interpreted as a lack of solidarity from Germany with Eastern European countries. Especially Poland fears that after the construction of the pipeline Russian curtailments of gas deliveries in the event of a dispute between Russia and Belarus or Poland itself will become more likely, as customers further downstream, such as Germany and the United Kingdom, could be supplied by the 'Nord Stream' pipeline. Thus, Western Europe would have lesser stakes in securing supplies to Eastern Europe<sup>23</sup> and become more indifferent towards the use of gas deliveries being used as political or even economic levers.

### **3.2. Gas relations and political power**

Given the concerns about supply interruptions, we will in the following section assess the usability of natural gas deliveries in exerting political pressure from a more theoretical point of view, before reviewing in that context some recent conflicts that have entailed the factual, or at least threatened, stop of energy deliveries.

The theoretical ability to exert political power from the command of energy flows stems from dependence of the importing country's economy and social life on imported energy carriers. Interruptions or increasing prices can disturb economic activity, lead to income losses and cause strong inconvenience in daily life, especially if heating systems are affected in winter times. Governments thus have an interest in preserving energy supply security and to prevent exporters from

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<sup>20</sup> Ibid.

<sup>21</sup> Cf. Finon, Dominique and Locatelli, Catherine, Russian and European gas interdependence. Can market forces balance out geopolitics? Working paper. Centre International de Recherche sur l'Environnement et le Développement, February 2007 and Hoogeveen, Femke and Perlot, Wilbur, Tomorrow's mores. The international system, geopolitical changes and Energy. Clingendael International Energy Programme. December 2005.

<sup>22</sup> Russia and China have discussed and signed preliminary agreements on the delivery of up to 80 bcm/a gas by pipeline. However, progress in realising such export plans is apparently slow, with disagreement about gas prices being suspected to be a major factor to be overcome. Compare 'Much turns on China, Russia gas talks.' *World Gas Intelligence*, 13 June 2007.

<sup>23</sup> Compare Lang, Kai-Olaf, Polens Energiepolitik. SWP-Studie S13. June 2007.

interrupting energy flows or increasing prices. Such an interest becomes stronger the more a country is dependent on individual energy supply origins and the less alternatives can be arranged. Governments might be tempted to accommodate the wishes of energy exporters in other policy areas if they receive secure and reasonably priced energy in return.

Wielding political power does not necessarily require the factual stop of energy deliveries. The perception of energy dependence on a limited number of (state-controlled) suppliers with little scope for alternatives can be sufficient to make politicians act carefully in their policy approaches toward their major energy providers. Natural gas might in principle be better suited as a tool for political pressure than oil. Being to a larger extent pipeline-bound than oil, deliveries can be suspended selectively to countries that lack the infrastructure to attract alternative supplies. Eastern European countries with their overwhelming dependence on Russian natural gas are a case in point.

However, employing energy pressure with the aim of destabilising an ‘inconvenient’ government or pursuing political demands is not a sure strategy and has a number of negative consequences for the pressuring party. Outside pressure on a country can have a unifying effect on the population and even strengthen the position of the government in office. Using the threat of energy delivery suspension as a political tool will also affect the reputation of the exporter as a reliable supplier and business partner. These effects might not be limited to the country that is the object of political demands, but would likely extend to other importers, so that the position of the exporter would be generally weakened. Although alternative supplies for natural gas are more difficult to arrange than for oil, losing natural gas sales in the mid to long term to LNG, energy savings or other fuels is a real danger to the vendor who chooses to interrupt energy flows or to increase prices excessively.

**Table 7: EU gas supply origins 2005**

	EU-27	New Member States
Domestic	41%	33%
Russia	26%	62%
Algeria	12%	1%
Norway	16%	4%
Other LNG	5%	0%

Indicative figures based upon BP Statistical Review of World Energy 2006

Using energy deliveries or the suspension of it as a political weapon is a dangerous tactic for any exporter that is strongly dependent on the income from those deliveries. Currently, all countries which could significantly wield political power through energy are all very much dependent on their energy exports for fuelling their economies and state budgets. The main, and arguably only example, in which the suspension of energy deliveries was explicitly used to achieve concrete political objectives was the oil embargo directed at The United States, Denmark and The Netherlands in 1973 by OPEC countries. This embargo with its accompanying price increases and the damage done to the reputation of the reliability of oil supplies from major exporting countries was one of the major factors which accelerated the development of alternative oil supplies, e.g. located in the North Sea, Alaska and the Gulf of Mexico, as well as to a decline in oil consumption.<sup>24</sup> Eventually, prices dropped and major

exporting countries suffered real income losses for almost two decades.

As mentioned before, with respect to natural gas deliveries, it is in particular Russia that European policy makers are concerned about; also because Russia, unlike the other major suppliers of European gas markets, is seen as a country with wider geopolitical ambitions. We will therefore briefly review various incidents of the last two years that have been used by commentators as examples that Russia is willing to employ energy deliveries, in particular those of natural gas, to achieve political objectives.<sup>25</sup>

<sup>24</sup> Cf. Willenborg, Robbert, Tönjes, Christoph and Perlot, Wilbur, Europe’s oil defences: An analysis of Europe’s oil supply vulnerability and its emergency oil stockholding systems. *The Journal of Energy Literature Vol. X (2004)(2)*: 3-49.

<sup>25</sup> Commentators often fail to link the tangible alteration of energy flows to concrete non-economic political objectives, but rather state general political objectives without identifying concrete ones. E.g. Baran, Zeyno, Lithuanian energy security: Challenges and choices, White paper, Hudson Institute, December 2006.



### Ukrainian-Russian gas relations and the January 2006 supply interruption<sup>26</sup>

Ukrainian-Russian gas relations had been characterised throughout the 1990s by recurring non-payment of natural gas deliveries from Russia to Ukraine, occasional diversions of Russian gas in transit and, in consequence, the accumulation of debt on the Ukrainian side. A settlement of the issues had been reached by 2004, including provisions for debt settlement. The bundle of agreements also included provisions for the terms under which Russian gas was transited through Ukraine to Western Europe. Russia would pay in kind for transit, with implied transit fees and gas prices fixed through 2009. Transit payment gas would represent a very large share of all Russian gas actually delivered to Ukraine, with the remaining Ukrainian import requirements primarily met by Turkmen gas, a contract for which also was believed to be in place for through 2009. Transit fees and gas prices were both well below those paid in Western European countries. From 2004 onwards, gas prices charged to West European customers progressively increased in line with international oil prices, widening the gap with implicit prices that Ukraine was paying. A continuation of the implicit prices would have meant in fact a continuing and increasing Russian subsidisation of the Ukrainian economy. Though the motives for increasing prices are clear, the way of imposing the proposed price remains rather opaque to observers. Gazprom stated that the existing contract with Ukraine was subject to annual endorsement by 'Intergovernmental Protocols', basically suggesting that prices could be renegotiated on an annual basis.<sup>27</sup> It also appeared that Russia bought large volumes of Turkmen gas for delivery in early 2006, which made the fulfilment of the supposedly existing contract between Turkmenistan and Ukraine impossible, given Turkmenistan's limitations in both production capacity and the capacity of its export pipelines.

On January 1<sup>st</sup>, Gazprom stopped gas deliveries to Ukraine, however stating that sufficient transit gas for European customers would still be injected into Ukrainian pipelines. It is unclear whether any Turkmen gas destined for Ukrainian markets still reached Ukraine. In any case, European customers suffered significant reductions in deliveries from the Ukrainian system, which suggested diversions of transit gas to Ukrainian markets. The outcry in Western media certainly contributed to the speediness of the resolution of the conflict, which led to a reestablishment of gas flows by January 4, 2006. The commercial solution found boiled down to Ukraine being supplied by a new intermediary, RosUkrEnergo, whose supplies would be primarily made up of Central Asian gas, which could be obtained at relatively low prices. Most likely, hardly any Russian gas is needed to meet Ukrainian import needs. If any Russian gas were needed, this would be priced at 230 \$/mcm, the price Russia wanted to obtain for its deliveries in the first place. The resulting average price of gas delivered to Ukraine was 95 \$/mcm, which was nonetheless increased in the second half of 2006 to around 130 \$/mcm, as Turkmenistan insisted on increasing its price to 100 \$/mcm.

It is unclear whether or not in early January 2006 either side broke existing contracts. What *is* clear is that existing contracts did not offer very much protection against price increases for Russian or Central Asian gas.

In the course of the conflict, there were no political demands made towards Ukraine, and negotiations concentrated solely on the pricing of natural gas. It has been suggested, however, that Gazprom pricing policy is influenced by general politics: Russia's allies, especially those who are willing to allow Gazprom participation in their pipeline infrastructure, will enjoy relatively low prices, whereas countries that are not considered to belong to that group would be treated like Western export markets. More generally, there was a widely felt perception that Ukraine was suffering a Russian reaction due to its internal and external policy changes resulting from the Orange Revolution in 2004.

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<sup>26</sup> This section is largely based upon Stern, Jonathan, The Russian-Ukrainian gas crisis of January 2006. Oxford Energy Comment. January 16th, 2006; Sokov, Nikolai, Alternative interpretation of the Russian-Ukrainian gas crisis. PONARS Policy Memo No. 404. January 2006 and IEA, World Energy Outlook. Paris: IEA/OECD, 2006. Note that the authors aforementioned do not necessarily highlight the same conclusions as those in this section.

<sup>27</sup> Comment on Naftogaz Ukrainy's statement from 7 December 2005, Gazprom press release. <http://www.gazprom.com/eng/news/2005/12/18443.shtml> 7 December 2005.

### **Belarus-Russian energy relations and the January 2007 oil supply interruption**

In the post-Soviet era Belarus has received natural gas deliveries from Gazprom at prices that have mostly been lower than for any other non-Russian customers.<sup>28</sup> One justification for the low energy prices granted to Belarus was the prospective of an economic and political union of Russia and Belarus, implying the supply of energy to Belarus at low Russian domestic prices. Additionally, since the beginning of the 1990s, Gazprom has sought control of Belarus gas network operator Beltransgas in order to increase supply security of the transit flows to Poland (directly) and other Western markets (via Ukraine) through the Northern Lights pipeline system. Despite the low prices charged, Belarus has been in chronic and very significant default on payments for natural gas. In the absence of the ability or willingness to pay, Belarus had agreed to concessions in the military sphere (such as the stationing of troops free of charge, and the non-reception of compensation for nuclear missiles removed).

In the 2000s, the provision of natural gas to Belarus at Russian domestic prices was made conditional on the sale of 50% of the transit and transmission network Beltransgas to Gazprom.<sup>29</sup> The years 2004 through 2006 saw discussions about the correct valuation of Beltransgas. Gazprom eventually accepted the highest valuation that ABN Amro, a Dutch bank appointed by both sides to value the networks, came up with: \$ 5 billion, which was close to the original Belarus position.

During 2006, Gazprom concurrently argued for higher gas prices, asking for up to 200 \$/mcm, as compared to the then current price of 46.68 \$/mcm. The price demands were moderated several times, and eventually Belarus agreed to prices as of 1 January 2007 of 100 \$/mcm plus selling 50% of Beltransgas to Gazprom at a price of \$ 2.5 billion. Prices are supposed to increase stepwise to 'European levels' by 2011. We share the conclusion of Yafima and Stern that this deal could be considered a good one for Belarus, given:

- The overwhelmingly dominant market position of Gazprom, which leaves Belarus little to no alternatives to other gas supplies;
- The fact that gas prices are increased stepwise; and
- The price being paid for the stakes in Beltransgas corresponds to the value established by an independent auditor.

January 2007 also saw the escalation of a conflict between Russia and Belarus about oil deliveries and transit.<sup>30</sup> Belarus had received oil deliveries at relatively low domestic Russian prices, again in view of a prospective economic and political union. Belarus processes the crude oil in domestic refineries and exports a significant share to Western markets, achieving comparably high prices. An agreement dated back to 1995 assigned 85% of the export duties levied on these exports to Russia and 15% to the Belarus government, reflecting the idea that a significant share of the profits made had their origin in the provision of crude oil at domestic Russian prices. The agreement was never enforced, and in 2001 it was cancelled unilaterally by Belarus who stated that the 'provisions of the [...] agreement were no longer acceptable to Belarus from the economic perspective'.<sup>31</sup> Russia attempted to revitalise the agreement in September 2006, and when these demands were not met by Belarus, established an export duty of 180.7 US-\$/t in December 2006. Belarus countered this measure with the establishment of a transit duty on Russian oil transit to Western markets through Belarus of 45 \$/t at the beginning of January. It started taking transit oil from the pipeline when Russia did not pay the transit duty. The latter action triggered the stop of oil deliveries to Belarus and transit through the Druzhba pipeline by

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<sup>28</sup> See, for a detailed account of Belarus-Russian gas relations, Bruce, Chloë, *Fraternal friction of fraternal fiction? The gas factor in Russian-Belarusian relations*, NG 8, Oxford Institute for Energy Studies, March 2005 and Stern, Jonathan, *The future of Russian gas and Gazprom*. Oxford University Press. 2005.

<sup>29</sup> See for the following: Yafimava, Katja and Stern, Jonathan: *The 2007 Russia-Belarus gas agreement*. Oxford Energy Comment, January 15th, 2007.

<sup>30</sup> Cf. Embassy of the Republic of Belarus in the Kingdom of The Netherlands, press release, 11 January 2007.

<sup>31</sup> *Ibid.*

Russia, affecting Russian oil customers in Ukraine, Germany, Poland, the Slovak Republic and the Czech Republic.<sup>32</sup>

Belarus eventually stepped back and lifted the transit duty on January 10<sup>th</sup>, which was followed by a resumption of oil flows.

Both the gas conflict and the oil struggle appear to have been primarily motivated by the wish to retain a larger share of economic rent within the Russian Federation. There were no political demands made in those two disputes. Although the press coverage questioned in general the reliability of Russia as an energy provider, the two disputes between Russia and Belarus show little direct evidence of gas deliveries being employed as a tool of political pressure.

### Estonia and the monument conflict

In April and May 2007 Russia and Estonia were in conflict about the relocation of a statue in honour of the Red Army from the Tallinn city centre to a less prominent spot on a military cemetery. Estonia's Tallinn port is one of the major energy export ports at the Baltic Sea, shipping mainly Russian fuel oil and coal, which is transported mainly by rail to the port. The port has undergone various extensions in 2004 and 2005.<sup>33</sup> In the course of the conflict, the Russian state railway announced that it would schedule repair works that might disturb oil transit flows to the Tallinn harbours.<sup>34</sup> The railway company denied that these repairs were related to the monument conflict and it remained unclear as to what extent actual flows were affected.<sup>35</sup> Russian government officials hinted at the possibility of economic sanctions, including the avoidance of Estonian ports for the export of Russian energy.<sup>36</sup> Reportedly, by July 2007 fuel oil exports via Estonia had been halved and plans to

**Table 8: Russian gas prices 2007 (\$/mcm, approximate figures)**

Ukraine	230
Georgia	235
Moldova	170
Baltic States	~240
Armenia	110
Belarus	100
Western Europe	~250
Russia	~50

Sources: WGI, various newspaper articles

reroute fuel oil exports via Russian ports were firming up.<sup>37</sup> Such diversion plans fit into a longer-term Russian strategy of prioritising Russian ports over foreign ports, retaining a larger share of economic rent within the Russian economy.<sup>38</sup> Aside from this strategy, shifting oil transport from railways to pipelines might simply make good economic sense. However, the timing of the apparent acceleration of this strategy feeds suspicions that political motives still related to the recent dispute between Estonia and Russia also play a role.

### Russian export gas pricing

Apart from actually suspending gas deliveries, political influence can be exerted through pricing, if the supplying party has a dominant position in certain markets. Political support can be 'bought' by charging low prices and political opponents can be punished by being charged relatively high prices. Table 8 gives an overview of prices as charged by Gazprom to export customers, some of which were the result of gas price negotiations that

included the temporary halt of gas deliveries or the threat thereof to the respective export markets.<sup>39</sup> There are differences in prices applied that are beyond purely economic explanations such as

<sup>32</sup> Cf. e.g. 'Russland stellt Bedingungen für Wiederaufnahme der Öllieferung', *Welt online*, 9 February 2007

<sup>33</sup> Energy Information Administration, Baltic Sea regional fact sheet, July 2006.

<sup>34</sup> 'Russia cuts off oil in battle over war statue'. Times online, 3 May 2007.

<sup>35</sup> 'Russland will von der EU Kritik an Estland hören' *Welt online*, 3 May 2007

<sup>36</sup> Russia should respond to Estonia by building ports on Baltic coast - Sergei Ivanov. Interfax, 26 April 2007.

<sup>37</sup> 'Russia wants oil products to move through Russian terminals' *Portworld*, 23 July 2007. 'Estonia unafraid of Russian energy embargo. *Petroleum Economist*, June 2007.

<sup>38</sup> EIA, op.cit.

<sup>39</sup> In addition to the delivery stop to Ukraine, deliveries to Moldova were interrupted as well in a pricing dispute at the beginning of 2006. Georgia accepted a doubling of the gas price in December 2006 when supply was made conditional on

differences in transport cost, especially when comparing prices charged to Armenia and Belarus with those charged to Georgia and Ukraine. In case of Armenia, a relatively low price could be achieved as part of a package deal that transferred control of a pipeline to Gazprom.<sup>40</sup> In the case of Belarus, Gazprom paid a reasonable price for the shares in the network. Thus, being politically closer to Russia or ceding infrastructures that Russia considers as being ‘strategic’ could result in lower prices for importing states, making gas deliveries at least to some extent political. However, the differences in pricing can also be explained in part by the outcome of negotiations that led to the highest ‘bearable’ prices for specific countries. For Belarus and Moldova it has been agreed that prices will gradually rise to net-back parity<sup>41</sup> with Western European markets, whereas Armenia managed to obtain a fixed price at least through 2009.

## Synopsis

The Russian government and Gazprom have been under the suspicion of using energy as a tool to pursue geopolitical objectives. Reviewing some of the recent incidents, which have been quoted as examples of such behaviour, reveals primarily economic objectives, largely aimed at optimising revenues for the Russian economy and removing what were in effect subsidies to foreign states. Differential gas pricing applied and the diversion of oil exports away from Baltic ports suggest to some extent that political motives might have influenced the shape of external economic and energy policies, although hard evidence is weak. Russia appears to be careful in linking political demands to the suspension of contracted energy flows, supposedly in an attempt to preserve or restore the image of a reliable energy supplier and trade partner.

### 3.3. Prospects and options for a cartel of major gas exporters

The concern of a cartel of gas producers coming into being currently receives a lot of attention in the media. Major producers such as Algeria, Qatar and Russia have at various occasions signalled support for such an idea and the well-attended meeting of the Gas Exporting Countries Forum in 2007 has given the impression that gas-producing countries are more open to cooperation. In the following, we briefly assess the viability of a cartel of gas producers and the consequences cartel formation might have on gas markets.

The usual objective of cartels is to eliminate competition between various suppliers, divide the market among them and eventually obtain prices that are higher than they would be under competitive circumstances. Customers are confronted with fewer competing offers, as suppliers will coordinate their offers or, as in the case of OPEC, the overall production offered to the market. Profits for producers increase and consumers lose welfare.<sup>42</sup> Cartels can only work if two conditions are met: the cartel members must hold to their promises and not attempt to acquire higher market shares at the expense of the other cartel members; second, members must control a sufficient share of the production of the product in question, and the behaviour of other producers must not frustrate the efforts of the cartel to maintain high prices. Obviously, enforcing a cartel becomes more difficult...

- The more difficult it is to impose punitive measure upon cartel members that do not live up to cartel agreements;
- The more elastic the supply of non-cartel members is; in other words, the more higher prices attract alternative supplies;

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accepting the new supply terms. ‘Gazprom of Russia to double natural gas price for Georgia’, *International Herald Tribune*, 22 December 2006; ‘Moldova agrees Russian gas deal’, BBC News 17 January 2006.

<sup>40</sup> ‘Gazprom reaches deal with Armenia’, *International Herald Tribune*, 7 April 2006. The pipeline in question delivers Iranian gas to Armenia, and speculations were made as to whether it would provide a potential future export corridor for Iranian gas to Europe or Georgia and increase competition for Russia.

<sup>41</sup> Net back parity price denotes a price equivalent to that obtained in a reference market corrected for differences in transport costs.

<sup>42</sup> See, for a good introduction to the basic principles of energy cartels, Soligo, Ronald and Jaffe, Amy Myers, Market structure in the new gas economy: Is cartelisation possible? In: Victor, David G., Jaffe, Amy. M. and Hayes, Mark H. (eds): *Natural gas and geopolitics. From 1970 to 2040*. Cambridge University Press, 2006.

- The more elastic demand for the product is; in other words, the more higher prices lead to decreasing demand, for instance due to energy conservation measures or substitution to alternatives.

The working of OPEC in the 1980s provides good examples for the problems a cartel faces in maintaining relatively high prices: the high prices improved the economics of non-OPEC production and accelerated the development of alternative oil provinces, in particular the North Sea. On the other hand, high prices triggered energy conservation on a large scale and supported the phasing out of oil as fuel for the power sector. In consequence, OPEC was confronted with stagnating and temporarily decreasing world demand for oil, while at the same time other producers increased their sales volumes. Saudi Arabia, who had in 1983 explicitly taken up the role of swing producer that would adjust production to support prices, had to progressively reduce production while other OPEC members exceeded their assigned production quotas.<sup>43</sup> 1985 saw the effective break-down of the cartel when Saudi Arabia, suffering from severe income losses due to production reductions, decided to recapture market share and desert the role of swing producer.<sup>44</sup> Saudi sales increased by 45% year-on-year in 1986,<sup>45</sup> and prices plummeted.

The establishment of a natural gas cartel might face a number of particular obstacles:

- Gas competes effectively with other fuels. Unlike oil in transportation, natural gas has a number of substitutes for industrial uses (oil products), in power generation (oil products, coal, renewables) and for space heating (oil products, renewables). This fact influences gas prices not only when prices are contractually linked to the prices of the competing fuels, such as is the case for most gas consumed in Continental Europe, or whether gas prices are formed on spot markets as is the case in the United Kingdom and the United States. On spot markets the prices of competing fuels usually provide floors and caps to natural gas prices. Floors are usually provided by the price for residual fuel oil, while caps, certainly in the medium and long term, are determined by the price for gasoil.<sup>46</sup> However, this price formation depends on the short-term switching capabilities of natural gas users. There is relatively little reliable data available as to the quantity of installations that could switch from gas to oil product use, especially when it comes down to fuel oil. Environmental regulations also make it increasingly difficult to switch installations running on natural gas to fuel oil. But if natural gas prices remain consistently higher than comparable fuel oil prices, technologies for 'cleaning' the use of fuel oil will become more economical, and fuel switching is likely to occur on a rather large scale. A gas cartel will be limited in its price setting by substitute fuels, which will most likely be gasoil or naphta in most cases.<sup>47</sup>
- An effective cartel would have to control a sufficient quantity of world gas reserves but preferably also comprise those countries that have proven their ability to develop their reserves for world markets. Countries such as Norway, Canada or The Netherlands will not join a cartel. Negotiations among countries that would be willing to consider cartelisation will probably be cumbersome, as interests are likely to diverge widely. For example, some of the most vocal proponents of the formation of a gas cartel and important resource holders, Iran and Venezuela, do not yet export significant quantities of natural gas. Within a cartel, they would have to be accommodated with increasing exports, while other cartel members would need to be restricted; otherwise the two countries would have strong incentives not to join a cartel and act as independent fringe producers. Given diverging political objectives of possible

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<sup>43</sup> Cf. Yergin, Daniel, *The prize: The epic quest for oil, money and power*. Simon&Schuster: New York. 1991, pp. 746 ff.

<sup>44</sup> Saudi Arabia introduced so-called net-back pricing deals which basically guarantee refiners a fixed refining margin. This meant the abandonment of the posted OPEC price and created demand especially for Saudi Arabian oil under such deals.

<sup>45</sup> BP Statistical Review of World Energy 2006

<sup>46</sup> If the gas price falls below the residual fuel oil price, industrial users burning fuel oil will switch to natural gas, increasing gas demand and stabilising prices. If the gas price surmounts the gasoil price, industrial users burning natural gas will switch to gasoil, decreasing gas demand and dampening prices.

<sup>47</sup> This does not rule out the possibility that in the short term gas prices will exceed those of substitute fuels in times of surging demand (e.g. a cold snap), as short-term switching capacities are, as said, limited.

cartel members, a cartel would also have to concentrate on ‘economic’ price setting, as cartel members would likely not be willing to support political objectives of other cartel members.

- In order to enforce cartel discipline and to prevent new entry, significant spare capacity in the system would have to be present. Holding significant spare capacity, however, will be much more costly for natural gas than it is for oil, as the necessary transport infrastructure in form of pipelines and LNG liquefaction plants are very capital-intensive. Gas producers have a stronger incentive than oil producers to run their infrastructure at capacity.
- International oil product prices are relatively high at the moment. Although there might be some scope for even higher prices before massive switching to oil products occurs, producing countries might not be willing to subscribe to policies that would restrict them in making independent decisions, as they feel comfortable with the revenue levels they already achieve.

Thus, it appears that the scope for price increases through cartelisation is limited and that coming to an agreement between the relevant gas exporters might be a cumbersome exercise in any case. However, it can also not be ruled out that agreements between producing countries will be concluded so as to actually restrict investment with a view toward increasing prices or ensuring that a larger part of the resource rent remains with the producers. Such agreements especially make sense if important producers perceive oversupply becoming more likely and prices are expected to drop to the lower end of the price band spanned by substitute fuel prices such as prices for fuel oil and coal. Our analysis in Chapter 2 indicated that by 2010 the world market for gas might be relatively amply supplied after a number of large-scale LNG projects have become operational, before again becoming tighter afterwards.<sup>48</sup>

Although there are many countries that hold commercial gas reserves, reserves are more concentrated than in the oil market,<sup>49</sup> and the competitive fringe might be relatively small in the end. Especially at current high price levels, we expect that all gas export projects of price-taking exporters will go forward as planned and that slightly higher prices induced by cartel behaviour would probably not induce additional supply.<sup>50</sup>

Due to the overwhelming importance of pipeline transport, gas markets today are still mostly regional markets. The increasing role of LNG has brought about some linkage of markets and prices, but gas prices in Asia, Europe and the US still show significant differentials most of the time. This implies that large pipeline suppliers have strong market positions in the relevant regional markets and corresponding pricing power. A regional market such as the European Union could therefore already feel negative consequences when the major pipeline suppliers start cooperating. In this respect, recent cooperation agreements between Gazprom and Sonatrach, although very limited in scope, have raised worries within the European Union, especially in Italy. Moreover, if one adopts the view that Russia is currently neglecting upstream investment in favour of the construction of ‘transit avoiding’ pipelines, spare pipeline capacity will come into being which Russia could use as a threat in order to deter new entrants to European markets. Once a new entrant plans to come up with a dedicated investment to a ‘Russian’ market, Russia could make a pretty credible threat that they would complement the existing pipeline capacity with newly developed production capacity.

It has been argued that the dominance of long-term contracts in European gas supplies would make OPEC-like cartelisation of gas markets very difficult if not impossible,<sup>51</sup> but this is not self-evident. Terms of new long-term contracts could very well be subject to coordination by cartel members, denying choice to consumers and leading to higher prices. In turn, such new contracts could then be

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<sup>48</sup> The members of the Gas Exporting Countries Forum are reported to be concerned about gas prices being likely to ‘fall in the medium term’. ‘Qatar, Russia eye super swap.’ *World Gas Intelligence*, 25 July 2007.

<sup>49</sup> Compare Soligo and Myers Jaffe, *op.cit.*

<sup>50</sup> In times of relatively low prices, more new entrants might be triggered when cartels raise prices, as supply will be more elastic at lower prices.

<sup>51</sup> For instance, by Algerian Oil Minister Chakib Khelil, quoted in *World Gas Intelligence*, 7 February 2007, p. 3.

used as triggers to renegotiate existing long-term contracts and pull the terms for all gas supplies under long-term contracts upwards.

Finon and Locatelli<sup>52</sup> argue that there would be too many players with diverging interests in world gas markets and underline the important role that international oil and gas companies play in the development of gas exports in important exporting countries such as Egypt, Nigeria, Qatar and Trinidad. Although there is some merit in arguing that these companies would be unwilling to cooperate with cartel strategies set by host governments, the example of international oil companies active in OPEC member countries proves that it is not unthinkable that companies will have to follow suit if host governments decide to firmly subscribe to joining a gas cartel.

Taken altogether, we do not think that the formation of an effective cartel is very likely, mainly because of the high capital intensity of gas infrastructure, which makes holding spare capacity very expensive, and because of diverging interests between possible cartel members. However, we cannot rule it out either, and it would make sense from a producer point of view to put the institutional setting for producer cooperation in place today, so that producers can act in times when prices fall. The main objective of a cartel in such an event will likely be to maintain price levels at the upper end of the price band set by substitute fuel prices. The unfortunate thing about energy export cartels from an importer's point of view is that there is not a whole lot to do about it. But when viable alternatives with respect to fuel choices exist, cartels are automatically restricted in their influence. Cartels become self-defeating when internal disagreements make them ineffective or when they increase prices too much, so that new entrants come to the fore and other technologies become more economical. The same applies to the excessive exploitation of the dominant position that individual gas suppliers might have in regional markets.

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<sup>52</sup> op.cit.

# 4

## Meeting the challenges

In the preceding chapters we have concluded that there is little hard evidence that energy deliveries have been or will be used as a means to achieve political objectives and that the formation of an effective gas cartel will face significant difficulties. Still, against the backdrop of projected tight markets and a perceived increasing influence of geopolitics on the flow of energy in general and gas in particular, uneasiness remains and is growing. Exploring policy measures that help to increase the resilience of the European Union's gas markets both in physical and economic terms is worthwhile. Increasing resilience of the EU gas markets will not only make them better able to cope with actual supply interruptions and market power, it will also make the exercise of economic and political pressure less likely.

It is useful to make a distinction between the short term and the longer term. From a consumer's point of view, for instance, it is irrelevant what causes a supply shortage or supply disruption and what part of the supply chain is causing the trouble. Governments, on the other hand, have different options in meeting energy supply security risks, as they relate to short-term risks as well as to the changes of these risks in the longer term. Such a distinction is relevant, as the policies concerned would range from emergency measures for mitigating sudden supply interruptions in the short term to fuel mix changes for reducing security of supply risks in the longer term. Especially looking at longer terms, challenges can be translated into opportunities: opportunities to move further forward in a sustainable and secure energy supply system and the according industrial, market and regulatory structures. Assessing the EU's energy vulnerability and the effectiveness of policies that are in place or that are considered would benefit from an objective tool set, a set of EU "standards-for-supply-security", that would measure risks and policy effectiveness.

Measures explicitly directed toward the gas market should contribute to the following objectives:

- Providing investors with more certainty about the future economic viability of their projects;
- Mitigating potential market power of individual producers or a group of producers;
- Limiting the impact of major alterations of gas flows on the economy and social life of the European Union and its Member States.

In the following sections we will identify a few measures and thoughts that should be taken into closer consideration.

### **4.1. Maintaining and intensifying international dialogues**

Energy security instruments are impossible for the EU without taking into account the external dimension. External policies not only help to prevent a short-term supply interruption, for instance by securing vulnerable supply and transport routes or by developing political understandings with major exporting countries and hence diminishing political risks, but also are very relevant in building longer-term confidence between market parties because they help develop stable and mutual beneficial frameworks for long-term energy trade and supply arrangements. EU security of supply would therefore greatly benefit from the further development of multilateral producer-consumer cooperation,



such as the ones developing in the frameworks of the G-8, the International Energy Forum (IEF) and, being somewhat more complex, the various UN Fora.<sup>53</sup>

In addition, the EU should further intensify its bilateral and regional initiatives with Russia and other gas producers, such as in North Africa, and transit countries. It is to be noted, however, that especially the EU-Russia energy dialogue could be of utmost importance, although it so far has had few practical results.<sup>54</sup> The prudently developing EU/OPEC Dialogue is worth mentioning as a tool for gradually enhancing mutual confidence concerning general energy market developments.

The dialogue with producers should focus on advertising the attractiveness of European gas markets, paying attention to producer countries' needs and mitigating possible producer concerns with respect to liberal EU markets. But international dialogues can help to relieve possible tensions between stakeholders and look for solutions to problems that hamper current and future gas trade. International dialogues can also be used to win understanding for diversification needs on the part of importing countries.

Cooperation with other energy-consuming and -importing countries is relevant as well, both in the multilateral framework of the IEA and in a more bilateral setting. Energy should continue to be recognised as a main consideration in the wider EU-US relationship. Even though there have been antagonisms between the EU and US in recent years, it should be questioned as to whether this serves the EU's longer-term energy interests. Cooperation with other consuming countries would require an EU that can act in a manner that allows it to follow through on the consequences of an independent policy. Recent political decisions such as the general political endorsements of the "single voice approach" mentioned in the Commission's 2007 Energy Package are a further step in that direction. A more vocal independent EU course in energy should not imply a weakened Trans-Atlantic relationship, but it would imply a different relationship. The same would apply to cooperation and dialogue with other important consumer countries, particularly China, Japan and India, in order to ensure as much as possible a common approach concerning stability on the global oil and gas markets and global warming.

#### **4.2. The relevance of long-term contracts**

Although we believe that the importance of long-term contracts has been widely accepted, we would like to underline it again. Long-term contracts have traditionally been used to distribute the risk associated with the development of large-scale, capital-intensive natural gas projects, usually assigning the volume risk to the purchaser and the price risk to the producer. While this still holds true today and contributes to the viability of new investments, the aspect of long-term contracts providing volume security to the purchaser is worth underlining. Producers are required to provide the quantities agreed upon, regardless if other opportunities arise for them in the meantime, either in export markets or for domestic sales.

#### **4.3. Increasing system resilience**

##### *Emergency response measures*

Making gas markets more resilient against supply disruptions not only increases the operational security of supply but also makes it more difficult for outside producers to exercise political pressure with the explicit or latent threat of withholding gas supplies. It might be advisable to define some EU-wide standards for gas supply security. EU-wide standards would provide similar security levels in emergency situations to all European citizens and also avoid 'weak spots', countries that feel more vulnerable to political and economic pressure. Standards should not be defined along instruments but rather should define the threats that need to be dealt with, leaving the choice of instruments to the Member State in question and allowing for the consideration of local circumstances. Holding strategic

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<sup>53</sup> E.g. UN CSD.

<sup>54</sup> See De Jong, Jacques J. and Susann Handke, Energy relations with Russia: The EU and Dutch Contexts. Clingendael Energy Paper. Forthcoming, September 2007.

stocks might be a feasibility for certain countries, while in other countries other measures, such as installing dual-firing capacities and holding alternative fuels in stock, are likely to be much more efficient<sup>55</sup> More efficient, more flexible and tailor-made choices for Member States and their specific energy security needs and their specific dependencies are then possible.<sup>56</sup>

### *Diversification*

Diversification of import routes and supply sources naturally remains a classical approach to reducing the vulnerability of gas markets to supply disturbances and economic and political risks. Against the backdrop of uneasiness about the political dimension of gas deliveries and the perceived market power of individual producers, such strategies are still warranted today. High hopes are placed on the resources around the Caspian Sea in Azerbaijan, Turkmenistan and Kazakhstan and in Iran. However, especially with respect to the Caspian Sea producers, diplomatic efforts might need to be increased if the EU hopes to convince those producers to establish new transport corridors instead of banking on opportunities offered by Russia and possibly also by China.

The EU might also consider granting some financial support to infrastructure investments that would facilitate diversification but for which financing is difficult. Such support could take the form of loans by the EIB or EBRD or state guarantees.<sup>57</sup>

### *Infrastructure flexibility*

The European Union might want to reassess the capability of networks to accommodate an internal market also in crisis situations. Increasing interconnection and allowing gas to move in both directions will allow acquiring additional gas on spot markets and physically delivering it to areas hit by supply disruptions. Regulatory conditions, especially tariff regulations, might have to be adapted in order to promote investment in additional connections between markets. It is likely that pipelines that are currently not being constructed but that are desired by politicians and proponents of increased market flexibility will be used to only a limited extent. The tariff regulation of the pipelines in question will therefore need to explicitly allow for the recovery of those costs.<sup>58</sup> Before regulatory systems are adapted to allow for the socialisation of such extra costs, we recommend applying thorough quantitative cost-benefit analyses. It might well be that other measures, such as fuel switching and demand measures, are more efficient options for securing gas supply. In cases where existing pipelines are only capable of accommodating flows in one direction, the additional investment to facilitate 'reverse flows' might be limited and thus worth considering first. Even if such investment is considered to be efficient for improving supply security, allowing the pipeline companies to recoup their investment through socialisation of the cost might not be sufficient for the actual realisation. In some cases legislation might have to explicitly provide for an obligation to invest in such measures, if

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<sup>55</sup> Gas stockholding is generally more expensive than storing crude oil or oil products, given the much lower energy density and gaseous form. Therefore, strategic stocks will be much lower in the ranks of efficient measures to mitigate emergency situations for gas markets than for oil markets. Other measures that could be considered are, for instance, interruptible supply contracts to final customers, fuel switching or emergency demand restraint regulations.

<sup>56</sup> Steps in this direction can be found in the Commission's proposals for a gas security framework issued in 2002. Cf. CEC 2002. The proposals defined threats that consumers needed to be protected from and left the choice of instruments to the Member States. The key points of the proposal have never been implemented.

As a further step, one might think about developing an energy security framework, which approaches energy security from an integrated perspective rather than from a fuel-by-fuel perspective. Initial thoughts have been developed by CIEP and ECN in a recent study (De Jong et. al., 2007), some ideas of which are explained in Appendix II.

<sup>57</sup> Compare European Commission, 2007, Energy corridors European Union and neighbouring countries. DG Research. p. 28.

<sup>58</sup> See, for an initial analysis of bottlenecks in pipeline connections, Van Oostvoorn, Frits (ed), Long-term gas supply security in an enlarged Europe. Final report ENGAGED project. ECN-C—03-122, 2003.

We wonder, however, whether this kind of support would not lead to demands for comparable benefits for all infrastructure projects bringing gas to the European market and how the efficiency of spending could be ensured.

the owners of the pipeline company have a (suspected) interest in withholding the investment, even if they could recoup the investment through regulated tariffs.<sup>59</sup>

#### **4.4. Clear vision on renewables, energy efficiency and CO<sub>2</sub>**

The European Union and its Member States need to proceed quickly in developing the future strategy with respect to renewables, energy efficiency and CO<sub>2</sub> reduction. At the moment it is very hard to see what the follow-up on the Council Presidency Conclusion of March 2007 will look like. However, the clearer the future targets in these areas are, and if the proposed measures to achieve them are deemed realistic, the better gas producers and importers will be able to assess the future demand for natural gas, this being a prime determinant for the decision to bring new gas to the market or not.

From a gas market perspective, it is recommendable to not stretch the targets too much. Leaving realistic additional potential in renewable and energy efficiency limits the pricing power of gas producers in the long run.

#### **4.5. Downstream industry structure**

The current consolidation of Europe's energy industry helps to increase bargaining power on the side of European companies as the customer bases of the merged entities form larger units and the interdependence between individual importers and external producers grows. Moreover, with European gas importers becoming more European in ownership structure, the interest of individual Member States' governments with respect to external gas matters will move towards alignment, improving the scope for common external energy policies. It is important, however, to withstand the temptation to loosen internal competition policies with a view to create external bargaining power. Eliminating or restricting competition in the internal market does not appear to be the right answer to strong market positions of external producers.

In some circles the establishment of a 'single buyer' for import gas or the stronger coordination of import contracts is discussed.<sup>60</sup> In the case of the single buyer model, such an entity would be the counterparty for all new imported gas, which would then be auctioned at the EU border to downstream companies. Although such an approach would probably help to some extent to set a counterweight to the bargaining power of major suppliers in tight markets, we find it a rather problematic suggestion. Such an approach would establish a strong role for a European public body (the single buyer), very much interfere with long-term established relationships between producers and current importers and probably add a few layers of bureaucracy. More importantly, such an approach is especially fitted to an environment of tight markets and producer power, but it would likely be difficult to abolish in times that the market environment shifts back to a buyers' market. It might be worth exploring in more depths the merits and disadvantages of this idea, but we would expect that the benefits of such an approach would be limited, and diverging interests among industry players and Member State governments alone already make the implementation of such a mechanism very unlikely.

A different structural discussion, which has been going on for some time in the European Union, concerns the unbundling of the European gas importers. Recent proposals of the European Commission aim at separating the pipeline networks from the trade activities of gas importers and distributors at the ownership level. While such a measure might be theoretically best suited to ensure non-discriminatory network access, the incumbent gas companies regularly argue that such a measure would compromise security of supply and weaken the bargaining power of gas importers towards large external gas producers.<sup>61</sup> Surprisingly little academic work has been done to assess the impact of unbundling on efficient investment in infrastructure and in particular on the bargaining power argument, and we see scope for further independent research in these areas.

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<sup>59</sup> Lang suggests, for example, that the necessary investment for reverse-flow capabilities of the so-called Yamal-pipeline through Poland had actually been withheld already once as Gazprom as co-owner of the pipeline would not agree to the investment. Lang op.cit., p. 16.

<sup>60</sup> Cf. e.g. Finon and Locatelli, op. cit.

<sup>61</sup> Some MS governments subscribe to such views, while others underline the benefits of ownership unbundling. See 'Rettungsaktion für Energiekonzerne' *Financial Times Deutschland*, 30 July 2007.

# 5

## Conclusions and summary

Security of gas supply plays a dominant role in current discussions on European energy policy. Concerns have risen with respect to sufficient investment coming forward in order to meet demand, with respect to the manipulation of markets by a prospected gas cartel and with respect to the use of natural gas as a means of achieving foreign policy objectives. It remains very difficult to assess how real some of these threats are, and perceptions will continue to play a large role when politicians and governments address these threats.

The European Union's gas markets are characterised by overall declining domestic production and increasing demand, so it will need to rely on more imports. Currently, much import infrastructure to the EU-27 is under construction or planned. Our analysis of investments underway suggests that market parties see opportunities and that they are willing to commit substantial financial resources to European gas markets. Infrastructure and upstream investment serving global and in particular EU gas markets appears to be sufficient to meet the rising EU-27 gas import needs, at least in the short term. However, the outlook is less clear already for the period between 2010 and 2015. That period will likely see a slowing down in the completion of global LNG liquefaction capacity, whereas global gas demand is expected to continue to rise. The development of Russian export capabilities is a point of particular uncertainty, which blurs the outlook for the supply and demand balance in the longer run.

The formation of a cartel-type organisation appears to be sensible from a producer point of view, especially with a view toward creating safeguards for times of excess supplies in the future. The large capital intensity of natural gas projects and the threat of nurturing the emergence of additional fringe producers not subject to production and investment controls under cartel policies limit the ability of any producer organisation to effectively increase natural gas prices.

Although geopolitics are expected to play a larger role in world energy markets, we believe that the economic attractiveness of EU gas markets will, to a large extent, compensate for the EU being probably less able to act politically on the global stage.<sup>62</sup>

There is also little that suggests that the EU could become subject to gas supply curtailments as a means of exerting political pressure. The negative consequences for the exporter in question in terms of demand destruction would potentially be significant. Still, it cannot be ruled out completely that political demands will be linked to energy flows and investments in the future, and the risk of being subject to such political pressure will be related to the exposure to a single supplier. Some EU member states apparently feel exposed to latent pressure, and establishing stronger security of supply policies might be warranted in order to de-politicise discussions about energy supply.

The European Union faces a principal challenge in dealing with security of gas supply. It needs to come up with policies that would maintain the paradigm of the competitive internal gas market while increasing the robustness of European energy markets to external disturbances in gas supply. At the same time, policies need to assure producers of reasonably certain and profitable sales markets. While the former objective would lead to measures that promote flexibility between fuels and suppliers, the latter objective would rather require commitments to predetermined quantities of certain fuels from defined suppliers.

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<sup>62</sup> Individual member states might be better able to employ bilateral relations with gas-exporting countries. As long as the European Union lacks international political clout in energy issues, such member states might play prominent roles in securing gas supplies for the whole EU.

The way forward should therefore include both elements. The flexibility of European energy markets in general and gas markets in particular in dealing with crisis situations should be increased. In this respect it would appear to make sense to avoid as much as possible the choice of specific instruments, such as strategic stocks, but rather define threats with which the policies need to be able to cope. The choice of measures could then depend on the local circumstances and take an integrated multi-fuel approach rather than looking at one energy market only.

Security of demand is a key issue for producer countries and thus also for importing countries. The European Union's Member States should be very much aware that prolonged discussions about how to fill in the ambitious EU energy policy goals as adopted by the European Council in March 2007 and the future modalities of the European emission trading system will complicate the conclusion of long-term contracts and the realisation of large gas projects for the European market and could thus compromise gas security of supply. But confirming quickly and credibly the commitment to energy efficiency and renewables will not only make the outlook for gas demand and investment more certain, it will also demonstrate that there are viable alternatives to gas and that fuel switching can be employed to counter political pressure and cartel behaviour by producer countries.

Against this backdrop, the European Union needs at the same time to continue and deepen the dialogues with the major gas-producing countries, clearly demonstrating and defending the objectives of the European Union, but also taking due account of the interests of producer countries and providing them with the security of demand required to generate the necessary investments.



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## Appendix I: Russian supply contracts to the EU-27 concluded in 2005/06

Country	Customer	Start	End	Quantity	Q p.a.	Concluded	Extension/New	Remarks
				bcm				
CZ	RWE Transgas	2014	2035		9	21-12-2006	Extension	Package with transit arrangements through 2035
CZ	Vemex (Gazprom controlled)	2006	2006		0.55		New	
BG	Bulgargaz	2011	2030		3	18-12-2006	New	Package deal; transit moves from barter to cash (as of now, instead of in 2010); BG government will cooperate on infrastructure projects
RO	WIEH	2012	2030		4.5	23-11-2005	Extension	Extension of existing contract
RO	Gazpromexport/Conef	2010	2030	50		05-05-2006		Preliminary agreement in order to get direct access to market from Nord Stream
DK	Dong	2011	2031		1	16-06-2006	New	
A	OMV Gas International	2012	2027		5.25	28-09-2006	Extension	
A	Econ Gas	2012	2027		0.875	28-09-2006	Extension	
A	Centrex	2012	2027		0.875	28-09-2006	Extension	
D	E.On	2009	2020		8	04-10-2005	Extension	
D	WIEH	2014	2031	90	5.25	05-07-2006	Extension	
D	E.On Ruhrgas	2011	2036	100	4	29-08-2006	New	through Nord Stream
D	E.On Ruhrgas	2020	2035	300	20	04-10-2006	Extension	Extension for delivery at Waidhaus
I	ENI	2017	2035		22	14-11-2006	Extension	Extension; concurrently ENI ceded 3 bcm/a to Gazprom for sale on Italian market
F	GdF	2012	2030		12	19-12-2006	Extension	1,5 bcm will be sold by Gazprom directly on the French market; Extension of existing contract
Total extensions					87.75			
New quantities					8.55			

Source: Osrodek Studiow Wschodnich (Center for Eastern Studies) (2007): Gazprom in Europe: Faster expansion in 2006. February.

## Appendix II: Standards for Energy supply Security

In Chapter 4 a reference was made to the idea of developing EU standards for energy supply security. This idea originates from the 2004 CIEP study on Energy Supply Security and Geopolitics (CIEP 2004). The rationale behind this is that such standards, if adopted by all Member States (MS), could facilitate a more objective review and assessment of the supply security of the entire EU and the individual MS' medium- and longer-term energy balances. It would help to reinforce coherence and efficiency of EU and MS' energy policies through a process of consultation and coordination, while acknowledging the asymmetries among the Member States.

A June 2006 study by CIEP and ECN, which was further updated in June 2007,<sup>63</sup> developed such a model based on standards for the EU and its Member States to assess energy supply security. Based on this model the MS can discuss, review and adapt their underlying national energy policies. This model would in particular focus on supply security as one of the three main goals of EU energy policy. The other two main goals, facilitating properly functioning energy markets and minimising the environmental impact of energy use, both have EU frameworks for defining and assessing policy instruments. Such a framework is largely absent for energy supply security, which, over time, has largely remained national policy of the Member States. Some partial frameworks do exist, however, but only on an energy sector basis, such as an oil supply emergency framework and, to a lesser extent, for natural gas. Yet there is no overall framework for the full energy balance.

The model developed by CIEP and ECN focuses on a process that is based on a common and objective framework for reviewing and assessing energy supply security on the basis of pre-agreed criteria. The model therefore has to be seen as a policy tool and not as a regulatory tool. It uses two quantitative indicators and includes some qualitative considerations. The first quantitative indicator deals with the risk of sudden unforeseen short-term supply interruptions and the capability to manage them. This is the Crisis Capability or CC Index. The second indicator is covering full energy supply and demand balances, both present and future ones. This is the Supply/Demand Index or S/D Index. Finally, qualitative considerations concern the multilateral measures for securing overall producer/consumer relations and safeguarding vulnerable transport routes for oil and gas.

The Crisis Capability Index (CC Index) combines the risk of a country to be confronted with sudden supply interruptions and their potential impacts (the Risk Assessment, RA) and the capability of that country to manage and mitigate these impacts (the Mitigation Assessment, MA). Each country is invited to make its own RA and MA on the basis of checklists with some simple scoring values. If the RA is higher than the MA value, the CC Index gets a value of less than 100. The CC Index model in itself is complete and ready for use, but concrete examples of the outcome for individual MS or the EU have not been developed, among other reasons due to a lack of confidential data.

The S/D index aims at review and assessment of energy security of supply in the medium and longer run. The S/D Index covers final energy demand, energy conversion and transport and primary energy supply. It uses four types of inputs; two objective types and two types of a more subjective nature. The objective inputs concern the shares of different supply and demand types (i.e., for supply: oil, gas, coal, nuclear, RES and other; for demand: industrial use, residential use, tertiary use and transport use) and the values characterising capacity and reliability in conversion and transport based on the secondary energy carriers (electricity, gas, heat and transport fuels). Figure 1 displays the conceptual model of the elements considered in the overall S/D Index.

The subjective inputs concern the weights that determine the relative contribution of the different components in the Index (such as the relation between supply and demand outputs, or the relation between EU imports and non-EU imports) and the scoring rules for determining various Index values reflecting different degrees of perceived vulnerabilities. The use of the S/D Index is illustrated in the study with examples for the EU-27 and its Member States for the years 2005 and 2020. The average

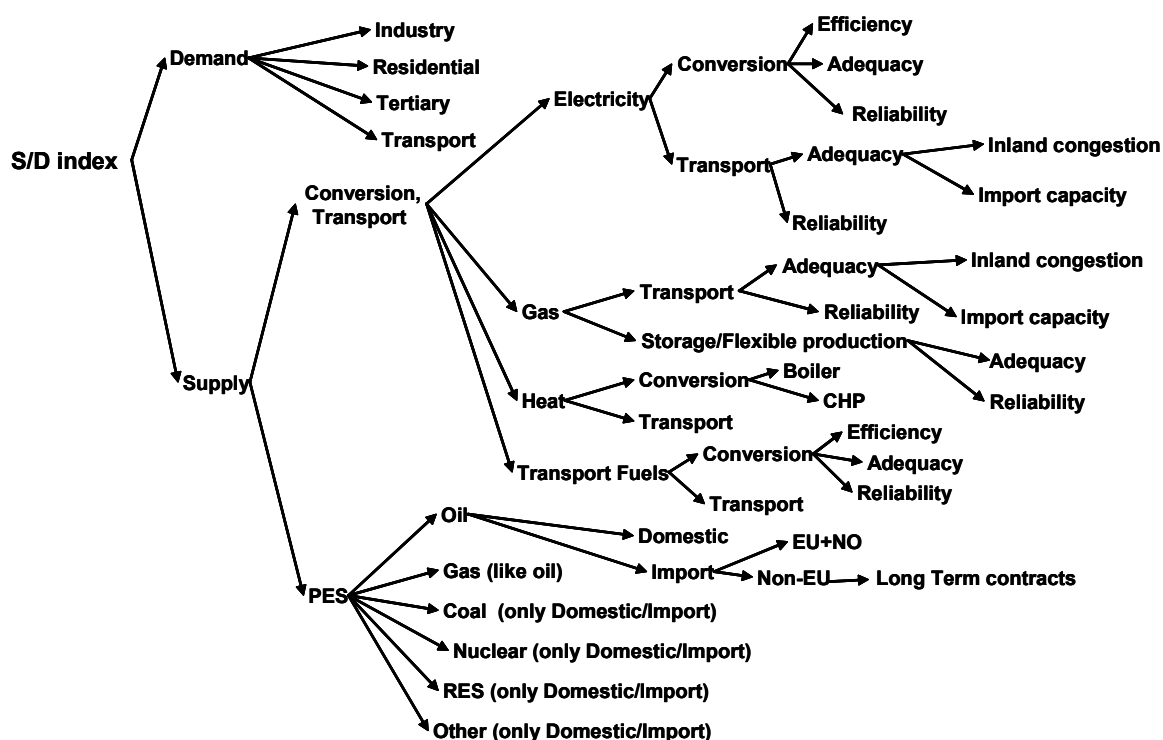
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<sup>63</sup> De Jong et. al, 2007.

value of the S/D index in 2005 is about 65, ranging from 82 (Denmark) to 25 (Cyprus). MS with high import dependencies on oil and gas, combined with high shares of these imports originating from outside the EU/Norway, have a relatively low score, as is to be expected (Cyprus, Luxembourg, Malta, Latvia, Greece, Lithuania and Portugal).

On the other hand, MS that are net exporters of gas and/or oil have a relatively high score (Denmark and the UK). As most of the largest MS (Germany, France, and UK) are part of the best scoring MS, the EU-27 aggregate score is also relatively high (65). It is interesting, though, to note future developments that were calculated based on the *2020 updates from the DGTREN baseline scenario*. On average, the S/D Index decreases by almost 3 points compared to 2005 (from 65 to 62), with Ireland and the UK observing the largest decrease. These decreases are generally caused by higher import dependencies in 2020.

Figure 4: The Supply/Demand Index Model Structure



Source: ECN/CIEP