

# Working Paper

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## Europe's future oil and gas supply – north, east or south?

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## Introduction

The supply of energy and especially of oil and gas usually is of concern to specialists only. But it seems as if the recent events in the oil market have made public opinion aware again of the increasing complexity of today's energy markets and the importance of stable energy supply. This is the case since the frequency of major news events seems to have increased lately, especially in the oil market: the plummeting of oil prices in 1998, the rebirth of OPEC strength, the tripling of prices until 2000 and consecutive European gasoline price protests, September 11 and the refocusing on the Middle East oil, the putsch and strike in Venezuela, the Iraq war and the current high prices above 50\$/bbl.

Consequently, oil and gas and their stable supply are back high on the political agenda. And as one notices that some suppliers are more stable than others, the Norwegian and Russian contribution to oil and gas supplies to Europe have entered the spotlight again. Over the last decades, both countries have ranked as the top two oil and gas suppliers to Germany.

At the same time, North Sea crude oil production is likely to have its peak somewhere close to the turn of the millennium and annual natural gas production of Norway has been exceeding new discoveries lately. Thus, European and Norwegian interest in geological prospects of yet undiscovered resources in poorly explored regions is increasing. One of these regions with a good potential is the far north, the vast area north of the Norwegian Sea and east into the Russian Barents Sea. Much of the area is still unexplored, but prospects seem to carry some potential for oil, but especially huge potentials for natural gas.

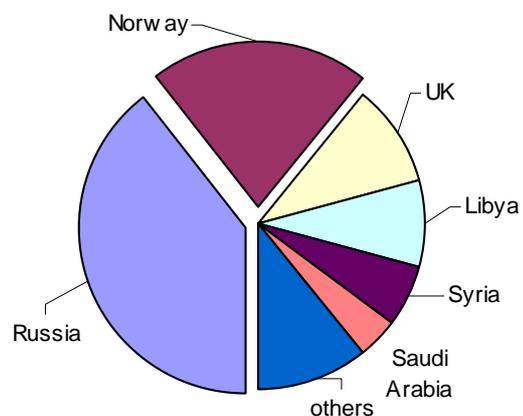
With Norway and Russia being crucial and extremely stable suppliers of oil and gas to Germany and Europe, a brief summary of to-

day's oil and gas situation in Europe will set the scene. Then will follow a brief description of the most likely future European oil and gas demand scenario, focussing on the probable imports trends. Finally, some aspects of the northern areas will be highlighted, concerning costs, financing and export infrastructure.

## Importance of the north and east for oil and gas

In Europe, only Norway with a production of 3mb/d and the UK with 2.1mb/d are significant producers of crude oil. For the UK, oil production in the North Sea has peaked in the 1990's and is rapidly declining, which will make the country a net importer of oil by around 2010. Consequently, only Norway will remain a significant European source of oil in the foreseeable future. Norway today is the third biggest exporter of oil in the world after Saudi Arabia

**German crude oil imports, 2003**

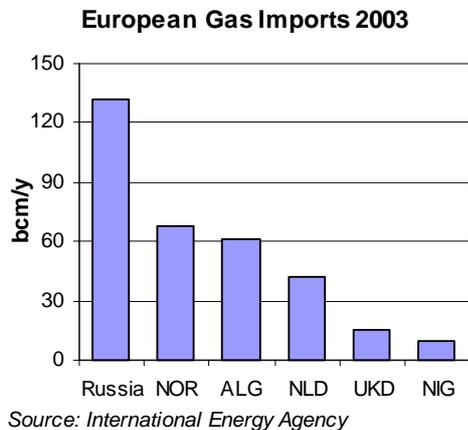


Source: International Energy Agency

and Russia; it exports 75-80% of its crude oil to Europe, the rest mainly to the USA. As for sources of oil outside Europe itself, imports from Russia are the biggest individual source, representing some 30% of imports into Europe. The same proportions hold true for Germany, Russia leading the imports with a 40% share, followed by Norway with a good 21%.

As for natural gas imports into Germany and Europe, a similar picture can be drawn today: Russia and Norway rank first and second as import sources. For Germany, Russia represents 40% and Norway some 30% of natural gas

years). Consequently, increasing quantities of imports will have to be covered from other import sources. Due to the increasing concentration of remaining oil reserves in the Middle East – 2/3 of today's proven reserves are located there – much of the supplemental European



imports. Inversely, Germany represents a major energy trade partner for Norway, as 1/3 of current gas production is sold to Germany, a share that is projected to increase to 50% of production by 2010.

### Future outlook: brief scenario of oil and gas in Europe

As mentioned earlier, production of crude oil in the North Sea is likely to have had its peak somewhere around the turn of the millennium. After a period of plateau production, Europe as a whole will then start a gradual decline until 2030. With consumption estimated to remain relatively stable (a modest increase of 0.5%p.a.), net imports of oil into Europe will increase significantly, projected to almost double until 2030. Russia is expected to increase its exports to Europe at a fairly similar small rate, keeping its share in total imports of a little less than 1/3 relatively constant until 2020 (notwithstanding the fact that some market analysts may raise warnings that Russian production may peak soon, especially with the steep increase seen over the last

**Oil and Gas in OECD Europe**

	2000		2030	
	mb/d		% consumption	
<b>oil</b>				
Production	6,7	2,5	48%	15%
Consumption	14,1	16,4	100%	100%
Net imports	7,4	13,9	52%	85%
<b>gas</b>	bcm/y		% consumption	
Production	296	276	61%	31%
Consumption	482	901	100%	100%
Net imports	186	625	39%	69%

Source: International Energy Agency, cited according to F. Müller, Klimapolitik u. Versorgungssicherheit, SWP Apr04

oil import will likely come from this region in the long run.

Natural gas is projected to be by far the fastest growing fossil fuel in Europe over the next 30 years. Consequently, with production slightly decreasing over the coming decades, net imports into Europe will have to increase substantially, to almost 70% of consumption or some 600bcm/y - a huge quantity. Where will these quantities be imported from?

Russia holds by far the largest gas reserves in the world, accounting for a third of total world gas reserves. Thus, in the long run, Russia will play the major role concerning natural gas and will continue to be by far the largest individual gas exporter to Europe over the next 20 years. Nevertheless, according to the official projections of the Russian 'Energy Strategy to 2020', the huge supplemental gas demand in Europe will not likely be matched by Russia (see table below). This is mainly due to three facts. First, expansion of natural gas production is projected to be 'only' somewhere in the region of 100-130bcm/y between 2000 and 2020, largely owing to the decline in three of the super-giant gas fields in West Siberia (which accounts for

some 85% of total Russian gas production). Gazprom anticipates offsetting the decline by bringing new fields on stream, including production at the recent Zapolyarnoye field and, most notably, the giant Shtokmanovskoye field in the Barents Sea. Consequently, parts of the gas in the northern area will serve to counter the decline in other fields and can thus not be used for export increases. Second, the Energy Strategy anticipates production increases in the far eastern provinces (e.g. Sakhalin, Irkutsk), which will be exported to the neighbouring Asian region (mainly China, Japan, potentially USA). These increased quantities will thus not be available to the European market. Third, Russian production is also used

### Russian natural gas in Europe\*

	2000	2020	Increase
Net imports into Europe, bcm/y	200	500	approx 300
of which imports from Russia, bcm/y	134	165	approx 30
Russian share, %	67	33	

Note: 'Europe' including the EU-25, Turkey and the South-east European candidates

Source: R. Götz, *The Russian Energy Strategy and European energy supply*, SWP, March04

to satisfy the extremely high domestic gas demand (above 52% of total primary energy supply), which is even projected to increase over the coming decades. The domestic demand increase is propelled mainly by use for power generation and especially by the extremely low consumer prices, which give no incentive to reverse the trend.

Consequently, the future European supplemental gas demand will be met by Russia to a small degree only, the majority of the huge quantities to expect will have to be imported from other sources (likely North Africa and the Middle East) over the projection period of the next three decades. However, while this clearly indicates that European gas demand will not be able to only rely on the North and East, this

sheds some light on the importance of the reserves in the northern areas: Russian production of natural gas will crucially rely on the development of natural gas in the Barents Sea and European imports, even though with a diminishing share, will continue to be dependent on production from the northern areas.

### The northern areas: outlook on natural gas

Under some restrictions due to very low exploration and drilling activity in the region over the past years, it is safe to say that the areas north of Norway and east in the Barents Sea mainly contain natural gas. Discoveries of oil have been very modest. Some fields of economic size have been found further south onshore in the Pechora region, but basically the region is of strategic interest due to its huge natural gas reserves.

Norway will be the first to exploit gas reserves in the area, when production at the Snohvit field begins in 2006. The quantities produced will be exported by LNG, a far reaching decision as it enlarges access to the major world gas demand regions. Of course, such a development is of strategic importance to the European gas market, as it breaks with the tradition of pipeline imports from neighbouring regions. This is not the first such occasion (Algeria has already set the tone in recent years, exporting gas to Europe by both pipeline and as LNG), but it may well be a representative first step for the further development of the entire region, as this option is also widely discussed for the Russian Barents reserves.

In the Russian part of the northern areas lies the super giant gas field Shtokmanovskoye offshore in the Barents Sea. Its development has been under discussion for many years, and will eventually happen in the medium term. But interested parties have been rather hesitant in the past, mainly due to the fact that its devel-

opment is rather expensive and the future price of natural gas quite uncertain. Especially when exported to Europe, it would have to compete with available natural gas from Northern Africa (Algeria, Egypt and Libya), which is relatively cheap, comes a short distance and is by all projections going to be a major player on the European gas market for the foreseeable future.

The same question arises around Middle East gas exports, as production is cheap and LNG transportation costs have significantly decreased. In addition, reserves are huge (Iran and Qatar each hold approximately 15% of the world total). Furthermore, quite some uncertainty reigns over the much-discussed possibility of a pipeline connection of Iran to the European gas grid (which is closer to Europe than West-Siberian gas), which seems impossible today for political reasons, but that may well change in the future.

The immense financial costs to develop the Barents Sea and the uncertainties over the future price made investors somewhat hesitant lately. But development will definitely come sooner or later. It may be argued that production costs are not the crucial parameter for a production decision, as gas pricing in Europe is mainly linked to oil or oil products. But with the increasing importance of gas spot markets and competition in Europe, this may well change in the future, resulting in an import preference for cost efficient production – which again would mean difficulties for Barents Sea production.

From a European perspective the choice of export infrastructure is of importance. Pipelines built between Shtokmanovskoye, Murmansk and the Baltic Sea would ensure these gas quantities to be available to the European market. However, it looks like there is a preference for LNG exports, mainly because this could avoid expensive new pipeline infrastructure (partly deepwater), open up new outlet

markets (the US), but also avoid direct competition for the existing West Siberian gas.

Last but not least, environmental reservations concerning exploitation of reserves in the Arctic Circle should be mentioned. Not only is the area a pristine reserve of natural habitat that has not yet been troubled with major spills or production leakages, but it also serves as a major fisheries reserve to the neighbouring countries Norway and Russia. And for both countries, the fishing grounds in the area are of major importance.

## Conclusion

The area north of Norway and east into the Barents Sea is mainly gas-rich and its development will possibly be driven by LNG, as shown by the Norwegian example. Especially due to the super giant Shtokmanovskoye field, the area will be of major importance for the expansion of Russian natural gas exports. Today, concerns over costs and financing still make investors hesitant, but it is clear that the massive reserves in the area will be developed in the medium term.

Correspondingly, Russia will retain its first rank in European natural gas imports. But at the same time, the driving factor for gas imports into Europe will be demand growing at a much faster pace than Russia's export growth. Thus, the bulk of supplemental European gas imports will not come from the north-east, Russia, even when development of the northern areas is included – instead, it will have to be imported from other sources, mainly the south and south-east: the main origins are likely going to be North Africa in the foreseeable future and the Middle East in the longer term.