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Research Report

Energy security: Demands imposed on German and European foreign policy by a changed configuration in the world energy market

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SWP Research Paper

Stiftung Wissenschaft und Politik
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and Security Affairs

Friedemann Müller

Energy Security

Demands Imposed on German and European
Foreign Policy by a Changed Configuration in
the World Energy Market

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Energy Security.

Demands Imposed on German and European Foreign Policy by a Changed Configuration in the World Energy Market

In the continental European tradition energy policy is considered a part of economic policy. This applies both to the organization of the national and European domestic markets and development of the requisite infrastructure as well as foreign policy aspects of energy supply. Heads of state are only brought in for support in the case of major projects such as the securing and expanding of infrastructure for the transport of natural gas between Russia and Germany. In Germany the authority of the Minister of Economics is bounded exceptionally by the mandate of the Minister of Environment in questions relating to nuclear safety and climate policy and the associated obligations imposed on the energy industry (emissions trading).

Since the beginning of the new millennium, varied signals have made it clear that energy markets are prone to crisis-like developments in certain regions, threatening security. In addition, the control of oil and natural gas supplies has come to be increasingly exploited as a political weapon. "Energy must not become the currency of power in international politics," writes German Foreign Minister Frank-Walter Steinmeier, knowing full well that, at least in isolated cases, energy has long become just that and indeed has become incorporated into the set of policy tools for addressing crises and conflicts. The leaders of Russia, Iran, and Venezuela have already invoked this currency of power in their public statements.

This development has been made possible by the fact that both the world oil and natural gas markets are not (or no longer) functioning as competitive markets on the supply side. The monopolistic tendencies are supported in fact by a concentration of supply and a trend towards nationalization or state control over energy production in the major producing countries. The result is a state-regulated investment policy that, on the one hand, has undercut the rules of market economics by fostering investment in areas that promise the highest return—which in turn leads to restriction of production in order to keep prices high. On the other hand such a policy motivates

major energy producing countries to pursue political goals through oil and natural gas policies.

Why have such policies, which were unthinkable during the 1980s and 1990s, become possible today? Three robust trends that can be expected to continue during the next two decades have transformed a market favorable to consumers into one favorable to producers: first, an already high concentration of secure conventional and economically exploitable oil reserves in the Persian Gulf (62 percent of global reserves) is increasing due to the fact that reserves in other regions are being exhausted at a significantly higher rate; second, domestic production is declining in absolute terms in major consumer regions, resulting in a higher import dependency; and third, development processes in Asian countries in particular have caused a surge in demand that has in turn generated distribution problems. In the case of natural gas a fourth factor comes into play: Due to the high cost of investment and insufficient pressure to increase competition, the infrastructure is underdeveloped to an extent that, generally speaking, only long-term relationships between buyers and sellers are of any relevance and no possibility exists to shift to other suppliers even if a serious supply crisis occurs.

The resulting shift in power in the energy markets towards the supply side does not only threaten the security of German and European energy supply; it fuels conflicts (Sudan), blunts instruments for addressing crises (Iran), and impedes compliance with the rules of the multilateral system (Russia as a supplier, China as a consumer). Insofar as their domain is affected by these trends and mechanisms, foreign policy decision makers must therefore address the power configurations resulting from these market failures. They must focus, in particular, on the following areas:

- ▶ Competition on the supply side must be fostered. This objective can be reached by aiming at a diversification of supply sources as well as by supporting (through political means) the construction of infrastructure that enables diversification from a technical standpoint, e.g., through the construction of a natural gas pipeline from the southern Caspian region (bypassing Russia) to Europe (Nabucco Project).
- ▶ Increased political effort must be expended on enforcing fair rules with respect to production, transport, and distribution contracts. The Energy Charter is one starting point. The dialog must take place with the new consumers (China, India, etc.)

and producers (committing OPEC to greater international responsibility).

- ▶ In light of the widening gap between supply and demand due to the demand pressure from Asia (motorization of China, India, etc.) and the associated risks, a consensus must be reached among industrialized countries concerning the stepwise withdrawal from the Oil Age. A gradual departure from the oil-driven automobile engine over a space of 20 years, organized on the G-8 level, would be a step in the right direction. The impact of such a move would be to reduce global oil demand and accordingly to take back some of the leverage lost in relation to oil producers.

A foreign policy thus conceived could not only recover the capacity to act in crisis regions but also lead out of the dead end into which climate policy has been maneuvered.

An External Energy Policy—A Critical Necessity

While in France energy-related questions are considered to fall within the domain of the head of state, in Anglo-Saxon countries energy ministries exist that unify issues and interests related to the provision of energy. In contrast energy policy was long—perhaps too long—deemed part of the economics portfolio, and consequently primary control was turned over to the Minister of Economics. The Minister of Environment had at best a say in certain matters. Until recently the Foreign Office was either not included in decision making processes related to energy policy or only included selectively, as in cases like the natural gas pipeline deals in the late 1970s and early 1980s, where the Foreign Office could provide useful services in arranging infrastructure projects with politically difficult regimes. The argument put forward to justify the non-inclusion of actors from the foreign policy area was that strong corporations and rules of the market could best assure provision of energy.

In the years following 1999—as had sporadically been the case during the first oil crisis of 1973/1974—two things have become apparent that have always been obvious in the natural gas sector: firstly, the supply side of the market does not operate in a competitive manner, and secondly, both energy sources can be used as political weapons. In 1999, the Organization of the Petroleum Exporting Countries (OPEC) was for the first time since 1985 able to successfully use the main tool at its disposal, achieving a price increase by way of a production limitation. Surprised by its own success and cognizant of the drawbacks of a policy of high prices that became obvious during the early 1980s, the OPEC in 2000, firstly, gave assurances that it would not make use of production limitations in order to reach political objectives as it had in 1973 and, secondly, declared its intention to keep the OPEC basket price within a range of between 22 and 28 US dollars. The relative stability of the oil price was maintained with minor exceptions until the end of 2003, that is to say beyond the start of the war in Iraq. Since then the price has skyrocketed to over three times the price at the end of 2003 due to an unexpected surge in demand and an increase in the power of producing countries without any sign from the OPEC that it

would be willing to stabilize the price even at a higher level.

Even the commitment not to use oil as a political weapon, which the OPEC had taken upon itself, was not longer regarded as binding by important OPEC members such as Venezuela and Iran. Quite to the contrary, these countries repeatedly threatened to cut off supplies. The regular attacks on production and transport facilities are, of course, also politically and not economically motivated. In the final analysis countries that control exportable energy reserves—like those that wield military power—are not primarily interested in fulfilling their threats. They are interested rather in inducing external power effects, compelling energy consuming countries dependent on them to adopt a desired behavior or in limiting these countries' range of political action. President Putin, for instance, spoke about a “natural competitive advantage” possessed by Russia that should not be used “to the detriment of our national interests.”¹

These developments of the past seven years have not just generated buzzwords such as “natural gas OPEC” and “energy NATO” as well as a new field of policy studies entitled “energy security” in Anglo-Saxon academic circles² but have also introduced the term “external energy policy” into the foreign policy discourse. As German Foreign Minister Steinmeier writes in a seminal article, “Energy must not become the currency of power in international politics. This is the goal of German energy-oriented foreign and security policy.”³ A position paper of the CDU/CSU

1 “Our country enjoys a natural competitive advantage, and has natural and technological capabilities for taking more prominent positions on the energy market. We must use these positions in the interest of the whole international community, but not to the detriment of our national interests.” (Speech by Vladimir Putin on 22 December 2005, cited in: <http://www.rferl.org/featuresarticle/2006/02/7428f1aa-b0af-4262-9ef4-b9ec69e48afa.html>.)

2 An overview of the subject can be found in Jan H. Kalicki and David L. Goldwyn (eds.), *Energy and Security—Toward a New Foreign Policy Strategy*, Baltimore 2005.

3 “Energie darf nicht zur Machtwährung in den internationalen Beziehungen werden. Dies ist das Ziel deutscher Energie-Außenpolitik und -Sicherheitspolitik.” (Frank-Walter

parliamentary group entitled “Strategic elements of a sustainable energy policy” (“Strategische Elemente einer zukunftsfähigen Energiepolitik”) states that “Germany must [...] aim towards the establishment of a European energy policy,”⁴ and the European Commission Green Paper “A European Strategy for Sustainable, Competitive and Secure Energy” contains a chapter entitled “Towards a coherent external energy policy.”⁵

In the Annual Economic Reports of the Ministry of Economics until 2005, the first item found under the heading “Goals of Energy Policy” (“Ziele der Energiepolitik”) is a reference to the triad of primary goals: security of supply, economic efficiency, and environmental sustainability. In the Annual Economic Report 2006, this section starts with a reference to the “global dimension of energy supply, the risks on the world energy markets, Germany’s growing dependence on imports and the dangers of climate change [which] all require intensive cooperation on European and international level.”⁶ Such passages demonstrate the emergence of a new conception of energy policy already long established in the United States. In his 2006 State of the Union address (and also at the EU-US summit in Vienna at the end of June 2006), President Bush drew attention to the United States’ dependence on oil and announced a 75 percent reduction of US oil imports from the Middle East by 2025.⁷ According to President Bush, dependence on oil from this region is to become “a thing of the past.” Notably, however, the United States imports significantly less oil from the Middle East than Europe (west of the Commonwealth of Independent States [CIS]) both in absolute terms (2.3 vs. 3.1 million barrels per day in 2005) as well as in relative terms (11 percent vs. 19 percent)⁸. In addition, the United States has access to military options in the region that are not available to European states.

The efforts of the US Administration to reduce the dependence on the Middle East, however, demonstrate that these options are no guarantee of a secure oil supply.

In the European Union a space of more than five years lay between the publication of the Green Paper “Towards a European strategy for the security of energy supply” (November 2000)⁹ and that of the subsequent Green Paper “A European Strategy for Sustainable, Competitive and Secure Energy” (March 2006).¹⁰ Both drew attention to the threatening security situation and stress the need for a common European strategy. However, only the second Green Paper and its message were received positively, while the first Green Paper was met with a rather cold response due to opposing and conflicting national interests within the Member States. The passage of time between the publication of the Green Papers has made clear that a political assessment and response to the problem is urgently necessary. Ultimately, the issue at stake is the coordination of a package of economic, security, and environmental objectives. The following three chapters will be devoted to the various possible packages of objectives. These packages cannot be coordinated without an external energy policy.

Steinmeier, “Energie-Außenpolitik ist Friedenspolitik,” in *Handelsblatt* 3, 23 March 2006).

⁴ “Deutschland muss [...] eine europäische Energieaußenpolitik anstreben” (Decision of the CDU/CSU parliamentary group of 2 April 2006).

⁵ Commission of the European Communities, *Green Paper: A European Strategy for Sustainable, Competitive and Secure Energy*, Brussels, 8 March 2006, SEK (2006) 317.

⁶ Federal Ministry of Economics and Technology, *Annual Economic Report 2006*, Berlin 2006, p. 69.

⁷ Text of the State of the Union address of 31 January 2006 in: <http://www.washingtonpost.com/wp-dyn/content/article/2006/01/31/AR2006013101468.html>.

⁸ Source: BP, *Statistical Review of World Energy*, London, June 2006, pp. 11, 20.

⁹ http://ec.europa.eu/energy/green-paper-energy-supply/doc/green_paper_energy_supply_de.pdf.

¹⁰ http://ec.europa.eu/energy/green-paper-energy/doc/2006_03_08_gp_document_de.pdf.

The Issue of Market Failure

The mechanisms of international oil transfer differ fundamentally from those of natural gas transfer with regard to market concerns and therefore require a separate description. In particular the market structures are shaped by diverging regional concentrations, differing means of transport (tankers on the one side and pipelines on the other), and the different extent to which the respective transport networks have been established.

The Global Oil Market

Oil is the most important source of energy in the world with a 35 percent share of the global energy mix and a 40 percent share of the energy mix of Western industrialized countries. This fact was as true during the past 30 years as it is likely to be in 2030.¹¹ In spite of tight supply of this resource, a global increase in consumption of around 60 percent should be expected during the first three decades of this century due to the close links of oil use with the most rapidly expanding energy consuming sector, the transport sector. However, three robust trends and one regulatory factor indicate that the supply of oil will not keep up with rising demand and that rules of the free market will come to be suspended.¹²

The first trend concerns the regional concentration of known conventional oil reserves. Currently 62 percent of these reserves are concentrated in the Middle East (Table 1). As the ratio of reserves to annual production (right column) indicates, the reserves in other oil producing regions are declining at a faster rate than those in the Middle East. Consequently the concentration in this region will increase.

¹¹ The International Energy Agency expects a share of oil in energy consumption globally of 35 percent and 39 percent for OECD countries for 2030; International Energy Agency (IEA), *World Energy Outlook 2005*, Paris 2005, pp. 430–434.

¹² Friedemann Müller, “Geopolitische Marktstörungen bei endlichen Ressourcen,” in: *Zeitschrift für Energiewirtschaft*, Vol. 29, No. 3 (2005), pp. 197–204.

Table 1

Regional concentration of oil reserves (2005)

	Reserves (in million barrels)	Share in world reserves (in %)	R/P* (years)
Middle East	743	62.0	81
Latin America	117	9.7	30
Africa	114	9.5	32
Russia	74	6.2	21
Caspian Region	48	4.0	62
USA/Canada	46	3.8	18
Asia/Pacific	40	3.4	14
Europe	18	1.5	8
World	1201	100.0	41

* R/P = Ratio of reserves to annual production (in 2005).

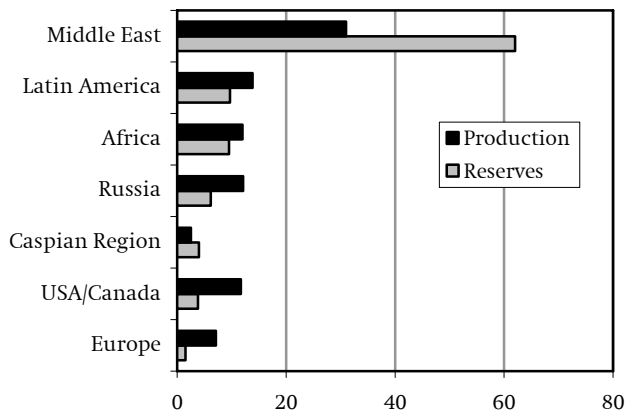
Source: BP, *Statistical Review of World Energy*, June 2006.

Figure 1 (p. 10) illustrates the consistent dominance of the Middle East on the world oil market by representing shares of various regions in world oil reserves and comparing these reserves with their shares in global production (R/P ratio). Not only are reserves in the Middle East immense but production costs are much lower than in other regions.¹³ As a result it hardly seems advisable to invest in the production of non-conventional oil resources as in Canada or Venezuela. Exploration in the Middle East produces profits even in the case of a collapse in world prices, as during the mid-1980s and end of the 1990s, while the costly development and infrastructure construction measures required to exploit non-convention oil sources stretching over decades would be unprofitable under these conditions. The International Energy Agency (IEA) and the US Department of Energy's Energy Information Administration (EIA) do not, therefore, expect that non-conventional oil could close the gap between oil supply and demand. According to their projections, non-conventional oil will account for a less than 8 percent share of global oil consumption in 2030, while consumption is

¹³ IEA, *World Energy Investment Outlook*, Paris 2003, p. 113.

projected to grow by more than 40 percent between 2004 and 2030.¹⁴

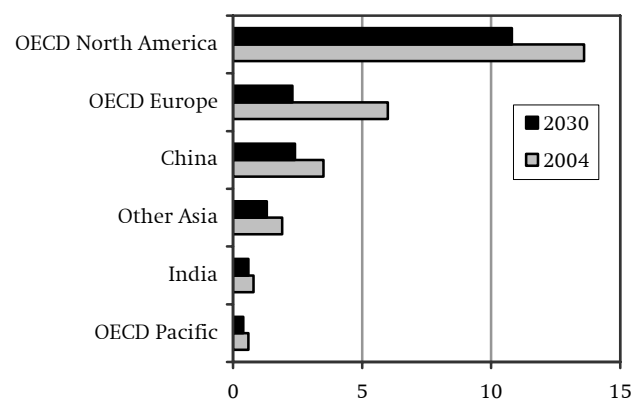
Figure 1
Regional shares in world oil reserves and global production, 2005 (in percent)



Source: BP, *Statistical Review of World Energy*, June 2006.

The second trend lies in the decline in domestic oil production in all major consumer regions, in the OECD countries as in China and India (affecting Europe most of all, as illustrated in Figure 2). As a result the import dependence of these regions is growing, fueling rivalry between oil importing regions.

Figure 2
Oil production in consumer regions, 2004 and 2030 (in millions of barrels per day)

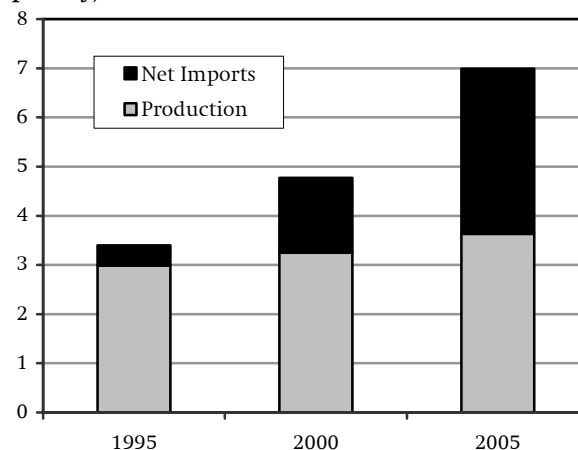


Source: IEA, *World Energy Outlook 2005*, p. 90.

¹⁴ Energy Information Administration, *International Energy Outlook 2006*, Washington, June 2006, p. 30; IEA, *World Energy Outlook 2005* [see footnote 11], p. 90.

The third trend relates to the modernization that is taking place as part of the process of national development in Asia in particular. Figure 3 shows that oil consumption increased dramatically and oil imports, in fact, increased eightfold during the period from 1995 to 2005. The country was still a net exporter in 1992 but by 2005 it was already the third largest importer in the world. While 23 million automobiles were registered in China in 2005, according to estimates by Sinopec, a Chinese oil company, this number is expected to rise to 130 million by 2030—a more than fivefold increase.¹⁵ Even then, the Chinese market would only be saturated to a fraction of the degree reached by the American or even the European market.

Figure 3
China's oil consumption (as a sum of production and net imports), 1995, 2000, and 2005 (in millions of barrels per day)



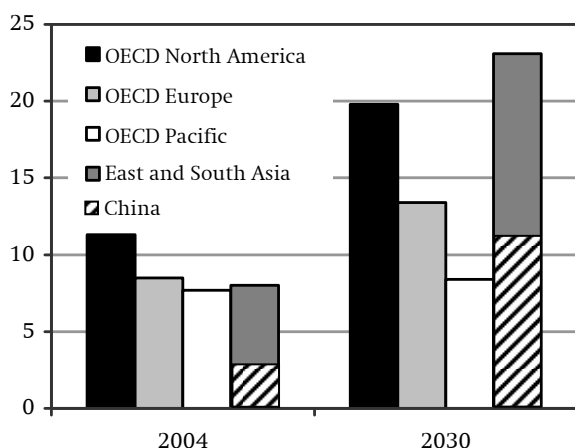
Source: BP, *Statistical Review of World Energy*, June 2006.

China is not the only Asian country in which development has gone hand in hand with an increase in oil consumption. India has a similar number of inhabitants and will, with some time delay, move towards at a similar growth pattern. Not to be forgotten are Southeast Asian countries with a similar development structure. Figure 4 compares the structure of oil import for 2004 and 2030 as projected by the IEA. During this time period, East and Southeast Asia (excluding OECD Asia) will become the leading regions in terms of demand. Less than half of this demand will be attributable to China. As currently demonstrated

¹⁵ Flynt Leverett and Jeffrey Bader, "Managing China-U.S. Energy Competition in the Middle East," in: *The Washington Quarterly*, (Winter 2005-2006), pp. 187-201 (189).

on the African markets in particular, the rules of the game are changing as regards efforts to gain access to as yet unexploited oil fields: Instead of OECD market rules, state-dominated monopoly rules, which China is already now pursuing, are increasingly becoming established.¹⁶ In Sudan, China acts as a quasi-monopolist in oil exploitation and is securing its production sites with 4000 civilian security personnel.¹⁷

Figure 4
Net imports in major consumer regions, 2004 and 2030
(in millions of barrels per day)



Source: IEA, *World Energy Outlook 2005*, pp. 83, 90.

In order to keep up with the development of demand shown above, the Middle East would have to double its oil production between 2004 and 2030. The other oil producing regions will be overtaken by global demand and will only be able to reach the production quantities shown in Figure 5.

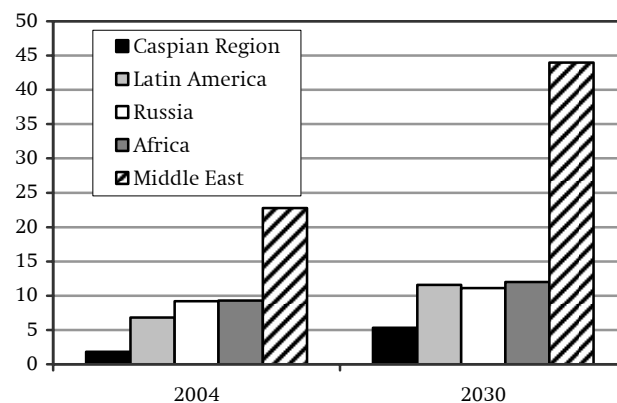
Growth in Middle Eastern oil production of this magnitude is unlikely to be reached. For various reasons, the most powerful oil producers in the region will not reach the production path shown in Figure 6: firstly, OPEC has rediscovered the tool of production limitation and its price effects; it will use this tool again to secure the profit margins reached since the beginning of 2004. Secondly, a drastic expansion of production, one that might even be financed with the help of foreign investors, could threaten the internal stability of major producer countries like Saudi Arabia

¹⁶ Even India has complained about China's bidding behavior, leading to the signing of an accord on bidding behavior in Beijing in January 2006; *Financial Times*, FT.Com, 12 January 2006.

¹⁷ David Zweig and Bi Jianhai, "China's Global Hunt for Energy," in: *Foreign Affairs*, Vol. 84, No. 5 (September/October 2005), pp. 25-38.

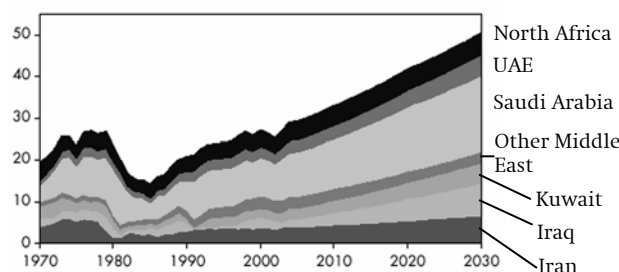
and Venezuela, as perceived by these countries' rulers. Thirdly, the bureaucratic system in countries like Iran is not sufficiently flexible for such an increase in production. And fourthly, the security situation, especially in Iraq, will not permit an expansion of such a magnitude in the foreseeable future.

Figure 5
Oil production in producer regions, 2004 and 2030
(in millions of barrels per day)



Source: IEA, *World Energy Outlook 2005*, pp. 90, 297, 449, und BP, *Statistical Review of World Energy*, June 2005, p. 6.

Figure 6
MENA crude oil production, 1970-2030
(in millions of barrels per day)



Note:
The production figures contain liquid derivatives of natural gas production and oil condensates.

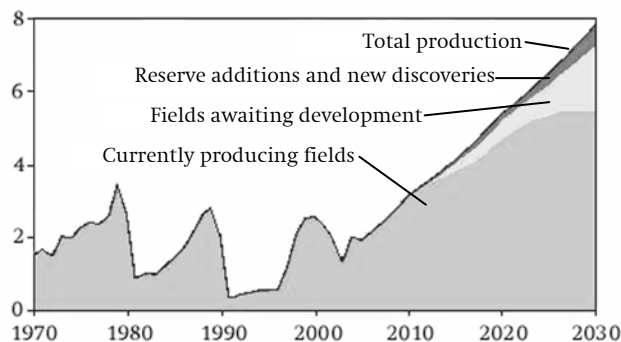
* The other Middle Eastern states are: Bahrain, Israel, Jordan, Lebanon, Oman, Syria, and Yemen.

Source: IEA, *World Energy Outlook 2005*, p. 138.

Specifically Iraq would have to abruptly make a transition from the back and forth of production highs and lows that have characterized the past 30 years to a steady growth leading to a level of production four times the present level by 2030 (Figure 7, p. 12). Under the current security conditions and those

likely to prevail during the coming years, this kind of growth should be considered out of the question.

Figure 7
Iraq's oil production, 1970–2030
(in millions of barrels per day)



Source: IEA, *World Energy Outlook 2005*, p. 395.

Regionalization in Oil Supply Relationships

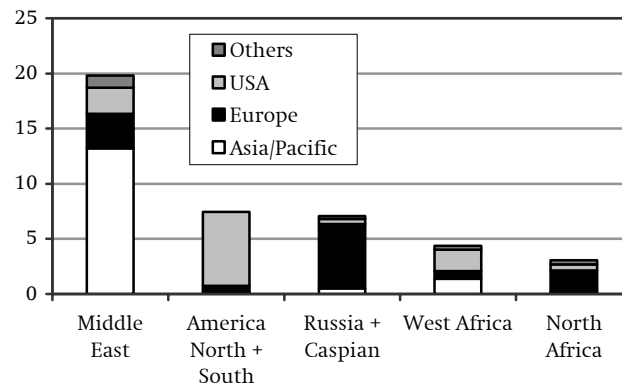
Countries like China, which only arrived as consumers on the market late in the game, face an additional problem beyond the shortage of supply: Trade relationships between producers and consumers have developed over decades and are now relatively solidified. The cause of this situation is on the one hand the participation of players on the demand side in investments for the exploitation of oil and on the other hand the development of transport infrastructures. Latecomers cannot compensate the resulting deficits through market behavior alone (by paying the world market price). As a result, countries like China feel legitimized in disregarding rules of fair play established by the OECD in areas like competition among bidders for exploitation rights. In the Middle East, Asian consumers have an advantage due to traditional supply structures.

The world oil market is largely fragmented into regional sub-markets. Table 2 and Figure 8 underline this fact. The Middle East delivers two thirds of its oil to Asia;¹⁸ the oil suppliers in North and South America (Canada, Mexico, and Venezuela) deliver three quarters of their exports to the United States alone; Russia and the Caspian region (post-Soviet region) ship 82 percent of their exports to Europe

¹⁸ This regional orientation of the largest import regions is noteworthy since the United States and Europe alone absorb 54 percent of interregionally traded oil with their imports.

alone; North Africa is bound to the European market with 64 percent of its exports.

Figure 8
Interregional oil trade 2005
(in millions of barrels per day)



Source: BP, *Statistical Review of World Energy*, June 2006.

Naturally the regionalization of the oil market described here has much to do with an interest in minimizing transport costs. Figure 8 makes clear that this interest leads to unmistakable regional relationships between oil producers and consumers. Thus North and South American oil exporters (Canada, Mexico, and Venezuela) deliver nearly their entire supply of oil exports to the United States in spite of grave political concerns in certain cases. Russia and the Caspian region supply a vastly predominant part of their exports to Europe, while the oil of the Middle East flows largely to Asia. Since the structures illustrated in Figure 8 have developed over many years, they represent a form of special relationship that also provides a sort of guarantee for secure oil supply. The market is not flexible enough that it could simply break down established structures on short notice—this goes for Venezuela just as much as for Russia, Libya, the Caspian region, or the Persian Gulf region—nor would the necessary transport capacities be available to reroute oil in case of a sudden shift in the structure of demand. If, however, producers delivering to Europe had to reduce their share in the oil that goes to supplying the world market, a particular supply problem would arise.

A regulatory factor exacerbates this perilous situation: it depends on the fact that major oil reserve and export countries do not subjugate their investment policy to market forces but rather prefer an under-

Table 2
Interregional oil flows 2005 (in millions of barrels per day)

Import \ Export	USA	Europe	Japan	China	Other Asia/ Pacific	Other	Total
North and South America	6.69	0.78	0.09	0.12	0.17	1.07	8.92
Post-Soviet region	0.47	5.81	0.05	0.40	0.07	0.28	7.08
Middle East	2.35	3.14	4.27	1.36	7.58	1.12	19.82
North Africa	0.55	1.96	–	0.06	0.11	0.39	3.07
West Africa	1.94	0.70	0.06	0.57	0.77	0.32	4.36
Other	1.53	0.87	0.76	0.87	1.64	0.99	6.66
Total	13.53	13.26	5.23	3.38	10.34	4.17	49.91

Source: BP, *Statistical Review of World Energy*, June 2006.

capitalization of oil exploitation. This preference has three main reasons:

Firstly, the most important instrument available to OPEC in the context of cartel policy is to limit the quantities of oil produced in order to maintain a trend towards high prices. The use of this instrument was suspended between 1985 and 1999, since market shares were lost as a result of quantitative limitations. Since March 1999, however, this instrument has found new life, because OPEC has come to recognize that all other oil supplier are producing at the limits of their capacity and cannot appropriate a more extensive share of the market. Quantitative limitations entail limitations in investment.

Secondly, important countries fear that the admission of powerful domestic and foreign investors would lead to a destabilization of their own political system. As a result, the tendency towards exploitation of oil resources by state monopolies has strengthened during the past years. Thus, a large part of the capital and know-how available on the world market is rejected. The exclusion of foreign investors is further intensified by the fact that resource-rich countries have a particular aversion to internationally judiciable rules as codified, for instance, in the Energy Charter Treaty. Russia signed this agreement in 1994 but has so far not ratified it. Saudi Arabia became a WTO Member in 2005 and Russia is at the brink of membership but both have negotiated exceptions for the energy sector. Iran and Iraq are not Members of the WTO, an organization to which about three quarter of all states belong.

Thirdly, major hurdles exist for investors in countries with large reserves such as Iran and Iraq as a result of external political circumstances (sanctions) as

well as internal circumstances (bureaucracy, corruption, domestic security). Due to lacking legal security, investors in these countries are unable to gauge the risk associated with longer-term investments.

Two conditions result from this undercapitalization. Firstly oil sells at a price at least ten times higher than the average production costs and at a multiple of the marginal cost—an undeniable indicator for a dysfunctional market in which the effects of monopoly rent are present. This rent is linked with vast financial transfers from industrialized and developing countries to oil producing countries. Secondly the capital necessary to develop buffer capacities needed to compensate politically triggered turbulences in countries like Venezuela, Nigeria, and Iraq is absent. Any well-managed enterprise maintains additional production capacities that can be mobilized in case of an unexpected breakdown. Without such capacities every interruption of production would offer an opportunity for speculative price escalations and volatilities. These would be particularly damaging to longer-term planning in the energy sector, even in the production segment devoted to alternative energy sources.¹⁹ These factors could be aggravated during the coming decades by the three trends described at the beginning of this section.

¹⁹ Enno Harks, "International Interests and Tensions," in: World Energy Council, *World Energy in 2006*, London 2006, pp. 12–15.

The International Natural Gas Markets

Natural gas is in strong competition with coal for the second place among global energy sources. In contrast to oil and coal, the share of natural gas in the world energy mix is rising steadily. At the beginning of the 1970s, this share stood at 16 percent, in 2002 at 21 percent, and for 2030 the IEA projects a share of 25 percent. At this point natural gas should supplant coal as the second most important source of energy worldwide, as it already has in industrialized countries. As an internationally traded good it has already long reached a far larger traded volume than coal. Natural gas is the fossil fuel with the lowest levels of emissions per unit of energy. This characteristic holds for sulfur and nitrous oxides, relevant for regional pollution, as well as for climate-relevant carbon dioxide. The ratio of natural gas reserves to current production exceeds that of oil reserves by over 50 percent.²⁰

The reason for this belated intensification in the use of natural gas lies in the much more demanding infrastructure requirements for the transport of this source of energy. The largest share of natural gas is transported via a continuous pipeline from the production site to the end consumer (gas stove, gas heating). Only industrialized countries have access to a pipeline network that would enable this type of transport. This network was established over a period of many decades. Analogously, it is expected that rapidly developing countries will require a similar amount of time to build up this type of network. Consequently, China, India, and other fast developing countries do not exhibit nearly the same energetic behavior as consumers on the international market for natural gas as for oil. Their entry onto the market for natural gas has been associated with significantly more moderate growth rates.

The pipeline connection imposes a far greater regionalization of the world market for natural gas than for oil, since pipelines of a length of over 4000 km can hardly be regarded as profitable, even if various market factors (alternative natural gas delivery options and their costs) ensure that no general upper limit can be set for a profitable pipeline network. A larger and larger proportion of the natural gas trade has been supplemented by trade with liquefied natural gas (LNG). In 2005, 26 percent of natural gas trade took place via LNG shipments.

²⁰ BP, *Statistical Review of World Energy*, London, June 2006, p. 6 and p. 22.

However, more than three fifths of this quantity were used to supply three countries in East Asia (Japan, Korea, Taiwan) that are too far distant from the production sites to be connected to the pipeline network. Without a doubt, LNG shipments will appropriate further shares of the international trade in natural gas; this will benefit the diversification of supply possibilities and the degree of competition. In Europe in particular, the extent to which this alternative to pipeline transport can be expanded is strictly limited by geographic hurdles and the associated economic costs.²¹

At present, it is impossible to speak about a global natural gas market. Rather, three major sub-markets have been established—the North American, the European, and the East Asian markets—whose supply sources hardly have any overlap at all. Table 3 shows that Russia, the largest natural gas supplier worldwide, ships its exports (outside of the CIS region) exclusively to Europe. Similarly, Canada exports exclusively to the United States. Finally, of the exports from the Asia/Pacific region (Indonesia, Australia) 84 percent go to the East Asian countries Japan, South Korea, and Taiwan. On these main delivery routes, which reflect the division of the three markets, 75 percent of the global interregional natural gas trade takes place.²²

Europe (west of the CIS) draws 64 percent of its natural gas imports (from outside of Europe) from Russia and 26 percent from Algeria. Of the remaining 10 percent, approximately half comes from Nigeria (Table 4). Of the total amount, 83 percent, including the entirety of imports from Russia, arrive in Europe via pipeline networks.

Transport via pipeline ties buyer and seller closely together, since the infrastructure does not permit any competition but only a rigid supplier-consumer relationship. Since the costs of investment into a pipeline project are typically only recovered after 20 to 30 years, the construction of this infrastructure requires long-term commitments to deliver and purchase as

²¹ According to estimates, LNG imports will experience high growth rates in North America in particular; in Europe the import share of LNG could increase from currently 17 percent to 30 percent by 2030. Source: Andreas Seliger, "Entwicklung des weltweiten LNG-Angebots bis 2030—Eine modellgestützte Analyse," in: *Zeitschrift für Energiewirtschaft*, Vol. 30, No. 2 (2006), pp. 91–101, in particular pp. 97–100.

²² The term "interregional" (in contrast to "international") signifies that intra-European trade is treated as domestic trade and is therefore not included in the calculation.

Table 3
Interregional natural gas trade 2005 (in billions of cubic meters)

	Import	USA	Europe	East Asia*	India	Other	Total
Export							
Canada	94.0	-	-	-	-	-	94.0
Russia	-	151.3	-	-	-	-	151.3
Algeria	2.8	60.6	0.1	-	1.3	64.8	
Middle East	0.2	10.9	30.8	5.9	1.4	49.2	
Nigeria	0.2	11.8	-	-	-	12.0	
Asia/Pacific	0.3	0.2	83.3	0.2	15.5	99.5	
Other	14.5	10.6	0.3	-	24.1	49.5	
Total	112.0	245.4	114.5	6.1	42.3	520.3	

* Only Japan, South Korea, and Taiwan.

Source: BP, *Statistical Review of World Energy*, June 2006.

Table 4
Europe's natural gas imports 2005 (in billions of cubic meters)

	Supplier	Russia	Algeria	Other	Total
Transport					
Pipeline	151.3	37.8	7.3	196.4	
LNG	-	22.9	18.2	41.1	
Total	151.3	60.7	25.5	237.5	

Source: BP, *Statistical Review of World Energy*, June 2006, p. 30.

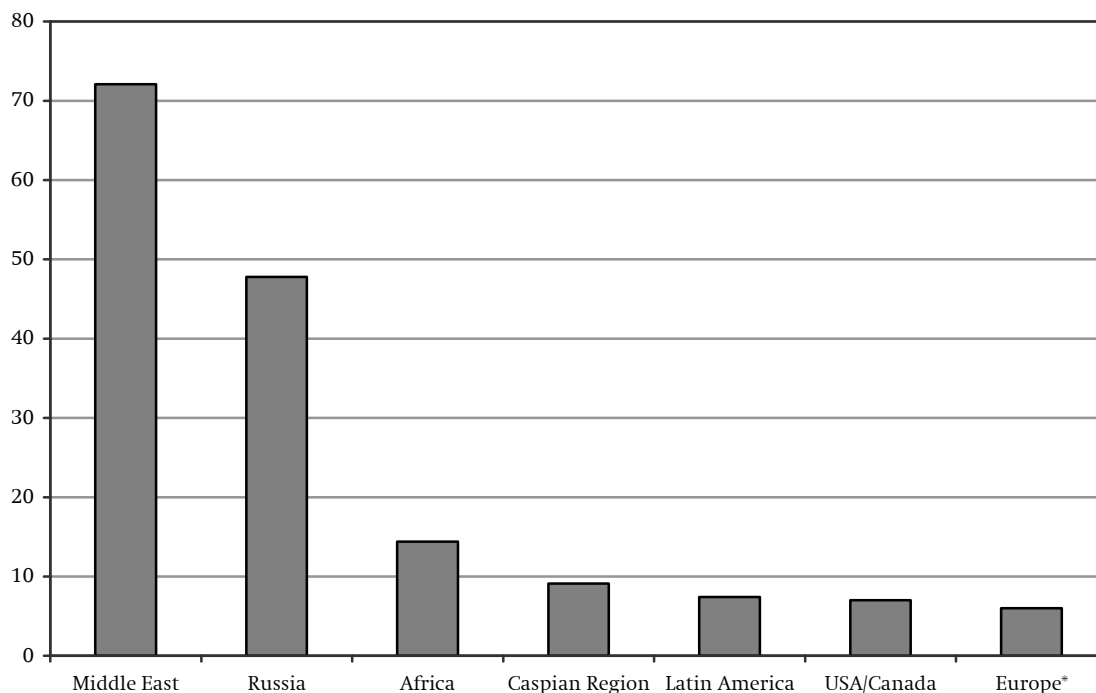
well as a substantial amount of trust that the other side will honor these commitments. In particular with respect to Russia, an advantage can be seen in this commitment to cooperate and trust. During the late 1970s and early 1980s, the construction of the infrastructure for Russia's natural gas trade was regarded as a tangible sign of a policy of détente. The drawback of the mutual dependency associated with this sort of trade relationship lies in the fact that competition is suppressed and that the dependency is asymmetrical: Where functioning competition exists on the supply side, no further measures for the securing of energy supply need be taken, since there are alternatives to the existing delivery structure. This situation is not present in the natural gas relationship between Russia and Europe/Germany. If Russia decided to halt deliveries, there would be no possibility to obtain natural gas in relevant quantities from other suppliers due to fixed transport capacities. The asymmetry of the dependency can be seen in the fact that a temporary delivery interruption could have catastrophic economic and social consequences for the consumer, while a temporary refusal by the consumer to pay for

deliveries would not have the same impact on the supplier.

The bilateral monopoly structures associated with pipeline transport represent a clear limitation of the market. Do realistic possibilities exist to create competitive structures? To answer this question it is necessary to provide a description of regions with natural gas reserves and regions potentially able to supply natural gas. Natural gas reserves are distributed differently than those for oil: The concentration in the Middle East is smaller. However, if this region is taken together with Russia, the concentration is similar to that of oil (Figure 9, p. 16).

Europe is in an advantageous situation in the sense that 80 percent of the world's natural gas reserves are within a distance reachable by pipeline (approximately 4000 km). This advantage is more pronounced for natural gas than for oil, since transport costs per kilometer are greater for natural gas than for oil, regardless of whether this transport takes place via pipeline or tanker. Less advantageous, however, is the fact that, as the largest import market in the world, Europe does not have any sort of infrastructure that would

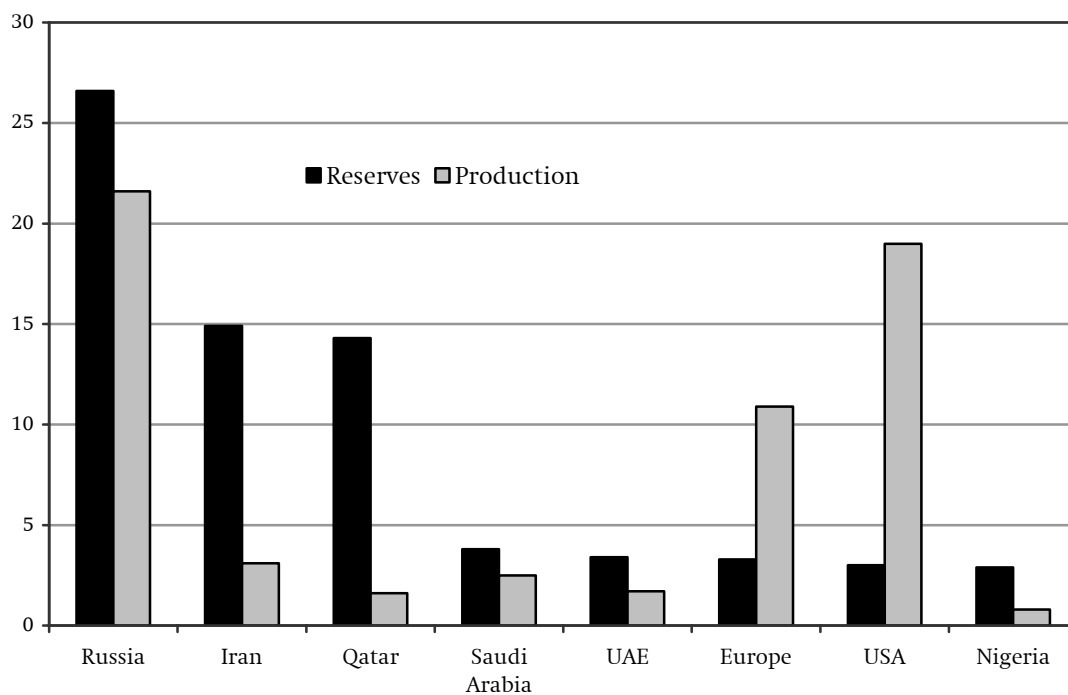
Figure 9
Concentration of natural gas reserves 2005 (in billions of cubic meters)



* Europe west of the former Soviet Union.

Source: BP, *Statistical Review of World Energy*, June 2006.

Figure 10
Regional shares in world natural gas reserves and production 2005 (in percent)



Source: BP, *Statistical Review of World Energy*, June 2006.

grant it access to the regions with the largest reserves in the world, namely the Middle East and the neighboring Caspian region. Spain imports small quantities (6 billion cubic meters) of LNG from Qatar and Oman, while Turkey obtains about 4 billion cubic meters of natural gas from Iran via pipeline. These amounts are not of a magnitude that would be relevant for security of energy supply.

Comparing the shares in global natural gas reserves of those eight countries and economic entities (Europe) that control the largest natural gas reserves with their shares in world production, it is clear that the share of Europe and the United States in world production is far higher than their share in world reserves. This means that they are using up their reserves quickly (Figure 10). By contrast, Iran and Qatar with their combined share in global reserves of 29 percent and their combined share in world production of only around 5 percent are in a position to expand their production vastly. Qatar, a peninsula in the Persian Gulf, is in the process of becoming the largest LNG exporter in the world with its huge South Pars Offshore Field. Iran, which also controls part of the South Pars Field and whose other important reserves are not far distant from this field, is regarded as a country that could be connected with Europe via pipelines at economically feasible costs. An extension of a large pipeline to Qatar is also conceivable.

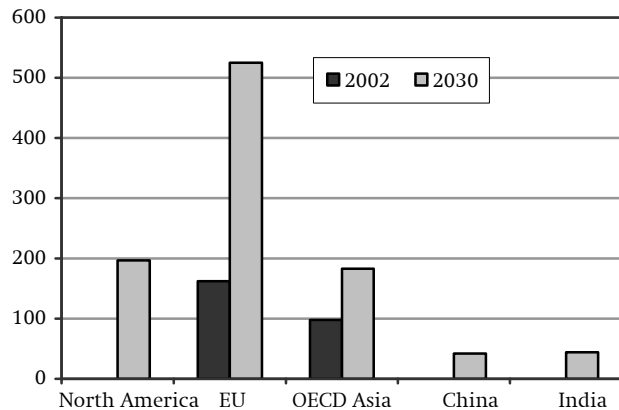
Europe is by far the largest natural gas importing region. Figure 11 shows that Europe is not only currently importing more natural gas than all other importing regions combined²³ but that this situation will remain unchanged in 2030 according to projections by the IEA.

The dramatic growth in imports in Europe can be explained in terms of a combination of two factors: diminishing domestic production and the expansion of internal infrastructure to substitute oil by natural gas—for instance for heating (Figure 12).

As a result, on the one hand, Europe's strong position as a consumer market into which major suppliers seek to enter is strengthened. On the other hand, this development makes Europe particularly vulnerable, as long as the external infrastructure for the transport of natural gas from major suppliers is not present. In any

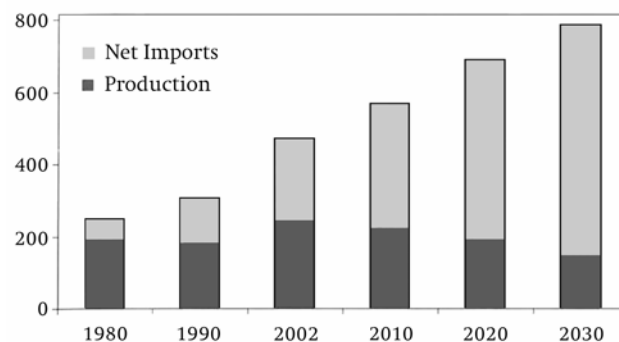
case, Russia will not be able to supply Europe to the same extent as is presently the case, independently of

Figure 11
Natural gas imports of various regions
(in billions of cubic meters)



Source: IEA, *World Energy Outlook 2004*, p. 140.

Figure 12
Natural gas production in the EU, 1980–2030
(in billions of cubic meters)



Source: IEA, *World Energy Outlook 2004*, p. 155.

whether the market share controlled by its natural gas is too high from a security perspective.²⁴ Concerns are growing that investments needed to secure the provision of natural gas will not be made in time.²⁵

²³ If the United States and Canada are treated as a common North American region, the EU imports more natural gas than the rest of the world. As Table 3 (p. 22) shows, the combined imports of all other regions only exceed those of Europe marginally, if the natural gas obtained by the United States from Canada is treated as imports.

²⁴ Roland Götz, *Russlands Energiestrategie und die Energieversorgung Europas*, Berlin: Stiftung Wissenschaft und Politik, March 2004 (S 6/04), in particular pp. 13–18.

²⁵ Paolo Scaroni, chief executive of ENI, an Italian energy corporation, expressed this as follows: “If we don’t address the structural problems that threaten the availability of gas in Europe and start managing demand, we risk an authentic shortage.” In this context a figure of the magnitude of 70

Conclusions to Be Drawn from the Different Market Structures for Oil and Natural Gas

For three reasons the world oil market is not a functioning free market. Firstly: The concentration of reserves in the Middle East, growing as a result of the more rapid depletion of reserves by other producers, gives this region a quasi-monopoly position. Secondly: OPEC, whose membership includes Venezuela and Nigeria (as well as Algeria, Libya, and Indonesia), countries outside of the Middle East with little interest in a moderating influence of the cartel on world economic development, has rediscovered its power to effect a redistribution of wealth in favor of resource-rich states, and in doing so has brought political interests to bear. Thirdly: The countries with major reserves and production are increasingly pursuing nationalistic investment policies that are not guided by market demands.²⁶

The international natural gas market is not structured as a competitive market, since it is composed primarily of strict bilateral infrastructure arrangements and the related long-term delivery contracts. The price of natural gas is contractually pegged to the price of oil to the detriment of consumers in OECD countries. In 2005, Gazprom set country-specific prices according to political expediency that differed from each other by as much as 400 percent.²⁷ Whether market power lies with the supplier or consumer depends largely on the alternative options provided by the existing infrastructure. Without a doubt, market power has shifted in favor of suppliers—as it has in the case of oil, though for different reasons. The major oil consumers have not taken adequate measures to secure supply possibilities—be it through the construction of LNG port facilities or of pipelines in the con-

text of the Nabucco Project.²⁸ It is particularly clear that the interests of importing enterprises are by no means identical with the interests in energy security and low end consumer prices. These enterprises are not interested in the creation of supply competition but in contractual arrangements benefiting them over the long term. This can lead to a convergence of interest between oil suppliers (such as Gazprom) and importing enterprises that is more extensive than the convergence of interests between importing enterprises and end consumers. The common interest of producers and importers can be established on the basis of long-term supply contracts. Such contracts offer secured revenue over a long period of time if no competition exists on the domestic market and import costs can be passed on to the consumer. Parties with an interest in competition to guarantee security of supply and efficient market conditions—namely consumers and their government representatives—are not parties to these contracts. The result is an underdevelopment of infrastructure for the provision of natural gas such that not only economic but also political power of natural gas suppliers increases. Given this situation, importing countries must act to ensure supply competition and must not transfer responsibility for providing security of supply to importing enterprises out of a mistaken sense of deference.

billion cubic meters has been cited as the likely gap between supply and demand in 2012. (Cited in: “Security of Supply—Speaking Different Languages,” in: *Petroleum Economist*, July 2006, p. 4.)

²⁶ The IEA has established a “deferred investment scenario” in its *World Energy Outlook 2005*. According to this scenario, world oil supply would fall by approximately 10 percent as compared to the reference scenario, given a 23 percent reduced investment in countries of the Middle East and North Africa. This would, in turn, result in a serious gap between supply and demand or, put differently, would entail an extreme rise in prices; IEA, *World Energy Outlook 2005* [see footnote 11], pp. 227–239.

²⁷ Roland Götz, *Nach dem Gaskonflikt*, Berlin: Stiftung Wissenschaft und Politik, January 2006 (SWP-Aktuell 3/06), p. 1.

²⁸ The Nabucco Project is a scheme led for years by OMV, an Austrian energy corporation, that aims to link natural gas producers in the southern Caspian Region—and potentially, in the long run, producers in the Persian Gulf region—with Southeast and Central Europe via an East-West pipeline crossing through Turkey.

States as Market Participants

The fact that the free market does not function either in the case of oil or in the case of natural gas gives countries supplying these resources the possibility of connecting their supply policies with objectives not oriented towards greater general economic efficiency. Insofar as these countries are monopolists, they can bring about a rise in prices by limiting supply and thus maximize their revenue.²⁹ As a result, the prices paid for oil and natural gas in Europe are many times higher than the marginal production and transport costs.

Beyond economic interests, producing countries can also link political goals with their supply policy. It is well known that CIS countries such as the Ukraine, Belarus, or Georgia are supplied with Russian natural gas at significantly more advantageous conditions than their Central or Western European neighbors. The low price contains the additional cost of political dependency in the case of these countries. The long-standing dispute about the exact route of the oil pipeline from Irkutsk to the Pacific is in its core a political dispute revolving around the question of whether Japan or China is to be granted priority in the considerations of Russian suppliers. Finally, the efforts to destabilize countries in the Middle East—in the form of frequent attacks against oil facilities in Iraq but also in Saudi Arabia—are as much politically motivated as Iran's threats to cut off oil supplies. Against this background it is absolutely necessary for foreign policy to deal to a larger extent than in the past with international energy policy.

The following sections will explore the political dimensions of possibilities for intervention by three countries. Specifically China will be examined as a major consumer country and Iran and Russia as major supplier countries. In the analysis it will be suggested that international politics are directly affected by important conflicts through the distribution, or concentration, of power over energy supply.

²⁹ This approach works especially well for oil due to the very rigid and short-term demand elasticity: It means that owners of an oil-fueled heating system or a car will not rid themselves of this type of investment in the short term due to a price increase and thus forego on oil/gasoline purchases.

China

Figure 3 (p. 10) shows the rapid rise of China as a consumer on the world oil market since the middle of the 1990s. As a latecomer, China acts as a disrupting factor, firstly, because it violates commonly accepted rules of conduct in bidding processes³⁰ or in its treatment of regimes known to disregard principles of human rights, good governance, and due legal process,³¹ and secondly, because it is working to push competitors out of the ever tightening supply markets. As a result, Japan fears that it will be replaced by China as the biggest consumer of Iranian oil. Japan obtains 82 percent of its imported and 80 percent of its total consumed oil from the Middle East.³² Based on this sensitive dependency, a concern exists that the Sino-Japanese rivalry will play out to the advantage of major suppliers in the Middle East.

As a future superpower and rival of the United States, China, which for its part obtains 40 percent of its oil imports and 19 percent of its total consumed oil from the Middle East—both with an upward tendency,³³ is confronted by the dilemma of an increasing dependency of supplies from this region, in which

³⁰ The decision to establish the Russian pipeline from Angarsk (Siberia) to Daqing (China) instead of to the Pacific, as desired by Japan, is said to have been reached in October 2005 after a dispute lasting many years, due to the fact that the China National Petroleum Corporation (CNPC) granted the Russian oil corporation Rosneft a loan of 6 billion dollars with which Rosneft was able to acquire parts of the dissolved Russian firm Yukos. Source: *Petroleum Economist*, December 2005, p. 11. Even India complained about the Chinese bidding behavior, which led in January 2006 to the signing of an accord on mutual information sharing. Source: *Financial Times*, FT.com, 12 January 2006.

³¹ In this manner, China took over almost the entire oil industry in Sudan (with a production quantity of around 400 000 barrels per day) and has secured the facilities with around 4000 civilian security personnel after the United States prohibited US firms from participating in the exploitation of oil in Sudan due to the civil war in the country. Source: Zweig and Jianhai, "China's Hunt for Energy" [see footnote 17], pp. 25–38.

³² BP, *Statistical Review of World Energy*, June 2006, p. 11 and p. 20.

³³ Ibid.

the United States is militarily dominant and controls the transport routes. For this reason, China strongly engaged in diversifying its sources of supply by means of investment offers in Africa, Latin America, the Caspian region, in Russia, and even in North America. The purchase of Unocal, a Californian oil company, by the state-owned China National Offshore Oil Corporation (CNOOC) for 18.5 billion US dollars more than any other potential buyer was willing to pay was blocked by the US Congress on grounds of national security.³⁴ China has sought to participate in the exploitation of oil sands in Canada. It has been engaged in Kazakhstan since 1997, although it is a latecomer here. Oil pipelines with large transport capacities (from the Tengiz oil field in Kazakhstan to Novosibirsk in Russia [CPC] and Baku-Tblisi-Ceyhan [BTC]) lead to the Black Sea and the Mediterranean. Nonetheless, China has a stake in the Usen oil field and other sites in Kazakhstan and has completed the first part of a 1000 km long pipeline from Atasu in Kazakhstan to China. Interestingly, Kazakhstan successfully prevented the full purchase of Canadian-owned PetroKazakhstan, which operates in Kazakhstan, by the China National Petroleum Corporation (CNPC), even though CNPC had submitted the highest offer. The agreement to allow the purchase was only granted after CNPC consented to sell one third of the shares in the company to KazMunaiGaz, a state-owned Kazakh oil company.³⁵ The Chinese company is still prevented from doing what had been permitted to the Canadian company.

China acts more forcefully in Africa, where purchasing processes are less transparent. David Zweig and Bi Jianhai characterize China's efforts to gain a foothold in the African market to secure its future energy demands as follows: "Another important feature of Beijing's resource-based foreign policy is that it has little room for morality."³⁶

The greatest efforts are expended on establishing a solid relationship with Iran with respect to energy matters. Along with Saudi Arabia (oil) and Russia (natural gas), Iran is not only one of the three countries with the largest reserves, but given a sufficient amount of investment and the conclusion of relevant agreements with Central Asian transit countries, Iran's geographic position would also permit trans-

port via pipeline, which would allow China to bypass the US control of sea routes.

Thus Beijing's efforts to woo Iran will be a sort of litmus test for China's aggressiveness in securing its access to energy. A series of long-term agreements have already been concluded. Among these agreements is a contract signed in October 2004 between Sinopec, a state-owned Chinese firm, and the Iranian government to develop the Yadavaran oil field that covers the delivery of 150 000 barrels of oil per day over a period of 25 years. The volume of investment is estimated at 70 billion US dollars. The sum of investments by China in energy projects on the territory of Iran is said to exceed 100 billion dollars.³⁷ A pipeline running through Central Asia could dampen Chinese concerns about a potential exploitation by the United States of its military superiority over the sea routes used for the transport of oil and (liquefied) natural gas for political ends, a worry that was intensified by the recent US-Indian rapprochement.³⁸ Zha Daojing, the director of the Center for International Energy Security at the Renmin University of China, expects a long-term rivalry over energy supplies between China on the one hand and Western countries on the other.³⁹ It seems almost inconceivable that China would solve the problems of oil supply that will nearly certainly be associated with its rapid rate of motorization by any other means than to pursue an aggressive acquisition policy on international markets. Not even the major projects for the liquefaction of domestic coal will make a significant contribution towards satisfying domestic oil demand.

Iran

Measured in terms of its reserves, Iran occupies second place behind Saudi Arabia, with 11.5 percent of world oil reserves and second place behind Russia, with 15

³⁷ Leverett and Bader, "Managing China-U.S. Energy Competition in the Middle East" [see footnote 15], p. 191.

³⁸ Yan Zhonglin, "Zhongdong, Zhongya yu Zhongguo de 'da zhoubian' nengyuan zhalüe" [The Middle East, Central Asia, and China's "pan-peripheral" energy strategy], in: *Ha'erbin Gongye Daxue Xuebao*, Vol. 8, No. 1 (2006), pp. 39-42, cited in Friederike Wesner and Anne J. Braun, *Chinas Energiediplomatie: Kooperation oder Konkurrenz in Asien?*, Berlin: Stiftung Wissenschaft und Politik, June 2006 (SWP-Zeitschriftenschau 5/06), p. 7.

³⁹ Zha Daojing, "China's Energy Security: Domestic and International Issues," in: *Survival*, Vol. 48, No. 1 (Spring 2006), pp. 179-190 (185).

³⁴ N. J. Watson, "Feeding the Dragon," in: *Petroleum Economist*, (December 2005), pp. 10-16 (10-11).

³⁵ *The Wall Street Journal*, 17 October 2005, p. 8.

³⁶ Zweig and Jianhai, "China's Hunt for Energy" [see footnote 17].

percent of world natural gas reserves.⁴⁰ Thus, Iran belongs to the group of the three countries with the largest reserves in the world and possesses a comparative advantage with respect to Russia as a result of significantly lower production costs. In 2005, however, Iran only had a 5.1 percent share in world oil production and a 3.1 percent share in world natural gas production.⁴¹ Iran also has a significant potential for development of its production of both energy sources, and this under economically much more advantageous conditions than are present in other regions of the world. At least in theory, these circumstances should motivate oil companies to seek approval for investment into relevant development projects. Iran in principle permits foreign investment, in contrast to, for instance, the Saudi oil sector. In practice, however, a great deal of skepticism has grown among Western enterprises. TotalFinaElf, which together with Gazprom and Petronas (Malaysia) has been involved since 1998 in the exploitation of the Iranian segment of the largest natural gas field in the world, the South Pars field, makes no secret of its frustration with the Iranian bureaucracy and the rampant corruption it has faced. Even if a political determination to stymie foreign investors underlies this behavior, Iran has, independent of this fact, gained a certain notoriety for its inefficiency in the exploitation of its energy resources. There is no sign that this situation will improve under the current government.

This situation changes nothing about the fact that consumer countries—perhaps in a reversal of political interests—have a substantial economic interest in advancing the exploitation of oil and natural gas in Iran. In itself, the fact that the current five percent share of world oil production already represents a critical mass and a serious threat potential for the world oil market. Moreover, Iranian oil reserves are of considerable interest with a view to the high oil price due to the ratio of reserves to production described above. As a result, Iran's so far underexploited natural gas production potential is of great significance. As the world's largest importer of natural gas, Europe must constantly be seeking out new supply opportunities. The Nabucco Project, led by OMV, an Austrian enterprise, under which a pipeline connection will be established from the Eastern part of Turkey to Central Europe, is only sensible if this pipeline is supplied

with natural gas by Iran in addition to Azerbaijan. In the long term this project must, however, do no less than kick off a broader scheme to provide Europe with natural gas from the South Pars field shared by Qatar and Iran and other natural gas fields in the region.

Iran gives the impression as if it prefers to look east, or to India/Pakistan and China, not only in its oil supply relationships but also with respect to the forthcoming construction of its natural gas delivery infrastructure. A particular measure of importance is accorded to a project that has been discussed for years to build a pipeline from Iran through Pakistan to India, which has been given a great deal of political attention in India and Pakistan as a bilateral trust-building measure.⁴² The three affected states are, however, unable to agree on several questions, in particular the level of contractual obligation, the route of the pipeline, and the means of financing. The price setting method (whether to bind the price of natural gas from the project to the price of oil or to establish an independent market price) represents a further unresolved problem, as in the case of many other long-term natural gas-related contracts. The project suffered a setback as a result of the warming of the US-Indian relationship that took place during the visit of President Bush to New Delhi. Fundamentally, the United States does not want to see a softening of the policy of isolation aimed at Iran as a result of such an important cooperative project.

Irrespective of the long-term development and potential execution of this project, the following fact holds: The combined import volume of India, Pakistan, and China's natural gas markets will not represent more than one fifth of the volume of the European market in 2030 (see Figure 11 [p. 17]). Since Qatar is also fighting hard to break into the Asian market and Russia and Saudi Arabia are seeking to expand their market share, demand from Asia will be too small, to spur an appropriate level of development of the Iranian potential for natural gas production. A conference held in Teheran on 12 and 13 March 2006 under the authority of the Iranian Foreign Minister on the subject of "Energy and Security: The Asian Vision," demonstrated that this particular vision is not attractive to Iran. It is of great importance, therefore, both for the development of the natural gas sector in Iran and for the balance of the world oil market that a co-

⁴⁰ BP, *Statistical Review of World Energy*, June 2006, p. 6 and p. 22.

⁴¹ *Ibid.*, p. 8 and p. 24.

⁴² Energy Information Administration, *Country Analysis Briefs, Iran*, Washington, January 2006.

operative solution is found together with Europe.⁴³ An additional factor is that Iran is seeking to become a member of the World Trade Organization (WTO), following the path completed by Saudi Arabia in December 2005.⁴⁴ Here too, a climate of consensus is required on important questions, to which issues related to the international oil and natural gas market belong, in particular the question of the Iranian nuclear program. Indeed, Iran finds itself at an important crossroads in terms of global oil supply and European natural gas supply: Besides the cooperative option, which includes an international agreement concerning its nuclear program, and an isolationist option, which would mean an underutilization of its resource potential, the only conceivable middle way would be a close association with China as Iran's preferred energy partner. In the context of a balanced development of the global economy and in the interest of maintaining the effectiveness of instruments for conflict resolution in the Middle East, it is clear that Iran must be urged strongly to adopt the first option.

Russia

After Saudi Arabia, Russia is the largest producer and exporter of oil in the world, though in terms of known reserves it ranks only seventh with a share of 6.2 percent, behind five countries in the Persian Gulf and Venezuela.⁴⁵ It is conceivable that the reserves of this vast country might be less well explored than those of the higher ranked countries. What is sure, however, is that at a current level of production, Russian oil reserves will be exhausted at a significantly higher rate than those of the other countries mentioned. Russia is playing a high stakes game insofar as it is placing itself among the ranks of the major oil suppliers. Various prognoses have been made concerning the development of production in Russia during the next two decades.⁴⁶ The US Energy Infor-

mation Agency predicts that, given a high oil price, Russia production will rise from 9.5 million barrels per day (mbd) in 2005 to 12.5 mbd in 2025. Other organizations such as Wood Mackenzie or the Oxford Institute for Energy Studies estimate that a peak in production of around 12 mbd will be reached in 2010 or 2015 at the latest, followed by a considerable drop in production.

Russia is the most important oil supplier to Europe and Germany. In order to avoid a drastically larger dependency on the Middle East, Europe (and Germany) must seek to maintain this special relationship, even if in the long term Russia allocates greater shares of its exports to China and Japan. But even if Europe continues to receive the lion's share of Russian exports, the share of Russian exports to Europe will unavoidably diminish and no longer be available as a buffer in case of supply gaps.

In terms of natural gas, however, Russia is a superpower: It is the country with the largest reserves worldwide, the largest production, and the most extensive export volume. If trade between Canada and the United States is considered internal trade, exports from Russia to Europe (outside of the CIS) alone represent 35 percent of global interregional natural gas trade (Table 3, p. 22). During the coming decades, Russia and Europe are and will remain respectively the largest exporter and importer of natural gas in the world. Neither Russian export diversification in favor of East Asia and potentially the United States (LNG) nor European import diversification in favor of the Middle East and possibly the Caspian region will change the fact that during the next two decades and beyond, the supply stream from Russia to Europe will constitute the worldwide largest bilateral trade volume with respect to natural gas. Production and consumption patterns as well as existing and planned infrastructure do not allow for any other possibilities.

Even if a large measure of mutual dependency between the EU-27 and Russia exists, this mutuality cannot be equated with symmetry. The actual asymmetry holds a great deal of potential power. For Russia's natural gas, as much as for President Ahmadinejad's oil, the following is true: The mere threat of cutting off supplies may have an immense impact on the world economy and create shockwaves throughout global society, even if these threats are only carried out for a few weeks or months. The great oil crisis in the winter of 1973/74, whose effects on growth and employment lasted for over half a decade, is a clear example of this proposition. Conversely, the threat of

⁴³ Manfred Horn and Claudia Kemfert, "Iran: Streit um Urananreicherung gefährdet Ausbau der Öl- und Erdgasgewinnung und führt zu Spannungen auf dem Ölmarkt," in: *DIW-Wochenbericht*, No. 23 (2006), pp. 343-351.

⁴⁴ Ali Z. Marossi, "Iran Is Knocking at the World Trade Organization Door: Iran's Economy and the World Economy—Challenges and Opportunities," in: *Journal of World Trade*, Vol. 40, No. 1 (2006), pp. 167-185.

⁴⁵ BP, *Statistical Review of World Energy*, June 2006, p. 6.

⁴⁶ The following data is derived from Roland Götz, *Russlands Erdöl und der Welterdölmarkt, Trends und Prognosen*, Berlin: Stiftung Wissenschaft und Politik, December 2005 (S 40/05).

stopping payments, even if carried out, is not an instrument that has any lasting impact on the supply side. Accordingly, as in the case of the first oil crisis, consumers are satisfied when deliveries resume, while a refusal to pay puts a strain on the climate of cooperation by causing an enduring loss of trust and thus indirectly strengthens the asymmetry. Russia has already used interruptions in the supply of natural gas as a political weapon against Poland and Bulgaria in the 1990s and against the Ukraine and Georgia in 2006, as well as an interruption in the supply of oil against Lithuania. The availability of this weapon alone gives Russia an enormous advantage. The results of the negotiations with the EU in 2004 concerning Russia's entry into the WTO and the refusal of the Duma to ratify the Energy Charter Treaty, which had been strongly promoted by the EU and signed by Russia in 1994, are plain evidence of the considerable negotiating power that Russia is determined to wield.

The Possibility and Necessity of Linking Security of Energy Supply with International Climate Policy

In light of the parallels between two global problems, on the one hand, the politically laden problems associated with securing a reliable supply of oil in particular and, on the other, the problem of climate change, international policymakers should attempt to combine approaches for solving these problems. The pressure on both fronts should make an adequate solution possible. In other words: If the economic and political costs of the current insecurity in terms of energy supply, combined with the costs of a dangerous level of climate change, were internalized in the price of fossil energy sources, alternatives to the use of oil would be developed far faster than is possible under present conditions.

The increase in greenhouse gas concentrations in the atmosphere is unarguably caused by the carbon dioxide produced through the burning of fossil fuels. Cutting the rise in concentration of carbon dioxide in such a way as to “prevent dangerous anthropogenic interference with the climate system” is a common goal of almost all (that is to say 189) countries in the world, including the United States, China, India, Russia, Japan, and the EU.⁴⁷ The climate challenge and the problem of securing energy supplies have a causal link insofar as both are rooted in economic and social dependence on the burning of fossil fuels.

International climate policy, particularly as it has developed since the conclusion of the Kyoto Protocol (1997), is in a deep crisis. It is not evident how the objective of UN Framework Convention on Climate Change (UNFCCC) as contained in Article 2 of the Convention—namely to prevent dangerous interference with the climate system—is to be reached in the framework of the negotiation process with the Kyoto Protocol at its heart. According to a broad scientific consensus, which has been embraced by the EU and the German government, this goal can only be reached, if the rise in the global average temperature is limited to a maximum of 2 degrees Celsius. The Fourth Assessment Report of the UN-mandated Intergovernmental Panel on Climate Change (IPCC) (to be

published in February 2007 and from which key data has already been made public) predicts a rise of at least 2 but more likely 3 degrees Celsius and possibly even more by the end of the century. If the 2 degree mark is not to be exceeded, growth in emissions would have to be reduced very soon and an emission peak be reached before 2030. No evidence exists that this goal can be reached using the tools provided by the Kyoto Protocol.⁴⁸

The following list of alarming facts should provide an impetus for giving the problem more weight on the foreign policy agenda, rather than handing over responsibility for solving the problem to the annual Conferences of the Parties to the UNFCCC with their narrow mandate:

- ▶ No slowdown is evident in the growth of global greenhouse gas emissions; in fact, emissions have continued to grow, and that at a rate twice as high during the present decade as during the 1990s (Table 5).
- ▶ If the European Union (EU-15) were actually able to reduce its emissions between 1990 and 2012 by 8 percent, this would mean an absolute reduction of 337 million tons CO₂ equivalent over 22 years. China’s emissions have grown by more than three times that amount (1047 million tons CO₂ equivalent) over the space of two years (between 2000 and 2002). Other countries not subject to the requirement of emissions reductions under the Kyoto Protocol such as India have experienced a similar growth in emissions.
- ▶ To date the European Union has only managed to achieve a reduction of 2 of the 8 percent to which it has obligated itself. It will not manage to reach this objective, except through allowances for investments made outside of the EU. Canada and Japan—the other two countries obliged to reduce their emissions under the Kyoto Protocol—are even farther from reaching their goals.

⁴⁸ The European Commission’s new Green Paper even argues that, in order “to limit the forthcoming rise of global temperatures at the agreed maximum of 2 degrees above pre-industrial levels, global greenhouse gas emissions should peak no later than 2025;” Commission of the European Communities, *Green Paper* [see footnote 5], p. 11.

⁴⁷ *United Nations Framework Convention on Climate Change*, June 1992, Article 2, <http://unfccc.int/resource/docs/convkp/convger.pdf>.

Table 5
CO₂ emissions 1990-2005 (billions of tons)

	1990	2000	2005	Average annual growth rate (in %)	
				1990-2000	2000-2005
World	21.57	24.02	27.35	1.1	2.6
EU-15	3.36	3.36	3.50	0.0	0.8
USA	5.01	5.01	5.99	1.6	0.4
China	2.29	2.97	4.77	2.6	9.9

Source: Hans-Joachim Ziesing, "Trotz Klimaschutzabkommen: Weltweit steigende CO₂-Emissionen," in: *DIW-Wochenbericht*, (30 August 2006) 35, p. 488.

► Since the signing of the Kyoto Protocol (December 1997), emissions in the European Union have not changed at a percentage rate significantly different from that of the United States, which is not bound by the Protocol.⁴⁹ Taking into account the higher rate of economic and population growth in the United States, the question must be answered, how empirically founded the argument is that the path taken by the Europeans will lead to the desired goal.

Even if the multilateral regime exemplified by the UNFCCC fulfills an essential function as a forum for communications and is to continue to play this role in the future, it must be considered whether additions or corrections are not perhaps necessary. The most important correction must be a change in the "grand-fathering" principle enshrined in the Kyoto Protocol, according to which national emission allowances are set using emissions from the base year 1990 as a reference value. Developing countries consider this principle to be neo-imperial in character and will not allow themselves to be saddled with any sort of binding commitment while this principle is applied. China and India, as the countries with the highest rates of growth in emissions, have long committed themselves to the elimination of this principle, which fixes emissions rights using emissions in 1990 as the base year.⁵⁰ Instead of a base year, a target year should

act as a point of reference in which population size as well as emission efficiency must be included in the formula for distribution emission allowances.

An addition should be made for a limited number of technologically advanced countries to adopt regulatory policies, similar to the Montreal Protocol on Substances that Deplete the Ozone Layer (1987). This would lend itself to a linkage with the problem of security of energy supply. If, for instance, the G-8 states were able to agree to no longer grant permits to new automobiles powered by oil combustion after 2025, a drastic reduction in oil demand and at the same time in carbon dioxide emissions in the sector with the highest rates of energy consumption and emissions growth. If such a regime could with some time delay be successfully implemented in the vital transport sector of China and other developing countries, oil consuming countries could not only once again negotiate with producers as equals, but a major contribution would also be made towards reducing global greenhouse gas emissions.

An effective climate policy requires two elements: firstly, the multilateral forum offered by the UNFCCC for monitoring, the setting of upper limits for emissions, and potentially the management of an expanding global emissions trade; and secondly, an approach favored by the United States of solving the problem through technological breakthroughs, where those states and enterprises with the necessary potential for doing so would bear a special responsibility. This would offer the possibility of getting the United States back on board in terms of a responsible international climate policy. Additionally, it would create the option of incorporating countries with high emissions

⁴⁹ Greenhouse gas emissions (the sum of all six covered greenhouse gases, of which CO₂ is the most important) increased by 1.9 percent in the EU-15 between 2000 and 2005 and 1.2 percent in the United States. Source: Hans-Joachim Ziesing, "Trotz Klimaschutzabkommen: Weltweit steigende CO₂-Emissionen," in: *DIW-Wochenbericht*, No. 35 (30 August 2006), pp. 485-499 (487).

⁵⁰ Sebastian Oberthür and Hermann Ott, *Das Kyoto-Protokoll*, Opladen 2000, pp. 245-246.

growth rates, in particular rapidly industrializing economies. At the same time, the very same instruments applied for solving the climate problem could contribute to an improvement of the security of energy supplies.⁵¹

51 A burgeoning literature exists on this subject, out of which two items are highlighted here: International Energy Agency, *Energy Security and Climate Change Policy Interactions. An Assessment Framework*, Paris, December 2004; Friedemann Müller, *Klimapolitik und Energieversorgungssicherheit—Zwei Seiten derselben Medaille*, Berlin: Stiftung Wissenschaft und Politik, April 2004 (S 14/04).

Policy Options

International policy is not only affected in the external economic policy area by developments on the world energy markets. There are several reasons for this: the concentration of reserves in politically unstable regions, the advance of rapidly industrializing countries—with the latecomer China at the forefront—onto the world markets, using methods that deviate from the rules of conduct established by the OECD, and finally, the climate issue, the perhaps most global of the challenges faced by international policy. The links between energy supply and foreign policy are primarily observable on the following three levels connected with the triad of primary goals, namely security of supply, economic efficiency and environmental sustainability:

- ▶ The growing competition on the demand side of the global oil market stands in contrast to a rising concentration of reserves and an increasing degree of nationalization of production in producing countries. Competitive structures are also absent in the case of natural gas. The crucial factor here is the state control and monopolization of supply in the particularly decisive case of Russia/Gazprom. The lack of a diversified transport infrastructure is a further preponderant factor, since drawing natural gas from sources other than the contractually arranged sources is excluded from a purely technical-logistical point of view. These factors combine to create a situation of dependency that is exploited by supplier countries not merely to maximize prices that are set many times higher than production costs but also in such a manner as to translate highly demanded resources into a currency of power. Russia and Venezuela are examples for this.
- ▶ The largest share of oil and natural gas comes from countries that do not apply OECD or WTO rules, for example by subjugating investment to political control. The consequence is an underdevelopment of production capacity. Since this situation applies to regions plagued by crises and conflicts—at least in the case of the Middle East and Africa, the dependency provoked by undersupply is used as a weapon, rendering the regulation of conflicts more difficult.
- ▶ The correlation between the consumption of fossil fuels and greenhouse gas concentration in the atmosphere creates a link between the use of energy and international policy by way of the deepening problem of climate change.

The triad of primary objectives, economic efficiency, environmental sustainability, and security of energy supply affects foreign policy on all three levels: either due to the fact that the costs of dependency must be paid in this area, or because the tool box for optimization of policy is mainly available there. Policy aimed at optimizing this combination of objectives must fundamentally include the following options:

Firstly: Competition on the supply side must be ensured by diversifying supply sources, supporting the more efficient exploitation of resources, and creating an appropriate infrastructure. An infrastructure that would enable such competition must not be limited to natural gas—see the case of the oil pipeline infrastructure in the Caspian region. Infrastructure, even when financed privately, has a policy dimension. The Nabucco Project, which aims to create access to the natural gas from the South Caspian region and has now gained the support of the European Commission, is a notable example for this.

Secondly: Efforts to forge an international consensus concerning rules of conduct for energy production and transport and, in particular, competition rules to combat corruption and political meddling, require, in the first place, that the major energy consumers (the United States, Europe, Japan, China, India), in whose interest it must be to establish such rules, must participate in a dialog. What is further required is a dialog between consumers and producers. It is time that the OPEC, a stable and powerful organization that has existed for nearly 50 years now, assume responsibility for the effects of its activities on the world market, as it had pledged to do in 2000 (when it pledged not to instrumentalize its influence for political ends, to make a contribution to combating price volatility, and to avoid creating new poverty in developing countries as a result of high energy prices).

Thirdly: An instrument that is likely to have the greatest effect in achieving all relevant objectives will have to deal with the demand side, since in spite of

their important auxiliary function, both of the above-mentioned instruments will neither get the problem of climate change under control nor ensure that a sufficient oil supply is provided to cover the demand predicted by all relevant institutions including the International Energy Agency and the US Energy Information Agency. The technologically most advanced countries must in fact make a particular effort to largely relinquish the use of oil, an energy source particularly attractive to the transportation sector, to developing countries. These countries would then be given an opportunity to catch up in terms of development. Above all, however, such action will curtail an intensification of existing or latent conflicts in those regions in which supply is concentrated, conflicts that result from an increasing gap between supply and demand, and prevent a blunting of instruments to resolve these conflicts.

Foreign policy decision makers are called upon to build a consensus among industrialized countries concerning a transition to other source of energy that is as neutral towards competition as possible. The departure from the Oil Age must take place in technologically advanced countries before it takes place in less developed countries. This objective can be reached by changing over from the grandfathering principle under the Kyoto Protocol to a principle that aims towards an equal per capita distribution of emissions allowances by some target date. Such a principle could be complemented by rewards for efficient energy use (or low emissions as compared to economic performance, as the case may be). However, climate policy of this kind depends on technological breakthroughs. A consensus on the G-8 level to no longer grant permits to new automobiles powered by oil combustion after 2025 would be a regulatory signal that would point in the right direction.

What is important is that external energy policy take into account the multi-layered and long-term character of the problem and not limit itself to combating abrupt market reactions resulting from strikes in Venezuela, breaks in pipelines in Alaska, or hurricanes in the Gulf of Mexico. Gaps in oil and natural gas supplies are of great importance for welfare and security because of difficult partners on the supply side on the one hand and the necessary transition of energy supply away from fossil fuels in the face of the problem of climate change on the other hand. Against this background, the conceptual planning of strategy and the establishment of an international consensus at least among Western industrialized countries

requires a long-term engagement by the foreign policy community.

Abbreviations

BTC	Baku–Tbilisi–Ceyhan
CNOOC	China National Offshore Oil Corporation
CNPC	China National Petroleum Corporation
CPC	Caspian Pipeline Consortium
EIA	Energy Information Administration (U.S. Department of Energy)
G-8	Group of Eight (the seven leading Western industrialized nations + Russia)
CIS	Commonwealth of Independent State
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LNG	Liquefied Natural Gas
mbd	millions of barrels per day
MENA	Middle East/North Africa
OECD	Organization for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
SINOPEC	China Petroleum and Chemical Corporation
WTO	World Trade Organization