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The European Union: Energy Security and the Periphery

John Gault
President, Energy Project Development, John Gault, SA, Geneva

Europe relies upon imported energy, and the degree of this reliance will increase in coming decades. Internal (primarily North Sea) production of liquid fuels will decline, and production of natural gas will reach a plateau, so that incremental hydrocarbon requirements will necessarily come from external sources. This trend of rising energy imports has important security implications.

European energy security requires, first, that the incremental resources be developed in a timely manner along with adequate transportation systems to deliver the energy to European markets. European security then requires that the likelihood of interruptions to such supplies is minimized, and, in the event of an interruption, the consequences for European consumers are moderated.

Oil and gas production capacities in countries neighboring Europe are being enlarged, and transportation systems are being planned and constructed to provide additional supplies to Europe. For the most part, private companies from both importing and exporting countries, and in some cases the national oil companies of the exporting countries, are making these investments, often as joint ventures.

The European Union is trying to define a comprehensive energy security policy and is still striving to achieve fully integrated and liberalized energy markets. Nevertheless, the EU already helps to provide the favorable business climate in which private energy infrastructure investments take place.

To some extent, energy security can be addressed directly through energy-specific policies, but ultimately energy security is inextricable from broader economic and foreign policy challenges and solutions.

Europe relies on energy imports

Currently, Europe is about as dependent on imported oil as is the United States, and is more dependent on imported natural gas.[1] For purposes of our forward-looking analysis of security issues, we treat Europe as it will probably become over the next ten to twenty years – an enlarged version of the present European Union, including not only the present EU but also candidate members and some countries not yet formal candidates (e.g. Norway, Switzerland). Thus, we treat here all the countries of Europe (excluding Russia, Belarus, Ukraine) as an entity, and the 'periphery' under consideration here includes Russia, the Caspian region and the Mediterranean Basin – the 'neighborhood' of an expanded EU.

Europe managed to reduce its dependence on imported oil during the 1990s (Figure 1[2]) by expanding production from the Norwegian sector of the North Sea and by delaying the inevitable decline of production in the U.K. sector. Substantial increases in natural gas production from both Norway and the U.K. restrained natural gas imports below 40% throughout the decade (Figure 2[3]) in spite of rapid growth in European gas consumption.

Europe's energy import dependence will grow

Plausible assumptions about European rates of economic growth, energy prices, environmental regulations, and other factors over the coming two decades lead to projections of increasing energy import dependence. All forecasts agree that natural gas consumption will grow rapidly,

[1] We focus on hydrocarbons because hydrocarbons constitute the largest energy imports by far (whether measured in terms of heating value or monetary value), and because they present substantial security issues. Other potential European energy security issues not discussed here include nuclear fuel cycle security in Periphery countries and electrical grid interconnections with the Periphery (especially in the Mediterranean region).

[2] Source of data underlying Figures 1 & 2: BP p.l.c., *BP Statistical Review of World Energy,* annual (various years).

[3] In Figure 2, the region 'Asia-Pacific' includes Japan, which is also shown separately.

and oil consumption will also expand though not quite as fast as natural gas.

Projections made by the International Energy Agency[4] are shown in Figures 3 and 4. While these projections were prepared just prior to the 2001 global economic recession, other projections[5] made more recently reveal similar trends. Of course, the rates of growth of oil and gas consumption could be moderated by European policies concerning market liberalization and competition, encouragement of renewable energy, excise taxes, the rate of retirement of nuclear power plants and other policies.

European oil production, primarily in the North Sea, is expected to decline from nearly 7 million barrels per day (mmbd) currently to less than 4 mmbd by 2020. Internal natural gas production, also primarily from the North Sea, will not rise much above current levels of around 300 billion cubic meters per year (bcm/yr) in the foreseeable future. Higher energy prices and/or new production technologies could extend the life of existing fields somewhat, but substantial expansion beyond the projected levels is unlikely.

Under the most plausible scenarios, Europe will import about 5.5 mmbd of additional oil and at least 300 bcm/yr (and quite possibly more) of additional natural gas in 2020 compared with today's import levels. This implies increasing levels of import dependence as shown in Figure 5.[6]

Europe's oil and gas imports already come from Europe's Periphery

Much of the oil currently imported into Europe (roughly 40%) comes from the Middle East Gulf. But an even larger proportion originates in regions closer to Europe, especially the Former Soviet Union (FSU) and North Africa, which together account for about 48% of Europe's oil imports (Figure 6[7]).

Sources of Europe's natural gas imports are even more concentrated, with the FSU and North Africa accounting for some 96% of Europe's imports, including both gas imported via pipeline and in the form of LNG (Figure 7).

In any consideration of where additional oil and gas imports may originate, these periphery regions deserve particular attention.

Where will the additional supplies come from?

There are a number of reasons to expect that additional energy supplies for Europe will come first from the periphery.

Resources from the Middle East Gulf will be drawn toward faster-growing markets in Asia. Recent increases in China's imports of oil are shown in Figure 1. Asian markets will draw Middle East resources away from Europe and will tap hydrocarbons in Eastern Siberia and in Central Asia.[8] At the margin, Europe will compete with China and other Asian markets for oil and gas supplies from these sources.[9]

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[4] Source of data underlying Figures 3, 4 & 5: International Energy Agency, *World Energy Outlook 2000* (Paris: International Energy Agency, 2000), and International Energy Agency, *World Energy Outlook 2001 Insights* (Paris: International Energy Agency, 2001). 'Europe' here refers to OECD Europe.

[5] See, for example, United States Department of Energy, Energy Information Administration, *International Energy Outlook 2002* (Washington, DC: DOE / EIA, 2002). Three scenarios are offered by Jonathan Stern, Traditionalists Versus the New Economy: Competing Agendas for European Gas Markets to 2020, (London: Royal Institute of International Affairs, Briefing Paper 26, November 2001).

[6] Similar conclusions about increasing European import dependency are expressed in Commission of the European Communities, *Green Paper: Towards a European strategy for security of energy supply*, Brussels, 29 November 2000, Document COM(2000) 769 final (hereafter referred to as 'Green Paper'), at pp. 20-21. Were the projections extended to 2030, the levels of import dependence could be even higher (Green Paper at p. 80).

[7] Sources of data underlying Figures 6 & 7: *BP Statistical Review of World Energy* (annual), and International Energy Agency, *Monthly Oil Report* (monthly). Various issues.

[8] James P. Dorian, "Oil, gas in FSU Central Asia, northwestern China", *Oil and Gas Journal*, September 10, 2001, pp 20-32. See also: Julia Nanay, "Prospects for Alternative Export Routes for Caspian Oil: Turkey, Iran and China", Middle East Economic Survey, 17 September 2001, pp. D4-D7.

[9] See Kang Wu, "Asia-Pacific oil dependence, imports to grow", *Oil and Gas Journal*, April 15, 2002, pp. 20-23. Wu projects that Asia-Pacific crude oil imports could increase by 6 mmbd between 2000 and 2010, and that by 2010 the Middle East will supply 84% of all Asian country imports, up from 74% in 2000.

The gradual shift in direction of Middle East oil exports from western to eastern destinations has been taking place gradually for a long time, as shown in Figure 8[10]. In 1980, nearly two-thirds of Middle East oil exports went to Atlantic Basin markets (North and South America, and Europe). Today, only about one-third of Middle East exports reach those markets.

This trend will continue, as illustrated in Figure 9.[11] By 2020, according to projections by the United States Department of Energy, only about 25% of Middle East oil exports will flow to the Western Hemisphere and Europe.

Oil has tended to move preferentially from the Gulf to Asia for many reasons, including shorter shipping times from the Gulf to Asian destinations than to Northern Europe and frequently higher netback values from Asian markets. Middle Eastern oil also has been displaced from Atlantic markets over the past two decades by increasing oil production in the Atlantic Basin.

Middle Eastern natural gas has until very recently flowed almost exclusively eastward (in the form of LNG) to Asian markets. Natural gas, whether transported via pipeline or as LNG, costs more to transport per unit of energy than does oil. Oman, the UAE and Qatar in 2000 together exported about 23.5 bcm, 90% of which went to Japan and Korea, and less than 4% went to Europe as occasional spot shipments.

Recent reductions in gas liquefaction costs have begun to make Middle Eastern gas marginally competitive as new baseload supply to Southern European markets. For example, the following trades have been announced:

- Qatargas is selling 1.45 mmtpy[12] LNG to Gas Natural (Spain);[13]
- Rasgas will supply Edison International (Italy) 3.5 mmtpy LNG;[14]
- Qatargas will supply ENEL (Italy) and Repsol (Spain) 4.8 mmtpy LNG;[15] and
- Iran has announced its intention to sell LNG to Repsol (Spain).[16]

In addition, Qatar Petroleum and ExxonMobil have announced a project (Qatargas-2) to deliver up to 14 mmtpy of LNG to the U.K. with startup scheduled for 2006 or 2007.[17]

These new trades have been influenced by the current economic slowdown in some Asian markets, almost certainly a transient effect. The Middle East, however, will not be the primary source of incremental European gas. New gas supplies for Europe will come primarily from North Africa, from Russia, and from the Caspian region (by pipeline via Russia and probably via Turkey, Greece and the Balkans). One possible ranking of priorities of incremental supply, developed by Nordine Ait-Laoussine, is illustrated in Figure 10, which is based upon the estimated cost of new supplies from various sources.[18]

Given the location of the world's gas reserves, Europe will find itself in competition with Asian markets for incremental gas. A large proportion of the world's reserves (62%) lies along what James T. Jensen refers to as "The Seam" between Atlantic and Pacific Basin markets (Figure 11).[19] The extent to which this gas is developed to flow westward or eastward will depend upon many factors, and critically upon the evolution of transportation technologies and costs.

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[10] Source of data underlying Figure 8: *BP Statistical Review of World Energy.*

[11] Source of data underlying Figure 9: United States Department of Energy, Energy Information Agency, *International Energy Outlook 2002*, Table 11, p. 38.

[12] mmtpy = million tonnes per year. One million tonnes of LNG is equivalent to approximately 1.38 bcm.

[13] *Middle East Economic Survey,* 14 May 2001, p. A15.

[14] *Middle East Economic Survey,* 2 July 2001, p. A13 and 24 September 2001, pp. A14-A15.

[15] *Middle East Economic Survey,* 8 October 2001, p. A8.

[16] *Middle East Economic Survey,* 19 November 2001, p. A12.

[17] *Oil and Gas Journal*, 1 July 2002, p. 9; *Middle East Economic Survey*, 1 July 2002, p. A8.

[18] Nordine Ait-Laoussine, "Fundamental Supply Developments Within A Liberalizing European Market: A Producer's Perspective", paper presented to the Flame 2002 European Gas Conference, Amsterdam, March 2002.

[19] James T. Jensen, "The LNG Option for Middle East Gas Trade", paper presented to The Sixth Meeting of Experts from Energy Exporting and Importing Countries, Abu Dhabi, January 2002. Jensen also points out that the 'Seam' region contains 75% of the world's 'exportable surplus' gas, i.e. gas which is not reserved for future domestic consumption, required for reinjection in oilfield pressure maintenance programs, or otherwise unavailable for new export projects.

Are the Periphery countries preparing to increase their hydrocarbon exports to Europe?

The outlook is good for the creation of the infrastructure necessary to supply Europe's future hydrocarbon requirements. Many of the key projects have been identified and suppliers – mostly private firms – are mobilizing the physical and financial means for implementation.

The recent track record for the development, maintenance and delivery of oil and gas from periphery countries is mostly positive. Crude oil production in the Russian Federation underwent a steep decline in the first half of the 1990s, but has begun to recover and is currently the most rapidly expanding source of non-OPEC crude oil in the world (see Figure 12[20]). Yukos and Sibneft have led the Russian recovery by acquiring and developing new oilfields. Caspian region production increased toward the end of the decade as new export capacity began to become available. Production in North Africa was approximately stable. Declines in Egyptian oil production in recent years were offset by increases in Algerian output. Algeria was able to increase oil production by encouraging, from the late 1980s onward, the return of international oil companies, who returned in significant numbers and made major new oil discoveries (including the Hassi Berkine oil province). Production from West Africa expanded slowly during the 1990s.

Natural gas production in Russia suffered much less of a downturn than did oil production in the wake of the collapse of the USSR (Figure 13). Caspian region gas production – especially from Turkmenistan – suffered a sharper downturn in the first half of the decade and only in the last year or so has commenced a recovery. Turkmenistan more than doubled its production during 2001, with exports flowing northward to the Gazprom system and southward into Iran. Natural gas production in Algeria and, more recently, Egypt, has increased considerably. During the 1990s, Algeria systematically debottlenecked and expanded the capacities of its LNG plants, doubled the capacity of the Trans-Mediterranean Gas Pipeline to Italy, and constructed and commissioned the Maghreb gas pipeline to Spain and Portugal. Libya failed to maintain the capacity of its only LNG plant, and as a consequence its marketed gas production stagnated in the 1990s.

Overall, the track record of oil and gas production in the periphery regions during the past decade has been positive.

Periphery regions also have done a good job of replacing the hydrocarbon reserves depleted by production. Since 1990, oil and gas reserves in the Former Soviet Union, North Africa and West Africa have all expanded (see Figures 14 and 15).[21]

By global standards, the efficiency of the reserve replacement process in the periphery regions has been rather high. These regions cannot compete with the Middle East Gulf, but North Africa was able in the 1990s to achieve North Sea levels of drilling efficiency (measured as gross reserves added per foot drilled, Table 1). The Former Soviet Union had a somewhat less successful experience during the entire decade, but a comparison of the first five years (47 barrels per foot) with the second five years (164 barrels per foot) reflects both a significant improvement in Russian drilling efficiency and the expanding role of international oil companies and oilfield service companies in the FSU region.[22]

Table 1[23]

Gross oil reserves added per foot drilled (average 1991-2000)	
Region	**Barrels per foot**
Gulf OPEC*	1663
North Sea**	443
North Africa	434
FSU	105
World	80

[20] Source of data underlying Figures 12 & 13: *BP Statistical Review of World Energy.*

[21] Sources of data underlying Figures 14 & 15: *BP Statistical Review of World Energy* and *Oil and Gas Journal.*

[22] At least one observer foresees FSU oil production peaking before 2010. See A. M. Samsam Bakhtiari, "Expectations of sustained Russian oil production boom unjustified", *Oil and Gas Journal*, 29 April 2002, pp. 24-26.

[23] Table 1 is based upon the author's calculations.

*excludes Neutral Zone

** includes U.K. and Norway only

All indications are that new oil and gas transportation systems from the periphery regions will continue to be developed. Some of the principal projects being constructed or planned are listed here.

Russia: Crude oil exports currently are constrained by the limited capacity of an aging pipeline network. New export routes via the Black Sea, the Baltic Sea (where a third loading port, at Primorsk, will be developed), and the Mediterranean (at Omisajl, Croatia), are being planned.[24] An additional export port, on the Kara Sea at Varandey, is being developed to handle crude oil from the Timan-Pechora region. For gas exports, the Blue Stream sub-Black Sea pipeline to Turkey will be commissioned this year, and plans call for the expansion of the Yamal-Europe gas pipeline to a capacity of 60 bcm/yr.[25]

Caspian Region: The Caspian Pipeline Consortium (CPC) oil pipeline from Kazakhstan's onshore Tengiz oilfield to the Black Sea port of Novorossiysk entered operation in 2001, and a final decision concerning the Baku-Tbilisi-Ceyhan (BTC) pipeline to carry liquids from Azerbaijan to the Mediterranean will be announced during 2002.[26] A natural gas pipeline to carry gas from the offshore Shah Deniz field to Turkey will parallel the BTC oil line. Turkey and Greece have agreed to construct a gas pipeline interconnection, suggesting that one day a route for Caspian gas via Turkey, Greece and the Balkans to Europe may be envisaged.

Egypt: Highly successful exploration in the Mediterranean Sea offshore the Nile Delta has vastly expanded Egypt's natural gas reserves in recent years, and no fewer than four LNG projects have been announced. The two leading projects are the ELNG project at Idku, which would export gas initially to France, with additional volumes possibly destined for Italy, and the Union Fenosa project at Damietta, which would serve Spanish markets. Construction has begun on a natural gas pipeline to Jordan, with the eventual intention of reaching Lebanon, Turkey and Cyprus via Syria. Another natural gas line westward to Libya also has been discussed.[27]

Libya: The West Libya Gas Project involves development of the Wafa oil, gas and condensate field in Block NC-169 and gas-producing formations of the (offshore) Block NC-41, and delivery of the natural gas via a trans-Mediterranean pipeline to Sicily.[28]

Algeria: Two new natural gas pipelines from Algeria to Europe are planned. One would run from Skikda via Sardinia to La Spezia. The other is the Medgaz subsea pipeline from Beni Saf to Almeira, Spain. Subsea power cables will be laid in conjunction with both pipelines. In addition, Algeria and Nigeria are studying the possibility of constructing a natural gas pipeline from Nigeria across Niger to Algeria, for eventual extension to Europe.[29]

While the projects listed here will not by themselves satisfy all of the anticipated increase in Europe's hydrocarbon import requirements to the year 2020, they nevertheless illustrate how new and diversified supply sources and routes are being developed. But such projects are expensive. The investment required to achieve the anticipated increase by 2020 in Europe's natural gas imports alone amounts to US$150 bn.[30]

[24] Nick Mikhailov, "Russian oil pipelines set for expansion", *Oil and Gas Journal,* March 25, 2002, pp. 62-68, and "Tariff accord clears way for Russian oil exports through Med", *Oil and Gas Journal*, March 4, 2002, pp. 64-65.

[25] Nick Mikhailov, 'Gas pipeline projects needed to boost Russian exports", *Oil and Gas Journal,* April 1, 2002, pp. 66-68. A study by Wood Mackenzie suggests that Russian gas exports to Europe will increase from about 130 bcm/year in 2000 to 186 bcm by 2008 and to slightly more than 196 bcm by 2020, assuming key new fields are brought into production and, if required, some gas from Central Asia would enter the Russian pipeline system. See: Ian Woollen, "Central Asian gas crucial to future Russian gas supply", *Oil and Gas Journal,* August 13, 2001.

[26] Hilary McCutcheon & Richard Osbon, 'Discoveries alter Caspian region energy potential', *Oil and Gas Journal,* December 17, 2001, pp. 18-25, and Hilary McCutcheon & Richard Osbon, "Risks temper Caspian rewards potential", *Oil and Gas Journal,* December 24, 2001, pp. 22-28. See also: Terry Adams, Caspian Oil Realities, (London: Royal Institute of International Affairs, Briefing Paper 23, September 2001).

[27] *Middle East Economic Survey*, 31 December 2001, pp. A5-A7, and 7 January 2002, p. A17.

[28] *Middle East Economic Survey*, 29 October 2001, p. A17 and 11 February 2002, p. A13.

[29] *Middle East Economic Survey*, 15 October 2001, p. A13, and 28 January 2002, p. A3.

[30] Ait-Laoussine, *op cit.*

What European government actions are required to facilitate such projects?

It is in the interest of European consumers that these and other important energy delivery projects be planned and constructed in a timely manner. Some important lessons emerge from the projects recently completed or currently being constructed or planned:

- Private sector firms take the initiative and respond strongly to market forces. Nearly all of the projects listed above are being pursued by private (including recently privatized) firms preparing to meet anticipated customer demands in Europe. Private investors are willing to take risk on extremely large energy transportation projects if they foresee sufficient demand and an opportunity to supply the required energy within the context of reasonable political stability.
- Nearly all of the projects are joint ventures involving two or more major investors. Often the joint ventures combine companies in the exporting and importing countries. By forming cross-border joint ventures, investors spread risk and ensure that both the exporter and the importer have a mutual interest in uninterrupted operation.
- Projects transiting an international boundary require some inter-governmental agreement as a precondition. Such agreements typically cover rights of way, transit fees, environmental compliance, and similar matters. The government of an importing country may at this stage pledge (through its export-import bank) to finance some portion of the investment.[31]

The European Commission's 'Green Paper' on energy security strategy argues that "the Union suffers from having no competence and no community cohesion in energy matters",[32] yet there are many ways in which the European Union as an entity can and does support the development of new and diversified oil and gas import sources:

- The Euro-Mediterranean Partnership, whose primary aim is to draw partner countries into a free trade area by 2010, will (if implemented) have indirect impacts on economic development, employment, income levels, investment, and economic integration in the Partner countries, all of which will contribute to a stable political environment in which energy supply projects can flourish.[33]
- The planned Euro-Mediterranean Investment Facility within the European Investment Bank will have similar impacts, whether or not it becomes directly involved in financing energy infrastructure projects.[34]
- The EU policy of liberalizing internal energy markets will encourage the private sector to expand internal EU energy transportation interconnections, complementing the expansion of external sources and enabling new import sources to reach distant EU markets.[35] Moreover, the so-far successful efforts of the EU to eliminate 'destination clauses' in long-term international natural gas contracts[36] will probably contribute to supply security by increasing the number of sources serving any particular country in the EU. On the other hand, the less successful efforts of the EU to remove take-or-pay terms from gas contracts could inhibit the

[31] Concerning the intergovernmental enabling agreements for the Algeria-Sardinia-La Spezia gas pipeline / electric transmission project and the Algeria-Spain 'Medgaz' gas pipeline / electric transmission project, see *Middle East Economic Survey,* 13 August 2001, p. A8 and 15 October 2001, p. A13.

[32] Green Paper, at p. 28. The final report on the Green Paper consultation process was issued 26 June 2002, COM(2002) 321 final. In many ways, the final report confirms that there is no consensus on European energy security policy. Suggestions gathered during the Green Paper consultation process varied widely and often failed to distinguish between the role of government and the role of the private sector.

[33] *Middle East Economic Survey*, 1 April 2002, p. B1. See also: Ali Aïssaoui, "European Strategy for the Security of Energy Supply: Re-evaluating Relations Between the EU and the Producers and Transit Countries of North Africa", *Middle East Economic Survey,* 15 April 2002.

[34] *Middle East Economic Survey,* 1 April 2002, p. B7.

[35] An analysis of the impact of a single EU gas market upon security of supply may be found in Chapter 7 of "A long-term vision of a fully operational single market for natural gas in Europe", a draft strategy paper prepared in January 2002 by the Joint Working Group of the European Gas Regulatory Forum, available at: http://europa.eu.int/comm/energy/library/strategy-paper-draft-28-01-2002.pdf

[36] *Middle East Economic Survey*, 22 July 2002, p. A8.

development of new natural gas transportation systems.[37] This transitional concern will recede once EU gas markets are fully liberalized and transparent, when short term and spot gas transactions become more common, but during the transition period the EU must pay attention to exporters' concerns on this issue.

- The EU is encouraging countries to implement the European Energy Charter Treaty and (when completed) the Energy Charter Transit Protocol.[38] These treaties establish common rules for energy trade, investment, and transit rights.[39] Although originally created to provide a stable and predictable environment for investment in the Former Soviet Union, the Energy Charter and the soon-to-be-completed Transit Protocol may gain wider application. Russia has not yet ratified the Energy Charter Treaty, and Gazprom has some significant reservations about the Transit Protocol.[40] The same issues concerning third-party access to pipeline capacity to be covered in the Transit Protocol sooner or later will be raised concerning natural gas pipelines from North Africa, although no North African country has ratified the Energy Charter Treaty.
- The EU has participated since October 2000 in "The EU-Russia Energy Partnership" which aims to improve the legal and security framework for investment in energy transportation projects linking Russia and the EU.[41] In addition, the EU's technical assistance program INOGATE (Interstate Oil and Gas Transport to Europe) has provided funding for metering stations along gas pipelines in FSU countries and for studies contributing to the reform of transit gas arrangements in Ukraine.[42]
- The European Union has intervened successfully on behalf of European energy companies ignoring unilateral sanctions imposed by the United States.[43] Beneficiaries include European companies involved in projects in Iran.[44] The stance of the European Union also may have reassured partners in the planned West Libya Gas Project. Continued EU defense of its corporate citizens against extraterritorial application of unilateral sanctions imposed by the United States will be important as long as the sanctions remain in place.[45] In June 2002, EU foreign ministers agreed to open negotiations on a trade and cooperation agreement with Iran.[46]

Short-term European energy security

It is one thing for the EU to facilitate the timely construction of new energy delivery systems to meet growing demand, but quite another to ensure their uninterrupted operation. Short-term interruptions have two potential consequences: prices may rise sharply, and physical rationing of limited supply may become necessary. Either will entail undesirable political and economic impacts.

The International Energy Agency was created, in part, to prepare for and manage severe oil supply disruptions. Members of the IEA are required to

[37] Ait-Laoussine, op cit. See also IEA, *World Energy Outlook 2000*, p. 147, and *Middle East Economic Survey*, 8 April 2002, pp. A5 and A13-A14.

[38] Green Paper, p. 88. The European Community deposited instruments of ratification of the Energy Charter Treaty on 16 December 1997.

[39] Ria Kamper, "New Charter to Govern International Energy Transit", *Oil and Gas Journal*, March 4, 2002, pp. 20-23.

[40] "Rules of the Game", *Russian Petroleum Investor*, March 2002 (interview with Ria Kamper, secretary general of the Energy Charter Secretariat, Brussels), available at http://www.encharter.org

[41] See: http://europa.eu.int/comm/energy_transport/en/lpi_en_3.html.

[42] "Security of gas supplies: Loyola de Palacio stresses the importance of the Putin/Kuchma declaration", IP/02/843, 11 June 2002. See also http://www.inogate.org .

[43] At a United States – European Union summit meeting in London on 18 May 1998, "the United States agreed to grant 'national interest' waivers to EU companies against liability to Iran Libya Sanctions Act (ILSA) sanctions." *Middle East Economic Survey*, 22 November 1999, p. A2.

[44] The first two beneficiaries of the US-EU accord were TotalFinaElf (operator of Sirri A and E fields and developer of Phases 2 and 3 of the South Pars gas field) and Shell (redeveloper of the Soroush and Nowruz oil fields). *Middle East Economic Survey*, 28 February 2000, p. A16.

[45] U.S. President George W. Bush signed a five-year extension of the Iran Libya Sanctions Act (ILSA) in August 2001 and an executive order extending sanctions against Libya in January 2002. *Middle East Economic Survey*, 14 January 2002, p. A17.

[46] *International Herald Tribune,* 19 June 2002, p. 3.

maintain emergency petroleum reserves equivalent to 90 days of net oil *imports*. The European Union imposes a somewhat stronger requirement on its members, who must hold emergency reserves equivalent to 90 days of inland *consumption* of three types of petroleum products. The IEA coordinates among its members, in the event of a serious supply disruption (defined as a loss of 7% of supply), a program of demand constraint, stock draws, and sharing of available supplies. The IEA, thus, has a primary coordinating responsibility in the event of a supply disruption.

Several trends in market structure already serve to reduce the danger of short-term supply interruptions:

- As mentioned above, joint ownership of the production and transmission system by companies from the exporting and importing countries creates a mutual interest in avoiding interruptions. Fortunately, joint ownership is becoming increasingly common. Many of the projects previously mentioned are jointly owned. More generally, downstream investments by the national oil companies of major exporting countries, pioneered by Petroleos de Venezuela, Kuwait Petroleum Corporation and Saudi Aramco in the 1980s, has continued into the era of privatization. Both Gazprom and Lukoil, for example, have invested in downstream European gas and oil facilities.[47] This trend should be encouraged.
- In some cases pipelines can be constructed or deviations can be created around regions or countries where interruptions have been experienced or seem likely. Transneft has constructed an oil pipeline around Chechenya for this reason, and Gazprom nearly announced in January 2002 a plan to bypass Ukraine.[48]
- The Energy Charter Transit Protocol, when completed, will contain provisions to prevent the unlawful taking of hydrocarbons from pipelines by transit countries.[49] Fortunately, interruptions to date of energy supplies destined for European markets have been rare. Deliveries to Europe of gas from Russia and Algeria have been, overall, highly reliable.
- Periphery countries already exporting oil and gas to Europe are at present more dependent on European markets than Europe is dependent on the suppliers (Table 2)[50]. Europe is already more diversified in terms of sources of supply than are Europe's suppliers in terms of outlets for their resources. However, the degree of dependence of the FSU on Europe may be expected to decline as Russia and the countries of Central Asia develop their links to Asian markets.

[47] Gazprom has been for more than a decade a partner of the German company Wintershall (owned by BASF) in the joint-venture Wingas, owner and operator of natural gas pipelines and storage facilities in Germany. Gazprom is also the partner of ENI in the Blue Stream natural gas pipeline project beneath the Black Sea to Turkey. Lukoil owns retail petrol stations in the Baltic States, the Czech Republic, Poland, Turkey, the United States and other countries outside of Russia.

[48] *Oil and Gas Journal*, March 25, 2002, p. 66, and April 1, 2002, p. 66. The plan for the detour was dropped by Gazprom prior to the Putin / Kuchma declaration of early June (see IP/02/843, 11 June 2002, cited in a previous footnote). Nearly all (about 90%) of Russia's gas exports to Europe currently pass through Ukraine. Expansion of the Yamal-Europe pipeline system, however, will probably be via Belarus and Poland.

[49] Ria Kamper, *op cit.*

[50] Sources of data underlying Table 2: *BP Statistical Review of World Energy 2001*, and *Oil and Gas Journal*, August 13, 2001, p. 64.

Table 2

Mutual Energy Interdependence 2000

	Europe's dependence on Supplier*		Supplier's dependence on European markets**	
Supplier	**Oil**	**Gas**	**Oil**	**Gas**
FSU	29%	66%	78%	98%
North Africa	19%	31%	77%	96%

*Share of Europe's total imports coming from Supplier

**Share of Supplier's total exports going to Europe

Note: "Europe" includes all of Europe other than Belarus, Ukraine, Russia.

However reassuring the above considerations may be, they by no means guarantee that Europe will be free from short-term supply interruptions or sharp price swings in the future. The development of new sources of supply from the Caspian region or new gas export pipelines from North Africa in particular do not constitute a countermeasure against unexpected price movements. The reason is that these suppliers will not maintain idle production capacity which could be called upon to replace interrupted supplies or moderate upward price movements.

Today, nearly all idle oil production capacity is in the Middle East Gulf (Figure 16).[51] A small amount of idle capacity – less than 500,000 bpd – was held in non-OPEC countries during the first half of 2002 as a temporary measure of cooperation with OPEC to support oil prices. Any consistent or permanent maintenance of idle production capacity in non-OPEC countries is unlikely, and would be resisted by the private companies investing in petroleum production capacity in those countries.

OPEC members have used their idle capacity to moderate oil price upswings in the past – notably at the onset of the Iran-Iraq war in 1980 and the Gulf War in 1990.[52] The overhang of more than 6 mmbd of idle capacity in early April 2002 was sufficient to prevent any run-up in oil prices when Iraq announced its unilateral export 'boycott'. European governments and the European Union have no control over the amount of idle capacity at any time, or the use of that idle capacity to moderate oil price swings.

The European Union could consider other policies to minimize the impacts of oil and energy price swings. One would be the maintenance and utilization of strategic petroleum reserves with the specific intention of intervening to influence prices.[53] The intention of intervening explicitly to modify prices would go beyond the present strategy of emergency petroleum reserves to be used in the event of 'supply interruption'.

Such a policy is filled with potential perils, and the experience of the United States in drawing down its Strategic Reserve during the Gulf War and in the autumn of 2000 is not encouraging. The first drawdown was too late to have any market impact (and the offered crude was not taken up by the market), and the latter drawdown had unintended negative consequences on the New England heating oil market it was supposed

[51] Sources of data underlying Figure 16: *Petroleum Intelligence Weekly* and International Energy Agency, *Oil Market Report* (monthly).

[52] Nordine Ait-Laoussine and John Gault, "OPEC's Delicate Balancing Act", *Middle East Economic Survey*, 24 September 2001, p. D8.

[53] In June 2002, EU Energy Commissioner Loyola de Palacio called for EU oil stocks to be increased from the current 90 days to 120 days. The commissioner was reported to have compared oil stocks to central bank reserves which would rarely be called upon. *Middle East Economic Survey*, 17 June 2002, p. A9. A review of EU natural gas storage capacity can be found in "A long-term vision of a fully operational single market for natural gas in Europe", *op cit.*

to assist.[54] Strategic reserves have not yet demonstrated their potential as a subtle tool for influencing prices.

A second policy which the European Union could follow to prepare for future price swings would be to encourage large energy users to hedge their future energy requirements. Many corporate energy users already engage in hedging. Such a policy would have to be accompanied by accounting regulations to assure that consumers correctly evaluate the long-term viability of hedging counterparties. The recent collapse of Enron in the United States should encourage hedgers everywhere to re-examine carefully their contracts for future energy supplies.

European policy options are limited, however, because oil markets are global by their very nature, and a supply interruption anywhere – even of supplies not serving European markets – has a worldwide price impact, including an impact on Europe. The greatest price swings of the past thirty years, those which have contributed to significant economic slowdowns in industrialized countries, have been instigated by, or coincidental with, political turmoil in the Middle East: the October War in 1973, the Iranian Revolution of 1979, the onset of the Iran-Iraq War in 1980, the Gulf War of 1990, and the Second Intifada in Palestine.

This suggests that, for Europe, the avoidance of future price 'shocks' ultimately requires long-term efforts to attack conditions in periphery countries which underlie political instability: poverty and inequality, unemployment, corruption, poor governance, lack of political and economic opportunity, and perceived injustice.

In general, the periphery countries from which Europe needs to draw additional volumes of oil and gas, and upon which Europe will become increasingly energy dependent over the next two decades, have significantly lower incomes per capita than do European countries (Table 3).[55]

Table 3

Income per capita, selected European countries and Periphery energy suppliers

Country	Income per capita*
Russia	6990
Azerbaijan	2450
Kazakhstan	4790
Egypt	3460
Libya	n.a.
Algeria	4840
France	23,020
Germany	23,510
Italy	22,000
United Kingdom	22,220

*1999 gross national product per capita, purchasing power parity (ppp) basis

Many of these countries – especially in North Africa – have high rates of population growth. Large amounts of investment will be required to raise productivity and reduce unemployment in these countries. Yet, in the eight-year period 1992 through 1999, Russia and North Africa together received only 1.5% of EU-15 outward direct investment – a miniscule amount considering the important roles these countries will play in Europe's energy future. EU policies designed to make these and other energy periphery countries more attractive to investors will be an important element in ensuring energy security over the long run.

[54] Sarah Emerson, "SPR drawdowns trigger law of unintended consequences", *Oil and Gas Journal*, December 10, 2001, pp. 24-30.

[55] Source of data underlying Table 3: World Bank, *World Development Indicators 2001*.

Figure 1

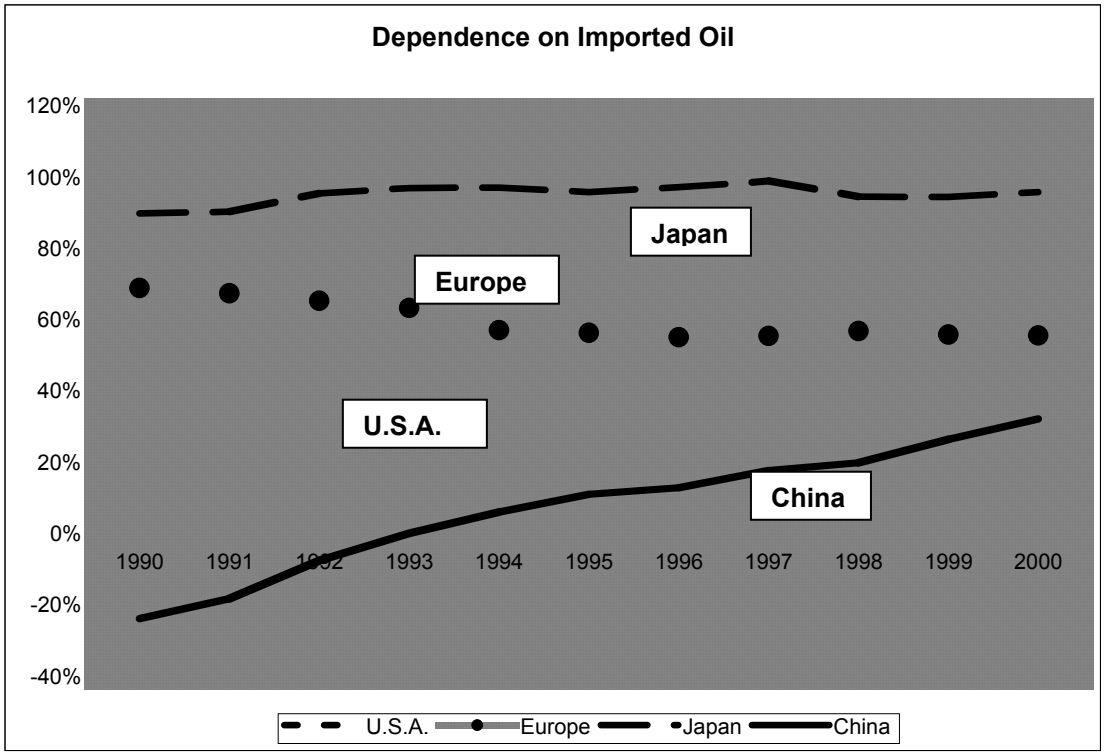
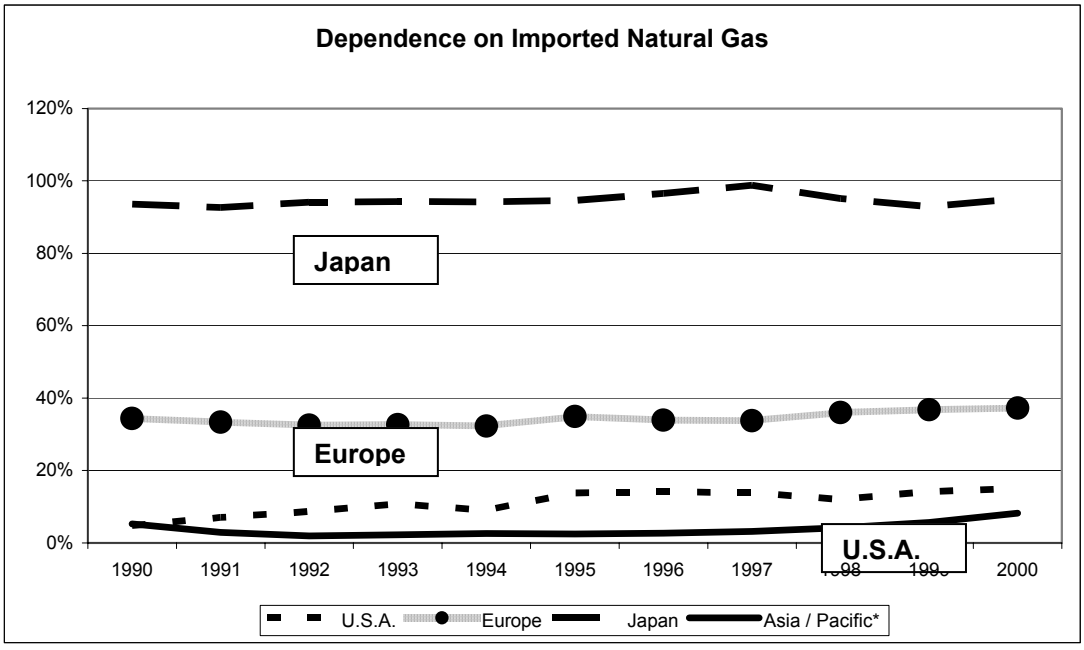
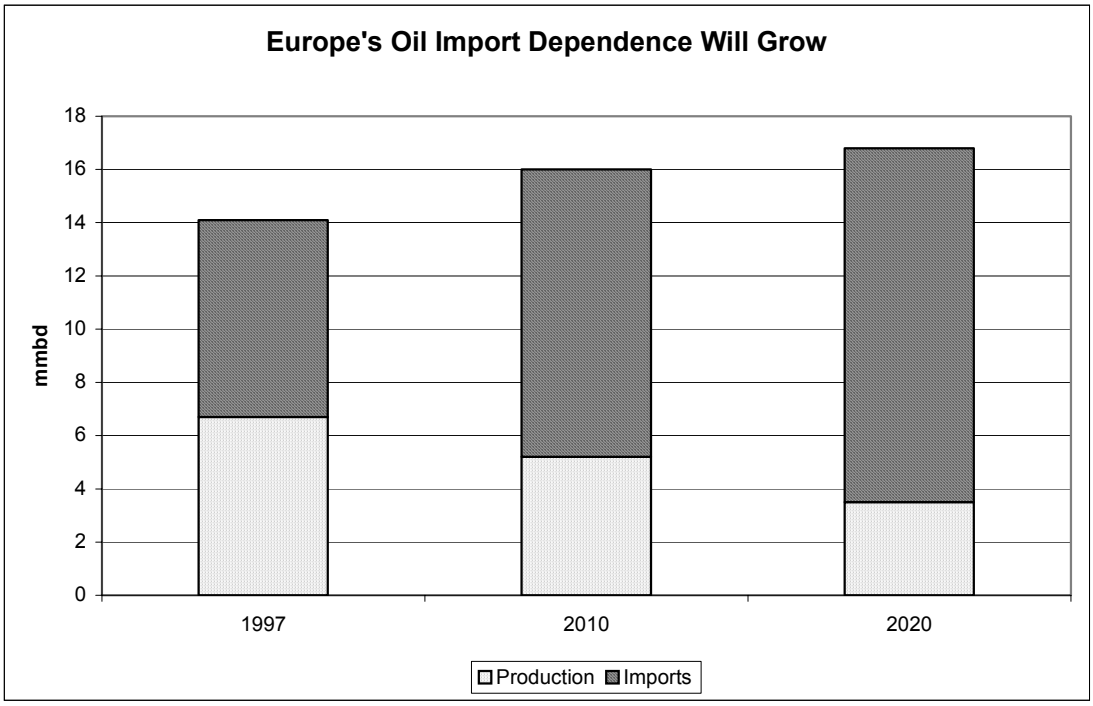


Figure 2



*Asia-Pacific includes Japan

Figure 3



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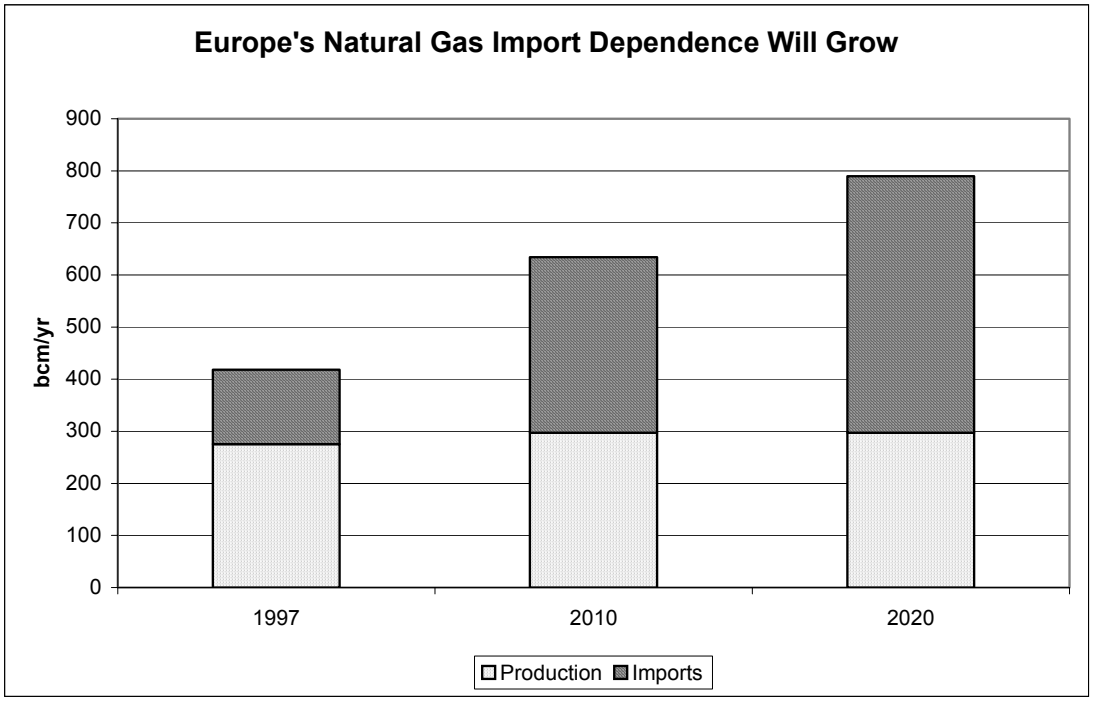

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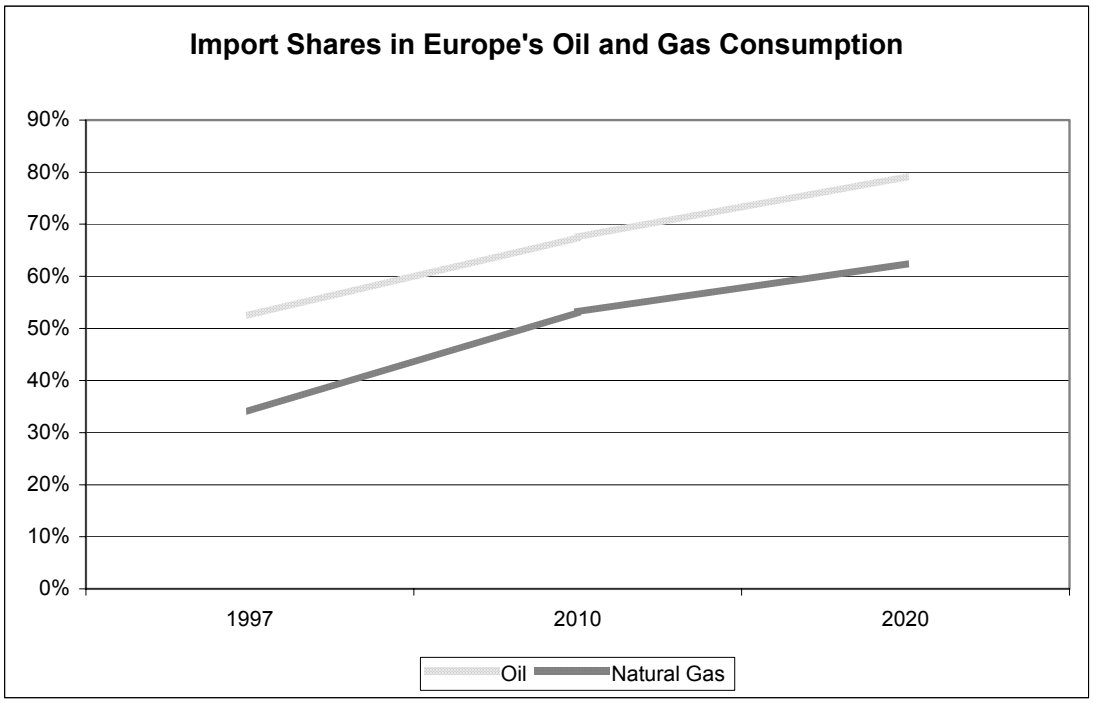

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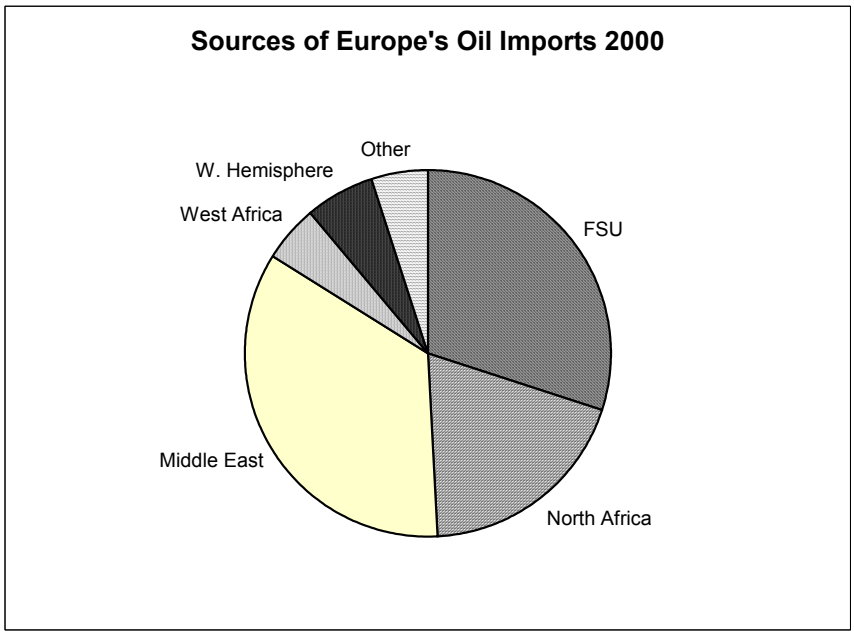

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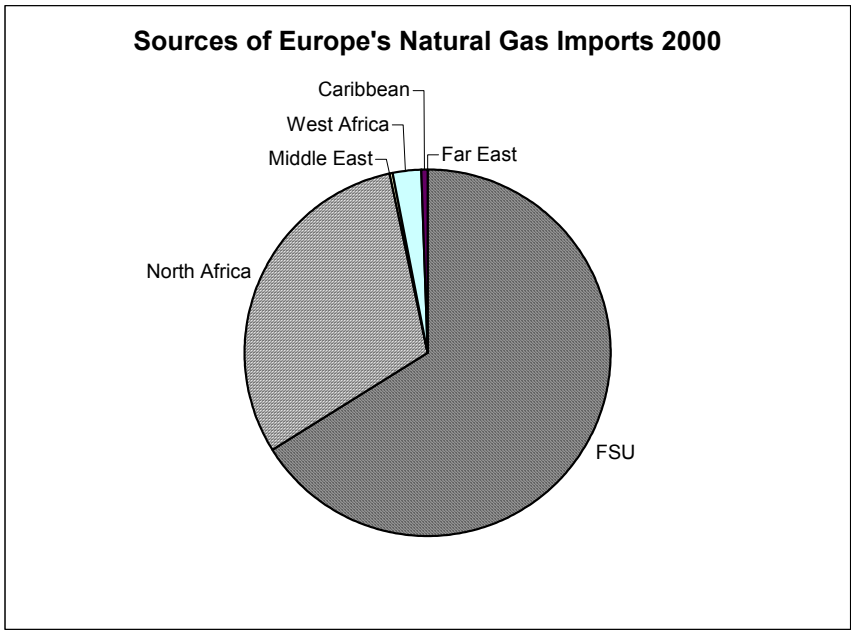

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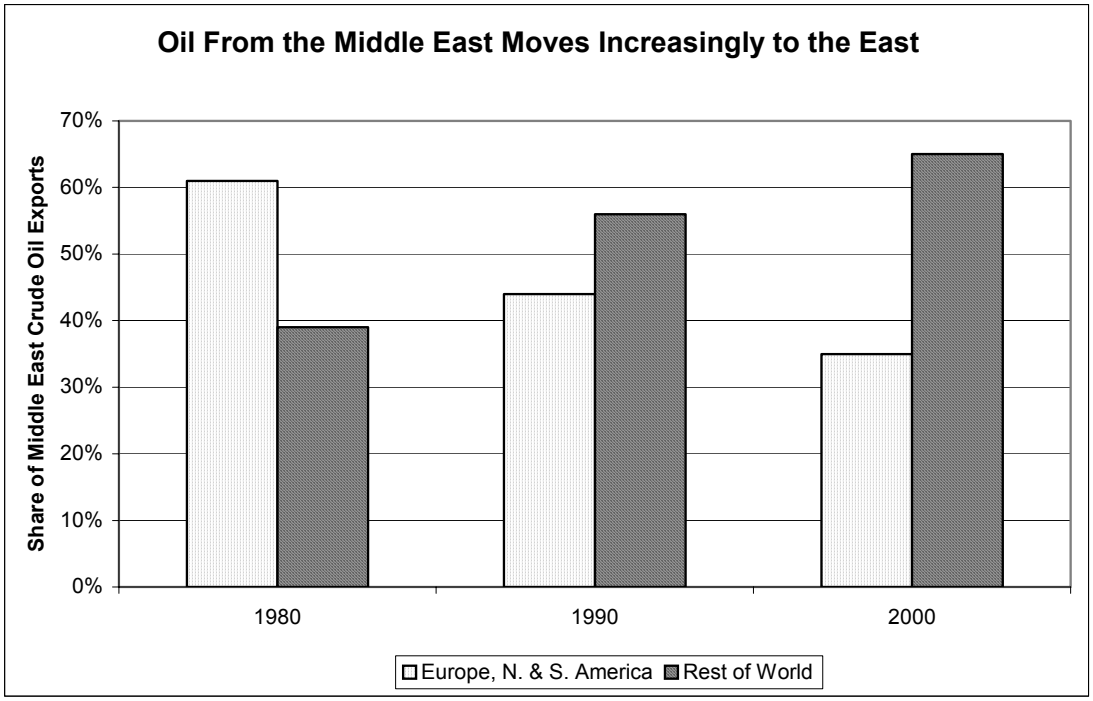

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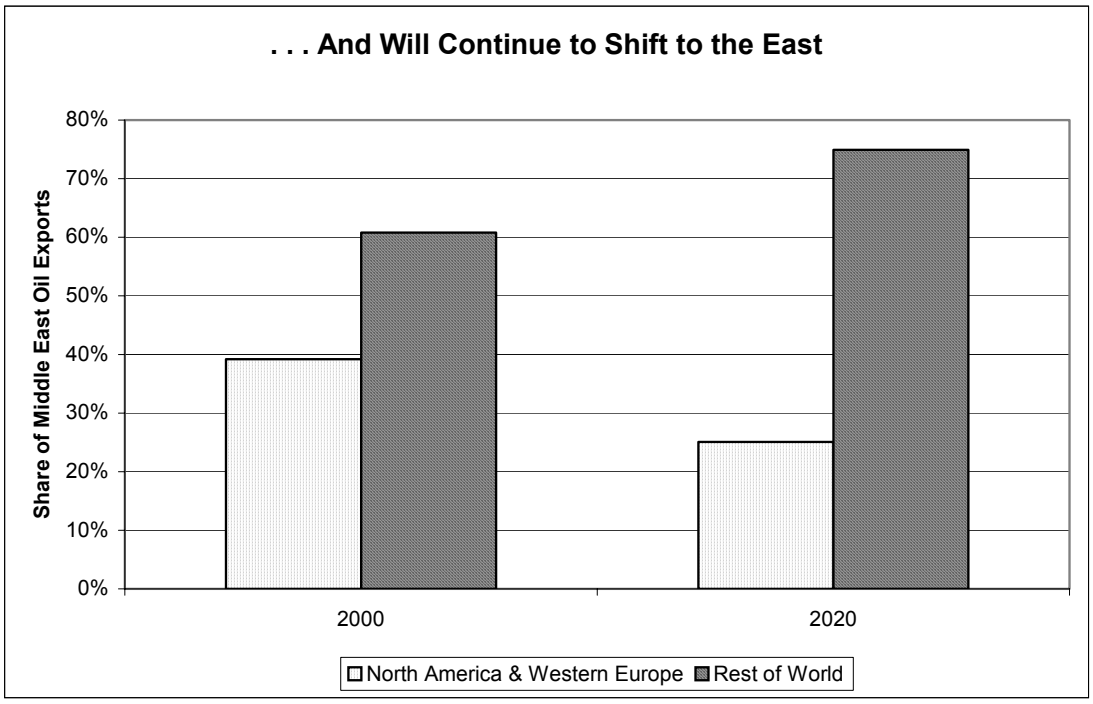

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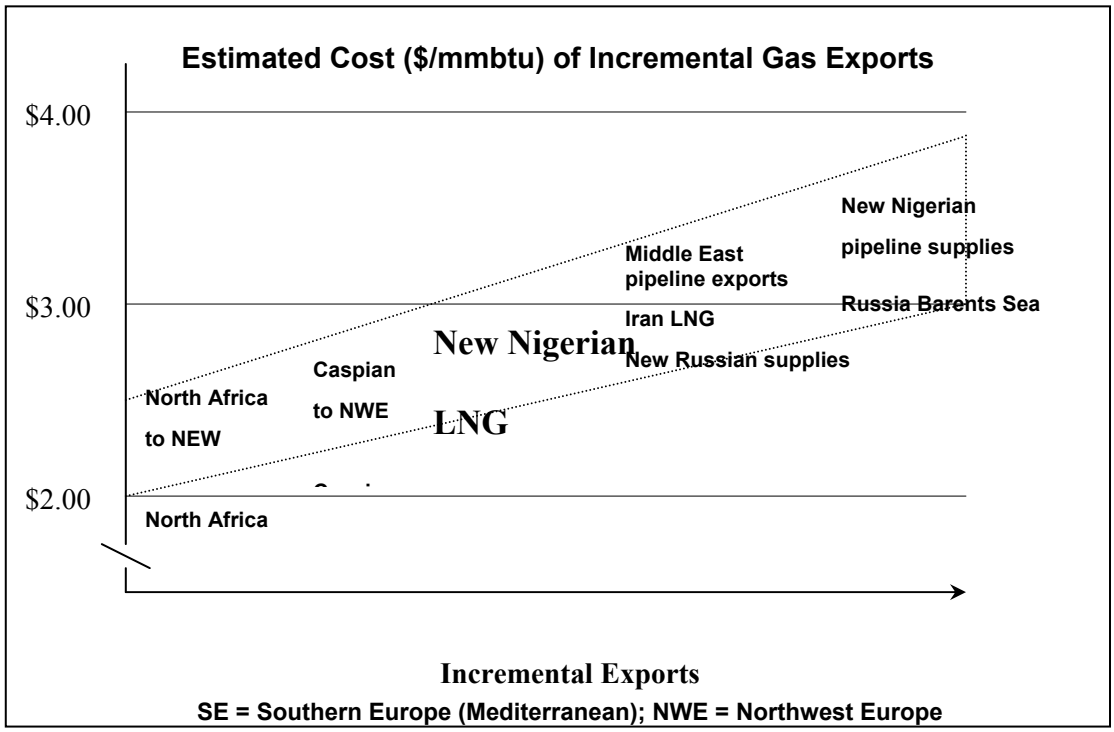
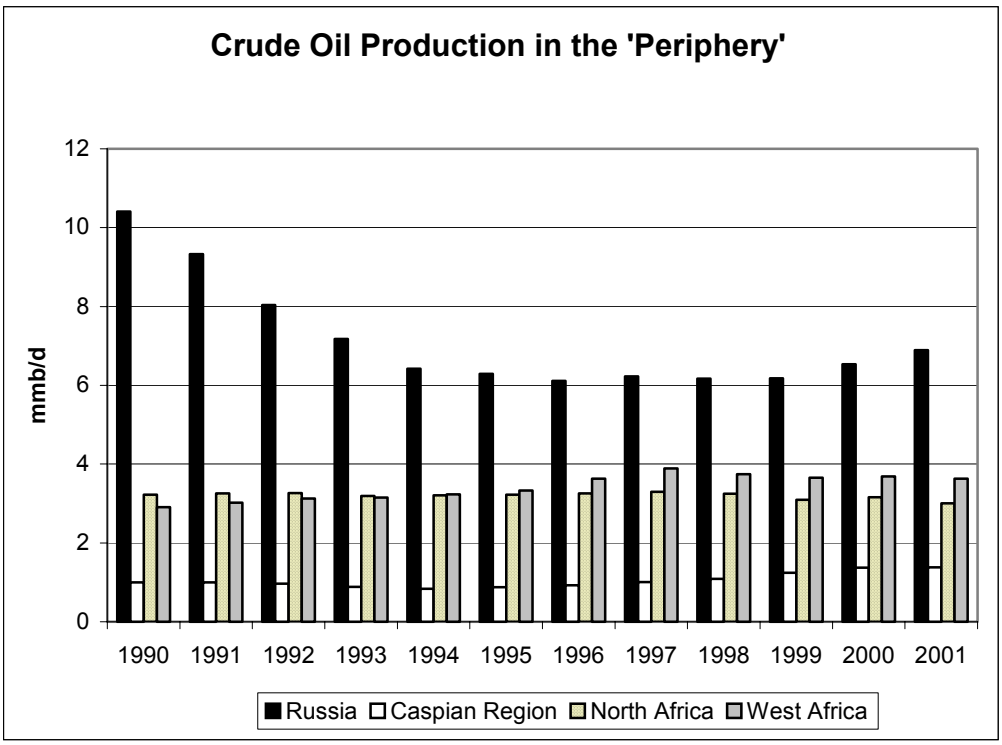


Figure 11

Figure 12



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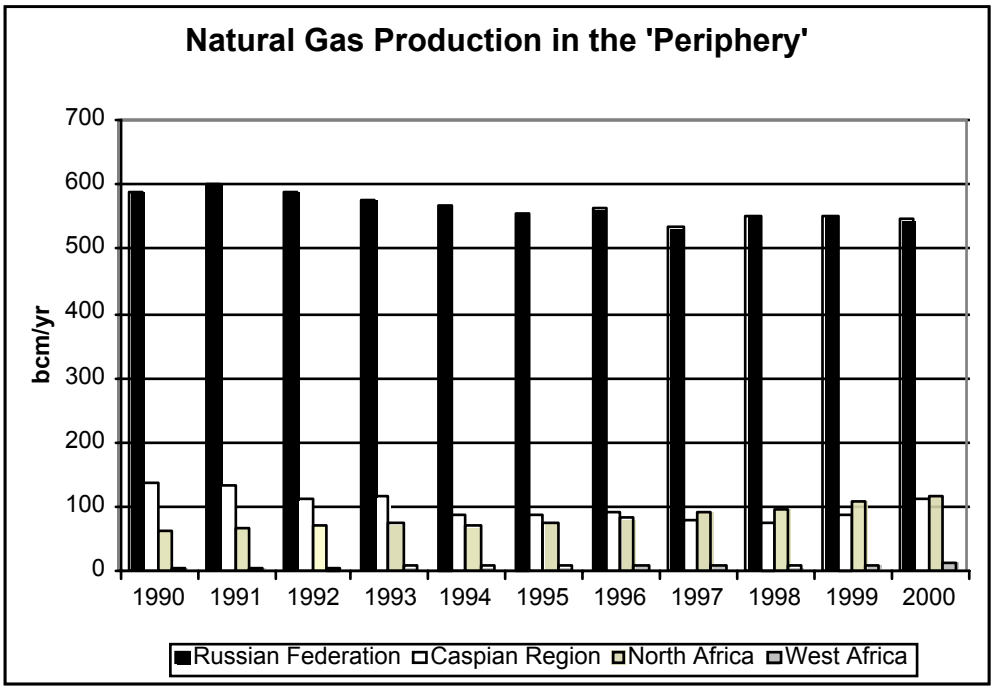

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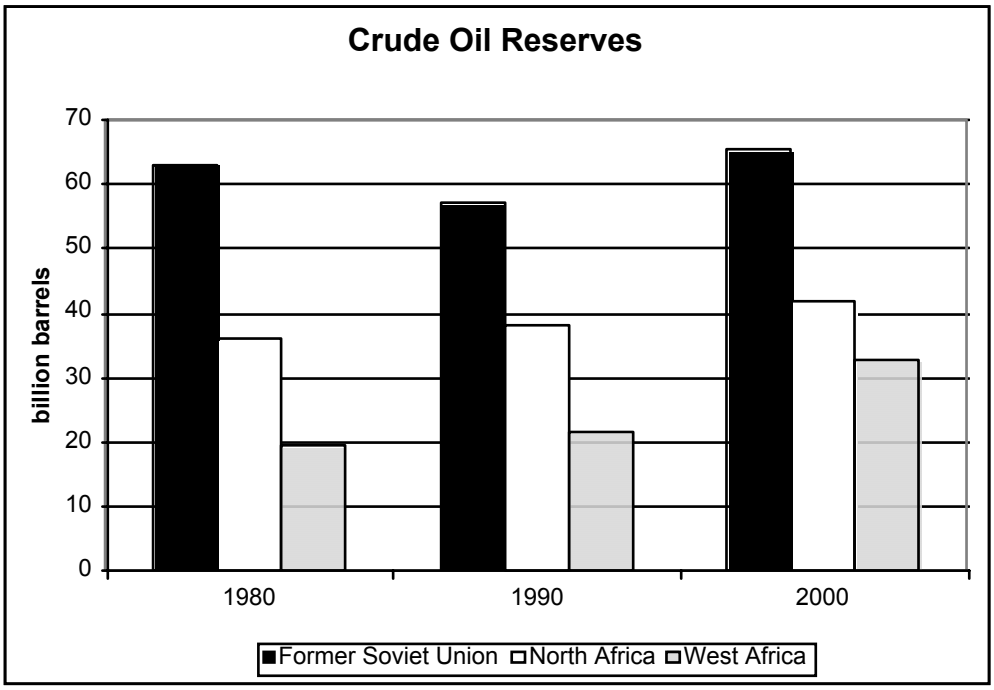

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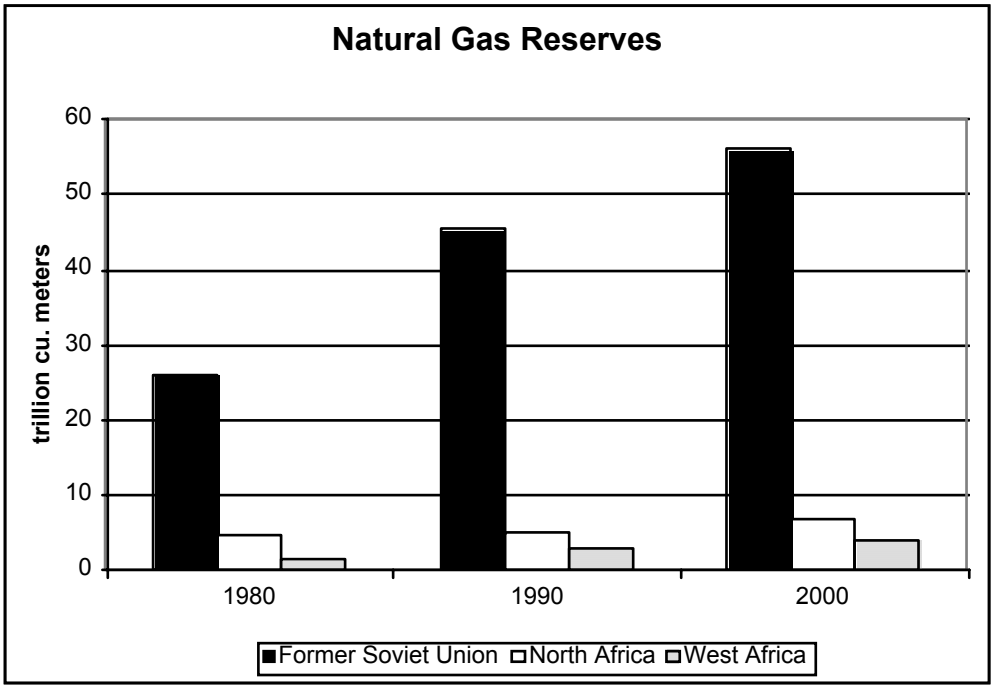
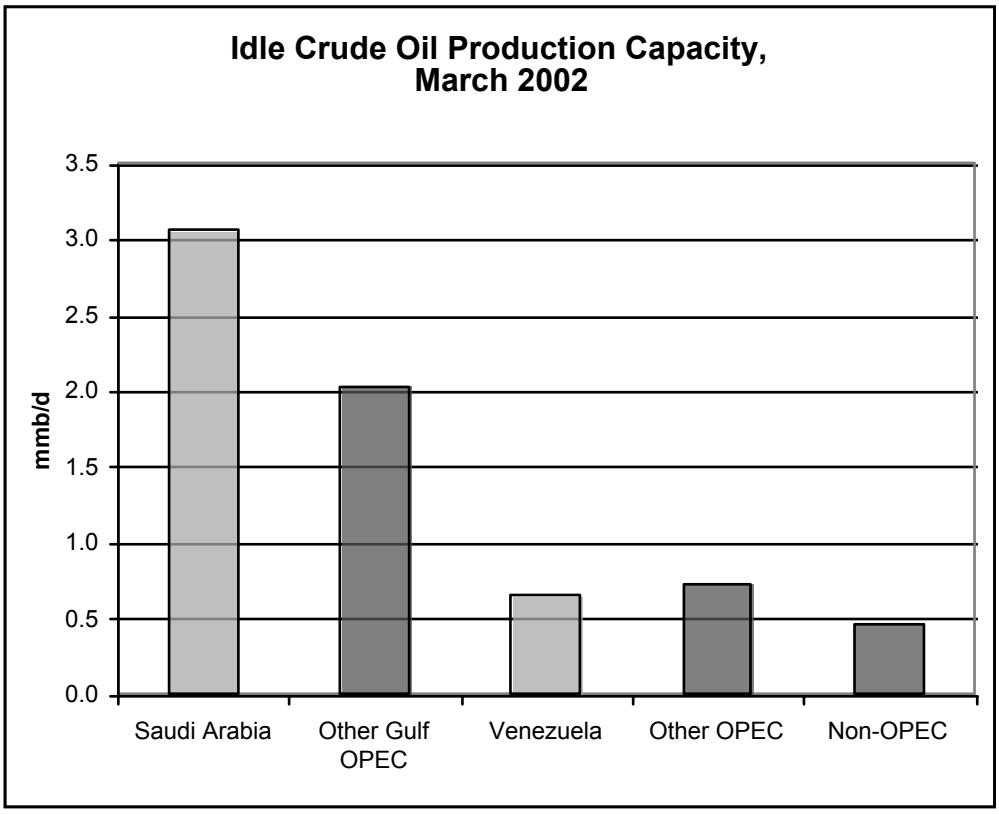


Figure 16



* Immediately prior to Iraq's unilateral cessation of oil exports in April