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# **Caspian Energy: A viable alternative to the Persian Gulf?**

**Mehdi Parvizi Amineh**

Research Fellow

International Institute for Asian Studies (IIAS)

Leiden, The Netherlands

[amineh@pscw.uva.nl](mailto:amineh@pscw.uva.nl)

Associate Fellow

Clingendael International Energy Program (CIPE)

The Hague, The Netherlands

[mamineh@clingendael.nl](mailto:mamineh@clingendael.nl)

## **ABSTRACT**

**T**he collapse of the Soviet Union resulted in the emergence of the eight independent states in Central Eurasia and changed the control of the Caspian Sea basin from the Soviet Union and Iran to Russia, Iran, Azerbaijan, Kazakhstan and Turkmenistan. The oil and natural gas reserves of the five Caspian Sea states are about 14.6 percent of the world's total proven oil reserves, and almost 50 percent of the world's total proven natural gas reserves. With the world's energy demands projected to rise rapidly over the next decades, can Central Eurasia and the Caspian Sea region become a viable alternative to the Persian Gulf as a global energy supplier?

*It is projected that by 2020 only about one-third of the total oil production increase will come from non-OPEC areas. OPEC's exports to industrialized countries in 2020 will grow steadily, with more than half of this growth sourced from the Persian Gulf. However, despite this growth, OPEC's total share of petroleum exports to industrialized countries in 2020 is estimated to be 14 percent below its share in 2000. In contrast, OPEC oil exports to developing countries will increase much faster, especially to developing Asia. China alone is expected to import most of its booming energy needs from the Persian Gulf. In terms of European demand for oil, the Caspian Sea region's reserves are crucial. Without them, it is estimated that oil exports from the Persian Gulf to Europe will increase by 0.5 million barrels per day in 2010. However, if the Caspian Sea region fully participates in the export market, oil from the Persian Gulf to Europe will be decreased to 1.5 million barrels per day by 2010.*

*Thus the EU has its own motives to be interested in the security of Caspian Sea oil and natural gas resources. Because of geographic proximity, the EU fears that instability in the region would also affect Europe. With the oil and natural gas resources of the North Sea in decline, the Caspian Sea region could become a serious alternative energy supplier. Thus, while the Caspian Sea region will in no way be able to replace the Persian Gulf in meeting global oil supply demands, it should be internationally recognized as a valuable additional alternative.*

## **ABOUT THE AUTHOR**

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Dr Mehdi Parvizi Amineh is a research fellow in Central Asia at the International Institute for Asian Studies (IIAS), Leiden, The Netherlands, and an associate fellow in post-Soviet geopolitics of energy security in Eurasia and the Caspian Region at the Clingendael International Energy Program (CIEP), The Hague, The Netherlands. He also teaches at the University of Amsterdam and Webster University, the Netherlands. Amineh's research interests include globalization and regionalism/regional integration; globalization and neo-geopolitics, globalization and politicized Islam and European energy security. His recent and forthcoming publications include *Globalization, Geopolitics and Energy Security in Central Eurasia and The Caspian region* (The Hague: CIEP, 2003); *Towards the Control of Oil Resources in the Caspian Region* (New York: Palgrave Macmillan, 2000); *Die Globale Kapitalistische Expansion und Iran (1500-1980): Eine Studie der Iranischen Politischen Ökonomie* (Münster: Lit-Verlag, 1999); (with Henk Houweling) (eds.), *Central Eurasia in Global Politics: Conflict, Security and Development* (Leiden: Brill Academic Publishers, 2003); and *Globalization and Islam: the Rise and Decline of Islam as Political Ideology* (forthcoming 2004). The author would like to thank the Editor and Dr Apurbu Kundu, Senior Research Fellow EIAS, for their comments and editorial support.

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## List of Abbreviations

BBbbl	billion barrels
BBcm	billion cubic meters
bbl	barrels
bcf	billion cubic feet
BSEC	Black Sea Economic Co-operation
BSEP	Black Sea Environmental Program
BSREC	Black Sea Regional Energy Center
CIS	Commonwealth of Independent States
EAEC	Eurasian Economic Community
EAPC	Euro-Atlantic Partnership Council
ECO	Economic Co-operation Organization
EU	European Union
GUUAM	Georgia, Uzbekistan, Ukraine, Moldova
INOGATE	Interstate Oil and Gas Transport to Europe
MAPs	Membership Action Plans
MMbbl/d	million barrels per day
MMcm	million cubic meters
NATO	North Atlantic Treaty Organization
OPEC	Organization of Petroleum Exporting Countries
OSCE	Organization for Security and Co-operation in Europe
PfP	Partnership for Peace
SCO	Shanghai Co-operation Organization
TACIS	Technical Assistance to the Commonwealth of Independent States
tcf	trillion cubic feet
TNCs	Transnational Corporations
TNOCs	Transnational Oil Corporations
TTbbl/d	thousand barrels per day
TRACECA	Transport Corridor Europe-Caucasus-Central Asia
US	United States
WEU	Western European Union

## 1. Central Eurasia and Caspian Sea Geopolitics

The collapse of the Soviet Union and the end of the Cold War led to a dramatic change in the landscape of Eurasian geopolitics. On the one hand, it resulted in the emergence of the eight independent states of **Central Eurasia**: the sub-region of Central Asia consisting of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan; and the sub-region of the South Caucasus consisting of Armenia, Azerbaijan and Georgia. On the other hand, it changed the control of the **Caspian Sea** basin from two littoral states—the Soviet Union and Iran—to the five countries of Russia, Iran, Azerbaijan, Kazakhstan and Turkmenistan.

The strategic geopolitical importance of Central Eurasia and the Caspian Sea region are obvious. They connect Northeast and Central Europe with countries on the Mediterranean Rim, Middle East and, further on, the Indian Ocean and Asia-Pacific. Central Eurasia and the Caspian Sea region are located between Russia—an unstable regional power—the Middle East—a resource-rich region confronted with structural political and economic crises—and Asia-Pacific—home to highly populous states with great economic potential. Central Eurasia and the Caspian Sea region are adjacent to Iran—a United States (US) adversary—Turkey—a Western ally—Afghanistan—a war-torn country undergoing reconstruction—and Iraq—a chaotic and unpredictable country.

The oil and natural gas reserves of the Caspian Sea region are undeniably significant. The proven oil reserves of the five Caspian Sea littoral states total 153.8 billion barrels (BBbbl), while their total natural gas reserves are estimated at 2688.3 trillion cubic feet (tcf). The five Caspian Sea littoral states have about 14.6 percent (1,050.0 BBbbl) of the world's total proven oil reserves, and almost 50 percent (5476.7tcf) of the world's total proven natural gas reserves.<sup>1</sup>

Since the end of the Cold War, states and non-state actors have assigned more significance to economic and resource concerns. Conflicts over the control of global oil and gas have become more probable as global energy consumption rises, environmental conditions deteriorate, the availability of oil and gas decreases, and prices for these commodities rise. Internal conflicts over oil and gas could arise in countries where these are the main source of income.<sup>2</sup> The possession of a huge military arsenal and an extended alliance system is no longer sufficient for state survival. The survival of state and domestic society instead depend on economic dynamism, the cultivation of technological innovation, and getting access to raw material inputs required for both. Resource competition could be accompanied by ethnic hostility, economic injustice, and political competition; all factors, which are linked to disputes over the control of hydrocarbon resources.<sup>3</sup>

With the world's energy demands projected to rise rapidly over the next decades, can Central Eurasia and the Caspian Sea region become a viable alternative to the Persian Gulf as a global energy supplier? What are the potential obstacles for the production and security of supply of the region's energy resources? This paper surveys the oil and natural gas reserves of Central Eurasia

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<sup>1</sup> British Petroleum, *BP Statistical Review of World Energy 2002*, <http://www.bp.com>

<sup>2</sup> M.P. Amineh, *Globalisation, Geopolitics and Energy Security in Central Eurasia and the Caspian Region* (Den Haag: CIEP, 2003), pp 2-3. See also M.T. Klare, *Resource Wars* (Markham: Metropolitan Books, 2001).

<sup>3</sup> On the geopolitical risks to security of supply of oil and natural gas resources in the Caspian Sea region (including the competition between state actors and Transnational Oil Corporations for control of production and export of the oil and gas resources, the construction of pipelines, the Caspian legal regime dispute as well as threats by non-state actors such as radical Islamist groups, separatist movements, ethno-religious conflicts, criminal groups, environmental problems, corruption, and poverty) see Amineh, *op. cit.*, Ref 2, chapters 2,4-10.

and the Caspian Sea region in the matrix of competitive forces of the post-Cold War world. It centers on the following three factors:

- The increasing global demand for oil and gas.
- The scarcity of oil and gas resources.
- The dispute over ownership rights of these resources.

## **2. The Main State Actors in Central Eurasia and the Caspian Sea Region**

The vast oil and natural gas resources of Central Eurasia have transformed the region into a location in which the forces of interstate rivalry, enterprise competition, and responses by regional state and non-state actors intersect. All major industrialized powers and many of the multinational companies that have their home base in these countries meet in Central Eurasia and the Caspian Sea region. Contenders from late-industrializing countries are trying to get a foothold in the region. Local actors have to respond to new social forces in the region. In such a complex matrix of social forces, competition and co-operation are ad hoc and multi-level. The main actors involved in Central Eurasia and the Caspian Sea region are: the immediate and highly interested regional powers China, Iran, Russia, Turkey and also Pakistan and Afghanistan; western countries, especially the US, European Union (EU) and its member countries; and western Transnational Corporations (TNCs).<sup>4</sup> The region is not incorporated into the territorial sphere of security institutions of one of the major powers and its allies.

Central Eurasia is not divided into agreed upon, and thus stable, zones of influence. Instead, extra-regional state and non-state actors attempt to project their power and influence into the politics and societies of their hosts, interacting with local actors. Uncertainty and thus unpredictability are part of the rules of the game. "Multidimensional rivalry" is perhaps a suitable term for what is going on. Because everyone is involved, and regime legitimacy is at stake, major power competition in Central Eurasia and the Caspian Sea region has the potential for aggravating instability of the world system as a whole.<sup>5</sup>

Russia remains the most prominent regional power in Central Eurasia and the Caspian Sea region. It continues to try to re-incorporate these areas into its security system, as can be illustrated with its aim of establishing a unified air defense system in the context of the Commonwealth of Independent States (CIS). For Russia, CIS provides the possibility of reviving the former security, political and economic order of the Soviet Union within a new political constellation. Another attempt at regional co-operation is the Eurasian Economic Community (EAEC) of Belarus, Kazakhstan, Kyrgyzstan, Russia and Tajikistan. Its main objective is deepening co-operation in the economic and humanitarian fields. Russia sees its decline in power as due to its own economic problems, the wish of Central Eurasia states to distance themselves from it, and increasing US involvement (military, political and economic) in the region.<sup>6</sup>

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<sup>4</sup> Amineh, *op. cit.*, Ref 2, p 3.

<sup>5</sup> See M.P. Amineh and H. Houweling, "Caspian Energy: Oil and gas resources and the global market", in M.P. Amineh and H. Houweling (eds.), "Central Eurasia in Global Politics: Conflict, Security and Development", a special issue of *Perspectives on Global Development and Technology*, vol. 2, issue 4 (Leiden: Brill Academic Publishers, forthcoming 2003). See also E.L. Morse and J. Richard, "The Battle for Energy Dominance", *Foreign Affairs*, vol. 81, no. 2, 2002.

<sup>6</sup> See A.V. Zagorski, "Traditional Russian Security Interests in the Caucasus and Central Asia: Perceptions and Reality", in R. Menon et. al., (eds.), *Russia, the Caucasus, and Central Asia; The 21<sup>st</sup> Century Security Environment* (Armonk: M.E. Sharpe, 1999).

China, another power immediate to Central Eurasia, could become a powerful force in the region in the coming years. Like Russia, it fears the US will try to dominate the region and thus gain control of the oil and natural gas resources in Central Eurasia. China has a booming economy and is currently the world's third largest oil consumer. This means it has a great interest in the import of the region's oil and gas resources. There are also common interests between Russia and China. As a possible counterbalance to US activities in Central Eurasia, China and Russia have established the Shanghai Co-operation Organization (SCO) which also includes Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan as member countries. The agenda of the SCO is based on military and economic co-operation, but also on combating radical Islam.<sup>7</sup>

Iran and Turkey, though politically and economically less powerful than Russia and China, are also important regional economic players and attractive countries for Central Eurasia and Caspian Sea region co-operation. Iran controls 8.5 percent of global oil and 14.8 percent of global gas resources.<sup>8</sup> It possesses a substantial pipeline infrastructure that could be easily connected to oil terminals in Central Eurasia. Turkey's oil and natural gas demand is increasing, making it an attractive market for oil and natural gas exports. Turkey is also a bridge to European markets. Iran and Turkey aim to strengthen their influence within Central Eurasia through their respective economic regional co-operation. While both countries are part of the Economic Co-operation Organization (ECO), Turkey has also initiated the establishment of the Black Sea Economic Co-operation (BSEC) that excludes Iran but includes Russia as a member country. BSEC also includes Greece, an important partner because of its EU membership.<sup>9</sup>

The United States has acknowledged the great oil and natural gas potential of Central Eurasia and the Caspian Sea region. A timely example of this is the yet unforeseeable consequence of the current war in Iraq. Central Eurasia's oil and gas resources could provide a temporary alternative supply if Persian Gulf oil becomes inaccessible because of political instability in the region. The US strives for influence in Central Eurasia through the Partnership for Peace (PfP) program, aimed at expanding political and military co-operation between the North Atlantic Treaty Organisation (NATO) and Central Eurasia, as well as all interested member countries of the Organization for Security and Co-operation in Europe (OSCE). The PfP program has been joined by all Central Eurasian states except Tajikistan and Russia. Other ambitious undertakings by the US in the region are the Membership Action Plans (MAPs) for possible NATO membership, Euro-Atlantic Partnership Council (EAPC), and the Georgia, Uzbekistan, Ukraine, Azerbaijan and Moldova (GUUAM) security arrangement with NATO. While Turkey is an ally of the US, especially with regards to the construction of westward energy pipelines,<sup>10</sup> this alliance is not fixed and has had

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<sup>7</sup> See X. Guangcheng, "China and Central Asia", in R. Allison and L. Jonson, *Central Asian Security: The New International Context* (Washington DC and London: Brookings Institution Press and the Royal Institute of International Affairs, 2001).

<sup>8</sup> British Petroleum, *op.cit.*, Ref 1.

<sup>9</sup> See M.P. Amineh, „Sicherheit und Entwicklung in Eurasien- neue Gedanken zur Geopolitik im Zeitalter der Globalisierung“, in Erich Reiter (Hrg.) *Jahrbuch für Internationale Sicherheitspolitik* (Hamburg: MITTLER, 2002), pp 267-301. See also A. Maleki, "Decision Making in Iran's Foreign Policy: A Heuristic Approach" (Tehran: International Institute for Caspian Studies, 2002); and G.M. Winrow, "Turkish National Interests", in Y. Kalyuzhnova *et. al.* (eds.), *Energy in the Caspian Region-Present and Future* (New York: Palgrave, 2002).

<sup>10</sup> For a detailed analysis of the existing and possible pipelines in Central Eurasia, see Amineh, *op. cit.*, Ref 2, chapter 10.

major differences over the war in Iraq. Since 11 September 2001, the US has expanded its military presence in Central Eurasia and adjoining regions, and its military is currently involved in Afghanistan, Pakistan, Uzbekistan, Tajikistan, Kyrgyzstan and Georgia.<sup>11</sup>

The European Union has its own motives for gaining influence in Central Eurasia and the Caspian Sea region. Because of its geographic proximity, the EU fears that instability in the region might also affect Europe. Additionally, as North Sea oil and natural gas resources decline, the EU has to find new providers to satisfy its energy demands. The EU is active in Central Eurasia through the Technical Assistance to the Commonwealth of Independent States (TACIS) program, Transport Corridor Europe-Caucasus-Central Asia (TRACECA), Black Sea Regional Energy Centre (BSREC), Black Sea Environmental Program (BSEP), and Interstate Oil and Gas Transport to Europe (INOGATE). The Western European Union (WEU), closely linked to the EU, is considering military peacekeeping activities in the region. The OSCE, also working in close co-operation with the EU, considers Central Eurasia to be an integral part of the European security system, and hopes to exert more political pressure on Central Eurasia governments.<sup>12</sup> However, a unified European strategy towards Central Eurasia does not yet exist. This is partly because EU member countries, particularly its main actors France, Germany and the UK, each have different priorities; France tends to be more oriented towards North Africa, Germany towards Eastern Europe, and the UK towards the Baltic States.

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<sup>11</sup> See G. Allison and E. van Buskirk, "US Policy on Caspian Energy Development and Exports" (Harvard University John F. Kennedy School of Government Caspian Studies program, May 3-4, 2001).

<sup>12</sup> See M.P. Amineh, *Towards the Control of Oil Resources in the Region* (New York: Palgrave Macmillan, 2000). See also Y. Valinakis, "The Black Sea Region: Challenges and Opportunities for Europe", *Chaillot Papers* (Paris: Institute for Security Studies) no. 36, July 1999.

### 3. Energy Security and Regime Change

As global consumption rises, the per capita availability of oil and natural gas from a fixed stock will, after some point in time, begin to decrease. This effect is called demand-induced scarcity. Demand-induced scarcity is due to rising per capita income in high-income countries, the world's major consumers and importers, and in late industrializing economies, particularly in South and East Asia where the bulk of the world's population lives. Demand-induced scarcity varies for groups at different levels of per capita income. Those who cannot afford market prices find themselves excluded (even without any actor deciding to exclude them). Due to the lopsided distribution of societies according to their level of per capita income, demand-induced scarcity will enter into the lives of high-income societies last. These are the countries that industrialized first on cheap energy. In the past, demand from these countries coincided with world demand. However, that is changing and will continue to change in the future. Both early and late industrializers will have to survive and prosper for the foreseeable time in one resource field only.

Supply-induced scarcity should be studied in its own right. One reason is that the dwindling of stocks is not translated by the price mechanism into gradual price increases. Rather, price volatility will increase as awareness spreads that stocks are dwindling. Supply-induced scarcity, or its anticipation, may be expected to provoke a process of competitive power projection by military-capable and import-dependent nations to gain control over the stock or over territory in which stocks are located, by either internally engineered regime change or by conquest of territory. Domestic regime strength and military capability determine the capacity of target countries to ward off unwanted penetration by outsiders.

In reality, demand and supply-induced scarcity interact. Extraction, refinery and retail costs plus profit mark-ups determine the offer price. The intersection of demand and supply determine consumer price. Structural scarcity is supply-induced by the deliberate action of a major power, the non-state actors such as major oil companies, or producer cartels such as the Organization of Petroleum Exporting Countries (OPEC). A major power that manages to get control over conditions of access by third parties to the stock has the option to induce scarcity for selected outsiders.

Oil and natural gas are not merely commodities traded on international markets. The US-led alliance which succeeded in a military take-over of Iraqi state territory transferred the property of the portion of the world stock located there. By controlling access to the portion of the oil stock, the alliance members also secured the resource niche in which state enterprises and households of domestic society subsist by creating and diverting trade. The option to put in place barriers to entry gives these powers the capacity to induce structural scarcity for contenders.<sup>13</sup>

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<sup>13</sup> M.P. Aminah and H. Houweling, *op. cit.*, Ref 5, chapter 2.

## 4. Projected Global Demand for Oil and Natural Gas

The global demand for oil and natural gas is predicted to increase over the next two decades (see **Table 1**). For oil, global demand is predicted to rise by about 2.2 percent annually between 1999 (74.9 million barrels per day [MMbbl/d]) and 2020 (118.6 MMbbl/d), and oil is expected to remain the main fuel for the world's industries and households, accounting for about 40 percent of global energy consumption<sup>14</sup> For natural gas, global demand is predicted to rise by an annual average of 3.2 percent between 1999 (84.2 tcf) and 2020 (162.8 tcf). Over this period, the share of natural gas in total global energy consumption is expected to increase from 23 to 28 percent from 1999 to 2020. A closer look at Table 1 reveals important region/country variations in the predicted consumption of oil and natural gas between 1999 and 2020.

**Table 1. Projected Global Oil and Natural Gas Consumption, 1999–2020**

Region/Country	Oil			Natural Gas		
	1999 (MMb bl/d)	2020 (MMb bl/d)	Annual average growth 1999-2020 (in percent)	1999 (tcf)	2020 (tcf)	Annual average growth (in percent)
North America	23.4	33.7	1.8	26.1	40.7	2.1
US	19.5	26.7	1.5	21.7	33.8	2.1
Western Europe	13.9	15.8	0.6	14	25.9	3.0
Industrialized Asia	6.9	8.3	0.9	3.6	5.3	1.9
Japan	5.6	6.4	0.7	2.6	3.8	1.7
Former Soviet Union and Eastern Europe	3.7	8.0	3.7	22.5	36.4	2.3
Developing Asia	13.3	28.8	3.7	6.0	20.9	6.1
China	4.3	10.5	4.3	0.9	6.4	10.1
India	1.9	4.9	4.6	0.8	2.6	6.1
Central and South America	4.7	8.8	3.1	3.2	14.6	7.4
Africa	2.5	5.3	3.6	2.0	3.5	7.4
Middle East	5.0	7.8	2.1	6.8	14.6	3.7
<b>World Total</b>	<b>74.9</b>	<b>118.6</b>	<b>2.2</b>	<b>84.2</b>	<b>161.8</b>	<b>3.2</b>

Source: United States Department of Energy Information Administration (EIA), *International Energy Outlook 2002*, <http://www.eia.doe.gov>

<sup>14</sup> Until otherwise noted, all figures following in the text are taken from Table 1 and/or United States Department of Energy Information Administration (EIA), *International Energy Outlook 2002*, <http://www.eia.doe.gov>

Amongst the industrialized regions (“North America”, “Western Europe” and “Industrialized Asia”), the largest increase in oil demand is expected in North America (US, Canada and Mexico) where it is projected to rise at an average annual growth rate of 1.8 percent between 1999 (23.4 MMbbl/d) and 2020 (33.7 MMbbl/d). Although oil is currently the largest energy source in Western Europe, its projected annual increase in demand between 1999 (13.9 MMbbl/d) and 2020 (15.8 MMbbl/d) of about 0.6 percent is the lowest among *all* the region/country categories in Table 1. This is mainly due to the gradual replacement of oil consumption by natural gas use in all industrialized regions, but especially in Western Europe (which holds less than five percent of the world’s natural gas reserves but was responsible for 17 percent of the world’s total gas consumption in 1999). In “Industrialized Asia” (Japan, Australia and New Zealand), oil demand is projected to increase by an average of 0.9 percent per year between 1999 (6.9 MMbbl/d) and 2020 (8.3 MMbbl/d). Japan, which imports all its oil needs, accounted for fully 81 percent of the total oil demand in Industrialized Asia in 1999. The region is predicted to increase its natural gas consumption by 1.9 percent annually between 1999 and 2020 (a remarkably smaller rate than the 11.2 percent annual increase in natural gas demand in Industrialized Asia between 1970 and 1999).

Since the end of Cold War, the demand for oil has *decreased* steadily in countries of the “Former Soviet Union and Eastern Europe”, from 8.3 MMbbl/d in 1991 to 3.7 MMbbl/d in 1999. Prospects for the region are looking up, and its expected economic growth is predicted to lead to an annual 3.7 percent increase in oil consumption between 1999 (3.7 MMbbl/d) and 2020 (8.0 MMbbl/d). Yet this predicted consumption is still well below the 9.0 MMbbl/d used by these countries in 1987. In terms of natural gas, consumption is predicted to rise at 2.3 percent annually between 1999 (22.5 tcf) and 2020 (36.4 tcf), with Eastern Europe (4.7 percent annual average growth) expected to outpace the former Soviet Union (1.9 percent average annual growth).

The greatest increase in oil demand over the period under study is expected in the states of “Developing Asia” (including China and India). Whereas China imported less than 800,000 tons of oil and oil products in 1985, these had increased to 43.81 million tons by 1999. The country’s oil consumption is predicted to increase by 4.3 percent annually between 1999 (4.3 MMbbl/d) and 2020 (10.5 MMbbl/d). At this rate, in less than 10 years, China will surpass Japan to become the largest oil consumer in Asia, and the second largest oil consumer in the world behind the US. By 2020, China’s aggregate oil consumption (10.5 MMbbl/d) is predicted to be almost half that of the US (26.7 MMbbl/d). Also its overall totals are smaller, the predicted growth rate of 4.6 per annum in oil consumption for India between 1999 (1.9 MMbbl/d) and 2020 (4.9 MMbbl/d) is even higher than that of China. Note that India imports about two-thirds of its crude oil requirements. At 10.1 percent and 6.1 percent, respectively, the predicted annual increases in natural gas consumption by China and India between 1999 and 2020 are even more striking. Developing Asia as a whole is predicted to account for 19 percent of the increase in global gas demand over the same period.

In two regions, oil is becoming an increasingly less important source of energy. In Central and South America, this is due to the development of hydroelectric energy, coal and natural gas. Indeed, whereas oil consumption is projected to increase by 3.1 percent annually between 1999 (4.7 MMbbl/d) and 2020 (8.8 MMbbl/d), the demand for natural gas is predicted to increase by 7.4 percent (from 3.2 tcf to 14.6 tcf) over the same period. In Africa, oil currently comprises 44 percent of the region’s total energy needs, and it is projected that oil demand will increase at 3.6 percent annually between 1999 (2.5 MMbbl/d) and 2020 (5.3 MMbbl/d). Africa accounts for about 5

percent of the world's natural gas production but only consumes 2 percent of the world's demand. It is projected that this region's natural gas consumption will increase by an annual average of 7.4 percent between 1999 (2.0 tcf) and 2020 (3.5 tcf).

Finally, in the Middle East, oil demand is estimated to grow by an annual average of 2.1 percent between 1999 (5.0 MMbbl/d) and 2020 (7.8 MMbbl/d). Middle East countries also are seeking to develop their domestic gas markets where consumption is expected to more than double between 1999 (6.8 tcf) and 2020 (14.6 tcf).

## 5. Caspian Sea Region Reserves and Production of Oil and Natural Gas

At the end of 2001, the total global oil stock was estimated at 1,050.0 billion barrels (BBbbl) proven reserves (see **Table 2**). Of the world's total, 863.29 BBbbl of oil was located in OPEC member states (Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, Venezuela and United Arab Emirates) and 242.12 BBbbl in non-OPEC countries.<sup>15</sup> Fourteen countries (Algeria, China, Iran, Iraq, Kuwait, Libya, Mexico, Nigeria, Norway, Russia, Saudi Arabia, US, United Arab Emirates, Venezuela) accounted for 90 percent of the total global proven oil reserves. Of these, just five countries (Saudi Arabia, Iraq, UAE, Kuwait, and Iran) hold almost two-thirds of the world's proven oil reserves.

The Caspian Sea littoral states of Russia, Kazakhstan, Azerbaijan, Turkmenistan and Iran account for an extremely important share of the world's oil reserves (see **Table 3**). Of these five countries, Iran and Russia are the two main powers in terms of oil reserves.<sup>16</sup> In 2001, Iran ranked fifth (89.7 BBbbl or 8.5 percent of the global total) in the world in proven oil resources, and Russia seventh (48.6 BBbbl or 4.6 percent). Kazakhstan has much larger reserves than were estimated during the Soviet period and, after Russia, is considered to be the richest of the former Soviet republics in oil resources. Its proven oil reserves (8.0 BBbbl or 0.8 percent) rank it fifteenth in the world. Azerbaijan has been an important source of oil for more than a century and, in 2001, its proven reserves ranked it sixteenth (7.0 BBbbl or 0.7 percent). Turkmenistan also has significant oil reserves, estimated at 0.5 BBbbl in 2001. Together, the total proven oil reserves of the five Caspian Sea littoral states were 153.8 BBbbl in 2001, about one fifth of the combined total 734.7 BBbbl of Europe, the US and the Middle East (Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen)

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<sup>15</sup> See M.P. Amineh and H. Houweling, *op. cit.*, Ref 5, chapter 2, Table 8. Until otherwise noted, all figures following in the text are taken from Table 2 and/or British Petroleum, *op. cit.*, Ref 1.

<sup>16</sup> Until otherwise noted, all figures following in the text are taken from Table 3; British Petroleum, *op. cit.*, Ref 1; and /or United States Department of Energy Information Administration, *Caspian Sea Region: Resources and Pipelines* (2002), <http://www.eia.doe.gov>

**Table 2. Oil and Natural Gas Reserves, 2001, by Country, Region and World Rank**

Regions/Countries	Proven Oil Reserves		Proven Natural Gas Reserves <sup>a</sup>	
	Billion bbl (Share of world total in percent)	World Rank	Tcf (Share of world total in percent)	World Rank
<b>Caspian Sea countries</b>				
1 Russia	48.6 (4.6)	7	1,680.0 (30.7)	1
2 Kazakhstan	8.0 (0.8)	15	65.0 (1.2)	15
3 Azerbaijan	7.0 (0.7)	16	—	—
4 Turkmenistan	—	—	101.0 (1.8)	11
5 Iran*	89.7 (8.5)	5	812.3 (14.8)	2
<b>Developed countries</b>				
6 United States	30.4 (2.9)	8	177.4 (3.2)	6
7 Norway	9.4 (0.9)	12	—	—
8 Canada	6.6 (0.6)	17	59.7 (1.1)	17
9 The Netherlands	—	—	62.5 (1.1)	16
<b>Developing countries</b>				
10 Saudi Arabia*	261.8 (24.9)	1	219.5 (4.0)	4
11 Iraq*	112.5 (10.7)	2	109.8 (2.0)	10
12 United Arab Emirates*	97.8 (9.3)	3	212.1 (3.9)	5
13 Kuwait*	96.5 (9.2)	4	52.7 (1.0)	18
14 Uzbekistan	—	—	66.2 (1.2)	14
15 Venezuela*	77.7 (7.4)	6	147.6 (2.7)	8
16 Libya*	29.5 (2.8)	9	46.4 (0.8)	20
17 Mexico	26.9 (2.6)	10	—	—
18 China	24.0 (2.3)	11	48.3 (0.9)	19
19 Nigeria*	24.0 (2.3)	11	124.0 (2.3)	9
20 Algeria*	9.2 (0.9)	13	159.7 (2.9)	7
21 Brazil	8.5 (0.8)	14	—	—
22 Angola	5.4 (0.5)	19	—	—
23 Oman	5.5 (0.5)	18	—	—
24 Qatar*	—	—	508.5 (9.3)	3
25 Malaysia	—	—	75.0 (1.4)	13
26 Indonesia*	—	—	92.5 (1.7)	12
<b>World Total</b>	<b>1,050.0 (100)</b>		<b>5,476.7 (100)</b>	

Notes: \* OPEC Member States.

Source: British Petroleum (BP), *BP Statistical Review of World Energy, 2002*, <http://www.bp.com>

**Table 3. Proven and Possible Oil and Natural Gas Reserves in the Caspian Sea Region, Europe, US and the Middle East, 2001**

Country	Proven Oil Reserves (BBbbl)+	Possible Oil Reserves* (BBbbl)†	Proven Natural Gas Reserves (tcf)+	Possible Natural Gas Reserves* (tcf)†
<b>Caspian Sea Region</b>				
Azerbaijan	7.0	32.0	30.0	35.0
Iran	89.7	15.0**	812.3	11.0**
Kazakhstan	8.0	92.0	65.0	88.0
Russia	48.6	14.0**	1680.0	n/a
Turkmenistan	0.5	80.0	101.0	159.0
<b>Total</b>	<b>153.8</b>	<b>233.0</b>	<b>2688.3</b>	<b>293.0</b>
<b>Other States/Regions</b>				
Europe	18.7	n/a	171.7	n/a
US	30.4	n/a	177.4	n/a
Middle East	685.6	n/a	1974.6	n/a
<b>Total</b>	<b>734.7</b>	<b>n/a</b>	<b>2323.7</b>	<b>n/a</b>

Notes:

n/a Not available.

\* Possible reserves are defined as oil and gas deposits that are considered 50 percent probable.

\*\* Only the regions near the Caspian Sea are included.

+ Based on *BP Statistical Review of World Energy, 2002*.

† Based on *Caspian Sea Region: Reserves and Pipelines*.

Sources: British Petroleum, *BP Statistical Review of World Energy, 2002*, <http://www.bp.com>; and United States Government Department of Energy Information Administration (EIA), *Caspian Sea Region: Reserves and Pipelines* (July 2002), <http://www.eia.doe.gov>

**Table 4. Caspian Sea Region Oil Production and Exports**

Country	Production			Net Exports		
	Production, 1991 (TTbbl/d)+	Production, 2001 (TTbbl/d)+ (TTbbl/d)†	Possible Production, 2010 (TTbbl/d) †	Net Exports, 1990 (TTbbl/d)†	Net Exports, 2001 (TTbbl/d) †	Possible Net Exports, 2010
Azerbaijan	238.0	300.0	1,200.0	77.0	175.2	1,000.0
Kazakhstan	569.0	828.0	2,000.0	109.0	631.0	1,700.0
Iran	3,500.0	3,688.0	00.0*	00.0*	00.0*	00.0*
Russia	9,326.0	7,056.0	300.0**	00.0**	7.0**	300.0**
Turkmenistan	113.0	162.0	200.0	69.0	107.0	150.0
<b>Total</b>	<b>13,746.0</b>	<b>12,034.0</b>	<b>3,700.0</b>	<b>255.0</b>	<b>920.2</b>	<b>3150.0</b>

Notes:

\* Only the regions near the Caspian Sea are included.

\*\* Includes Astrakhan, Dagestan, and the North Caucasus region bordering the Caspian Sea.

+ Based on *BP Statistical Review of World Energy, 2002*.† Based on *Caspian Sea Region: Reserves and Pipelines*.

Sources: British Petroleum, *BP Statistical Review of World Energy, 2002*, <http://www.bp.com>; and United States Government Department of Energy Information Administration (EIA), *Caspian Sea Region: Reserves and Pipelines* (July 2002), <http://www.eia.doe.gov>

In terms of current and future oil production, the five Caspian Sea littoral states loom large as source of the world's future energy needs (see **Table 4**). In 2001, Russia the third largest oil producing country in the world (with an estimated 7,056 thousand barrels per day [TTbbl/d]), and Iran (3.69 TTbbl/d) produced almost half the world's consumption. Although Azerbaijan's oil production decreased from 238 TTbbl/d at independence in 1991 to 180 TTbbl/d in 1997, very substantial recent foreign investment in its oil sector has reversed this trend, and the country's oil production output rose to 300 TTbbl/d in 2001. Oil production has remained stable in 2002, averaging 310 TT bbl/d through March. Azerbaijan's oil exports could exceed 1,000 TTbbl/d by 2010. Kazakhstan's oil production dropped to 415 TTbbl/d during the first few years following the collapse of the Soviet Union. Kazakhstan's remoteness from world markets, along with its lack of

export pipelines, has hindered the faster growth of oil exports. However, foreign investments in its oil sector have helped the country boost oil production to 828 TTbbl/d in 2001. In 2001, most of Kazakh oil exports were shipped mainly via the Atyrau-Samara pipeline through Russia, with additional supplies being shipped by rail and by barge across the Caspian Sea. Nonetheless, Kazakhstan's is expected to produce reach 2000 TTbbl/d by 2010. Kazakhstan exported 631 TTbbl/d of oil in 2001. After independence, Turkmenistan's oil production also suffered before rebounding by the turn of the century. In 2001, Turkmenistan produced 162 TTbbl/d, a figure expected to increase to 200 TTbbl/d in 2010. The availability of the Caspian Sea region energy supplies on world markets will enhance prospects for economic growth and political stability in the Caspian region..

**Table 5. Caspian Sea Region Natural Gas Production and Exports**

Country	Production			Net Exports		
	Production, 1990 (bcf)	Production, 2000 (bcf)	Possible Production, 2010 (bcf)	Net Exports, 1990 (bcf)	Net Exports, 2000 (bcf)	Possible Net Exports, 2010 (bcf)
Azerbaijan	350.0	200.0	1,100.0	-272.0	00.0	500.0
Kazakhstan	251.0	314.3	1,100.0	-257.0	-176.0	350.0
Iran	911.1#	2,126.0	00.0**	00.0**	00.0**	00.0**
Russia	21,181.9#	19,246.7	n/a***	n/a***	n/a***	n/a***
Turkmenistan	3,100.0	1,642.0	3,900.0	2,539.0	1,381.0	3,300.0
<b>Total</b>	<b>25,794.0</b>	<b>23,529.0</b>	<b>6,100.0</b>	<b>2,010.0</b>	<b>1,205.0</b>	<b>4,150.0</b>

Notes:

n/a Not available

# Data for 1991.

\*\* Only the regions near the Caspian Sea are included.

\*\*\* Includes Astrakhan, Dagestan, and the North Caucasus region bordering the Caspian Sea.

Source: United States Government Department of Energy Information Administration (EIA), *Caspian Sea Region: Reserves and Pipelines* (July 2002), <http://www.eia.doe.gov>

Together, the Caspian Sea littoral states of Russia, Kazakhstan, Azerbaijan, Turkmenistan and Iran account for the lion's share of the world's natural gas reserves. In 2001, their natural gas reserves of over 2688 tcf was greater than the combined total of 2323.7 tcf found in Europe, the US and the Middle East (see **Table 3**). Russia and Iran contain the world's first (1680.0 tcf) and second (812.3 tcf) largest supplies, respectively, of proven natural gas reserves, while Kazakhstan, Azerbaijan and Turkmenistan hold a combined total of 196.0 tcf of this energy resource.

In terms of natural gas production, the states of the Caspian Sea region face a number of challenges. In 2000, Russia's gas production was 19,246.7 billion cubic feet (bcf; see **Table 5**), and the country is currently the world's second largest gas producer after the US. In the same year Iran produced 2,126 bcf of gas. In 2000, Azerbaijan's natural gas production slipped by 5.6 percent to 200 bcf due to the country's lack of a suitable infrastructure to deliver natural gas to markets. Given the necessary infrastructure, it can be expected that Azerbaijan's natural gas production could increase to as much as 1,100 bcf by 2010. Kazakhstan's gas industry is similarly underdeveloped and hampered by a lack of infrastructure. In August 1999, the Kazakh government passed a law requiring Transnational Oil Corporations (TNOCs) to include natural gas utilization projects in their development plans. As a result, Kazakhstan increased its natural gas production to 314.3 bcf in 2000 (the highest level in the past decade), and to 324 bcf of natural gas in 2001. From January 2002 through May 2002, Kazakh natural gas production totaled 158.5 bcf; an increase of 2.1 percent over the same time period in 2001. If the domestic natural gas demand remains stable gas production is expected to reach 1,100 bcf in 2010. In Turkmenistan, the production of natural gas fell sharply between 1990 (3,100 bcf) and 2000 (1,642 bcf). However, the recent trend is positive—mainly due to a major gas export deal with Russia and the resumption of supplies to Ukraine—and the country is expected to produce up to 3,900 bcf in 2010.

## 6. Prospects for Energy Supply from the Persian Gulf and the Caspian Sea Regions

In 2020, the world's oil supply will exceed its 1999 level by 43.7 MMbbl/d (see **Table 1**). Production increases are expected from both OPEC and non-OPEC countries. The rise in non-OPEC oil supply over the last two decades has resulted in a substantial decline of OPEC's market share, once at an historic high of 52 percent in 1973. However, by 2020, it is projected that only about one-third of the total oil production increase will come from non-OPEC areas. OPEC oil production is growing at an annual average rate of 3.3 percent, and is expected to reach 57.2 MMbbl/d by 2020. Its capacity utilization will increase immensely after 2000, reaching 95 percent in 2015.

The Persian Gulf is the most crucial region in the supply and demand of the world's oil. In 2000, industrialized countries (North America, Western Europe, Industrialized Asia) imported 15.8 MMbbl/d of oil from OPEC countries; 9.9 MMbbl/d of which came from the Persian Gulf region. OPEC members exported 70 percent of their oil exports to industrialized countries, of which almost two-thirds came from the Persian Gulf region. It is expected that OPEC's exports to industrialized countries in 2020 will be about 6.2 MMbbl/d higher than in 2000, and that more than half of this increase will come from Persian Gulf countries.

However, despite the growth in Persian Gulf oil exports, OPEC's total share of petroleum exports to industrialized countries in 2020 is estimated to be 14 percent below its share in 2000. Notably, Persian Gulf oil exports to industrialized countries will fall to about 40 percent of the OPEC total. At the same time, OPEC oil exports to developing countries will increase by more than 17.0 MMbbl/d between 2000 and 2020, half of which will go to developing Asia. China alone is expected to import about 7.2 MMbbl/d from OPEC by 2020, most of which will come from the Persian Gulf region.

As the share of the world's oil supply coming from OPEC declines, non-OPEC petroleum exports from the Caspian Sea and other regions are expected to increase steadily between 2000 and 2020. For the period 1998 to 2010, the three new Caspian Sea littoral states of Azerbaijan, Kazakhstan Turkmenistan alone will account for 18 percent of the total increase in non-OPEC production of oil (while the North Sea, Latin America and Africa will account for increases of four, nine and 14 percent, respectively). In terms of European demand for oil, the Caspian Sea region's reserves are crucial. Without them, it is estimated that oil exports from the Persian Gulf to Europe will increase by 0.5 MMbbl/d in 2010. However, if the Caspian Sea region fully participates in the export market, oil from the Persian Gulf to Europe will decreased to 1.5 MMbbl/d by 2010.<sup>17</sup>

A major concern for the US over the last ten years has been not only to secure its demand for oil and natural gas at home, but also to diversify its oil and natural gas supply to decrease its dependence on one major oil supplier; namely the Persian Gulf region. The latter is the main motivation for increasing US involvement in the Caspian Sea region and its aim to control the production and export of the region's energy resources (see the current Iraq War). The US has acknowledged the great oil and natural gas potential of the Caspian Sea region. The oil and natural

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<sup>17</sup> S.A. Emerson, "The Relevance of Caspian Oil for the World Market", in *Caspian Energy Resources: Implications for the Arab Gulf* (Abu Dhabi: Emirates Center for Strategic Studies and Resources, 2000) pp 174, 178, 184.

gas resources of the states of the Caspian Sea littoral could provide a temporary alternative energy supply if political instability in the Persian Gulf region interrupts the latter's oil exports.

The EU has its own motives to be interested in the security of Caspian Sea oil and natural gas resources. Because of geographic proximity, the EU fears that instability in the region would also affect Europe. With the oil and natural gas resources of the North Sea in decline, the Caspian Sea region could become a serious alternative energy supplier.

Thus, while the Caspian Sea region will in no way be able to replace the Persian Gulf in meeting global oil supply demands, it should be internationally recognized as a valuable additional alternative.



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