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POST SEPTEMBER 11 UPDATE REPORT

Political, Economic, Social, Cultural, and Religious Trends in
the Middle East and the Gulf and their Impact on Energy
Supply, Security, and Pricing

**GLOBAL OIL GEOPOLITICS POST-SEPTEMBER 11:
CHANGING LANDSCAPES**

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Introduction

The September 11 attack on the United States has changed the geopolitical landscape in major ways. U.S. response to the attacks has prompted it to forge new strategic relationships and undertake new military initiatives that have affected old alliances and linkages. This shifting landscape of international relations will have significant ramifications for the geopolitics of oil in the coming decades. Already, the terror attacks and the implementation of the subsequent U.S. "War on Terror" has thrown a spotlight on the inherent risks associated with heavy reliance on oil supplies from the Middle East. In addition, as strategic policies are reviewed, many countries, such as the U.S. and other European, Asian, and Latin American powers, are re-evaluating their energy security policies.

The shift in geopolitical relationships that is developing as the U.S. responds to the attacks on its citizens is already influencing oil trade and supply relationships and changing patterns can be expected in the years to come. Almost overnight, Russia announced its willingness to help the West diversify its oil sources to include a growing stream of Russian crude. And, the international and regional political relationships that have come to have bearing on Caspian oil exports appear to be shifting as well. The importance of other non-OPEC producers and non-conventional oil supplies like Canadian heavy crude and oil sands is expected to be elevated in the years to come.

Ties between major oil consuming nations will have a pivotal influence on whether the world will become increasingly dependent on Middle East oil in the coming decades. If large consuming nations band together on energy policy in a fashion similar to that currently evident in the construction of international coalitions in other policy areas, the risks of oil supply disruptions could be greatly reduced. But this sort of multinational cooperation among the major powers may be hard to orchestrate given the complexities of big power politics post-September 11.

This paper will investigate the trends that appear on the horizon for the international oil industry in the aftermath of the September 11 attacks on the U.S. and discuss the impact altered

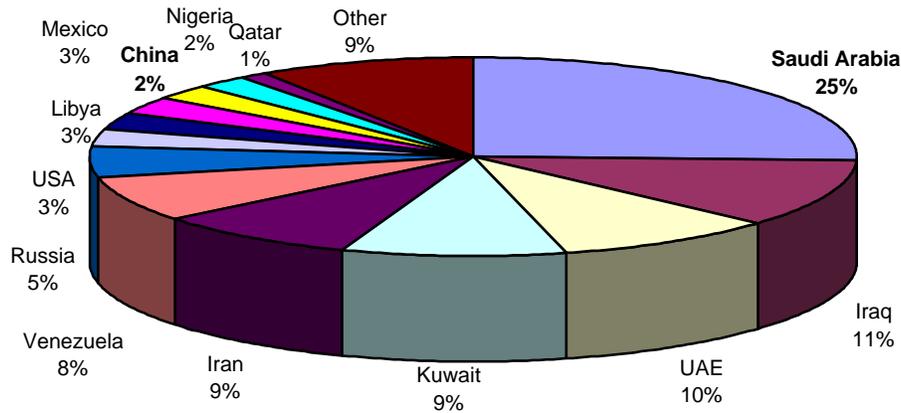
geopolitics might have on the supply and demand for oil. Discussion will include shifting alliances, the politics of new supply, new non-conventional supply sources and their potential competition to traditional supplies from the Organization of Petroleum Exporting Countries (OPEC), the cost structure of global oil production and oil trade flow patterns. It is hoped through this process, it can be shown that the fate of international energy security is not pre-determined but can be shaped through thoughtful policy formation and diplomatic effort.

From Daniel Yergin's award-winning book *The Prize* to Kent Calder's less notable, but still influential volume *Asia's Deadly Triangle*, authors who have tackled the difficult subject of oil have tended to emphasize the competition for scarce resources as the driving force of oil geopolitics.¹ But energy markets could be just as easily oversupplied as undersupplied in the coming years, depending on the energy policies undertaken by key consuming countries such as the United States, Japan, and China. In analyzing the possibilities, it is hoped that insights might be gained on how to achieve the brighter of the two futures.

The Stubborn Reality of Middle East Supply

Much ink has been spilled chronicling the world's rising dependence on Middle East oil. More than 60% of the world's remaining conventional oil reserves are concentrated in the Middle East.² A quarter of these reserves sit in Saudi Arabia alone. The Middle East is currently supplying over one third of world oil demand.

Chart One: World Proven Oil Reserves 2000



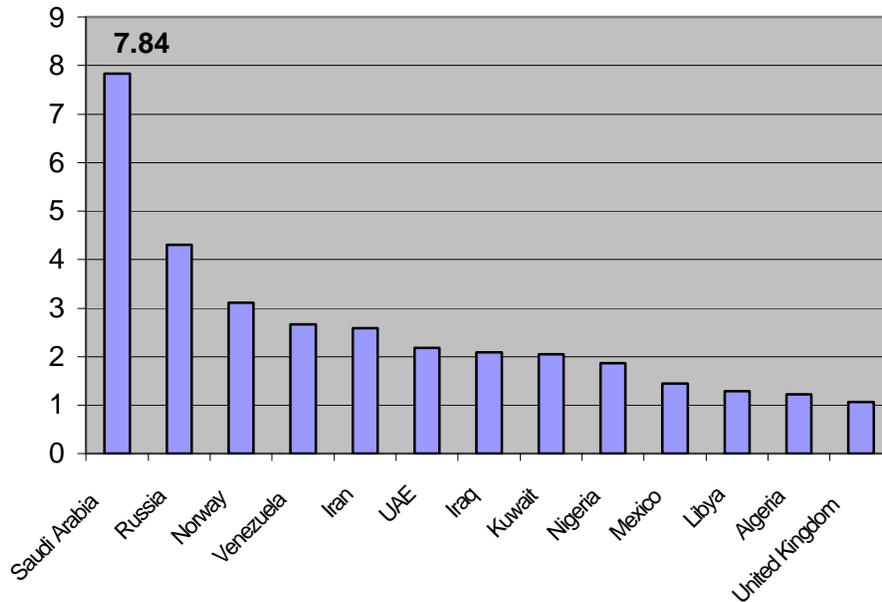
This percentage could rise significantly in the future, depending on policies in consumer countries and on the pace of development of new resources and technologies.³ The U.S. Department of Energy, in one forecast, even predicts that the need for OPEC oil could rise from 28 million b/d in 1998 to 60 million b/d in 2020, with the majority of supply having to come from the Middle East, especially Saudi Arabia.

Iran, Iraq, Syria, Sudan, and Libya produce around 8 million barrels a day at present or about 10% of world oil supply. Saudi Arabia alone is responsible for almost 10% of world supply and holds a unique position in oil markets. It maintains the largest share of spare idle production capacity of any other nation in the world. The kingdom is the *only* oil producer in the world that can replace single-handedly, within a short period of time, the total loss of exports for any other oil producer on the globe. No other nation currently has enough spare capacity to claim this role. Saudi Arabia is also the world's largest exporter, in past years selling almost 100% more than its next largest export competitor, Russia.

Saudi Arabia's cushion of spare capacity, which represents almost two-third of all global spare capacity, has provided security and stability to world oil markets for two decades. The kingdom derives its international clout from this custodial role and is unlikely to relinquish it, especially in the face of weakening oil market trends. The kingdom must worry about market share considerations in the face of rising investment in Russia, Africa, Iran, and Canada as well as long-term economic considerations. Oil revenues are critical to the health and well being of the

Saudi economy. Therefore, Saudi Arabia can ill-afford to jeopardize its coveted position as a stable and reliable supplier from which its geopolitical influence and long-term economic interests derive.

Chart Two: Top World Oil Net Exporters, 2000



World Demand Trends

World oil demand is expected to rise at a rate of roughly 2% per annum over the next two decades from about 76.4 million barrels a day (b/d) in 2001 to 95.8 million b/d in 2010 and 114.7 million b/d by 2020.⁴ During this same period, Asian demand is anticipated to increase from 28% of total world demand to 35%. Already, at over 19 million b/d, Asia's oil consumption exceeds that of the U.S. At present, only about 40% of Asia's oil supplies are produced inside the region.

By 2010, total Asian oil consumption could reach 25 to 30 million b/d -- of which 18 to 24 million b/d will have to be imported from outside the region.⁵ Asian oil demand averaged 19.6 million b/d in the first half of 2001, while local oil production totaled only around 5.9 million b/d, leaving a gap of over 13.7 million b/d that was met by imports mainly from the Middle East and to a lesser extent Africa.⁶ This is up from a gap of over 11 million b/d in 1998. As Asia

develops, oil demand is expected to grow two to three times more rapidly than in the industrialized West, reaching around 29 million b/d by 2010, according to the business as usual forecast scenario of the IEA. Regional oil supplies are not expected to keep pace in any corresponding fashion. The IEA forecasts Asian oil production will average only 6.4 million b/d by 2010, only a modest gain from current levels. Other analysts expected somewhat larger gains of 1 million b/d or so but far less than the 6 to 11 million b/d projected gain in demand.⁷

Already, over 60% of Middle East exports go to Asia and nearly 70% of all Asian imports come from Middle East oil producers. Some 84% of all crude oil refined in Singapore comes from the Middle East while 78% processed in Japan originates from that region. The IEA projects that the Asia Pacific region will be importing 20 to 24 million b/d from the Middle East by 2020. These oil linkages could present new political and strategic challenges in light of the emerging geopolitics of the post-September 11 period. The defense of oil supplies from the Persian Gulf is now protected almost single-handedly by the United States. While it is hard to predict how the U.S. *War On Terror* will impact this role in the coming decades, expanding oil ties between major Asian powers and Middle East exporters will certainly influence East Asian strategic thinking, especially in the relation to regional sea lanes issues. The result is likely to be some alteration in big power relations in East Asia in the coming years that might test traditional relationships.

Saudi Arabia and other Middle East oil producers have already grasped the growing importance of the Asian markets and have been building bridges to the region. In July 2001, Saudi Arabia overtook the UAE as Japan's primary supplier of oil. (Saudi Arabia's exports to Japan grew by 20.7% in July to 27.40 million barrels, while the UAE's exports to Japan dropped by 19.7% to 26.25 million barrels).⁸ Pricing flexibility will be key to the kingdom's strategy to win over any market it lays claim to.

China's current refinery configurations are currently not suitable to refine large amounts of the lower quality supplies that are produced in Persian Gulf countries such as Iraq, Iran, Saudi Arabia, and Kuwait. This explains the relatively small amount of crude imports from these

countries. Without refinery upgrades, China is projected to have only a little more than 1.35 million b/d of capacity to process this lower-quality Persian Gulf oil by 2005.

Chart Three: Chinese Oil Imports from the Middle East (2000)

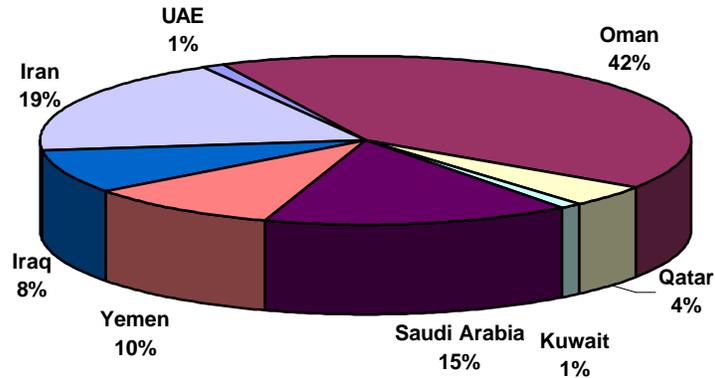


Table One: China Refinery Capacity by Crude Tolerance
(Thousands b/d)

| Crude Type | 1998 | 2002 | 2005 |
|--------------------------|--------------|--------------|--------------------|
| Sweet: < 0.9%S (1) | 4,350 | 4,050 | 3,700 |
| Medium Sweet: 0.9-1.15%S | 160 | 550 | 750 |
| Sour: 2%S or Higher | 240 | 600 | 750-1,350 |
| Total | 4,750 | 5,200 | 5,200-5,800 |

Source: Asia Pacific Energy Consulting, Xu working paper, *China's Oil Strategy Towards the Middle East*

However, low sulfur supplies from Yemen and Oman are expected to fall in the coming years as production from older reservoirs begins to decline. China is thus seeking light crude oil supplies from other sources, including Africa, and is seeking to make new upstream investments to lock up such supplies. State oil company CNOOC secured Indonesian supplies recently with its \$585 million purchase of the Widuri and Cinta fields in Indonesia from Repsol-YPF, thereby adding 100,000 b/d of light crude oil that can quickly be processed through China's existing refinery capacities.⁹ SINOPEC is expected to follow suit and is currently negotiating for an exploration

deal in Nigeria.¹⁰ Chinese state firms are also seeking exploration and production deals in other African states as well as Libya.¹¹

To protect its piece of the growing Chinese market, Saudi Arabia has shown a willingness to help China upgrade its refining capacity to use more Saudi crude oil. “If we (Saudi Arabia) are to become one of the major players in the Chinese market, we are going to have to help them increase their ability to refine sour Saudi crudes,” said a senior member of the Saudi Consultative Council and a former Deputy Minister of Finance and National Economy. “Basically, Saudi Arabia is going to have to invest heavily in Chinese refining upgrades if we’re to have a dominant presence in China.”¹²

In late 2001, Saudi Aramco, ExxonMobil, and Fujian Petrochemical took another step toward the ultimate completion of a 240,000 b/d upgrade of a major Fujian refinery by signing an agreement for a Joint Feasibility Study (JFS).¹³

In addition, Saudi Aramco is now the largest shareholder in the Thalin refinery and is negotiating with SINOPEC to expand the refinery at Maoming. Also, China has made a deal for 10 million tons of Saudi oil annually for a 50-year period, with SINOCEM processing part of the oil at the new joint-venture Qingdao refinery and the rest at its Dalian facility, signaling a close and growing import/export relationship between the two countries.¹⁴

Enter Russia

Mirroring an important international trend, Saudi and other Middle East producers will find competition for growing Asian markets from Russia, which in the aftermath of the September 11 attacks has made clear its intentions to increase oil and gas production with an eye to enhancing exports to the West and Northeast Asia.

Russian firms have been able to marshal capital on their own to revive the Russian oil industry; and Russian oil production rose by over 640,000 b/d from September 2000 to September 2001. So far, in 2002, Russian production has risen almost 600,000 b/d from 6.95 million barrels a day

in December 2001 to 7.55 million b/d in August 2002, according to Energy Intelligence Group.¹⁵ Moscow's political leaders, and leaders from its corporate oil and gas sector, are portraying Russia's oil firms as stable sources of supply, willing to add output to the market to sustain reasonable prices. Russian leadership is even tinkering with the idea of building strategic stocks that could be used to calm markets during times of supply crisis or crunches, much the way Saudi Arabia uses its spare capacity and oil storage abroad.¹⁶ In the view of Russian leaders, this new geopolitics of energy "can help Moscow gain both economically and politically."¹⁷

If concrete plans of the Russian oil firms and their Central Asian counterparts come to fruition in the coming years, rising oil exports from the former Soviet Union (FSU) could rise by another 2 million b/d in the next five years and move closer to rivaling those of Saudi Arabia. This threat has grabbed the imagination of Middle East policy-makers inside OPEC who called on Russia late in 2001 to cease and desist from stealing OPEC's market share. Moscow responded initially with conciliatory talk towards the end of 2001 and again in March 2002, but Russian oil production has risen 600,000 b/d in the first three quarters of this year vs. year ago levels. And, Russian officials gathering at the Baker Institute for Public Policy at Rice University in October for the state-to-state U.S.-Russia Commercial Energy Summit made clear Moscow's intentions to increase its oil production in the coming years to help the West diversify its oil supply. Russian government officials and private company chairmen also posited the possibility of Russia establishing an international strategic stockpile of Russian oil that could be used to serve countries that aren't currently able to amass strategic stocks. The Russian stockpile would be used to supply markets during times of market emergency and to dampen price run-ups.¹⁸

At the official U.S.-Russian state meeting, Russian oil giant Lukoil presented its proposed \$2 billion project to build a pipeline and deepwater year-round port at Murmansk, in the north of Russia, that could be used to export oil in very large crude carriers (VLCC) to distant markets such as the U.S. Lukoil, Yukos, Sibneft, and TNK are financing a feasibility study of the port project, which is slated to handle up to 1 million b/d of exports. The project is to receive U.S. Exim Bank support. The proposed port would replace current makeshift operations where Russian companies such as Yukos have been loading trans-Atlantic VLCCs in the Mediterranean to sell in the U.S. The oil is brought to the Mediterranean from smaller vessels shuttling from

the Black Sea. Russian companies see the U.S. sales as a means to diversify its markets, in order to avoid oversupplying Europe with growing sales from the former Soviet Union.

Traditionally, Russian oil exports have been bound for Europe and have not confronted Middle East oil producers' efforts to build market share in the U.S. and Asia. But more recently, there has been a political push both in Moscow and Beijing to facilitate growing cooperation between Russian and Chinese firms in oil and gas investments and trade. A similar warming of relations on energy trade issues has taken place between Moscow and Japan.

The view from Beijing now is that Russia is a key future hydrocarbon supplier. China hopes to receive supplies from new investments by Western firms at Sakhalin and from new field developments within Russia, especially by Yukos. At Sakhalin, notably ExxonMobil finalized its multi-billion dollar investment project in late 2001. ExxonMobil's Sakhalin oil plans are robust. Initial oil output of 160,000 b/d by 2003 is expected to rapidly grow to 250,000 b/d from the Chavyo field alone. Two additional fields involved in the project will contribute volumes as well. A related natural gas pipeline plan involves some 9.5-bcm/year of hydrocarbon exports to Japan and potentially Korea and China.

The Royal Dutch Shell Group also has a major project slated to come on line at Sakhalin that includes oil expansion from the current 15,000 b/d to 120,000 b/d by 2006. The Shell plans also involve the construction of the largest liquefied natural gas plant in the world, at 9.6 million tons per year. Thus far, the Shell consortium's exports have been going to China, Japan, Korea, and the U.S. In short, within the next 4-5 years, Russian supply to East Asia from Sakhalin fields under current development are likely to provide upwards of 500,000 b/d of incremental supply.

Moreover, new areas are now under discussion for development, including BP and Russia's Rosneft joint operating company, which will explore for oil and gas in the Sakhalin 4 and 5 blocks starting in 2004. A strategic investor is also being sought for the Sakhalin 6 zone held currently by Alfa Eco.

Beyond Sakhalin, there are other prospects from East Siberia, where Yukos, the Russian firm holding perhaps the largest potential reserves in the area, is already in discussion with CNPC/SINOPEC on joint projects. Yukos holds what it claims are 11 billion barrels in the Yurubcheno-Takhomskaya zone in East Siberia in the region of Krasnoyarsk. It has a development plan to spend \$1.7-billion on 2,300-miles of pipeline to bring oil to market. Yukos and Russian pipeline company Transneft are vying for the pipeline rights, and it may be that two lines rather than a single line will be built. An equal 400,000-b/d line is also envisaged by Yukos for licenses it holds along with Slavneft in Angarask, also in Eastern Siberia. The issue for Yukos here is whether the 400,000-b/d line should be built to China through Mongolia or directly to the Russian port of Nakhodka for export.

U.S. Growth Also Important to Oil Producers

Still, so much attention has been paid to the increase expected from Asian markets that analysts often forget to note the continued importance of the U.S. market to OPEC. U.S. net oil imports rose from 6.79 million b/d in 1991 to 10.2 million b/d in 2000 while global oil *trade* (that is oil that was exported across borders from one country to another) rose from 32.34 million b/d to 42.67 million b/d. The U.S. share of the increase in global oil trade over the period was a substantial 33%. In OPEC terms, the U.S. import market was even more significant -- over 50% of OPEC's output gains between 1991 and 2000.

Table Two

U.S. and Asia Pacific Share Of World Oil Demand

| | <u>1991</u> | <u>2000</u> |
|----------------------|--------------------|--------------------|
| United States | 24% | 25% |
| Asia-Pacific | 22% | 28% |

U.S. Net Oil Imports as a Share of Global Oil Trade

| | <u>1991</u> | <u>2000</u> |
|-------------------------|--------------------|--------------------|
| Total | 32.34 mmb/d | 42.67 mmb/d |
| Net U.S. Imports | 6.79 mmb/d | 10.20 mmb/d |

U.S. Share of Increase in Global Oil Trade, 1991-2000 **33.02%**

U.S. Share of Increase in Opec's Output, 1991-2000 **55.58%**

Source: Lecture *The Price of Crude Oil: Markets, Politics and Geopolitics*, Edward Morse, Columbia University, Feb. 21, 2002

Saudi Arabia, in particular, has been keenly aware of the importance of the U.S. market and careful to keep nagging political issues between the U.S. and the kingdom on a separate track from oil policy. The kingdom has been diligently maintaining its U.S. market share in recent years, and threw down the gauntlet in 1997 to punish Venezuela for challenging its grip on the important U.S. market. Following the oil price collapse of 1997-1998, newly elected Venezuelan President Hugo Chavez rescinded state oil firm PDVSA's plans to expand capacity to 7 million b/d by 2007. Instead, Venezuela announced revised plans to grow its production more gradually, to 5.5 million b/d by 2006. However, Venezuela's new Hydrocarbons law, which raised royalties from 16.67% to 30%, is expected to discourage further investment by foreign oil companies in the country. Venezuela's oil production capacity has fallen significantly in recent years given constraints on investment capital and a tough geological decline curve at aging fields. Sustainable capacity has fallen to 2.8 million b/d currently, down from a peak of 3.7 million b/d in 1998.

Saudi Arabia may face a new challenge to its U.S. market share from a regional exporter, but this time north of the border. Analysts for the kingdom's oil industry say they are watching with concern the rising output profile for Canada.¹⁹

The start-up of new tar oil sands projects and other offshore projects has put Canada on track for the largest jump in oil output in several years, despite lower capital spending by industry that is often cited as evidence that production will decline. Canada's national energy board pegs 2001 production at 2.199 million b/d, up from 2.155 million b/d in 2000.

Companies have spent about \$7 billion in oil sands projects since 1996 and are expected to allocate an additional \$25 billion by 2007. Production, which has already reached 800,000 b/d, could rise to 2 to 2.5 million b/d by 2010 if currently proposed projects meet their targets.

Table Three: Approved Canadian Oil-Sands Projects
(thousand b/d)

| <u>Project</u> | <u>2001</u> | <u>2002</u> | <u>2005</u> | <u>2010</u> |
|----------------------------|-------------|-------------|-------------|-------------|
| Syncrude | 225 | 250 | 350 | 465 |
| Suncor | 130 | 220 | 260 | 400 |
| Shell/Chevron | | 155 | 155 | 155 |
| Albian/Koch/T.N. | | | 95 | 190 |
| Canadian Natural Resources | | | | 300 |
| Gulf Resources | | | | 100* |

Source: Petroleum Argus

*proposed for 2013

The potential for Canadian heavy crude and oil sands development is huge. Of the 2.5 trillion barrels of crude bitumen (oil sands) resources in place in Canada, about 12% or 300 billion barrels is thought to be recoverable, a figure comparable to the proven reserves of Saudi Arabia. This is in addition to extra heavy oil resources. In Venezuela where some U.S. oil companies are working on heavy crude upgrading projects, over 1.2 billion barrels of bitumen are thought to exist.

In past decades, the high costs of mining and processing tar sands and extra heavy crude oil were somewhat prohibitive at around \$21 a barrel. But engineering and technological advances are lowering costs rapidly. Analysts estimate that oil sands projects all in costs (investment and operating) have fallen to as little as \$8 to \$9 a barrel and could fall to \$6 to \$7 in the coming years as industry continues to make new advances. However, cost variables in Canada have

been somewhat unstable this year given a tight labor market, and cost overruns have been seen at several of Canada's top existing oil sands projects, including Syncrude, Athabasca and Millenium.

African supply may also become a key focus of efforts by the West to diversify away from the Middle East. Of the 14.5 million b/d of exports projected to be needed from Africa or the Middle East by 2010 in the Atlantic Basin market to fill its supply gap, at least half will be able to be sourced from Africa and North Africa. Angola, a non-OPEC producer, is projected to see increased production from 750,000 b/d to over 2 million b/d by 2010 as new fields are developed in its deep offshore at full-cycle costs of between \$3 to \$5 a barrel. Chinese national oil companies are also showing interest in African upstream investment, with CNPC already firmly planted in Sudan and Chinese companies showing expanded interest in Nigeria, Chad, Niger, Equatorial Guinea, Algeria, Tunisia and Libya.²⁰

Structure of the Industry

The viability of OPEC opting for a price war strategy has been receding in recent years because of the dramatic lowering of finding and operating costs in many non-OPEC countries through technological advances. Even U.S. deepwater Gulf of Mexico, which is now expected to contribute over 3.5 million b/d to U.S. oil production by 2010 has seen full-cycle costs lowered dramatically to around \$3.00 to \$3.25 a barrel or so.

The industry trend towards consolidation should accentuate this cost downturn by helping firms create new cost-cutting opportunities and better utilize technology. In completing their mergers, ExxonMobil will cut \$7 billion from the combined annual cost structure of ExxonMobil by end 2002. BP is also close to achieving its target of \$5.8 billion in deal-related cost savings. Between 1998 and 2000, BP averaged an oil and gas replacement rate of 126%, compared to 116% for ExxonMobil and 102% for Shell, which has not undertaken a major merger or acquisition. The two merged companies have not managed yet, however, to compete with Shell for low finding and developing costs. Shell's average costs stood at \$3.20 a barrel of oil equivalent versus \$4.16 for ExxonMobil and \$4.79 for BP.

Even smaller independents such as Anadarko have joined into the process as a means to increase cash flow. Anadarko jumped into first place among independents in reserves and market value after its \$6.7 billion purchase of Union Pacific Resources Inc. in July 2000 and the \$1.1 billion purchase in 2001 of Canada's Berkley Petroleum Corp. The acquisitions gave Anadarko almost 1 billion barrels of oil equivalent in reserves and \$1.8 billion in *additional* cash flow to develop more expensive, large-scale production projects in Algeria and U.S. Gulf of Mexico. At the same time, Anadarko was able to triple the number of its operating rigs in the U.S. from 30 to 90.

Through the mergers trends and improvements in technologies, the major's average finding and development costs have fallen to \$4.30 a barrel in 1998-2000, down 16% from the 1990-1992 period. Globally, total replacement costs have similarly fallen to under \$4.00 a barrel from a peak of \$8.00 in 1982. This trend has combined with a recent increase in capital spending. Upstream capital expenditure spending for the majors has been on the increase since 2000 as oil prices recovered and is expected to reach \$50 billion by 2005-2006, likely to reflect improved growth in production rates outside of OPEC. Already, non-OPEC production gained 2.5% from 44.2 million b/d in January 2001 to 46.7 million b/d in 2002 despite a cut in spending in 1998-1999. The top 200 firms upstream capex (capital expenditure) rose 20% in 2001 to over \$100 billion. However, the smaller independent drillers are heavily affected by cash flow changes, especially the recent drop in prices of U.S. natural gas, and are expected to reduce upstream spending by 20%-70% depending on the company. This reduction will mainly show up in production rates in the North Sea and North America.

Although volatile oil prices seem here to stay, the world's largest oil companies will be better shielded from price drops in the coming years than they were in the 1980s. This is because the companies are now more fully integrated. By selling refining assets and strengthening upstream holdings through mergers, the top 10 privately held international oil companies are becoming increasingly integrated, rendering them less vulnerable to unexpected swings in prices. Since the level of upstream capital expenditures for firms is generally influenced by cash flow considerations, the move back to integration should help make exploration spending in non-OPEC, by at least the largest companies, more stable. Indeed, this year the international majors

are only expected to drop spending by 2%, despite expectations that average oil prices could be over \$5 a barrel lower this year.

In 1990, liquids production for this group represented about 50% of its total refining volumes or 12.2 million barrels a day vs. refining of 23.6 million b/d. By 2000, liquids production had risen to 60% of total refining volume or 13.06 million b/d out of 23.2 million b/d. At the same time, in 2000, the 10 companies have total barrels of oil equivalent production of liquids and natural gas of 23.2 million boe/d or more than total refining capacity, shielding performance from price volatility. By example, Shell's integration of liquids rose from 47% to 72% over the period.

OPEC Capacity Expansion

Over the past two years, there has been a dramatic shift in the internal politics of the Organization of Petroleum Exporting Countries (OPEC), reflecting changes of political leadership at the highest levels and of broader policies of key members. The result has been greater cohesion inside the producer group and a clearer articulation and implementation of goals and aspirations.

The mid-1990s were characterized by OPEC disunity and overproduction, so much so that OPEC members themselves were questioning the future viability of the organization. Venezuela's ambitious campaign to increase oil productive capacity from 2.8 million b/d in 1991 to 7 million b/d by 2010, combined with the gradual rise in Iraqi oil export rates through the auspices of the United Nations Oil for Food program, made it almost impossible for the producer group to agree to a workable production sharing agreement.

During this period in the mid-1990s, market share considerations were paramount for most OPEC countries with spare capacity. Saudi Arabia, in particular, had to concern itself with both the short and long-range implications of Venezuela's market expansion plans that were expected to have significant bearing on the Kingdom's ability to maintain its sales to the U.S. Venezuela's government was committed to supplementing state revenue by increasing oil exports and in 1992 began a new policy to allow international oil companies (IOCs) to invest in

the country's once nationalized oil fields. This campaign contributed to a rise in Venezuelan output from roughly 2.5 million b/d through the 1980s to about 3.5 to 3.7 million b/d by 1997. Venezuela refused to comply with any OPEC production sharing agreements, greatly damaging the producer group's ability to manage oil markets and providing a strong disincentive for Saudi Arabia to contribute a large cutback in output to defend oil prices.

This political stumbling hit a dramatic snag in 1997-1998 when an unexpected economic meltdown hit much of Asia and precipitated an unexpected drop in Asian oil use. Asian oil demand fell to 18.18 million b/d in 1998, down from 18.53 million b/d, a drop of 1.9%. This compared with a 4.5% rise in Asian oil demand between 1996 and 1997. The slowdown in Asia contributed to a major change in the global oil supply-demand balance, limiting the growth in worldwide oil demand to 74.24 million b/d in 1998, up only 0.5% from 1997 compared to more typical annual growth rates of 2 to 3% in the mid-1990s.

Table Four: Oil Demand per Region, 1996-1998

| | <u>1996</u> | <u>1997</u> | <u>% Change</u> | <u>1998</u> | <u>% Change</u> |
|--------------|-------------|-------------|-----------------|-------------|-----------------|
| World | 72.03 | 73.9 | 2.6 | 74.24 | 0.5 |
| U.S. | 18.25 | 18.62 | 2.0 | 18.7 | 0.4 |
| EU-15 | 13.03 | 13.10 | 0.5 | 13.39 | 2.2 |
| Asia | 17.74 | 18.53 | 4.5 | 18.18 | -1.9 |
| China | 3.55 | 11.5 | 11.5 | 3.95 | -0.3 |

By 1997-1998, these circumstances led oil prices to collapse below \$10, requiring extraordinary efforts by OPEC and non-OPEC countries Mexico and Norway. The intense financial suffering of almost all OPEC countries, and key changes in government leadership in Venezuela, paved the way for a major agreement among oil producers to trim output and propel oil prices back above \$22 a barrel. OPEC set a price band of \$22 to \$28 as its target that currently remains in place.

OPEC's new, more unified dynamic is rooted in several factors:

1. A rise in democratization, freedom of the press and political debate, and a growing tide of anti-Americanism is bringing a greater concern for popular opinion inside OPEC

countries, especially in the Middle East Gulf, than in past years. This new concern for popular sentiment is restricting the options of regional leaders to accommodate Western interests. Populations, as well as some leaders, remain bitter about the suffering that took place when oil prices collapsed in the late 1990s.

2. Rising populations and economic stagnation in many OPEC countries has meant revenue pressures have been taking precedence over other considerations.
3. Lack of investment in infrastructure and oil fields over the years due to tight state treasuries and rising social pressures has greatly curtailed OPEC's spare productive capacity, rendering it much easier to agree to restrain output.

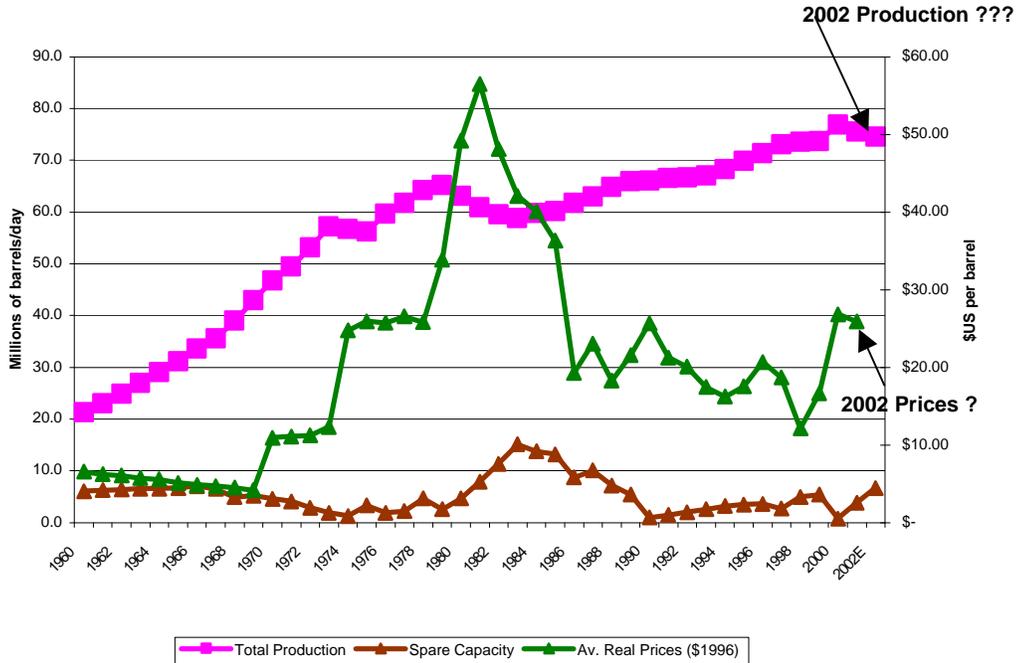
Given this new dynamic, and colored in part by the rise of Hugo Chavez as President of Venezuela, OPEC rhetoric has taken a more strident turn, with oil ministers defending their choices to attain a "fair" price for OPEC oil despite ramifications for global economic growth rates. The debate has become one of economic struggle for "rents" between oil producers who demand high revenues and major consumers whose economies can grow faster with low oil prices.

OPEC's rhetoric has generally been directed at Organization for Economic Cooperation and Development (OECD) consumer governments who capture rents from oil sales through high national energy taxes. "People always talk about the revenues of OPEC," said OPEC president Chakib Khelil to the press following the March 16-17, 2001 OPEC meeting held in Vienna. "Before they point a finger at OPEC, they should probably reduce taxes in their own country."

OPEC's anti-tax, anti-Western rhetoric comes against the backdrop of popular domestic sentiment inside OPEC countries that their governments aren't doing enough to deliver economic benefits to a substantial portion of the population. Leaders in OPEC countries cannot be seen as delivering benefits to Western consumers at the expense of their own citizens because such perceptions would leave regimes more vulnerable to public attack and more susceptible to the efforts of opposition parties and groups.

While political factors have contributed to OPEC’s unity over the past two years, the more limited amount of spare capacity that has to be held back by most member states is also a supportive factor. Indeed, oil prices tend to track changes in OPEC spare capacity quite closely.

Chart Four: Relationship Between Oil prices and OPEC Spare Capacity



Source: Hetco Trading

In 1985, when oil prices collapsed, OPEC was estimated to have some 15 million b/d of shut-in production capacity, equal to perhaps 50% of its theoretical capacity (Iran and Iraq were at war with one another at the time) and 25% of global demand. By 1990, when Iraq invaded Kuwait, spare capacity globally was still about 5 to 5.5 million b/d, the amount of oil taken off the market by the U.N. embargo. That was about 20% of OPEC’s capacity at the time and about 8% of global demand. Last winter, before OPEC’s seasonal cuts, spare capacity was a negligible 2% of global demand, a level that left oil markets highly susceptible to disruption and supported a run-up in prices above \$30 a barrel.

OPEC currently has a “gentlemen’s agreement” for the past few years that each member will hold back capacity expansion efforts to allow the group to defend the \$22 to \$28 oil price and limit competition. OPEC has been helped in this process in recent years by irregularity in Iraqi production rates given the regime in Baghdad’s aggressive posture to use the withdrawal of its U.N.-monitored oil exports as a political tool. In addition, other OPEC members have also benefited from a drop in capacity in Venezuela and Kuwait, who have been struggling against technical problems and natural declines in key fields. Venezuelan oil production capacity has fallen from 3.7 million b/d in 1998 to around 2.8 million b/d currently. Kuwait has lost capacity in certain western and northern fields such as Raudhatain, limiting their output capacity by several hundreds of thousands of barrels a day. Sustainable Kuwait capacity is now pegged at 2 million b/d.²¹

However, the challenge to OPEC will increase in the coming years as OPEC member countries begin to anticipate an expected restoration of Iraqi capacity over time. In fact, lobbying inside OPEC has already begun for certain members to legitimize a greater than *pro rata* increase in their own individual oil production-sharing quotas. Several individual OPEC countries have a backlog of new fields that can be brought on line in the next year or two. They must be concerned that once Iraqi production begins to rise, demands may be made for them to make cutbacks to defend prices despite rising capacity potential.

Countries whose current quotas reflect low 1999 sustainable capacity rates may want to see the process of reintegrating Iraq coming against a higher individual base quota for themselves. Several countries, such as Nigeria, Algeria and Iran, have been quietly expanding capacity and anticipate possible production rises over the next few years. But the current production quota system is based on lower, late-1990s capacity limitations. Countries like Algeria and Nigeria, whose new fields involve foreign oil company investment, will increasingly be under additional pressure from these IOC investors to obviate OPEC agreements and allow new fields to move forward at optimum production rates. Meeting these pressures will be difficult for OPEC if market demand for its oil doesn’t increase significantly in the next year or two.

In an early example that unity inside OPEC to maintain cutbacks may be challenged over time, Algerian Energy and Mines Minister, Chakib Khelil, announced last April that Algeria will seek a higher OPEC quota to reflect Algeria's increasing oil production capacity. "We will be negotiating a higher quota for Algeria because Algeria before had a higher quota and we accepted (a reduction in quota) at the time because we didn't have the capacity...Now that we have a higher capacity, we should be able to do the reverse."²² Since January 2002, Algeria's quota has been 693,000 b/d, against production potential of 850,000 b/d. Algeria's oil production capacity could reach as high as 1.1 million b/d by 2003 and the country is shooting for an expansion to 1.5 million b/d by 2005.

OPEC sources say Algeria's request is not aimed to rock OPEC's boat, but the opposite, since Algeria's minister has played a key leadership role inside the producer group and does not want to be seen as acting destructively to its interests. "It is felt that Algeria must get its production increases legalized to be able to have the standing to continue to play a constructive leadership role," explains one OPEC delegate. Some OPEC members say they have advised Algeria to simply produce what it must but refuse to consider a higher than pro rata increase for the North African producer. Saudi Arabia, however, might be favorably disposed to allowing Algeria to gain a somewhat higher than pro rata quota if market conditions allow an increase in OPEC production down the road, out of appreciation for Algeria's supportive role in OPEC.²³

President of the OPEC conference, Dr. Rilwanu Lukman, however, told reporters at the press conference following the latest June 26 OPEC extraordinary meeting that all future increases in quotas would be made on a group, pro rata basis rather than accommodate individual country requests. "Increases (in quotas) will be pro rata," he noted.²⁴

Algeria's situation is not a huge test for the organization because of the small volumes involved but other larger OPEC countries will have capacity additions of their own, possibly testing the meddle of the group. Iran is forging ahead with capacity expansions and could reach over 5 million b/d by 2008 based on investments through buy-back agreements with IOCs and NIOC investment. However, this ambitious plan will be dependent on the success of major IOC field developments including Azadegan, South Pars, Sirri, Gagh Saran and the Ahwaz area. Nigeria

has plans to expand production in its offshore which could, if successful, raise production to over 3.5 million b/d by 2006. A change in Iraq's situation that allowed an easing of U.N. imposed oil sanctions might unleash more productive capacity inside the producer group than could be accommodated by oil demand expansion.

Iraq currently has commercial export capacity of around 2.2 million b/d via Turkey and the Gulf, with an additional smuggling capacity through Syria, Iran, and Jordan. Were both outlets via Turkey and the 1.6 million b/d Mina Al-Bakr export terminal in the Gulf repaired to their former pre-1990 capacities, Iraq's commercial export capability (not including smuggling) would increase to 2.7 million b/d. Iraq has expressed a desire to expand its productive capacity to 6 million b/d following the lifting of economic sanctions, and analysts believe Iraq could quickly raise its oil field productive capacity back to 3.6 million b/d if Iraq's upstream oil field sector was opened to foreign oil company investment. However, for Iraq to be able to export these higher volumes, extensive repairs will be needed to its export infrastructure.

If Iraq is to achieve its stated, long-term 6 million b/d production target, it would have to repair not only the second extension of the existing Iraq-Turkish pipeline system, but also both the Gulf terminals of Mina Al-Bakr and Khor Almaya to their full capacity and also regain access to an export pipeline through Saudi Arabia or build a new pipeline to replace it. Thus, it is likely that the rate of repair and expansion of Iraq's export facilities is likely to be the limiting factor to the rate of Baghdad's supply expansion rather than the oil field investment and development pace.

There will be pressure inside OPEC to bring Iraq back into the production quota system if sanctions against the Middle East country are lifted. Key members may insist that Iraq be initially limited to its historical allocation of a quota at parity with that of Iran and then hold its export increases to levels in line with market demand. However, Iraq will have pressing economic reconstruction needs to take into consideration as well, raising questions, depending on the future politics inside the country, as to whether it will be in a position to opt for policies that emphasize solidarity with OPEC.

OPEC's current capacity is estimated at 29.5 million b/d but could rise to as much as 36.4 million b/d by 2005 if new fields under development come on line as expected. Were OPEC to expand access to foreign IOC participation, particularly in key countries now off limits to Western investment, capacity could expand to as much as 44 million b/d by 2010, leaving very little room for growth from non-OPEC supplies to take place without pressuring oil prices over the next seven or eight years. Were OPEC output capacity to move up to 44 million b/d by 2010 plus 3.5 million b/d of condensates and liquids under a shift to a high investment scenario, non-OPEC production would only have to rise just over 2 million b/d over the next ten years to 48.5 million b/d under the now possibly optimistic IEA forecast for 2010, up from 46.4 million b/d currently. This would represent an increase of only 265,000 b/d a year for the remainder of the decade, far less than historical norms.

Some OPEC officials say they are hoping world demand will rise enough to make room for increasing Iraqi production without major quota concessions on the part of other members, but this may prove optimistic. OPEC's secretariat is projecting that world oil demand will grow much more slowly than the current IEA forecast of 94 million barrels a day that serves as an industry "mean."²⁵

In late 1987, Baghdad began to increase its export capacity via an expansion in its outlets through Turkey. The problem became more intensified after a cease-fire was reached in 1988 between Iraq and Iran, allowing Iraq to repair export facilities via the Gulf. Efforts to bring Baghdad into an OPEC quota agreement proved difficult and the conflicts that ensued in the late 1980s not only brought oil prices down into the teens but also created tensions that served as the backdrop to Iraq's invasion of Kuwait.

In OPEC's favor in dealing with the problem of capacity expansion plans among key members is the more businesslike atmosphere that now permeates the producer group and the backdrop of four years of successful cooperation to hold prices at healthy levels. OPEC heads of state and ministers will be reluctant to sacrifice these gains.

Table Five: OPEC Capacity: History and Planned Additions

(million barrels/day)

| | <u>Sustainable Capacity 2005</u> | <u>Sustainable Capacity (2002)</u> | <u>Sustainable Capacity (1997)</u> | <u>Projected Capacity if reopened (2010)</u> |
|---------------------|--|--|--|--|
| Saudi Arabia | 10.80 | 9.50 | 10.00 | 11.00 |
| Iran | 4.30 | 3.70 | 3.65 | 5.00 |
| Iraq | 3.90 | 2.80 | 1.20 | 6.00 |
| Kuwait | 3.00 | 2.00 | 2.20 | 4.00 |
| UAE | 2.70 | 2.40 | 2.40 | 3.50 |
| Qatar | 0.90 | 0.70 | 0.55 | 0.80 |
| Venezuela | 3.50 | 2.80 | 3.40 | 6.00 |
| Nigeria | 3.00 | 2.10 | 2.20 | 3.20 |
| Indonesia | 1.40 | 1.20 | 1.40 | 1.50 |
| Libya | 1.80 | 1.45 | 1.40 | 1.70 |
| Algeria | <u>1.50</u> | <u>0.90</u> | <u>.84</u> | <u>1.20</u> |
| <u>Total</u> | <u>36.70</u> | <u>29.50</u> | <u>29.24</u> | <u>43.90</u> |

*Sustainable capacity is that which is attainable within 30 days and sustainable for 3 months.
Source: Petroleum Intelligence Weekly, Wood MacKenzie Consultants, and industry estimates.

Despite the positive precedence of OPEC's current unity and success, quota sharing agreements could become increasingly difficult to implement as capacity expansion emerges in Iran, Iraq, Kuwait, Nigeria, Algeria and possibly Venezuela. While OPEC members might sincerely desire to avoid the political confrontations of the past, especially in light of the painful lessons of the Gulf war, implementing strong agreements with good quota adherence is likely to become increasingly difficult.

Saudi officials stress that any quota increases for countries that expand capacity will have to be tempered to meet market conditions. The hope is that countries like Iraq who might have large capacity increments becoming suddenly available will be patient and accept a gradual introduction of these volumes into the market, in line with market conditions.²⁶ However, this

may prove overly optimistic given the large excess of capacity that could build should economic growth falter, as some expect, in the coming years. Saudi Arabia should not be expected to cede significant market share to make room for countries that want to force rising production into weak markets, Saudi officials note.

In the current environment of healthy oil price levels, OPEC delegates believe future quota agreements can be forged even with rising capacity gains, especially since most of OPEC's regimes remain under severe financial pressures and expect countries with rising capacity to act reasonably to avoid rocking market stability. A precedent for gradual quota increases for countries with restored capacity does exist, however, from the mid-1990s when Kuwait was able to increase its export levels. Kuwait was asked to wait for better market conditions to emerge before its quota increase requests were fully accommodated in 1994. Still, OPEC will have more than one country's expansion to deal with by the middle of this decade, raising the possibility of flagging quota compliance and downward price pressure. An outright price war is probably avoidable given reasonable expectations that Saudi Arabia will continue to advance constructive political ties with Iran and any new Iraqi government. Production increases from Nigeria or Algeria are unlikely to be large enough at any one time to provoke an intensive Saudi struggle for market share. Still, a change in regime in Venezuela could rekindle the South American nation's challenge to Saudi market share down the road, prompting a breakdown in OPEC unity again. But Caracas may be reluctant to engage in such competition given the economic crisis such competition caused in Venezuela in the 1990s.

Even if OPEC does not devolve into a market share war, strong production sharing agreements to hold prices at the group's current \$22 to \$28 target range by shutting in substantial capacity might become increasingly difficult to implement over time, especially if incremental Iraqi capacity is brought on line quickly. Any expansion in Iraqi capacity could upset the delicate balance inside OPEC.

Consumer Country Power in a Deregulated Setting

As discussed above, the United States is a major buyer of imported crude oil and its imports represent a large share of the market for internationally "traded" oil. Given the large scale of U.S. purchases, incremental U.S. acquisitions of oil affect the overall international market price of oil. Stated another way, the cost of each marginal barrel is higher than the price paid for that barrel since this additional purchase affects the costs of all oil consumed. From the perspective of the U.S., this constitutes an externality in the sense that consumers will base their decisions regarding the quantity of oil (and oil products) purchased on the average, rather than marginal, cost of oil.²⁷

On the other hand, the fact that the U.S. faces a rising supply curve for oil gives it monopsony power. To the extent that the U.S. -- or a group of consuming countries including the U.S. or of a comparable scale -- takes concrete actions to reduce the size of its purchases, they can lower the market price of oil.²⁸

It has been well established that OPEC frequently changes its price targets in response to changes in market demand.²⁹ Discussion of the size of a monopsony (power) wedge that is the "difference between the current price of oil and the marginal cost of adding a barrel of demand" was the subject of Energy Modeling Forum working group #6 and other exercises.³⁰ OPEC's response to efforts by the Organization for Economic Cooperation and Development (OECD) to reduce oil demand has varied over time. Initially, in the 1980s as OECD demand receded, OPEC maintained its output path, letting oil prices decline. This result produced the highest buying power wedge size and reinforced the viability of consumer country policies that sought to exercise this monopsony power.

OPEC can, however, also maintain its price preference path and allow its market share to decline. This appears to be its strategy of recent years. But the continuation of the production sharing discipline needed to maintain this approach, as discussed above, may become harder to sustain in the future.

Consuming countries have implemented two key approaches to dealing with OPEC given the increasing trend towards oil price deregulation inside the OECD. One is governments have organized to hold strategic stocks of oil.³¹ The second is the imposition of consumer taxes on oil, which reduces demand for oil. As already discussed, OPEC has engaged in a public relations battle against Western consumer taxes on oil.

Prior to deregulation, in the 1970s, crude oil was sold mainly through exclusive, long-term fixed priced contract arrangements with a handful of major suppliers. Crude prices throughout the world were regulated by national governments at fixed levels. Under this system, oil sellers could pose a clear threat to any individual buyer. A clear thread linked a disruption in supply to the shortfall of actual deliveries. A particular barrel lost in exports was neatly matched to a particular barrel lost to a particular buyer who had a contract for that barrel. Little recourse was available. Barrels were moved around the world like pieces on a chessboard, and there was no other *deus ex machina* to mitigate or alter the impact of any supply cutoff if one's particular barrels were lost. Lucky buyers whose supply chains remained in tact could continue to receive their oil at prices locked by long-term fixed price contracts at pre-crisis levels. In a word, some buyers were safe, and others were not. This system created a psychology that enhanced OPEC's monopoly power and left individual consuming nations vulnerable to the possibility of a supply cutoff. The oil crisis of 1973 confirmed fears that oil producers might use this leverage to adverse political ends.

Given the high costs of a cutoff under this fixed price system (i.e., regulated price system), large consumers, oil distributors, and middlemen had direct incentive to carry ample inventories of spare supplies. The possibility that oil from any particular supplier could be disrupted without recourse was reason enough to pay the costs to carry extra supplies on hand. Prices that could be passed on to consumers were, in many cases, inflexible and regulated and competitors who weren't subject to a cutoff would have clear cost advantage.

Today's world is radically different. Crude oil prices have been "deregulated," that is, set by market forces through market auction practices that allocate supplies to the highest bidder. Price

arbitrage will ensure that a price increase for one buyer or location will be a price increase for all buyers and locations.

In the new, freewheeling marketplace for oil, buyers cannot insulate themselves from price jumps by holding long-term contracts since prices in these contracts are pegged to the spot market. But in today's market, one can always get the oil one desires even in a major supply disruption by simply paying a higher price.

At the end of the day as the market clears, a buyer with imports from countries that were not subject to disruption will be in no better position than a buyer who had all of it imports subject to interruption. During any kind of cutoff, the highest bidder can buy replacement barrels from the spot market from many different locations. In an unfettered spot market, shortages will not manifest themselves by a physical inability to find supplies, but rather in the rising price of oil. The market will "clear" or allocate available physical supplies to the highest bidder.

In this new commoditized market, commercial players such as distributors or middlemen have less incentive to carry inventory, especially if supply disruptions are infrequent. Higher costs during times of supply cutbacks can be simply passed on to end-users reducing the business risks that previously motivated the accumulation of commercial inventories. While the existence of a large spot market trading at unregulated prices certainly appears to work against OPEC's ability to "blackmail" any particular buyer, structural reductions in commercial inventories can augment the producer group's power to the extent that alternative supplies from countries outside of OPEC are reduced.³²

As discussed more thoroughly in a recent *Economics Quarterly* article by the author and co-author, Ronald Soligo, the "public goods" aspect to oil market stability elevates the accumulation of oil inventories to a domain beyond the commercial industry.³³ Individual players in the oil market will not take into account the externalities of low commercial stocks, such as increased energy price volatility and its negative distributive effects on poorer consumers or its aggregate negative macroeconomic effects. Thus, government takes a role in ensuring adequate inventories are on hand to maintain orderly markets and to counter the temptation of suppliers with

monopoly power from taking advantage of short-term tightness in oil markets. To achieve these ends, government held stock levels must be credible to convince oil producers that efforts to exploit temporary market tightness by further cuts in production to achieve even higher oil prices will not be successful. Such attempts to extract additional rents from consuming countries would be countered by the release of sufficient inventories to offset any cuts in production contemplated by producers.

The larger the government-held stocks and the more consuming governments that participate in such a stock holding program, the more effective it is likely to be in serving as a deterrent to OPEC's monopoly power in deregulated markets.

Market deregulation has left consumers more susceptible to the ill effects of energy price volatility. However, consuming country governments have been able to reduce the negative effects of price variability by increasing energy efficiency and reducing dependence on oil using hefty consumer taxes on oil. The net effect of such taxes is to discourage a wasteful use of energy by consumers at the same time as collecting some of the rents that would otherwise accrue to oil producers. Furthermore, large oil consumption taxes, as discussed above, can force OPEC to accept lower prices as happened throughout most of the late 1980s and 1990s.

When OPEC's monopoly power strengthens due to short term market tightening, the incentive to exploit that power is tempered by the fact that increases in monopoly rents will not accrue entirely to producers but must be shared with consuming countries that have high energy taxes.

Consumer Country Strategies

OPEC's ability to raise prices in the short-run to levels that may be damaging to the economies of major consuming countries poses a major policy challenge to the governments of consuming countries. Rising oil prices threaten consumer country national interest in several ways. Oil price volatility can inhibit investment, economic growth, and spur inflation in major economies, which purchase consumer country exports.³⁴ The burden of rising energy import costs also threatens social stability in such key regional consuming countries as India, Pakistan, and

Southeast Asia. Moreover, supply constraints also make it easier for governments or sub-national groups to threaten vital interests of the U.S., Japan, and their allies.

Thus, consuming countries have a clear interest in undertaking policies that will undermine both OPEC's short-term and long-term ability to act as a cartel to inflate oil prices. Policies taken in conjunction with other consuming nations are likely to be more effective than policies taken individually by increasing the strength of the monopsony wedge.³⁵

Policy options include the following:

1. Expand and restructure the IEA to better reflect the change in consumer country demand trends
2. Encourage investment in diverse non-OPEC oil resources
3. Develop and deploy alternative energy technology
4. Develop federal policies to continue to enhance energy efficiency
5. Maintain taxes on oil and gasoline

Expanding the IEA

The International Energy Agency was created a quarter of a century ago as a mutual-protection society of OECD countries. Designed as a political grouping to prevent any oil-producing countries from using oil exports as a political instrument to influence the foreign policies of IEA members, the IEA was formed at a time when the OECD countries dominated global energy consumption. Today it excludes the most rapidly growing energy-consuming countries in the world -- China, India, and Brazil among them. And, as a result, these new consumers become vulnerable economically in times of disruptions as well as vulnerable potentially to political pressures of producers.

In recent years, there has been discussion about increasing the number of member countries inside the IEA, and South Korea has joined the organization. Other countries, such as China and India, are investigating creating national strategic oil stockpiles. The IEA invited both China and India to participate as observers in recent meetings and is pursuing options for

finding mechanisms for major non-IEA oil consuming countries to participate in joint stockpiling emergency programs.

This policy of bringing other major consumers into the joint stockpiling and emergency release program is an important one. While oil is a private good, security is a public good in the sense that the price effect of any release of stocks will accrue to all whether or not they have contributed to the cost of maintaining those stocks. That is, all countries benefit from the increased security provided by oil stocks and cannot be excluded from this benefit -- so long as oil continues to be traded in an open and free market.

As in the case of all public goods, the situation in which each country acts according to the benefits and costs that it faces, will lead to an under-investment in such stocks. Each country must bare the full cost of acquiring and maintaining the stock but will have to share the benefits of their stocks with all countries. The IEA acts to coordinate stocks for the industrial countries and to prevent "free-riding." Countries, which do not belong to the IEA, can -- and do -- free ride. Any one country, such as Japan, which increases stocks unilaterally or (and more significantly) undertakes other policies to reduce its exposure to price shocks will bear the costs of that action but the benefits it derives will be diluted because the benefits accrue to all.

The U.S. and Japan should continue to investigate providing assistance to Asian countries that need financial support to initiate oil-stocking programs. It should also support any review IEA membership and support the creation of a new class of associated members who could be encouraged to hold minimum stocks and benefit from direct participation in other IEA activities.

The extent of effectiveness of the IEA system, however, will depend on oil market developments, including Asian demand trends. The member countries of the IEA now represent a smaller portion of the oil market than they did at the time of the IEA's formation in 1977. As oil demand growth in Asia expands in the coming decade, new strains could come to the international system if new policies are not put in place. The omission of key consumer countries from Asia into the global emergency stockpiling system will increasingly put pressure on the effectiveness of limited, existing stocks in the Organization for Economic Cooperation

and Development (OECD) countries. Moreover, tensions created by Asian “free-riding” or possible “hoarding” actions during a crisis could hinder the IEA’s ability to stabilize international oil markets in the future.

The OECD countries comprising the IEA represented 42.3 million barrels a day (b/d) out of a total world oil use of 60.6 million b/d in 1977 or around 70% of world oil demand. The U.S. alone consumed 30% of the world’s oil used in 1977. Asia Pacific demand at that time was a less critical component to the world oil use situation at 10.1 million b/d or roughly 16% of world oil demand.

By 2001, the OECD share of world oil use had declined to 62% of total world demand while Asia Pacific use had grown to 28%, overtaking the U.S. share of 25%. Asian economic powers Japan, South Korea, Australia, and New Zealand are OECD members and, as such, are part of the IEA system now. But other key Asian oil consumers such as China, India, Taiwan, Thailand, Philippines, Pakistan, and others are not. As their share of world oil demand grows, this disconnect between Asia’s size and importance as a consumer region and its lack of energy policy coordination with other large oil consuming countries (and/or the International Energy Agency) will create new problems and challenges for international oil markets and the international economic system. In particular, it is important that large Asian consuming countries not purchase and “hoard” oil during an IEA stockpile release because this activity would reduce the effectiveness of a stock release to calm markets and prevent oil supply shortages.

As oil import levels for key Asian countries rise over the next two decades, the behavior of oil players from these countries during times of market crisis will increasingly matter. If a significant percentage of countries continue to hold little or no strategic oil stocks despite their rising oil import levels, then any rush to markets with panic buying by these countries at the first signs of crisis will thwart the joint, coordinated and constructive policies of the industrial countries to the detriment of all concerned. In addition, even without panic buying, industrialized countries are likely to resent “free-riding” by other large consumer countries over time since the level of stocks needed to stabilize markets will expand as world demand rises.

The best possible win-win scenario would be for new links between the IEA and other large consumer countries or consumer country groups.

Table Six: Asian Oil Stocks

| <u>Country</u> | <u>State Held</u> | <u>Privately Held</u> | <u>Forward Cover (1999)</u> |
|-----------------------|--------------------------|---|------------------------------------|
| South Korea | 30-60 days | 30 days | 56 days |
| China | under Discussion | none | 20 days |
| Thailand | under discussion | 3% refiners, 6% importers | 36 days |
| Singapore | none | 60-90 days fueloil/gasoil (for power stations) | 44 days |
| Malaysia | none | none | n.a. |
| Indonesia | 34 days | none | 25 days |
| Philippines | none | none | 40 days |
| Taiwan | 30 days (planned) | 60 days | 60 days |
| India | none | none | 30 days |
| Japan | 20 days | 70 days | 156 days |

Despite the obvious benefits from an Asian stockpiling group or system, so far Asian countries have been reluctant to commit to the expense involved in creating such a system. While an ASEAN delegation visited Japan in 2000 to study the industrialized country's emergency stockpiling system, the cost per capita was considered "high" by many ASEAN delegates.³⁶ ASEAN energy ministers have focused on security of sea-lanes and international gas pipelines at recent meetings, rather than joint stockpiling arrangements, press reports indicate.

Meetings between officials from the IEA and Chinese state planning officials have similarly failed to produce an agreement of coordination so far. The Chinese government has announced its intention to build a strategic petroleum reserve but, so far, has failed to define its size or possible location publicly. There has also been no official verification that China would like to work cooperatively with its Asian neighbors or OECD countries to develop measures to safeguard against disruptions in oil supplies from the Middle East. In March 2001, the State Council and the State Development Planning Commission included a "Strategic Petroleum

Reserve” as a key project in the 10th Five-year plan but continued debate about its size, location, and funding between party leaders, State Council agencies, National People’s Congress deputies, and the three central-owned state oil and gas companies calls its quick construction into question.³⁷

Although informal programs to encourage stocking by developing world countries would have a positive impact, such efforts cannot replace the more effective tool of centralized coordination with the IEA. Centralized efforts are needed so that international norms and standards can be met during a crisis. The United States and Japan should initiate a review of ways the IEA can work with key countries that are not members of the IEA to encourage them to define their strategic oil stockpile requirements and to build strategic stocks (or to create minimum inventory requirements for industry). The IEA should also consider creating a new class of associated members, who, in exchange for making commitments to hold minimum stocks, would gain direct benefit from participating in certain IEA activities. The IEA should follow up Russia's offer to establish a Russian strategic oil stockpile to be used to supply countries lacking in their own strategic stocks.³⁸

Besides enhancing the number of countries involved in IEA’s emergency oil stocking program, IEA’s coordination with non-member countries that are large oil importers should extend beyond managing strategic reserves to include issues of increasing energy efficiency so as to reduce sensitivity of more consumer economies to oil price variability. As a world leader in this area, Japan can play an important role in educational programs and at the same time, open markets for Japanese technology exports.

An interesting difference between maintaining stocks and undertaking policies that reduce oil use, such as encouraging the use of alternative energy technologies, is that stocks will always be effective in reducing price variability for all countries (including free-riders) whereas reducing domestic use of oil will only have a temporary effect on oil price level and variability. The country that diversifies its energy inputs will experience less overall energy price variability. Countries that do not diversify fuel sources may experience a temporary fall in the price of oil (resulting from the reduction of oil use in the former country) but, as any excess capacity is

absorbed, will be in the original situation of price fluctuations. In this sense, policies such as the expansion of nuclear or solar power, fuel cell car technology, energy efficient construction practices, etc, will be less of an international "public good" than oil stocks.

For example, if a country subsidizes nuclear power in order to reduce exposure to oil and gas prices, it is, in essence, trading off higher average power costs for less variability in power prices. In addition, by substituting nuclear for oil and gas as a fuel source, the country is lowering the prices of these petroleum inputs below what they would otherwise be. The magnitude of this effect will depend on how much oil and gas use is reduced and could be very small or, alternatively, quite significant. In either case, all oil users share the reduction in price.

Non-OPEC Production

From an energy security point of view, consuming countries benefit when global oil production comes from as diverse a base as possible. Such diversity reduces reliance on any one particular geographic country or center, thereby lessening the potential for a large-scale disruption from any one area. As discussed above, increased reliance on a handful of Middle East oil producers also enhances the potential for the exercise of monopoly power, especially during times of supply shortfall or disruption. When oil supplies exceed demand by a substantial measure because of large gains in non-OPEC oil development, it mitigates the impact of a loss of output from any particular location.

Political, legal, economic, and geographical constraints currently block development of vital resources in several oil rich countries in the competitive fringe of non-OPEC. Active policies that attempt to use bilateral influence, aid, conflict resolution assistance, and other diplomatic leverage to remove some of the barriers to investment and technology transfer to oil producers in Russia, Central Asia, Latin America, and Africa could dramatically reduce the pressure on oil markets in the years to come.

Investment capital is a critical constraint on the development of non-OPEC sources in many locations. The reorganization of Japan's oil companies, such as JNOC, to improve the utilization

of capital employed in investments in non-OPEC will enhance energy security goals. One option is to join Japanese companies into strategic alliance partnerships or acquisitions of small, capital-short but technically innovative, private oil companies from other countries to help Japanese companies lower operating costs and improve returns on capital.

Backstop Technologies

Consumer governments can develop backstop technologies to prevent producer cartels from exacting blackmail. Or, they can promote alternative energy sources that can serve to reduce the need for fossil fuel. In this practice, backstop technologies create an incentive for oil producers to avoid oil price shocks and supply disruptions for fear that the new technologies would be released and utilized, permanently eliminating sales markets. Alternative energy supplies provide ready substitutes if the increase in the price of oil is too extreme and can shield the economy from the negative impact from disruption of any one fuel source. The development activities of a new substitute energy technology can in itself lower the oil price and reduce OPEC's cartel behavior before such technology is actually utilized since the threat of this technology should motivate OPEC, if rational, to sell as much oil as possible before a substitute technology is invented and deployed.

The deployment of improved car technology could have a dramatic effect on future oil-demand trends as well as play a major role in lowering CO₂ emissions by advancing fuel efficiency. Assuming no major breakthroughs or government intervention in the deployment of innovative, more efficient automotive technology into the marketplace, the IEA projects that 59% of the 41 million b/d increase in worldwide oil demand expected from 1995 to 2020 will come from the transport sector. In the U.S. market, for example, if sales of more fuel efficient sport utility vehicles (SUVs) were to create competitive pressures to push the light truck stock to those with mileage standards that simply equaled that of cars, the U.S. fuel savings would equal about 910,000 b/d of crude oil, with noticeable impact on the clearing price for international oil markets. A larger contribution that pressured improved mileage standards on all vehicles of a significant magnitude -- such as hybrid vehicles that can attain mileage standards in excess of the typical 24 miles to the gallon car currently in stock -- would have even greater impact.

Energy Efficiency

The benefits to the role enhanced energy efficiency has played in protecting the domestic Japanese economy from oil price variability is well known. Japan did not experience a severe recession after the 1979-1980 price shock whereas the U.S., U.K., and Germany, which were less energy efficient at the time, did experience a painful loss in economic output.

It has been shown that the lower a country's energy consumption to GDP ratio or the shorter the period that oil prices remain higher, the lower the cost of the trade off between inflation and GDP loss. New technologies exist on the horizon that could allow even Japan, a leader in energy efficiency, to make more gains. Such technologies include micro-turbines for distributed power markets, improved car technologies (as mentioned above), and household solar technologies, among others. OECD governments should encourage the deployment of these technologies into the marketplace through tax incentives or other vehicles in an effort to reduce its individual exposure to OPEC's monopoly power.

Energy Taxes

As discussed above, consumer country taxes on domestic oil and gasoline consumption serve several purposes, including promoting conservation and limiting the trade deficit consequences of marginal increases in oil use. Because of these concrete benefits, consuming countries should resist OPEC's call to remove or lessen these taxes.

Endnotes

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