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THE POLITICAL, ECONOMIC, SOCIAL, CULTURAL, AND RELIGIOUS
TRENDS IN THE MIDDLE EAST AND THE GULF AND THEIR IMPACT
ON ENERGY SUPPLY, SECURITY AND PRICING

MAIN STUDY

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Introduction: Defining the Issues of The Energy Security Debate

There is an ill-considered complacency in Western capitals and international oil centers like Houston and Singapore that market forces can handle any oil disruption crisis, no matter its size or duration. The fact that an international economic crisis of 1970s proportions didn't emanate from the Gulf war has contributed to this view. But such complacency may be misplaced as rising demand has eaten away at the overhang of surplus oil inventory and productive capacity that shielded consumers in 1990 from the sudden loss of 4.5 to 5 million barrels a day (b/d) of Kuwaiti and Iraqi production.

At the time of Iraq's invasion of Kuwait, oil markets were experiencing a major supply glut that included a superfluous three to four days worth of excess commercial oil stockpiles as well as a buildup of tens of millions of barrels of unsold Saudi and Iranian crude oil afloat in tankers. Beyond this stock cushion, Opec held about 4 million b/d of spare unutilized oil field capacity that was immediately available. These factors greatly ameliorated the loss of Iraqi and Kuwaiti crude in 1990 but do not exist to the same extent today.

World oil demand in 1996 grew by close to 3% per annum rather than the rate of 1.5-2% that was projected by many private oil industry analysts and the International Energy Agency (IEA). At the same time, Western oil companies, under pressure to show a strong return to investors, have abandoned the practice of carrying extra inventory, leaving world commercial oil inventories close to historical lows. Spare productive capacity is equally scarce. Excluding embargoed Iraqi oil, there is barely more than 2 million b/d of spare sustainable shut-in oil field capacity that is not being utilized and could be tapped in a crisis, almost all of it lying in Saudi Arabia. Indeed, oil markets are perhaps more vulnerable today to a major short-term supply disruption than in any year since the late 1970s.

Should a disruption take place today of even half the magnitude of the Gulf crisis, there simply isn't any ample supply to bring the market easily back to equilibrium at moderate prices without relying on the largess of the Saudi monarchy, a major stock

release of the IEA or a sudden UN vote to open Iraq to trade again. Saudi Oil Minister Ali Naimi reaffirmed in a public speech last November the Kingdom's commitment to use its spare capacity to maintain stability in oil markets during a crisis. On a more daily basis, however, Saudi Arabia did not significantly take advantage of stronger market demand by increasing production over the course of 1996 but instead kept its output relatively flat. As a result, oil markets stayed in a tight situation, and oil prices rose 35% or six dollars over the course of last year. Oil prices have eased in recent weeks following the reentry of limited Iraqi exports, a small boost in Saudi exports and the seasonal downturn in crude oil demand, but markets remain vulnerable to an unexpected supply disruption. A sudden imbalance in demand and supply of equal magnitude to the Gulf war would generate an even larger and more rapid price response today than in 1990.

While the threat of yet another 1970s-style oil market shock may be great, for a number of reasons which we will discuss, the effect of such a crisis on real output in the industrialized West may be considerably less than that experienced in the 1970s. Vast improvements have been made in energy efficiency in many countries, particularly in the OECD, and there have been new, more energy efficient technologies within the petroleum sector as well. Also, consumer governments are better prepared to deal with sudden oil price changes given new tools of strategic oil stocks and improved knowledge of the benefits and limitations of fiscal and monetary policy response.

In examining both short- and long-term risks to the oil market, consideration must be given to the role that private and government inventories, spare productive capacity and producer diversity and competition play in maintaining market equilibrium at moderate price levels during periods of turbulence. In particular, there are special economic and geopolitical risks associated with addressing the world's increasing thirst for oil by accepting expanded reliance on a single geographical area --the Middle East Gulf, which is fraught with political instability and socio-economic challenges. Such reliance raises the possibility of a more severe dislocation if the free flow of oil from the Middle East is threatened as well as the possibility that the frequency of oil shocks could increase. Markets, aware of the importance of the supplies from this area, will be quick to react to events in the Middle East. Markets tend to think of the Middle East as an area where

events in one country can easily impinge on the fortunes of others, more so than other parts of the world. Because of these political and military interdependencies among producers in Gulf region, events in the Middle East will threaten larger quantities of oil and hence produce larger price reactions than one would expect from disruptions in other parts of the world.

From the 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. Experience has also shown that maintenance of moderate prices is more easily achieved when there is reasonable market competition within and outside Opec. Moreover, policy planners must consider how to ensure that the strong global oil demand growth now being experienced, driven partly by vigorous economic growth in Asia, does not outpace available resources in the years to come.

Many options exist to enhance the diversity of the world's oil productive base. Alternatives include enhancing technology transfer and encouraging resource development in politically-difficult regions such as Central Asia, Russia, Asia and Africa. Consideration must also be given to the cost and benefits of thwarting upstream oilfield investment in Iran given its prolific resource wealth.

Finally, careful consideration must be given to factors that are now emerging that could potentially change the geopolitics of oil into the next century. Those factors include the soaring demand for oil in the Asia-Pacific region that is unlikely to be met by a corresponding growth in Asian local oil supplies and a contrasting match between regional supplies and growing demand in the Western Hemisphere. A survey of forecasts on the Asian oil markets shows consumption is projected to grow from 17.8 million b/d up to between 25 to 33.3 million b/d by 2010 with China, India, Japan and South Korea seeing large gains. On the supply side, regional oil production is expected to peak at between 6 to 8 million b/d by 2010 from about 6 million b/d currently. This will leave a large deficit of 15 to 25 million b/d that are likely to come mainly from the Middle East given a host of factors including transportation economics. Future Chinese requirements

will comprise a significant share of this rising import dependence, with Beijing shifting from a minor importer of crude oil in 1995 to mushrooming need for 2 to 4 million b/d of foreign crude by 2010-2015.

The expanding dependence of Asia on energy imports, particularly from the Middle East, could create new tests for the world political order and have serious ramifications for the future balance of power. Rivalries for energy supplies might intensify in Asia in the coming years, potentially complicating maintenance of a stable world economic and political order, if Asian countries react to their energy vulnerability by taking aggressive precautionary steps. Such steps could involve forming alliances with Middle East nations and increasing military capability and projection of power. Building regional institutions that encourage cooperation among the Asia-Pacific nations as well as the expanding the role of government oil stocks and reassessing politically-motivated oil sanctions are of critical importance to this equation.

Probability of Disruptions: A Constant Threat

Several world events have led to major oil disruptions in the past two decades or so but not always with significant economic impacts: the 1973 Arab oil embargo, the Iranian revolution (1979), the eight year Iraq-Iran war, and Iraq's invasion of Kuwait and the subsequent embargo on Iraqi supplies. More recent events include the frequent bombing of the main export pipeline of Colombia, the massive explosion on the Piper Alpha platform in the North Sea, civil war in Angola, weather-related or export policy inspired shut-offs of Russian oil exports, prolonged oil workers strikes in Nigeria, and hurricane damage to Mexican oil installations in 1995.

These events debunk the argument that oil disruptions have a low probability of occurrence. They occur frequently --driven by weather, war, earthquake and accident. But not every supply loss becomes a major crisis 1970s style. In fact, the majority of these events failed to have significant lasting impact because they occurred at a time when the industry was experiencing an oversupply of inventory and/or productive capacity. At the time of the Gulf War, when markets were temporarily deprived of 4.5 to

5 million b/d, oil prices rose from \$16 to about \$36. But by the time the United Nations coalition began its aerial war against Baghdad, oil prices had fallen back to \$20, leaving oil market participants and policy-makers alike complacent that "markets work" and moderate oil prices were here to stay.

This argument misses a fundamental point: At the time of Iraq's invasion of Kuwait, markets were experiencing a major supply glut. The oil industry measures its commercial inventories in terms of the number of days of forward demand that can be covered from such stockpiles. The existence of surplus days of commercial stocks is considered a quantitative indication of oversupply. At the time Iraq invaded Kuwait, oil markets were cushioned by an extra three to four days of cover of excess commercial stocks beyond historical, seasonal norms. Besides that extra oil in the hands of private oil companies, market oversupply had also led to a buildup on tens of millions of barrels of unsold cargoes from Saudi Arabia and Iran that were floating toward consumer markets in search of buyers. Beyond those immediately available stocks, Opec held about 4 million b/d of spare capacity that could quickly be called up. In addition, the market benefited from a Saudi leadership willing to spend the money to bring on incremental capacity as needed to meet world demand. These various factors greatly ameliorated the loss of Iraqi and Kuwaiti crude in 1990. They do not exist to the same extent today.

In contrast to 1990, commercial usable oil inventories fell to historical lows in 1996, heightening market volatility especially in the fourth quarter when oil prices reached \$28 a barrel. Even more worrying is the fact that the industry is carrying exceptionally lean cover of stocks of refined products during peak demand seasons. For example, ahead of this past winter, usable commercial product stocks in the main reporting areas of the US, European Union and Japan stood at the equivalent of a mere 1.9 days of forward demand cover, according to Petroleum Intelligence Weekly, down from 4.5 days in September and well below the seasonal norm of 6 to 10 days. Producers hold similarly lean extra stores, leaving the market highly vulnerable to short-term dislocation. The lingering effect of oil sanctions, economic constraints in oil producing countries and unexpectedly strong demand growth have dwindled away Opec's cushion of spare productive capacity such that only about 2 million b/d or so remains readily accessible, most of it in three

countries --Saudi Arabia, Kuwait and the United Arab Emirates. Of the three, only Saudi Arabia could muster replacement of more than several hundred thousands of barrels a day.

In this new environment of sustained lean inventory, the oil supply response options for even a limited disruption are quite small, leaving markets highly exposed to price volatility. With so much of the world's spare capacity in just three Gulf nations, the political stability of these states and their ability and willingness to make incremental oil available in times of crisis takes on an overwhelming influence on oil price trends. Any threat to the free flow of oil from these states would have rapid and profound affect on prices, starting with speculation in the futures markets.

A repeat of 1990 where a real loss of exports from the Mideast Gulf or elsewhere occurred would wreak havoc on oil markets under current circumstances. A closure of the Straits of Hormuz, for example, would necessitate the release of government-held strategic stocks in consuming countries. Almost all of the countries of the world are producing oil at maximum rates, and only Saudi Arabia has the capacity to boost its flows to replace a significant shortfall of supplies on an instantaneous basis. If Saudi supplies were cut off, the market reaction would be severe. Were domestic or regional factors to convince the Kingdom not to provide a supply backstop in the event of a major supply disruption, the world would experience a different scenario that the orderly replacement of production seen during the Gulf crisis.

In sum, the presumption that oil markets will always return to equilibrium at moderate prices because it happened in 1990 is unjustifiably optimistic. The factors that go into the oil price equation have changed, and policy-makers must respond to the new realities. The following analysis of the key problems faced by leaders concerned with energy security and their possible solutions falls into two main domains: Firstly, diplomatic or socio-economic initiatives that can foster greater political stability in the Middle East given its central importance as an oil producing province; and secondly, energy policy strategies that will mitigate the threat of disruptions from the Middle East or elsewhere.

The Context of Disruption Fears: Identifying Energy Security Risks

For the past several years, in the aftermath of Iraq's invasion of Kuwait, renewed consideration has been given to concerns about energy security and the role the Middle East plays in this equation. But policy responses from major oil consuming nations have in some cases been contradictory, creating a need for a more comprehensive and coherent approach. To begin the process, we must be clear on what we mean by the term "energy security" and what kind of vulnerabilities are worth trying to avoid.

The phrase "energy security" has evolved in great measure since the 1950s when it was used to address the need to safeguard adequate supplies would be available in the event of war. Today, the focus of energy policy has moved beyond the military to include the effect of supply interruptions and oil price shocks on economic performance in the US and in other major importing countries. It is now a popular wisdom that the events of the 1970s, including the Arab oil embargo and the Iranian revolution, reduced Western GDP growth rates and generated the highest rate of inflation in US post war history, throwing the West into recession. This line of reasoning enlarged the scope of energy security concerns. In addition, the term energy security also reflects longer-term concerns for the continuing availability of inexpensive oil.

The oil market has become commodified and globalized in recent years. Oil is no longer sold mainly through exclusive, long-term, fixed price contract arrangements with a handful of major suppliers but rather on a free-wheeling, free market floating price basis with a multitude of players. More than in the 1970s and early 80s, "at the level of daily market trends and ...trade patterns, the global oil game is a commercial game." (Zanoyan 1996).

In such a market, no single consuming country can insulate itself from oil price shocks, no matter its level of self-sufficiency --provided it doesn't impose import and export controls on energy. Price arbitrage ensures one price in all markets. Thus, focus on the share of imports in total US consumption, which is often cited as evidence of increasing energy dependence, does not make sense. The price shock experienced by any nation

from a disruption will be independent of its import share of petroleum supplies. Also, in an unfettered market, shortages will not manifest themselves by a physical inability to find supplies but rather in the price of oil. The market will clear or allocate available physical supplies to the highest bidders.

This "clearing" process has become extremely rapid and transparent given the proliferation of oil futures and forward markets. The distinction between the "paper" market and physical market has blurred over the years, and paper and forward markets now represent five to seven times the volume of physical oil trade. As this mushrooming oil trade now involves banks, pension funds, and other financial institutions as well as industry users and speculators, the allocation of losses from any huge price swings may extend beyond oil industry players or end-users.

The existence of International Energy Agency (IEA) stocks serves to reduce the short-term magnitude of a price shock, and hence, the cost to the economy of the shock. In addition, the existence of these reserves gives governments a tool to maintain orderly oil markets in the event of panic induced by surprises in the market and to reduce the temptation of suppliers with monopoly power from taking advantage of short term tightness in oil markets. To achieve these ends, stock levels must be credible (to convince producers that the opportunity cost of waiting out the stock release is quite high and would transfer a significant portion of the economic gains of the crisis to consuming countries) and the trigger mechanism for their use transparent.

While the IEA holds as its trigger the event of a 7% disruption in world oil supplies, a complementary set of measures known as the Co-ordinated Emergency Response Measures provide a rapid and flexible system of response to actual or imminent oil supply disruptions. This system, which allows a coordinated release of stocks from major consuming countries without administration of strictly-mandated oil sharing mechanisms, was successfully implemented in the first days of the Gulf war and demonstrated the viability of IEA stocks as a tool during politically unstable times. The release also showed that market forces could adequately account for the movement of oil once stocks were initially offered for sale. Another lesson learned from the implementation of the

stock release was that greater market stability could be fostered through the open and transparent public communication via the IEA and other Western governments of markets fundamentals data such as planned government stock policies, accurate world oil inventory data, and detailed, updated supply-demand information. Timely, efficient and accurate information about supplemental oil supplies that would be made available to buyers during the Gulf war served to dampen speculative activities that might otherwise have created greater price volatility.

Few, if any, political factors exist today that would threaten the normal functioning of the unfettered, orderly clearing of prices in a time of crisis. Thus, in this free market environment, the question for the US or any other military establishment is not so much, how will it identify oil supplies in a crisis, but what will it and civilian industry and consumers have to pay for them. However, in the next century, there is no certainty that changes in the international order will not influence this free market response so it should not be taken for granted.

The free market environment of the 1990s has broadened the issue of energy security from a national security matter to an international one. For the US, energy security means both guarding the domestic economy for changes in prices, inflation, economic growth rates and wealth transfers but also protecting the international economy and international financial systems. However, energy security is not solely an economic question but enters the realm of the political to the extent that large increases in income are distributed to countries that will use the money to facilitate their support for terrorist and dissident groups, to increase the size of their military and to speed the pace of acquisition of weapons of mass destruction.

The Economic Costs of Oil Price Swings

In choosing policies to respond to the risk of larger or more frequent price shocks, governments must weigh the costs imposed by oil price increases against the cost of reducing the vulnerability of the economy to that risk. It may appear that the US and other consuming countries bear no such costs for securing energy supplies at present, but

there are subtle choices that have been made, each of which diverts resources away from other areas of economic activity. These costs include subsidies to oil industry (by means such as reductions in taxes or exemptions from environmental and other regulations), extensive capital spent to develop and produce oil outside the Middle East in order to diversify sources of output and reduce dependence on the Middle East, the maintenance of government-controlled oil stocks to moderate the price effects of supply interruptions, military expenditures to protect oil assets from disruption, and efficiency losses implicit in policies to shift the transport and other sectors to alternative fuels which are more costly, than oil, among others.

Against this allocation of resources to defend energy security, one must consider the probability of oil shocks and the magnitude of their impact. To do this, distinctions are needed between the kinds of price risks that can occur. Economic studies have broken down risks into three categories: 1) a sudden, large uptick in oil prices of either short or long duration; 2) increased price variability (upward and downward) over a long period 3) a gradual sustained rise in the price of oil. Each of these kinds of shocks poses different challenges.

Most economists have maintained that the price shocks in the 1970s did have a negative impact on employment and GNP and contributed to inflation. A smaller group has argued that oil shocks had no real effect and that the stagflation of the 70s was due to other factors such as monetary policy and price controls of the time. The latter group can point to the fact that rapid economic growth continues in the West and Asia despite the 35% increase in oil prices last year as support for their position.

Few dispute the fact that economic output and oil price increases are correlated. Hamilton (1983) showed that all but one of the post WWII US recessions were preceded by an oil price shock. Rather, the controversy over the macroeconomic effects of oil price shocks reflects opinion regarding how the price shock is transmitted to the rest of the economy and whether any policy intervention can effectively ease the transmission of such a shock.

Considering that the fall in oil prices in the 1980s did not bring corresponding recovery in output and employment in the US, the relationship between oil prices and output is at best asymmetrical. This was supported by Mork (1989) who confirmed the statistically significant correlation between oil price increases and reductions in GNP but found that oil price decreases were not significantly correlated with GNP increases. Other studies have shown that the effect of a major oil price change on aggregate output is much greater when prices have been relatively stable and therefore the price change is unanticipated as opposed to situations where price movements have been frequent and erratic (Lee, Ni, and Ratti 1995).

The most comprehensive review of macro models of the effects of a permanent change in oil prices on the economy was undertaken by the Energy Modeling Forum (EMF) at Stanford University (Hichman, Huntington, and Sweeney 1987). Their study included 14 prominent macro forecasting models of the US and examined the macro effects of various oil and energy price shocks as well as how these would be affected by various policy responses. The EMF effort found that a 50% oil price shock would have substantial deleterious effects on the US economy, particularly in the first two years, when there is no policy response by the government. The median result showed a 1.42% decrease in output in the first year and a 2.9% decrease in GNP in the second year.

Unemployment increases amounted to .56 percentage points higher in the first year and 1.21% in the second year than would have been the case if oil prices had not gone up. Over a four year period tested, cumulative losses in GNP range from \$141 to \$608 billion in 1983 dollars. Simulations of a 20% price increase or decrease produced roughly proportional effects on GDP. In addition to losses in GNP, the model measured the loss due to the adverse shift in the terms of trade which requires the US to export more goods and services to import any given quantity of oil. Typically, the terms of trade effect accounted for an average loss of approximately \$2,000.00 for each US resident over four years.

It is important to understand that these projections depend on certain assumptions about the economy and the perpetuation of an oil price shock. A short term price increase that

lasted under a year would have smaller effects. Indeed, to the extent that economic agents expected oil prices to return to the previous pre-shock level, the cumulative losses described above would probably be a substantial over-estimate of actual losses since the response to an oil price change will differ according to how long it is expected to prevail. Finally, these models were constructed from data gathered in the 1960s and 1970s and reflect the structure of the economy and the pattern of resource use that existed at the time. To-day the composition of output has shifted from relatively energy intensive manufacturing to less energy using services and all sectors have become much more energy efficient. Energy now accounts for a smaller share of the total cost of producing any good or service than in the 1970s and early 1980s and hence a given price shock will have a smaller impact on consumer incomes, aggregate demand, or inflation. As a result, the elasticity of output with respect to oil prices will be lower than predicted by these models. Furthermore, in the 1970s the macroeconomic effects of a price shock was exacerbated by assumptions within the economy that any price increase would persist indefinitely. Today, price shocks are not expected to be prolonged. Since the response of economic agents to a price shock will depend on their expectations regarding its durability, reactions today will be less severe than in the 1970s.

Although there is much controversy among macroeconomists regarding the effectiveness of monetary and fiscal intervention in sophisticated markets which can anticipate such measures, thereby reducing their effectiveness, Energy Modeling Forum also found that monetary policy could reduce the losses in output and employment at the cost of a temporary increase in the rate of inflation. The effect of payroll tax cuts and increases in the investment tax credit, because they affect the supply side of the economy, have the effect of reducing both the decline in output as well as the increase in the price level that would have occurred in the policy neutral case. However, the benefits of tax cuts come at the cost of a higher government budget deficit. Moreover, national monetary policy changes will have impacts that extend to international financial dealings, potentially inviting reactions that could impact the value of the dollar on international currency markets.

Recent research (Mine Yucel 1996) supports the view that the burden to the economy of a sudden but temporary increase in oil costs may not be all that severe. The response of monetary policy to a one-time supply shock can strongly influence the effect on output and inflation. An accommodative monetary policy, by facilitating an increase in the general price level, can lead to a reduction in real wages and restore equilibrium in the labor market even when nominal wages are inflexible. The research, which analyzed the effect of monetary policy for eight OECD countries, found that a country can delay and mitigate but not eliminate the effect of an oil price shock on output and employment, by engaging in a more expansionary monetary policy. Thus, a temporary increase in oil prices need not have major short-run effects on output, employment, and/or inflation. Furthermore, it was 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.

While the quantitative significance of oil price shocks has not been settled, the above research suggests that a temporary increase in oil prices need not have major short run effects on output, employment, and/or inflation. While debate lingers, the authors believe evidence supports the view that judicious intervention in the initial stages of a longer-lasting disruption could help ease the initial negative effects of the shock on output and employment. Sensible economic policies, including an accommodative monetary expansion or supply side tax cuts can mitigate the effects of the price shock on output and employment, albeit at the cost of larger increases in the general price level or higher government deficits respectively.

The longer term economic consequences of a more gradual real price increase is less clear. In the latter case, the economy will be able to adjust gradually to oil price changes and hence avoid many of the costs associated with an abrupt change, such as losses due to short run resource immobility. On the other hand, sustained energy price volatility could pose more complicated challenges. Unlike the 1970s when oil price changes were expected to be permanent, price variability today is accompanied with the bias that price increases are unlikely to be sustained. To the extent that agents do not believe oil prices will remain high, cumulative losses can be delayed. But if price volatility becomes a

regular feature of the economy, it seems safe to assume agents will divert real resources away from productive endeavors to avenues that deal with uncertainty. Firms may hold larger stocks or shift risk onto others in the futures market, incurring costs. And, higher uncertainty may also reduce the level of output in the long run by reducing the profitability of investment or requiring investors to seek a higher rate of return to compensate for price risks. Thus, theoreticians who argue price variability may pose no risks to the economy may not prove correct if such volatility continues for an extended period of several years.

Despite the risks discussed above, when one takes into account the large number of changes that have occurred since the price shocks of the 1970s, it is reasonable to conclude that the economic cost of either a transitory or a permanent price shock will be smaller today than two decades ago. Member states of the International Energy Agency can now mitigate the peaks of oil prices rises through the availability of strategic petroleum stocks which did not exist in the 1970s. Vast improvements have been made in energy efficiency in many countries, especially the OECD, due to shifts in the composition of output from manufacturing to services, to the development of more efficient automobiles and other consumer goods, and more efficient processes within the production sector of the economy.

There have been new, more energy efficient technologies with the petroleum sector as well. The cost as well as the time required to find and develop new oil reserves have decreased due to technological advances. These developments have the potential to not only shorten the average period of a price shock but also to limit the extent to which prices can rise over the longer-term. (For example, the lead time in new oil field development in traditional areas has shrunk from 5 to 8 years down to 2 to 3 years given improvements in data processing, drilling technology and project management while falling for some frontier areas from 10 years to 5 years). Alternative energy sources can also be made available at cheaper levels today than 20 years ago, further capping the upside potential of long-term oil price movements. For example, analysts believe the costs for developing resources such as tar sands have fallen dramatically from \$32-35/bbl in the early 1980s to \$20 to \$25 today. However, development of higher cost alternative

energy resources will require that investors be confident that oil prices remain above their costs long enough for them to recapture the enormous investments required of these projects.

Finally while a permanently higher energy price level would, all other things remaining the same, reduce future incomes below what they would otherwise have been, higher energy prices have, and would continue, to induce technical innovations which would reduce the impact of the higher prices.

The Geopolitical Side of Energy Security: Dynamics of the Next Century

By the 21st century, energy security could take on new geopolitical meanings if the predicted changes materialize in the balance of resources around the world. In examining the longer-term economic and geopolitical risks that might emanate from the future conditions of international oil markets, special attention must be given to striking disparities that are emerging among the major importing geographic regions. Supply-demand balances and trade patterns in oil no longer conform to boundaries fashioned by the Cold War mindset. North/South, Opec/non-Opec, OECD/non-OECD, free-world/Formal Soviet Union (FSU) may not be the most illuminating method to analyze future oil market trends. Instead, to elucidate the trends that will impact the geopolitics of oil in the coming years, it is more useful to look at the trade flows in the oil market from one region to another to better understand changes that are in the making.

A change in trade flows in oil markets is just now starting to emerge that could have serious ramifications to the balance of power in the future. Forecasts for the year 2000 and beyond show a significant expansion in the production of oil in the Western hemisphere where regional crude oil output will come close to demand, rendering the hemisphere theoretically self-sufficient. This contrasts sharply with the substantial scarcity of regional crude supplies projected for the thirsty "tigers" of Asia. The expanding energy insecurity of Asia will become a major policy challenge over the next decade or so. The gap between local Asian supplies and requirements is expected to widen substantially, perhaps leaving a large deficit of 15 to 25 million barrels per day that

may have to come mainly from Middle East suppliers. At the same time, Western hemisphere counterparts will likely be reducing imports from the volatile region as increased supply from Mexico, Venezuela and Canada comes on line. Europe's supply situation is likely to remain static with Europe and the states of the former Soviet Union continuing to need some 5 to 6 million b/d of supply from the Middle East and Africa.

In an orderly global market suddenly struck with a major supply disruption, buyers with the greatest need would outbid others to attain replacement barrels. So, in the case of Asia in the year 2000 or 2005, a significant loss of Middle East supplies would mean that Asian buyers would have to outbid Western counterparts for South American, African or other replacement barrels that normal transportation-cost arbitrage conditions would have sent Westward, resulting in a higher price for all markets. Depending on the degree of oil lost, this smooth operation of such a free market response, however, will have to rely on international cooperation and political stability. The danger, from the point of view of maintaining a stable world economic and political order, is that Asian countries will react to their energy vulnerability by taking precautionary steps to ensure adequate supplies in the event of a crisis. Such steps could involve enlarging their sphere of military influence inside and outside Asia and forming alliances with the rogue states of the Middle East.

Political Stability in the Middle East: Challenges and Concerns

In studying both the short-term, strained conditions of oil markets and the prospects for the start of the next century, it is clear that the political stability of the Middle East will remain important given the region's role as a major supplier of energy resources to the world economy. Achievement of economic and social progress in the region and resolution of the Arab-Israeli conflict are critical to the development of such stability. The US policy of "dual containment" of Iraq and Iran has increasingly identified the US as serving as a military "protector" of the Gulf states, especially Saudi Arabia, and this role has attracted increased internal and external criticism of these friendly regimes. Dual containment has also been costly in terms of lost oil capacity investments and in the strengthening of radical forces inside Iran.

The lack of spare unutilized production capacity outside Saudi Arabia, Kuwait and the United Arab Emirates has also spotlighted these producers' power to single-handedly influence ultimate oil prices, creating unique political pressures. Ten years ago, when a majority of Opec countries were holding back spare production of 10 to 15 million b/d, greater market competition and regional political rivalries injected a give and take, balance of power element into group Opec production decisions.

Now, other factors, including sanctions policy, has limited the playing field within Opec. Iran, Libya and Iraq no longer have the ability to immediately increase oil export levels, and therefore do not push for the kind of self-interested marketshare increases that fed the market surpluses seen from the producer group in the 1980s. During the 1980s, domestic economic pressures and competition among the major oil producing states of the Middle East Gulf for political power and leadership prerogatives pitted Iran, Iraq, Libya, Saudi Arabia, Kuwait and the United Arab Emirates against each other in a struggle to delineate who was entitled to increase output under Opec's production quota allocation system during times of market strength. Each player wanted to maximize the amount of individual marketshare gain for himself in a complex zero sum interaction which generally resulted in quota cheating and oil price competition that benefited consumers.

By contrast, today spare capacity within Opec has been whittled away, and the majority of Opec players now are producing at maximum rates. This means that only higher prices can bring these members enhanced revenues as production increases are restricted from their own individual countries. Under such circumstances, countries such as Libya or Iran (and some day Iraq once the embargo against its oil exports is lifted) have every incentive to use political or other means at their disposal to try to convince the Gulf Arab players not to use their existing spare capacity.

The absence of marketshare rivalry within Opec has put a spotlight on Saudi policy and the Kingdom's close relations with the West. That is because in the days of greater market competition, Saudi Arabia's efforts to seek higher production for itself was viewed as stemming from regional power politics and a desire to maintain or expand its marketshare relative to other regional powers like Iraq and Iran. Now that this

competition for marketshare has been eliminated by capacity constraints in other Opec countries, the pursuit of higher marketshare by Saudi Arabia is interpreted differently. In particular, Iran and Islamic opposition groups have accused the Gulf leaders of seeking higher production rates to accommodate Western economic interests at the expense of the needs of local populations, creating internal pressures against a moderate price stance.

When more producers had shut-in abilities, then pressure to increase production within OPEC could find support from more than one quarter, deflecting such criticism.

In light of this new reality, US policy makers must seriously reassess the costs and benefits of imposing oil sanctions on several oil producing countries simultaneously. In the current situation of rapid demand growth, lean inventories and constant output by Saudi Arabia and other Gulf states with excess capacity, the effect of sanctions is to reinforce upward pressure on prices and to transfer a large amount of income from consuming to producing countries. Also, by imposing sanctions, the US is creating special incentives for other nations such as China to form special military relationships with the sanctioned nations. These relationships could potentially exacerbate tensions involving both Asian and Middle East countries as will be discussed below.

The analysis of current oil market fundamentals demonstrates that political stability of the Middle East, particularly the Gulf region, is perhaps a more important psychological ingredient in oil price stability than ever before. The outlook for the region raises cause for concern. The economic, social and political challenges to the countries of the Middle East are staggering. Populations are swelling at rates which surpass other world regions, and could more than double by 2005. This population explosion will place potentially overwhelming demands on infrastructure and basic resources such as water and food and could lead to a further deterioration in per capita GDP. Demand for renewable water resources will soon surpass supply under current conditions, and the Middle East is the least food self-sufficient region in the world. Economic growth rates have also lagged other regions. And, yet the countries of the region, including Turkey and Iran, spent \$166 on military expenditures for every \$1 spent on health and education. In the case of Saudi Arabia, military spending as a share of GDP was the fourth highest in the world between

1972-1988 (Hewitt 1992). To maintain and enhance political stability, the countries of the region must address these basic problems as well as focus on economic diversification that can create wealth that is independent of government spending and subsidies.

North Africa has experienced average declines in annual real per capita GDP rates in the periods 1980-85, 1985-90, 1990-93 while the Gulf and Levant saw negative to flat GDP rates between 1975 and 1990. Growth in the latter region averaged 1.1% between 1990-93, ahead of global and OECD rates, but trailing Israel's 2.1% improvement. The noticeable per capita GDP gap between Israel and its neighbors affects regional cooperation, and serious structural economic constraints and barriers block regional economic development and trade in the global market.

Leaders in the region worry that failure in the Middle East peace process will aggravate localized problems of social unrest and revolutionary politics. The Arab-Israeli peace process is at another historic crossroads. The Hebron agreement is a positive development in so far as it represents the first signed agreement between a Likud government in Israel with the Palestine National Authority and endorses the Oslo process to date. However, it is yet to be seen if the Hebron agreement will prove to be the true gateway to a final status negotiations between the Israelis and the Palestinians. The final status negotiating agenda includes the tough issues of borders, refugee return, Israeli settlements and Jerusalem. Much hard work and political goodwill will be needed on the part of all the parties to achieve agreement on these critical issues.

What has been achieved to date in the Madrid peace process since 1991 --i.e., the Israeli-Jordanian treaty, the Oslo accords and the Hebron agreement as well as the progress in the negotiations between the Israelis and Syrians during talks broken off in February 1996 -- will not be consolidated unless there is forward movement in the Israeli-Syrian negotiations and, consequently, the Israeli-Lebanese negotiations. To move forward on all these fronts will require an assertive United States leadership role involving the President and the Secretary of State, as well as the parallel commitment of the parties themselves to make progress. The Arab-Israeli peace process should be a major priority

of diplomacy in the period ahead. If the peace process stalls, the risks of political instability in the region as a whole will be heightened.

In the Gulf, some progress has been made to improve internal political stability in the aftermath of Desert Storm. The Kuwaiti parliamentary elections are a positive factor and the legislature remains a forum where public policy issues can be debated openly. In Qatar, issues of participatory government and economic and social development are being addressed as well by the leadership. The political and financial accommodations between Emir Hamed and his deposed father is a positive factor. US-Bahrain relations are good and there is support for the military relationship which now includes the newly-created US Fifth Fleet headquartered there. However, Shiite dissidence is a destabilizing factor affecting internal security, and expansion of the Majlis as-Shura has not satisfied the opposition which seeks power sharing in a constitutional, legalistic framework. There is concern in Bahrain over the US policy of dual containment against Iran and Iraq.

In Saudi Arabia, the dynamics of internal political and economic developments need to be assessed carefully as the period of political transition at the top could make decision-making more cumbersome. Leaders in Saudi Arabia remain preoccupied with the state of national finances and the massive debt incurred by the Desert Storm operations and other military expenditures. Demographic pressures and the need to create suitable job opportunities for an increasingly younger population are important considerations. The entrepreneurial middle class is seeking a larger role both politically and economically. At the same time, the US military in the kingdom has been targeted by terrorist groups and there is increased criticism of the US military presence. Greater activism of Islamicist groups opposed to the regime is a serious source of concern to the Saudi leadership. Because of these issues, the Saudi regime is operating under a series of political, economic and financial constraints.

The Threat of Iran and Iraq

The Arab Gulf states also remain concerned with the power of their large neighbors of Iran and Iraq to destabilize the region. Each country is taking its own approach to the threat these two players represent to its internal stability and to the free flow of oil.

Concern remains that Iraqi leader Saddam Hussein will resort to force again beyond his borders. Saddam still has the military capability to do so. The movement of Iraqi troops earlier in the year raises the prospect that Iraq could seize a portion of Kuwait and threaten Saudi Arabia. To the regime of Iraq, state revenues are a tool to be deployed for political, ideological goals in a single-minded focus on the security of his regime as well as on regional and international power. From Iraq's perspective, the invasion of Kuwait was not a means for Iraq to balance the budget or deal with worsening economic factors at home. The conflict was rooted instead from the regime's inexhaustible ambitions and a long term orientation to change the rules of the game in the entire Middle East. However, for the time being, Saddam Hussein's weakened internal situation is prompting the leader at least temporarily to mend fences with powerful neighbors who could support his continued hold on power in Iraq.

In the aftermath of the Kuwaiti invasion, the Iraqi regime has created a "rational" explanation for its actions that resonates as consistent with ambitions to be the great pan-Arab leader in the model of Egypt's Gamal Abdul Naser. Iraq has disseminated propaganda that it fought the Gulf War against the "villain" of Western colonialism which is exemplified by Israel's position in the region. The impact of such propaganda should not be dismissed out of hand. Conspiracy theorists in the Middle East accuse the US of purposely tricking Iraqi leader Saddam Hussein into a conflict with Kuwait to create the opportunity to destroy his massive military machine and defeat "a great Arab state" before its power expanded to proportions that would compete with the Western world. Iraq's post-invasion rhetoric revolves around the contention that the US and its allies want to control the resources of the Arab World (ie, oil prices) and the distribution of those resources to suit solely the needs of Western populations against the will and best interests of the Arab peoples.

As Iraq seek again to reestablish its place at the top of the regional balance of power, Saddam may view his potential role as protector against nascent Islamic revivalist tendencies in the Gulf as an opening for a rapprochement with Western powers. But caution should be exercised as Saddam has shown his inclination in more than one incident to extend his rule by terror beyond Iraq's borders, and therefore cannot be considered a long-term stabilizing force in the region.

Internally, the legitimacy of Saddam's authority finds its roots beyond the terror in his unique ability to provide the most convincing idea of "Iraq." Saddam stands alone as a genuinely national leader who provides no favor by ethnic background by loyalty alone. To quote author Kenan Makiya, "What the tragedy (September 1996) unfolding in northern Iraq shows, is that the Iraqi opposition in general still lacks the very element that Saddam Hussein's terror has so successfully created for him: a commitment to a whole that is larger than the sum of its parts, a commitment, in other words, to a convincing idea of Iraq." This status as a national leader goes a long way to explain the staying power of the regime in the face of incredible odds. However, internecine fighting over black-marketering businesses and other spoils continues to weaken the regime substantially.

As Saddam's regime seems to hold a monopoly on nationalistic sentiments and identity, questions remain about what kind of system could replace Saddam's clan, the Tikritis, as a ruling elite. The Shia population lacks the ideas, numbers and organizational leadership it would take to create an Islamic republic in Iraq, according to Makiya and other analysts. Like Kurdish leaders in the North whose focus has remained essentially ethnic, the Shia community has not been able to embrace a vision that would attract broad support. It may even lack the religious structures and clerical hierarchy to forge such a cultural movement within its own community. In balance, Iraq's population is urban and secular in its orientation. This has led many analysts to conclude that a breakdown in orderly political conduct might ensue were Saddam to lose control of power, especially if foreign influences were to interfere in internal Iraqi affairs. The possibility of a breakdown of order in Iraq remains a potential destabilizing force in the Middle East and there is a perceived need to keep Iraq intact as a country, lest a regional balance of power vacuum be created by the splintering off of Kurdish, Sunni and Shiite entities.

Iran's challenge to the political balance of power in the Middle East manifests itself in two fashions: through its ideological challenge to the legitimacy of neighboring regimes and through its abilities to pose military challenges to the free passage of oil through the vital Strait of Hormuz. Scholars and practitioners seem to agree that intellectual and doctrinal impact of Iran's revolution has been more limited than first anticipated. While the Khomeini government proclaimed the goal of the new state was to "perpetuate the revolution both at home and abroad," revolutionary Iran remains relatively unsuccessful in actively propagating and disseminating its ideas to the Arabian Gulf or to Iraq and Egypt (Esposito 1990). Iran's revolution has served as an "inspirational" model reinforcing preexisting political tendencies rather than as a catalyst able to initiate new revolutionary forces. Admiration for the revolution remains but Khomeini's unique revolutionary ideology has a distinctively Iranian and Shia focus that has not to date proven exportable in its current form. While Iran has provided funding support for local opposition movements in other countries in the Middle East, it would probably take a rearticulation of Islamic revolutionary philosophy in a Sunni or at least less culturally Iranian context to produce an ideological seachange within the region.

Even in Bahrain where Iranian Hojrat al-Islam Hadi Mudarissi created a Shia opposition network, the follow-up organization, the Islamic Front for the Liberation of Bahrain, was quieted by the government for over a decade and a half. More recently, the Bahraini opposition takes the form more of a reformist call for constitutionalism and power sharing under a legalistic structure rather than Iranian-inspired revolutionary rhetoric. A Shia-led Iraqi nationalist movement also appears to have lacked credibility or support to give it momentum, and Iran's failure to achieve victory over Iraq in the eight year war has weakened the prestige of Tehran's ideological mission even among its own population. Moreover, a battered economy and a general deterioration in overall living standards has put the Iranian regime under pressure and highlighted factional divisions within the ruling elite. The upcoming elections in Iran this May need to be watched very closely to see whether they will usher in a shift to the right that could lead Tehran to increase efforts to propagate the revolution abroad.

However, there is little doubt that radical fringe Shiite movements have caused political unrest and as such can require costly security measures that also tend to reduce the support and popularity of local regimes (for more details see Von Der Mehden paper). There have also been minor attacks on petrochemical facilities blamed on such groups, highlighting the potential for sabotage. US military installations have been targeted in the past. Such groups could change their focus to oil facilities should such a strategy prove advantageous. Thus, Iranian support to radical elements in the Shiite communities in the area represents one of the biggest sectarian dangers to the energy industry. But, as already noted, there are important factors that limit Shiite capabilities to influence domestic politics and that make them vulnerable to government efforts to control their activities. Regimes have followed a two-pronged approach of upgrading the infrastructure in Shiite areas and developing increase surveillance and control, potentially reducing the chances that violent activities from these fringe groups will have significant bearing on energy operations and installations. So far, these efforts have been relatively successful.

Outside of its support for radical movement, another area of Iran's military focus has been the Strait of Hormuz. At the present time, about 20% or one fifth of the world's supply of crude oil transits through the Strait. This volume includes oil exports from Saudi Arabia, Kuwait, the United Arab Emirates, Qatar and Iran. Saudi Arabia also exports some oil via pipeline to the Red Sea. Prior to the oil embargo, Iraq exported the majority of its oil via pipeline through Turkey and Saudi Arabia. Kuwait, Saudi Arabia and the United Arab Emirates also house 90% of the world's spare, shut-in productive capacity that could be called upon instantly in an oil supply crisis caused by weather or other unpredictable factors. At the present time, these three Arab nations could physically provide replacement supplies for 2 to 2.5 million b/d of lost production, the equivalent of Iran's current export program.

Inasmuch as Iran has the military power to interdict or to threaten to interdict free passage through this waterway, the Islamic Republic gains considerable political leverage and influence, forcing the United States to maintain a military presence to protect this crucial lifeblood to the Western economy. Iran's own requirement to ship oil via Hormuz, nonetheless, serves as a deterrent to Tehran to assert this military leverage, but the

Islamic Republic did resort to such actions during its eight-year war with Iraq. For the US, military engagement in the Gulf runs the risk of alienating the US from other uninvolved Muslim nations.

The US Navy has assessed that several means for Iran to close the Strait would not prove effective. Those include the use of submarine warfare, floating mines or sunken debris. However, Iran's growing arsenal of weapons of mass destruction is considered a more strategically difficult challenge for the US military in the restricted environment of the Strait. While it is still believed to be extremely difficult militarily for Iran to close the Strait for an extended period of time, a very temporary disruption seems possible.

It might be argued that it would not be "rational" for Iran to initiate aggressive action against shipping in the Strait. Yet in the past year, Iran has taken delivery of a wide arsenal of offensive weapons (See Brito paper). It is also accused of placing offensive missiles on the islands of Abu Musa, Greater Tumb and Lesser Tumb, which lie close to Gulf shipping lanes and are the center of a territorial dispute between Iran and the United Arab Emirates.

Iran's actions mean that the US navy loses some of its freedom of maneuver because certain assets must be kept in close proximity of the Strait on a constant basis. Its actions also mean that other powers must constantly weigh the value of policies that will upset or anger Iran against the costs of a confrontation over the Strait of Hormuz. One such policy that is influenced by such a trade-off would be the desirable international price for oil as influenced by Opec's production levels. These costs, among others, demonstrate that Tehran's capabilities matter despite that fact that Iran has not in recent years shown an inclination toward direct military adventurism of the nature that would warrant US military response.

One option would be to improve facilities to bypass the Strait of Hormuz to a greater extent, depriving Tehran of its ongoing political leverage. The less oil that must transverse the Strait, the weaker Iran's politico-military influence. Calculations show that with a relatively low amount of infrastructure investment, as much as 10 million b/d

of the 13 million b/d plus of Middle East oil production that transits the Strait could bypass the pivotal waterway altogether. This production could come from an increase in Saudi output or from a wider contingency plan that involved other nations in the Gulf region. In effect, contingencies that would allow as many nations as possible in the Arabian Gulf to export their oil via other routes would leave only Iran as odd man out in the closure of the Strait of Hormuz, minimizing the risks associated with closure of the Strait. Already, a substantial part of the necessary infrastructure exists to isolate Iran in this fashion, including the 5.1 million b/d East-West Pipeline (Petroline) which runs across Saudi Arabia to the port of Yanbu on the Red Sea, the 1.65 million b/d Iraqi-Saudi Ipsa-2 pipeline that extends from the border of Iraq and that carried Iraqi crude to the Red Sea port of Muajjiz in the late 1980s and short pipelines that connect Harad and Abqaiq oil fields to Ras Tanura (For more details see Brito paper).

To facilitate exports of Kuwaiti crude across Saudi Arabia, a new pipeline connection must be constructed between Kuwait and the Kingdom. The most efficient technical means to accomplish this would be to build a pipeline that would connect Kuwait's main crude gathering centers at Mina al-Ahmadi and Mina Abd Allah to Eastern Saudi end of the IPSA-2 pipeline. Two cases were studied for the costs of transporting oil by pipeline from the oil fields of Saudi Arabia and Kuwait to the ports of Yanbu and Mu'ajjiz on the Red Sea; one obtaining additional capacity by adding horsepower to existing pipelines and a second by increasing capacity through the use of a Drag reduction agent.

In the first case, additional capacity could be obtained by adding incremental pumping capacity to the existing 5.1 million b/d Petroline and to the 1.65 million b/d Ipsa-2 pipeline. The Ipsa-2 line has since been repossessed from Iraq by the Saudi government as war reparations following Iraq's invasion of Kuwait. Actual use of the second pipeline under current political conditions would pose some risks of a deepening in the rift between Iraq and its neighbors Kuwait and Saudi Arabia. Such risks would have to be weighed carefully before proceeding with this part of the pipeline expansion plans.

Adding horsepower would require substantial capital expenditures of around \$400 million to \$600 million in addition to a 3 cent increase in the cost of transporting oil.

Using stored Drag Reduction agents to accomplish similar ends would require capital expenditure of approximately \$250 million but would increase the 11 cent cost of transporting oil by between 25 cents to 67 cents a barrel. Given the low cost of production of Arabian oil, such a cost increase for transportation would have no significant impact. Consideration of these approaches relative to each other must factor in the probability of extended duration of use to the contingency routes.

Similar calculations can be made to calculate the cost of moving oil from the United Arab Emirates to the Omani terminal of Mina al-Fahal near Muscat, outside the Strait. A 30 inch pipeline following the road from Abu Dhabi-Suhar-Muscat would cost approximately \$1 million per mile or about \$220 million. This pipeline, using DRA to augment throughput could move about 2.3 million b/d at a cost of \$0.15 a barrel. A spur to Qatar would also be possible.

These alternatives would lessen the amount of military assets that would need to be dedicated to areas within the range of Iran's Silkworm and Seeker anti-ship missiles, permitting the Navy greater freedom of maneuver in whatever projection of power may deem in the US interest. Iran's military options are reduced to land war with Iraq, the use of weapons of mass destruction directly against neighboring countries or sponsoring terrorist groups that would disrupt the stability of the Gulf states. The proliferation of weapons of mass destruction is a very serious problem. But it is hoped that the risk of a massive retaliation against any country that uses such weapons is credible. The ability to bypass the Strait of Hormuz may be most useful in fighting state-sponsored terrorism as well. A serious incident such as an attack on neighboring regimes or an American installation can be addressed by an interdiction of Iranian oil without having to fear the consequence of an Iranian attack on Gulf shipping.

Other Regional Conflict and Cooperation

The question of whether the financial oil surpluses generated in the 1970s have been squandered is a major concern voiced by the opposition against the regimes of the Middle East. Between 1975-1990, a sample of countries including Bahrain, Cyprus, Iran, Iraq,

Jordan, Kuwait, Saudi Arabia, Syria, Turkey and Yemen, experienced declines in annual real per capita GDP rates while world, OECD, and Asia all saw increases. The establishment of manufacturing capability has not progressed, and the region relies increasingly on imported labor. In addition, regional trade patterns for manufactured goods suggest that several countries have extremely low participation in regional markets. In fact, currently only 8% of total trade in such goods in the Middle East is intra regional.

Elites in the Middle East have encountered increased political pressure to sustain current levels of domestic welfare expenditures in a time of constrained growth and a rising demand for services. Classical liberal theorists in political science have argued that the expansion of trade not only increases economic prosperity and efficiency, but also fosters peaceful diplomatic relations between states. The principal logic behind the latter assertion is that trade builds mutual benefits and economic interdependence (Gilpin 1987) While recent studies on the impact of trade on the occurrence of war have yielded conflicting results, evidence suggests that 1) domestic politics inside several of the confrontation states can induce decision makers to reevaluate alignments in a period of economic decline and 2) that fostering commercial ties with an adversary can promote bilateral prosperity and diplomacy among former foes. Thus, it seems credible that increased regional trade in the Middle East could contribute to the region's political stability and economic progress.

Middle East regional gas trade remains an area with great potential for the region. The Middle East is endowed with approximately 20% of the world's proven reserves of natural gas. However, the cost of transporting Middle Eastern gas is quite high. North Africa, Russia, and the North Sea all have locational advantages to the European market. The high cost of transporting liquefied natural gas (LNG) also limits the amount of Middle East gas that can be sold to the Far East.

Asia consumed around 52 million tons of LNG in 1995, and this could rise to as high as 70 to 80 million tons by the turn of the century as demand rises steadily in Japan, South Korea and Taiwan. New markets may also emerge in India, China and Thailand especially if economic reforms take hold and create new opportunities for private

investment in the electricity sector. This window of demand has provided opportunities for Middle East producers, such as Qatar and eventually Oman, to expand LNG sales eastward. However, Middle East LNG projects will have to compete with new LNG supply projects under development in Indonesia, Malaysia, and Australia. The natural gas resources of the Russian Far East are also extensive. This being said, nonetheless, certain Asian buyers will likely continue to pursue Middle Eastern gas purchases for a variety of reasons despite alternative regional sources. One reason is the proclivity among certain key buyers to maintain a wide geographic diversity in import sources of all energy to gain price negotiating leverage and supply security. Another is that Asian commercial investment in Middle East gas projects strengthens the economic and political ties between Asian nations and Middle East oil exporters.

It has been argued that Middle Eastern countries that produce oil are competing with their oil when they export gas to markets where oil and gas are substitutes (see Brito paper). Indeed, the substitution of natural gas for oil is illustrated by looking at the composition of energy production worldwide. The share of oil and oil liquids has declined from 49.5% in 1973 to 39% in 1993 while the share of natural gas has increased from 18.2% to 21.5% over the same period in part in response to off-budget subsidies for both the production and use of natural gas. Competing non-Opec gas is reported to be eroding Opec markets by as much as 200,000 b/d per year (Stauffer 1996), lending credence to the view that development of natural gas resources worldwide enhances consuming countries ability to limit the risks of dependence on a concentrated oil supply center as discussed above.

From the intra-Middle East perspective, the steep costs associated with the commercial exploitation of natural gas for export outside the region creates an opportunity for its use as a catalyst for economic development inside the region. The creation of a regional gas grid that would extend to the Levant and into Turkey, but including Israel, could provide a major impetus to forward the peace process and stable regional relations. Energy is a key commodity for economic development. The Middle East has about 45 trillion cubic meters of proven natural gas reserves, with the largest deposits located in Iran, Qatar, Iraq, Saudi Arabia and Abu Dhabi. The high costs of transporting gas make it difficult to export it commercially outside the region. Middle East Gulf origin gas shipped by

pipeline would be marginal in competition with \$20/ barrel fuel oil in the European market, barring regulatory assistance, and competitive in India (Brito, pipelines). But it would yield considerably more value in the Levant. As an economically-driven proposition, shipments of gas outside the region becomes more questionable at \$16/barrel fuel oil prices but other factors can come into play as discussed above.

Individual Mideast countries in the region have their own plans for energy development. But a plan for regional energy policy does not exist. In an industry like gas with its expensive greenfield infrastructure costs that require large consumer markets, pursuit of individual national policies will lead to tremendous inefficiencies and disparities which are not optimal. By contrast, a common plan for cooperation in energy could serve as a major catalyst for regional development and integration. It harkens back to the beginnings of the European Union which began with the formation of the European Coal and Steel Community in 1957. The critical component to a common energy policy is the construction and administration of pipelines throughout the region. These pipelines would serve to bring gas to where it is needed in the region. Demand for natural gas in the region, including Turkey, is projected to rise from 24 billion cubic meters per year in 1995 to 96 billion cubic meters a year by 2010.

A common plan to construct pipelines and distribute gas could potentially knit together Arab and Israeli economies, promoting peaceful coexistence and cooperation. The West Bank, Gaza, Israel, Jordan and Egypt could form the initial core of such a plan but ultimately, it could involve others in the region, including Syria, Lebanon, and countries from the Mideast Gulf to the eastern Mediterranean. The construction of a network of pipelines and associated facilities would provide an immediate economic boost in a variety of locations, also providing direct and tangible evidence of the benefits of peace and political stability. Local natural gas resources could also be used to fuel the transportation of water by pipeline. The US could play a constructive role in fostering the development of regional trade in the Middle East and should support efforts to establish regional trade in natural gas and water that would provide economic benefits to the Palestinian National Authority and other nations in the region to promote a lasting peace and stable inter-state relations.

Cultural, Religious and Social Factors That Could Influence the Supply of Oil from the Middle East

There is nothing intrinsic in the Islamic religion or doctrine that endangers the production and distribution of oil and gas by Muslims or in cooperation with non-Muslims. However, Islam, like other religions, can be and has been employed by partisans to support or attack a wide array of political and economic positions. In the past, Saudi ruler and the founder of modern Saudi Arabia Ibn Saud received religious support for the involvement of foreigners in Saudi Arabia's oil industry on the basis of an Islamic injunction for the ruler to look after the public good. Other interpretations of Islam have

been fostered by opposition groups to counter Western interests but are rarely stated in terms of stark anti-Christian dialogue. Rather they focus on anti-capitalism in general, resource patrimony or the injection of "un-Islamic" values and activities into Muslim societies.

It need be noted that there is no monolithic bloc or international effort behind Islamic groups and movements. There is considerable diversity in how various movements around the Middle East and North Africa express the ideals of Islamic society and how such ideals should be implemented. Of the nearly 1 billion Muslims in the world, more than half live outside the Arab world and differ linguistically, ethnically, racially and culturally.

In the context of the Iranian revolution of 1979, Islamic fundamentalism expressed a preoccupation with the moral unity of the community or ummah and the role that Islamic religious law or Shariah plays in upholding this unity. Thus, beginning with Rashid Ridha, fundamentalists advanced the concept of an Islamic state as a vehicle to create an ethical community which prevents people from giving in to their baser desires. If the state ceases to fulfill this mission, where it tolerates the spread of corruption and social disintegration, the state is no longer Islamic and must be reformed or replaced. In the case of Iran, the philosophy ushered in a totally new set of goals and priorities. The revolution was at its heart presented as a demonstration of the failure and disenchantment with Westernization

in Iran, and upped the ante for the practice of revolutionary politics in the Middle East which had previously held a Marxist tinge. It leaned on five core principles: 1) the Western model of separation of church and state was to blame for Iran's social and economic ills and imbalances 2) these imbalances could only be repaired through the reassertion of Islam as a total way of life 3) a return to Islam would bring about restoration of lost Muslim power internationally 4) laws must be based on Shariah to bring a moral and socially just society 5) there must be a willingness for jihad and martyrdom in the cause of Islam. Further, Khomeini's constitution proclaimed that the goal of the new state was to "perpetuate the revolution both at home and abroad." 1 (Esposito, *The Iranian Revolution: A Ten Year Perspective*, p 31)

The introduction of Islamic fundamentalist doctrine does not by necessity pose a risk to oil and gas operations. Rather, the major risks to Western energy interests in the Middle East that might arise from Islamicist activities can be identified in the following categories:

- 1) violent attacks or threat of such action by action-oriented Muslim groups that target personnel or facilities. This is most likely to arise in cases where such a group holds the view that wealth derived from oil and gas is being employed by a government to weaken or destroy Islamic groups and activities or in response to perceptions that foreign oil firms are cooperating with a domestic political regime that is antithetical to Islamic interests.
- 2) imposition of investment or trade sanctions against avowedly Islamic countries for their perceived involvement in "terrorist" activities
- 3) the weakening or overthrow of governments friendly to Western interests by Islamically-oriented organizations.

In this latter case, however, it needs to be questioned whether a new Islamically-oriented government would turn its back on sustaining commercial relations in the oil sector. The case of post-revolutionary Iran is enlightening in this regard. After the 1979 revolution, Iran made a conscious effort to build economic ties to its developing neighbors such as

Pakistan, and India and emergent economies of Asia, Africa and Central Asia to the detriment of economic relations with the US in a "game" of alternative economics that emphasized Tehran's orientation toward Third World power politics. But the policy probably would have languished under the sheer weight of financial considerations but for the imposition of US trade sanctions which forced Iran out of the US market and necessitated increased marketing to the Third World.

To drive home the limits of a Third World-only trade policy, it need to be noted that even after the blockade on sales to the US, the foreign subsidiaries of US refining companies still stood as Iran's largest customers until 1995 when Congress forced the US President to close the loophole on any oil business dealings at home or abroad. In addition, trade between Iran and major European states and Japan remains brisk despite US arm twisting to the contrary.

To date, the Iranian revolutionary leadership has never sought to leave its oil in the ground rather than sell it to "infidels." If anything, Iran's oil industry, even with interference from the clergy, has remained commercially-oriented. Oil and gas has been used to open diplomatic initiatives or influence regionally, but always in an offer of supply rather than a threat of denial. Past evidence seems, therefore, to support the view that the West has little to fear a priori from Islamic governments with regards to oil flows. An Islamic orientation does not appear by its inherent nature to indicate a forthcoming deprivation of access to energy supplies for non-Muslims.

That being said, there is a side of Islamic culture that bears watching where the optimum development of oil resources is concerned. In popular Islamic culture, particularly in Iran, oil does not hold a prestigious place but rather is viewed as a negative, corrupting force. Indeed, the political and intellectual elites of the Middle East have tended to have an ambivalent attitude toward oil. On the one hand, oil has served as an important source of revenue to meet development goals, but on the other, oil resource wealth has invited "Western penetration and hegemony."

In popular Iranian culture, oil can be also considered a temptation or infatuation. To a common member of the Bazaari commerce class, oil is a corrupting influence, and there are those at the extreme who advocate to destroy all the oil facilities to eliminate dependence on the West. However, it is a large leap for a religious leader once holding the reigns of power to articulate an extreme policy such as the cutoff of oil flows or even limit sales to Islamic nations given the link between oil exports and external finance.

Questions remain as to how effective oil sanctions have been in restricting the flow of money into and out of Iran. However, some loss of oil productive capacity seems to have resulted from US-led restrictions on equipment procurement. To the extent that this has impacted Iranian export revenues, an impact on social welfare inside Iran is a key casualty. Again, ironically, worsening economic conditions inside Iran breed a widening audience for hard-line, Islamic-oriented policies, thereby raising the question as to whether sanctions are hitting where they are supposed to or in fact promoting the tendencies they were designed to dissuade against. The United States, with its global responsibilities, must maintain a firm and consistent policy on Iran. However, the US must also recognize that it has not been successful in bringing our allies and others to the same level of sanctions of Iran and that Iran continues its military buildup despite sanctions. The US domestic political crutch of sanctions policy also reduces incentives within government to find effective solutions to the military buildup in the Middle East which could probably be addressed by other more effective means. The possibility of constructive dialogue with the West can help keep alive the forces of reform in Iran, and therefore the US should leave open the door for future dialogue to be conducted openly and without preconditions.

While the US and Western allies can respond effectively and successfully to military adventurism in the Gulf region, fashioning effectual policy responses to internal instability or anti-Western or anti-American ideological movements will be far more difficult. The western powers have exhibited the will and capacity to respond to events such as an Iranian or Iraqi military threat to the free flow of oil from the Gulf. Internal upheavals may pose different, more thorny problems, however. And, the chances of such turmoil increases as the region moves toward the transfer of power from the current

generation to the next as the century turns. US policy toward the Mideast Gulf is being driven today primarily by a preoccupation with military concerns. But while Gulf security remains in the vital interests of the US, policy toward the region must look beyond military issues to emerging situations for economic, political, social and cultural change, with special consideration given to the role of religious groups. We must assess what the US can and should do in the face of generational and regime change in the Gulf and in Iraq.

While attacks on oil facilities by Islamic elements have been limited to date, US military facilities have been targeted, demonstrating the vulnerabilities that could be exploited. The dilemma for the Western economies is that they, to large measure, must rely on regimes whose legitimacy could be weakened by anti-imperialist and Islamic-oriented philosophies.

Algeria presents a classic example that illustrates key factors serving as warning signs that Islamic activism might have a negative impact on energy production and distribution, including:

- 1) Islam as a means of identification for oppressed elements of a population;
- 2) A ruling political elite perceived as "un-Islamic" or "corrupted" by Western influences;
- 3) Close identification of a ruling elite with foreign aid or assistance, particularly where oil companies are perceived as aiding that elite

The employment of Islam as a rallying cry for the disaffected in Algeria would probably not have been as effective if it had not been for the fact that the ruling elite was perceived as religiously and culturally disconnected from the masses. Similar conditions do not exist at the present time in the Gulf region but certain trends bear watching, especially inside Saudi Arabia.

Moving to a Period of Transition in the Gulf

There seems little doubt that in the aftermath of the Gulf War, the Middle East Gulf region is moving toward a period of cultural and ideological transition. An open debate exists on the role of Islam versus the presence of American and other Western influences with no clear outcome to date. Outside of Iran, the region is struggling to distinguish a viable paradigm.

The search for new cultural and political ideologies can open the way for political instability in the region of the sort which might temporarily disrupt oil exports. This process of rethinking value orientations could accelerate between the year 2000 and 2010 when the older generation in Saudi Arabia, the United Arab Emirates, and Kuwait must pass the reigns of power on to the younger generation. The stationing of American troops in Saudi Arabia was a watershed and serves as a lightning rod for such debate, and there is an increasing gap between religious authority and the state in the kingdom. Besides opening up invocations against bringing the "infidel" to Saudi soil in the form of US soldiers, the Gulf War prompted sharp criticism that the Saudi and Kuwaiti regimes wasted huge swatches of the national budget on military arms purchases only to find that these weapons provided no real security to the state.

Windfall in oil revenues that have exceeded levels forecast in Saudi Arabia's 1996 budget will alleviate some of the socio-economic problems created by the financial belt tightening necessitated by the low oil prices of the late 1980s. The government is better able to pay its bills but burdens remain including sporadic power shortages and lower levels of public services currently available. A number of public facilities are also in need of repair and maintenance.

Experts believe the real crunch, if it ever materializes, will come over the issue of jobs. In the ten largest Saudi cities, the unemployment problem is impacting the middle classes with about 20-30% of people unemployed. In addition, there exists a discernible disinclination against factory work among the native population that thwarts broader development. Writes senior author Amir Taheri of in the leading Saudi daily Asharq al-Awsat which generally reflects official thinking, "There are, of course, still many

psychological barriers that prevent some Saudis from seeking industrial, technology-based jobs rather than positions within the bureaucracy and its numerous branches. But the fact is that the bureaucracy is no longer capable of producing the jobs needed...It is safe to assume that the bureaucracy will have to shed many jobs and accept "negative growth" over the next few years."

Changing Role of the Merchant Class

Traditionally, there has been a symbiotic relationship between the regimes in the Gulf and the wealthy merchant class. But even from this previously loyal sector, the regimes are finding new challenges to authority.

Future economic development will have to harness the private sector in a bigger way, giving more freedom of action. Nevertheless, privatization will raise expectations for political participation. To encourage private sector participation in certain industries, the government has had to make institutional and other organizational changes to entice private investment.

The business elites are calling for more accountability in the way the government operates and spends money. In particular, they want a more structured system of rules and regulations to be applied in Saudi Arabia and Kuwait. To the extent that this process of power-sharing proves difficult for these regimes, they have little means to silence the debate given the proliferation of information technology.

It is expected that the populations in the Gulf will demand public accountability for the national budget process and other allocations of assets as is already happening in Kuwait's Parliament. Many risks exist in how this process proceeds, and the accumulation of private wealth has created a generous, hard to control, internal source of finance for indigenous opposition movements.

In the midst of this minefield of cultural transition comes a generational transition of great challenge. Within the next ten years or so, the older generation of Gulf leaders must pass the reigns of power on to a younger generation where the field of politically-

ambitious candidates is wide and potential for interpersonal conflict great. Succession disputes can be expected in several Gulf Arab states, including possibly Saudi Arabia and the United Arab Emirates (For more details, see Oil and Culture Seminar paper).

Against the backdrop of succession tensions within the Saudi royal family, is a broad cultural and demographic shift within the wider Saudi society. In recent years, a large, idle class of students has evolved inside Saudi Arabia. This development is of keen importance when studied in the context of revolutionary movements in the region in modern times. For example, the students of Qom and other religious centers provided a key momentum for the Islamic Revolution in Iran and a ready core of leaders to take part in a shifting cultural/political pattern of state organization there. Students have played similar revolutionary roles in Egypt, Algeria, and Baathist Syria.

From 1970 to 1990, the Saudi population doubled from 6 million to 12 million. By 1992, some 48% of Saudis were under 15, 58% were under 20 and 68% were less than 25 years old. Whereas during the 1980s some 10,000 Saudis studied in American and Western Universities, that number dropped to 3,500 by 1994. An increasing number of students are choosing the religious classes of study as they are considered the "easiest" to pass, creating a fertile ground of students with long beards and Islamic orientation. With employment opportunities in the kingdom low, the government is losing its ability to coopt this expanding group of the younger generation.

A basic contradiction exists in the kingdom today where the regime sits watching the University confer so many degrees in religious studies while at the same time it attempts to muzzle the expression of religious ideology. To date, the government's responses to perceived threats from Islamic dissidents has been either to take repressive actions in the political arena which have alienated the religious sector or to offer financial largess in return for stronger political allegiance. The latter has become increasingly difficult to administer given state revenue limitations. Some minimal administrative, political reforms have also been taken but they have not been effective in silencing the opposition. (for details see Oil and Culture paper, Von der Mehden paper).

Opposition movements are not considered an immediate threat to the Saudi regime as they lack credible organizational strength and support. However, the government clampdown on the activities of such groups has served to alienate the regime to some extent from religious authorities. The creation of a Majlis al Shura (Consultative Assembly) that has exercised a measure of authority, particularly regarding difficult decisions about expenditures, has played a constructive role in Saudi Arabia, analysts believe. While it is not expected that dissident activities will topple the Saudi regime, such movements can widen the gap between the state and society, lending an unspoken legitimacy to acts of violence by militants such as was seen in the al-Khobar attack.

As the Gulf region moves toward the succession of leadership from the older, traditional leaders to the next generation, the role of clergy will likely be reassessed. Clerical institutions are currently under severe pressures in almost all the countries of the Gulf Cooperation Council (GCC) to meet popular interest in fundamentalist movements. How they will balance fragile relationships with patron-establishments will have great bearing on future ideologies and political movements. Moreover, the leaders of the younger members of the ruling families will have to forge their own relationships with clergymen. However, the question remains whether this new generation will seek its legitimacy through patron relationships with religious leaders or through some other format. As power shifts in the Middle East region, many questions arise: Where will the new generation find its power base? What ideologies will it choose to motivate its populations? What kind of broad consensus will emerge in the Middle East? What is the potential for a charismatic leader --Islamic or otherwise? So far, no clear philosophy or leader has emerged to inspire or unite the populations even within one nation, let alone throughout the region.

To prepare for this period of cultural and political transition, active engagement should be undertaken with potential leaders from the younger generation of political and religious elites to gain clearer understanding of their motivations and ideologies and to build bridges for long-term relations.

Opposition movements have focused on anti-Americanism and blame Western orientation for social and even economic ills. However, within the business community, criticism has centered on the Middle East regimes' inability to stimulate an adequate vision and implementation plan to promote economic growth. This opens the door to value orientations that begin with an economic rather than religious or political premise. The US should support governments of the Gulf states in promoting political reform and privatization of and broader participation in the economic system to diminish the manifestations of social injustice and economic deprivation which give rise to extremism. In doing so, however, we must remain attune to the unique cultural aspects of each society. Job creation can play an important role in diffusing support for radical fundamentalist movements.

The Asian Development Model

The Middle East is wondering "why it missed the boat," of economic progress, why it has failed to develop in a sustained manner like Indonesia or Malaysia, other Muslim countries that have been able to develop diverse economies that attract foreign investment. As the weaknesses of the Iranian-style model of Islamic government particularly in the economic sector become more transparent to regional populations, a new inclination is emerging, particularly in the commercial classes, to admire the Asian development model. Citizens of Dubai, for example, aspire to be like Singapore or Hong Kong.

The Mideast countries are moving away from the Euro/American models in favor of copying the Asian model of economic growth which is seen as more closely protective of moral order and less oriented toward individual freedoms. Questions arise whether, given the wide-spread use of non-indigenous labor and the lack of a similar work ethic to the East, the export-based Asian model can succeed in the Middle East as a means of cultural organization.

Another possibility is the non-zero sum alternative economics model of regional trade-oriented political organizations that transcends national boundaries and nation-state identities, such as is now emerging in Europe under the European Union model. Regional

water, electricity and natural gas grids would be a starting point for a Middle East economic union that promotes local trade and prosperity. Already, such images have been generated on paper in the Arab-Israeli peace process but these proposals face steep political and cultural obstacles to actual fruition and acceptance by the general population.

The Outlook for 2000 and Beyond: Energy Policy Issues

Acknowledging the difficulties of influencing political, socio-economic factors in the Middle East, it makes sense to investigate energy policy options that can lessen the importance of the region to oil markets and shield consumers from its geopolitical vagaries.

From the 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. Increased reliance on a handful of Middle East oil producers also enhances the potential for the exercise of monopoly power, especially during a supply disruption, and experience has shown that maintenance of moderate prices is better served when there is reasonable competition for marketshare within the Opec circle. Saudi Arabia has maintained its commitment to market stability and oil supply reliability for many years. At a recent speech in Washington DC, Saudi Oil Minister Ali Naimi noted that "For the past 15 years, through wars, revolutions, invasions, crises and increased consumption, (our standby spare production capacity) has been employed to offset disruption of world oil supplies. We remain committed to that policy."

Forecasts for the year 2000 and beyond reveal that if a majority of known prospects were developed on schedule in the competitive fringe producers which seek to maximize output, the amount of oil from the Middle East needed to meet rising oil world demand requirements could be greatly reduced even as production rates wane in the prolific North Sea as predicted for the turn of the century (see Soligo, Mieszkowski, Jaffe paper). For example, applying the US Department of Energy's conservative estimate for non-Opec output of around 44 million b/d would mean at least an extra 3 to 7 million b/d would be

needed from the residual suppliers of the Mideast Gulf to maintain moderate prices, assuming world oil demand grows by 2-3% per annum between 1995 and 2000. If Iraq doesn't return to markets, the gap would be even larger.

Saudi Arabia's role in opting to raise output would be a major factor in determining oil prices under the DOE's scenario. At present, the kingdom has not responded to rising prices by raising output. Modeling exercises can help interpret the Saudi decision-making in this regard (See Sickles paper). Limited preliminary simulations which used data representative of a country like Saudi Arabia indicates that the kingdom's current production levels are driven more by short-term financial concerns than long-term economic considerations. This analysis assumes that decisions be based solely on long run dynamic profit maximization with the cost, revenue, and production functions taken into account. Modeling also showed that a producer like Saudi Arabia might find it more advantageous over a large number of years to produce at a higher rate, taking price, cost of money, revenue and cost of production functions into account.

Conversely, under a scenario where all reasonably economic identified non-Opec prospects now down on the books for implementation could come to fruition, the need for Saudi or other Middle East oil could be reduced significantly. Respected forecaster Petroleum Industry Research Associates (PIRA) anticipates that known non-Opec prospects could total some 55 million b/d in output by the year 2000, leaving a market oversupply of as high as 8 million b/d, meaning the world could do without ANY production from Saudi Arabia and still experience relatively moderate prices.

However, political, legal, economic and geographical constraints currently block development of vital resources in several oil rich countries in this competitive fringe. Several areas of development that are included in the PIRA forecast suffer from such roadblocks. Active policies that attempt to remove some of the barriers to investment and technology transfer to oil producers in Central Asia, Russia, Asia and Africa could dramatically reduce the pressure on oil markets in the years to come. The process of technology transfer and cooperation is already proving extremely successful in Latin America as will be discussed below. Trade activities that promote technology transfer

and increased investment in the oil industry can be encouraged in many fashions including educational and diplomatic initiatives that help remove investment barriers in oil prolific countries. Moreover, the private US and European drilling service industry could play a larger role, particularly if supported by US diplomacy, in assisting in the development of oil fields and technology transfer to oil producing countries that cannot or will not consider production sharing/joint venture participation by private oil companies. Service companies can be paid on a fee for service basis that will not interfere with nationalist concerns about resource patrimony.

The argument is often made in the popular press that the giant non-Opec oil basins found in the 1970s are being rapidly depleted, and that no new resources of major consequence have been identified since then. This thesis ignores new Basins unearthed in recent years in South America, Africa and the CIS. It also pushes aside major deposits of oil that have been found in new strata under existing fields, in deep water, or suspected to lie in new challenging frontier areas such as under salt or in polar regions. Among the Basins not yet fully explored and exploited are the Russian Arctic, Sakhalin Island, the Caspian Sea, Timor Gap, Malvinhas Straits, the Atlantic Front in northeast Europe, the Norwegian More and Voring Basins and the Barents Sea, to name a few.

On a more futuristic note, science continues to improve its understanding of the migration patterns of oil under the ground. Roger Anderson (Anderson 1993) points to recent research that discovered that reservoirs in the Gulf of Mexico are being refilled by migrating oil "from a much deeper source." By drilling into the source of this migrating oil so as to extract the oil before much of it seeps out to uneconomic areas, one would increase the amount of oil that is eventually recovered. He suggests that this "new play concept, if successful, promises to book some 20 billion barrels of newly found hydrocarbons in the Pleistocene Gulf of Mexico."

In sum, the world does not appear to have a shortfall of physical crude oil resources. The question is, rather, can these resources be rendered readily accessible and at what price? This latter question is the major challenge facing energy policy makers today.

In looking at the outlook for non-Opec in general, it needs be mentioned that overall oil price levels and taxation and fiscal regimes within non-Opec provinces will also play a major role in how much incremental production will be available after the turn of the century as will the cost of available drilling rigs and other equipment. Critics of optimistic forecasts note that much of the production that is available to come on line in the North Sea and other offshore areas in the next five to ten years must come from small, fast depleting fields whose development could be constrained by lack of readily available drilling rigs or floating platform system conversions that would be needed to complete the necessary well completions. The 170 exploration and appraisal wells planned in UK waters last year stalled at 102, for example, due to the lack of available rigs, according to consultants Wood Mackenzie. New technology will also play a pivotal role in whether rapid production declines can be staved off in mature areas like the big fields of the North Sea.

Prior to the collapse in oil prices in 1986, fiscal regimes generally were not designed to limit the impact from a price decline, and they unintentionally magnified the impact of falling oil prices (Eckbo 1987). Since that time, competition for limited investment dollars has brought about an improvement in fiscal terms and conditions that still has room for augmentation. Rates of investment can be influenced by improved cash flows from higher overall oil prices or improved rate of return from producers who have slashed royalties or removed other obstacles to application of foreign technology and investment capital.

The revamping of the UK Petroleum Revenue Tax (PRT) in 1993, for example, contributed to a more rapid development of a larger number of new fields in the North Sea. Certain prolific areas face either economic barriers or legal and political risk obstacles or lack of access to investment capital due to nationalistic concerns or embargo. The removal of investment barriers in Venezuela is case in point. Prior to Caracas' initiation of its new policy of "opening," all investment in oil field development had to be handled by the state monopoly Petroleos de Venezuela (PDVSA). However, dire economic conditions in Venezuela limited the level of investment in the oil sector that PDVSA could undertake. As late as 1995, forecasters were predicting Venezuelan oil

production would rise to 3.5 million b/d by the year 2000 before the impact of the policy of "opening" (which allowed foreign oil companies to make investments in identified Venezuelan oil fields on a production sharing basis) was fully understood. Now that PDVSA has had time to assess the programs of foreign oil companies entering its upstream sector, it currently expects oil production to hit 5 million b/d by the year 2000 and 6.2 million b/d by 2006, from 3.4 million b/d at present, and companies active in Venezuelan oil field projects confirm such targets are relatively realistic.

It is the domain of the policy-maker to identify areas where such obstacles can be removed or lessened for, as discussed above, oil markets would be less vulnerable to a major disruption under conditions where 1) oil markets carry a larger percentage of oil production outside the volatile Middle East, 2) where more competition is present inside Opec or any organization that might develop to replace it and 3) where oil supplies generally exceed demand by a substantial measure, thereby mitigating the impact of a loss of output from any particular location.

Russia and the Central Asian Republics have tremendous potential but legal, political and geographic constraints makes predicting the accessibility of these resources a risky proposition. In Russia alone, a study by Troika Energy Services commissioned by the US Department of Energy concluded in 1994 that up to 600,000 b/d of Russian productive capacity could be restored through simply the repair of idle wells at a cost of about \$1,000/daily barrel. US foreign policy towards Iran further complicates the ability to optimize Caspian resources by complicating the task of identifying pipeline routes, and the potential resources of Iraq and Iran are also curtailed by political factors.

The question of Iran and Iraq begs the question regarding the costs of the US policy of "dual containment" which attempts to isolate and control those countries through embargoes. Domestic political considerations aside, in practice, the effect of these sanctions has been to reinforce upward pressures on prices and to transfer a large amount of income from consuming to producing countries such as Iran which is gaining billions of dollars per annum from the current oil price hike. Also, by imposing sanctions, the US

is creating incentives for other nations such as China to form special relationships with sanctioned nations, raising balance of power concerns.

Political risk variables also thwart promising export projects in Sudan, central Africa, the Spratly islands, and to a lesser extent Algeria. In addition, several countries face financial constraints and/ or impediments to technology transfer and foreign investment that inhibits full utilization of available resources such as Mexico, China and Nigeria, among others. The costs of exploring Arctic regions and frontier deep water remain high at this juncture and might require additional fiscal incentives.

To further demonstrate the geopolitical stakes of a high production profile for countries outside the Middle East versus a low production profile, it is useful to look at sample forecasts for global oil supply and demand for 2000 and beyond that have been divided not along the traditional Opec/non-Opec lines but along geographic lines. Such analysis shows striking disparities emerging among the various regions and highlights what is likely to be an increasing dependence on Middle East supplies from Asian powers at the same time as US reliance on such supply may shrink given projections for large increases in Western Hemisphere production.

China was a minor importer of crude oil in 1995 but is forecast to become a large importer by 2010 as demand rises to 6 million b/d to 7 million b/d. Western projections for China's production for 2005 and beyond range from unchanged at 3 million b/d to up to 4 million b/d, implying a huge gap of 2 to 4 million b/d that will have to be made up by imports, mainly from the Middle East. China National Petroleum Corp. expects oil production to reach 3.5 million b/d in 2000 with demand 1 million b/d higher. A larger gap of 2.4 million b/d is anticipated by 2010 and 3.6 million b/d by 2015 (Xu, 1996). At the same time, Japan's oil needs are not scheduled to grow significantly as government policy encourages shifts to other energy sources though some sources expect a 1 million b/d increase given popular domestic objections to nuclear plant additions. South Korean demand will increase gradually by about 500,000 b/d over the next fifteen years to 2.5 million b/d. India will see bigger gains from 1.5 million b/d currently to 2.7 million b/d in 2010.

As regional oil markets tighten, competition for supplies will intensify, holding "potential for severe strains between Asian powers...Changing supply routes for northeast Asian importers may spark geopolitical rivalries along the vulnerable sea-lanes that link Asia with the Middle East." (Calder, 1996) Such maritime concerns have already been studied in depth by the National Defense University's Institute for National Strategic Studies (Noer, 1996) which concludes that "If access to key southeast Asian SLOCs is ever denied, freight rates would increase worldwide, at least as a result of long-term blockage of world shipping around there" giving the issue strategic and economic significance for all trading nations.

It is not difficult to imagine how such rivalries for energy supplies might intensify in the coming years, especially a major disruption from the Middle East. The imperative to relax such rivalries is brought home when consideration is given to the fact that territorial disputes over oil resources have already erupted between China and its neighbors. The danger from the point of view of maintaining a stable world economic and political order, is that Asian countries may react to their energy vulnerability by taking precautionary steps to ensure adequate supplies are under their sphere of influence. Such steps could involve forming alliances with Middle East nations and increasing military capability and projection of power. China, South Korea and Japan have all in recent years taken steps to enhance their naval presence. The US naval presence in Asian and Indian Ocean waters, as well as a protector of the Strait of Hormuz, complicates the challenge of power politics to the Asia energy import question.

US policy-makers have several challenges to address in America's foreign policy role in energy security into the 21st century. US-led sanctions on Iraq and Iran, which in the latter case have been extended at least on the books to include secondary boycotts, have contributed to a weakening of Japan's traditionally strong economic links with these two major producers. At the same time, China has moved in to fill the military gap experienced by these countries in light of Western military equipment embargoes, strengthening its position vis-à-vis Middle east supplies. To the extent that China deepens its military sponsor-client relationship with Iran and Iraq, a conflict between either of those Mideast nations and a US ally in the region would take on superpower connotations

reminiscent of the 1970s. Moreover, as the US considers its future role as the protector of the free flow of oil from the Mideast and into Asia, it will have to address domestic constituencies that may not fully understand the global nature of oil economics and will as such question US military policies in an environment where the physical import supplies entering the US may not in great measure derive from the Mideast but rather from Venezuela, Mexico, Canada and Latin America.

China may also wish to extend its influence beyond Asia and Iran to other nearby oil producing regions and support eastward oil and gas projects from Russia, Central Asia and Southeast Asia. Projects have been investigated from Russia's Krasnoyarsk, Irkutsk and Yakutsk to the China Yellow Sea with possible spurs to Korea and Japan and from Turkmenistan to east China.

It would be natural and prudent for Asia nations to assert influence with oil suppliers either through alliances or militarily unless formal arrangements could be worked out that provided some assurance of oil supplies in the event of supply disruptions. Building regional institutions that encourage cooperation among the Asian Pacific nations will be crucial as a policy to counter tendencies towards rivalry and competitive military buildups. One option would be to expand the International Energy Agency membership to include the emerging economies of Asia, including China, to diffuse energy insecurity. The IEA and the US Department of Energy could also provide know-how on strategic oil stockpiling, emergency response measures, alternative energy and energy conservation.

In the oil industry context, eliminating barriers to improved oil and gas resource development in Indonesia and China deserves priority. To the extent that CNPC has begun investigating "strategic alliances" with western oil companies in oil-rich West China, Western governments should support and encourage such efforts. Some analysts (Salameh 1996) have advocated that the provision of technology and investment be given conditional to peaceful resolution of maritime and territorial disputes, but it is unclear whether China would submit to such bargaining. Official development aid is not viewed by regional parties as likely to be an effective measure in the case of China but could help

prod enhanced Indonesian investment incentives in the energy sector that are considered necessary to improve the outlook in Jakarta.

Energy Policy Conclusions

Temporary disruptions are a common occurrence in oil markets. The energy security of oil consuming countries is enhanced when oil production comes from as diverse a base as possible, reducing reliance on any one particular geographic country or center and lessening the potential for a large scale disruption from any one area or country. Market stability is better served by competition within the Opec circle as well as by the buildup of inventory and spare productive capacity to cushion the blow of a sudden supply loss. If all known prospects were developed on schedule in the competitive fringe oil producers outside the Middle East, the amount of oil needed from the politically unsettled Middle East could be greatly reduced over the next decade, but political, legal, economic and geographic constraints currently block development of vital resources in several oil prolific countries in non-Opec. Also, the looming supply gap between regional production and demand in Asia and relative self-sufficiency of the Western Hemisphere could bring a shift in the geopolitics of oil in the 21st century. The danger, from the point of view of maintaining a stable world economic and political order, is that Asian countries may react to their energy vulnerability by taking aggressive precautionary steps to ensure adequate supplies are available in the event of a "crisis." Building regional institutions that encourage cooperation among the Asia-Pacific nations will be crucial as a policy to counter tendencies toward rivalry and competitive military buildups.