

A Producer's Perspective of Oil and Gas Supply Security

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The production and trade in oil and gas, their role in the economies of the producing and consuming regions, their relative shares in the world primary energy mix and their relation to the environment have shaped global economic and energy relations in the past three decades. This dominance has put oil, and to a lesser extent gas, at center stage in the global as well as national energy security debates. Oil's share in global primary energy consumption which declined from 50 to 40 percent in the past three decades is still the single most important energy source; the share of gas, however, has increased from 18 percent in the mid seventies to 24 percent today.

Although not often recognized, efficiency improvements in the whole energy value chain in the past three decades have impacted energy security. The U.S. economy, for example, grew by 150 percent in the past thirty years while its energy consumption grew by 25 percent. The OECD and the world's energy intensity declined from 2.5 barrels of oil equivalent (boe) per \$1000 GDP (in 1995 prices) in the seventies to 1.5 boe today (1.3 boe to 0.6 boe respectively for oil intensity). Conservation along with relatively lower oil prices contributed towards easing energy security concerns for most of the eighties and throughout the nineties. However, the continued dominance of hydrocarbons in global energy mix which declined marginally from 68 to 64 percent in the past three decades, have often times identified energy security with political developments in the oil and gas producing regions and/or oil price jumps.

The past three decades have also witnessed structural changes in world oil and gas demand patterns. The OECD oil demand which accounted for 70 percent of global demand in the seventies grew by an average 0.7 percent annually since then, while demand from the emerging economies in Asia and Latin America grew by an average 4 percent during 1975-2005 period which contributed to an increase in their share in global demand from 16 percent in 1974 to 36 percent today. The demand for gas, on the other hand grew by 1.7 percent annually in the OECD and 6.7 percent annually in the developing countries during the period, altering the relative shares in global gas demand, from 68 to 52 percent for the OECD and from 8 to 26 percent for the developing countries. The period also witnessed a change in the relative shares of the different sectors in oil and gas demand, where the less demand elastic transportation sector increased its share in oil demand while the more demand elastic power sector increased its share in gas demand.

On the supply side, relatively high oil prices in the seventies as well as declining costs and improving technology in the eighties led to increases in production from different regions outside OPEC of around 18 million barrels per day in the past three decades. This contributed to the diversity of sources of

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supply on the one hand and a decline in the share of oil in global merchandise trade, since most of the new oil was for local consumption or interregional trade. Advancements in exploration and production technologies and improved investment climate also contributed to enlarging oil and gas resources worldwide, refuting the "limits to growth" notion of the seventies. Proven oil reserves in 1975 estimated at 630 billion barrels doubled by 2005 after an accumulated production of around 750 billion barrels in the thirty-year period. Gas reserves, estimated at 80 trillion cubic meters (TCM) in 1975 stood at 180 TCM today after an accumulated production of 60 TCM during the period. Such supply diversity and hydrocarbon resource growth over time contributed also to easing the global energy security concerns.

The relative position of the Middle East in this overall supply picture is central. Its shares in global oil and gas reserves which stood at 55 and 20 percent respectively in the mid seventies increased to 62 and 41 percent respectively in 2005. During the same thirty years period, its combined oil and gas shares increased while its oil share declined from 37 to 31 percent and its gas share increased from 2.5 percent of world total to 10 percent in 2005.

Despite the association in few OECD countries between energy security on the one hand and reliance on Middle East oil on the other, history has demonstrated that the only alternative to Middle East oil has been from the region itself. When supplies were disrupted during the Iranian revolution in 1979, the Iran-Iraq war in 1980, Iraq's invasion of Kuwait in 1990, Venezuela's strikes of 2002, the war in Iraq in 2003, the gulf of Mexico's hurricanes in 2005 to name just few, other countries from the region, especially Saudi Arabia, provided the needed oil to the market.

On the industry side major changes have occurred which altered the whole business environment. The emergence of the national oil companies of the producing (and consuming) countries introduced new dimension to oil and gas investment and supply pictures. Today, companies such as Saudi Aramco, Brazil's Petrobras, China's CNPC, Russia's Gazprom and Mexico's Pemex to name just a few, play an important role in global energy relations. The NOCs control around 2.3 billion BOE constituting 64 percent of global oil and gas reserves, with all what that may entail in terms of influence over supply. For the IOCs, the wave of mergers and acquisitions in the international oil industry towards the end of the twentieth century reduced the number of the top twenty oil and gas companies worldwide in 1997 to seven today, further consolidating the energy industry.

The Future of Energy Security

Most of the world energy outlooks of the IEA, OPEC and DOE forecast continued oil and gas demand growth at a respective 1.5 and 3 percent annually through 2025 when oil's dominant share in the world energy mix declines marginally to 37 percent. And the gas share increases to 30 percent where both are expected to account for two thirds of global energy consumption and more than 85 percent global energy trade by 2025.

The declining OECD share in global oil and gas demand

is forecast to continue, reaching 48 percent by 2025. The developing countries of Asia, the Middle East and Latin America that have accounted over the past three decades for half of the increase in global oil demand are expected to account for 75 percent of the 38 million barrels per day projected increase in world oil demand by 2025. The transportation sector is projected to account for 60 percent of oil use due to the increase in vehicle ownership worldwide from 135 vehicles per 1000 inhabitants today to 193 vehicles in 2025 (from 38 to 95 vehicles, in the developing countries)

The projected increase in oil and gas demand and the availability of conventional and non-conventional oil as well as gas resources along with the projected production increase from different parts of the world such as Russia, the Caspian, Canada, West Africa, Latin America and the Middle East will lead to an increasing trade in energy resources, which necessitates rethinking the old energy security notions. Meeting global demand requires timely investment in the whole oil and gas chains from production to transportation to refining and processing and the related infrastructures. The OPEC Secretariat estimates total investment needed to increase production capacities in member countries to satisfy global oil demand in the reference case at \$95 billion by 2010 (for a 38 MBD projected OPEC production) and \$382 billion by 2025 (for a 51 MBD projected production) with the bulk of this investment coming from the Middle East. In case of a low world economic growth scenario resulting in 32 MBD production by 2010 and 42 MBD production by 2025, the estimated investment is reduced to \$70 billion in 2010 and \$258 billion in 2025. This uncertainty translates into an over or under-investment of \$25 billion and \$124 billion in the two respective years.

Since the future energy outlook points to increasing trade across regions, open and transparent energy markets are crucial to investment and to energy security. It is projected that irrespective of energy security concerns or related policy measures, OECD oil import dependency will increase from 55 percent today to 66 percent by 2025. China's oil import dependency is forecast to increase from 35 percent to 75 percent over the same period. The Middle East which has been providing the world with the incremental oil needs, due to its vast reserves, lower production costs, readily available capacity and diversified export routes is forecast to increase its production share to 40 percent of the projected world oil production of 115 million barrels per day in 2025 which will contribute to an increase in its share to half of the projected global oil trade of 70 million barrels per day in 2025.

While oil and gas import dependency was perceived as detrimental to energy security in the past, such perception in an era of globalization, free markets and a competitive world economic environment as well as an integrated global oil market is not warranted. Needless to say an increase in oil imports of this or that market, from this or that source, as the market dictates, need not jeopardize energy security. The growing dependence of the U.S. on oil imports since the seventies has not prevented it from becoming the world's single super-power, nor did oil and gas self-sufficiency (and surplus) of the former FSU prevent it from collapse. China's change from a net exporter

to a net importer since the mid-nineties did not undermine its economic performance or its energy security.

Producer's Perspective of Energy Security

The projected continuation of the dominance of oil and gas in the energy and economic scenes in the producing/exporting and consuming/importing countries for decades to come necessitates redefining the term "energy security" to account for the new global economic and energy relations. Therefore, the role of oil in the energy mix and of its imports to the consuming/importing countries economies and hence to their growth and prosperity is matched by its role in the economic development and industrialization of the producing/exporting countries. While the consuming countries are concerned about the availability and continuity of oil and gas supplies at reasonable prices to sustain their economic growth, the producing countries have equal concern about access to markets and the overall stability of oil markets at reasonable prices for their economic diversification and development. From such perspective, energy security is a shared concern among energy producers and consumers. The more supplies are secured and consumers feel as such, the more demand assumes its normal growth pattern at reasonable prices, providing security to the producers to invest to increase capacity to make supplies available.

Saudi Arabia on its part realizes the importance of market stability as a cornerstone to energy security. Realizing its dominant position in world oil reserves, production and exports as well as the role of oil in its economy, it has endeavored over the years (often times through coordination with other producers and consumers) to ensure that markets are adequately supplied at all times. It has built and maintained a production capacity of 11 mbd with a stated policy of keeping excess capacity of 1.5-2.0 mbd at all times to cushion against unwarranted price fluctuations or supply shortfalls and to ensure supply reliability. It is planning to increase capacity to 12.5 mbd through capacity increments of 2.35 mbd by 2009 to augment and add a further 1.5 mbd to existing capacity.

Market related oil pricing by Saudi Arabia and other producers through price formulas linked to the benchmark crudes traded in the major markets (WTI, BWAVE, DUBAI) help ensuring transparency and enhancing security, so is the investment in refining and marketing in the main consuming markets with long term supply commitments to such markets. Saudi Arabia is now committing more than one million barrels per day of its crude exports to its joint ventures in U.S., Korea, Philippines and Japan and China and plans to double such refining capacity by 2015.

Energy security has to be placed in the context of a global economy which is not only interdependent but in which world political and economic institutions either accommodate or reinforce that interdependence. Reciprocal security along the elements outlined above should be a major part of the global dialogue between energy producers and consumers. The energy industry at large (NOCs and IOCs) have an important role to play in alleviating energy security concerns of producers and consumers by taking the appropriate and timely investment decisions and entering into partnerships along the various oil and gas supply chains.