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PROPOSED IRAN-PAKISTAN-INDIA GAS PIPELINE: IMPLICATIONS FOR REGIONAL COOPERATION IN SOUTH ASIA

Abstract

For nearly one and half decades, India and Pakistan are negotiating with Iran for a transnational gas pipeline that would deliver gas to India *via* Pakistan. The rationale behind the pipeline are well conceived in terms of meeting increasing energy requirements of both India and Pakistan as well as providing a source of foreign currency for an oil dependent economy of Iran. However, a number of factors are hindering the project. The intra-regional political issues include basically the strained India-Pakistan relations that generate such serious concerns about the uninterrupted supply of gas to India as well as leaving India's long-term energy security to an unfriendly nation. There is also concern about the infrastructural security of the pipeline since it will travel through the volatile region of Pakistan. Moreover, there is extra-regional pressure emanating basically from the USA opposing the pipeline in order to isolate Iran. In such a scenario, question arises as to the feasibility of the pipeline. The present paper attempts to answer such questions viz., do the present requirements for energy cooperation provide adequate impetus for the concerned countries to overcome the barriers to the pipeline? Can economic benefits win over political considerations? And if the project materializes what will be its impact on regional cooperation in the energy sector in South Asia in particular, and on

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South Asian regional integration in general? The paper argued that the Iran-Pakistan-India (IPI) gas pipeline project would contribute significantly to energy cooperation in the South Asia region that in turn would strengthen other regional cooperation initiatives in the region. Suggestions have been made for measures that would ensure security of the pipeline as well as guarantee uninterrupted supply of gas to India. It is suggested that the leaderships of the concerned countries need to embrace the concept of 'geopolinomics' to grasp the multifarious benefits of the pipeline, and must take initiatives for immediate implementation of the project.

1. Introduction

"About the most fitful and wayward phenomenon in contemporary human experience is the political climate in South Asia. It is infuriatingly unpredictable. Hot spells follow frozen one, friendly winds suddenly turn furious, serene breaks are abruptly overtaken by hurricanes."[1] This and similar assessments of political environment in South Asia is a painful pointer to the highly volatile and unpredictable nature of inter-state relations in the region. However, political and security environment in South Asia is undergoing a gradual change over the recent years, with the transformation that is undergoing in international arena.

Traditional security issues are losing significance with concurrent gaining of importance of the security issues more of non-traditional nature. Terrorism has also become one of the serious concerns for the countries of this region. More importantly, economic considerations are fast gaining prominence over political considerations with more emphasis on resolving bilateral security problems persistent in the region. Given such a scenario, any cooperative effort in this region is well poised to make significant contribution to the accelerated and meaningful regional cooperation, benefiting the people of this region in terms of economic advancement and poverty alleviation. One potential area for such cooperative effort identified by the South Asian scholarship is

[1] Ross Masood Husain, "Geo-Strategic Compulsions of Peace Dialogue in South Asia: Possibilities and Problems," in *National Development and Security*, Vol. XIII, No. 4, Summer 2005, p-40.

regional cooperation in the energy sector.[2] South Asia as a whole is an energy deficient region (see Table 1). Energy resources in this region are not evenly distributed. Some countries have considerable reserves in hydrocarbons, and some have enormous hydro-electricity potentials. The region as whole, however, is highly dependent on external supply of energy resources. While Sri Lanka, a major hydro-electricity producing country in the region, relies heavily on external supply of energy resources that accounts for 78 per cent of its total commercial energy consumption, Maldives is a country that completely depends on oil imports (Table 1).

Realizing the importance of energy, India since 1994, has been discussing and negotiating with Iran for implementation of a natural gas pipeline project to import Iranian gas to India *via* Pakistan. The discovery of natural gas reserves in Iran's South Pars natural gas field[3] in the Persian Gulf in 1988 led the Iranian government to

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[2] There is a number of studies concluded by the scholars both from inside and outside the region, who suggested energy cooperation among the countries of South Asia as a potential area for forging meaningful regional cooperation in the region. To mention some, the studies conducted by Research and Information System (RIS), "Energy Cooperation in South Asia: Potentials and Prospects", *RIS Policy Briefs No. 8*, New Delhi, 2003; RIS, *South Asia Development and Cooperation Report 2004*; South Asia Initiative for Energy (SARI/Energy) *Regional Report*, "Regional Energy Security for South Asia"; Mahendra P Lama, *Energy Cooperation in South Asia*, paper presented at SAFMA Regional Conference, August 20-21, 2004, Dhaka; Mahendra P Lama, "Energy Cooperation in South Asia: Opportunities, Strategies and Modalities", Dhaka: *CPD-CASAC Research Programme*, 2004; Mohsin Khan (ed), *Economic Development in South Asia*, Tata McGraw-Hill, New Delhi, 2005; and Preety Bhandari, "India Country Study on Regional Cooperation in the Energy Sector in South Asia", *CPD-CASAC Research Programme*, 2003; all show and suggest various ways and means for regional cooperation in the energy sector in South Asia.

[3] The South Pars gas field is estimated to be the world's second largest reservoir of natural gas accounting for approximately 8% of the world's share with a reserve of 464 trillion cubic feet of natural gas. See, Usman Aminuddin, "Opportunities in the Development of the Oil & Gas Sector in South Asian Region", *Islamabad Papers No. 4*, Islamabad Strategic Studies Institute (ISSI), 2004. URL: http://www.issi.org.pk/Islamabad_paper/2004/oil_2004.htm accessed 17 January 2007.

increase their efforts to promote gas export. In 1995, Pakistan expressed similar interests to import natural gas from Iran, and signed a preliminary agreement in the same year for construction of a natural gas pipeline, linking the Iranian South Pars field with Karachi, Pakistan's main industrial port located at the Arabian Sea. However, the long-standing animosity between Pakistan and India kept the multibillion dollar pipeline project an ambitious plan, until the commencement of the composite peace dialogue process between the two countries in 2004[4].

With continuation of the composite peace dialogue processes, which on many occasions termed as irreversible, and the consequent improvement in the bilateral relationship between Pakistan and India, the dormant dream of IPI gas pipeline project gains a new momentum. At present, the concerned three countries i.e., Iran, Pakistan and India are on the verge of effecting a tripartite agreement to set the modalities and arrangements for India to import Iranian gas *via* IPI pipeline. While the rationale behind the project are well conceived in terms of meeting increased demand of energy resources both in Pakistan and India, a number of factors are endangering the project by creating significant barriers to the realization of the pipeline. These factors are basically part of South Asian politics – both intra-regional and extra-regional. Among the intra-regional political factors, the predominant issues that are hindering the project are the security of the pipeline and the issue of guaranteeing uninterrupted supply of natural gas to India. There has been an apprehension, prevalent among the policy makers and the strategists of India that, in case of any conflict between Pakistan and India, Pakistan may suspend supply of the pipeline gas to India, in effect subjecting India to the wishes of Pakistani leadership. The other

[4] The India-Pakistan Composite Dialogue Process, borne out of the 6 January 2004 Joint Statement made by the former Indian Prime Minister Atal Behari Vajpayee and the Pakistani President Gen Pervez Musharraf during the 12th SAARC Summit held in Islamabad, Pakistan, in 2004. For discussion on Pakistan-India Composite Dialogue Process see, KS Manjunath, Seema Sridhar & Beryl Anand, "Indo-Pak Composite Dialogue 2004-05: A Profile", *Special Report 12*, Institute of Peace and Conflict Studies (IPCS), February 2006. URL: www.ipcs.org accessed 17 January 2007.

important issue that crop up in the pipeline is its infrastructural security, particularly in relation to the militant autonomy movements in Pakistan. As proposed, the Pakistan portion of the pipeline will travel over its Balochistan province, which at this point of time is one of Pakistan's most volatile areas. There is an intense as well as violent movement for provincial autonomy. The militants even target the domestic supply routes of energy resources.

The extra-regional sources of impediments to the pipeline emanate basically from the strenuous opposition of the United States of America to the project. The USA alleged that the project will accrue handsome benefits to one of its present day adversaries i.e., Iran,[5] which in effect may sponsor increased Iranian investments in their controversial nuclear programs. Given such impediments, the pipeline may appear at times unrealistic but the economic imperatives may prevail paving the way for materialization of the project. Thus, giving rise to a number of questions as to the prospects of the pipeline, and its implications for South Asia region. First, what are the rationale behind the pipeline, and can these factors would be able to overshadow the political impediments? Secondly, can economic benefits win over political considerations? Thirdly, if the leadership of Pakistan and India succeed in materializing the project, what will be its impact on regional cooperation in the energy sector in South Asia? The present paper attempts to deal with these and related questions.

The paper is divided into seven sections. While this introduction is the first section, the second section analyses the genesis of the pipeline and its proposed route. The third section provides an analysis of the rationale behind the pipeline, focusing on the energy needs of both Pakistan and India as well as that of the South Asia region as a whole. In section four, intra-regional and extra-regional political factors that are hindering the project are analysed with a view to assessing the impediments and evaluating the potentials of the leadership of the concerned countries to overcome these

[5] The US-Iran relations, in this 21st century, deteriorated at the lowest ebb when President George W. Bush in his State of the Union speech in January of 2002, the first one after September/11, 2001, identified Iran in the "axis of evil" along with Iraq and North Korea.

impediments. The fifth section would probe into the impact of the pipeline on the process of regional cooperation. The paper would also discuss the present status of the project and shed some light on its future prospects in sixth section. Some policy recommendations regarding the security of the pipeline and the proper utilization of the project have also been explored in this section. Finally, section seven includes some concluding observations and recommendations.

2. Genesis of the IPI Pipeline and the Proposed Route

2,670 km in length, proposed IPI gas pipeline is expected to deliver gas from Iran to India via Pakistan. The project was conceptualized in 1989 by R K Pachauri, then Director of the Tata Energy Research Institute (TERI), in partnership with Ali Shams Ardekani, former Deputy Foreign Minister of Iran. Pachauri proposed the plan to both Indian and Iranian governments in 1990. The Government of Iran responded positively to the proposal and Ardekani backed Pachauri's proposal at the annual conference of the International Association of Energy Economics in 1990.[6] The initial response from New Delhi was sceptical, with Indian politicians wary of leaving their long-term energy security in the hands of Pakistan – especially during a period in which their relations were becoming increasingly sour.

Later, during the Gulf War, India realized the urgency to diversify its energy supply sources. In 1991, Iraq and Kuwait together supplied two-thirds of India's oil; when the war broke out, India's oil supply was reduced from 15 million tons to 5 million tons overnight.[7] This incident left a deep imprint on Indian psyche regarding energy security and the country remains on a sharp and constant alert regarding its vulnerability in terms of the fulfilment of energy requirements. All these led India to explore a wide diversity

[6] Shamila N Chaudhary, "Iran to India Natural Gas Pipeline: Implications for Conflict Resolution & Regionalism in India, Iran, and Pakistan", *TED Case Studies*, Vol. II, No. 1, January 2001. URL: http://www.american.edu/TED/iranpipeline.htm, accessed 12 December 2006.

[7] David Temple, "The Iran-Pakistan-India Pipeline: The Intersection of Energy and Politics", *Research Paper No. 8*, Institute of Peace and Conflict Studies (IPCS), New Delhi, April 2007, p-06.

of options to fulfil its ever-increasing energy requirements. Thus, in 1993, India came to sign a Memorandum of Understanding (MoU) with Iran to import Iranian gas through pipeline. India also explored other options for pipelines. An agreement for an underwater pipeline project from Oman was signed in 1994. However, the project soon collapsed due to financial and technological difficulties.

But, when India began to entertain the IPI project, Pakistan resisted the idea. Due to existing lack of confidence between Pakistan and India, the former was reluctant about the project. There was also strong resistance amongst the army and the intelligence agencies who worried about the pipeline's long-term benefits to India.[8] Moreover, at that time, the Pakistani leadership also worried about the long-term impact of improvement in Iran-India relations. Consequently, as reported, in 1995, Pakistan refused to allow a feasibility study in its Exclusive Economic Zone (EEZ), the 200 kms of water that extend from its shores.[9] When Nawaz Sharif returned to leadership in 1997, he supported the Asian Development Bank's (ADB) proposal for a Turkmenistan-Afghanistan-Pakistan (TAP) pipeline project bypassing the IPI project. Pakistan's reluctance, combined with considerable disquiet in India, led New Delhi to look into several alternative options for laying the pipeline from Iran. Aside from the overland route, India also investigated two other options: a deep sea route and a shallow water pipeline.

However, upon his accession to power, General Musharraf, contrary to general apprehension, supported the idea of IPI pipeline probably realizing the importance of energy imports for meeting Pakistan's future energy requirements. Another important factor might be the deterioration of the political situation in Afghanistan that persuaded Pakistani government to think of IPI pipeline instead of TAP pipeline, as the only realistic way of meeting its energy demands. In April 1999, the Iranian and Indian governments established a bilateral task force of businessmen and government officials to look at the economic and industrial feasibility of

[8] S Pandian, "The Political Economy of Trans-Pakistan Gas Pipeline Project", *Energy Policy*, Vol. 33, Issue 5, March 2005, pp-659-70.

[9] F Naaz, "Indo-Iranian Relations: Vital Factors in the 1990s", *Strategic Analysis*, Vol. XXV, 2001, pp-227-41.

developing the pipeline, and at the end of the same year General Musharraf visited Tehran to discuss bilateral relations as well as the pipeline project.[10] This visit was followed by a number of diplomatic initiatives. In March 2000, the Pakistani Secretary of Petroleum visited Iran to formally agree to the pipeline project. Iranian government officials visited Islamabad later in April 2000 to sign the contract. Pakistani energy minister guaranteed in July 2000 to both Iran and India that security of the pipeline remained the topmost concern and would be ensured.

Finally, the breakthrough came in January 2005, when Iran, Pakistan and India agreed to undertake the project as a commercial venture. The first real progress in the technological, commercial and legal aspects of the pipeline took place during the first six months of that year.[11] The meetings took place bilaterally between Iran and India, and between Iran and Pakistan. This method ensured that political disputes would not eclipse the focus of the meetings. In May of 2005, an Indian delegation went to Tehran but realized that having never built a pipeline before, it lacked the technological and commercial knowledge to proceed. After a month of research, the delegation returned to Tehran and presented the first detailed project outline. According to the Indian ministry of Petroleum and Natural Gas, the meeting encompassed such matters as 'gas reserve certification and allocation, gas quantity and buildup, gas quality, system configuration, and project structure.' For the first time, the meeting also touched upon politically sensitive issues such as 'pipeline routing, delivery points, transportation tariffs, transit fees, capital and operation costs, and pipeline security.' Between June and December of that year, nine other bilateral meetings took place.

In December 2005, India agreed to take part in trilateral meetings, the first of which took place in January 2006. Several major players from the gas industry attended the meeting and a variety of international companies made presentations on the relevant technology. Aside from price and a few details of contractual structure, the delegates from the three countries agreed on most of the important aspects of the pipeline, such as pressure,

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[10] Shamila N Chaudhary, *op. cit.*
[11] David Temple, *op. cit.*, p-07.

thickness, etc. Bilateral meetings have continued to take place, but with the international gas market lacking any formal pricing structures, disagreements over pricing of gas persisted.

However, the following map shows the pipeline's main route. The pipeline will originate in Assaluyeh of Iran, on the coast of Persian Gulf near the Iranian South Pars gas field. Stretching over 1100 km in Iran itself, the pipeline will travel to Pakistan through Khuzdar, with one section of it going on to Karachi on the Arabian Sea coast and the main section travelling on to Multan, Pakistan. Therefore, in Pakistan, it will pass through Balochistan and Sind provinces. From Multan, the pipeline will travel to Delhi, where it ends. At this point, according to agreement, India is free to consider and negotiate further domestic routing of the pipeline. The pipeline is proposed to be of 48 inch diameter and initially it will carry around 60 million cubic-metres of gas per day, split equally between Pakistan and India. The total cost of the project is estimated at US$7.4 billion.[12] Four major companies have expressed interests in constructing the pipeline. They are BHP of Australia, National Iranian Gas Company (NIGC), Petronas of Malaysia, and French Total. A consortium consisting of Shell, British Gas, Petronas, and an Iranian business group already existed and was negotiating how to export gas from South Pars to Pakistan. The NIGC and the Gas Authority of India Limited (GAIL) are also involved in the project.[13]

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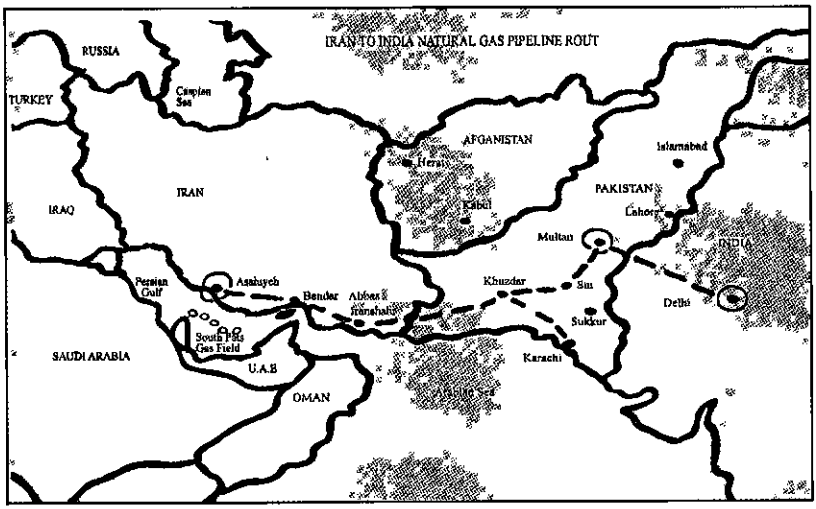
[12] *Daily Times*, "Pakistan and India to discuss IPI transit fee on 27th", June 25, 2007.

[13] Shamila N Chaudhary, "Iran to India Natural Gas Pipeline: Implications for Conflict Resolution & Regionalism in India, Iran, and Pakistan", *TED Case Studies*, Vol. II, No. 1, January 2001. URL: http://www.american.edu/TED/iranpipeline.htm accessed 12 December 2006.

Map 1: Proposed Route of Iran-Pakistan-India Gas Pipeline



Source: Shamila N Chaudhary, "Iran to India Natural Gas Pipeline: Implications for Conflict Resolution & Regionalism in India, Iran, and Pakistan", *TED Case Studies,* Vol. II, No. 1, January 2001. Available online at http://www.american.edu/TED/iranpipeline.htm, accessed 12 December 2006.

3. The Rationale Behind the IPI Pipeline

The rationale behind the IPI gas pipeline derives basically from three factors. The foremost is the demand for energy resources in Pakistan and India, and the question of how to meet that demand. The second point is the overall energy scenario in South Asia, its demand-supply gap in the energy sector, and how a trans-national pipeline from Iran would benefit the region in terms of meeting its escalating energy demands. The other important factor lies on the part of the supplying country i.e., Iran, since the country urgently needs to reduce its excessive dependency on oil exports and increase its export earnings particularly through non-oil exports, within a faltering economy. Moreover, according to many energy experts, South Asian market is economically profitable and geo-politically viable for Iranian and Central Asian energy resources. The following evaluation of the rationale behind the IPI pipeline is done on the basis of the detailed analysis of the factors mentioned above.

3.1 Energy Overview and the Demand-Supply Gap in India

Secured and uninterrupted supply of energy resources has been the basic building block for socio-economic development of any country or a region. Steady economic growth of a country depends on the long-term availability of energy resources in increasing quantities from sources that are easily accessible and available, socially acceptable and environment friendly. Energy has become so important that scholars have now become more concerned with the energy security of growing economies, and as such it has achieved the pre-eminent position in the security analysis of a particular country especially from non-traditional security perspective. If we go through recent literature on Indian energy sector, the findings show that the country is in severe need to diversify the sources of its energy. Given its current and projected rate of economic growth[14], ensuring adequate energy supply has become one of the foremost challenges faced by the country.

According to a report by the Planning Commission of India, if India is to sustain an 8 per cent level of economic growth, it has to increase its primary energy supply by at least 3 to 4 times and its electricity supply by a factor of 5 to 7 by 2031-2032.[15] Likewise, the power generation capacity will need to be increased from 120,000 MW to 780,000 MW. India's per capita energy consumption is also very low, in fact, one of the lowest in the world (see Table 1). India consumed only 435 kwh of electricity per person in 2003, compared to a world average of 2429 kwh[16]. Similarly, according to the Energy Information Administration (EIA), India's installed power generating capacity as of January 2003 was only 126,000 mw, compared to

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[14] In 2005, India's growth rate was 8.5 per cent (see Table 2), and it is projected to grow at the rate of around 8 per cent per annum for the next few years; even it is expected that, it may reach the double digit growth in nearest future.

[15] *Draft Report of the Expert Committee on Integrated Energy Policy,* Planning Commission, Government of India, December 2005.

[16] See, URL: http://www.nationmaster.com/index/php accessed 12 December 2006.

2,221,000 mw in the OECD countries.[17] Table 1, shows India's proven reserves, production, consumption and imports of energy resources that include oil, coal, and gas, and also hydel and nuclear power. According to the 2001 census, only about 44 per cent of the country's households are electrified. Even among those who do have access to electricity, unscheduled outages, load shedding, fluctuating voltages, and erratic supply prevent optimal use. India's National Electricity Policy aims to meet total demand by 2012, with peak shortages overcome by adequate reserves. The policy endeavours to add 100,000 mw of targeted capacity increases to the national grid in the next ten years, which will almost double the 2003 electricity total – and is estimated to require investments of nearly US$177 billion.[18]

However, as world's third largest coal producer, India relies heavily on coal to meet majority of its current energy needs. India's primary energy supply mix scenario (see Table 3) shows that India is currently dependent on coal for 52 per cent of its energy consumption and will continue to do so in the foreseeable future (see Table 4). During the period 1984-2004, coal consumption in India increased from 140 million metric tons (mt) to over 400 mt annually, growing at a rate of 5.4 per cent per year. Of the coal consumed, 90 per cent is produced domestically while about 10 per cent is imported, primarily from Australia and South Africa.[19] It is projected that the coal demand will be 688 million tons per annum by the year 2020 (see Table 5). At current level of consumption, it is estimated that India's coal reserve will last for another 80 years and if 5 per cent growth per annum in consumption is factored in, then India will run out of coal in only 40 years.[20]

Of other energy resources, oil provides 34 per cent of India's primary energy supply. In 2004, India consumed 2.5 million barrels of oil per day. Of that 844 thousand bbl/d, or 35 per cent of the total

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[17] Energy Information Administration (EIA), Department of Energy, Government of the United States of America, *International Energy Outlook 2006*, Report No. DOE/EIA – 0484 (2006).

[18] See, Ministry of Power, Government of India, URL: http://powermin.nic.in/H accessed 12 December 2006.

[19] *Draft Report of the Expert Committee on Integrated Energy Policy, op. cit.*

[20] *Ibid.*

consumption was produced domestically, whereas the remaining 65 per cent was imported, with its dependence on import is growing quickly. However, while the consumption of oil has increased at 3.8 per cent per annum over the couple of years, India's domestic production has remained relatively stagnant and it is estimated that, India could only sustain for another 22 years at the current levels of production. The majority of India's oil goes to the transportation and industrial sectors. The EIA has predicted that Indian oil consumption will increase considerably by 2010, reaching 3.1 million bbl/d and by 2025, that number is expected to increase to 5.5 million bbl/d, showing a growth of about 4 per cent a year.[21] However, the EIA's estimations are based on very low GDP growth rates for India, and it is likely that oil dependency will grow faster than these numbers suggest. Moreover, there exists substantial concern that an oil-dependent India would drastically impact international supply thus necessitates immediate diversification of the sources of its energy to avoid the possibility of debilitating supply disruptions later.

Currently, natural gas provides only 7 per cent of India's primary energy supply mix but it is projected to be 20 per cent of the total primary supply by the year 2024-25 (Table 4). The country's proven reserve is 38.8 trillion cubic feet, and it currently produces and consumes 964 billion cubic feet per annum (see Table 1). The majority of gas is consumed by the power and fertilizer sectors, which taken together comprise about 75 per cent of gas sales.[22] Demand in these two sectors has grown simultaneously with increased electricity consumption. The government estimates that 71 per cent of the total increase in demand for gas between 2005 and 2025 will come from electricity-generating consumption.[23] However, the Indian Government has projected that from 49 billion cubic metre (bcm) of gas consumption in 2006-2007 India's demand for gas is expected to rise to 125 bcm by 2024-2025.[24] While optimists predict that India will be able to meet 42 per cent of this demand

[21] "Asia's Thirst for Oil", *Wall Street Journal*, 5 May 2004. URL: http://www.iags.org/wsj050504.html accessed 12 December 2006.
[22] David Temple, *op. cit.*, p-18.
[23] *Draft Report of the Expert Committee on Integrated Energy Policy, op. cit.*
[24] *Ibid.*

from domestic supplies, over 75 bcm of natural gas will still have to be imported each year either as LNG or through pipelines.[25]

India also receives decent amount of energy supply from nuclear energy and hydro-power resources. Together they provide 6 per cent of India's primary energy supply mixture.[26] Currently, nuclear energy provides 3,900 mw of electricity to the power sector per year – roughly 3 per cent of the total power use. According to the report of the Planning Commission,[27] even if India's nuclear power generating capacity increases 20-fold by 2031-2032, it would still contribute at best 5-6 per cent of the country's total energy mix. Moreover, in a different study, it is projected that by the year 2024-25 nuclear capability would contribute only 3 per cent of India's total energy supply (see Table 4). On the other hand, one of India's limitations in exploiting its nuclear capability is its inadequacy of domestic uranium reserves. Domestic uranium supplies can only fuel 10,000 mw of Pressurized Heavy Water Reactors. The quality of the country's uranium is also extremely low, being extracted at less than 0.1 per cent ores compared to 12-14 per cent ores that can be found elsewhere.[28] Nevertheless, the country has put significant political and intellectual capital into the development of its nuclear energy program. The hydro-power, on the other hand, currently provides 30,936 mw of electricity per year, or 26 per cent of the total electricity production.[29] Until 1980, the growth rate of hydro and thermal power generation in India was roughly equal. Yet, during the 1980s, hydropower grew at only 4.4 per cent per year compared to 11.6 per cent growth in thermal generation.[30] It is estimated that even if India were to exploit its full hydro potential of 150,000 mw, the

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[25] "India Faces Challeges Meeting Gas, LNG Import Needs", *Oil and Gas Journal*, 6 February 2006.

[26] Nuclear power provides 1 per cent of India's total primary energy supply.

[27] *Draft Report of the Expert Committee on Integrated Energy Policy, op. cit.*

[28] David Temple, *op. cit.*, p-15.

[29] Ministry of Power, Government of India. Website: http://powermin.nic.in accessed 17 January 2007.

[30] *Draft Report of the Expert Committee on Integrated Energy Policy, op. cit.*

contribution of hydro energy to the energy mix will only be around 1.9-2.2 per cent by the year 2032.

Preference of Natural Gas to Meet the Demand

The above discussion shows striking demand-supply gap in India's energy sector. Projections made by various studies indicate that the gap would widen if necessary measures are not taken immediately. India must diversify its energy resources and also the supply sources of traditional energy resources including coal, gas and oil. The country requires massive investments in its energy sector to meet its projected demands. However, with serious limitations facing the development of the coal, oil, nuclear and hydroelectricity sectors, it seems self-evident that India should place a premium on natural gas. The country has considerable domestic reserves and the cost of gas in the international market is significantly cheaper than that of oil. It is more cleaner and environment friendly than oil. Demand for gas as clean energy is increasing worldwide. Currently it accounts for 21 per cent of global energy supply, with higher proportions in the relatively mature markets of North America and Europe. And it is projected that by the year 2030, natural gas would account for 23 per cent of global total energy supply mix (see Figure 1). Due to its clean nature, energy experts term natural gas as "the fuel of the 21st Century". Moreover, gas is a multi-purpose fuel that can be used in addition to domestic consumption, in the industry, in power generation and also for fertilizer production so far India as well as any other country of South Asia is concerned. In India, private sector companies have also demonstrated a willingness to invest in the necessary gas infrastructure for both domestic production and imports. However, as said earlier, given India's limited reserve, the country has to import significant amount of gas if it has to meet its demand for natural gas as primary sources of energy supply, thus raising the question of how to import – through pipelines or in the form of Liquefied Natural Gas (LNG)?

Preference of LNG or Pipelines as Import Option

LNG is natural gas that is cooled to -161°C, at which point it becomes liquid. In liquid form, the gas occupies only 1/600th of its

original volume, making it convenient for shipping. However, in order to cool the gas and keep it at such low temperature, a capital intensive infrastructure is involved, forcing up the cost of gas. LNG plants, special ships outfitted with cryogenic cooling tanks, regasification terminals and domestic transmission infrastructure all add up to make LNG a relatively expensive venture. Thus, natural gas is far cheaper if it can be obtained in its original form making the pipeline option as relatively more cost-effective way of transporting gas among the nations. Other advantages of gas pipelines over LNG's include (a) natural gas can be transported through pipeline up to 6000 km with currently available technology; (b) the volume of gas supplied through the pipeline can be increased easily; (c) the security and quality of supply of pipeline gas is guaranteed by long-term contracts on take or pay principle; and (d) pipeline gas provides the best opportunity for the development of economy due to its competitive price, stable and long-term supply.[31] Currently, only 25 per cent of world gas production is internationally traded, with 19 per cent being transported through pipelines, and 6 per cent being traded as LNG.[32] The majority of the pipeline trade takes place in Europe and North America. By contrast, LNG imports tend to be more prevalent amongst East Asian consumers such as Japan and North Korea who do not have access to nearby gas supplies.

For India, the LNG option should be examined carefully, as reported by the energy experts, "especially in the light of the large irreversible investments involved, high outflows of hard currency, and the likely impact of devaluation of the rupee on the landed price of LNG. LNG should at best constitute 20-30 % of total gas imports into the country".[33] Situated between the major LNG export markets of the Middle East and the Southeast Asia, India is in a geographically ideal location to take advantage of global LNG trade. In the late 1990s, India's Foreign Investment Promotion Board (FIPB) decided to take advantage of the LNG imports, and approved twelve prospective LNG terminal projects to that effect. Of these twelve projects, five have actually been built. In 2003, Petronet, India's

[31] Usman Aminuddin, *op. cit.*
[32] David Temple, *op. cit.*, p-18.
[33] *Report of the Group on India Hydro-carbon Vision 2025,* Government of India, New Delhi.

largest investor in state-sector projects and a joint-venture between ONGC, OIL, GAIL, the National Thermal Power Corporation (NPTC), and Gaz de France, signed a 25 year sale-and-purchase agreement with Qatar's Rasgas. The US$2.53 MMBtu price was low enough to convince Petronet to build a 5 million meter a year (mm/y) LNG import terminal at Dahej, which came into operation in 2004, receiving India's first shipment of LNG on January 30, 2004. However, the gas purchased by Petronet for US$2.53 MMBtu sells in India for US$4-4.5 MMBtu once the insurance, freight, and regasification costs have been added.[34] Following this success, and eager to get a stake in India's massive market, Shell Group built an LNG import terminal of their own at Hazira in Gujarat and signed contracts for LNG imports from Oman. The Hazira terminal went into operation in November of 2004, and Petronet's second terminal at Kochi is expected to go onstream in 2009. Thus, there are currently five LNG terminals either in operation or under construction in India.

However, the main constraints hindering India's emergence as a major LNG import country despite being in a geo-strategically advantageous position, is the growing price of LNG in the international market. Following a surge in the oil prices in the post 9/11 and the Iraq war period, which rocketed as high as over US$75 bbl, international spot prices for LNG have also climbed as high as US$10 MMBtu.[35] On the contrary, power developers in India claim that any price over US$3-3.5 MMBtu would not be economically viable. Although power sector reform and liberalization will reduce some of the price pressure on power sector, the problem seems likely to persist, at least in the near future. Thus, Wood Mackenzie's John Meagher has argued that Indian LNG demand growth is "highly uncertain and depending on, among other factors, the pace of gas market price reform in India."[36] Moreover, with spot prices hovering at around US$7.5 MMBtu in the US market, it is unlikely that India will be able to secure LNG for under US$5.5 MMBtu.[37] Thus, LNG

[34] "India Enters LNG Era," *World Gas Intelligence*, 13 January 2004.
[35] David Temple, *op. cit.*, p-21.
[36] "India's terminal story: First-time lucky, tough road ahead," *Platt's Natural Gas*, 25 July 2005, quoted in *ibid.*
[37] David Temple, *op. cit.*, p-22.

imports do not provide a good option for meeting India's energy needs until the electricity market is liberalized or technology improvements in LNG infrastructure decrease the cost of LNG in the international market. Considering all these, transnational pipelines are the most attractive options for meeting India's need of gas imports as they provide large quantities of hydrocarbon for long-periods of time as well as uniting the producer and consumer in a mutually dependent relationship.

3.2 Pakistan's Energy Scenario and the Need for Gas Import

Pakistan's economy has recovered from years of sluggishness with growth experienced in the agriculture, industry and service sectors. In the year 2005, the country achieved an impressive GDP growth of 7.78 per cent but an inflation rate of 9.8 per cent also accompanied this growth (see Table 2). This high inflation was attributed mainly to the escalating oil prices, higher housing rents and food item shortages.[38] The country has so far performed well and made good progress in structural reforms. Nevertheless, greater reforms in the public institutions, and accelerated reform initiatives in the energy sector have been stressed for sustained economic development in the country.

In recent years, the combination of rising oil consumption and flat oil production in Pakistan has led to rising oil imports from the Middle East exporters. In addition, the lack of refining capacity (only 5 refineries) leaves Pakistan heavily dependent on petroleum product imports. According to *Oil and Gas Journal (OGJ)*, Pakistan has proven reserves of 289 million barrels of oil as of January 1, 2007 (Table 1). The majority of produced oil comes from the southern half of the country, with the three largest oil-producing fields located in the Southern Indus Basin. Additional producing fields are located in the Middle and Upper Indus Basins. In 2004, all these fields produced 66,400 bbl/d of crude oil including NLG, NPG etc., whereas the consumption in the same year were 324,000 bbl/d. Oil provides 38 per cent of Pakistan's primary energy supply mix. However, the country had to import 306,000 bbl/d of oil of which

[38] "Pakistan", EIA *Country Analysis Briefs*, December 2006, available online at www.eia.doe.gov accessed 6 December 2006.

161,000 bbl/d was crude oil and 145,000 bbl/d were refined petroleum products (Table 1). Thus, Pakistan had to import almost 90 per cent (Figure 2) of its total oil consumption contributing to the overall dependence of the country for 24 per cent of its total energy consumption on external supply of energy resources (Table 1). Pakistan has ambitious plans to increase its current output to 100,000 bbl/d by 2010.[39] This would require increasing investments in the oil sector for the development of present and future oil fields. However, given its limited reserve, and slow pace of investment in the oil infrastructure, the country would continue to depend on oil imports. And it is projected that the country's oil imports will rise substantially in coming years as demand growth outpaces increases in production,[40] exerting increasing pressure on the balance of payments of the country.

Currently, coal plays a minor role in Pakistan's primary energy mix constituting only 6 per cent of the total, although the country contains an estimated 3,362 million short tons (mmst) of proven recoverable reserves. In 2004, Pakistan produced small amounts of coal only 3.5 mmst, and imports additional coal of 1.7 mmst to satisfy the domestic consumption of 5.21 mmst (see Table 1). With a handsome reserve, coal in Pakistan has enormous potential. Over the next ten years, coal can play significant role in meeting Pakistan's energy requirements in terms of establishing coal-based power technologies, integrated gasification combined cycle and the integrated gasification fuel plants. Large coal gasification plants will substantially enhance pipeline quality of gas into the reticulation system of Pakistan.[41] But all these require increasing investments in the development of coal fields in the difficult terrain of the Southern part of the country and also constructing power distribution infrastructure. Recently, the discovery of low-ash, low-sulfur lignite coal reserves in the Tharparkar (Thar) Desert in Sindh province, estimated at 1,929 mmst, has increased both domestic and foreign development interest.[42] China, which began developing various electric power plants in tandem with the coal mine in 1994 in

[39] *Ibid.*
[40] *Ibid.*
[41] Usman Aminuddin, *op. cit.*
[42] "Pakistan", EIA *Country Analysis Briefs*, *op. cit.*

Pakistan, has also shown interest in the Thar region. However, several factors are hindering the development of the Thar coal reserves, including the depth and moisture level of the lignite reserves, scarcity of fresh water, and lack of road and power infrastructure.[43]

Moreover, nuclear energy and hydropower resources provide decent amount of energy to Pakistan's primary energy supply mix accounting for 15 per cent of the total supply. Pakistan has one nuclear power plant, Chashma-1, with 462 mw of installed capacity (Table 1). The Pakistan Atomic Energy Commission operates the nuclear plant. The country is also working on second nuclear power plant (Chashma-2), with the assistance from China National Nuclear Corporation. The plant will have 325 mw of installed capacity and is expected to be in operation by 2009.[44] Hydroelectric power represents a third of Pakistan's power source, despite the fact that periodic droughts very often affect the availability of hydropower production in Pakistan. Water and Power Development Authority (WAPDA) controls the country's hydroelectric plants, with the largest being the Tarbela plant at 3,046 megawatts (mw) of installed capacity. Additional hydroelectric plants in operation include Mangla (1,000 mw), Warsak (240 mw), and Chashma (184 mw).[45] Although Pakistan has plans to develop additional hydroelectricity generation capacity, infrastructure constraints, such as access roads in mountainous regions, resettlement costs of affected populations, and the risks of environmental degradations have stalled the progress.

Natural gas, on the other hand, provides 41 per cent of Pakistan's primary energy requirements. Pakistan had a proven natural gas reserve of 34 trillion cubic feet (Tcf), at the year-end of 2005 (Table 1). In 2005, the country produced 890 billion cubic feet (Bcf) of natural gas and consumed all of this domestically. The major gas consuming sectors are power 40 per cent, fertilizer 18 per cent, industry 19 per cent, commercial 4 per cent and domestic use of 19

[43] *Ibid.*
[44] *Ibid.*
[45] *Ibid.*

per cent.[46] The Sui field, which is located in the Southern Indus Basin, is the largest gas production field of Pakistan, with an average production of 655 million cubic feet per day (Mmcf/d). Other producing fields include Mari (446 Mmcf/d), Sawan (366 Mmcf/d), and Bhit (316 Mmcf/d).[47] However, due to the ageing gas fields, natural gas production in Pakistan is expected to decline over the next 15-25 year period,[48] while gas demand is expected to increase from 3.7 bcf per day in 2005 to 4.6 bcf per day in 2015 (see Table 7). In light of the current onshore exploration activities and resource outlook, the Pakistani government expects minor increases in natural gas production in the short-term.[49] Thus it is also expected that the demand-supply gap in Pakistan's gas sector would also increase in the immediate future amounting to as high as one bcf per day by the year 2015 (see Table 7), thus, necessitating Pakistan to become a natural gas importer. The Pakistani government is seriously considering importing natural gas through pipelines and also in the form of LNG. In this regard, the IPI pipeline provides the best opportunity to the Pakistani leadership to meet its future demand of natural gas, and that is why Pakistan is pulling its resources in favour of this project, and made it clear that in case of any retreat on the part of the Indian side, Pakistan would pursue the project even unilaterally.

Other Economic Benefits for Pakistan:

Apart from a reliable and a cheaper source of energy supply, the IPI pipeline would also entail Pakistan other attractive economic benefits in terms of transit fees and royalties. As estimated earlier, in early 2000s, Pakistan will earn US$600-700 million per annum as transit fees.[50] There are other estimates too. In 2005, it is estimated that Pakistan may hope to earn US$14 billion in 30 years from the project, including US$8 billion in transit fees, US$1 billion in taxes

[46] Usman Aminuddin, *op. cit.*
[47] "Pakistan", EIA *Country Analysis Briefs*, *op. cit.*
[48] *Ibid.*
[49] *Ibid.*
[50] R K Pachauri, "The Pipeline of Peace - What could also flow through the India-Iran pipeline: improved Indo-Pak relations", *The Indian Express*, 21 January 2003.

and US$5 billion in savings.[51] Whichever estimate is taken, economic benefits in terms of transit fees and royalties for Pakistan are significant enough to consider the IPI pipeline more seriously and vigorously.

3.3 Energy Overview of the South Asian Region and the Need to Meet Increasing Energy Demand

In addition to meeting the increasing energy requirements of both Pakistan and India, the IPI gas pipeline may also turn to be a viable source of energy resources for other countries of the region, if it extends further. Economic and population growth in South Asia have resulted in rapid increases in energy consumption in recent years, well above rates seen in the OECD countries. The EIA estimates of South Asia's primary energy consumption showed an increase of 52 per cent between the years 1993 and 2003. In 2003, South Asia, with one-fifth of world's population accounted for approximately 4 per cent of world's commercial energy consumption, up from 3.1 per cent in 1993. Despite, this growth in energy consumption, South Asia continues to average among the lowest levels of per capita energy consumption in the world (compare table 1 and table 15).

So far reserves of energy resources are concerned, apart from India, Pakistan, Bangladesh, and Afghanistan, no other country of the region has any reserve of hydrocarbons (Table 1). Afghanistan does not have any proven reserve of coal and oil. It only has some estimated gas reserves of 120 billion cubic meters, although these reserves have not officially been validated and the resource evaluation is going on.[52] Moreover, the turbulent and traumatic history of Afghanistan, which witnessed a Soviet invasion, an almost decade-long war to repel this invasion, a bloody civil war following the Soviet withdrawal, and the latest US's war against terrorism in the soil of Afghanistan, all have left the country with wrecked socio-economic and natural resources infrastructure. Today, the prime

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[51] Mohammad Ramzan Ali, "Energy Resources and Regional Economic Cooperation", *Regional Studies*, Vol. XXIII, No. 2, Spring 2005. pp- 37-38.

[52] South Asia Initiative for Energy (SARI/Energy) *Regional Report*, "Regional Energy Security for South Asia", pp.1-4.

objective in Afghanistan is to rebuild the country wherein the energy security concerns focus mainly on rebuilding, restoring, and enhancing production capacity, exploiting the natural gas resources and making operational the energy supply systems.[53] India, on the other hand, has the World's fourth largest reserve of coal with a 10 per cent share of total world reserve. It is also the world's third largest producer of coal.[54] Nevertheless, with a 5 per cent growth in the consumption level, India's coal reserve can meet its demand for at best another 40 years. The country also has some reserves of gas, amounting to approximately 39 tcf, but these reserves proved to be insufficient to meet both the current and future demands of gas resources in India, as become explicit in the preceding discussion on India's energy security, implying the urgency to import gas via transnational pipelines.

An overview of South Asian energy reserve implies that the region is energy deficit (Table 1). Similar to the present scenario, it can easily be predicted that the region will continue to depend on external sources of energy supply in future unless any major initiative is undertaken to increase the supply of energy resources domestically or regionally. It is now widely believed that with unabated economic growth in India as well as in other South Asian countries the next geographical region to undergo sustained economic development is South Asia.[55] The most potential benefit that the IPI pipeline would accrue for the region of South Asia is that it will provide an energy corridor for this growing region to the energy resources of West and Central Asia. If materializes, and if the leadership of Pakistan and India is able to operate the pipeline successfully then it has all the potential for further extension to other countries of the region and even to China. Moreover, it is very likely that the IPI pipeline would provide impetus to the efforts of regional countries for various other transnational gas pipelines on which

[53] *Ibid.*, pp.2-7.

[54] Energy Information Administration (EIA), Department of Energy, Government of the United States of America, *International Energy Outlook 2006*, Report No. DOE/EIA – 0484 (2006), p.61.

[55] "The New Titans: A Survey of the World Economy", *The Economist*, September 16, 2006.

discussions and negotiations are continuing for long viz., the TAP pipeline, and the Myanmar-Bangladesh-India gas pipeline etc.

3.4 Iranian Economy and the Country's Need for Gas Export

From Iranian perspective, rationale for the IPI pipeline project emanates from the fact that the country is in urgent need of increasing its export earnings through diversifying its export basket and thus, reducing its excessive dependency on oil exports. In the past three decades, Iran's economy faced serious difficulties in terms of shrinking living standards, contracting public sector resource base, internal and external imbalances, high rate of inflation and unemployment, low level of domestic and foreign investment, and minor private sector participation. These economic hurdles derive partly from the long process of economic exhaustion of Iran during the Iran-Iraq war (1980-88), and partly from the deep rooted economic problems accumulated since the early days of the revolution. The end of war with Iraq in 1988 opened a new window of opportunity for economic reform and restructuring in Iran. Therefore, throughout the period of 1990s, Iran had to deal with restoring and sustaining the economic growth; bringing about an increase in per capita income in spite of rapid population growth; expanding employment opportunities and promoting price stability.[56] In the long-run, there was a need to diversify the export basket in order to reduce the exclusive dependence on oil.[57]

In an ambition to restructure and reform the economy, the government of Iran formulated five-year development plans that paid particular attention to fiscal and monetary stabilisation, the gradual removal of price controls and subsidies, the establishment of realistic interest rates, the liberalisation of trade and investment regulations, and the promotion of non-oil exports through the provision of appropriate incentives. The First Five-Year Development Plan (1989-1993), though well conceived and forcefully undertaken from the government's point of view, failed in practice, to address the

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[56] Mohammad Hassani, "Iran's Macroeconomic Performance and Economic Liberalisation: 1990-2000", in *India Quarterly*, Vol. LXI, No. 3, July-September 2005, p.118.

[57] *Ibid.*, pp. 118-19.

fundamental distortions in the economy that had developed during the second half of the 1970s and the notable deterioration of the economy during the 1980s.[58] According to government reports, GDP rose by an average of 7.2 per cent per year during the plan period 1989-93, in constant prices slightly below the target rate of 8.1 per cent. Though the initial phase of the plan, culminating in 1991, was marked by significant growth, the fluctuating performances indicated the failure to build stable long-term trends in the economy. Having recognised the structural problems of Iran's economy, it is argued that economy's growth rate during the first five-year plan was not the result of national economic planning but was caused by exogenous factors, such as the increase in the oil revenues during the second Persian Gulf War (1990-91).[59]

The Second Five-Year Plan (1995-99) called the Socio-Economic and Cultural Development Plan continued the liberalisation policies envisaged in the First Five-Year Plan, and opted for extensive deregulation in areas such as trade and price policy. In terms of sectoral changes, a sector-by-sector analysis in this period showed, average annual growth rates in constant prices were significant in the infrastructural sector, with a growth of about 12.7 per cent compared to the plan projection of 9.5 per cent.[60] The petroleum sector and agriculture experienced positive growth rates almost near to those projected in the plans. Nevertheless, the plan failed in the industrial and mining sectors, where the targeted rate was 15 per cent. Average annual growth of the two sectors did not exceed 8.2 per cent.[61] Though, the first plan was biased against the service sector, and planned to minimize its role in the economy, in practice, the service sector grew at an average annual rate of 7.4 per cent for the plan period, exceeding the projected rate of 6.8 per cent.

The early years of 1990s experienced an inflation rate of 25 to 28 per cent which increased as high as 35-37.4 per cent during the mid-years, and then declined at 16 per cent by the end of the decade (Table 8). Even at present the country continued to experience high

[58] *Ibid.*, p.119.
[59] *Ibid.*, pp.120-21.
[60] *Ibid.*, p.121.
[61] *Ibid.*, p.121.

inflation rate at 18 per cent in the year 2005 (Table 2). However, the relatively slow pace of economic growth and high rate of inflation throughout the 1990s led to the emergence of a stagflationary situation. In 1997, after the oil price crash, the government again undertook a remedial package, the so called *Tarh-e Saman Dehi Eghtesadi* ('Plan for the Amelioration of the Economy') to deal with the persisting economic problems. The focus of the plan was to address the implementation of needed reforms neglected by earlier plans, and also to address the lack of realism in some of the previous policies. Therefore, the plan stressed: (a) creation of job opportunities through improvement in the structure of production and productivity; (b) breaking up of existing monopolies and enhancing competition in economic activity; (c) increased taxation and fiscal reforms; (d) control of prices and wages; (e) expansion of non-oil exports; and (f) reform of monetary and exchange rate policies to conform with strict observation of the interest-free banking law.[62] However, the amelioration plan left the conflict between interventionist versus free-market policies unresolved and did not provide credible measures to deal with the stagflation situation of the country. Moreover, some specific remedies appeared problematic. These included, creating an atmosphere requiring a restructuring of the tax system and a reduction in inflation by ensuring an increase in output. Due to the partial failure of the development plans to correct macro economic imbalances, major economic problems e.g., high rate of unemployment and inflation, and the heavy reliance on oil exports continued to persist.

Perhaps, the most important characteristic of Iranian economy is its heavy reliance on oil. With the third largest proven reserves of oil (Table 9), Iran happens to be the fourth largest producer of oil with a world share of 5.2 per cent. The country is also the fifth largest exporter of oil with an oil export of 122 mt. in 2005 contributing 5.67 per cent of the total world export (Table 10). In the national economy, oil constituted the second largest share of the gross domestic product (GDP) during the period 1971-1975, with an annual average share of 31.12 per cent, and in 2003, the oil sector continued to contribute the fourth largest share to the GDP with the annual average share of 11.7 per cent (Table 13). Despite the various

[62] *Ibid.*, pp.124-25.

efforts and policies undertaken during the five-year plans to reduce dependency on oil exports by promoting non-oil exports, oil exports still contribute the major share of Iran's total export (Table 14).

Now, while oil happens to be a major export commodity for Iran contributing more than 81 per cent of total exports (Table 14), natural gas accounts for nearly half of Iran's domestic primary energy consumption (49 per cent, although the oil's share is 48 per cent), and the government is planning to invest billions in coming years to increase this share.[63] Although, Iran contained an estimated 971 trillion cubic feet of proven natural gas reserves (Table 11), which makes it the second largest reservoir of natural gas (15.44 per cent of the world reserves), it produced only 2.8 tcf of natural gas in 2005 of which exported only 124 billion cubic feet of natural gas (Table 15). Around 62 per cent of Iranian natural gas reserve is located in non-associated fields and have not yet been developed. According to *Global Insight*, major non-associated gas fields include: South Pars (280 – 500 Tcf of gas reserves), North Pars (50 Tcf) and Kangan-Nar (23.7 Tcf).[64] The price of natural gas to residential and industrial consumers is state-controlled at extremely low prices, encouraging rapid growth in consumption and replacement of fuel oil, kerosene and LPG demand. However, as the non-associated fields are yet to develop, Iran has all the potential to become a significant natural has exporter despite the fact that domestic natural gas demand is growing rapidly. It is projected[65] that Iran's share in world gas production would become 7.6 per cent by 2030 from 2.5 per cent in 2002 (Figure 3), and the country would become the third largest supplier of natural gas with its share of 8% in world gas supply by the year 2030 (Figure 4).

Given this scenario of the oil and gas sector of Iranian economy, and to meet the need for expanding gas market both at home and

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[63] "Iran", EIA *Country Analysis Briefs*, August 2006, available online at www.eia.doe.gov accessed 6 December 2006.

[64] *Ibid.*

[65] Amy M Jaffe and David G Victor, *Geopolitics of Natural Gas.* A study conducted jointly by the Energy Forum of the Baker Institute, Rice University and the Program on Energy and Sustainable Development, Stanford University, and presented in the Study Conference on May 27, 2004, Houston, USA.

abroad, South Asia provides the most potential, geographically viable and economically profitable market for the Iranian gas. South Asia happens to be the region of future growth with unabated demand for energy resources and, the region is also accessible from geographical point of view. All these factors as delineated above, contributed to the strengthening of efforts by the Iranian authority to export natural gas to Pakistan and India via the IPI pipeline. Nevertheless, numerous issues, which are basically political in nature and involve both regional and extra-regional actors, are hindering the process of finalisation of the pipeline project.

4. IPI Pipeline and South Asian Politics: The Impediments

The current agreement among Iran, Pakistan and India on trans-national gas pipeline is the outcome of intense negotiations for years among the parties. It has now nearly one and half decades elapsed since the proposal was first mooted in 1994. The proposal since its inception has gone through a problematic process of cost-benefit analysis by the concerned parties. As already discussed, economic rationale of the IPI pipeline project is based on solid foundation. Nonetheless, a number of difficult issues of political nature that involve regional as well as extra-regional actors are serving as almost insurmountable obstacles in the way of finalisation of the pipeline project. What follows is a discussion on these obstacles.

4.1 Intra-Regional Political Issues

The foremost factor constraining the realization of the IPI pipeline relates to the bilateral relationship between Pakistan and India. The backdrop of acrimony between these two countries is too elaborate and well known to be recounted here. Suffice it to say that they have ever since their emergence as independent entities in 1947 continued to view each other in a mutually antagonistic framework.[66] The Jammu and Kashmir dispute is the core issue between these two countries that has bedevilled their relations for now more than half-century. It has also become central for peace and stability in the South Asian region as both the countries now attain nuclear arsenals

[66] Ghani Jafar, "Determinants of South Asian Stability", in *Regional Studies*, Vol. XXIII, No. 1, Winter 2004-05, p.59.

by the year 1998, led to the emergence of the region as a nuclear flashpoint. The two neighbours fought three wars, the latest in Kargil in 1998, and in 2002 their bilateral relations have once again come down to a brink of war following the terrorist attack on the Indian Parliament in December 2001. The possibility of war receded after a high-level US diplomatic effort following withdrawal of tens of thousands of Indian and Pakistani troops along their 1,800-mile border. The bitter relationship between these two countries have also led in this age of globalization and regionalism, denying most favoured nation (MFN) status to India by Pakistan, barring border trade, and defying cooperation on numerous economic and social issues of mutual interests.

Such, Indo-Pak acrimony has contributed to the serious concern among the policy makers and the strategists of India about the guarantee for uninterrupted supply of gas over the IPI pipeline. In any case, it is difficult to trust a foe and the Indo-Pak acrimony is so well grounded that it is very hard to assure India of the implausibility of any such future consequences. Repeatedly, India expressed its concerns over leaving its long-term energy security in the hands of Pakistan, and throughout the negotiation processes asked for guarantee measures. In some instances, India refused to proceed unless an alternative measure is ensured through the Iranian guarantee of oil supplies as a substitute in the case of gas supply disruption by Pakistan.[67] However, India, finally agreed to proceed further after the landmark agreement by Iran to shoulder the responsibility for delivering gas all the way to the Indian border.[68] Since, Iran is the supplying country, accepting such responsibility by Iran, in fact, warranted India to a great extent.

The second important intra-regional issue, constraining implementation of the pipeline is the autonomy movements in Balochistan, the Southern Province of Pakistan. The issue is a domestic concern of Pakistan. Nonetheless, it has serious regional ramifications for both the South and Central Asia regions. As per the proposed route, the IPI pipeline would go through this volatile region. It raises serious concerns regarding the security of the

[67] David Temple, *op. cit.*, p. 07.
[68] *Ibid.*

pipeline in the face of intensifying separatist movements in that region. The root of the Balochi uprising dated back in history in 1948, when Pakistan army annexed the Kalat State, which had expressed unwillingness to join Pakistan following the partition of British India in 1947. The forcible annexation resulted in the first Baloch rebellion that was crushed by the armed forces of Pakistani through land and air attacks.[69] Subsequently, the political unrest continued for all these years, for the growing dissatisfaction among the Baloch people that resulted due to a sense of deprivation and ethnic marginalization. The region is resource rich. Along with oil, gas and coal resources, Balochistan also has significant gold, copper, silver, platinum, aluminum and uranium reserves.[70] The province provides 50 per cent of Pakistan's gas needs.[71] But the people of Balochistan are denied the right to their natural resources, and there were massive internal displacements due to developmental projects. Their demand for provincial autonomy guaranteed by the 1973 Constitution of Pakistan was also dishonoured. All these generated a deep sense of marginalization that resulted in intensified confrontation.

The latest worsening conflict in the province ensued when a company doctor, namely Shazia Khaled was gang-raped at the Sui gas plant on January 7, 2005, and the army did not allow the local police to interrogate the suspects, whom included an army officer.[72] The Balochi Liberation Army (BLA) activists attacked the security Camp on January 7, 2005, and killed 24 security personnel.[73] Gas supply to Punjab and Sindh was badly disrupted when the Sui gas plant was damaged in the fight between Baloch nationalists and the security forces. The incidence of attacks on electric and gas supply increased since then, and there is all the possibility that the IPI pipeline might also be a target. Indian apprehension increased when the insurgents blew up two gas pipelines, a few days after Iran's Oil

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[69] International Crisis Group, "Pakistan: The Worsening Conflict in Balochistan", Asia *Report No. 119,* 14 September 2006, p.3.
[70] *Ibid.*, p.2.
[71] Samuel Baid, "Baluchistan: A Fault Line of Pakistan", *World Focus*, Vol. 27, No. 7, July 2006, p.4
[72] International Crisis Group, *op. cit.*, p.8
[73] Samuel Baid, *op. cit.*, p.5.

Minister Bijan Namdar Zanganeh arrived in New Delhi in 2004 to discuss the future of the IPI pipeline.[74] The message sent by the Baloch separatists to all the concerned parties is rather simple, the "pipeline of peace" might be anything but peaceful. Moreover, since 2006, the situation in Balochistan has deteriorated significantly, particularly after the military killed Nawab Akbar Khan Bugti, one of the most influential Baloch political leaders on 26 August 2006. As 475 miles of the 1700-mile pipeline from Iran's South Pars field to India will pass through Balochistan province[75] and with no end to the Baloch insurgency in sight, the IPI gas pipeline is likely to remain vulnerable to subversive acts. And this remains a discouraging factor.

4.2 Extra-Regional Issues

While the Indo-Pakistan enmity and the Baloch uprising are creating substantial obstruction to the pipeline, the situation is further complicated by the firm opposition of the USA to the project. At odds with Iran since the Islamic Revolution in 1979, the US has sought to isolate Tehran, both diplomatically and economically. As the US confronts Iran over its nuclear program, it has had difficulty in getting China and Russia to agree to effective sanctions at the UN. This means that the US has more incentives to look for other ways to starve Iran of investment.[76] The IPI gas pipeline, which would pump millions of dollars into the Iranian economy each year, put the US on sharp alert. Soon the US came to employ persistent pressure on India and Pakistan to pursue alternate sources of energy. In this regard the US is using a combination of threats and incentives to lure India and Pakistan away from IPI gas pipeline deal. In addition to Indo-US nuclear cooperation, the US is also offering lucrative trade incentives to India. On the other hand, the US also trying to discourage potential investors in Iran including India and Pakistan through its policy of placing sanctions on any entity that invests over US$20

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[74] "Iran-Pakistan-India Pipeline: The Baloch Wildcard", in *Energy Security*, Institute for the Analysis of Global Security, January 12, 2005, URL: http://www.iags.org/es.html accessed 2 April 2007.

[75] *Ibid.*

[76] David Temple, *op. cit.*, p.05.

million in Iran.[77] In the light of the above, while the IPI pipeline project is well conceived in terms of meeting increasing energy requirements of both Pakistan and India, and perhaps also of the growing South Asian region, the intra-regional and extra-regional political issues are posing as serious challenges to the stakeholders in implementing the pipeline project. While such challenges are disappointing and appear to be outweighing the benefits of the pipeline in respect of meeting energy requirements, it is pertinent to discuss at this point, the impact of the pipeline on regional cooperation in the South Asian region, for which the regional countries are striving for long. Any positive impact of the IPI pipeline in enhancing regional cooperation initiatives in South Asia would definitely provide additional impetus to the leadership of concerned countries to rethink the pipeline with renewed interest.

5. Implications of the IPI Pipeline for Regional Cooperation in South Asia

South Asia is a conflict-ridden region that is not known for cooperation between and among its constituent states.[78] Inter-state and regional relations in South Asia have been characterized by suspicion and distrust, arms race, proliferation of weapons of mass destruction, lack of sustained and substantive cooperation, divergence in security/strategic perceptions and policies, and in foreign policy orientations.[79] In such situation, regional cooperation among the constituent countries, though indispensable and in fact a means of resolving conflict, is also extremely difficult to achieve without resolving the conflict or at least effecting an institutional framework for resolving the conflict. Against this, the IPI pipeline's

[77] The cornerstone of this explicit, anti-Iranian American policy is the Iran-Libya Sanctions Act (ILSA), which threatens to place US sanctions on any entity that makes an "investment" worth over US$20 million in Iran in one year.

[78] Mohammad Humayun Kabir, "The Need for Confidence Building Measures and Security Cooperation in South Asia", in Mohammad Humayun Kabir (ed.), *Confidence Building Measures and Security Cooperation in South Asia: Challenges in the New Century*, Dhaka: BIISS, 2002, p.1.

[79] *Ibid.*

impact on regional cooperation in South Asia can be assessed from two perspectives. First, how the pipeline may lead to conflict resolution in South Asia both by working as a confidence building measure (CBM) between Pakistan and India as well as creating incentives for other countries of the region to resolve their bilateral disagreements. The second perspective involves the impact of the pipeline on regional cooperation in the energy sector by setting an example of energy cooperation as well as creating motivations for other constituent states of South Asia to start negotiating on other trans-national pipelines more seriously and with sincerity.

5. 1 IPI Pipeline and Conflict-Resolution in South Asia

Since its inception in 1985, SAARC has been constantly criticized on the ground that the regional grouping could not materialize meaningful regional cooperation over the last three decades. The observers of SAARC have identified numerous reasons for such shortcomings. The most remarkable one has been the conflict between India and Pakistan. Indo-Pakistan conflict has served as the most severe obstacle in way of strengthening regional cooperation in South Asia. Even today, Pakistani denial of granting MFN status to India and their bilateral relationship, among other factors, are hindering effective and timely implementation of the Agreement on South Asian Free Trade Area (SAFTA). In view of the above, some observers have concluded that regional cooperation in South Asia to a great extent contingent upon the Indo-Pakistan bilateral relationship. Realizing this, scholars of conflict resolution have stressed on the need for CBMs between these two regional antagonists for managing their bilateral relations that may contribute to the strengthening of regional cooperation in South Asia. Thus, an analysis of the impact of IPI gas pipeline on conflict management in South Asia relates to the understanding of to what extent the pipeline, if materialized, would contribute as a significant CBM between India and Pakistan.

Historically speaking, CBMs are not new as mechanisms or instruments for improving inter-state relations but emerged as a

strategy during the Cold War period.[80] There is a wide diversity of definitions of CBM. A South Asian scholar defines it "as a bilateral or multilateral measure that builds confidence, arrests the undesirable drift towards open hostilities, reduces tensions and encourages the adversaries to make contact for negotiations without taxing too much the operative policy pursuits."[81] Confidence building is often confused with confidence building measure. But it should be remembered that, while the former is a process, goal and objective, the latter is a technique, method, means, mechanism or tool. The whole spectrum of confidence building may be delineated into three stages, such as conflict avoidance measures (CAMs), confidence building measures (CBMs), and confidence and security building measures (CSBMs). Moreover, confidence building measures may have negative or positive premises. Negative premise means conflict management or conflict resolution, while positive premise implies not only absence of conflict but also post-conflict cooperation. CBMs may be of several categories: Transparency Measures, Communication Measures, Declaratory Measures, Early Warning or Notification Measures, and Consultation Measures. However, these confidence building measures were actually applied or conceptualized in the context of Europe/West. CBMs in other parts of the world may have different premise and may include non-military aspects as well. Thus a CBM may be defined as a bilateral or multilateral instrument that may be used for building trust, effecting conflict resolution and enhancing mutual cooperation.[82]

Now this discussion on the concept of CBMs reveals that the IPI pipeline has all the potential to become significant confidence avoiding measure as well as a confidence building measure between

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[80] The sporadic conceptualization of the CBM begun with the establishment of the 'Hot Line' between Washington and Moscow following the Cuban Missile Crisis in 1962, became commonplace with the signing of the Helsinki Accords in 1975. For details, see Mohammad Humayun Kabir, *ibid.*, p-3.

[81] Pervaiz Iqbal Cheema, "CBMs and South Asia", in Dipankar Banerjee (ed.), Confidence Building Measures in South Asia, Regional Centre for Strategic Studies, Colombo, 1999, p-29, quoted in Mohammad Humayun Kabir, *ibid.*, p.3

[82] Mohammad Humayun Kabir, *op. cit.*, p.5.

India and Pakistan. According to an Indian analyst, "India-Pakistan relations being characterized by antagonism due to the roots and process of partition, every possible agreement, arrived at between the two countries.....deserves to be treated as a CBM. In this context, the canvas of the Indo-Pak CBMs has been very broad-based covering almost every important area of mutual engagement."[83] Similarly, another Indian analyst also characterised the pipeline as a robust CBM between India and Pakistan.[84] Both the country as the beneficiary of the IPI pipeline may refrain from conflict as any such activity may put an end to such kind of energy cooperation. In terms of CBMs, it is definitely a non-military confidence building measure. Moreover, ensuring the uninterrupted supply of gas from the Pakistani side would build confidence in the Indian side, and may lead to both the parties seeking other areas of cooperation.

5. 2 IPI Pipeline and Energy Cooperation in the South Asian Region

Trans-border energy cooperation in South Asia has emerged as one of the significant ideas regarding the expansion of new vistas of regional cooperation within SAARC.[85] It has also come out from various research findings that cooperation among the SAARC countries in the field of energy would lead to opening up of a number of opportunities for profitable investment and promotion of trade within the region. Realizing this, the 12th SAARC Summit held at Islamabad on 4-6 January 2004, laid emphasis on setting up of a Working Group on Energy (WORGEN). The working group has been mandated to conduct a study on creating a framework for South Asian Energy Cooperation including the concept of an Energy Ring. Two meetings of the working group on energy were held in

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[83] S D Muni, "CBMs and Security Cooperation between India and Pakistan: An Indian Perspective", in Mohammad Humayun Kabir (ed.), *Confidence Building Measures and Security Cooperation in South Asia: Challenges in the New Century*, Dhaka: BIISS, 2002, p.13.

[84] Mahendra P Lama, *"Human Security in India: Discourse, Practices and Policy Implications"*, paper prepared under the Ford Foundation-BIISS Human Security Project and forthcoming as a book.

[85] C Raja Mohan, "The Twelfth Summit and the Future of SAARC", in *BIISS Journal*, Vol. 25, No. 4, 2004, pp- 327-342.

Islamabad on June and December 2004. The first Energy Ministers' Meeting was held in Islamabad on October 2005 and a programme was prepared that included workshops and seminars on the subjects of energy trade, independent power producers' energy efficiency, rural electrification, and micro-hydroelectricity from the collective experiences in priority areas. It was also agreed in the meeting that the SAARC member states would cooperate in the development and use of all forms of energy, whether commercial, non-commercial, renewable or non-renewable, ...so as to achieve the objective of creating an Energy Ring in South Asia.[86] The cooperation in the energy sector, according to this meeting, would also cover, the establishment of a SAARC Energy Centre in Pakistan; facilitation of private investment in the energy sector; accessing resources from International Financial Institutions for harnessing regional energy potentials; development of a regional energy database; promotion of energy trade including establishment of regional energy grids; exploitation of vast coal resources using clean and more economic fossil fuel technologies; exchange of geological information for expediting fossil fuels exploration and development; development of hydro power resources; development of renewable and alternate energy resources, particularly in the rural areas, for poverty alleviation; sharing of best practices in energy sector including, but not limited to rural electrification, CNG, solar, wind, bio-fuels, and other technologies; promotion of energy efficiency and conservation; human resource development in the energy sector and exchange of experts; and cooperation with regional and international organization and learning from the experience of energy cooperation programmes in other parts of the world.[87]

At the 13th SAARC Summit, the Heads of State or Government welcomed the Joint Statement of the First SAARC Energy Ministers meeting and agreed to establish the SAARC Energy Centre in Islamabad; promote development of energy resources, including hydropower; promote energy trade in the region; develop renewable and alternative energy resources; and promote energy efficiency and

[86] Ministry of Petroleum & Natural Resources, Government of Pakistan, available at: http://www.mpnr.gov.pk, accessed 3 August 2006.
[87] *Ibid.*

conservation in the region.[88] Subsequently, the SAARC Energy Centre (SEC) was established in Islamabad, Pakistan. On November 6-7, 2006, the first meeting of the SAARC Energy Centre's Governing Board was held. The SEC adopted all the energy cooperation objectives laid down by the ministerial meeting of the member states and the Governing Board approved for consideration of higher SAARC bodies the 'Strategic and Operational Plans' for the SAARC Energy Centre. Now, apart from this establishment of the SEC, in the area of regional energy cooperation, no concrete steps have yet been taken, particularly for intra-regional energy trade. Moreover, the concept of regional energy grid either a regional electricity grid or a regional gas grid, remains in the paper only. No significant initiatives in this regard have been taken. The IPI pipeline may fill the void. If materialized and could be operated successfully by Pakistan and India, there is all the possibility of further extension of the pipeline to other countries of the region. In such a case, India may remain as the centre of gas supply and the idea of a South Asian gas grid may also be realized. Furthermore, India may use the imported gas to produce electricity and then export the surplus amount to other energy starved countries like Bangladesh. In this way again the vision of a regional electricity grid might become a reality. As such, the IPI pipeline may constitute the first concrete step for regional cooperation in the energy sector in South Asia and provide the ground for other countries to seriously think about energy cooperation through trans-national energy trade.

The IPI pipeline may contribute to regional energy cooperation in South Asia in another way. Successful completion and operation of the IPI pipeline may provide real impetus for other trans-national gas pipelines in the region on which negotiations are going on for long time. One such pipeline is the Myanmar-Bangladesh-India (MBI) pipeline. Expecting an exponential growth in its energy demands from an expanding economy, India has been trying hard to secure hydrocarbon energy supplies by looking eastwards to the extensive natural gas reserves of Bangladesh and Myanmar. It is the geographic proximity of Bangladesh and Myanmar that makes the import of pipeline gas not just convenient, but an economically

[88] Dhaka Declaration, Thirteenth SAARC Summit, 13 November 2005, available at: http://fbcci-bd.org accessed 24 August 2006.

attractive proposition. In view of this, India started on negotiating a trans-national gas pipeline from Myanmar to India through Bangladesh. However, this pipeline is experiencing difficulties in two ways. First, India failed to secure agreement with Myanmar for gas supply over this tri-national gas pipeline, and second, India also failed to reach an agreement with Bangladesh to secure the transit right. Given the state of Bangladesh-India relations marked by lack of trust on political and security issues, and lack of mutual reciprocity in economic issues, Bangladesh consider the MBI pipeline as an opportunity to secure some economic benefits from India which are denied by the same for long. The bilateral trade between Bangladesh and India is characterized by deficits in the tune of billions of US dollars in favour of India. As such, Bangladesh is asking for long for removal of the non-tariff barriers (NTBs), which are largely responsible for huge deficits in favour of India in Bangladesh-India trade, and greater access to Indian market. India has been far from being responsive. Bangladesh is, now, asking for the removal of NTBs in exchange for allowing India to import gas from Myanmar through MBI pipeline across Bangladesh. Bangladesh is also interested to receive other benefits from India, such as, a transit route allowing Bangladesh to purchase cheap hydropower from Bhutan and Nepal, a trade route through India to facilitate trade between Bangladesh and Nepal.[89]

However, India, in its effort at assuaging the grievances of Bangladesh, offered a transit fee amounted to about US$100-200 million per annum.[90] In addition, it is also estimated that the pipeline may lead to an investment of about US$150 million inside Bangladesh for the pipeline construction.[91] Moreover, it is argued that, the MBI pipeline would also ensure the future energy security of Bangladesh as the country may import gas from Myanmar in future, in the event of exhaustion of its own gas resources. Thus, the

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[89] Srinjoy Bose, "Energy Politics: India-Bangladesh-Myanmar Relations", IPCS Special Report, No. 45, July 2007, p.2.

[90] "Gas and oil from Africa and the Middle East will pass through Myanmar," *Asia News*, 4 May 2007, http://www.asianews.it/index.php?l=en&art=9167&theme=1&size=A, accessed 25 June 2007.

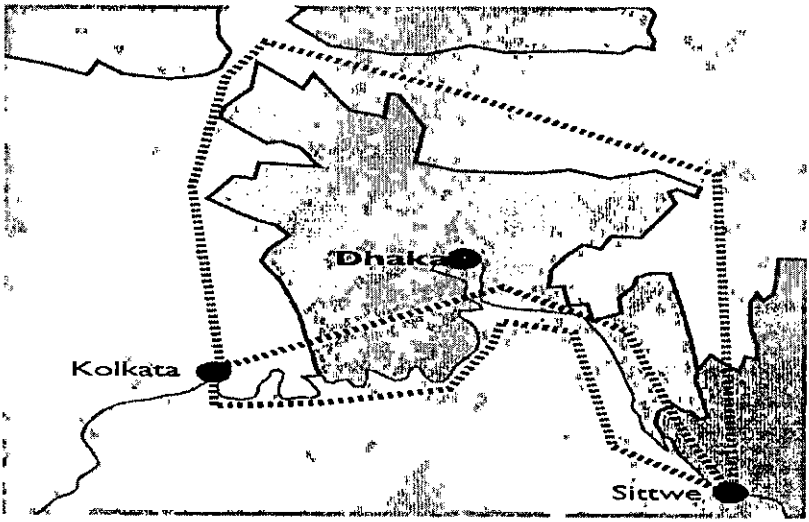
91 Srinjoy Bose, *op. cit.*, p.4.

Indian observers argue that Bangladesh must realize the economic benefits of this trans-national pipeline, including increased investment, employment generation and accretion of revenue.[92] Notwithstanding all these, Bangladesh is firm on its demand compelling India to also consider other routes for importing gas from Myanmar. A number of alternative routes that are being considered by the Indian authority are shown in the map below.

The map shows, India is considering both alternative overland routes for the pipeline as well as the deep sea routes. In any case, if Bangladesh and India failed to reach an agreement and India is compelled to reroute the pipeline, it will increase the cost of the pipeline and affect the viability of the pipeline itself. Apart from the differential economic interests, the bilateral relations between Bangladesh and India characterized by mistrust on numerous political and security issues contribute to the disagreement between these two countries over the MBI pipeline. It is in this respect, that the IPI pipeline may provide the two countries with an opportunity to renegotiate and renew their bilateral relations. All the outstanding issues between Bangladesh and India are negotiable and it is only through negotiation that these issues can be resolved. Thus, the success of the IPI pipeline between Iran, Pakistan and India may provide encouragement to Bangladesh and India for reconsidering the Myanmar-Bangladesh-India pipeline.

[92] *Ibid.*, p.6.

Map 2: Proposed Routes of the Myanmar-India Pipeline



Moreover, if India has been able to resolve the issues with Bangladesh regarding the MBI pipeline, and if the pipeline is materialized, it will also contribute to regional cooperation in the energy sector in South Asia. As the region is deficient in energy, any external supply of energy resources would contribute to the realization of the regional energy grid either gas or electricity. Thus, any trans-national gas pipeline appears as the most viable and prolific source of energy supply in the region and in realizing the regional energy grid in the South Asian region. However, whatever the benefits of the IPI pipeline, the state parties to the project are yet to resolve their differences and, conclude an agreement for implementation of the pipeline project.

6. The present status of the project and its future prospects

One of the important reasons for pessimism about the IPI pipeline is the fact that the project has been languished nearly for a decade and a half. But, one really needs to focus on the period starting January 2006, when the first trilateral meetings between Pakistan, India and Iran took place and the progress on the pipeline negotiation really began. All the important elements of the pipeline have been agreed upon in only two years, except the contractual

structure and the pricing of the gas issue. Moreover, the environment surrounding negotiations since 2006 provides optimism for the success of negotiations.

The most difficult issue that impedes the negotiations of the IPI pipeline is the matter of pricing. Since the pipeline is expected to provide a stable supply of gas from Iran to Pakistan and India for the next 40 years, all three countries were actually wary of signing a deal that they may regret later. Moreover, the international gas market has no regulated price mechanisms such as those found in the petroleum market. Thus after agreeing on the routes of the pipeline, and on the modalities of gas supply and gas sharing between Pakistan and India, all the three countries continue their negotiations on pricing of the gas. So far, Iran has made several offers of pricing mechanisms that have been unacceptable to India. Initially, Iran wanted the gas to be priced according to Henry Hub, the American spot price index, but India and Pakistan rejected the offer instantly as spot prices are always substantially higher than prices for long-term deals. Iran has also offered to base the price on the average of LNG prices to Japan, and Korea. However, this proposal was also unacceptable to India and Pakistan, because Japan and Korea are entirely dependent on LNG and therefore willing to pay more than other users.

India has demanded that the price of the gas be offered at 'cost-plus', which is the cost of gas production plus transportation costs. An analysis of the situation under-taken by the Gaffney Cline and Associates consultancy firm failed to yield any positive results when India and Pakistan refused their proposal in late 2006.[93] In April of 2007, Iran provided a gas price formula that places a floor of US$30 a barrel and a ceiling of US$70 a barrel of Japanese Crude Cocktail (JCC) price. If the price of gas falls between this floor and ceiling, gas will be priced at 0.063 times the JCC price, plus a fixed US$1.15. This formula would yield a price of US$4.93 per MMBtu at a US$60 barrel of Japanese crude oil. However, the US$0.49 MMBtu fee demanded by Pakistan combined with the transportation tariff of US$1.57 MMBtu would mean that the cost of gas at the

[93] David Temple, *op. cit.*, p.27.

India border would be close to US$7 MMBtu, almost US$2.50 more than India is willing to spend.[94]

India has its own limitations regarding the price of the imported gas through the IPI pipeline. Unfortunately, in case of India, there are several end-users of the IPI pipeline, who all have different priorities. India has not stated yet, how it will allocate the pipeline gas, nevertheless, the preliminary negotiations suggest that it would be broken up in a way that 50 per cent of the gas would go to the power sector, 30 per cent to fertilizers, 15 per cent to industry and the remaining 5 per cent would be sold for domestic consumption.[95] The Indian problem arise when all these different end-users are willing or in fact, able to pay different prices for the gas. The fertilizer sector, which has no alternative other than the exorbitantly priced naphtha, would be interested in the gas at almost any rate it can get. Similarly, industrial users will pay large amounts for the gas because their alternatives are oil and coal. Although coal would be cheap, the development of environmental protection measures that would need to coincide with coal use would be highly capital intensive. The situation is particularly difficult for the power sector. If India allocates majority of its gas import to the power generation, which it desperately needs, then the end-user is the bankrupt State Electricity Boards, and it cannot afford to pay commercial rates for the gas. In this respect, in 2006, Iran's then deputy oil minister Mohammad Nejad Hossenian commented, "the price suggested by India and Pakistan is almost half of the price we offered. If the two governments intend to subsidize their domestic gas, there is no reason for Iran to pay this subsidy."[96]

However, at present, the important issues on which negotiations are more crucial include determination of the delivery point of the gas for India, and the issue of transit fee for Pakistan. As regards the delivery point, there are two options, either the Pakistan-Iran border or the Pakistan-India border. About the transit fees, it was reported

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[94] Anupama Airy, "Iran gas deal: keep it simple, stupid," *Financial Express*, 10 April 2007.

[95] David Temple, *op. cit.*, p.26

[96] Quoted in Neil Ford, "India's Insatiable Demand for Gas," *Platts Energy Economist*, 1 September 2006.

that Pakistan was asking for higher transit fees against the transit fee offered by the Indian side. According to a newspaper report, Pakistan and Indian officials, after holding a meeting in India in June 2008, resolved their differences on the transit fee and agreed on a transit fee of 30 cents per MMBtu.[97] Similarly, Indian oil minister Murli Deora stated that India and Pakistan had resolved their commercial differences that were holding up the deal. Other issues will be sorted out at a very high level in August 2008.[98] Regarding the price issue, both Pakistan and India need to agree on a formula that provides a fixed gas price for long term, rather than any spot price formula particularly given the current trend of oil price rise in the world oil market, which reached a record price of US$145 a barrel in July of 2008.

Ensuring Security of the Pipeline

The present negotiations on the IPI pipeline also revolve around the security of the pipeline infrastructure. In view of the high potentiality of attack, the pipeline infrastructure appears to be single most security concern for Pakistan, India and for Iran as well. Numerous agencies, energy experts, and international oil and gas companies made numerous suggestions and strategies for ensuring the security of the pipeline infrastructure as well as guaranteeing uninterrupted supply of gas to India. One of the proponents of the project, Dr. R K Pachauri, realizing the likelihood of supply disruption, made suggestions for ensuring security of the pipeline. He categorically suggested for establishing an international consortium to finance and own the bulk of the IPI pipeline, which would make them stakeholders in the project, and afterwards this consortium can be entrusted with the responsibility to ensure the security of the pipeline thus reducing Indian dependence on the vagaries of Pakistani leaderships. Secondly, he suggested for such a

[97] Available online at http://www.deccanherald.com/Content/Jul162008/national20080716791 22.asp?section=updatenews, accessed 25 July 2008.

[98] "IPI gas pipeline deal to be finalised by August", *Daily Times*, Pakistan, 06 July 2008, available online at http://www.dailytimes.com.pk/default.asp?date=7%2F6%2F2008, accessed 25 July 2008.

contractual arrangement which may include provision for heavy penalty terms in case of supply disruption, and such provision would compel Pakistan to ensure proper protection of the pipeline.[99] He also suggested an interlocking measure such as India receiving part of the gas, generating power from it and supplying it to Pakistan as part of a comprehensive contract.[100]

The Australian firm, BHP Billiton, the principal backer of the pipeline, plans to ensure the safety of the line by burying the entire project a meter below the ground. Compressor stations will be installed every 100 km with concrete armour that, BHP believes, will protect the line from attacks. According to BHP, the pipeline would be created with such heavy-duty material that it could "withstand rocket attacks."[101] Furthermore, the line would be guarded by armed patrols and motion sensors installed along the length of the route. BHP also proposed Satellite monitoring of the pipeline to ensure its security. However, while a number of security measures both traditional and sophisticated are suggested, adoption of such measures will also increase the cost of the pipeline and in effect the price of the gas.

In brief, ensuring security of the pipeline infrastructure must include: (a) multilateral investment in the pipeline project; (b) multiparty responsibility to ensure the security of the project; (c) liberalization of the energy sector in both Pakistan and India to promote efficiency and competition as well as to contribute to the security of supply; and (d) involving China in the project that may lead to maximize the gains as well as guarantee security of the supply. Former Indian Petroleum Minister Mani Shankar Ayer, while inaugurating the third Asian gas buyers' summit in February 2005, proposed that the gas pipeline from Iran via Pakistan should be extended to China. He stated, "We should look beyond a national gas grid. Asian natural gas industry players should come together to form an Asian gas grid. Asian region was rising as India, Pakistan and

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[99] R K Pachauri, *op. cit.*

[100] *Ibid.*

[101] Gal Luft, "Iran-Pakistan-India Pipeline: The Baloch Wildcard", in *Energy Security*, Institute for the Analysis of Global Security, January 12, 2005, available online at http://www.iags.org/es.html accessed 2 April 2007.

China were turning major buyers of gas. It is possible that Iranian gas would be made available to China by extending the proposed Iran-Pakistan-India pipeline to South China."[102] If China participates in the project, any attempt by Pakistan to suspend the supply of gas to India would also mean suspending it to China, thus inclusion of China may act as a deterrent to suspension of the supply of gas to India. Moreover, as Tehran has agreed to supply an equal amount of LNG, in case of a supply disruption by Pakistan at the same price, and also indicated that in such scenario, Iran will also stop all deliveries of gas to Pakistan, the Indian apprehension has very well been addressed.

7. Conclusion

The new global age of post-modern thinking has ushered in an element of methodological sophistication, as analysts have been seeking to overcome the conceptual confusion by intermingling old notions with new concepts so as to offer a better view of the developments of the new era.[103] 'Geopolinomics' is one such strategic notion that combines geography, geostrategy, politics and economics in a conceptual framework. To elaborate, as we all know, geography is the descriptive science of the earth that provides an analysis of a state's physical settings, with focusing on such factors as space, topography and climate.[104] Strategy, on the other hand, as articulated by Napoleon Bonaparte long back, is the science/art of using time and space to serve national interest in the international environment.[105] Geography, thus, imparts spatial relations and reflects strategic interaction, and merges with strategy under the nomenclature of geo-strategy.[106]

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[102] Mohammad Ramzan Ali, *op. cit.*, p.39.

[103] Abul Kalam, "Geopolinomics of National Strategy of Bangladesh", in *Regional Studies*, Vol. XXIII, No. 3, Summer 2006, p.93.

[104] Saul B Cohen, *Geography and Politics in a World Divided*, 2nd Ed., New York: Oxford University Press, 1973, p-3; Nicholas J Spykman, *The Geography of Peace*, New York: St. Martin's Press, 1944, p. 41.

[105] Machubin Thomas Owens, "In Defence of Classical Geopolitics", *Naval War College Review*, Autumn 1999, Vol. 52, No. 4, p.11.

[106] Abul Kalam, *op. cit.*

Geopolitics, the dynamic science of statecraft, endows the state with the link between geography and strategy. While geography defines limits and opportunities of states in international relations, states can also realize their geopolitical opportunities or become victims of their geopolitical situation.[107] Geo-economics, which has currently superseded geopolitcs in international relations, purports to place inter-state relations on an economic basis, through their conditioning by a "grammar of commerce".[108] Now, the formulation of a nation's strategy in this new age, is influenced by all the foregoing concepts; hence the notion of 'geopolinomics' is coined by analysts to provide an all encompassing nature of a conceptual framework, required for ensuring a secure strategic journey for states.[109]

This concept of geopolinomics should be adopted by the leadership of the South Asian countries to understand the economic, political and strategic necessities of the region. This is particularly true for the Iran-Pakistan-India gas pipeline. The pipeline, as the foregoing discussion suggest, will serve the economic, political as well as the strategic necessities of the countries of South Asia. The rationale behind the pipeline are well grounded in terms of meeting energy requirements of both Pakistan and India, and in terms of generating external revenues for the oil dependent economy of the Islamic Republic of Iran. While the rationale behind the IPI pipeline is sufficiently justified from the perspective of all the three stakeholders, Iran, Pakistan and India, a number of factors, particularly the intra-regional political issues and pressure from an extra-regional power are serving as substantial barriers to the implementation of the pipeline. Some of the intra-regional issues like the issue of uninterrupted supply of natural gas to India are real and difficult to ignore given the history of hostility between Pakistan and India. Guaranteeing the supply of gas by the supplier itself i.e., Iran, to a great extent provides the required and an effective guarantee measure in the event of any adverse attempt from the Pakistani side. Moreover, various technical measures that are suggested by energy

[107] Machubin Thomas Owens, *op. cit.*, pp.3-11.
[108] Edward Luttwak, "From Geopolitics to Geo-Economics: Logic Conflict, Grammar of Commerce", *National Interest,* Summer 1990, p.17.
[109] Abul Kalam, *op. cit.*, p.94.

experts and international energy companies are considered as being effective measures to ensure the security of the pipeline. However, the cost-effectiveness of such measures remains open to investigation.

At this point, the leadership of the concerned countries may assess the impact of IPI pipeline on conflict resolution and regional cooperation in the energy sector in South Asia. The pipeline's impact on regional cooperation in South Asia in terms of conflict-reduction through confidence-building as well as providing impetus for improvements in the bilateral relations between other countries of the region is unmistakeable. More specifically, the pipeline may enhance regional initiatives for energy cooperation by providing an opportunity for further extension of the pipeline to other countries of the region as well as exporting gas generated electricity to countries like Bangladesh. The pipeline would also generate renewed interests for negotiations on other trans-national gas pipelines viz., TAP & the Myanmar-Bangladesh-India pipeline. Trans-national pipeline is a new concept in South Asia and not having precedence, the regional countries are relatively wary about the implication of any such venture given the volatility in the security environment of the region. Nevertheless, the leadership of the region should also not miss the opportunity as the pipeline would set a positive example for constructing future trans-national gas pipelines in South Asia and may also contribute in opening up new routes for new trans-national pipelines.

On the other hand, the concerned countries should also weigh the US opposition to the pipeline though it would be difficult for the USA to deter Iran and India, since Iran and Central Asia provide the most prolific sources of energy for Pakistan and India in particular and for the South Asian region in general. There is no point in barring the IPI project because any such attempt may lead only to a temporary postponement of the project but at the end of the day India must go for the Iranian and Central Asian energy resources. If pipeline is not viable or feasible than ultimately India would go for LNG or LPG import. An attempt by India is already on the offing since the country has signed a contract to import LNG from Iran. If the IPI project fails, then India would definitely go for more LNG contract with Iran. So, there is no point of deterring the IPI project by

the USA with an objective to starve Iran of foreign currency receipt as well as to isolate the nation. Iran's vast energy reserves would make it an attractive partner for any energy deficient country or region. At the moment, if India and Pakistan are deterred by the US pressure, they would only look for an opportune moment to opt for the IPI gas pipeline if the project remains an attractive option for ensuring energy security at a lucrative price.

Appendix

Table 1: Energy Overview of South Asian Countries

Energy Reserve & Use / Countries		Bangladesh	India	Pakistan	Bhutan	Nepal	Maldives	Sri Lanka	Afghanistan
Oil									
[a]**Proven Reserves** (Billion Barrels) as of January 1, 2007		0.028	5.625	0.289	nil	nil	nil	nil	nil
Production (Including Crude NLG, NPG etc. in 2004) (Thousand barrels per day)		6.8	844.4	66.4	nil	nil	nil	nil	nil
Consumption in 2004 (Thousand bl/d)		85.0	2,450 (2.96%)	324	1.1 (2003)	15.7 (2003)	7.0 (2003)	77.3 (2003)	3.8 (2003)
Imports (Thousand barrels per day) (2003)	Crude Oil	26.7	1788.7	161.7	nil	nil	nil	39.9	nil
	Refined Petroleum Products	53.5	166.7	145.2	1.1	15.7	8.7	35	3.8
	Total Imports	80.5	1955.4	306.9	1.1	15.7	8.7	74.9	3.8
Exports (Thousand barrels per day) (2003)	Crude Oil	0	0	2.3	nil	nil	nil	nil	nil
	Refined Petroleum Products	1	325.2	19.8	nil	nil	1.7	nil	nil
	Total Exports	1	325.2	22.1	nil	nil	1.7	nil	nil
Crude Oil Refining Capacity (Thousand bl/d) (2005)		33	2255	269	nil	nil	nil	50	nil
Number of Refineries		1	17	5	nil	nil	nil	1	nil
Gas									
Reserves (Trillion Cubic Feet) at Year-End 2005		15.391	38.865	33.994	nil	nil	nil	nil	Not available

Energy Reserve & Use / Countries	Bangladesh	India	Pakistan	Bhutan	Nepal	Maldives	Sri Lanka	Afghanistan
Production (Billion Cubic Feet) (2003)	429.08	964	890	nil	nil	nil	nil	1
Consumption (BCF) (2003)	429.08	964	890	nil	nil	nil	nil	1
Import (BCF)	0	0	0	nil	nil	nil	nil	nil
Export (BCF)	0	0	0	nil	nil	nil	nil	nil
Coal								
Reserves as of July 2006 (Million Short Tons)	1054*	101,903 (10.21%)	3,362	Not available	1	nil	nil	73
Production (mmst.) (2004)	0	443.72 (7.29%)	3.54	.057	.012	nil	nil	.001
Consumption (mmst.) (2004)	0.8	478.16 (7.84%)	5.21	.068	.321	nil	.003	.001
Import (mmst.) (2003)	0.8	25.98	3.07	.050	.309	nil	.003	nil
Export (mmst.) (2003)	0	2.01	0	.039	nil	nil	nil	nil
Electricity (2004 Data)								
Thermal Power								
Generation Capacity (Million kw)	4.450	96.495	13.434	.012	.019	.044	1.595	.063
Generation (Billion KW-hr)	16.95	525.35	51.21	nil	.004	.133	4.040	.197
Hydel Power								
Generation Capacity (Million kw)	.230	29.569	6.464	.430	.584	nil	1.172	.260
Generation (Billion KW-hr)	1.14	83.79	27.1	1.881	2.24	nil	3.277	.630

Energy Reserve & Use \ Countries	Bangladesh	India	Pakistan	Bhutan	Nepal	Maldives	Sri Lanka	Afghanistan
Nuclear Power								
Generation Capacity (Million kw)	0	2.770	0.462	nil	nil	nil	nil	nil
Generation (Billion KW-hr)	0	15.04	1.93	nil	nil	nil	nil	nil
Total Electricity Generation Capacity (Million kw)	4.680	131.43	20.360	.442	.603	.044	2.77	.323
Total Electricity Generation (Billion kw-hr)	18.09	630.57	80.24	1.881	2.244	.133	7.32	.827
Energy Consumption & External Dependency								
Total Primary Energy Consumption (Quadrillion Btu) 2004	0.658	15.417	1.986	.020	.063	.015	0.197	0.016
Per Capita Energy Consumption (Million Btu)	4.7	14.5	12.5	9.0	2.3	44.7	9.9	0.5
****Dependency on External Energy Supplies as a percent of Commercial Energy Consumption** (2002)	20.5	17.8	24.3	24	87	100	78	60

Note: [a] Oil includes crude oil and condensate.

[b] United States oil data, including both crude oil and natural gas liquids, and United States natural gas data are from the Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 2005 Annual Report*, DOE/EIA-0216(2005), November 2006.

[c] Figures in parentheses indicate percentage share of world total.

***This information has been gathered from www.unescap.org/esd/energy/publications/Cogen/part3ch3.pdf.**

****** See, South Asia Initiative for Energy (SARI) *Regional Report*, "Regional Energy Security for South Asia". P- Section 2-5

Source: Penn Well Corporation, *Oil & Gas Journal*, Vol. 104.47 (December 18, 2006), *BP Statistical Review of World Energy June 2006*, Data available at http://www.eia.doe.gov/emeu/international/contents.html, accessed 22 March 2007.

Table 2: Economic Overview of India, Pakistan, Iran and Bangladesh

Economic Indicators \ Countries	Bangladesh	India	Pakistan	Iran
Demography				
Population (millions) (2005)	142	1,095	156	68
Area (Thousand sq. km.)	144	3,287	796	1,648
Economy				
GDP (Billion US$) (2005)	59.9	785.4	110.7	196.3
Agriculture (% of GDP)	21.04	19.56	22.35	10.76
Industry (% of GDP)	26.60	27.28	24.93	41.51
Services, etc. (% of GDP)	52.36	53.16	52.72	47.73
GDP Growth Rate (%) Average (2000-05)	5.3	6.9	4.8	5.8
GDP Growth (%) (2005)	5.4	8.5	7.78	5.94
Per Capita GNI (2005)	470	720	690	2,770
[a]Per Capita GDP (2004)	406	640	632	2,439
Inflation, GDP deflator (annual %) (2005)	5.0	4.18	9.8	18.0
International Trade				
Exports of Goods and Services (% of GDP) 2004	15.46	18.95	15.97	31.83
Imports of Goods and Services (% of GDP) 2004	20.81	20.99	14.90	30
Merchandise Trade (% of GDP) (2005)	38.46	28.20	37.28	50.91
Merchandise Imports (Billion US$) (2005)	13.8	131.6	25.3	41.5
Merchandise Exports (Billion US$) (2005)	9.1	89.8	15.9	58.4
[a]Manufactured Exports (% of merchandise exports) (2004)	90	73	85	9

Economic Indicators / Countries	Bangladesh	India	Pakistan	Iran
[a]High Technology Exports (% of manufactured exports) (2004)	0	5	1	2
External Debt				
Long-term debt (DOD, current US$ billion)	19.17	115.19	32.56	10.10
Present value of debt (% of GNI)	25.71	18.41	35.33	9.20
Total debt service (% of exports)	05.23 (348in1990)	19.5	21.17	1.3
Government Expenditure				
[a]Education Expenditure (% of GDP) (2002-04)	2.2	3.7	2.6	4.8
[a]Health Expenditure (% of GDP) (2003)	1.1	1.2	0.7	3.1
Military Expenditure (% of GDP) (2005)	1.14	2.90	3.36	4.32
[b]Military Expenditure in 2005 (Million US$ at constant 2003 prices)	660	20,443	3,241	7,035
Human Development				
[a]HDI Rank	137	126	134	96
[a]HDI Value	0.530	0.611	0.539	0.746
Literacy (% of people ages 15 and above) 2004		61.01	49.85	77
Poverty (At International poverty line) Population below $1 a day	36.0	34.7	17.0	2.0
Life Expectancy at Birth (2004)	63.3	63.6	63.4	70.7
Workers' remittances and compensation of employees received (Billion US$) 2004/2005	3.58	19.84	3.94	1.03
Energy Use & Environment				
Total Primary Energy Consumption (Quadrillion Btu) 2004	0.658	15.417	1.986	6.449
Per Capita Energy Consumption (Million Btu)	4.7	14.5	12.5	95.5

Countries / Economic Indicators	Bangladesh	India	Pakistan	Iran
[a]Traditional Fuel Consumption (% of total energy requirements) 2003	51.5	19.8	23.5	0.7
[a]Electricity Consumption (Per capita kw-hrs) 2003	145	594	493	2,304
[a]Carbon dioxide emissions (Per capita mt.) 2003	0.3	1.2	0.8	5.6
[a]Carbon dioxide emissions (Share of World) 2003	0.1	5.1	0.5	1.5

Source: World Development Report 2007, the World Bank.
World Development Indicators, Online Database. Available at:
http://devdata.worldbank.org/data-query, accessed 23 January 2007.
[a]Human Development Report 2006, UNDP. [b]The SIPRI Military Expenditure Online Database, available at: http://first.sipri.org/non_first/milex.php, accessed 23 January 2007.
The symbol (--) implies data are not available.

Table 3: Primary Energy[1] Supply Mix of South Asian Countries

Energy Mix / Countries	Petroleum	Natural Gas	Coal	Nuclear	Hydro-electricity	Other renewables
Bangladesh	29	67	1	nil	2	nil
Pakistan	38	41	6	1	14	nil
India	34	7	52	1	5	0.3
Bhutan	9	nil	9	nil	82	nil
Nepal	49	nil	14	nil	37	nil
Maldives	100	nil	nil	nil	nil	nil
Sri Lanka	84	nil	nil	nil	15	nil
Afghanistan	60	31	nil	na	na	na

[1]Primary energy consumption includes commercial energy consumption only, and excludes such 'non-commercial' energy sources as animal waste, wood, and other biomass, which account for more than half of South Asia's total final energy consumption.

Source: SARI Regional Report and Energy Information Administration, USA.

Table 4: Share of Future Energy Supply in India (%)

Year	Coal	Oil	Gas	Hydel	Nuclear
1997-98	55	35	7	2	1
2001-02	50	32	15	2	1
2006-07	50	32	15	2	1
2010-11	53	30	14	2	1
2024-25	50	25	20	2	3

Source: *Report of the Group on India Hydrocarbon Vision – 2025*, Government of India, New Delhi, 2000, Annexure I

Table 5: Projected Fuel Demand in India

Fuel Type / Year	Coal (Million Tons)	Oil (Million Tons)	Gas (Billion Cubic Meters)
1997	311	83	21.5
2020 BAU	688	245	70.8
2020 BCS	538	195	64.7

Note: BAU=Business as Usual, BCS= Best Case Scenario
Source: Based on R.K. Pachauri and Pooja Melhotra, "Vision 2020: Sustainability of our Material Resources", paper prepared for Planning Commission.

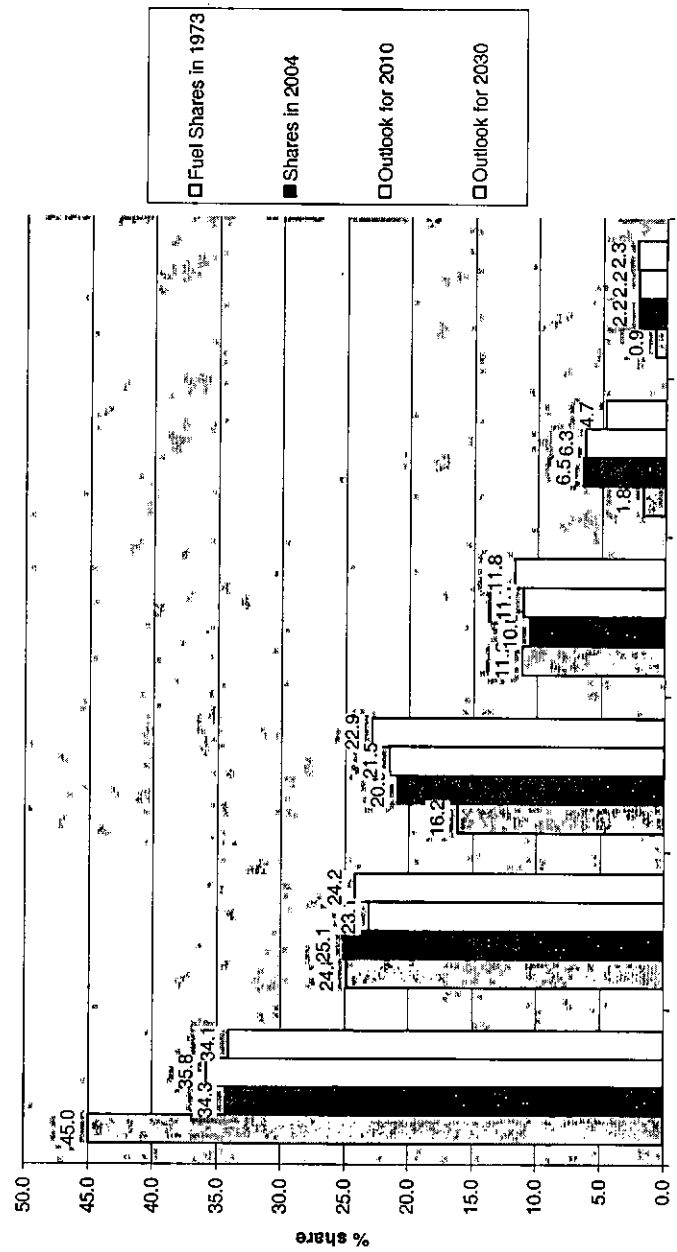
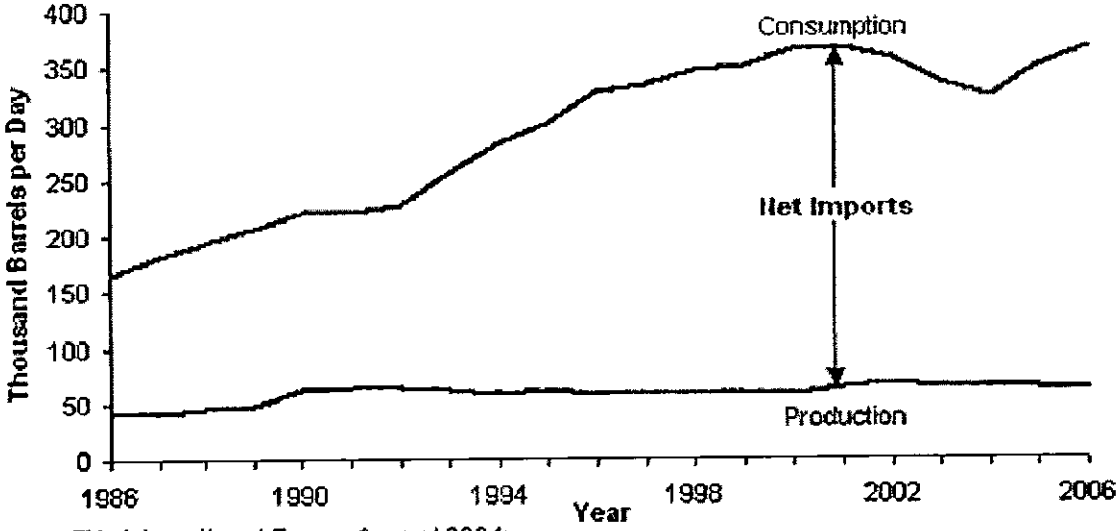


Figure 1: Fuel Shares in World Total Primary Energy Supply

Figure 2: Pakistan's Oil Production, Consumption and Imports 1986-2006*



Source: EIA *International Energy Annual 2004; Short Term Energy Outlook November 2006*

*2006 is forecast

Table 6: Pakistan's Gas Demand Projections (Billion Cubic Feet per Day)

Year / Sectors	2000	2005	2010	2015
Power	1.1	1.8	2.0	2.2
Fertilizer	0.5	0.6	0.7	0.7
Industrial	0.5	0.6	0.7	0.8
Commercial	0.1	0.1	0.1	0.1
Domestic	0.5	0.6	0.7	0.8
Total	2.7	3.7	4.2	4.6

Source: Usman Aminuddin, "Opportunities in the Development of the Oil & Gas Sector in South Asian Region", Islamabad Strategic Studies Institute (ISSI) *Islamabad Papers No. 4*, 2004. Available online at http://www.issi.org.pk/Islamabad_paper/2004/oil_2004.htm accessed 17 January 2007

Table 7: Pakistan's Gas Demand and Supply Projections (Billion Cubic Feet per Day)

	2000	2005	2010	2015
Demand	2.7	3.7	4.2	4.6
Supply	2.2	3.1	3.4	3.6
Gap	0.5	0.6	0.8	1.0

Source: Usman Aminuddin, "Opportunities in the Development of the Oil & Gas Sector in South Asian Region", Islamabad Strategic Studies Institute (ISSI) *Islamabad Papers No. 4*, 2004. Available online at http://www.issi.org.pk/Islamabad_paper/2004/oil_2004.htm accessed 17 January 2007

Table 8: Iran's Price Indices

Crude Oil Proven Reserve as of January 1, 2006:			
Country	Reserves (Billion barrels)	Share (%) of World Total	Rank
Saudia Arabia	264.3	20.45	1
Canada	178.8	13.83	2
Iran	132.5	10.25	3
Iraq	115.0	8.90	4
Kuwait	101.5	7.85	5
United Arab Emirates	97.8	7.57	6
Venezuela	79.7	6.17	7
Russia	60.0	4.64	8
Libya	39.1	3.03	9
Nigeria	35.9	2.78	10
United States	21.4	1.66	11
China	18.3	1.42	12
Qatar	15.2	1.18	13
Mexico	12.9	1.00	14
Algeria	11.4	0.88	15
Brazil	11.2	0.87	16
Kazakhstan	9.0	0.70	17
Norway	7.7	0.60	18
Azerbaijan	7.0	0.54	19
India	5.8	0.45	20
Rest of the World	**68.0**	**5.26**	
World total	**1292.5**		

Notes: Proven reserves are estimated with reasonable certainty to be recoverable with present technology and price.

Source: "Worldwide Look at Reserves and Production," Oil & Gas Journal, Vol. 103, No. 47 (December 19, 2005), pp. 24-25.

Table 9: World Oil Reserves

Year	Consumer Price Index (CPI)	Growth of CPI
1990	11195.2	24.5
1991	13640.8	28.1
1992	16368.6	20
1993	22412.7	37
1994	30431.8	35.7
1995	40967.3	34.6
1996	56271.9	37.4
1997	63303.7	12.5
1998	74784.4	18.1
1999	86751	16

Source: Computed from Annual and
Economic Reports, Central Bank of Iran, Various years.

Table 10: Producers, Exporters and Importers of Crude Oil

Rank	2005 Data						2004 Data		
	Producers	Mt	% of World total	Exporters	Mt	% of World total	Importers	Mt	% of World total
1	Saudi Arabia	519	13.2	Sadia Arabia	346	16.07	United States	577	25.82
2	Russia	470	12	Russia	258	11.98	Japan	206	9.22
3	United States	307	7.8	Norway	132	6.13	People's Rep. of China	123	5.50
4	Islamic Rep. of Iran	205	5.2	Nigeria	123	5.71	Korea	114	5.10
5	Mexico	188	4.8	Islamic Rep. of Iran	122	5.67	Germany	110	4.92
6	People's Rep. of China	183	4.7	Mexico	105	4.88	India	96	4.30
7	Venezuela	162	4.1	United Arab Emirates	95	4.41	Italy	93	4.16
8	Canada	143	3.6	Venezuela	94	4.37	France	85	3.80
9	Norway	139	3.5	Canada	87	4.04	United Kingdom	63	2.82
10	Nigeria	133	3.4	Iraq	75	3.48	Netherlands	60	2.68
	Rest of the World	1474	37.7	Rest of the World	716	33.26	Rest of the World	708	31.68
	World total	3923	100.00	**World total**	2153	100.00	**World total**	2235	100.00

Source: International Energy Agency, *Key World Energy Statistics 2006.*

Table 11: World Natural Gas Reserves

		As of 1 January 2006
Country	Reserves (Trillion Cubic Feet)	Share (%) of World Total	Rank
Russia	1,680	27.5	1
Iran	971	15.9	2
Qatar	911	14.9	3
Saudi Arabia	241	3.9	4
United Arab Emirates	214	3.5	5
United States	193	3.1	6
Nigeria	185	3.0	7
Algeria	161	2.6	8
Venezuela	151	2.5	9
Iraq	112	1.8	10
Indonesia	98	1.6	11
Norway	84	1.4	12
Malaysia	75	1.2	13
Turkmenistan	71	1.2	14
Uzbekistan	66	1.1	15
Kazakhstan	65	1.1	16
Netherlands	62	1.0	17
Egypt	59	1.0	18
Canada	57	0.9	19
Kuwait	56	0.9	20
Rest of the World	602	9.8	
Top 20 Countries	**5,510**	**90.2**	
World Total	**6,112**	**100.0**	

Table 12: Oil Prices & Iran's Revenue

Year	Oil Prices	Oil & Gas Revenues (US$ Billion)	Rate of Change
1971	2.18	1.85	
1973	2.75	5.0	115
1974	10.84	18.67	268
1978	14.50	17.86	-40
1979	39.00	19.31	8
1983	28.63	20.20	1
1984	27.00	16.76	-17
1985	26.00	13.17	-21
1986	13.05	6.25	-53
1987	17.14	10.75	72
1990	22.26	17.93	-9
1992	18.77	16.30	10
1993	15.77	14.33	-12
1994	14.87	14.60	2
1997	16.00	15.46	-20
1998	12.02	9.90	-36
1999	16.79	16.3	65
2000	26.70	24.2	48.96
2003	26.55	27.0	17.71

2. OPEC Annual Reports, Various Years.

Source: 1. Central Bank of Iran, Annual Reports and Balance Sheet, Various Years.

Table 13: Iran's Five years Annual Average of GDP Composition (1971-2003)

Year	Annual Average Share of Agriculture	Annual Average Share of Oil	Annual Average Share of Industry & Mine	Annual Average Share of Services
1971-75	12.1	31.12	13.54	46.86
1976-80	11.96	16.24	17.56	58.98
1981-85	15.18	8.76	17.5	60.22
1986-90	19.12	9.82	16.56	54.98
1991-95	18.18	10.62	18.82	53.28
1996-2000	17.1	8.56	19.7	55.38
2003	13.9	11.7	23.8	50.6

Sources: Computed from Central Bank of Iran, Annual Reports, Various Years.

Table 14: Iran's Balance of Payments

In US$ Billion

Year	Exports	Oil Exports	Growth of Oil Exports	Oil Exports as percentage of Total Exports	Non-Oil Exports	Non-Oil Exports as percentage of Total Exports	Imports	Trade Balance
1991	18.66	16.00		85.74	2.60	13.93	25.10	-6.50
1992	19.86	16.80	5.40	84.59	2.90	14.60	23.20	-3.40
1993	18.08	14.30	-15.10	79.09	3.70	20.46	19.20	-1.20
1994	19.43	14.60	1.90	75.14	4.80	24.70	12.60	6.80
1995	18.36	15.10	3.40	82.24	3.50	19.06	12.70	5.50
1996	22.39	19.20	27.60	85.75	3.10	13.85	14.90	7.40
1997	18.38	15.40	-19.70	83.79	2.90	15.78	14.10	4.20
1998	13.11	9.90	-35.80	75.51	3.10	23.65	14.20	-1.10
1999	21.03	17.00	72.00	80.84	3.90	18.54	13.40	7.50
2000	28.34	24.20	41.80	85.39	4.10	14.47	15.20	13.10
2001	18.26	12.30	-49.10	67.36	5.90	32.31	17.20	1.00
2002	23.90	19.33	36.37	80.88	4.56	19.08	18.12	5.78
2003	28.23	22.96	15.81	81.33	5.27	18.67	22.03	6.20
2004	33.90	27.35	16.05	80.68	6.63	19.56	29.56	4.34
2005	43.85	36.31	24.68	82.81	7.53	17.17	38.19	5.66
2006	60.01	48.82	25.62	81.35	11.18	18.63	40.96	19.05

Table 15: Energy Overview of Other Concerned Countries

Energy Reserve & Use \ Name of Countries/ Regions		Islamic Republic of Iran	China	Myanmar	[b]USA	Japan	Europe	North America	Middle East
Oil									
[a]**Proven Reserves** (Billion Barrels) as of January 1, 2007		136.270 (10.54%)[c]	16.0	0.050	21.757	0.059	15.800	213.319 (16.50%)	739.205 (57.19%)
Production (Including Crude NLG, NPG etc. in 2004) (Thousand barrels per day)		4,101 (4.94%)	3,635.4 (4.37%)	20.7	8,700.2 (10.48%)	120.6 (0.14%)	**6,574.8** (7.90%)	**15,683.0** (18.89%)	**24,618.9** (29.65%)
Consumption in 2004 (Thousand bl/d)		1,510 (1.82%)	6,400 (7.74%)	37	20,731 (25.09%)	5,353 (6.48%)	**16,307.8** (19.74%)	**25,003.4** (30.27%)	**5,662** (6.85%)
Imports (Thousand barrels per day) (2003)	**Crude Oil**	0	1805.8	4.9	9664.9	4195.4	12716.8	10583.8	570.0
	Refined Petroleum Products	105.3	796.5	14.5	2599.5	1372.3	6360.5	3125.3	672.0
	Total Imports	105.3	2602.3	19.4	12,264.4 (20.51%)	5567.7	19,077.3	13,709.1	1242
Exports (Thousand barrels per day) (2003)	**Crude Oil**	2296.3	162.7	0	12.4	518.1	4552.2	3210.2	15,339.5
	Refined Petroleum Products	275.3	337.1	0	1014.2	189.3	5381.9	2138.1	3485.8
	Total Exports	2571.6 (4.33%)	499.8	0	1026.6	707.4	9933.2	5348.3	18,825.3 (31.70%)
Crude Oil Refining Capacity (Thousand bl/d) (2005)		1474	4650	57	17125 (20.68%)	4707	16681	20826	6472
Number of Refineries		9	56	2	148 (21.41%)	32	136	175 (25.32%)	45

Name of Countries/ Regions / Energy Reserve & Use	Islamic Republic of Iran	China	Myan mar	USA	Japan	Europe	North America	Middle East
Natural Gas (2003 Data)								
Reserves (Trillion Cubic Feet) at Year-End 2005	943.922 (15.44%)	82.955	18.533	204.385 (3.34%)	1.4	200.541 (3.28%)	274.879 (4.49%)	2546.048 (41.65%)
Production (Billion Cubic Feet)	2861	1211	339	19099	99	11477	26953	9184
Consumption (BCF)	2910	1143	89	22277 (22.35%)	3045	19220	27351	7991
Import (BCF)	174	0	0	3944	2888	12817	4692	193
Export (BCF)	124	68	250	680	0	5171	4263	1385
Coal								
Reserves as of July 2006 (Million Short Tons)	462	126,215 (12.65%)	2	267,312 (26.79%)	396	65,762	276,100	462 (Only Iran)
Production (mmst.) (2004)	1.08	2156.4 (35.5%)	1.44	1112.10 (18.29%)	3.54 (in 2001)	806.33	1197.30	1.08
Consumption (mmst.) (2004)	1.72	2062.39 (33.8%)	0.14	1107.25 (18.15%)	203.72	1036.30	1182.53	16.72
Import (mmst.) (2003)	.60	12.2	0	34.15	205.9	--	--	--
Export (mmst.) (2003)	.02	119.8	.88	49.31	2.2	--	--	--
Electricity (2004 Data)								
Thermal Power								
Generation Capacity (Million kw)	29.890	289.77	1.185	745.446 (29.17%)	174.7	441.388	818.161	105.433
Generation (Billion KW-hr)	145.15	1701.7 (15.6%)	4.06	2825.01 (25.92%)	594.2	1791.89	3168.75	552.47

Name of Countries/ Energy Regions Reserve & Use	Islamic Republic of Iran	China	Myan mar	USA	Japan	Europe	North America	Middle East
Hydel Power								
Generation Capacity (Million kw)	4.420	94.89 (12.8%)	0.745	77.641 (10.49%)	22	167.205	157.488	6.499
Generation (Billion KW-hr)	10.56	327.68 (11.9%)	2.25	268.42 (9.77%)	93.55	543.56	627.61	14.11
Nuclear Power								
Generation Capacity (Million kw)	0	6.186	0	99.628 (27.03%)	45.74 (12.4%)	138.550	111.608	0
Generation (Billion KW-hr)	0	47.95	0	788.53 (30.10%)	271.6 (10.3%)	967.5	883.13	0
Total Electricity Generation Capacity (Million kw)	34.310	391.42	1.930	942.178 (25.03%)	243.5	781.385	1110.12	111.938
Total Electricity Generation (Billion kw-hr)	155.71	2079.7 (12.5%)	6.31	3979 (23.97%)	974.4	3439.9	4795.4	566.60
Energy Consumption & External Dependency								
Total Primary Energy Consumption (Quadrillion Btu) 2004	6.449	59.573	0.202	100.414 (22.49%)	22.62	Not available	Not available	Not available
Per Capita Energy Consumption (Million Btu)	95.5	45.9	4.4	342.7	177.7	do	do	do
****Dependency on External Energy Supplies** (2002) (percentage)	-79.1	1.4	-28.0	27.5	95.8	do	do	do

Note: [a] Oil includes crude oil and condensate.

[b] United States oil data, including both crude oil and natural gas liquids, and United States natural gas data are from the Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 2005 Annual Report*, DOE/EIA-0216(2005), November 2006.

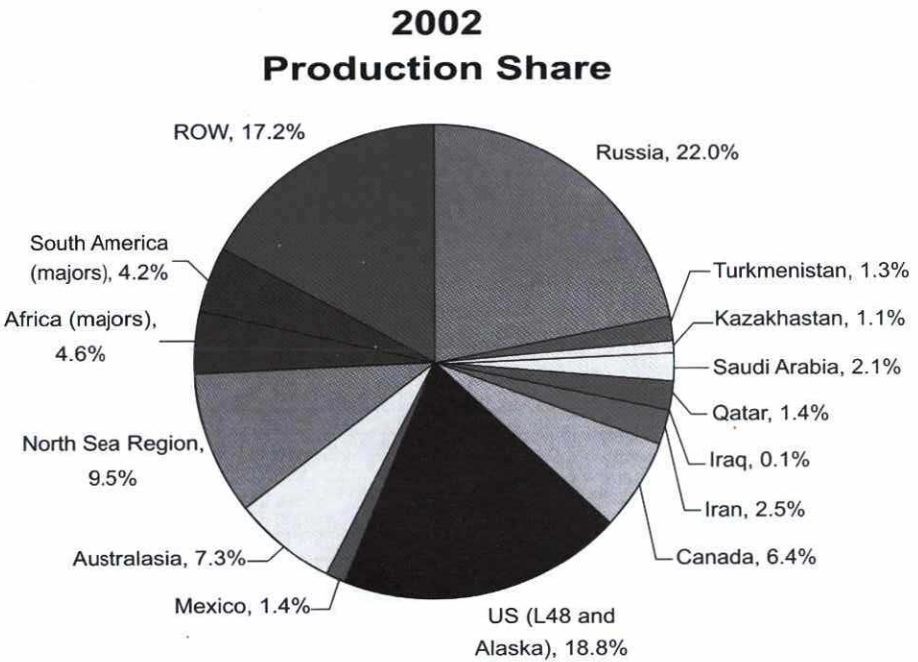
[c] Figures in parentheses indicate percentage share of world total.

*This information has been gathered from www.unescap.org/esd/energy/publications/Cogen/part3ch3.pdf.

** Information available at http://www.iaea.org/inis/aws/eedrb/data/BD-enimco.html, accessed 22 March 2007.

Source: PennWell Corporation, *Oil & Gas Journal*, Vol. 104.47 (December 18, 2006), *BP Statistical Review of World Energy June 2006*, Data available at http://www.eia.doe.gov/emeu/international/contents.html, accessed 22 March 2007.

Figure 3: World Gas Production and Supply: A Vision for 2030



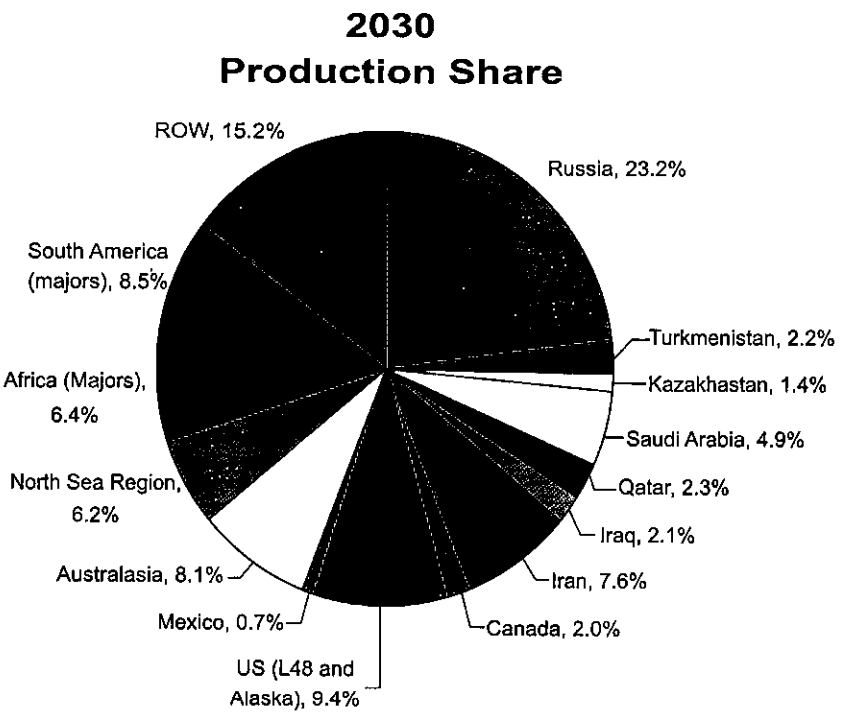

2030
Production Share
ROW, 15.2%
Russia, 23.2%
South America (majors), 8.5%
Turkmenistan, 2.2%
Kazakhastan, 1.4%
Africa (Majors), 6.4%
Saudi Arabia, 4.9%
Qatar, 2.3%
North Sea Region, 6.2%
Iraq, 2.1%
Australasia, 8.1%
Iran, 7.6%
Mexico, 0.7%
Canada, 2.0%
US (L48 and Alaska), 9.4%

Figure 4: Supply Projection 2030