

India's Current and Future Energy Situation

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Abstract:

Energy demand in India has grown rapidly over the last two decades. Yet Indian population does not have access to commercial energy. Hence India has to depend on foreign powers to meet her energy requirements. India had always been aware of the enormous energy reserves within its geographically proximate neighbours. The recent visit by Indian Prime Minister to these countries has proved critical in paying the way for India to meet her energy demands. The author discusses energy utilization in India to become self-sufficient and also makes her presence in these countries so that it could benefit maximum from exploring various sources of energy from these countries.

Key words: commercial energy, energy utilization, oil and gas, OPEC, GAIL, Uzbekneftegaz, ONGC, CNG, LNG.

INTRODUCTION:

Although commercial energy in India has grown rapidly over the last two decades a large part of India's population does not have access to commercial energy. India accounts for only around 3.4 percent of total world primary energy consumption. India has so far been dependent for its oil imports on highly

unstable and uncertain sources Iraq and other Middle Eastern countries. The growing dependence of the country on energy imports has important security implications. India's energy security issues involves matters such as declining quality, international pressure to shift to cleaner fuels, and foreign exchange vulnerability from dependence on a single region (Middle East) for oil. It is now well accepted that India needs to diversify both its source of oil imports and its energy consumption portfolio. The choices available to India to strengthen its self-sufficient are: increased domestic oil and gas base; improved efficiency of energy use; and diversify energy import options.

ENERGY UTILIZATION IN INDIA:

The energy consumption in India is the fourth biggest after China, USA and Russia. The total primary energy consumption from crude oil (29.45%), natural gas (7.7%), coal (54.5%), nuclear energy (1.26%), hydro-electricity (5.0%), wind power, biomass electricity and solar power is 595 Mtoe in the year 2013.¹ In the year 2013, India's net imports were nearly 144.3 million tons of crude oil, 16 Mtoe of LNG and 95 Mtoe coal totaling to 255.3 Mtoe of primary energy which is equal to 42.9% of total primary energy consumption.² About 70% of India's electricity generation capacity is from fossil fuels, with coal accounting for 40% of India's total energy consumption followed by crude oil and natural gas at 28% and 6% respectively. India is largely dependent on fossil fuel imports to meet its energy demands – by 2030. India's dependence on energy imports expected to is expected to exceed 53% of the country's total energy consumption. In 2009-10, the country imported 159.29 million tonnes of crude oil which amount to 80% of its domestic crude oil which amounts to 80% of its domestic crude oil consumption and 31% of the country's total imports are oil imports. The growth of electricity generation in India has been hindered by domestic coal shortages and as a

consequence, India's coal imports for electricity generation increased by 18% in 2010.³

Due to rapid economic expansion, India has one of the world's fastest growing energy markets and is expected to be the second-largest contributor to the increase in global energy demand by 2035, accounting for 18% of the rise in global energy consumption. Given India's growing energy demands and limited domestic fossil fuel reserves, the country has ambitious plans to expand its renewable and nuclear power industries. India has the world's fifth largest wind power market and plans to add about 100GW of solar power capacity by 2022. India also envisages to increase the contribution of nuclear power to overall electricity generation capacity from 4.2% to 9% within 25 years. The country has five nuclear reactors under construction (third highest in the world) and plans to construct 18 additional nuclear reactors (second highest in the world) by 2025.

OIL AND GAS:

India imports nearly 75 % of its 4.3 million barrels per day crude oil needs but exports nearly 1.25 million barrels per day of refined petroleum products which is nearly 30% of its total production of refined oil products. India has built surplus world class refining capacity using imported crude oil for exporting refined petroleum products. The net imports of crude oil is lesser by one fourth after accounting exports and imports of refined petroleum products.⁴

During the financial year 2012-2013, the production of crude oil is 37.86 million tons and 40,679 million standard cubic meters (nearly 26.85 million tons) natural gas. The net import of crude oil & petroleum products is 146.70 million tons worth of Rs 5611.40 billions. This includes 9.534 million tons of LNG imports worth of Rs. 282.15 billion.⁵ Internationally, LNG price (One mmBtu of LNG=0.18 barrels of crude oil=28 cubic meters of natural gas) is fixed below crude oil price in terms of heating

value. LNG is slowly gaining its role as direct use fuel in road and marine transport without regasification. In the year 2012-2013, India consumed 15.744 million tons petrol and 69.179 million tons diesel which are mainly produced from imported crude oil at huge foreign exchange out go. Use of natural gas for heating, cooking and electricity generation is economical as more and more locally produced natural gas will be converted into LNG for use in transport sector to reduced crude oil imports. In addition to the conventional natural gas production, coal gasification, coal bed methane, coal mine methane and biogas digesters/renewable natural gas will also become source of LNG forming decentralised base for production of LNG to cater to the widely distributed demand. There is possibility to convert most of the heavy duty vehicles (including diesel driven rail engines) into LNG fuelled vehicles to reduce diesel consumption drastically with operational cost and least pollution benefits.⁶

The state-owned Oil and Natural Gas Corporation (ONGC) acquired shares in oil fields in countries like Sudan, Syria, Iran and Nigeria – investments that have led to diplomatic tensions with the United States.⁷ Because of political instability in the Middle East and increasing domestic demand for energy, India is keen on decreasing its dependency on OPEC to meet its oil demand, and increasing its energy security. Several Indian oil companies, primarily led by ONGC and Reliance Industries, have started a massive hunt for oil in several regions in India including Rajasthan, Krishan Godavari Basin and north – eastern Himalayas. The proposed Iran – Pakistan – India pipeline is a part of India's plan to meet its increasing energy demand.

COAL:

India has the world's 4th largest coal reserves. In India, coal is the bulk of primary energy contributor with 54.5% share out of the total 595 Mtoe in the year 2013. India is the third top coal

producer in 2013 with 7.6% production share of coal (including lignite) in the world. Top five hard and brown coal producing countries in 2013 (2012) are (million tons) : China 3,680 (3,645), United States 893 (922), India 605 (607), Australia 478 (453) and Indonesia 421 (386). However, India ranks fifth in global coal production at 228 mtoe (5.9%) in the year 2013 when its inferior quality coal tonnage is converted into tons of oil equivalent. Coal – fired power plants account for 59% of India's installed electricity capacity. After electricity production, coal is also used for cement production in substantial quantity. In the year 2013, India imported nearly 95 Mtoe of steam coal and cooking coal which is 29% of total consumption to meet the demand in electricity, cement and steel production.⁸

CNG and LNG are emerging as economical alternatives to diesel oil with the escalation in international crude oil prices. Synthetic natural gas production technologies have tremendous scope to meet the transport sector requirements fully using the locally available coal in India. Dankuni coal complex is producing syngas which is piped to the industrial users in Calcutta.⁹ Many coal based fertilizer plants which are shut down can also be retrofitted economically to produce SNG as LNG and CNG fetch good price by substituting imports. Recently, Indian government fixed the natural gas price at producer end as 5.61 US\$ per mmbtu on net calorific value (NCV) basis which is at par with the estimated SNG price from coal.

Central Asia has a significant and diversified energy resource base, though it is unevenly spread across the territory, Along with the extensive explored recoverable reserves of hydrocarbon fuel, the region has significant hydro energy potential, large uranium deposits, and also good opportunities for developing renewable energy sources. Proven natural gas reserves within Azerbaijan, Uzbekistan, Turkmenistan and Kazakhstan equal more than 236 trillion cubic feet, the region's total oil reserves may reach more than 60 billion barrels of oil – enough to services Europe's oil needs for 11 years. Some

estimates are as high as 200 billion barrels. In 1995, the region was producing only 870,000 barrels per day (44 million tones per year (Mt/y)).¹⁰

India has three options to engage the Central Asia Region. One through Pakistan and Afghanistan; two, through Xinjiang (China) and; three, through Iran. While negotiations have taken place to explore all the options to transport energy from Central Asia to India, the current geo-political scenario in India's neighborhood does not seem conducive.

While negotiations have revived on building a gas pipeline from Turkmenistan to Pakistan through Afghanistan, it is doubtful it will be extended to India. The Indian government is also apprehensive about participating in this project. The flow of gas will be through Pakistan and given the relations between the two countries, India does not want its energy security to be jeopardized, in case of an Indo-Pakistan conflict. Also, the current political scenario in Afghanistan does not guarantee the safety of the pipeline.

The second option of building a pipeline through Xinjiang seems to be promising but studies on the technical feasibility of such an ambitious project have not been conducted. The ongoing border disputes between India and China have to be amicably resolved and most importantly China has to express a willingness to have any energy cooperation with India.

The third option involves energy transport from Central Asia to Iran and then from Iran to India's west coast through sea. In this regard, the proposed highway from Chah Bahar through Afghanistan to Tajikistan will enable India to have a transport corridor to the otherwise inaccessible Central Asia region. However, this option is only viable and Iran is willing to participate as it may want to sell its own energy to India.¹¹

The intensive diplomatic efforts by India resulted in the signing of some economic cooperation agreements. India has taken several trade initiatives. The Indian government has signed a framework agreement in the field of oil and gas

exploration and production with Kazakhstan, Uzbekistan and Turkmenistan. On April 26, 2009 India (Gas Authority of India - GAIL) and Uzbekistan (Uzbekneftegaz) signed seven Memorandums of Understanding (MoUs), including in the fields of petroleum and natural gas. The Government of India is currently funding various development assistance programmes in Central Asia. In Central Asia, Kazakhstan is the most abundant in energy resources, having 89 percent of CAR's coal; 93 percent of its oil; 30 percent of its gas; and 88 percent of its uranium. Kazakhstan has in the past blocked the Oil and Natural Gas Cooperation (ONGC) – Mittal's joint bid for a US\$ 48 bn takeover of petro Kazakhstan in favour of China in 2005.¹²

CONCLUSION:

India was quite aware of the enormous energy reserves within its geographically proximate neighbours. They could fulfill India energy demands. The recent visit by Indian Prime Minister to these countries has proved critical to fulfill India's energy demand. But there is an opportunity for India to enhance her presence in these regions. The Central Asian region energy reserves will certainly make a positive contribution to its growing demands. More important the present government seems to have realized that India's domestic turmoil are linked to a large balance of power game and hence it should not be treated in isolation. The present government is also trying to widen the scope of geo-political engagement. In the current scenario, each great powers USA, Russia and China – will play their own cards keeping in view the national interest. In such power game, Russia will continue to befriend India for the simple reason that the chances of clash between China and Russia may resurface. Hence, India should take full advantage of this position and meet her energy demand from the conflict prone regions of the world.

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