

Energy Security Policy

M. A. Pathan



FORUM
of Free Enterprise

*"Free Enterprise was born with man
and shall survive as long as man
survives".*

— **A. D. Shroff**

1899-1965

Founder-President

Forum of Free Enterprise

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M. A. Pathan

In the past 35-40 years, worldwide energy consumption has nearly doubled, driven by population growth, rising living standards, development of energy dependent technologies, and consumerism. While coal usage has decreased marginally, consumption of every other major energy source has increased markedly. Electricity use has nearly tripled. If these trends continue, global energy consumption may double again by mid-century.

Despite anticipated changes in the overall energy mix fossil fuels will continue to dominate and the share of nuclear power and renewable energy sources – wind, solar, geothermal etc. – will remain limited.

According to estimates one sixth of the world's population lack safe drinking water, half lack adequate sanitation, and half live on less than \$2 per day. About two billion people do not have access to electricity. A reliable energy supply

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is a pre-requisite for addressing these essential needs – the basis of United Nations Millennium Goals set five years ago.

Energy security is, thus, a key global challenge – one which will require global perspective, global thinking, global solutions, and innovations of the highest order. Achieving a sustainable global energy frame work, capable of meeting the energy needs of citizens, without causing irreparable environmental damage, will require continuing technological advances that modify our current production and use of energy.

In the long term, there will be no single “solution” to providing abundant, clean, and inexpensive, energy for the global community. Rather, there will likely be a “mix” of solutions. These will include innovative extractive and transportation technologies for fossil fuels, innovative conservation technologies, sustainable, more efficient and innovative alternative fuel technologies. It demands of us new strategies, new alternatives, new approaches, new ways of thinking. Every profession will be challenged to find new ways to work and to think, to plan and to collaborate, to innovate and to discover.

According to the International Energy Outlook 2005 the total energy use worldwide is projected to grow from 412 quadrillion British thermal units (Btu) in 2002 to 553 quadrillion Btu in 2015 and 645 quadrillion Btu in 2025 – an increase by 57% in a 23-year time span.

As can be visualized the emerging economies account for much of the projected growth in marketed energy consumption over the next two decades, with energy use in the group more than doubling by 2025. Economic activity, as measured by gross domestic products (GDP) in purchasing power parity terms, is expected to expand by 5.1% per year in the emerging economies, as compared with 2.5% per year in the major market economies and 4.4% per year in the transitional economies of Eastern Europe and the former Soviet Union. It may be worthwhile noting in this context that India's GDP grew by over 8% last year and that the country expects to sustain a growth in the region of 7-8%.

Fossil fuels (oil, natural gas, and coal) will continue to supply much of the energy used worldwide, and oil remains the dominant energy source, given its importance in the transportation and industrial end-use sectors. The outlook for environment friendly non-fossil fuels can, however, be altered by government policies and programmes.

World oil use is expected to grow from 78 million barrels per day (mbd) in 2002 to 119 mbd in 2025.

Natural gas is projected to be fastest growing component of world primary energy consumption. Its use increases in the forecast by an average of 2.3% annually from 2002 to 2025, compared with projected annual growth rates of 1.9% for oil consumption and 2.0% for coal consumption. The natural gas consumption is projected to increase by 69%,

from 92 trillion cubic feet (tcf) to 156 tcf, and its share of total energy consumption is projected to grow from 23% to 25%. The power sector accounts for 51% of the total incremental growth in worldwide natural gas demand over the forecast period.

The world net electricity consumption nearly doubles in the forecast from 14,275 billion kilowatthours in 2002 to 26,018 in 2005. Coal and natural gas are expected to remain the most important fuels for electricity generation, accounting for 62% of the energy used for electricity production in 2025.

It is, however, the dominance of oil in the energy basket and its rising price that has rocked the world during the past few years. More so because of its dominance in use as an imperative in the transportation sector which accounts for about 60% of the total projected increase in oil use between 2002 and 2025. World crude oil prices have risen from US \$10.29 per barrel in 1998 to over US \$65 per barrel in 2005 with spare capacity of oil producing countries dropping to barely 1 mbd. Moreover, almost 80% of all the traded oil will come from just three areas – West Africa, the Middle East and Russia.

According to the International Energy Agency, to meet the soaring world energy needs, an estimated US \$17,000 billion is required to be invested by governments and companies globally by 2030.

Energy is inextricably linked to economic growth. With 17% of the world's population India has just 0.8% of the world's known oil and natural gas resources. It has the 12th largest GDP in the world at US \$600 billion and according to the International Energy Outlook 2004, will have the 9th largest GDP in the world at US \$1.8 trillion by 2025. In 30 years India's economy could be largest than all except US and China. The per capita energy consumption is, however, only about 21% of the world average, 35% of China, and only about 4% of the US.

India consumes over 3% of the world oil consumption while it produces only 1% of the world production. The country imports over 70% of its crude oil requirement and in fiscal 2004 the net oil and oil products import was valued at over US \$22.7 billion. The crude oil imports may exceed 85% of requirement in two decades. A focussed attention to energy security is therefore a prime concern for the nation.

Energy security rests on two principles. The first, to use the least amount of energy to provide services and cut down energy losses. The second, to secure access to all sources of energy and technologies worldwide, to provide a diverse supply of reliable, affordable and environmentally sustainable energy. Energy security also means ensuring that the country can supply lifeline energy to all its citizens at affordable costs at all times.

India presently consumes 112 million tonnes of petroleum products which will quadruple to over 400 million tonnes by

2030 at the current rate of GDP growth. The demand for Natural gas is expected to triple in the next five years. There is an installed capacity of 121,000 megawatt (MW) of electricity, which is 3.1% of world capacity. The demand from power sector will go up to about 400,000 MW by 2030 when the population may touch 1.4 billion. Fortunately, dependence on oil and gas for power generation is only about 11%.

Energy being of prime importance for economic growth, therefore, deserves far greater attention than heretofore. India has a hydrocarbon vision 2025. Not only does that need to be taken forward to 2050, there should be an Energy Vision 2050 for the nation with milestones. While a beginning appears to have been made by having an Energy Coordination Committee services by the Prime Minister's Office and the Energy Division of the Planning Commission, what is needed is a comprehensive Ministry of Energy, encompassing oil and gas, coal, power, renewables and nuclear.

The importance of oil security can be gauged from the fact that a US \$10 increase in oil price can reduce our GDP by nearly 1% and enhance inflation by nearly 2.6%.

There has to be a multi-dimensional approach to the problem. In the area of oil and gas, strategic reserves should be developed and maintained to be used in times of extreme fluctuation in prices and/or disruptions in supplies. At the same time, we need to diversify our sources

of supply and enter into long term sourcing contracts beginning from security of production at fields and continue with security of delivery along the supply chain so that the investments in processing and consumption are secured.

There needs to be an integration of regional markets. The Asian Market dependence on the Middle East for imports is over 80%. There may, therefore, be a need to have a different benchmark crude and ensure that an Asian premium is not paid by India for its crude oil supplies. At the same time, regional trade should de-politicized. Gas pipelines are already planned from Myanmar, Bangladesh, Turkmenistan and Iran. Exports of diesel are planned to Pakistan and equity investments have already been made in Sri Lanka. More such multi-lateral initiatives, at Asian and global level, can serve as vehicles for regional coordination and cooperation.

The above does not in any way diminish the importance of systematically enhancing oil and gas production within the country and aggressively investing in securing equity oil abroad. ONGC Videsh has been actively pursuing equity oil abroad. The other entrants in the field are GAIL and OIL – Indian Oil combine. The recent formation of another company with ONGC and the Mittal Group should add further clout to the Indian effort.

India's energy intensity, which is the amount of energy needed to produce one unit of GDP, is 2.88 times that of the rich countries. In other words we consume thrice as

much energy as the average rich country to produce equivalent amount output. We therefore need to strongly enforce, even mandate, demand management and efficiency improvement. It has been estimated that since 1973, the world has saved far more energy through improved efficiency than it has gained from all new sources. Technology can deliver increased benefits with less energy, in effect replacing some of that electricity and oil with brain power. Substantial savings can also be affected in use of electricity. Energy related requirements should be provided on the name plate of domestic equipment through standardization and labelling which will help consumers, through awareness campaigns, to use only energy efficient equipment. Inefficient energy utilizing devices should be discouraged. Fiscal incentives through tariff and taxes should be provided to energy efficient equipments and systems to encourage their production and use. It should, in fact be ensured that India does not become a dumping ground for cheaply available energy inefficient technologies and equipments.

Energy pricing is another key to conservation. Free power to the agricultural sector and subsidized power to some other sectors results in large scale wastages. Efficiency of most of the equipments in these sectors, mainly motors and pump sets, is extremely low. Subsidies and low prices prove a powerful dis-incentive for energy conservation. Artificially suppressed prices, not in tandem with market determined prices, lull the user into complacency in conservation and encourage profligacy. In the case of

electricity even time of day metering and pricing can reduce loads on grids and encourage better usage.

Further boost to energy demand management can be provided by benchmarking of technology and energy efficiency in groups of industries. Industrial plants can be classified based on technology type, scale, age and then benchmarked for their energy efficiency with international standards. Similarly there need to be building codes and regulations to mandate cost effective energy efficiency techniques into building designs. Significant savings in energy can be achieved with initiative which will contribute to energy security in the long term.

In general, energy conservation, energy efficient appliances and technology need to be encouraged through fiscal measures and incentives and even mandated by legislation. We should at the same time make optimum use of our resources. We have coal and lignite in plenty. Coal gasification can effectively provide substantial power which can be utilized for mass transportation with associated carbon dioxide sequestration. Coal-bed methane and gas hydrate technology should also be effectively utilized. In the event of our striking good gas finds and/or being able to tie up imports of NG through trans-national pipelines, gas-to-liquid technology can be explored to meet transportation fuel needs economically.

The other strategies for energy security involve increasing use of renewables, including bio-fuels. In India, renewable

sources of energy like solar, wind, biogas, biomass, municipal and industrial effluent treatment and bio-fuels have substantial potential. The gross potential for power generation from wind power, biomass and bagasse based co-generation in sugar mills, small hydropower projects and urban and industrial bio-degradable wastes is estimated at 82,200 MW. Of this only 5700 MW, which is less than 7% of the potential and less than 5% of the total installed power generating capacity from all sources has been tapped. And the above does not account for the non-fuel-use vast potential of hydroelectricity of 150,000 MW in the country, of which less than 25% has been tapped so far.

Similarly, nuclear power generation can be increased several fold using thorium. Technology development is to be accelerated for thorium based reactors since the raw material for thorium is abundantly available in our country. Also, nuclear fusion research needs to be progressed with international cooperation to keep that option for meeting the large power requirement.

India has nearly 60 million hectares of wasteland of which 30 million hectares are available for energy plantations like Jatropha. Each acre will produce about two tonnes of bio-diesel which is carbon neutral and many valuable by-products flow from this agro-industry. Diesel is the largest single petroleum product being consumed in the country – over 40 million tonnes. Reduction in petro-diesel usage by replacing it with bio-diesel will substantially aid India's energy

security. Similarly, ethanol blending of petrol will aid energy security.

Last, but not the least, energy efficiency in usage will need adequate infrastructure in terms of good quality, de-congested roads and mass and rapid transportation systems. India has substantial scope for development of inland water transportation systems. Renewables and energy efficiency are being encouraged in several developed countries.

It is amply clear that in the next 30-50 years the world would need to diversify its sources of energy. Hydrogen and coal-to-liquid may be some of the sources but considerable R&D is required for their commercialization, particularly the former. Substantial emphasis should, therefore, be laid on R&D to commercialise new sources and reduce energy requirements. A beginning has been made in India and the Chairman of the Steering Group on Hydrogen Energy, Mr. Ratan Tata, has in November 2005, presented the National Hydrogen Energy Roadmap to the Government projecting an investment of about Rs. 250 billion, of which about Rs. 10 billion would be for R&D and demonstration. The roadmap covers Green Initiative for Future Transport (GIFT) and Green Initiative for Power Generation (GIP).

In the ultimate analysis since energy impacts the nation and its economy, it has to be a national effort and the economic policy of the country needs to be realigned and

re-oriented towards the myriad aspects of energy security. Not only should there be an Oil Price Stabilization Fund, but the tariff and taxes need to be structured in a manner that encourages energy efficient equipment and technology and innovation. The tariffs must consider all aspects of energy in a holistic manner. Even the Defence expenditures need to take into account the fact that we must protect our maritime routes and energy supply chain. The Foreign Policy will need to factor in energy security. This needs a global perspective and innovations of the highest order by every profession and arm of the Government. The national policies towards energy security will need to be depoliticized for long term favourable effect. And at the end, it all needs effective implementation.

*The views expressed in this booklet are not necessarily
those of Forum of Free Enterprise*

"People must come to accept private enterprise not as a necessary evil, but as an affirmative good".

— Eugene Black

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The Forum of Free Enterprise is a non-political and non-partisan organisation - started in 1956, to educate public opinion in India on free enterprise and its close relationship with the democratic way of life. The Forum seeks to stimulate public thinking on vital economic problems of the day through booklets, meetings and other means as befit a democratic society.

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