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Demand-supply mismatch, energy security and sustainable development in India

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Abstract

The objective of this paper is to analyze the trend and pattern of energy use, demand-supply mismatch, energy challenges, the cause and effect relationship between energy and economic development, and it's sustainability in India. The study is based on secondary data collected from energy policy reports, economic survey of India and reports of oil corporations of India. The study has used methods of compound growth rate and energy elasticity to analyse the present and future energy challenge in India. In terms of primary energy consumption, India ranks fifth in the world and accounts for about 3.5 per cent of the world's commercial energy demand. But the country lacks sufficient domestic energy resources, particularly of petroleum and natural gas and must import much of its growing requirements. Currently, about 35% of India's commercial energy needs are imported. Energy security and sustainable development are critical issues to ensure India's economic growth.

The trend of the primary commercial energy consumption in India shows that electricity and coal are the major sources of energy consumed in India. The demand for coal and electricity increased at 8 % to 9 % during last 3 years. Coal is essential source of energy in India and three-fourth of electricity is generated from coal in thermal plants. The oil and natural gas reserve in India is very low. Total coal energy requirement is projected to increase from 283MT in 2011-12 to 937 MT in 2031-32 which is four times rise in 20 years. The projected oil energy requirement increases almost at 20 % per year whereas GDP growth rate is only 8% to 9 % per year. Natural gas requirement is projected to rise from 48MT in 2011-12 to 197 MT in 2031-32 which is more than four times in 20 years. During 10 years from 2011-12 to 2021-22, the total coal demand will increase from 627 MT to 1131 MT. The per capita primary energy consumption in India is a low 305 kg against the world average of 1,487 kg. Accordingly, with a total primary energy consumption of 314.7 million metric tones of oil equivalent (MMTOE), India accounts for just 3.4% of the total world primary energy consumption. The share of primary energy consumption is projected to increase from 72.2% to 90.4% during the same period. The share of non-commercial energy will significantly reduce to 9.1% in 2031-32. The projected compound annual growth rate of total primary energy requirement from 2006 to 2032 is 5.4 % where as it is only 0.76 % in case of Non-commercial Energy. The paper focuses on the projections, growth rates and GDP elasticity of total energy requirements. During fifteen year period from 1995 to 2010, the compound growth rate of total primary energy is 2.9 % and for total primary commercial energy is 4.9%. In order to deliver a sustained growth of 8% through 2031, India would at least need to grow it's primary energy supply by 3 to 4 times whereas the electricity supply needs to grow at the rate of 5 to 7 times the present consumption.

Key words: Energy, coal, sustainability, projection, electricity