



## INDIA'S ENERGY POLICY: REQUIREMENTS, SUPPLY AND CHALLENGES

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The Draft Report of the Expert Committee on Integrated Energy Policy was put out by the Planning Commission in December 2005 for comments.<sup>1</sup> The report examines the issues from the point of view of energy requirements and the supply options, and attempts to address issues of energy security.

The per capita level of energy consumption in India is half of that in China and one third the world average. GDP per capita and energy consumption have a close correlation, and therefore energy needs are likely to rise dramatically as the economy grows at 7-8% a year. The elasticity of total primary commercial energy consumption is around 0.82 for India, consistent with cross-country regression figures. In addressing energy policy issues, the report attempts to move away from the traditional approach of determining optimal supply strategy with quantitative targets. The report takes a broader approach of recommending an enabling environment such that relative economics of alternatives are left to the combination of technology and prices, and choices left to the economic decision takers. As such, the document recommends broad policy alternatives, and has to be viewed against this context.

The commercial energy requirements have been estimated to the year 2031-32, assuming a population of 1.46 billion at that time. At a 7% rate of growth, GDP would be over 5.5 times that of today, and at 8% growth, over seven times. The scenarios depict a four to five times growth in energy consumption, with electricity requirements going up from 633 BkWhr to over 3,000 BkWhr, requiring a five to six fold increase in installed generating capacity from 131,000 GW in 2003-2004. This increase is expected to come from an increase in Hydro from 75 BkWhr to 500 BkWhr, Nuclear from 18 BkWhr to 441 BkWhr, with coal based energy generation projected at 78% of energy demand in 2031-32 and gas based generation set to increase to 20% from the current level of 12%. The estimates for domestic energy have been projected assuming that pattern of fuel use for a particular monthly per capita consumption expenditure class remains the same as observed in the last NSS survey. The

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<sup>1</sup> The Draft Report of the Expert Committee on Integrated Energy Policy was prepared under the chairmanship of Mr Kirit S. Parikh, Member (Energy), Planning Commission, India. A copy of the draft report is available at <http://planningcommission.nic.in/genrep/intengpol.htm>.

projections continue to show a heavy dependence on traditional fuels like firewood and dung cake of around 62% in 2031-32 (down from around 81% currently).

The interesting numbers are that crude oil use is expected to increase from around 105 MMT in 2001 to a range between 264 to 324 MMT in 2024-25; demand for natural gas has been estimated to grow from 62 MMSCMD in 2001 to a range between 195 and 225 MMSCMD in 2025, and demand for coal from 473 MTe in 2006-07 to over 1100 MTe in 2024-25. The scenario summary, given a range of alternatives to choose from, including coal dominant, forced hydro and forced nuclear scenarios, indicates that the fuel mix in 2031-32 could vary between 42% to 65% for coal, and up to a maximum of 6% for nuclear and 4% for hydro. Oil would be in a range of 28% to 33% of the fuel mix and Natural gas between 7% and 12%. There is emphasis on realization of full potential of hydro-energy and a fast growth in nuclear energy. Hydro potential for India has been estimated at 150000 MW, and the report recommends its realization. Nuclear energy is recommended to grow 20 times to meet over 6% of primary energy requirements by 2031-32.

The real concerns in the study emerge in the supply side. Given that transportation fuels for aviation, ships and road transport are likely to depend heavily on petroleum products, and that the growth of urbanization would increase LPG and kerosene use significantly, there is only limited flexibility in substitution of petroleum products. The best estimates of domestic oil production in 2025 do not exceed 50 MTe. Therefore, imports would have to increase from around 80 MTe of crude currently, to over 200 MTe in 2025. The world pumps around 87 million barrels of oil daily, and India's total annual imports of crude are equivalent to around a week of global crude production, or less than 2% of traded oil. Recent estimates, including testimonies accepted by the US House of Representatives from experts as late as December 2005, indicate that while global oil production is unlikely to peak for the next 20 years, the supply is likely to increase by 25% per day by 2015. The draft report envisages that, even in the low growth scenario, Indian imports would have to double by 2015. This raises serious concerns about availability as well as prices.

This is true for natural gas as well. Global production is growing at around 2% per annum, and there are no signals that this rate of growth would accelerate in the next decade. Yet the natural gas demand has been projected to double by 2015, and the availability of this fuel would be constrained.

The worries about coal, the base fuel of the report, are even more serious. Of the total global coal production of 4 billion tons per annum, coal trade is of the order of 700 million tons. The requirement of coal as per the projections increases from 415 million tons in 2004-2005 to 2.7 billion tons in 2031-32, that is, in volume terms, 68% of global production and nearly four times the current volume of global trade. Even in the scenario wherein there is full development of hydro and acceleration of nuclear generation, the demand for coal is 2.1 billion tons per annum in 2031. Given extractable indigenous coal and lignite reserves of around 14 billion tons, this represents around seven years domestic availability, nor is it likely that global production and trade would grow to an extent that a reasonable management of own resources could be supplemented by adequate imports.

The heavy reliance in the report on market mechanisms to arrive at an optimal policy mix do not seem to have adequately taken note of the above global supply side limitations. Further, there are already distortions in the fuel price market, in terms of inefficient labour intensive coal production, multiple prices for gas and regulated prices for petroleum products. There

are also historical factors that have resulted in industry, including steel plants, using cheaper gas. In fact, the political choice of the locus of the gas pipeline has resulted in the acceleration of a particular development along the pipeline. The report is silent about the costs of removing these distortions, and who would pay for them. The report is also silent about the investments needed to develop the massive infrastructure needed to develop the port and transport infrastructure needed to handle the massive imports, and whether they are to be added on to the fuel costs or to be treated as public goods. It would have been useful if the report had followed through on its premise of market management of fuel choices, had identified distortions and obstacles, and suggested solutions.

Finally, the suggestions for alternate approaches and technologies do not appear to be well argued. Efficiency of energy use, in coal fired power stations, automobiles, and in domestic use is indeed important but it is difficult to see the steps that the report is suggesting beyond those that have been pursued all these years. The enthusiasm about gas hydrates, hydrogen fuel, solar power and alternate energy sources has remained undiminished across many energy committee reports; and this document offers no illumination why future efforts in the country would be any different from the past. It would have been useful if the report had examined why these have not taken off, and suggested changes in strategy, structures, institutions as well as approaches from lab to use. As it stands, the reader has an apprehension that the experts are clutching at straws.

The report is an important one in that there has been an attempt to look holistically at different energy scenarios in the context of a 7% to 8% GDP growth and has to be commended for its analysis.

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