



PSA/2006/3

National Energy Map for India

Technology Vision 2030



Office of the Principal Scientific Adviser
to the Government of India

Preface

India has recorded impressive rates of economic growth in recent years, which provide the basis for more ambitious achievements in the future. However, a healthy rate of economic growth equalling or exceeding the current rate of 8% per annum would require major provision of infrastructure and enhanced supply of input such as energy. High economic growth would create much larger demand for energy and this would present the country with a variety of choices in terms of supply possibilities. Technology would be an important element of future energy strategy for the country, because related to a range of future demand and supply scenario would be issues of technological choices both on the supply and demand sides, which need to be understood at this stage, if they are to become an important part of India's energy solution in the future.

The Indian government aims to achieve an economic growth rate of over 8% in the next two decades in order to be able to meet its development objectives. However, rapid economic growth would also imply the need for structural changes in the economy as well as for induced shifts in the patterns of end-use demands. To meet the needs of the Indian populace in the most effective manner, it is important to map out the energy demand and supply dynamics in the country. This study estimates alternative trajectories of energy requirements and examines the likely fuel mix for the country under various resource and technological constraints over a 30-year time frame.

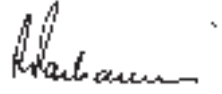
This study has been commissioned and supported by the office of the PSA (Principal Scientific Advisor) to the Government of India. The two-year study has drawn input from several organizations and sectoral experts across the country to gauge the likelihood of technological progress and availability of energy resources in the future.

The MARKAL model used in this study is a widely used integrated energy system optimization framework that enables policy-makers and researchers to examine the best technological options for each stage of energy processing, conversion, and use. This modelling framework was used to represent a detailed technological database for the Indian energy sector with regard to energy resources (indigenous extraction, imports, and conversion) as well as energy use across the five major end-use sectors (agricultural, commercial, residential, transport, and industrial).

The report discusses the data, assumptions, and methodological framework used to estimate useful energy requirements of the country based on demographic and economic drivers. Technological assessments of resources and energy conversion processes have been described in the report. Economic and technological scenarios have been developed within the integrated modelling framework to assess the best energy mix during the modelling time frame. Based on the scenario assessment, the report provides directions to various stakeholders associated with the Indian energy sector including policy-makers, technologists, and investors.

The report clearly points towards the country's increasing import dependence of all fossil fuels. It also indicates that coal would continue to play a key role in meeting the country's energy requirements. However, the indigenous availability of coal is expected to plateau in the next couple of decades with the current exploitation plans and technology. The need for energy efficiency in the end-use sectors and radical policy changes in the transport sector is also

highlighted. The study points towards focussing efforts simultaneously on the demand and supply sides for the economy to attain the most efficient utilization of available resources.



(R K Pachauri)
Director-General, TERI