Abstract

A Dynamic Model for Energy Sector of India –
With Special Reference to Household Energy System

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The. study investigates linkages between energy and economy, and also examines the relationship of various energy forms with household energy. A macro model of energy–economy interaction has been developed using input–output approach to study the linkages. A cue from system dynamics technique was taken to capture dynamic nature of the relationship. Energy requirements of the economy are derived using input–output model whereas capital requirement for energy production is computed using capital output relationship. Capital stock and gross output were used to study the capital –output relationship. Over the past 20 years, no significant change in the capital – output ratio was found in case of coal and electricity sectors. In case of petroleum sector and the economy as a whole, the ratio was observed to be rising. Therefore, to achieve the projected growth rates during Seventh Plan, while keeping investment limited at already planned level, it is necessary to improve productivity of the capital.

A mathematical model encompassing various energy sources used by households has been developed to study the household energy system. The relationship between various variables like type of fuels and their shares in energy consumption, growth rates of consumption of fuels, appliance efficiencies etc. has been brought out in the model. The focus of this part of the study has been to explore use of non–commercial energy by households.

The share of commercial energy in the household energy was observed to be increasing at a fast pace, resulting in gradual reduction in the absolute consumption levels of all non–commercial fuels except dungcakes. Various scenarios of household energy consumption under different conditions and policies have been worked out for year 2004–05. Likelihood of higher commercial energy requirement and lower absolute consumption levels of non–commercial fuels, compared to projections made in the past studies emerges as one of the important findings of the study. The study also throws light on the serious gaps in the available data, which make a meaningful policy analysis difficult. The improvements required in the energy survey methodologies and data requirements of critical variables for proper energy planning and analysis of the household energy have also been identified.