ABSTRACT

An Operational Model for Forecasting Energy Demand in India

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An intersectoral-intertemporal model has been formulated to forecast energy demand in quantity terms for the economy during the 10 year period 1978-88 considering a 30 sector economy. The model forecasts the energy demand for all the three categories of commercial fuels namely, Coal, Petroleum and Electricity.

The model, not only forecasts the energy demand in quantity (physical) terms but is also capable of studying the impact of changes in the various economic and other variables on energy demand. The impact of such variables like income redistribution, changes in imports, changes in product-mix of iron and steel, change in technology in agriculture sector and extended time lag in project execution of all the sectors have been studied and useful policy considerations arrived at.

The energy demand forecast by the model shows a slightly higher value for coal, similar value for petroleum products and a little lower value for electricity, compared to the other energy demand forecasts in the economy. The major contribution of the model has been to provide an estimate of energy demand that is intersectorally and intertemporally consistent. Moreover, it is capable of studying in totality the effect of changes in the various economic and other variables on energy demand, which the existing models are not capable of. However, the limitations like non-availability of recent data and lack of precise data on changing technology and product-mix have acted as constraints.

The sensitivity analysis provides some very useful information such as (i) poverty removal is very marginally energy-intensive; (ii) provides value of energy intensity for the entire economy as well as for the specific sectors; (iii) recycling of ferrous scrap under Indian conditions is almost equally energy intensive as in producing from iron ore; and (iv) increased time lag in project execution increases the energy demand in the economy. No other energy demand forecasting model is capable of providing such information.

Thus, the model indicates that it is a powerful tool in not only forecasting energy demand but also helpful in studying the effect of various policy measures on energy demand. But the data requirements are immense and only the latest data can provide the best results.

The model can further be expanded to study the effect of energy conservation measures and introduction of a new technology in the economy.

A significant further development in the model can be brought about by converting it into an optimizing model so that the supply constraints both of energy as well as other goods (like capital goods) in the economy can be considered.

The multi-sectoral, intertemporal model developed here will provide a very useful base for developing the required multi-sectoral optimizing model.