ABSTRACT

[Key words: Indian coal industry, long-range planning, questionnaire survey, regression analysis, polynomial curve fitting, system dynamics, goal programming]

Coal is one of the principal sources of energy in India. It is consumed by a very large number of sectors such as Power, Steel, Cement, Fertilizer, Railway, and other industry sectors. The coal exploitation activities in India are carried out mainly by Coal India Limited which produces about 88% of the total coal production of the country.

In 1972 and 1973 the coal industry was nationalized. Since nationalization the cost of coal production is rising and the industry is incurring huge losses every year. At the same time, due to lack of coordinated approach to the management of production, movement, consumption and stock of coal, the pit-head stock mounted to over 30 million tonnes during March 1985.

An approach is suggested in this thesis to realistically assess coal demand and coal availability and to develop a suitable policy that ensures all-round growth of the coal industry.

The approach consists of (i) conducting a questionnaire survey to elicit the opinion of experts in the coal industry, (ii) using regression methods to develop functional relationships for the important industry variables, (iii) developing a system dynamics model to develop a long-range plan, and (iv) formulating a goal programming model for building a working, short-range plan.

The questionnaire survey has helped to identify the problems that are encountered by the industry and to identify the likely future developments that would have significant influence on the performance of the industry. This survey has also helped to seek the opinion of the panelists on the likely policy measures to be pursued by the coal industry that could mitigate the problems of the industry.

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In course of the development of the long-range plan, realistic future estimates have been made for coal consumption of the consuming sectors and for coal production by the coal industry. The future cost of production, price of coal, fund requirements, coal exploration activities, capacity expansion requirements, manpower requirements, and coal stock are likewise estimated.

The functional relationships for coal demand, production, and financial variables have been established using the regression methods.

The long range plan for the industry has been developed with the help of a system dynamics model. The model incorporates the findings of the questionnaire survey and the functional relationships for the coal demand, production, and financial variables. Various policies have been tested with the system dynamics model and the policies that have the maximum leverage in improving the health, and ensuring the growth, of the industry have been suggested for the industry.

A short-range plan has been developed using a Goal Programming model. This short-range plan provides an effective means to achieve the future projections made in the long-range plan and helps in identifying the imbalances and deviations from the plan.

The concluding chapter summarizes the results of the study and suggests the scope for further work in this area.