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**INTRODUCTION**

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**T**his study examines the scope of using economic instruments for raising the efficiency of resource use and reducing environmental damages from air, water and solid waste pollution. The main objective of the study is to analyse the efficient pricing and taxation of energy, water and solid waste disposal through (a) pricing of publicly provided resources; (b) taxation of, or user charges for products or effluents; and (c) modification of subsidy structures. Energy resources include coal, petroleum and gas fuels, and electricity in their major forms and uses. Water includes municipal and industrial water supply and water-borne waste disposal. Solid waste disposal is confined to urban areas.

All the three energy resources—coal, petroleum and natural gas, and electricity—are private goods. Until recently coal and petroleum and natural gas had been public monopolies under central government ownership and control. In electricity, there is a mix of private and public utilities, but the share of the private sector in total electricity sold is less than 5 percent. The central sector units are engaged only in power generation. At the state level, the state electricity boards (SEBs) are entrusted with the responsibility of generation or purchase of electricity, and its transmission and distribution. In this sector the analysis is at the macro level.

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Water supply and sanitation and solid waste disposal services are provided by municipalities and state level water supply and sewerage boards. Water supply is considered as a merit good and hence equity considerations play an important role in its delivery. Sanitation and solid waste disposal services are local public goods. These services are obligatory functions of local bodies. The study on solid wastes is based on data collected from a few selected municipalities.

The economic instruments considered here are prices, user charges, taxes, and subsidies. One may interpret a per unit tax/subsidy as a deviation between price and long-run marginal cost (Hotelling, 1938). User charge is often fixed as a proportion of average cost or operating (variable) cost. Here the concern is on cost recovery. Since almost all the products and services covered in the study are, at present, provided by public sector agencies, there is a close link between pricing/charging/tax policies and budgetary surpluses and deficits of the governments.

The administered prices of energy resources are based on accounting costs which underestimate the opportunity costs of resources. In coal, petroleum and natural gas, the total revenue covers the total accounting costs but there is considerable cross subsidisation in the provision of petroleum products. In electricity, the SEBs have been incurring huge financial losses. Agricultural and domestic consumers are being cross-subsidised by other consumers of power.

In water supply, except in the case of large industrial users in a few selected cities, water charges are unrelated to the cost of supplying water to different categories of consumers. Most small consumers pay lump sum amounts and the poorer sections of population pay little towards the cost of water. In the provision of sanitation and solid waste services, there are no user charges.

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In all these sectors what is observed is a syndrome of inadequate and undependable product supply or service provision, lack of adequate resources for investments in capacity creation, and inefficiency in resource use. At present, no effort is being made to internalise the environmental costs through administered prices or user charges.

The economic reforms introduced since June 1991 have encouraged the entry of the private sector in the energy sector and favoured the application of long-run marginal cost pricing principle in the determination of prices for publicly provided products. The *Policy Statement on Abatement of Pollution* issued by the Ministry of Environment & Forests in February 1992 stresses the need for internalising environmental costs in pricing and endorses the adoption of the "polluter pay principle" wherever feasible. The recent 73rd and 74th Amendments to the Constitution of India have opened up the possibilities for making local bodies in the rural and urban areas "institutions of local self-government". The State Finance Commissions set up in each state in pursuance of the amendment acts are required to decide on, among other things, the issue of financing water supply, sanitation and solid waste disposal services.

Against this background this study examines the scope of using economic instruments in improving efficiency in resource use and reducing environmental damages. In the energy sector, the study investigates the effects of (a) a shift from the existing administered pricing regime to one which is based on long-run marginal social costs; and (b) a carbon emission tax on fossil fuels, on the energy prices, energy demands, public sector revenues and environmental improvements. There is, however, available a sound database on production, consumption, prices, revenues and financial performance. Estimations of long-run marginal social costs of the energy products are based both on actual data and certain norms. The information

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base is generally weak on the estimates of demand elasticities and emission coefficients. However, an attempt is made to infer the effects under certain assumptions within a partial equilibrium approach.

As for water supply and sanitation services, reliable information is available only on the actual costs incurred on the provision of services, water availability, water consumption by large user categories and the provision of some estimates of sanitation services. Water supply is metered for industrial categories, large users, and sporadically for other users. Water treatment facilities are inadequate in most cities. As there is no user charge system for sanitation and solid waste disposal services, it is difficult to study the users' responses to price signals. This study is thus confined to a discussion of alternative methods of financing the services keeping in view the need for providing services to vulnerable groups of population at subsidised prices.