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Integrating Eco-Taxes in the Goods and Services Tax Regime in India

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"Integrating Pollution-abating Economic Instruments in Goods and Services Tax (GST) Regime"

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Chapter 1

INTRODUCTION

The quality of environment and the quality of life are nearly synonymous. Maintaining the environment at an acceptable level of quality is the duty of central, state, and local governments as also the duty of all citizens as per the provisions of the Constitution of India read with the relevant Supreme Court judgments. The process of economic growth, however, entails myriad activities that generate pollution affecting the quality of air, water, and land. If the level of pollution increases beyond acceptable thresholds, it can potentially cause major health hazards, entailing both economic and welfare costs.

Some of this pollution is cleared up by natural processes. Others like carbon dioxide and other greenhouse gases remain in the atmosphere for a long time due to high life time. Accumulated pollution over a long period of time as a result of economic activities is a stock; current pollution is a flow that adds to that stock. This flow of pollution can be mitigated to a certain extent by policy intervention. There are two groups of policy instruments to stem the flow of pollution: regulatory and economic. This paper focuses on the latter. The main economic instruments are fiscal instruments encompassing both taxation and subsidies. In India, consideration of the fiscal instruments is particularly important at the present juncture as we are in the process of bringing in comprehensive reforms in the system of taxation of goods and services.

This paper has seven chapters. Chapter 2 highlights some of the constitutional provisions in regard to environment in India as also the economic costs associated with pollution. Chapter 3 highlights the importance of economic instruments as compared to the regulatory instruments in controlling pollution. Chapter 4 reviews the progress of reforms in indirect taxes arguing for the rollout of the goods and services tax. Chapter 5 examines the role of eco-taxes in environmental management and provides a brief review of international experience in the use of eco-taxes. Chapter 6 looks at the implications of integrating eco-taxes in the Goods and Services Tax (GST) framework in terms of revenue potential and impact on pollution besides providing a comprehensive discussion on basic features of the proposed GST and some of its variants, complementary role of environment promoting subsidies and industry perspectives. Chapter 7 concludes.

Chapter 2

ENVIRONMENTAL MANAGEMENT: CONSTITUTIONAL PROVISIONS AND POLLUTION COSTS

Article 21 of the constitution, relating to the fundamental rights, states that 'No person shall be deprived of his life or personal liberty except according to procedure established by law'. This article has been repeatedly interpreted by the Supreme Court as ensuring 'right for clean environment' – arguing that right for life is not feasible without protection and preservation of natures' gift. Any disturbance to the basic environment elements, namely, air, water, and soil necessary for life, would be hazardous to life within the meaning of Article 21 of the Constitution.

Article 47 of the Constitution requires the State to improve the standard of living and public health. To fulfill this constitutional goal, it is necessary that the State should provide among other things a pollution free environment. The United Nations Conference on Environment held at Stockholm in 1972 placed the protection of biosphere at the centre of international policy and law. India through its participation in the Stockholm convention and explicit statement has committed itself to the protection of the environment. Relevant constitutional changes were brought about through the 42nd Amendment Act in 1976 relating to articles 48 and 51.

- *Directive Principles of State Policy*: Article 48 A – 'The State shall endeavour to protect and improve the environment and to safeguard the forest and wildlife of the country'

- *Fundamental Duty*: Article 51-A (g) – 'It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures'

Amendments to the Constitution were also made to accelerate the pace for environmental protection through changes in the Seventh, Eleventh, and Twelfth Schedules of the Constitution.

- *Seventh Schedule of the Constitution* – in the Concurrent List, 42nd Amendment inserted, Entry 17-A – providing for forests; Entry 17-B – for protection of wild

animals and birds; and Entry 20-A – providing for population control and family planning

- *Eleventh Schedule of the Constitution* was added through the 73rd Amendment Act in 1992. This schedule has 8 entries providing for environmental protection and conservation. This amendment assigned the function of soil conservation, water management, social and farm forestry, drinking water, fuel and fodder etc. to the Panchayats with a view to environmental management.

- *Twelfth Schedule of the Constitution* was added through 74th Amendment Act in 1992. This schedule provides directives for the Urban Local Bodies such as municipalities to perform the functions of protection of environment and promotion of ecology.

Under the constitution, three important subjects concerning environment, namely, water, land, and gas and gas-works are placed in the State List of the Seventh Schedule of the Constitution as items 17, 18, and 25. Forests are placed in the Concurrent List.

From the economic viewpoint also, reduction in pollution is of considerable importance. The Thirteenth Finance Commission observed (GoI, 2009; para 10.179) "During field visits in the states we witnessed significant environmental degradation affecting the lives of people in the mining regions". The economic costs associated with pollution can be significant although there are very limited number of studies that systematically assess such costs. For example, the World Bank (1995) for the first time provided an aggregate economy-wide estimate of cost due to various environmental pollution in India. The study estimated the health impact of water pollution to be $5,710 million and the agricultural output loss due to soil degradation as $1,942 million. The health impacts of air pollution were assessed as $1,310 million and the loss of live-stock carrying capacity due to rangeland degradation was found to be $328 million. The cost of deforestation came to $214million and the loss of international tourism was found to be $213 million. Overall, the results show that the total environmental damage was $9.7 billion per year, or 4.5% of GDP in 1992 values.

In a subsequent estimate World Bank (2005) assessed that the annual economic cost of damage to public health from increased air pollution alone based on RSPM measurements for 50 cities with the total population of 110 million was close to US$ 3 billion in 2004.

Smith and Mehta (2002) have analysed the years of life lost (YLL) and disability adjusted life years (DALY) among the rural and urban children below the age 5 years and estimated the YLL and DALY attributable to the use of solid fuels in the household. It is estimated that annually about 20 million YLL and DALY in India can be attributed to not using the clean fuels.

Recently Green Indian States Trust (GIST, 2008) has made an attempt to estimate the aggregate impact of natural resource degradation on Indian economy. The resources covered included depletion of forest resources, biodiversity loss, agricultural and pasture land degradation, and loss in ecological services. The gain/loss due to change of these resources are estimated across major states of India and expressed with reference to the NSDP in 2002-2003.

- In terms of loss due to depletion of timber, fuelwood, and non-timber forest products, Bihar is estimated to have incurred significant burden – about 5 percent of its NSDP, followed by Himachal Pradesh (2 percent of its NDSP) and Orissa (1 percent of its NDSP). At all India level, the losses are estimated at about 0.5 percent of NDP.

- With regard to loss due to depletion and degradation of agricultural and pasture land Rajasthan, Madhya Pradesh and Orissa registered high losses (4 percent, 3.5 percent and 3 percent respectively of NSDP).

- Himachal Pradesh, Uttar Pradesh and Kerala registered significant loss due to biodiversity loss from the forest degradation.

Thus, maintaining good quality environment is mandated both under the fundamental rights of the constitution and the directive principles. There is also a strong economic rationale to justify this. Under the constitutional provisions, the central, state, and local governments must make the necessary effort to promote activities that maintain the acceptable quality of the environment.

Chapter 3

MANAGING ENVIRONMENT: REGULATORY AND ECONOMIC INSTRUMENTS

Regulatory instruments, also called, 'Command and Control' (CAC) instruments, involve state regulation of activities where the state prescribes emission or effluent standards, limits the production of certain goods beyond a prescribed limit, prohibits the use of polluting inputs, and restricts location of polluting industries. Non-compliance to these standards results in punishment in the form of fine or other legal measures. Regulations could also take the form of performance standards where the state dictates a certain level of performance or work practice standards where it imposes the use of a technique known to reduce pollution.

All our environmental legislations come under criminal laws[1]. In implementation of the laws as well as in judicial decisions, the issue is on compliance or non-compliance, and not on the extent of compliance. The penalties for non-compliance are unrelated to the compliance costs. This type of pollution control regime creates an opportunity for corruption and rent-seeking. The present standards and control regime – particularly the ones based on technology standards and input usage norms – provides no incentive for polluters to search for and adopt environmentally sound cost minimizing technologies/practices. Economic instruments like taxation and subsidies, on the other hand, use incentives and disincentives to affect the decisions of producers and consumers. These are self-administered and allow the possibility of affecting the extent of pollution.

The main criticism against the command and control instruments is the high cost of emission reduction and government implementation failures. Given that all industries do not have the same abatement cost, it is cost efficient for some industries to abate more and others to abate less than required. However, regulations require all industries to adhere to similar standards irrespective of their cost of abatement which increases the overall cost of abatement. Regulation is also more difficult to implement as they require considerable information and involve significant administrative costs for implementation

[1] National Environmental Policy (2006) notes that, 'Civil law offers flexibility and its sanctions can be more effectively tailored to particular situations. The evidentiary burdens of civil proceedings are less daunting than those of criminal laws. It also allows for preventive policing through orders and injunctions' (GoI, 2006; p. 17).

and monitoring. Further, the penalty for non-compliance does not depend on the extent of non-compliance. In case of non-compliance, everyone pays the same fine irrespective of the difference in their level compliance.

Market based Economic Instruments (EIs), on the other hand, are intended to internalize environmental costs and externalities and hence influence decisions of agents by sending signals through price and other variables. These provide financial incentives to make environment friendly decisions. It is in the economic interest of the polluter or the consumer to reduce pollution voluntarily by using better inputs and techniques or consume less polluting goods by conservation or substitution.

The main strength of economic instruments is the flexibility they allow leading to a reduction in the overall cost of abatement in comparison to other regulatory approaches. Economic Instruments call for an overall level of environmental performance in the economy. The private players, depending on their relative costs, can decide their respective levels of abatement. This ensures that industries with lower abatement cost abate more than those with higher abatement costs. Market-based instruments are of three broad types: price-based, quantity-based and informational-policy instruments.

A pigouvian tax is a typical price-instrument used when the output produced of a 'bad' is at the point where the marginal cost of the firm meets the price. The socially optimum output should have been lesser if the social marginal cost (which is higher than the firm's private cost) had been considered. Since the firm ignores this externality, a tax imposed on it to the extent that its private cost equals the social cost internalizing the externality and inducing the firm to produce at the socially optimum level. Thus, as resources and emissions become more expensive, consumers and producers have an incentive to consume lesser or pollute lesser. It works out to be more efficient than CAC regulations as firms which have a lower marginal abatement cost than the marginal tax rate will do so and those who do not will simply pay the tax.

Subsidies for environmental 'goods' which are generally under-produced or consumed, to encourage more production and consumption are also a price instrument. The main drawback of price instruments is that the outcome level is allowed to vary and hence cannot be pre-determined.

There can also be quantity-based instruments where the government fixes the output and the private firms can choose prices to achieve the quantity limit. In a way,

quantity instruments are similar to performance standards except that non-compliance to the limits is allowed if a firm could buy credits from another firm which has over-achieved the target, that is, reduced emissions beyond requirement. Such credits can be exchanged through instruments like tradable pollution permits. Such permits give an incentive for firms to pollute less as they could sell their permits if they achieve better performance. The main advantage of quantity instruments is that they ensure the desired environmental outcome. However, the practical implementation of trade permits requires an effective legal and institutional structure which acts as major hurdle for its effectiveness.

Eco-tax is a broad term used to denote a variety of negative price incentives including not just taxes that directly tax pollution but also other indirect taxes which discourage the consumption of polluting outputs and the use of polluting inputs in production. For example, a tax on automobiles would lead to a reduction in pollution indirectly through lesser usage of automobiles. A tax on coal, which is regarded to be highly polluting, will discourage its use as raw material in production process and encourage its substitution with other environment friendly materials. From the perspective of implementation, taxing an output or input rather than pollution is preferred due to availability of information on outputs and inputs and familiarity of tax authorities with input/output data.

Hence eco-taxes (the way they are referred here) can be levied directly on pollution or on pollution-causing inputs and outputs signalling the price for the unpaid factor of production, thereby internalizing the externality. However, taxing pollution directly is often difficult due to measurement problems. Further, in some countries like India pollution taxes necessitate significant legal and institutional reforms. In such circumstances taxing polluting inputs and outputs is considered as a second-best solution. Eco-taxes, levied on output, are aimed at raising the price of the output, inducing consumers to reduce consumption levels or shift to non-polluting substitutes. Reduction in consumption will subsequently lead to a reduction in production and hence in pollution load. Impact of eco-tax in this case depends on the price elasticity of the polluting good and the availability of close substitutes. If levied on inputs, the burden of the tax is borne partly by the producers and is partly passed on to the consumers in the form of increased prices. This will encourage producers to invest in technological innovations and to use non-polluting inputs if substitutes are available.

In recent international experience, the reliance on using economic instruments has considerably increased. In Chapter 5, we discuss the reasons for this increased dependence for using economic instruments for environmental management internationally.

Chapter 4

INDIRECT TAX REFORMS IN INDIA

The reform of indirect taxes in India started in the right earnest in the late eighties. In the pre-reform era, industry was subjected to multiplicity of rates and classifications, high tax rates and numerous exemptions, cascading of taxes, heterogeneity in the tax structure across states, tax-barriers to trade across state and local boundaries, and differentiation between goods and services. The design of the tax did not aim at the final tax payer. It focused more on production or the origin of the good. As a result, industries suffered large compliance costs and policy makers could not plan according to the incidence of the tax. Reforms undertaken since the late eighties to date have corrected many of these deficiencies. In particular, the principle of taxing the value added in the production and sale of goods has been introduced; the number of rate categories have been lowered; and the tax rates have been reduced. But many problems still remain. Cascading still continues. Goods and services are taxed separately and differently. The central sales tax continues to create tax barriers at the state borders.

The GST has been proposed to complete the reform process in India. However, GST in the forms that are currently under discussion may have perverse environmental consequences. For instance, if a polluting good is taxed at a lower rate under the GST regime than the present tax structure, the resulting consumption of the polluting good is expected to be higher. Further, in a destination-based system, the tax revenue will accrue to the consuming states rather than the producing states. This will not only increase emissions in the producing states but will also leave them with lesser revenues to cope with the negative externalities of production.

In designing a suitable system of taxation of goods and services, five types of costs need to be taken into account:

- Welfare costs: this relates to loss of consumer welfare due taxation; economists call it excess burden or deadweight costs.

- Compliance costs: this refers to costs to be borne by industry and dealers; the more complex and differentiated the tax structure, the higher the compliance costs.

- Administrative costs: This refers to administrative costs of collecting taxes; in this case also, the more complex the tax system, the higher the administrative costs.

- Incentive costs: this refers to costs resulting from distorted resource allocations in production processes.

- Environment costs: this refers to costs resulting from environmental pollution; different tax and subsidy regimes entail different environmental costs.

The main characteristic of the GST would be that it will have a single rate or just a few rates. In theory, the excess burden of taxation, the first kind of cost listed above, is minimized when we have a differentiated tax rate structure, with higher tax rates for low elasticity goods. In GST with single or few rates, this kind of cost may increase. But any such increase in costs is overtaken by reduction in compliance costs, administrative costs, and incentive costs. The last kind of cost can also be reduced if we integrate eco-taxes in the GST framework.

Recent international reforms of tax systems point to both a movement towards adoption of VAT and a greening of tax systems by implementing eco-taxes. This popularity of VAT has been due to a number of reasons. First, VAT is considered as an effective means of taxing consumption; second, in VAT, revenues are more secure because these are collected at all stages of production and sale rather than only in the final stage as in the case of the retail sales tax (RST); third, it is an effective means of avoiding cascading. The international experience has also shown that it can be successfully adopted in countries with federal structure. There is evidence that VAT raises the tax-GDP ratio as also production efficiency by inducing better resource allocation.

Earlier many analysts had thought that VAT/GST would be a 'money machine' providing an easy way to increase the tax-GDP ratio. Martinez-Vazques and Bird (2010) note that a mild increase in the tax-GDP ratio has been observed for the countries that have adopted VAT. But for developing countries, the observed increase in the tax-GDP ratio is substantial. They also note that once a country gets started, there is considerable scope for improving the collection efficiency. Earlier, Keen (2006) and Keen and Lockwood (2007) had noted that countries with a VAT tend to raise more revenue, all else equal, than those without it. Keen and Lockwood (2010) find using an unbalanced panel of 143 countries find that adoption of a more efficient tax instrument like VAT is associated with a long run increase in the overall revenue to GDP ratio of 4.5 percentage

points. Martinez-Vazques and Bird (2010) use a balanced panel of 107 countries to examine the same question. They observe that countries having a VAT in their tax-structure have, on average, a higher share of total revenue in GDP of 12 percentage points than those countries that do not have it. After taking into account differences in the share of the agriculture and level of development, Martinez-Vazques and Bird (2010) observe that developing countries who have VAT in their tax structure have on average a revenue-GDP ratio that is higher by 11 percentage points compared to those developing countries who do not have VAT in their tax-structure. One possible reason is that in the presence of VAT revenue yields from some others taxes like the income tax improves.

Chapter 5

ROLE OF ECO-TAXES AND INTERNATIONAL EXPERIENCE

Environmental costs are significant costs for system of production and consumption of goods and services. It has long term inter-generational implications emanating from leaving for the future generations a highly polluted environment. It also has significant implications for the present generations in terms health hazards and quality of life that pollution entails. Emissions of carbon dioxide and other so-called "greenhouse gases" (like methane, nitrous oxide, chlorofluorocarbons and related compounds, non-methane volatile organic compounds, and water vapour) are contributing to 'global climate change'.

Differences in pollution levels across countries or states within a country with large geographic areas as is the case in India depend, among other factors, on the level and structure of demand for goods and services, which may be produced by polluting inputs and processes. Effects of pollution are different for local, regional, national, and global perspectives. Depending on the nature of pollution and its effects, policies to abate pollution also need to be different.

Analytical studies and practical experience at the international level indicate that environmental taxes can be effective in reducing pollution. We highlight the findings of a limited number of studies.

Symons *et al.* (1994) use a demand system with estimated demand elasticities to study reduction in emissions resulting entirely from consumer demand responses. They modelled the carbon tax as a set of *ad valorem* taxes on commodity groups. Using input-output data for calculating the consumers' responses to the price changes, they have taken 14 sector household survey commodity grouping and 28 sector input-output classification for Australia for the price changes and the corresponding demand changes. They also investigated the effect of allowing for substitution in production. They observe that the order of magnitude of a carbon tax induced reduction in emissions in Australia, assuming no technological substitution, is about 20 percent, at A$414 or US$306 per tonne of carbon. Symons *et al.* (1994) also made similar calculations for the UK, where the estimated emission reduction was even higher.

Nordhaus (1993) examines the optimal greenhouse gas reductions and the tax policy in the dynamic integrated climate-economy (DICE) model. He considered how

recycling carbon-tax revenues through cuts in distortionary taxes affect the optimal carbon tax. When revenues from the carbon tax are returned in lump-sum fashion, the optimal tax rate for the first decade is about $5 per tonne; the optimal rate rises to $59 per tonne when revenues are devoted to reducing distortionary taxes. This model integrates the economic costs and benefits of other greenhouse gases reduction with a simple dynamic representation of the scientific links of emissions, concentrations, and climate change. The model contains two policy variables, conventional investment and reduction of the rate of emissions. The latter represents the fractional reduction of emissions relative to the uncontrolled level. The model determines the optimal control rate along with its dual variable, the derivative of the objective function with respect to emissions, which is the "carbon tax". Two key parts of the model are the climate-damage function and the GHG-reduction cost function. The results suggest that the optimal policy has a global benefit relative to no controls of $16 billion annually. This policy would have a GHG control rate of slightly less than 10 percent in the first period. The optimal carbon tax would rise steadily over the coming decades, reaching about $20 per tonne by the end of the next century. The environmentally correct policy of a 20 percent cut would impose significant net global costs of $762 billion in annualized terms. The control rate in the environmentalist policy is higher than the optimal rate, around 30 percent in the first period, and would require a carbon tax of $56 per tonne.

Manresa and Sancho (2005) follow the tradition of applied general equilibrium modelling of the Walrasian static variety to study the empirical viability of a double dividend (green, welfare, and employment) in the Spanish economy. They consider a counterfactual scenario in which an eco-tax is levied on the intermediate and final use of energy goods. Under a revenue neutral assumption, they evaluate the real income and employment impact of lowering payroll taxes. They perform simulations under a range of alternative models and policy scenarios to assess the extent the model structure and behavioural assumptions influence the results. They conclude that a double dividend (better environmental quality, as measured by reduced CO_2 emissions and improved levels of employment) may be an achievable goal of economic policy.

Sterner (2007) provides a review several studies for a number of countries and concludes, 'Had Europe not followed a policy of high fuel taxation but had low U.S. taxes, then fuel demand would have been twice as large'. Sterner observes that fuel taxes are the single most powerful climate policy instrument implemented to date. Environmental tax reform can have a powerful effect on energy use.

Ekins (2009) estimates the price elasticity of energy demand in the UK at about (-) 0.64, which implies that a 10 percent increase in the energy price will reduce energy consumption by 6.4 percent. He also finds that energy use tends to increase with value added with an elasticity of (+) 0.5 (meaning that a 10 percent increase in value added will tend to increase energy consumption by 5 percent). Other things being equal, this means that if a sector (or by implication the economy as a whole) is growing, its energy use will be growing too, unless it is restrained by a rising energy price.

With a reasonable change in the relative prices of labour and environmental resources, environmental tax reform may significantly change the incentives for innovation and technological development, inducing companies to devote more effort to increasing resource productivity, and less to increasing labour productivity. Though there is no universally agreed definition on environmental goods/environmental industry, the industries that reduce pollution, increase resource productivity (through clean technologies and processes) and encourage a switch to renewable resources can be broadly referred as environment industry. The environment industries have two distinct components: the supply of traditional pollution control technologies and services ('end-of-pipe treatment') and industries relating to resource management (management of materials and energy). Both components of the environment industries have contributed to environmental improvement in the EU.

Since the primary objective of environmental taxes is to bring about a reduction in environmental damages from different polluting sources, existing eco-taxes have targeted three main areas that are major contributors to pollution: (a) transport, in the form of differential taxation on vehicles based on fuel efficiency and congestion charges such as the one in place in London; (b) energy, where fuels which feed into energy generation are taxed; and (c) waste and use of natural resources, where pollution, waste disposed and exploitation of natural resources is taxed so that an industry that is more polluting or is more natural resource intensive ends up paying a higher amount in taxes. Table 5.1 provides a summary of some examples of eco-taxes used in recent years. Available evidence indicates that nearly 8 to 10 per cent of total tax revenues are being raised by eco-taxes in countries that have implemented such taxes.

Table 5.1: Eco-taxes – International Experience

Country	Tax	Objective	Description
Taxes on Energy			
UK	Climate Change Levy (CCL)	To encourage energy efficiency	Charged on business use of energy such as natural gas, electricity, LPG and solid fuels. Different rates for different fuels.
	Fuel Duty	To reduce number of trips made by car	Tax levied on fuels based on emissions.
Germany	Energy Tax	To encourage energy efficiency	Tax charged on tax rate on mineral oil for fuel, gas and heating oil, coal and electricity.
Sweden	Carbon Tax	To reduce carbon emissions	Levied on oil, coal, natural gas, liquefied petroleum gas, petrol and aviation fuel in domestic traffic.
	Sulphur Tax	To reduce sulphur emissions	Levied on liquid fuels, coal and fuel oil according to the sulphur content.
Canada	Fuel Tax	To encourage use of efficient fuels	Fuel is subject to the GST/HST, the federal excise tax, provincial taxes and provincial sales taxes. Hence, tax rates differ among provinces.
	British Columbia's Carbon Tax	To reduce emissions of CO_2, methane and nitrous oxide	Levied on the purchase and use of fossil fuels such as gasoline, diesel, natural gas, heating fuel, propane, coal, etc based on emissions of CO_2 equivalent.
Taxes on Waste and Natural Resources			
UK	Landfill Tax	To reduce externalities associated with waste disposal	Charge levied on landfill site owners and can be passed on to consumers via higher prices
	Aggregates Levy	To reduce externalities associated with aggregates extraction	Tax levied on quarry operators and other organizations that commercially exploit aggregates. Different rates for active and inactive wastes.
	Water Abstraction Charge	To cover the costs they incur in water resource management	Levied on businesses that extract and use over ground, underground or tidal water sources

(Contd… Table 5.1)

(Contd..Table 5.1)

Country	Tax	Objective	Description
New Zealand	Waste Levy	To provide both an incentive to avoid waste, along with funding to help develop waste minimisation infrastructure	Charged on waste disposed at disposal facilities
Mexico	Water Abstraction Charge	To encourage efficient use of water	Different rates for specific types of uses of water. Rate also determined by the relative scarcity or abundance of an area's water resources
	Pollution Charges	To reduce discharge of polluting effluents	Different rates for different contaminants and for different types of water bodies to which effluent is discharged.
Transport Taxes			
UK	Vehicle Excise Duty (VED)	To encourage purchase of low emission cars	Annual tax on road vehicles based on the emissions rating of the vehicles.
	Air Passenger Duty (APD)	To reduce the number of times a person flies	Levied on airlines based on the number of passengers flying domestically or internationally from UK airports.
	London Congestion Charge	To reduce level of congestion in Central London	Charged on any vehicle entering or parking in the charging zone between 7 am and 6.30 pm on a weekday.
	Taxation of Company Cars	To reduce emissions by company cars	Company cars are allocated a cash value on which company car drivers are liable to pay income tax and employers are liable to pay Class 1A National Insurance Contributions (NICs).
Germany	Vehicle Tax	To reduce CO_2 emissions from road traffic	Tax based on cylinder capacity of vehicle, over which EURO 2 per gram of CO_2 emissions per kilometre (g/km) is charged if those exceed a threshold of 120 g/km.
Sweden	Vehicle Excise Duty (VED)	To reduce CO_2 emissions from road traffic	Duty comprises of a base charge of 360 SKR plus a CO_2 charge of 15 SKR per gram of CO_2 exceeding 100 grams per kilometre (g/km).
Canada	Vehicle Tax	To encourage purchase of low emission cars	Federal excise tax on automobiles based on the weighted average fuel consumption rating of the vehicle.

Source: Srivastava *et al.* (2010).

Chapter 6

INTEGRATING ECO-TAXES IN THE GST FRAMEWORK

a. GST: Alternative Versions

The variants of GST currently under consideration emanate from respectively from (a) the Empowered Committee of State Finance Ministers (see, Empowered Committee, 2009), (b) the Thirteenth Finance Commission (Task Force on Goods and Services Tax, 2009), and (c) the model implicit in Central Government's proposed constitutional amendment (GoI, 2011). A major achievement is that the basic features of GST, namely, that it will be a concurrent GST, consistent with India's federal structure has been agreed upon. In all the three versions, the GST consists of central and state GST components (CGST and SGST) with the following main features:

i. The basic features of law such as chargeability, definition of taxable event and taxable person, measure of levy including valuation provisions, basis of classification etc. would be uniform across central and state statutes as far as practicable.
ii. The CGST and SGST would be applicable to all transactions of goods and services made for a consideration except for the exempted goods and services, goods which are outside the purview of GST and the transactions which are below the prescribed threshold limits.
iii. The CGST and SGST are to be paid to the accounts of the Centre and the States separately. Taxes paid against the CGST and SGST will get input tax credit (ITC) within the CGST and SGST chains respectively but cross utilization of ITC between CGST and SGST would not be allowed.
iv. The administration of the CGST will be with the centre and that of SGST with the States.
v. The GST will be based on the destination principle. This requires that inter-state sales of goods and services and exports are zero-rated.

There are continuing differences however regarding taxes to be merged under GST, threshold limits, rate structure, compensation to the states, and mechanism of treating inter-state trade.

There are also issues concerning whether the proposed GST will have adverse environmental implications and what can be done to bring environmental considerations in the GST framework. Treatment of polluting inputs and outputs for effective

environmental management is of critical importance in the context of GST as these inputs and output create negative externalities.

There are three routes for the environmental taxes to be part of the overall scheme of indirect taxes in India the core of which can be the GST. These are: (a) non-rebatable excise duties on identified polluting goods and services by the centre and the states, (b) environmental cesses where a link can be established between the revenue from the cess and the environmental promoting activities, and (c) user charges. In addition, at the local government level environmental taxes like the congestion charges can be levied. The most important of these will be the non-rebatable excises and the selection of goods that can be placed under these.

The 13th Finance Commission has made reference to all of these but the coverage of goods for non-rebatable excises is limited to petroleum products, alcoholic beverages, and tobacco. The mention of cesses is limited to cesses for emergency conditions. In other places, the Commission says that all cesses should be merged. The Task Force on GST (2009) argues in favour of subjecting all environmental polluting goods to a non-rebatable excise.

b. Taxation of Demerit and Polluting Goods and Services

In all the three versions of GST, taxation of petroleum products and a limited number of demerit goods like alcoholic beverages and tobacco have been treated distinctly. The Empowered Committee model keeps taxation of petroleum out of the GST framework. This is also consistent with the proposed constitution amendment bill (GoI, 2011). In the model by the Task Force on GST (2009) a distinction is made between emission fuels and others in so far as petroleum products are concerned.

Both the Empowered Committee and the Task Force have considered the issue under 'demerit goods' or 'sin goods'. The Empowered Committee has made reference to 'demerit goods' and the Task Force setup by the Thirteenth Finance Commission has referred to these as 'sin goods'. These concepts also allow for integrating environmental considerations into the GST regime as both of these relate to 'negative externalities' and good and services whose use need to be discouraged.

In its Draft Discussion paper, the Empowered Committee has discussed about the demerit goods including petroleum products (which, as already discussed above are one of the main polluting goods in India). The Empowered Committee has argued in favour of

keeping the demerit goods including petroleum products, tobacco, and alcohol out of the GST purview. These goods in turn will be subjected to separate non-debatable excise duties. In the Draft Discussion paper circulated by the Empowered Committee (2009) the following was recommended.

> " ….Demerit goods such as alcoholic beverages and tobacco should be brought under GST with ITC. However, Excise duties (without ITC) should be levied over and above the GST by both the centre and states. Since crude and petroleum products are non-renewable resources, a similar model, as recommended for alcoholic beverages and tobacco, could be adopted. An alternative would be to, keep crude, motor spirit, and high speed diesel out of the purview of the GST. This would reflect current practice in India that does not allow ITC of petrol and diesel to downstream users."

The Task Force set-up for the 13th Finance Commission clubbed the petroleum products, tobacco and alcohol under the category 'sin goods'. The Task Force recognized the issue of negative externalities in a clearer way and collectively referred to these as sin goods and services and makes a distinction between sin goods and non- sin goods. The Task Force defines sin goods as goods whose consumption create negative externalities and for the purposes of their Report these, collectively or severally, refer to emission fuels, tobacco goods and alcohol. The Task Force notes that generally, goods with negative externalities should be subjected to excise duties in respect of which input tax credit is not to be allowed.

No other specific polluting input or output is mentioned although the environmental objective is clearly recognized by the 13th Finance Commission. The Commission observes: (GoI, 2009; Para 5.28), "The taxation of petroleum products and natural gas would be rationalised by including them in the tax base. HSD, MS, and ATF could be charged GST and an additional levy by both the Central and State Governments. No input credit would be available against either CGST or SGST on the additional levy. A similar treatment would be provided to alcohol and tobacco. Such an arrangement would ensure protection of existing revenues while taking care of environmental concerns."

The Commission on Centre-State Relations has also endorsed the idea (Commission on Centre-State Relations, 2010; para 9.5.02): "In view of the dire need to arrest environmental degradation it is necessary to integrate environmental considerations within the framework of GST. Environmental taxes act as an indirect

mechanism to control pollution and are likely to induce appropriate environmental decisions. We therefore recommend that polluting inputs and outputs may be subjected to a special non-rebatable levy by both the Centre and the States. In addition petroleum products alcoholic beverages and tobacco products may also be subjected to a non-rebatable levy".

A select number of other polluting goods should be subjected to either a non-rebatable excise over and above the GST or a cess. When a cess is levied, the revenue should be earmarked for the same industry for environmental promoting activities. It may be noted that in the GST, effective tax rate of some of the polluting goods are bound to come down compared to present tax rates, central and state rates taken together. This is bound to encourage pollution. This needs to be corrected in moving to GST by a non-rebatable excise or cess. A key component of the environmental taxes will have to relate to taxation of coal. In the Union Budget of 2010-11, for the first time the central government has taken the initiative of levying a cess of Rs. 50 per tonne on domestically produced and imported coal. The revenue of this cess will form the resource pool for a 'clean coal fund'.

For purposes of further discussion three versions of GST, based on certain distinguishing features, may be referred to as GST0, GST1, and GST2. The first one is a slightly modified version of version recommended by the Task Force of the 13th Finance Commission (GST0); the second is the version implied by the proposed constitutional amendment (GST1); and the third reflects the views of the Empowered Committee of State Finance Ministers, with elements that the central government has proposed (GST2). These are briefly described below.

GST0

Model close to the version recommended by the Task Force of Thirteenth Finance Commission: includes all goods and services under GST including petroleum products, tobacco products, alcoholic beverages, and polluting goods; some local taxes are also included such as property tax, no-entry tax; provision for non-rebatable excises/cess on the 'sin/demerit' goods that includes including petroleum products, tobacco products, alcoholic beverages, and polluting goods

GST1

All goods and services under GST including petroleum products, tobacco products, alcoholic beverages, and polluting goods; local taxes are not included but provision for

non-rebatable excises/cess on the 'sin/demerit' goods that includes including petroleum products, tobacco products, alcoholic beverages, and polluting goods

GST2

This is the model implied in the proposed constitutional amendment introduced to parliament by the central government. In this model, petroleum products are outside GST and will continue to cascade; state excise on alcoholic beverages is outside GST and will continue to cascade; tobacco is part of GST but the central government retains powers to levy an excise duty in addition to GST; there is no provision for an excise/cess on polluting goods and services.

It may be observed that GST without a non-rebatable levy on polluting goods and services would have an adverse effect on the environment as it would lead to a lowering of effective tax rate on polluting goods and services compared to the situation in recent years under the existing tax regimes. Based on the available input-output tables, we summarize below some of the effective tax rate (indirect tax net of subsidies as % of gross value added) on selected goods (Table 6.1).

In addition to the GST there would be other state and local taxes which may be used to serve the environmental purpose. Congestion taxes and preferential treatment to green properties in the case of property tax are two examples.

The effect of environmental taxes are often negated and almost always difficult to work out when important polluting goods like petroleum, coal, and fertilizers are characterized by administered pricing regimes and non-transparent subsidies. Market-determined prices and transparent subsidy regime is a necessary condition for working out an effective design of environmental taxes.

Table 6.1: Effective Tax Rates for Selected Polluting Goods/Industries

Indirect Taxes Net of Subsidies as percentage of Gross Value Added					
Sectors	**2003-04**	**2006-07**	**Sectors**	**2003-04**	**2006-07**
Electrical industrial machinery	112.8	81.8	Fertilizers	24.7	28.1
Batteries	81.8	61.9	Motor cycles and scooters	30.0	27.5
Electrical wires & cables	73.6	59.5	Soaps, cosmetics & glycerine	22.7	26.4
Petroleum products	31.9	56.9	Drugs and medicines	23.3	25.0
Iron and steel foundries	52.0	56.7	Non-ferrous basic metals	32.0	24.1
Electrical appliances	70.0	56.2	Other chemicals	23.3	23.7
Plastic products	42.9	39.8	Pesticides	20.1	23.4
Iron and steel casting & forging	35.5	35.0	Coal tar products	24.3	21.6
Paints, varnishes and lacquers	30.3	34.4	Printing and publishing	21.3	19.4
Motor vehicles	37.0	34.1	Iron, steel and ferro alloys	9.1	17.1
Synthetic fibers, resin	28.1	32.7	Leather and leather products	8.2	17.0
Inorganic heavy chemicals	29.9	31.5	Cotton textiles	10.1	10.1
Paper, paper prods. & newsprint	35.3	31.4	Cement	12.5	9.9
Organic heavy chemicals	28.8	30.8	Electricity	-31.5	-20.3

Notes: 1. 2003-04 rates are based on commodity by commodity matrix
2. 2006-07 rates are based on commodity by industry matrix
3. Negative value means that the good/industry is net subsidized.

Source: Based on Input-Output Tables of India, CSO.

c. Rate and Revenue Potential in the Presence of ET in GST

Central to the acceptance of GST in India is to form an idea of the short and long run revenue potential of the GST. States fear that the movement to GST and abolition of CST would erode their revenues. Some of the producing states would particularly suffer as the basis of taxation moves to the destination principle. The revenue potential depends very largely on the GST rate structure and the efficiency effects that the GST can create thereby increasing the tax base.

In India, the debate on revenue implications has focused on determining a 'revenue neutral rate' or a 'structure of revenue neutral rates', which would generate the same amount of revenues as presently under the taxes that are to be replaced by the GST. With such a revenue neutral rate, two additional questions are: a division of the overall rate between the centre and states; and if for the states taken together, the rate is revenue neutral, then some states are bound to lose while others will gain. If so, how

to compensate the losing states for their losses and for how long can such compensation continue.

We assess the revenue impact of GST in the Indian economy not in the narrow sense of working out a GST rate or rate structure that will produce the same amount of revenue as currently generated by the taxes that the GST will replace. Instead, we place GST in the overall context of the size of the government that will be consistent with the changing needs of the Indian economy to provide the required size of government. In that context, we also work out the contribution of the indirect taxes levied by the central and state governments, and see how the GST, in combination with the extra taxes on petroleum products and the demerit/polluting goods, taken together can generate the required increase in the tax-GDP ratio. This is done using a macro-econometric model of the Indian economy with a longer term perspective going up to 2029-30. The macro model is described in detail in Srivastava (2011). The model is extended for the generation of indirect taxes using a disaggregated sectoral detail. In the macro model output at factor cost is generated for eight sectors. These are further disaggregated into six additional sectors. The input-output table is used for the generation of intermediate demand for output.

Over the longer run, as the Indian economy is progressively more globalized, there will be important structural changes in the economy. We see the size of the service sector increasing to about 80 percent of GDP and that of the agricultural sector falling to about 7 percent of GDP. The share of imports and exports also rise to about 40 percent of GDP. Consequently, the revenue contributed by the customs duties also becomes important.

Import duties are meant to first neutralize any cost disadvantages that domestic producers may be facing. Thus, inclusive of import duties, the prices of the imported goods may be such that domestically produced goods remain competitive. Over and above this 'protection' role, there may be countervailing duty on imports that are equal to the tax rate for the domestically produced goods both under GST and for the cascading type of taxes. Under the GST, imports that are used as intermediate goods,

the countervailing duty equivalent to the GST rate will be rebated at later stages of the value added chain. Only the cascading type of levies will not be rebated[2].

The tax revenues are generated using an input-out model within the macro-model. The input-output table reports indirect taxes net of subsidies. The indirect taxes here include central and state taxes on goods and services. In additional the local taxes on goods are also included. The present analysis focuses only on the central and state taxes. Since net indirect taxes, that is indirect taxes net of subsidies, are given sector-wise, it would be useful to separate the indirect taxes and subsidies for the desired level of disaggregation. Cascading type of taxes that may continue are state excise duties, electricity duty, purchase tax if it is allowed to continue under GST, entry tax/octroi, tax on petroleum products, non-rebatable component of tax on polluting goods and services, mandi tax, and municipal taxes and cesses. Compared to 2006-07, when CST was at 4 percent, in the GST regime the CST would go away.

Intermediate output is generated linked to the projected domestic output. The relevant tax bases are defined by using both intermediate demand for cascading type of taxes and domestic output that is domestically used, i.e. netting out exports and adding that part of import that goes for final consumption. Tax bases are distinguished according to the possibility of application of differential rates in the GST framework. The tax revenues are generated by application of sectoral tax rates, sectoral subsidies, cascading taxes, and non-cascading taxes (see Figure 6.1).

In the model, output has been disaggregated into the following eight sectors defined at 1999-00 prices. For estimating the tax base, we use the following steps:

- GST base is taken as final demand proxied by domestic output net of exports plus imports meant for final consumption.

- We estimate the base for taxation of un-rebated intermediate using the input-output coefficients and along with projection of sectoral outputs along with adjustments. This is needed for capturing (a) the tax base relating to exempt

[2] Treatment of eco-taxes on exports needs special attention, since in the context of destination-based principle, the possibility of importing countries levying countervailing duties raises the issue of border taxes. The exporting states would lose the tax revenue. However, if the eco-tax on an exported good is rebated, the importing countries may raise objections in the WTO negotiations.

sectors where intermediate purchases are made from registered dealers, (b) for polluting goods, petroleum products, alcoholic beverages, and tobacco where the whole or part of tax would be allowed to cascade.

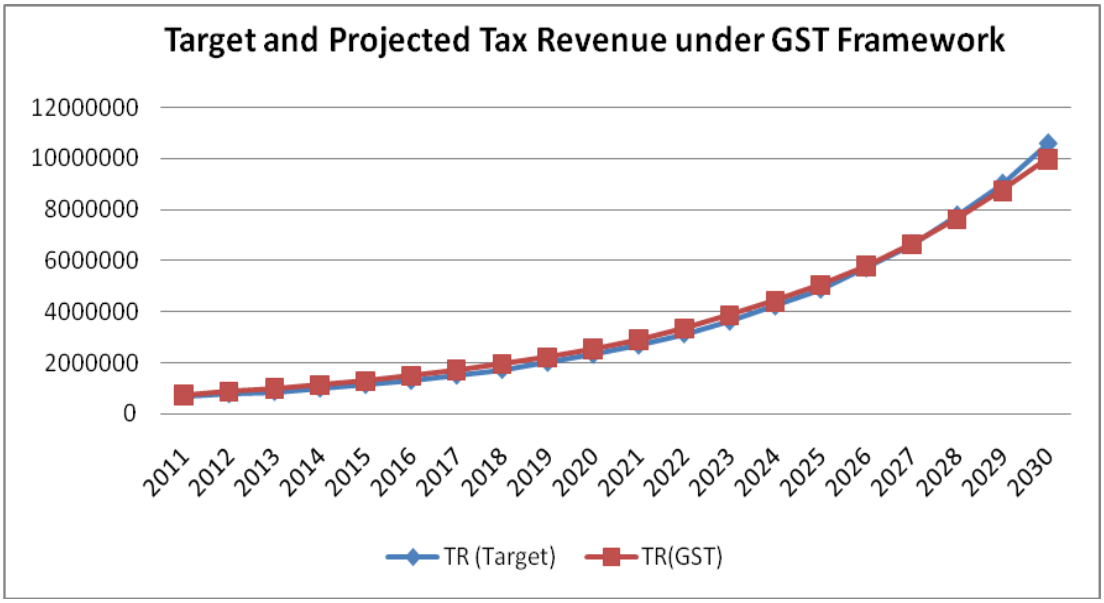
- Import duties and countervailing duty: projection of imports along with sectoral decomposition.

- We also take into account the rebate that exporters would get on the GST paid on their intermediate purchases.

Our empirical exercises start with the GST model (GST1) and examine the possibilities of revenue neutrality arguing that the core GST rate can start with 14 percent divided into two parts for the centre and states. It argues that if provision is made for a non-rebatable excise/cess on polluting goods, it is possible to reduce the core GST rate within a few years, if revenue neutrality is considered in a broader context where the overall contribution of taxation of goods and services (excluding local taxes) is taken into consideration. Three important features are: with the international crude oil prices continuing to rise in the future, the tax on petroleum products will continue to contribute progressively higher amounts; with the Indian economy progressively opening out, import duties will continue to have significant revenue importance; and with the provision of non-rebatable excise on polluting goods, these will lead to additional tax revenues permitting reduction in the core GST rate and more environment friendly output structure.

From the GST2 model, moving to GST1 model will only mean somewhat higher excise tax rates for the sin/demerit goods and services but it will provide producers of these goods also rebate on non-sin/demerit goods when used as inputs.

Figure 6.1: Target and Estimated Revenue from Taxation of Goods and Services with GST at 14 percent



Source: Srivastava and Kavi Kumar (2011).

In the projected revenues, the relative shares of different components are given in Table 6.2. The following are some of the noticeable features:

- The core GST rate is kept at 14 percent.
- Without changing the core rate, and compliance rate, the desired buoyancy comes from the petroleum taxes.
- The core rate can be further reduced if higher rate is charged on polluting goods/petroleum products or if the compliance rate improves.
- Overtime the GST share in total tax revenues goes down as the share of exports in GDP increases, but this is compensated by the higher share of import duties.

Table 6.2: Relative Shares in Total Tax Revenue from Goods and Services

(as percentage of Total Indirect Tax Revenue)

Year	TRGST	TRPOLL	TRPETROL	TRBEVR	TRTOBACCO	TRCUSTOMS	TROTHERS
2011	33.44	9.39	15.35	4.64	0.30	18.27	18.60
2015	34.50	9.25	15.68	4.36	0.25	17.49	18.47
2020	31.16	9.20	16.79	3.89	0.20	20.28	18.48
2025	28.49	9.13	17.93	3.55	0.16	22.40	18.34
2030	28.67	8.82	18.29	3.31	0.13	22.29	18.49

Source: Srivastava and Kavi Kumar (2011).

We have argued for a core GST rate of 14 percent, supplemented by a non-rebatable excise duty/cess on demerit/polluting goods and services including petroleum products, tobacco, and alcoholic beverage for human consumption.

d. Impact of Eco-taxes in GST Framework on Pollution

We generate future pollution load by: (a) estimating growth of output at 14 sector disaggregation (GDP at factor cost) up to 2029-30; (b) converting output in to gross output (sum of GDP at factor cost/gross value added, net indirect taxes, and input requirements) using technology assumptions from the 2006-07 input-output table; and (c) using pollution load matrix giving pollution per unit of gross output. Pollution levels into the future can then be analysed and modified either by changing the growth and/or structure of output, or by changing the input-use coefficients (substitution of inputs/changed technology) or by changing the pollution load coefficients (more environment friendly technology).

In the base growth scenario, sectoral growth is projected as per potential growth using the model discussed in Srivastava and Kavi Kumar (2011). These growth rates can be considered as potential growth since they assume a supporting policy scenario and are based on supply side considerations. Pollution load, both of local and global pollutants are generated using the projected output at 1999-00 prices, generating gross output from these, and then applying the pollution coefficients. The estimated pollution load for selected years is given in Table 6.3.

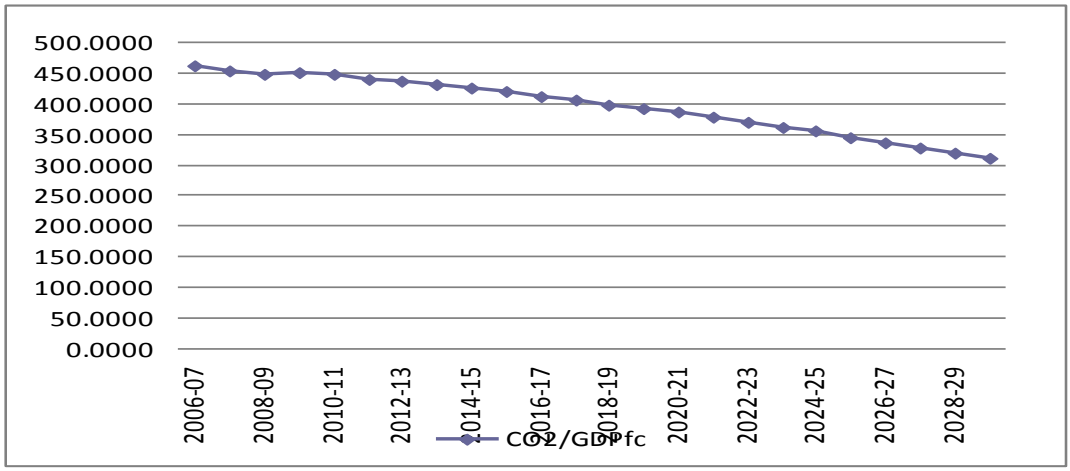
Table 6.3: Estimated Pollution Load: Base Scenario

Year	Kilotons						in million tons
	SO_2	NO_2	CO	VOC	FP	TSP	CO_2
2007-08	10460.48	5405.60	4564.28	1750.00	5189.08	4198.47	1424.53
2010-11	12710.88	6547.58	5507.86	2106.59	6390.15	5118.97	1781.21
2014-15	16183.32	8332.96	7019.80	2682.66	8130.39	6516.49	2323.58
2019-20	21054.44	10854.98	9240.76	3519.83	10415.87	8438.88	3112.85
2024-25	27335.40	14132.97	12247.11	4641.92	13136.72	10862.39	4185.25
2029-30	36364.83	18939.71	16846.00	6332.49	16628.44	14244.06	5855.26

Source: Srivastava and Kavi Kumar (2011).

In the base scenario, the structure of output keeps changing in favour of the services sector. As a result, even while the input-coefficients and the pollution load coefficients are held constant, the CO_2-intensity of output falls as shown in Figure 6.2.

Figure 6.2: Carbon Intensity: Base Scenario



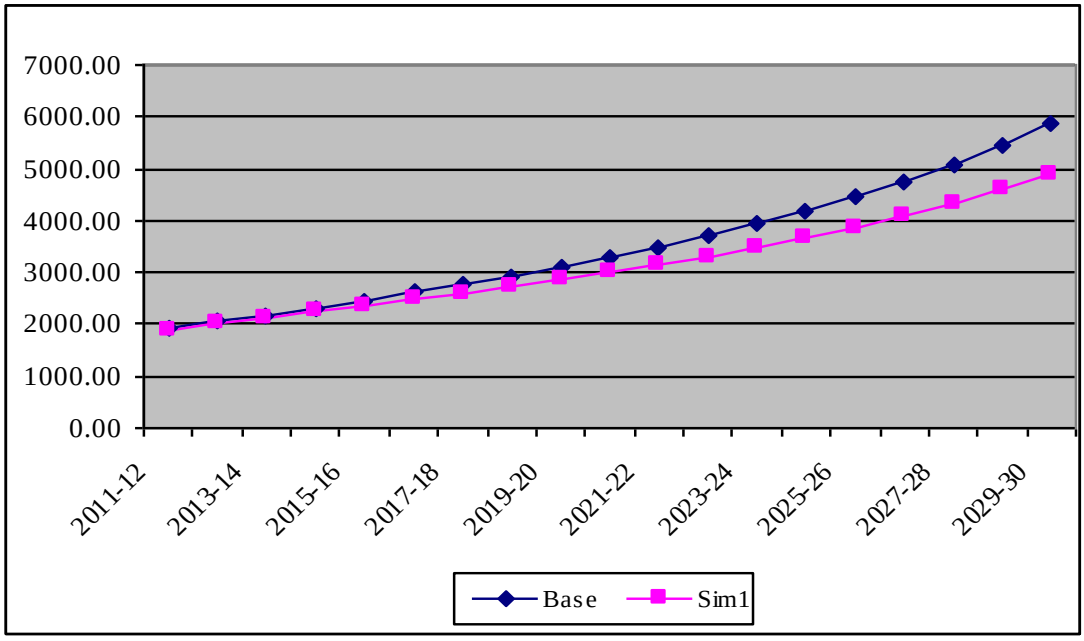
Source: Srivastava and Kavi Kumar (2011).

The policy options used in scenario simulations may be summarized as follows.

a. Allow growth at less than potential rate as deliberate policy;
b. Modify the input-use coefficients of major sources of pollution; and
c. Restructure output in favour of less polluting sectors while maintaining growth at about potential rate.

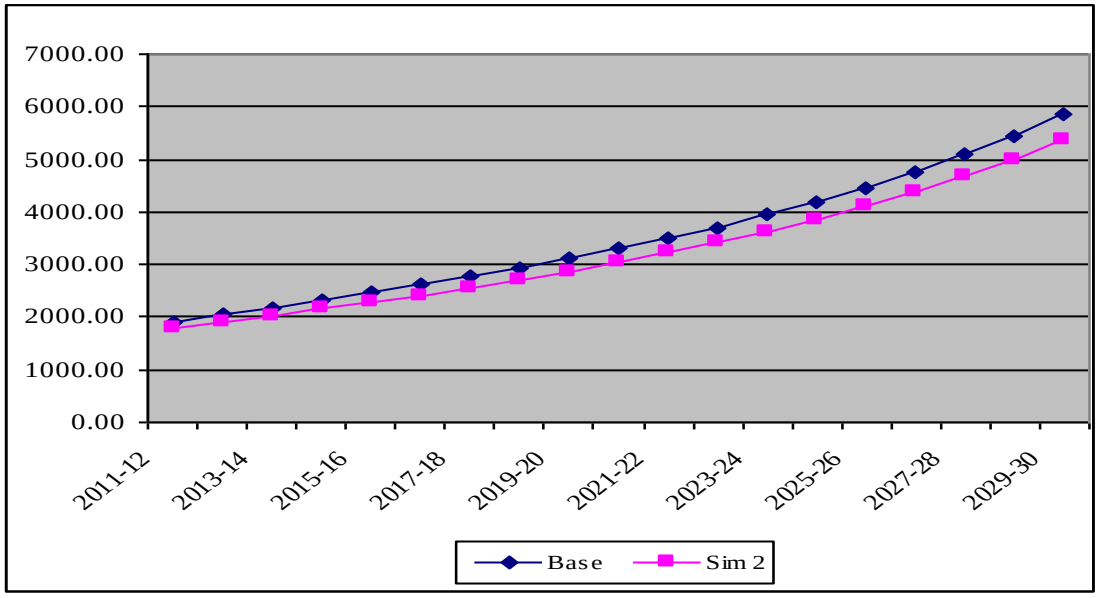
The environmental impacts of policy simulations are assessed through the emission trajectory of carbon dioxide. The effect of two simulations on the global pollution load (CO_2) is summarized in figures 6.3 and 6.4. In simulation 1, we reduce the sectoral growth rates across the board by one percentage point except for agriculture and allied services, which is retained at the base level. In simulation 2, we change the pollution load of selected sectors by 5 percent and in the case of 'other polluting goods' and 'electricity, gas, and water supply' by 10 percent and combine it with reduction in growth of 1 percentage point in coal and lignite, crude petroleum and petroleum products, polluting goods, alcoholic beverages, and electricity, gas, and water supply. In this scenario, growth across the board is not reduced. It is reduced only in sectors more directly responsible for pollution combined with improvement in technology that causes less pollution.

Figure 6.3: CO_2: Comparison of Base and Simulation 1



Source: Srivastava and Kavi Kumar (2011).

Figure 6.4: CO_2: Comparison of Base and Simulation 2



Source: Srivastava and Kavi Kumar (2011).

Table 6.4 summarises the reduction in carbon intensity in select years in the base and two policy simulation scenarios.

Table 6.4: Progressive Reduction in Carbon Intensity

(progressive percent reduction relative to 2006-07 level)

	Base	**Sim1**	**Sim2**
2007-08	1.78	1.78	1.70
2010-11	3.47	3.47	3.29
2014-15	8.29	8.78	9.91
2019-20	15.33	16.24	18.62
2024-25	23.25	24.36	27.46
2029-30	33.05	34.30	37.23

Source: Srivastava and Kavi Kumar (2011).

It may be noted that the difference in percentage reduction in the carbon intensity in the three scenarios is not much. As such, there is no need to consider sacrifice the growth rate as a desirable option, if the target is only reduction in carbon intensity.

There are more noticeable differences, however, if the objective is to reduce the absolute level of CO_2 emissions (Table 6.5).

Table 6.5: CO_2 Emission Levels

(in million tons)

Year	Base	Sim1	Sim2
2007-08	1330.5	1330.5	1235.1
2010-11	1650.0	1650.0	1534.0
2014-15	2184.5	2124.3	1995.9
2019-20	2935.4	2723.4	2612.4
2024-25	3937.6	3485.8	3432.3
2029-30	5446.4	4602.4	4690.8

Source: Srivastava and Kavi Kumar (2011).

e. Complementing Eco-taxes with Environment Promoting Subsidies

Fiscal intervention for promoting environment will be most effective if environmental taxation is complemented by environmental subsidies. In India, the design of fiscal instruments for environmental management has additional considerations arising because of the federal arrangements. Oates (2001) distinguishes between three cases in the context of environment issues in a federal context: with environmental quality being (a) a pure public good, (b) a local public good, and (c) local public good with spillover effects. Combinations of taxation and national subsidies can suit handling different types of environmental issues.

Subsidies in India require considerable restructuring to play an effective positive role in promoting environment. Quite a number of subsidies in the present regime can be considered as environmentally perverse. These will have to be modified and replaced by environment promoting subsidies. Some of environmentally perverse subsidies are noted below.

Irrigation

A number of studies have noted the perverse long term effects of irrigation subsidies.

- Myers and Kent (2001) note that in India 100,000 sq. km out of 420,000 square km. of irrigated croplands have been lost to cultivation through waterlogging, and 70,000 square km. are affected by salinization.

- Marothia (1997) showed that subsidized canal irrigation and subsidized electricity (in some cases free) for tube wells, remunerative output price support,

availability of HYV seeds and higher returns encouraged the farmers to opt for water intensive crops. Nearly ¼th of the cultivable command area under all canal projects in India is suffering from waterlogging and soil salinity.

- Joshi and Jha (1992) focusing primarily on the problem of soil alkalinity and waterlogging in the Sharda Canal Command area measured its impact at the farm level in terms of resource use, productivity and profitability of crop production. Four villages in the Gauriganj block were chosen for the study covering the 1985-86 cropping year. The study found that overuse of canal irrigation and underuse of groundwater has disturbed the water balance of the area causing waterlogging and increase in salinization in the command area.

- Sharma *et al.* (1997) found that in Haryana about 70 percent of the geographical area is facing the problem of rising water table due to the dominance of canal irrigation, lack of adequate drainage and low extraction of ground water.

Thus, widespread and repeated use of irrigation water without provision for adequate drainage, and crop intensification in favour of high water requirement crops without utilising the groundwater has resulted in rapid rise in water table in the areas with poor quality groundwater, leading to the problem of waterlogging and salinity. On the other hand, the regions endowed with good quality groundwater are being over exploited without maintaining the water level at a reasonable depth.

Fertiliser Subsidy: Soil Productivity and Water Contamination

Three main fertilisers used in agriculture are urea (N), di-ammonium phosphate (DAP) and Potash (K). Of these the production of urea is under the retention price scheme. There is a flat rate subsidy on DAP. Potash, which is mainly imported, also has a flat rate subsidy. One of the main purposes of retention price scheme is to develop the urea industry in the country. Every individual plant is assured a fixed rate of return. Hence the retention prices are fixed for each individual plant. The subsidy on urea is the difference between the retention price (adjusted for freight etc.) and the price that the farmer pays. According to Gulati and Narayanan (2000), the fertiliser subsidy bill in 1988-89 amounted to Rs. 112 billion. In the eighties there was an unprecedented growth in the fertiliser subsidy in India. Parikh and Suryanarayana (1992) shows that the rate of fertiliser subsidy on domestic production has increased from Rs. 565.72 per tonne to Rs. 1383.33 per tonne in 1987-88.

Singh *et al.* (1997) find that increasing fertiliser use has led to diminishing marginal gains to nutrient ratio from 14.65 to 9.36 for rice and from 21.5 to 8.67 for wheat between 1970-75 and 1990-94.

Ray (1998) analyses fertilizer consumption data for Andhra Pradesh, Punjab, Haryana, Tamil Nadu, Bihar, Madhya Pradesh, Orissa, and Rajasthan from 1981 to 1995 and concludes that:

- Due to use of more and more fertilizers the return from per unit of fertilizer was decreasing for both the crops and in almost all states;

- The return from per kg. of fertilizer is highest in less developed states where the rate of use of fertilizers is substantially lower as compared to the states where a high dose of fertilizer has been used; and

- Due to the use of higher dose of fertilizers and pesticides, the pollution of soil and groundwater is more and as a consequence, the marginal physical productivity of fertilizers declined significantly.

Pesticides

Deep concern is expressed about the excessive use of pesticides in developing countries, which is reported to have led to environmental degradation. Farah (1994) shows that some pesticides persist longer than others or break down to even more toxic components, extending the time span in which they could contaminate agricultural crops, surface and underground water, and surface water bodies. Pesticides affect not only the location of their application but also the ecosystems far removed due to their mobility in air and water. Further, pesticides usually kill pests and their natural enemies alike. Pests are also very adept at developing resistance against the chemical pesticides intended to control them. Thus pesticide use initiated to suppress pests may lead to greater pest outbreaks. The study notes that towards the late 80s, with the growth of herbicide use, at least 48 weed species had gained resistance to chemicals. Another source estimates that from 1930 to 1960, the number of resistant anthropoid species (insects, mites, ticks) rose from just 6 to 137, an average increase of 4 resistant species per year. In the period of 1960-80, on an average 13 species per year are reported to have gained resistance to chemical pesticides. It was estimated that in 1990 approximately 504 insect and mite species had acquired resistance to pesticides in use.

Pesticides also find their way into the river through agricultural runoffs because the upstream catchment areas are intensely cultivated. Around 150 tons of pesticides and herbicides are used in the agricultural and plantation areas. The deadly impact of these chemicals has caused destruction of several types of fish and aquatic organisms in recent years.

Electricity Subsidies

Electricity subsidies in India (measured as under recovery of costs) are very large and give rise to economic, environmental and social costs – although hidden in these estimates are substantial costs due to procurer and other systemic inefficiencies. The primary effect of the electricity subsidies is to distort the overall energy market in favour of electricity which results in higher electricity intensity of GDP. Production of electricity which is largely coal based in India, has implications for both local and global pollutants. Electricity subsidies may also indirectly hold back rural development by undermining the ability of the state electricity boards to invest in extending distribution networks to villages. Lack of electricity contributes to poverty, as it precludes most industrial activities and the jobs they create. Subsidies also create incentives for both suppliers and users for inefficiency – which only harms both environment, economy and society (UNEP, 2003).

For identifying environment promoting subsidies, the budgetary heads that have an environmental impact both in the social and economic services need to be first identified. With this in view the services may be classified into two groups, Group A and Group B. Those that have a 'direct positive' effect on environment are included in Group A. The remaining services, those that have an adverse or mixed effect on environment are placed in Group B. Most Group B items will be judged by the fact that the primary objective of the service is not related directly to environment and the adverse or mixed effects are likely to be generated indirectly or incidentally. The grouping categorisation is similar to the study by Pandey and Srivastava (2001). The grouping is detailed below in Table 6.6.

Table 6.6: Environmental Subsidies: Budgetary Heads

Group A	Group B
Sewerage and Sanitation	Major and Medium Irrigation
Soil and Water Conservation	Minor Irrigation
Fisheries	Command Area Development Programme
Forestry and Wildlife	Fertiliser
Forest Conservation, Development and Regeneration	Pesticide and Chemicals
Environmental Forestry and Wildlife	Mining in Iron and Steel Industries
Afforestation and Ecology Development	Cement and Non-metallic Industries
Agricultural Research and Education	Non-ferrous Mining and Metallurgical Industries
Soil and Water Conservation	Mineral Exploration in Geological Survey of India
Fisheries	
Forestry	
Special Areas Development Programme	Mineral Exploration in Regulation and Development of Mines
Drought Prone Areas	
Desert Development Programme	
Wasteland Development Programme	
Flood Control and Drainage	
Flood Control	
Anti-Sea Erosion	
Non-Conventional Sources of Energy	
Ecology and Environment	
Prevention and Control of Pollution	

The volume of subsidies has been estimated for these budgetary heads for the Central Government and for four states viz., Maharashtra, Gujarat, West Bengal and Rajasthan for the year 2008-09. The basic data is drawn from the Finance Accounts of the Central and the State governments. Some of the main findings are as follows (see, Srivastava *et al.,* 2012 for more details):

- Subsidies that could be identified to have a positive effect (Group A) or mixed or adverse effects (Group B) emanating from the Central budget taken together amounted to less than 0.5 percent of GDP. Of this total amount, subsidies considered to have a clear positive effect on the environment had a share of about 25 percent in the case of the Centre. This share ranged between 10 to 25 percent for the four states that were selected as case studies.

- Centre has a higher share in some of the Group B subsidies. Of the total environmental subsidies, Group B subsidies account for 80-90 percent during the

period 1994-95 to 2008-09. Among the Group B services fertiliser subsidies account for major share (96 to 98 percent).

- A profile of recovery rates for environmental related subsidies across the four states shows that they are extremely low. However in 2008-09 the recovery rates have been substantially higher in Group B services due to inclusion of non-ferrous mining and metallurgical industries, a surplus sector. At the centre the rates are high due to the presence of cement and non-metallic industries and non-ferrous mining and metallurgical industries – all surplus sectors.

- Inter-state comparisons of per capita environmental related subsidies broadly indicate that: per capita subsidy is higher for states with higher per capita incomes; and a substantial share of environmental subsidies pertains to forest conservation, development and regeneration in Group A services and to non-ferrous mining and metallurgical industries followed by irrigation in Group B services.

There seems to be a positive relationship between per capita revenue expenditure on environment promoting schemes and per capita income of the state, indicating that the propensity of a state to invest in environmental subsidies depends largely on financial condition of the state.

It is time that environmentally harmful subsidies are reformed and converted into environment promoting subsidies. Increasing support for analytical research and policy dialogue in developed countries underline that decisive progress is needed (e.g. OECD, 2006; OECD, 2007; OECD, 2009; TEEB, 2009) towards the reform of environmentally harmful subsidies. The barrier to the reform on the one hand has been the resistance by vested interests and associated difficulty of gaining public support, on the other hand it is hindered by the lack of preparedness in terms of an agreed method to define, identify and quantify them, and the lack of application of the available tools in assessing the wider implications of the impact of their removal on the economic, social and environmental dimensions.

There can be various ways to address these. One is to formulate alternative policies that target the same subsidy objectives better, while also compensating losers. A related measure is to develop an economic and environmental-policy context that encourages subsidy removal through reducing government controls generally and freeing

up markets. A subsidiary measure is to introduce provisions that require surviving subsidies to be re-justified periodically, thus avoiding the perpetual subsidy problem. All these measures can be strongly reinforced by promoting transparency about perverse subsidies, especially in the context of their impacts both economic and environmental, and their costs to both taxpayers and consumers.

The financing of environment-promoting subsidies can come from the following sources. Considering that promotion of environment can be seen as a public good with associated high positive externalities, common property features, non-excludability and non-rivalry in consumption, the ideal method of financing is through taxation. Suitable allocation from the general budgetary resources should be made to finance environment-promoting activities, directly or through subsidies.

Given competing claims on budgetary resources, it is often that adequate priority to environment promotion is not accorded. Often the committed expenditure in the budget become very large and the discretionary space becomes limited and promotion of environment gets relegated in term of importance. Therefore a more practical strategy may be to earmark amounts through cesses or excises that must be used only for purposes of promoting environment. Examples are: coal cess, petroleum cess, which are earmarked for expenditure on the concerned sector or industry. The coal cess is meant to be spent for cleaning of coal. In the context of GST, this question has to be rethought. Given that in the current discussions on GST all cesses and surcharges are likely to be abolished, it may have adverse effects on the environment. However, in the scheme suggested by Srivastava and Kavi Kumar (2011), a non-rebatable excise or cess over and above the core GST rate has been proposed in the case of the taxation of petroleum and other major polluting goods and services. The revenue from this additional non-rebatable rate can be earmarked for use for environmental purposes only. Here also, an excise may be preferable over a cess since the cess will be sector specific but the overall revenue from the non-rebatable excise can be earmarked for reducing pollution and promoting environment considering all sectors together.

A third source for financing environment-promoting subsidies can be restructuring of subsides. In particular, resources can be released from environmentally perverse subsidies and these resources can then be allocated towards correcting the environmental damage. Srivastava *et al.* (2012) have estimated that the share of environmentally perverse subsidies in India is quite large and that considerable resources

can be released by discontinuing such subsidies and using the resulting resources for environment promoting subsidies.

Environment Promoting Subsidies – Industry Perspective

Although a large volume of resources can be released by converting the environmentally harmful subsidies into environment promoting subsidies supplemented by revenues from earmarked eco-taxes, their impact can be maximized by suitably targeting the most polluting industries. In the Indian context, the main industries that can be supported for encouraging innovations and substitution of cleaner inputs can be listed as energy, particularly thermal energy, iron and steel, motor vehicles, paper, textiles, and plastics. Potential support to these sectors is summarized below. Given the arguments that subsidies in the form of lower customs/excise duties on capital equipments, accelerated depreciation allowances and tax rebates my stimulate capacity creation but not necessarily production, we argue broadly in favour of output/outcome based measures (e.g., generation-based incentives in wind/solar power).

- **Energy and Coal** - It is well known that the combustion power plants manufactured by Bharat Heavy Electricals Limited (BHEL), constitute the core of the coal-power sector in India. Although the unit size and efficiency of these BHEL-manufactured power plants have gradually increased, the basic technology remains highly polluting. As observed by Chikkatur and Sagar (2007), there is now a range of advanced, more efficient, and cleaner technologies for producing electricity using coal. Combustion based on supercritical steam, offering higher efficiencies than sub-critical PC. These are commercially viable and internationally available. Ultra-supercritical PC, which offers even higher efficiency, is also being deployed. Adoption of these in India would require support. Among other initiatives, Chikkatur and Sagar (2007) also suggest investment in a focused plan for geological carbon storage options, with detailed assessment of CO_2 storage locations, capacity and storage mechanisms in order to collect valuable information for India's carbon mitigation options and inform future technology selection as well as siting decisions for coal-power plants. Similarly washing of coal at the mine heads will reduce the weight to be transported to the power plants and reduce pollution from transport vehicles apart from that in the power production.
- **Iron and Steel -** In the case of iron and steel, cleaner technologies must start from the mining of iron ore itself. Recycling of iron is another area where cleaner

technologies can be encouraged. Iron and steel industry also uses a lot of coal and thus clean coal technologies would help reduce pollution through the iron and steel industry also. Innovative technology of micro addition of more earth (RE) to liquid steel is being advocated for production of cleaner and quality steel. Another clean technology being advocated is the use of Energy optimizing furnace (EOF), which is the basic unit proposed in place of basic oxygen furnace used for conventional steel making process. The process is being commercially exploited since 1982 but has been introduced in India, only recently. Again, good incentives could enable adoption of these energy efficient practices faster.

- **Textiles -** The textile industry is intensive in the use and discharge of chemical substances in various stages of production. Hence major industry players are committed to allocating resources towards new and clean technology to reduce impact on natural resources. Cultivation of eco-friendly organic cotton is an important step in this direction. This involves growing cotton without the use of synthetic pesticides and chemical fertilizers, hence a more sustainable technique. The use of natural dyes and non-toxic colours and agents during bleaching and dyeing; replacing ozone depleting extinguishers with eco-friendly one are other green initiatives undertaken. Waste water recycling is another common measure adopted at the source itself, as opposed to end-of-process, so that more water is reusable. Effluent treatment plants provide water not only for reuse, but also for irrigation and gardening. Penetration of common effluent treatment plants among the small units engaged in textile exports was made possible largely by the support provided by the government. Other resource conservation measures include recycling of plastic, polyester and polyester yarn to produce fiber and packaging materials. Recycling of cotton waste also yields a significant raw input for yarn manufacture. Suitable incentives could facilitate wider and faster adoption of all such initiatives.

- **Paper and Pulp** – The paper industry has perceptible impact on forest cover and water resources. Keeping this in view, the environmental measures taken by the industry are broadly in the areas of effective effluent treatment, promoting green cover through social forestry and captive plantation for sustainable raw material availability. Effluent treatment plants are a major source of saving on freshwater consumption by paper mills. Major players are targeting zero effluent discharge in their mills. Being energy intensive, some players have also invested in wind farms for generation of renewable energy.

- **Clean Materials Initiative -** More generally, across the spectrum of industries, usage of cleaner materials needs to be encouraged. The potentials of reducing the environmental impacts have been quantified for the following categories of technologies:

  - material production technologies;
  - material application technologies;
  - material recycling and product recycling technologies;
  - end-of-pipe technologies.

  It has been argued that there is strong potential for cleaner production technologies and recycling technologies to reduce environmental effects for all environmental impact categories. For a number of impact categories, such as 'Carcinogenics', 'Summer smog' and 'Ozone depletion', end-of-pipe technologies have a substantial potential to reduce environmental impacts. One important area where technologies for limiting environmental impacts are missing is the recycling of cement/concrete and ceramics. Another issue is the use of oil as feedstock in the production of plastics, leading to a growth in fossil fuel depletion.

f. Overcoming Road Blocks in Rolling Out GST

The main constraints in the rollout of GST are coming from the states. Their main concerns relate to one or more of the following:

a. Loss of revenue autonomy: states fear that they would lose powers to change the tax rates, exemptions, etc. And power would go to the GST Council;

b. The so-called 'producing' states are apprehensive that they would lose in a destination based GST;

c. There is a general apprehension that in the transition to GST, there would be revenue loss and that the centre would not adequately make up for this revenue loss.

But with eco-taxes, this can be made up since the producing states stand to gain with non-rebatable excises on polluting inputs and outputs. But price increases by

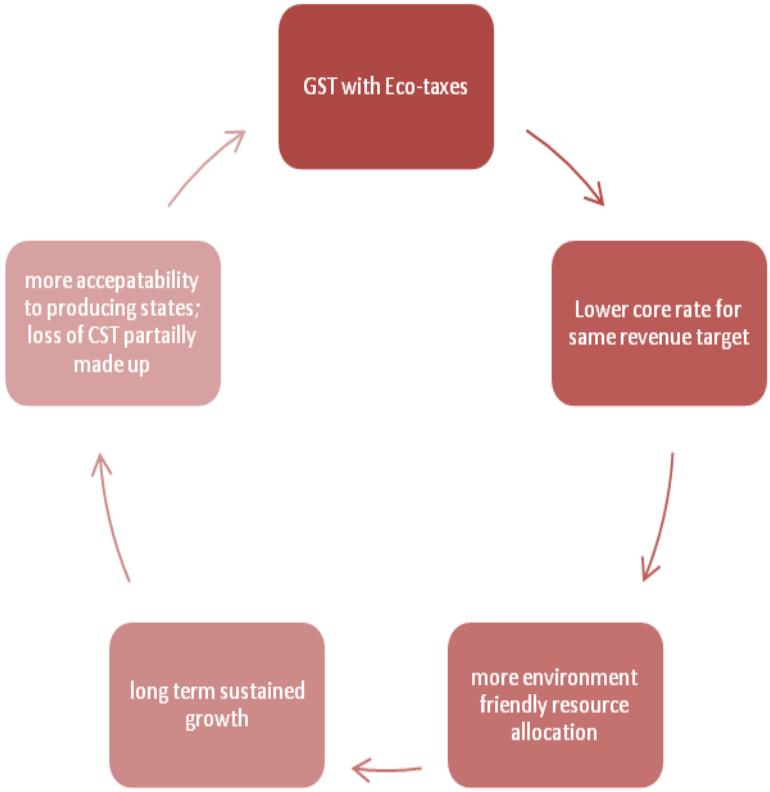
government keep revenues in the country and generate tax receipts which allow other taxes to be reduced. There is a very important economic difference between market-driven and taxation-driven increases in energy prices. In the case of the former the extra revenues accrue to energy companies and energy-producing countries, at the expense of energy-consuming countries. With the latter the government of the energy-consuming country keeps the revenues from the price increase, which, for a given level of government expenditure, allows it to reduce other taxes, with greatly reduced negative impacts on its economy.

Another important difference is that market-driven increases in, for example, oil prices will stimulate investment into high-carbon substitutes for crude oil (e.g. oil shale and tar sands - as indeed has happened with the relatively high oil prices over 2006-08) as well as into low-carbon energy sources. Government taxation, in contrast, can target carbon emissions through a carbon tax, which would penalize high-carbon oil substitutes and be far more effective in promoting new investment into low-carbon energy sources.

We have looked at the case and concerns of producing states on the eve of the transition to GST. International experience indicates that there has been considerable efforts to use environmental taxes both with a view to dis-incentivize the use of polluting inputs and outputs in the production of goods and services as also use the additional revenues for provision of environmental goods and health services.

The basic advantages of a green GST may be summarized as shown in Figure 6.5. It is suggested here that in the case of polluting goods and other natural resources, taxation should be considered as a potent instrument which should be used to curb both production and consumption. Accordingly, the Centre and the State governments should be allowed to levy non-rebatable excise and/or cesses on all polluting goods (coal, petroleum, fertilizers, pesticides, textiles, plastics, leather, electricity) being produced/mined out from their regions and all goods with potential health hazards for their citizens (alcohol, tobacco) at rates considered appropriate by them. The list of goods selected for such non-rebatable excise and/or cesses may be determined by the states from within a list of such goods approved by the Goods and Services Tax Council. The constitutional amendments for introducing GST should leave adequate fiscal space for the levy of such excises/cesses.

Figure 6.5: Overcoming Roadblocks to GST with Eco-taxes



Chapter 7

CONCLUSIONS

The present discussions around GST are characterized by a number of concerns.

- First, the states fear loss autonomy. Sales taxes and 'state-vat' are their main revenue sources. With these merged in GST, states fear that they will completely lose autonomy in determining tax rates and raising more or less revenues according to their needs.
- Second, many states fear that with the central sales tax abolished, they will lose revenue in the long run. While the central government may compensate them for a few years, eventually this compensation will dry up. This concern is particularly true of the so-called 'producing' states.
- Thirdly, in a destination-based system, the tax revenue will accrue to the consuming states, while considerable amount of pollution will remain in the producing states.
- Fourth, states are talking about dual rates for goods: one lower rate for goods of mass consumption and the other, the core rate for all other goods. This would necessitate having two rates for goods and possibly a third rate for services. This will bring back classification disputes amongst goods and between goods and service.
- Fifth, the GST as presently envisaged is environmentally perverse, since it will tax polluting and non-polluting goods and services at the same rate.
- Sixth, in spite of the reforms, taxation of petroleum products, is still being kept out of the purview of GST where cascading is allowed to continue.

It is possible to demonstrate that if environmental taxes are integrated in the GST, almost all of these concerns can be effectively addressed. The environmental taxes can be introduced in the form of non-rebatable excises or cesses on polluting goods and services. With respect to these non-rebatable excises, the states can be given autonomy to select the goods from within a list approved by the Goods and Services Tax Council. The rates may also be fixed by them subject to bands approved by the GST Council. Second, the revenue from environmental taxes can be used to bring the overall GST rate down to say 14 percent, divided between centre and states, at 7 percent each. Third, the producing states will get a long term source of additional revenue enabling them to cope with the problems of localized pollution. Fourth, the 7 percent rate is low enough

obviating the need to have dual rates for goods. We can then have a single rate for goods and services. Fifth, we will then have an environmental friendly taxation regime. Sixth, the provision of non-rebatable excise will allow petroleum products also to be brought under GST. All in all a Green GST (GGST) will be far more welfare improving and acceptable than the narrowly formulated GST.

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