

A Study on the LPG Distribution and Related Subsidy Administration and the Generation and Assessment of Options for Improvement of the System

Final Report Submitted to the Petroleum Federation of India,
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Antecedents of the Study

During the post budget discussions organised by the Petrofed, there was much agreement that on behalf of the petroleum industry and the consumers of petroleum products at large, Petrofed should take up issues that have a bearing on policy especially those that lead to better implementation of policies. One of the major problems faced by the petroleum industry relates to the administration of subsidised LPG for household use. This subsidy has been rising rapidly and the diversions of LPG meant for household (cooking) use to other applications is rising.

The budget contained an announcement that the central government would actively explore the option of using an appropriate form of the 'food stamps' or an alternative scheme to improve the efficacy and reduce the cost of the current system of administration of food subsidies. The announcement provides an opportunity to discuss the issues of subsidy on account of LPG and devise a system of subsidisation based on 'LPG Stamps' or some other scheme to improve the efficacy of subsidisation and remove the large distortions created by the current system.

In this context, Mr. A. K. Arora (Director General, Petrofed India) and Mr. Yogendra Sahai (Director Communications and Marketing, Petrofed India) met with Profs. Ajay Pandey, Samir Barua and Sebastian Morris, at IIMA, on 13th August 2004. It was decided in the meeting, that in order to take the matter forward, IIMA should submit a proposal to Petrofed for a study with a view to recommending improvements in administration of LPG subsidisation to ensure better targeting of subsidy and minimisation of leakage of subsidy.

Petrofed is an association formed by the oil majors to dialogue with government on policy matters related to the industry. Petrofed has approached IIMA with the request that IIMA examine the possibility of improving the subsidy administration for LPG with a view to minimizing

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diversions, leakages, and removing the current distortions through instituting a new system that is cost effective, easy to administer, and is yet able to take care of the needs of the subsidised segments.

Terms of Reference of the Study

The proposal c. 2004 submitted by IIMA listed the following terms of reference which were accepted by the Petrofed.

1. To assess the existing subsidisation in the extant distribution and usage of LPG.
2. To recommend possible improvements and alternative mechanisms (including possible direct subsidisation mechanisms) to cap the subsidy, and possibly remove dependence on equipment separation.
3. To examine the alternative mechanisms for subsidy and distribution administration, to enhance the reach and access of the poor, while ensuring feasibility of implementation.
4. To be associated with the implementation in case the recommendations are accepted.

Chapter 1 : Introduction and an Analysis of the Problem of Oil Marketing and Pricing in the Context of LPG Subsidisation

INTRODUCTION

There are arguments arising out of merit goods considerations for enhancement of use of LPG in households for cooking over fuels like coal, wood, and even kerosene. The gross subsidy (recognising the total effect of taxes and administered prices), on account of LPG, arise from the retail prices of LPG being well below the retail prices of LPG used in non-domestic applications.

Nature of LPG Subsidy

Unlike subsidy on kerosene, the subsidy on account of LPG is available to all persons who have a household LPG connection with the public sector oil companies. The subsidy, therefore, even by design is not restricted to the poor or the lower income strata of society. The distribution of connections and consumption of LPG between the rich and the poor and between the rural and the urban would indicate that the subsidy may to large measure be directed at the middle classes and not at those that are really poor (S. Gangopadhyay, 2004). More important than this factor, is the problem that the amount of subsidy is essentially open ended. As the number of connections increase with urbanisation and growth, and per capita consumption increases with incomes, the total subsidy can only increase. LPG consumption has grown much faster than the consumption of either motor spirit or middle distillates over the last couple of decades, and this high growth rate is expected to be maintained. In addition, the variability in international prices and exchange rates, impose great variability on the amount of subsidy.

According to the government, in 2001-02, the subsidy bill on account of all POL products stood at Rs. 11,140 crore. Of this, the LPG subsidy alone was over 50% at Rs. 5830 crore. If the differences in the retail prices of LPG for commercial use and for household use is taken as the subsidy, then the gross subsidy (including the effects of differential taxation) is likely to be even higher.

Direction of Subsidy Reforms

The need to cap the subsidy on account of LPG in domestic use, to prevent /minimise diversion of subsidised LPG and possibly to also ensure that LPG subsidy is more pro-poor than it is currently warrants that the entire issue of subsidy be studied with a view to arrive at a superior system of subsidy

delivery that is able to address the issues raised above. The demand side effects of subsidies in kerosene also impact the demand and patterns of consumption of LPG. Therefore, interaction effects would have to be considered in any assessment of the policy and needs of subsidisation. It is necessary to develop a transparent method of subsidy administration that does not demand complete separation of the bottles for household and other applications, and yet removes the incentives for diversion, refilling and other clandestine activities. Such a system would make it possible for the oil companies to treat LPG marketing as a commercial activity while ensuring the efficient delivery of the subsidy. If such non-distortionary subsidy administration is in place for kerosene too, then feasible exit from administered /overly regulated prices would be possible.

In this report we study the evolution of LPG markets the basis for the current system of subsidisation, the problems therein and the possible remedies. We then evaluate the remedies to make our conclusions.

In this chapter we focus on the oil crisis, and the response to the same by Indian policy makers, the changed situation today which therefore question the current mode of subsidisation and pricing of LPG and more generally of oil products. No discussion of LPG subsidisation is possible without covering the larger problem of the deregulation of the oil sector, the interaction of LPG subsidisation with the pricing of other products such as kerosene.

THE OIL CRISIS AND THE RESPONSE

The second oil crisis in 1979 was a turning point in India's India's industrial and tax policy. The response to the large rise in prices of crude was : (a) to accelerate the efforts to discover oil; (2) to speed up the exploitation of oil fields already discovered, principally Bombay High; and (c) to use high taxes to curb consumption of all but that strictly necessary. Option (c) was an important part of the response to the oil crisis. The Fuel Policy Enquiry Committee broke new ground in recommending the use of high taxes rather than rationing to curb consumption. The taxes were steeply increased for motor spirit which restricted its use over much of the next decade of the eighties. The other principal fuel diesel's prices although rising was kept low in relation to motor spirit since the consumption of motor spirit was largely in automobiles and in a fast growing two wheeler population.

Despite these rather severe rise in prices, the Indian economy grew rapidly in the eighties, in the wake of higher agricultural growth (up from under 3% to 3.3%), higher and more efficiently directed public investments especially in infrastructure, and the spending effects of Gulf remittances. The functionality of the policy initiatives was revealed by the fact that over the eighties the Indian economy grew rapidly recovering from the period of slow grow (1965-1979) when there was global slowdown.

But the adjustment of the external account was not entirely as desired since the trade deficit continued to widen through the eighties. The problem was not on account of the oil sector, since the oil consumption was reigned by the large taxes without too large a penalty on growth. The exchange rate which was quite misaligned from 1956 onwards was only partly corrected, and continued to be overvalued right through the eighties. The principal reason for the large BoT deficits which ballooned into the BoP crisis in 1990-91 was that even the partial correction of the overvaluation in the exchange rate took place only in 1986-87 which was too late.

The logic right through the eighties was one of curtailing demand for petroleum products without affecting growth so that the policies of high and differential taxation were perhaps justified from the macroeconomic situation then.

Differential Prices as Policy Response to Oil Companies

The strategy in raising the prices was accompanied by bringing kerosene sales under the PDS parallel to the free market in kerosene, so that the poor and others with ration cards could still access kerosene at subsidized prices. The releases to the PDS system were equal to the quantum of subsidised kerosene made available.

Initially LPG was not seen as a product that needed to be subsidized but since LPG had by the mid-eighties become a middle class fuel its price was a very much an issue in the competition for populism by political parties.

The response almost till the end of the decade was to keep the LPG prices from fluctuating much. With the international price parity measure, the implicit subsidy per cylinder varied depending upon the crude prices and the international price of LPG. LPG marketing in the eighties had been characterised by tight control over the distribution of connections. The consumption of LPG through these control measures was restricted. Pent up demand in the form of wait lists for connections continued into the early nineties.

CHANGED SITUATION

With the success of the stabilization measures of 1991-92 and 1992-93 and the structural adjustment that followed the economy was able to close the balance on current account gap. Today it is in surplus. Despite the large negative balance on trade (BoT) gap, since the invisibles led by the very large (private) remittances more than compensates for the BoT deficit, the current account would be structurally constrained to show a surplus or at the worst a small deficit².

² Unless of course the RBI allows the rupee to appreciate sharply, which would be disastrous for manufacturing value added domestically.

Growth of the economy is in excess of six and a half per cent, and the balance on capital account too is in large surplus. As a result of the high growth since 1993-94 right up to 1997-98 and thereafter from 2002-03 onwards, capital inflows have been large.

The reserves of the economy has gone up significantly and since much of the debt of the country is of a long term nature. The need to curb the consumption of petroleum products (and energy more generally) is not there. This is a major change in the situation that merits recognition, in any design of petroleum pricing and subsidy policy.

Costs of Price Differentials

The earlier adjustment to high fuel prices did not come without its costs. The inter-fuel substitution that followed the rise in oil and oil products prices, for instance the use of more coal and heavy residues, as also the use of higher levels of capital would have increased the capital output ratio in the economy. In contrast other countries without such energy curbs were able to grow much more rapidly with higher elasticities of energy consumption with respect to industrial GDP as for example China, Malaysia and Indonesia in the seventies and eighties.

The specific nature of the response to the oil crisis – through vastly different prices of petroleum products – set in motion certain continuing fiscal and political processes which may be broadly described as follows: The prices of 'poor people's consumption' – first kerosene and then LPG were kept the lowest, those of intermediates high – most of the products other than diesel, and those of 'luxury consumption' – petrol the highest.

Subsidies get Entrenched

As the farmers' lobbies gathered much strength in the eighties with the success of the green revolution, the price of diesel despite being an intermediate product was kept 'low' in relation to petrol and other intermediates to accommodate the demands of farmers which had much legitimacy since agricultural products were not freely traded and the farmers were dependent upon support and procurement prices.

The slow growth period over the late sixties and the seventies had itself ushered in an era of redistributive policies which soon became populist. Thus starting from the seventies other subsidies too have grown. Examples are irrigation subsidies because the rates failed to keep pace with the costs of maintenance, so that today not even the maintenance cost are being recovered in canal irrigation (Vaidyanathan, R. (2003)).

Similarly electricity subsidies also began in the late seventies and accelerated over the eighties. And over the nineties they have ballooned to become the

most important problem facing the state and hence central government today (Morris, S., 2002).

Over the late sixties a large number of other redistributive programmes and targeted oriented schemes directed at various groups including the poor were put in place. These typically took the form of programmes of the planning commission and the ministries aimed directly at the target groups. All these except the food for work programme were vastly wasteful with large leakages and have today come to become an important form of wasteful spending (Morris, S. 2003).

Implicit Subsidies Today

Implicit subsidies too rose over this period and today they constitute as much as 12% of GDP or more. Budgetary (i.e. those which are explicitly budgeted for) constitute about 3-4 %, so that the total subsidies in the economy are as high as 15-16% and have not significantly fallen in relation to GDP, even over the nineties.

Budgetary subsidies though have fallen largely on account of falling food subsidies and the removal of export subsidies that went with the bringing in of current account convertibility of the rupee in 1993 (Joshi 1998).

Heavy Taxes and Subsidies

The issue of subsidies is also linked to the issue of heavy indirect taxes in many sectors of the economy. While much reform of the tax structure has taken place in the economy (the replacement of excise duties with modvat and value added taxes, convergence of rates from uncountably many rates to a few, the movement to less cumbersome and more meaningful registration processes) such reform has been constrained by the need of the state and the centre to continue to tax certain sectors very heavily.

This is because the governments' non-interest expenditures especially revenue expenditures continue to remain high and governments both central and the state have not been able to reign them in significantly.

Some subsidies continue because the government is unable to give up the high taxes on sectors like petroleum, since the 'need' to moderate the prices due in part to these high taxes on the 'poor and vulnerable' sections becomes a difficult polemic to counter. The problem with the oil sector as we shall see arises because the sector is overtaxed. The sector contributes as much as 22% of all central taxes and 25% of all state taxes. The two problems of high taxes and subsidies make rationalisation difficult even if very urgent.

THE IMPACT OF SUBSIDIES

Subsidies have known ill effects. They result in transfers (which may have been intended) and in deadweight losses. These ill effects based on static economic analysis, are well recognised and understood. They are though the least of the problems. In a dynamic context the impact of subsidies is much more significant though difficult to measure. The cost of subsidy has traditionally been measured by the deadweight losses incurred for a unit of subsidy delivered.

The issue with regard to LPG and petroleum subsidies goes far beyond those considered in the usual static economic analysis. More than the static deadweight losses, the perversities and revenue diversion especially the former have had vast impact not only bringing about additional social costs arising out of

- affecting the demand and supply functions themselves (second order effects), but also
- altering the very behaviour of society (adulteration for example),
- bringing about vast environmental effects (affecting air quality), and
- feed back effects on investment (choice of socially improper technologies) and policy itself (such as choice of natural gas to keep automobile pollution under check given the presumption that adulteration of liquid fuels is inevitable).

These effects which we may call 'third order' along with the second order effects are of incomparably greater import than the first order impacts.

These distortions have arisen not so much because of the subsidization per se but because of the mode of subsidization i.e., the mode in affecting the market prices of the products under question create the situation for the distortions to emerge, grow and be sustained (Morris, S. 2002a).

DYSFUNCTIONALITIES OF PRICE BASED SUBSIDISATION

While price differences arising out of differential taxation and out of the need for subsidization or of keeping the prices of certain commodities under control may not be immediately dysfunctional, keeping such differential prices alive for long periods has resulted in perversities which may be described as follows:

- Low prices for fuels such as kerosene and LPG result in their excessive consumption, inefficient consumption including in applications that are not the comparative advantage (of application) of the fuel in question
- Relatively low prices for the fuel in question leads to higher growth in the consumption of that fuel vis-à-vis other fuels i.e. in interfuel substitution that may not have been intended in the first place. Thus consumption of diesel in cars and other small motorised vehicles (in place of petrol) is an unintended consequence.

- Such shifts as above also result in 'revenue loss' since now the additional expenditure on diesel by the economy results in a revenue loss to the extent of the price difference times the shift.
- The possible 'option' to mop up such potential losses in revenue through higher taxes on diesel cars for instance would have limits, being constrained by the deadweight losses on account of the additional capital (and maintenance costs that the shift to diesel cars would imply).
- Even if such deadweight losses do not exhaust the possibility of mopping up some of the benefits accruing to those making the shift, there may be political and administrative difficulties, as when it is impossible to distinguish between users of diesel for private personal transport (cars) and others such as users of diesel in taxicabs, other applications etc, so that the revenue loss in interfuel substitution is usually exhausted by the transfer of value to those shifting and to deadweight losses.
- The deadweight losses for example in the use of diesel in small motorized applications result in higher capital cost per unit of power, greater consumption of energy, and much higher wear and tear.
- The artificial price differences having resulted in shifting the demand patterns therefore create the need to supply these demands. In matching the production processes to supply these demands there would arise the distortion of the tax regime (determining the retail prices) affecting the production process and technology.

This is one of the most important distortions that an excise rate regime brings about (and the distortion is amplified when the rates vary widely). And tax reform shifting to a modvat (value added taxes) regime removes such distortions in the economy.

In the petroleum sector this distortion results in the need to produce more diesel rather than petrol and to fix the refinery processes so that it results in more of diesel (middle distillates) rather than the usual light distillates, which result in some energy losses, and more importantly higher costs.

In the specific case where the price difference between motor spirit (MS) and diesel is very large as in India, it has created the problem of 'excessive' production of a higher (lighter fraction) MS/ naphtha since the demand is artificially depressed and the output of diesel from a refinery cannot be raised above a certain level economically.

So the surplus production of naphtha (which with further processing could have become MS) now has to be disposed off. In India this is done through usage in fertilizer plants and power industries. This is a large social waste since the use of naphtha if valued at the international price of MS minus avoided cost of not taking the distillate all the way to MS per

unit of calorific value delivered is very high in relation to other possible fuels and sources like gas, coal and other feed stock. The extra production of LPG and kerosene that the relatively low prices for these fuels induce result in similar losses.

- But this is not all there is to it. Since the starting point of the distortion is the high price of petrol, the excess naphtha has an arbitrage possibility when diverted to use by otherwise MS users. In India this takes the form of diversion of naphtha from industrial uses to adulterate MS, and since subsidized kerosene prices are lower than diesel kerosene has the possibility of being used to adulterate diesel.
- The above kinds of diversions for adulteration result in large revenue losses.
- Adulteration while privately profitable is a major social loss in relation to the situation of non-adulteration due to (1) the resulting environmental quality losses (2) the wasted efficiencies (3) lower engine life (4) higher cost of maintenance of engines that use adulterated fuels (5) higher monitoring and organizational and such other costs that are borne in fighting adulteration itself.
- The cost (1) above is very high in India. Thus the environmentalists in the face of very poor quality of the air in Delhi, due largely to the use of adulterated fuels argued that liquid fuels even LSHS (low sulphur high speed diesel) with modern (Euro II or better) engines would not solve the problem, since LSHS could be just as easily adulterated. So gas was chosen. While this solves the problem for Delhi it does so at large social cost to the economy, which could have been avoided in case the distortions creating the incentive for adulteration had in the first place been removed.
- The use of 'wrong fuels' but which are privately beneficial given the distortion can even create innovativeness in its wake that is wrongly directed as for instance when 'innovators' direct their attention at additives that allow use of kerosene in petrol engines, lubrication for strange machines such as 'diesel engines' that use LDO in motorized applications.
- The higher growth rate in the consumption of the lower priced (lower taxed) fuel when the price is such as to result in a 'subsidy' to the consumer (here subsidy in the sense that the taxes – subsidies are negative on that product, or in the sense that the taxes as they exist - taxes had the uniform value added rate been applied) rising indefinitely.
- Thus subsidies, that are built into differential prices imply that they are open ended and even with no increase in the rates, can only increase as the consumption grows. Growth can be expected to be faster than the consumption of the other higher priced segments.

- Therefore even if such price based subsidies are initially met with through cross subsidization and some (seemingly small) distortion they have cumulatively reinforcing effects. Thus the higher growth of the subsidized (low priced) product's demand results in a gap in cross subsidization unless the price of the higher priced product goes up, which in turn widens the gap in the demand growth rates. The valid assumption of short run price elasticity when used without recognition of the total effects (not merely the ceteris paribus effects) becomes a problem and leads with the passage of time to the limits of cross subsidy being realized. That happens along with the other distortions of adulteration diversion etc mentioned before.
- Since the above divergence in prices resulting in very high prices (high taxes) for the 'luxury' good arises slowly, the cumulative effects on demand are not seen. Even prices (arising from tax rates) far above the revenue maximization levels can happen. Thus the current medium term price elasticities for MS may be well above 1 so that the scope for revenue maximization by lowering the price (taxes on) of MS goes unrecognized, which is an obvious revenue loss.
- The starting point of the price difference has been the need to subsidise some sections while curbing consumption more generally, which as said before may have had a limited functionality. The resulting high taxes on the sector then result in a dependence of the government upon the same, and hence, given the tendency of expenditures of governments to rise especially in a situation where "re-distribution" is widely accepted as a valid activity for the state, the tax rates on the whole for the sector can rise to levels that are very high, and hence are not easily rationalized.
- When both state and central governments share the same base the temptation of the states to raise the rates when the centre lowers its rate with a view to rationalization is also possible as is seen in many of the states.
- Thus both central and state taxes on the sector have grown and the extreme dependence of the sector makes the task of rationalization very difficult.
- The retail distribution and sales of various products in the situation of such major price distortions and perverse incentives, becomes too sensitive to be left to private players. So the role of public enterprises (which can operate 'better' – not actively work to exploit all arbitrage opportunities) become indispensable and hence commercialization and privatization possibilities are negated. When private players operate, as for instance in retailing, the exploitation of the arbitrage opportunities happens therein as a matter of course. Had the sector been without the public players the matter of managing the sector to correctly report and collect the taxes due

to the exchequer would have been a nightmare and well nigh impossible. Hence despite all the discussions large scale privatization or commercialisation remains unachievable as long as price based subsidisation continues. Thus possible efficiency gains, gains from enhanced investments do not take place to the extent that is otherwise possible. The industry in having to closely work with the government cannot be shielded from being micro-managed by the government.

- The appointment of the dealers has itself become strongly politicized. This is a aspect of governmental control and interference over public enterprise that has been a feature of the Indian state and of the interface between government and public enterprise. Public enterprises despite MoUs do not really have the operational autonomy and the oil sector enterprises are no exception. In involving itself directly in an operational decision viz selection of the retailers of a company, inter alia the interface has become dysfunctional. One of the major pressures for continuation of such interface is the very high 'surpluses' that retailers can in reality make. The legitimate profits of the retailers are regulated by their margins which should make retailing only a moderately profitable businesses. But the rents that can arise out of short-selling and adulteration can be considerable. Thus it is not uncommon to find wide variation in the quality of retailed petroleum products especially diesel and MS. Without the rent possibilities much of the demand and the pressure to determine the allocation of retail businesses politically would reduce considerably though it would not vanish unless the Dealer Selection Board is completely abolished.
- The embedding of such practices as diversion and adulteration become difficult to check. The monitoring costs rise to very high levels in case such practices have to be completely checked and they have to overcome the strong perverse incentives, which is well high impossible. It makes little sense to pit the motivation of the public enterprise manager armed with little else that normal law against the open arbitrage opportunity that large price differences of near substitutes create.
- Oil companies have poor valuations in the market – their P/E ratios are low in relation to other public enterprises in developing countries (MoD, 2002) and the difference, despite the high growth factor in India is on account of the infirmities arising out of policy and governmental control. A large part of these is due to the specific policy of overtaxing the sector, introducing vast tax rate risks on the sector and in the distortions the policy of price based subsidization creates.
- The distortions create the basis for micro-intervention in the sector that goes beyond dealer selection for instance into retail price determination, degree of cross subsidization, the distribution of unfounded subsidies across segments of the industry, dynamic variation of tax rates in response to changes in input prices etc.

IMPACT OF THE CURRENT MODE OF LPG SUBSIDISATION

The current mode of subsidization is to maintain retail prices that are different for different uses of LPG. LPG for household use hitherto understood to be for cooking use (and now also water heating and also for powering air conditioners and electricity generators) is supplied at a lower retail price than LPG to industrial and commercial uses.

Such 'industrial and commercial' use includes cooking in kitchens of hotels and restaurants. The price difference per kg of LPG can be as high as Rs.180 for 14.2 kg of LPG. The cylinders and connecting equipment are different for household use, and in commercial and industrial applications, the former being supplied in 14.2 kg cylinders and the latter in 19 kg cylinders.

Besides bottled LPG, unsubsidised LPG is also supplied through dispensers for automobile use (LPG stations) and in bulk for large industrial application especially in industries that require controlled and clean fuel applications.

Earlier in the era of shortages the LPG connections were controlled and there was large queue for domestic LPG connections. These were overcome in the nineties as LPG connections were made available on the tap and most consumers who wanted connections could get the same. Despite high growth in LPG domestic connections it could not embrace the bulk of the population because for more than half the population their incomes would not justify the use of LPG in relation to coal or wood fuels for which the costs may only in part be outlays out of cash income.

Additionally even among the not so poor, there are difficulties in the wide use of LPG despite the subsidy:

- the initial cost of connections or the connection /access charges is high;
- LPG cannot be effectively retailed in smaller sizes;
- the associated cost of equipment for use being high;
- the price per kg of fuel is high in relation to coal and PDS kerosene;
- the rural population would always have a very cost alternative in bio-fuels and agricultural residues

Over the nineties LPG has spread to the middle-middle and lower middle classes in urban areas. Its advantages in cooking are overwhelming so that LPG connection is a high priority in the list of durables purchase and use expenditure, so that it is a merit good that does not need to be 'promoted' by the state beyond the initial stage that creates a market, if there is sufficient income with the household. Even very large subsidies would not push LPG use among the very poor. This has also been the international experience. (World Bank, 2003).

DISTORTIONS AND PERVERSITIES IN PRICE BASED SUBSIDISATION OF LPG

The distortions and perversities that have come about in LPG subsidization are as follows:

LPG in relation to kerosene and other fuels

LPG is a fuel consumed largely by the non-poor - largely middle classes and above, and over the nineties by a growing lower middle class. These segments are in no way, poor and would have anyway consumed LPG to derive the specific consumer benefits in consuming LPG over fuels like kerosene. Household electricity prices in urban areas have for long been too high to allow use of electricity in cooking (except to the extent that microwave cooking demands). Actually lower prices for kerosene (measured in terms of cooking cost per meal for example) through PDS shops, and available to most ration card holders may have delayed the switch over to LPG despite its subsidised prices among the lower sections of the lower middle classes. See for instance Table 1, for a comparative analysis of using LPG and kerosene, subsidised and unsubsidised.

Access Subsidization

Thus assuming that one wants to subsidize LPG it would have been far better to subsidize the access subsidization (cost of cylinders, connection and equipment rather than the use cost). LPG usage subsidization is a poor substitute. Only the fact that the usage per household does not vary widely results in some equity across the consumers who have the resources to bear the access cost. Access subsidization while reducing the consumption per family would have allowed the use of LPG by many more families especially in urban areas at costs that would have been a fraction of the current costs of subsidization. Access subsidisation has been tried independently by the Andhra Pradesh government to increase the connections among BPL households. While this has led to greater penetration even subsidised LPG has not been able to replace biomass and kerosene since these are much cheaper. See World Bank (2003). But since the access to LPG goes up, had such families had the requisite level of income the usage would have increased. More than BPL families, lower middle class families are ready for judicious use of LPG.

Thus assuming that the subsidy cost per cylinder (one per month being the maximum consumption per household) being at Rs. 100 and 150 per cylinder and allowing for 12 cylinders per year the present value of the subsidy cost per connection ranges between Rs. 14000 and 25,700 depending on the discount rate. We have used the likely range of borrowing costs of the government. Indeed, it may be even more since the real borrowing costs are likely to be much lower /or when the nominal rate is used the inflation in the subsidy would have to be taken into account.

Present Value of Open Subsidies

In contrast the total connection cost per household for a single barrel connection would be cost of the stove (of the order of Rs. 1000, the cost of a barrel Rs. 600 and the cost of the regulator) all told about Rs. 2000 or less. If about half of these costs (say the firm side barrel costs) are not to be paid for up front by the consumer then the number of connections can go up at very small life cycle costs to the government they would also be distortion free.

Life Cycle Costs of Subsidising LPG Per Consumer (Rs per consumer)

		Assumed subsidy per cylinder	
		100	150
Interest rate of government	8.5%	14118	21176
	7.0%	17142	25714

Other applications even within the household have come up. These are to a large extent in response to perversities that emanate from other sectors especially electricity supply. Thus today LPG is being promoted and increasingly used for hot water applications. Hot water consumption for baths has a very high income elasticity of demand, and today there is a shift out from electricity to other fuels. Coal etc are inconvenient and impossible in modern urban residences while LPG has emerged as a major possibility since LPG geysers in the price range of Rs. 2500 to 4000 with efficiencies that can only increase with further product development are available. At current prices of LPG and electricity (in cities like Ahmedabad, Mumbai, Bangalore where household electricity is priced above cost to serve) the payback period for shift to LPG for four member household families is less than a year! Therefore, major shifts are likely to start with upper middle class households and then among middle-middle class households, as the new product passes the early adopters stage. Lower middle class households would neither use LPG nor electricity for water heating.

LPG Use is by non-poor

Tables 2, 3 and 4 bring out beyond doubt that the lower deciles of population (as measured by per capita expenditures by the NSS) are hardly users of LPG in both rural and urban areas. Even in urban areas where the access is somewhat better, the consumption per head is small. LPG therefore is entirely a 'superior' fuel that for long would only be consumed by the non-poor.

Diversion Potential is increasing

The large open price difference between household use LPG continuing for long in the face of emerging new needs and applications adds to the potential for diversion. While earlier the potential was restricted to use of household

LPG cylinders by the hotels and restaurants business (typically by small scale operators) today there are many more applications for diversion.

The failure of utility electricity systems (erratic supply, high price, peak cut off, wide voltage and frequency variations, but especially the erratic supply) have forced shifts / adjustments even at the household and commercial (shops and small establishment) levels. The household response thus far has been to purchase inverters. These having low capacity, at the commercial and affluent household levels, the options has been to use portable/ small generator sets which are based on diesel, kerosene and petrol (solvent and naphtha). The use of kerosene and diesel has been more than the petrol obviously because of the price factor. As household demand for electricity increases and the inconvenience of diesel and kerosene is difficult to overcome, the lesser inconvenience of LPG could see a change to the use of LPG in such generating sets. What is interesting is that in upper income households the use of LPG based generating sets linked directly to ACs is beginning.

Automobile Use- LPG and diversion

Perhaps the most important new development in LPG use stems from the distortion within the petroleum sector. These arise on account of the falling costs of converting automobiles to dual fuel LPG use, on the one hand and the rising gap between the cost per effective calorie of LPG and MS. Legal automobile use LPG which is dispensed directly into pressurized cylinders in automobiles is lower priced in relation to petrol and comparable to current prices of diesel when due account is taken of associated costs. Use of CNG which is somewhat cheaper is restricted by the availability of CNG stations since the co-use of CNG with either MS or diesel is not possible except at high conversion costs. LPG on the other hand can be dual fuel with petrol so that conversions to LPG are less restricted by the availability of LPG filling stations. Most importantly, the existence of small scale pump fillers who for a charge of Rs. 20 to transfer the contents of a cooking gas cylinder (14.2 kg) to the automobile's cylinder, increase the possibility of diversions. This excludes the possibility of checking for diversion by checking cars. The only possibility of catching such operations is at the pump fillers site. These are very tiny backyard operations and can even be carried out by households parking space or yard, so that detection of the operation is for all practical purposes ruled out. The availability of unsubsidized LPG, wide availability of conversion kits, and simultaneously the existence of low priced household LPG can potentially lead to diversion. See for instance John Paul (2004).

The scale of such diversion is difficult to estimate, since very few consumer profile parameters are available in the consumer database of LPG consumers. But there are certain indications that these are significant and growing. Thus in the city of Surat there is no LPG dispensing station, yet the number of vehicles that have converted to LPG use is very large. Similarly in Kerala, the wide availability of coconut palm residues and firewood and most of the

people being in homesteads implies that such residues and firewood are used even by upper class households in all parts except in the very large cities. Nevertheless the reported per connection consumption of LPG is the same as that for other states so that we may infer that there is much diversion of LPG for automobile use. The existence of conversion garages is confirmatory of such diversion. More importantly it is a forgone conclusion that such diversion can only increase as the 'market' in usage of LPG for automotive applications develops. Studies in the late nineties showed that in contrast to kerosene where the leakage was as high as 50%, the diversion of LPG was very small if at all. See table 5. This is likely to have been true. Since then though the rise in petrol prices relative to the price of LPG, the falling costs of conversion of automobiles to LPG, availability of good second hand cars easily converted to LPG use, free availability of connections, besides legalisation of LPG use in automobiles would have set in motion the process of diversions, which once started would be most difficult to control. Thus today LPG diversion is likely to be significant, and a later NSS study may be able to throw some light on the problem.

The private sector was permitted into LPG marketing without allowing the private sector the benefit of subsidy to its consumers. Therefore the private marketing arrangements have not grown as rapidly as in the very beginning when it catered to applicants who were in the waiting list of PSU companies. With connections being available without much difficulty the space of private marketers in household LPG has declined steadily. They are today largely restricted to bulk LPG and commercial use packaged LPG. Their entry into household LPG, (the policy being to keep them out of the subsidised market), was on the basis of different standard of cylinders and regulators so that easy inter use was not possible. This was to make difficult the use of a subsidised cylinder by consumers of private marketers. Earlier, the consumer base of connections and consumption of cylinders for each of the PSUs was sought to be kept separate by defining different cylinder and regulator standards for each of the companies. Today the cylinder weight is the same but interoperability is difficult.

Logistics Costs of Separation of Distribution Channels

These impose larger than necessary costs of distribution and logistic costs more generally on the system. Thus it makes necessary the parallel stocking, of empties and filled cylinders at more number of locations and in greater costs than otherwise – in other words the inventory costs are higher than they need be. So is the case of bottling costs. Economic reach is therefore reduced, denying the benefits of higher reach that would have been possible otherwise. The consumer base therefore is thinner than otherwise. This is easily understood since in the case of a merit good with limited income elasticity (LPG for house hold use) the greatest social benefit is to be gained by ensuring widest possible levels of access.

Costs to the Consumers

There are other dysfunctionalities too. Large families and groups of residences that are in close proximity could have saved significantly through buying in larger sized cylinders say the 19 kg type or through local piping and metering arrangements with gas supplied from large common cylinders or a tank which is then filled regularly. This is beginning in high rises in the new complexes being built in Gurgaon, Pune and Bangalore and is socially cost reducing and value enhancing. The potential is even larger if such arrangements could have benefited out of bulk supply. Subsidy that results in differential pricing would overrule the use of non-household LPG today. In other words at the very least the cost of individual bottling which could have been saved is not.

In such apartment blocks with free pricing of LPG, the use of LPG and NG simultaneously depending upon the cost effectiveness in a calorific sense is important. Many of the cities are planned to be covered with piped natural gas. This market is yet to unfold. In which case, the LPG would have to compete with NG so that the issue of LPG prices cannot be divorced from the pricing of natural gas. Current distortions could, if the prices are allowed to reflect the subsidies or if tax differentials are large, result in inappropriate choice as and when such competing gas would be available.

Chapter 2 : Trends in the Growth of LPG and Petroleum Products

In this chapter we draw out the time trends in the demand and supply of petroleum products, bringing out some of the differences between products. While demand for petroleum products as a whole only shows gradual changes in elasticity with respect to income, certain products including LPG show major swings which reflect both the phenomenon of new product penetration and price differences that lead to inter-fuel substitution

The growth of the demand for petroleum products is strongly dependent upon time and on the income with one working through the other. The income dependence arises through affordability and the time dependence arises through population growth and the spread of such 'life style" and absolutely value enhancing products as kerosene, LPG and MS that replace traditional fuels, kerosene and draught animals. Conventionally it has been the practice to relate consumption of petroleum products to incomes since the short run price elasticities of demand are assumed to be small. This is a valid and useful exercise when the sector is not excessively taxed, and when the price differentials are not large across the various energy products (various petroleum fuels that are partly substitutable, coal, electricity, and natural gas). It is the demand for total commercial energy that is expected to be largely income determined with predictable elasticities that rise with the industrialisation process and then decline.

Income Elasticities vary

In India since the relative prices of various energy products have varied widely we do not expect the income elasticities to not vary. Table 6 brings out the symmetric exponential year to year growth rates of various key petroleum products and that of real GDP, natural gas and electricity consumption both utility and non-utility. See also figure 1. Observe that non-utility production of electricity has grown rapidly over the eighties and nineties in response to poor supplies /higher prices of utility supplies to industry. Overall oil products show growth rates in keeping with income growth. LPG has shown much higher growth rates all through but especially in the eighties when the penetration of LPG among the urban middle classes at increasingly 'subsidised' prices took place. MS consumption has varied with low growth in the high price period during the oil shock period but then has grown in keeping with GDP growth. Others like kerosene and LDO which are known to be used for adulteration / partial substitute for diesel show the large fluctuation that such uses would result in since they would depend upon the arbitrage price difference. The same is true of naphtha. As kerosene imports were restricted in the last three years the consumption has gone down. Similarly the large rise and fall in possibly naphtha reflects the relative price changes of naphtha. Changes in

efficiency in use could also reflect upon consumption as is possibly the story in the case of HSD over the last three / four years.

Table 7 and Figs. 2 and 3 bring out the revealed income elasticities on the basis of average of growth over three prior years. For LPG the price elasticities after having fallen to about 1.3 by the late nineties have now started rising sharply. The same is true of MS where the rise in matched by a fall in the elasticity of naphtha. In all of HSD, LDO, Furnace oil and kerosene, and NG there is a fall in elasticity implying that besides relative price changes there are other structural factors at work. In China over the late eighties and the nineties the elasticities have fallen sharply as the efficiency of the economy improved greatly with the pursuit of manufactured export led growth. Similar tendencies though less forcefully are at possibly at work in India in the wake of its reform since the alignment of production towards India's comparative advantage has been an ongoing process. Fig.1 brings out the much faster growth of LPG in relation to GDP and all other important light distillates and all oil products reflecting penetration (and substitution) effects.

Fig 4 further brings out the range of GDP over which the elasticities for LPG and NG were high. NG and LPG were both 'promoted' over the eighties with the HBJ pipeline coming into effect and substitution taking place through administered pricing in the former and both under pricing and consumer surpluses driving the latter.

Chapter 3 : An Analysis of LPG Sales Across States and Regions

In this chapter of the report, we analyze the LPG sales data for the industry as a whole. We also examine the trends state-wise and region-wise. However, we have not examined the data at the company level as the focus is on the issues related to LPG subsidy and we have been given to understand there is not much variation in policies and practices across LPG marketing companies.

GROWTH IN CONSUMERS

At the end of fiscal 2003-04, there were approx. 7.72 million LPG consumers. (See Table 8). As reported in Table 9, there has been around 10% growth every year in number of consumers during last four years. As a result of aggressive growth in the number of consumers however, the percentage of double barrel customers has fallen over last three years, from 63.75% in 2001-02 to 57.69% in 2003-04. (Table 10)

The maximum average growth in customer base has been in the Southern region with average growth of 12.1% over last three years. (Table 9). All other regions have seen growth of around 9-10% in the corresponding period. At the state level, the customer base in Andhra and Karnataka in Southern region, Chattisgarh, Madhya Pradesh and Maharashtra in Western region, Bihar, Nagaland, Sikkim and Orissa in Eastern region, and Punjab, J&K, Rajasthan and UP increased faster than the regional average growth. At the end of fiscal 2003-4, customer base of around 31% each was in Southern and Northern region, whereas it was 25% and 13% in Western and Eastern regions respectively.

The double barrel connections are higher in case of relatively small and remote states such as Goa, Arunachal, Andamans and Lakshwdeep.

GROWTH IN LPG SALES

Over the last four years during which the customer base increased at around 10% every year, the LPG sales in terms of quantity grew at 11.3% on an average. (Table 12). At the regional level, maximum sales growth was in Southern region at 12.3% followed by Northern region, Eastern region and Western region. In term of absolute volumes however, Northern region accounted for 34% of total sales during 2003-04, whereas the proportion of Southern, Western and Eastern regions was 28%, 26% and 12% respectively. (Table 11).

At the state level, there are states where the volumes have grown in line with the increase in customer base such as Punjab, Rajasthan, Nagaland etc. However, there are states where the LPG volumes have not grown in line with

the increase in customer base. This is true of states such as Maharashtra, UP and Andhra. This indicates variation in LPG sales volume growth per connection across states and regions, which we discuss later.

While the total LPG sales have grown in a stable manner over the last four years, an interesting fact can be noticed in Table 13. The bulk LPG sales, which was about 2% of the total LPG sales during 2003-04, shows wide swings in growth with absolute volume decline in volume in two years out of four.

LPG SALES PER CONNECTION

With the rise in customer connection and with the decrease in DBC customer proportion, it could be argued that the LPG sales per connection might start falling once more marginal (relatively poor) customers join the customer base. On the other hand, the existing customers could increase their consumption faster than the negative effect of marginal customers on LPG sales per customer. LPG sales per connection (Table 14) or customer in volume term, is also an indicator of price elasticity of LPG consumption. It is important to analyze therefore, whether per connection sales of LPG in quantity terms have been rising and if so, at what rate.

From Table 15, it can be seen that the per connection sales of packed LPG has been rising on an average of around 1.5% per annum. This is despite customer growth rate of around 10% per annum and fall in DB connections as percentage of total customer base. DB connections improve the effective availability of LPG for consumption by eliminating the waiting time for refill and hence it is expected that consumption at the household level would increase in case double barrels are available. Despite the fall in DB connections and possibility of marginal customers getting added to the existing customer base, it is clear that LPG sales per connections have actually been rising. On an average, around 8.1 cylinders of 14.2 Kg each were sold during the year 2003-04. The corresponding figure during 2000-01 was 7.9 cylinders. This means on an average, each customer (or connection/household) consumes one cylinder in around 1.5 months.

There is considerable variation in consumption of LPG per connection across regions. The northern region, with around 31% of all India customer base accounts for higher sales in proportion term and has highest LPG consumption/sales per connection across regions. The growth in per connection LPG sales during last four years has been highest in this region at around 2.5% per annum. Within Northern region, LPG sales per connection has been even faster in relatively prosperous states (and also having large customer base) such as Delhi, Punjab, Haryana and Rajasthan whereas there has been considerable decrease in per connection LPG sales in Uttar Pradesh.

The next highest per connection LPG sales/ consumption has been in Western region where it has been growing only slowly (at less than 1% per annum).

Most of the large states exhibit stable consumption pattern over last four years with sales falling in Maharashtra gradually. While LPG sales per connection in Eastern region are lower than Western region, they have been growing faster than the Western region at around 1.5% per annum. Given the low penetration level in the Eastern region (with only 13% of all India customers as opposed to 25% in Western region), the LPG sales per customer has become very close by 2003-04.

Southern region exhibits most anomalous behaviour among the regions. As pointed out earlier, it had maximum growth in customer base during last four years. However, the LPG sales per connection in the region are significantly lower than all India average, just as Northern region has significantly higher LPG sales per connection. Moreover, here the growth has been slowest and practically nil, just opposite to that of Northern region. Within the region, Andhra and Karnataka have relatively low LPG consumption (or sales). In case of Karnataka, it has been growing over last four years on a low base while in case of Andhra it has been actually declining on a low base.

SUMMARY

From the analysis of sales data it is clear that the LPG sales (and consumption) has been growing more than the increase in customer base, which itself has been at rate of around 10% per annum during last four years. This has been due to increase in sales per connection (in quantity terms) during the period. The increase in per capita consumption has been despite the possibility of adding marginal customers, falling proportion of double barrel connections and price increase. The current consumption levels are of the order of around 8 cylinders per year (or about 1.5 months use of a cylinder). Based on this it can be inferred that consumption of LPG is fairly price inelastic.

Across the regions and states, there are substantial differences in LPG consumption pattern with the sale per connection being relatively high in Northern region and in relatively prosperous states. These states have also higher penetration levels. In Southern region, there seems to be distinctly different usage pattern with some of the large states having extensive customer bases having relatively lesser per connection consumption.

Another interesting feature of LPG sales has been that the industrial sales have been quite volatile across these four years with very little volume growth by the end of 2003-04.

Chapter 4 : An Analysis of LPG Subsidy and Costs-to-deliver

In order to understand the extent of subsidy involved in delivering LPG to the customers, it is important to analyze the costs which are incurred until the delivery of the LPG cylinder to a customer. In this chapter, we have analyzed the cost break-up for estimation of subsidy involved. This analysis is based on the data provided to us by Petrofed. The data on which this analysis is based was for four metros to capture the essence of differences in costs across states and locations and is based on Import-parity price of LPG as on 5th November 2004.

MAJOR COSTS

As would be expected, the cost of LPG is the most important cost element in the estimated cost-to-deliver LPG to the customers. Of the costs estimated in Table 16, landed import cost of LPG constitutes around 61-65% (depending upon the location) of the estimated cost-to-deliver per cylinder. By the time the LPG is bottled at the bottling plant, around 80% of the cost-to-deliver is incurred. The rest is accounted for by the excise duty, dealer's margin, and the state sales taxes. In the total cost structure, the items which have important bearing on the costs are bulk freight, filling costs, cylinder depreciation, packed freight costs, excise and sales taxes and dealers' commission. (Table 17).

EXTENT OF SUBSIDY

The extent of subsidy estimated based on the import prices of LPG and its retail price as of 5th November is given in Table 18. This table on gross subsidy estimates is based on prevailing tax rates. As can be seen from the Table, the extent and range of gross subsidy varies marginally across four metros from Rs.190 per cylinder to Rs.205 per cylinder. The import price of LPG used in the table is weighted average price across the country and hence the variations are mainly on account of state taxes as the billable prices before state level taxes not vary much if all India weighted average landed costs of imported LPG is used.

NET SUBSIDY TO THE CONSUMERS

Even though the gross subsidy computed using prevailing tax rates are quite high, the net subsidy to the consumers based on the costs excluding taxes (both state and central taxes) are much lower and are of the order of Rs.110 per cylinder. It is minimum in Kolkata as the consumer prices are highest there among four Metros, owing to higher sales taxes. It varies from Rs.86 per cylinder in Kolkata to around Rs.105 per cylinder in Mumbai, and is higher at about Rs.110 per cylinder in Chennai and Delhi. The net subsidy to

consumers is based on the difference in cost-to-deliver assuming no taxes and the prices paid by the consumers.

NET SUBSIDY BY THE OIL COMPANIES AND CENTRAL GOVERNMENT COLLECTIVELY

As the states have the constitutional right to charge sales taxes and if this right is not foregone by them for LPG, then the next relevant subsidy concept to look at would be Net subsidy provided collectively by the central government and LPG marketing companies. Since the billable prices before sales tax are relatively uniform across locations, it would be expected that the collective subsidy by the central government and oil companies collectively would also be uniform across locations. It is and is of the order of Rs.130 per cylinder. This means that if the central and state governments were to collect same sales tax per cylinder as of now (but not at the prevailing rates), then increase by an amount equal to Rs.130 per cylinder would eliminate subsidies.

NET SUBSIDY TO BE COVERED BY THE OIL COMPANIES

The next subsidy concept is in relation to the question that if the state and central government were to collect as much taxes per cylinder as of today (but at a lower rate), then how much price increase per cylinder would be sufficient to eliminate the subsidy. In other words, if the central government was not to subsidize the LPG but has to be absorbed or covered by the oil companies, then what is the extent of loss to be covered by the oil companies? In such a case about Rs.162-163 per cylinder loss would have to be covered by the oil companies.

SUMMARY

As of 5th November, the LPG subsidies at the gross level amount to about Rs.190/195 per cylinder, which is about 40% of the total costs. However, the total costs include taxes at central government and state government levels and confound the issue of subsidy with simultaneous incidence of taxes and subsidies. If the subsidies were to be eliminated by removing taxes in the entire value-chain, then the extent of subsidy or "Net Subsidy to the Consumer" is only about Rs.90/110 per cylinder, which amounts to approximately 30-35% increase in prices. If the state governments were to continue collecting the same amount per cylinder albeit at lower rate, but the central government were to forego the taxes then the amount is of the order of Rs.130 per cylinder. If all taxes are collected were to remain at the same amount (but lower rates), the uncovered subsidy to be absorbed by the oil companies would be about Rs.162/163 per cylinder. Here it is important to note that given the ad valorem taxes at all levels, input costs increases increase the tax revenues and the gross subsidy, which is perverse in case of purportedly subsidized commodity such as LPG.

Chapter 5 : Possible Strategies for Capping and Targeting LPG Subsidy

After the analysis of growth in LPG sales and extent of subsidy prevailing today and its historical growth, it is obvious that the LPG subsidy is non-trivial in terms of fiscal and non-fiscal consequences.

From the analysis, the following major points emerge-

- Unlike 10/15 years back, there has been tremendous growth in LPG connections and the LPG connections are generally available on demand.
- LPG connections in the recent past have been growing at the rate of 10% per annum.
- There are major first order distortions caused by LPG subsidy in the form of diversion of subsidized LPG for commercial usage.
- There are various second and third order effects because of LPG subsidy as pointed out earlier.
- Despite LPG subsidy, there is some evidence that the penetration of LPG as a fuel for cooking has been low in poorest segments of the society and the same can be said for relatively poor states. Eastern region as a whole has significantly lower penetration (adjusted for population).
- Even though the LPG connection growth has been substantial and the proportion of double barrel connections have fallen, there has been increase in offtake of LPG per connection indicating that LPG volume and therefore subsidy would rise per connection.
- The higher offtake per connection may also be an indication of higher diversion. Similarly stagnant sales of bulk LPG by PSU LPG marketing companies is another indirect indicator of the same.
- If the LPG connections were to grow, which would be consistent with the policy of promoting LPG as a relatively clean household fuel (as compared to wood and other bio-mass based fuels), then the subsidy growth would be driven by the connection growth as well as higher per connection consumption.
- While currently the subsidy levels might have shot up due to high petroleum prices, the subsidy even at lower petroleum price levels could impose significant fiscal costs on the exchequer or oil companies due to this volume growth.

From these conclusions it can be said that unless capped and targeted well, the LPG subsidy could either explode causing major fiscal problems or would end up being a deterrent in expansion of LPG connections.

With the adverse fiscal consequences, there would be an in-built pressure in the system not to aggressively expand the customer base for the fear of such consequences. Besides the need for capping and targeting the subsidy, there

is also a case for reexamining the rationale behind LPG subsidy. Any policy intervention in LPG subsidy has to be sustainable in terms of its fiscal impact and be consistent with growth in LPG connections for household consumption.

In this chapter of the report, we evaluate and examine various strategies which can be used to cap and target the LPG subsidy better.

Alternatives for Sustainable LPG Subsidy

1. COMPLETE ELIMINATION OF LPG SUBSIDY

LPG as a Merit Good

While the complete elimination of may seem preposterous considering the “merit good” argument, i.e., the positive externalities created by the usage of LPG as opposed to alternative fuels such as kerosene, wood or other bio-mass based fuels, it still needs to be examined carefully. In other words, LPG subsidy can be defended as a matter of public policy if LPG consumption necessarily promotes public good, and is not regressive.

It is difficult to argue against this position per se. However, the merit good argument is valid only if the current level of subsidy is able to promote increased consumption of LPG in some segment which would have otherwise not used LPG. There are several reasons to suspect that the intended increased use of LPG (or higher penetration of LPG through enlarged customer base) would be constrained due to several factors. Some of these are listed below:

- Firstly, the extent of subsidy given to kerosene currently (which is even higher than LPG) may promote kerosene usage more than LPG.
- The capital or one-time costs associated with use of kerosene are much lower than LPG. Kerosene requires a relatively cheap stove and no other costs. Given that poor household face serious credit constraints, they may find it difficult to pay for deposit and gas stove.
- For those outside urban areas, wood or other bio-mass based fuels might be quite cheap (in terms of private costs) in addition to relative cheapness of kerosene, and may therefore prefer continue to use such fuels even if they are environment unfriendly.

In such a case even if as a standalone argument a case can be made for LPG subsidy, its effectiveness in achieving the intended outcomes would be quite suspect. Evidence to the effect that LPG subsidies (certainly subsidies that lower the price of fuel) do not improve penetration in the context of low incomes is systematic across countries. See World Bank (2003).

Evidence against Merit Good Argument

There is some empirical support available for each of the points listed above. A study based on analysis of 50th and 55th rounds of Consumption Expenditure surveys conducted by National Sample Survey Organization (NSSO) of Government of India by Gangopadhyay et al. (2004) indicates that the use of LPG is heavily skewed in favor of urban areas, where the availability of biomass is limited. The use of LPG in even the highest income households is extremely limited in rural areas. In the urban areas too, the LPG penetration is much lower in the weaker sections as compared to kerosene.

Another study highlighting the same issues in the context of "Deepam Program" and cited by the World Bank in its report on "Kerosene and LPG Markets", is by Rajakutty et al. (2002). Deepam Program was launched in Andhra Pradesh in July 1999 to promote penetration of LPG as a cleaner fuel. As a part of the program, Government of Andhra Pradesh covered the initial connection fee of Rs.1000 per connection for 3 million women from Below Poverty Line (BPL) families. Since the scheme was through self-help groups, the members also helped in additional initial costs associated with stove etc. As a result by February 2002, around 1.7 million new connections were given. However, the review study found that most of the new users used LPG sparingly and still relied on bio-mass. LPG was used in monsoons when dry bio-mass is difficult to come by, and when less labor was available for the collection of such fuel.

From these studies, it is clear that the increased penetration of LPG solely because of subsidy cannot be attained, as long as income levels do not go up substantially or unless LPG subsidy is increased dramatically or level of urbanization increases. In such a context, the extant LPG subsidy is directed more towards urban lower middle to upper income households, where the demand for LPG is not likely to be affected by prices within a reasonable band. At the current consumption level of around 1.5 months for a cylinder, the net subsidy is close to Rs.70 per month for an average consumer at the current input costs, which is not much for the type of households where the LPG is actually consumed. In any case, subsidization of such households is far from progressive³.

³ Informally it was told to us that by the oil companies that about 70% of LPG using households also own two-wheelers. If this is true then as users of two-wheelers these households pay punitive prices on motor spirit, even as they are subsidised on LPG! A simple analysis assuming that a low average users of a two-wheeler would purchase about 10 litres of MS per month, the addition tax over say diesel that such users pay per month is approximately Rs 100 per month since the price difference between MS and diesel is around Rs 10/litre. The net consumer subsidy on LPG use (after taking into account the taxes on MS) at say 10 kg/month for such consumers would be Rs 43/-. Thus even the lower middle class consumer is on a net basis only taxed! And all that the economy has "achieved" through such price based subsidies and financing of subsidies (through cross subsidies) are the vast distortions, and their ill effects.

Political Difficulties in Eliminating LPG Subsidy

While it is difficult to imagine substantial economic impact from removal of LPG subsidy on the concerned households, it might be difficult to eliminate LPG subsidy straightway without creating public opinion for the same. Firstly because of the fact the affected households are vocal, there are bound to be reactions in the public arena. Secondly, since the issue affects everyone within the concerned constituency, it provides a very convenient and emotive plank for political mobilization. Thirdly, since the media caters to this very constituency, it is likely to magnify the issue and keep it in the focus for a long time creating further political problems for any Government attempting to eliminate LPG subsidy.

Despite likely political difficulties in eliminating the LPG subsidy, it might still be possible to handle it much better if some of the statistics easily available with the Government and oil companies were made available through mass media. These would be the differences in urban and rural LPG consumption per connection, penetration of LPG in rural and urban households, use of kerosene vs. LPG in the poor income households etc. These differences would point out the direction of flow of LPG subsidy and would mitigate to a large extent the possibility of political mobilization against elimination of LPG subsidy.

2. DIRECT SUBSIDY TO BPL FAMILIES THROUGH COUPONS

As elimination of LPG subsidy in one stroke might be politically difficult, the next best alternative would be to try and cap the amount of subsidy by directing it to more deserving households from among the LPG users. One such criterion for selection of households could be "below poverty line" or BPL families. The advantage of this criterion is that for subsidy administration, it offers a readily available and already identified (not always though) target segment.

Subsidy has to be direct and not Price-based

In case the subsidy to BPL or any other easily identifiable and deserving segment is decided, then it is important to make sure that subsidy administration is also sound. Any price-based subsidy runs the risk of diversion of commodity (in this case LPG) to users other than the intended ones. Dealers may simply issue cylinders in the name of such consumers and collect a premium from other customers. This would defeat the very purpose and would also result in denial of LPG use to the intended segment. The effect of price-based subsidy in case of kerosene and electricity has had such

a perverse result, which is now well known and documented. It is therefore important that the prices charges from all customers are all same but the target customers are given coupons (in fixed numbers every year), which can be used to offset the prices to the required level. The dealers would collect the coupons and would be able to cash it by presenting the same to concerned oil company. Each customer may be given coupons equal to current average consumption of 8 cylinders, i.e., 8 coupons. Each coupon would entitle the customer of the target segment to receive pre-determined subsidy levels. These levels can be fixed periodically and therefore the customer has to pay the difference of the retail selling price and the announced subsidy as cash payment and surrender a coupon while taking the delivery of a cylinder. The coupons would be collected by the dealer and in turn surrendered to the oil companies for getting equivalent (or slightly higher amount for compensating the dealer for costs incurred in administering and accounting for coupons) amount in cash. At this stage it would be worthwhile to clarify that coupons (in the form of paper coupons) are just one way of achieving this objective. By coupons, we mean any technology which allows the establishment of well-defined entitlements for the intended group. The technology must be feasible, reliable and should result in secure (not open to frauds) definition of entitlements. The technologies may range from security printed paper coupons to IT based smart card solutions requiring supporting IT infrastructure.

Coupons could be tradable and LPG Subsidy could be converted to Income Subsidy

In case the BPL families are not inclined to use LPG as much as the number of coupons issued to them, they could be allowed to trade these coupons (all or some) after issue to anyone whom they wish. In such a case the coupons would become a means of obtaining income. While such a possibility may change the character of subsidy, still the beneficiaries would be the deserving ones as long as non-BPL families do not get the coupons and there is some amount of control exercised in new connections so that BPL families or others in their name do not take multiple connections.

Identification, Control over new Connections and Coupons are key to Success of the scheme

It is obvious that any scheme trying to target subsidy to a select group is open to abuse by the others and by that very group. The obvious problems already spelt out are- (a) Non-BPL consumers getting identified as BPL consumers, (b) Non-BPL consumers taking connections in the name of BPL consumers, (c) BPL consumers taking multiple connections, (d) Inadequate administrative arrangement of coupons disbursement, accounting and collection, and (e) creation of duplicate coupons.

First three of these are more difficult problems to solve. To the extent, there is already a misclassification or misidentification of BPL families, the first

problem would be extremely difficult to handle and any framework to take care of the same would have to come from local administration with a very limited role for LPG marketing companies. Second problem may result in proliferation of BPL consumers as they might see this as opportunity to generate income whereas the non-BPL customers may pay for connection if they can appropriate subsidy. The natural conflict associated with sharing of subsidy would limit this tendency somewhat. Third one is more serious as there is no such inherent conflict if the connection is being funded by the BPL family to generate income. The only constraint here would be the initial costs associated with everyone additional connection. This problem could also be checked more effectively if all such connections are cleared by the oil companies in somewhat centralized manner with appropriate documentation. All other types of new connection may continue to be treated as they are treated today, i.e., without any oversight by the company. The problems of the second and third types can be further mitigated if there was uncertainty about the continuation of LPG subsidy. The incentive to misuse the coupons would be less if the continuation of scheme itself is doubtful and is only a transitory measure before elimination of LPG subsidy.

Last two of the problems mentioned above are more managerial or administrative in character and can be solved at the LPG marketing company level by having a system for control over the number and security of coupons printed, accounting of coupons and associated cash disbursements. This would call for new organizational set up for subsidy administration and a proactive role in identification of beneficiaries, facilitation of disbursement of coupons etc. if the intervention of this type were to find acceptance among the intended beneficiaries. Extensive use of IT would have to be made to make sure that the support system for coupon administration is efficient and effective.

3. ACROSS THE BOARD SUBSIDY WITH LIMITED ENTITLEMENT

The third possibility in capping the LPG subsidy is to define limited entitlements for all the users by issuing coupons to all the customers for a pre-determined number of cylinders every year. In such a case, while the political difficulties would be the least, but there would be no targeting of subsidy and hence can only be thought as third best solution.

Limited Possibilities of Misuse

Unlike the BPL families directed subsidy, in this case the only way the scheme can be misused is by taking multiple connections as each connection entitles same number of coupons.

May blunt the political impact if used for phasing out Subsidies

If this option is chosen as a transitory measure, the incentives for multiple connections weaken considerably. It can also be effectively used to blunt the

expected political impact associated with subsidy reduction by phasing out and simultaneously capping the LPG subsidy. For example, issue of coupons for 6 cylinders per year (as compared to an average consumption of 8 per year) could reduce the subsidy by around 25% from current levels. The number may be reduced to 4 next year and 2 or zero, year after. The phasing program can be sweetened further by linking the pace of reduction with the likely prevailing price (without subsidy). It can be slowly reduced if the prices are relatively high and faster if they are lower. Once the number is reduced, the only firm stand need to be that it would not be revised upwards.

Control over new Connections and Coupon Administration are key to Success of the scheme

Since this option of controlling subsidy is similar in character to the previous one except that the problem associated with classification of consumers, the need for an efficient organizational set up at the LPG marketing company level would be must. In this case the company would have to be careful for all new connections and may have to centralize the process during the transition. It would also require the data base of existing customers to verify and control the problem of multiple connections.

The main advantage of this last option is in increasing the acceptance of subsidy reduction politically and reducing the subsidy currently somewhat. It also allows some time for phasing out the subsidy. Otherwise the option ends up continuing the subsidy without directing it to deserving target group. It also imposes, like the previous option, the costs and risks associated with direct subsidy administration and potential misuse. These can however also be viewed as costs for preparing the ground for subsidy elimination eventually.

Further Issues Related to Subsidy Reduction and Administration

In addition to the possible strategies for LPG subsidy reduction, there are several attendant issues, which warrant a discussion in the context of reforms and subsidy reduction. Some of these are discussed here in this chapter of the report.

1. CENTRAL TAXES AND SUBSIDY

As pointed out in the chapter analyzing LPG costs and subsidy (as of 5th November 2004), the gross subsidy based on full cost includes the taxes at the prevailing rates. Because of lower than cost issue price and billable price, the actual taxes collected are lower than at full cost. Nonetheless, the net subsidy to the consumer is around 50% of gross subsidy. In the context of a subsidized commodity, assessment of gross subsidy after taking into account taxes is highly misleading and such an estimate is upward biased as far as true subsidy is concerned. If the central government were to forego all the taxes collected on subsidized LPG sales, then the subsidy would have been

about Rs.130 per cylinder. It is appropriate to keep this in mind that any effort towards subsidy elimination at full cost (incl. taxes) is tantamount to move from net subsidy to net taxes. Such an attempt would be difficult (as it raises the target of price increase) and is not consistent with any rationale on LPG use. LPG use suddenly cannot become "public bad" to be taxed, just because current subsidy levels are inadequate to promote its penetration in the target segment due to extremely low (private) cost alternatives and poor income levels.

Based on the estimates of costs (as of 5th November 2004), the appropriate subsidy reduction target would be Rs.130 per cylinder assuming that state government would continue to collect the same amount per cylinder (but not at the same rate) as they were doing before. This brings the problem of state taxes as well, which we discuss next. The gross subsidy is heightened not only because of central taxes but also state taxes. Unlike central government, the state governments do not have to bear the costs (fiscal) of LPG subsidy and are only net revenue collectors from LPG.

2. STATE TAXES AND SUBSIDY

Even if the central government were to forego the taxes completely, the subsidy to be recovered would be artificially high due to state sales tax. Given the power to impose sales tax, it is easy to see that state government can in fact increase the misery of the central government if they were to increase sales tax. Already, the sales taxes are different across states with some having higher sales tax on LPG sales. If the states were to charge the same rate, any attempt to reduce LPG subsidy is a revenue gain for the states and at zero subsidy (without any central taxes), the LPG would be taxed on net basis due to state sales tax.

While it is difficult to get the states to remove sales tax, it is important that the amount of tax be kept same (at lower rates) as of now, otherwise the target retail price for subsidy elimination or reduction remains high and possibly politically unacceptable. Besides freezing the amount being collected, there is a need to control any possible perverse behaviour by the states by linking the issue price for a state with its sales tax rates (if legally possible). The argument for such a move is that the state should not tax a commodity, which is clearly a public good and is being subsidized by the central government.

3. VOLATILITY IN INPUT PRICE AND SUBSIDY

As pointed out in the previous chapter, bulk LPG is the main input cost in packed LPG cylinders. The bulk LPG prices depend upon the international prices and are subject to variations. In the recent past, LPG as well as all petroleum product prices have been unusually high and have increased the gross subsidy levels.

Independent of the option chosen to reduce subsidy and in fact even if LPG subsidy is not reduced, there is a case for instituting a mechanism to determine how the input costs increases would be dealt with. If the subsidy is eliminated, then also this would remain as an issue as is the case with some other petroleum products.

In order to prevent the potential monopoly power which can be collectively exercised by the LPG marketing and Oil companies, there is a case for oversight or regulation so that the prices are not fixed at levels, which generate excess profits for the companies. However as the experience has shown that such an oversight at the level of Ministry results in loss of objectivity in revising or changing prices as political considerations prevail over economic ones. To prevent overpricing and also to moderate the price swings, a regulator may use average input costs over a pre-determined period as the basis for prices increases or decreases. Alternatively, the companies may be given flexibility within a prescribed band (linked to input costs) with prices monitored by the regulator so as to prevent the prices sticking to upper end of the band. Infrequent revision in prices consequent to input cost changes lead to increasing difficulty in adjustments (in regulatory parlance, tariff shocks) and also accumulation of surplus or deficit over prolonged periods causing fiscal strains or intergenerational equity concerns. The periodicity could be as frequent as a month or as low as a quarter. The reviews could also be linked to the observed volatility of input prices.

Chapter 6: Brief Findings and Recommendations

1. LPG subsidy has grown historically and has become quite high because of aggressive growth in connections and increase in per connection consumption in addition to rising input costs.
2. Given that there is evidence that LPG subsidy has been ineffective in increasing penetration in rural and poorer households, there is a case for capping and targeting LPG subsidy. Otherwise it can explode over time unless new connection growth is curbed, which is indefensible.
3. The best option to curtail LPG subsidy would be to eliminate it straight away. However, there are at least two factors which are likely to make it difficult. Firstly, the input costs are high (from a historical point of view). Secondly, the high input prices coupled with lack of preparatory ground work may result in political mobilization against the move.
4. Even if difficult to implement, the option to eliminate LPG subsidy need to be debated and be at the focal point as more information indicating the flow of LPG subsidy would help in softening and preparing the ground. It is also important to keep this option in play as all other next best options are prone to misuse and may become ineffective over a long enough period through systematic abuse. These possibilities are curbed as long as there would be uncertainty about continuation of subsidy.
5. The next best option which sharply focuses on the deserving segment is direct subsidy to below poverty line families. These households may be given up to 8 coupons every year. Each coupon can be used for subsidy for a cylinder. A separation of the identification and issuance of coupon is critical to the success of this scheme. As clarified elsewhere in the report, by coupon we mean any technology which allows the target group to get a well-defined and secured entitlement. It could be paper coupons with security features or smart cards, using IT for identification and entitlements.
6. Direct subsidy to BPL family through coupon would allow them to pay cash equal to retail price less the subsidy per coupon. This amount and a coupon would entitle them to get a cylinder. The coupon surrendered to the dealer would be in turn be surrendered by him to the Oil companies, who would pay equivalent cash to the dealer. In fact, dealer may get an additional compensation for the cost of accounting and administration.
7. The BPL coupon holders may be allowed to trade the coupons as this would convert the LPG subsidy to income subsidy. Even if the transfer or

trade is not allowed, it is bound to take place and the net effect of that would be sharing of subsidy between intended beneficiary and some intermediary.

8. Targeting LPG subsidy to BPL consumers may encounter problems in improper identification about which Oil companies need to work closely with district/ local administration so as to proactively eliminate inappropriately classified consumers.

9. Targeting BPL consumers for LPG subsidy also leaves open the possibility of non-BPL consumers taking connections in the name of BPL consumer and that of BPL consumers opting for multiple connections. Both problems are to some extent self limiting (due to conflict and due to connection charges) but warrant closer examination of new connections under BPL category.

10. Coupon based direct subsidies require efficient administrative support associated with coupon distribution, appropriate documentation, coupon accounting, collection and cash reconciliation. Coupons have to be difficult to copy and print to prevent frauds etc. This can be ensured by printing of coupons at a security press.

11. As the extent of penetration of LPG in BPL families might be too low and because of political difficulties, the next best option would be to limit the number of cylinders for which the subsidy would be allowed for all the customers. To start with, each consumer may be given 6 coupons per year which allows him to get 6 cylinders at subsidized rate.

12. Even though this option does not attempt to direct the subsidy to more deserving segments, yet this option cuts down the overall subsidy by about 25% in one stroke (or about Rs.40/50 per cylinder). Coupons could be given to all consumers without the need to worry about misclassifications.

13. Like in case of targeting BPL consumers, this option also suffers from the possible misuse through multiple connections. The Oil companies would have to have data base of all of their consumers to prevent such a possibility. In addition, a sound coupon disbursement, collection and accounting system needs to be developed by them. Outsourcing of such administrative tasks is feasible and might be more efficient as well, in case eventually subsidies are withdrawn.

14. Under this option, a phased subsidy elimination program can be laid out. After 6 coupons per year, the number of coupons may be brought down to 4 and then to 2. Phasing down of subsidy by reducing number of coupons may be linked to input costs with faster phasing down if the input prices are lower and vice versa. This would allow the expectations of consumers to be modified gradually.

15. Irrespective of any method of LPG subsidy reduction, there is a need to examine the taxes built in currently estimated gross subsidy. The net subsidy

to the consumers should be the basis of elimination otherwise the target is self-defeating (by being higher) and not justifiable (elimination of gross subsidy means moving from net subsidy to net tax regime).

16. Even if the state governments continue to collect sales tax, the central government which also collects taxes and simultaneously bears subsidy should neutralize the subsidy estimate from central taxes. The state governments need to be persuaded to retain the current amount of sales tax (but at a lower rate) otherwise states get higher revenue and the price target goes up.

17. In case the state governments were to pay truant on this issue, there is a need to explore whether differential issue prices can be used as a deterrent.

18. Another issue which warrants closer examination is the impact of volatility of input costs on retail prices. Had the industry been competitive, this would not have been a major issue. Clearly, some oversight or regulation is required so that prices are changed at appropriate intervals and are still neither excessive nor too low. It would be appropriate to set up a regulator to review periodically review the input costs and allow changes. He may allow prices on the basis of average cost with a lag or may prescribe a band linked to input costs and may monitor the prices to prevent any abuse.

19. The rationalisation of prices and of tax reform in this sector is long overdue. These need to be simultaneously pursued. It is possible for the entire sector to move towards a revenue neutral cenvat based tax regime. That in itself and the direct subsidization of kerosene and LPG through coupons is necessary to remove all the distortions. The ill effects of the distortions that result in misuse, diversion, revenue loss, and added environmental and governance problems can only be feasibility addressed by the movement away from price based subsidies to direct subsidies. Similarly kerosene subsidises if correctly targeted and administered can have large spillovers in the management of subsidies in LPG.

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Fuel	Price	Stove efficiency	Rs/MJ	Equivalent quantity	Rs /month
LPG	Rs 241/cylinder*	55%	0.67	14.2 kg	241
LPG	Rs 469/cylinder	55%	1.31	14.2 kg	469
kerosene1	Rs 9/liter*	40%	0.52	21 liter	188
kerosene, high pressure2	Rs 9/liter*	45%	0.47	19 liter	167
Kerosene	Rs 16.54/liter	40%	0.96	21 liter	345
kerosene, high pressure	Rs 16.54/liter	45%	0.85	19 liter	307

*Subsidized price in New Delhi as of February 2003; Rs per month per household for purchasing the quantity indicated under "Equivalent quantity"
Source Table 2.2 of Chapter 2 "Kerosene and LPG Markets in India",
([http://lnweb18.worldbank.org/SAR/sa.nsf/Attachments/InHHFuelCh2/\\$File/Chapter+2.pdf](http://lnweb18.worldbank.org/SAR/sa.nsf/Attachments/InHHFuelCh2/$File/Chapter+2.pdf))

	Aggregate Supplies of PDS/ Officially reported consumption	Aggregate Household Consumption of PDS Kerosene /LPG from Consumer Expenditure Reports	Leakage	Leakage as % of supplies
1993-94 (Kerosene)*	8704	4428	4276	49%
1999-00	10731	5354	5377	50%
1993-94 (LPG)**	2433	2552	-119	Negl.
1999-00 (LPG)**	4974	4808	166	Negl

*Table 13; **Table 17 of Gangopadhyay, Subashis; Bharat Ramaswami and Wilma Wadhwa (2004)

Expenditure Decile*	Rural	Urban
1	0	7
2	0	15
3	1	25
4	1	35
5	2	43
6	3	54
7	4	58
8	8	62
9	14	69
10	29	78
All	6	45

*Expenditure deciles consist of equal proportions of households (10%) ranked by total household expenditure corrected for inter-state price differentials.
Source: Gangopadhyay, Subashis; Bharat Ramaswami and Wilma Wadhwa (2004), Table 14

Expenditure Decile*	All Households		LPG Using households	
	Rural	Urban	Rural	Urban
1	0.00	0.12	3.28	1.56
2	0.00	0.25	1.05	1.74
3	0.01	0.44	1.32	1.89
4	0.02	0.71	1.61	2.28
5	0.03	0.94	1.94	2.24
6	0.04	1.28	1.61	2.47
7	0.07	1.67	1.68	2.59
8	0.16	1.95	1.84	2.79
9	0.25	2.44	1.91	3.12
10	0.82	3.30	2.56	3.72
All	0.14	1.31	2.18	2.78

Source: Table 15, *ibid.*

Table 4: Distribution of Subsidised LPG by Expenditure Decile, c.2000				
	Rural		Urban	
Expenditure decile	Consumption	As % of sectoral total	Consumption	As % of sectoral total
1	52916	0	4511636	1
2	467238	0	9114228	3
3	762306	1	17183652	6
4	1614442	2	23020697	8
5	2872509	3	29704120	10
6	3586543	4	36887906	12
7	7001074	7	39672402	13
8	11882598	12	42298686	14
9	21412281	22	47816501	16
10	46674765	48	54177950	18
All	96326671	100	304400000	100

Source: Table 16, *ibid.*

Table 6: Symmetric Exponential Growth Rates in Sale of Petroleum Products, Electricity, Natural Gas and Real GDP

year	GDP	All Oil PR	Light Distillate	LPG	Naphtha	MS	ATF	Kerosene	HSD	LDO	FurnOil	NG	E Ut	E Nut
1973														
1974	3.11	2.56			11.06	0.16		6.19	5.56	-26.75	-0.12	-1.17	3.27	2.28
1975	1.18	-1.16	6.58	14.85	1.21	1.26		2.38	0.15	0.46	-0.28	22.16	5.12	6.05
1976	8.77	1.58	1.32	3.02	17.90	3.17	6.37	3.73	7.46	20.89	-1.39	16.71	12.12	3.15
1977	1.69	7.03	11.69	9.10	4.19	5.54	8.52	12.03	8.49	7.31	32.47	20.59	10.88	8.39
1978	6.98	6.09	4.50	6.06	9.37	7.48	10.31	8.39	11.03	4.37	-28.41	15.59	3.38	3.73
1979	5.58	9.63	8.06	4.26	-4.14	-0.60	-0.87	-2.05	12.63	4.03	8.73	-2.07	11.52	0.64
1980	5.38	5.26	-2.72	0.49	-3.72	2.12	-1.67	8.80	5.40	-12.07	11.97	-9.64	2.03	7.42
1981	6.48	2.95	-1.63	-1.23	24.25	4.94	0.27	10.43	4.60	-7.97	-22.75	37.84	5.77	2.69
1982	6.17	5.56	16.73	19.46	-0.17	7.41	1.50	10.53	10.35	2.95	-2.30	28.58	9.67	6.97
1983	3.59	6.49	4.39	20.01	-5.35	9.36	5.36	5.78	4.77	2.77	-0.02	13.93	6.47	10.63
1984	6.84	3.72	3.27	21.61	10.84	9.72	10.07	7.58	8.34	8.81	1.16	19.75	7.33	7.49
1985	4.04	7.77	12.06	24.49	-0.61	8.77	8.40	4.43	8.33	-6.46	-11.18	17.85	11.24	13.22
1986	5.48	6.02	7.00	26.41	4.50	9.63	9.82	6.46	7.27	2.90	-0.34	35.68	8.25	5.47
1987	4.72	6.50	8.97	18.75	8.77	8.40	8.40	6.46	7.27	2.90	-0.34	35.68	9.71	3.94
1988	4.18	5.60	1.80	11.89	-13.03	11.49	3.13	8.45	9.80	7.42	9.98	11.93	7.38	21.93
1989	9.40	7.75	13.28	15.16	16.51	8.26	3.50	6.69	6.25	14.34	9.42	14.92	9.12	16.45
1990	6.24	7.11	8.80	14.49	-0.42	13.44	3.56	6.36	9.68	2.95	-2.53	18.88	10.31	15.40
1991	5.65	1.69	4.05	6.28	2.83	1.53	-5.68	2.21	2.07	1.74	-0.63	13.34	7.41	7.80
1992	0.90	3.17	3.15	9.29	0.43	0.79	-7.30	-0.55	7.04	-3.38	10.12	12.33	8.24	13.02
1993	5.14	3.38	1.91	7.84	-2.31	0.61	0.38	1.20	6.87	-3.78	6.58	10.97	4.87	9.18
1994	4.76	3.18	2.49	8.27	-5.81	6.44	10.66	2.63	6.32	-2.89	-4.80	1.38	7.26	2.93
1995	7.32	10.44	9.62	9.81	6.34	7.70	8.90	2.94	8.81	0.22	14.96	5.93	7.84	8.26
1996	7.25	9.99	12.18	11.41	7.61	12.21	8.99	3.86	13.22	-4.34	10.70	20.11	8.05	8.47
1997	7.13	5.71	9.02	8.32	24.68	5.73	3.59	3.47	8.22	-7.05	0.58	1.37	4.13	6.77
1998	4.38	6.04	9.02	9.09	15.97	4.48	-2.34	2.38	2.96	0.98	1.77	13.18	6.33	7.57
1999	5.81	7.10	13.17	9.57	18.85	6.08	0.19	7.04	3.13	170.50	1.73	4.75	6.16	9.32
2000	6.89	8.51	13.11	17.90	18.08	7.05	3.95	1.24	5.41	-149.86	0.72	4.45	7.00	13.60
2001	3.87	4.14	6.14	9.25	1.11	11.26	2.34	-0.16	-3.49	-7.77	-6.75	3.56	4.10	7.38
2002	5.02	3.66	5.13	10.02	0.85	5.84	0.31	-5.76	-3.82	-15.18	10.62	0.63	2.34	
2003	4.49	0.10	2.80	10.79	-10.53	7.67	0.57	-4.11	0.05	16.17	-2.05	6.67		

Table 7: Marginal Elasticities of Certain Oil Products, Natural Gas and Electricity

year	GDP	All Oil PR	Light Distillate	LPG	Naphtha	MS	ATF	Kerosene	HSD	LDO	FumOil	NG	E_Ut	E_Nut
1973														
1974														
1975														
1976		0.23	0.91	2.05	1.41	0.16		0.98	0.66	-3.02	-0.05	2.89	1.57	0.88
1977		0.64	1.68	2.32	2.59	0.39	1.64	1.06	1.13	-0.46	-0.15	5.11	2.41	1.51
1978		0.84	1.00	1.04	1.34	0.57	1.28	1.04	0.92	1.64	1.77	2.47	1.51	0.88
1979		1.60	1.70	1.36	2.21	1.14	1.77	1.69	1.89	2.29	0.19	2.95	1.81	0.90
1980		2.92	1.37	1.51	1.31	1.73	2.50	2.56	4.48	2.19	1.78	2.70	2.36	1.64
1981		2.68	0.56	0.53	0.23	1.35	1.16	2.27	4.36	-0.55	-1.16	0.58	2.90	1.61
1982		1.90	1.71	2.58	2.26	0.89	-0.31	2.37	3.12	-2.21	-0.28	3.60	2.41	2.35
1983		0.92	1.20	2.36	1.25	0.89	0.01	1.83	1.25	-1.05	-0.81	3.50	1.35	1.25
1984		0.95	1.47	3.68	1.13	1.31	0.43	1.61	1.19	-0.14	-1.51	4.84	1.41	1.51
1985		1.24	1.36	4.57	0.37	1.83	1.17	1.65	1.62	1.00	-0.08	4.30	1.73	2.17
1986		1.07	1.37	4.43	0.30	1.70	1.46	1.09	1.31	0.31	-0.61	3.15	1.64	1.60
1987		1.42	1.97	4.89	1.03	1.97	1.99	1.30	1.68	0.37	-0.73	5.14	2.05	1.59
1988		1.26	1.24	3.97	-0.64	2.08	1.48	1.35	1.77	0.27	-0.11	4.55	1.76	2.18
1989		1.08	1.31	2.50	0.44	1.60	0.90	1.18	1.27	1.35	1.04	3.42	1.43	2.31
1990		1.03	1.20	2.10	0.15	1.67	0.51	1.08	1.30	1.25	0.85	2.31	1.35	2.71
1991		0.78	1.23	1.69	0.89	1.09	0.06	0.72	0.85	0.89	0.29	2.21	1.26	1.86
1992		0.94	1.25	2.35	0.22	1.23	-0.74	0.63	1.47	0.10	0.54	3.48	2.03	2.83
1993		0.70	0.78	2.00	0.08	0.25	-1.08	0.24	1.37	-0.46	1.38	3.14	1.76	2.57
1994		0.90	0.70	2.35	-0.71	0.73	0.35	0.30	1.87	-0.93	1.10	2.29	1.89	2.33
1995		0.99	0.81	1.51	-0.10	0.86	1.16	0.39	1.28	-0.37	0.97	1.06	1.16	1.18
1996		1.22	1.26	1.53	0.42	1.36	1.48	0.49	1.47	-0.36	1.08	1.42	1.20	1.02
1997		1.20	1.42	1.36	1.78	1.18	0.99	0.47	1.39	-0.51	1.21	1.26	0.92	1.08
1998		1.16	1.61	1.54	2.57	1.20	0.55	0.52	1.30	-0.56	0.70	1.85	0.99	1.22
1999		1.09	1.80	1.56	3.43	0.94	0.08	0.74	0.83	9.49	0.24	1.11	0.96	1.37
2000		1.27	2.07	2.14	3.10	1.03	0.10	0.62	0.67	1.27	0.25	1.31	1.14	1.78
2001		1.19	1.96	2.22	2.30	1.47	0.39	0.49	0.30	0.78	-0.26	0.77	1.04	1.83
2002		1.03	1.55	2.36	1.27	1.53	0.42	-0.30	-0.12	-10.95	0.29	0.55	0.85	1.99
2003		0.59	1.05	2.25	-0.64	1.85	0.24	-0.75	-0.54	-0.51	0.14	0.81	0.72	1.65

Table 8: LPG Customer Base of Oil Companies (at the end of year)

STATE/U.T.	2000-01	2001-02	2002-03	2003-04	Customer Base in 2003-04 (% of total)
CHANDIGARH	273439	276901	279734	289970	0.4%
NCTD DELHI	3221449	3321017	3448496	3600679	4.7%
HARYANA	1910743	2097168	2319507	2521783	3.3%
HIMACHAL PR	807858	862586	930408	1009262	1.3%
JAMMU & KASHMIR	801800	892915	996284	1098860	1.4%
PUNJAB	2548447	2942806	3306411	3666986	4.8%
RAJASTHAN	2305964	2524205	2786775	3095644	4.0%
UTTARANCHAL	1012990	1072083	1155260	1228966	1.6%
UTTAR PR.	5834397	6398749	7083107	7788049	10.1%
NR TOTAL:	18717087	20388430	22305982	24300199	31.5%
ANDMAN & NICO.	27306	28966	31993	35246	0.0%
ARUNACHAL PR.	79135	83136	88376	92836	0.1%
ASSAM	1018399	1126949	1246773	1322792	1.7%
BIHAR	1195119	1364166	1564698	1762878	2.3%
JHARKHAND	589200	612476	674461	763491	1.0%
MANIPUR	135251	148984	163225	172329	0.2%
MEGHALAYA	62451	66499	72006	76038	0.1%
MIZORAM	126772	133652	141450	148621	0.2%
NAGALAND	67607	78754	89979	97274	0.1%
ORISSA	725844	811504	936316	1054511	1.4%
SIKKIM	48735	55733	68467	77990	0.1%
TRIPURA	135382	147113	164218	175932	0.2%
W.BENGAL	3107258	3248964	3551279	3908270	5.1%
ER TOTAL:	7318459	7906896	8793241	9688208	13%
CHHATISGARH	502422	551546	624756	717709	0.9%
DADRA & N.H.	16878	18695	20590	20679	0.0%
DAMAN & DIU	23431	24110	22630	25969	0.0%
GOA	302615	316153	327923	345674	0.4%
GUJARAT	3700674	3875148	4123508	4417039	5.7%
MADHYA PR.	2318572	2568264	2815478	3107305	4.0%
MAHARASHTRA	7813814	8590540	9430487	10402924	13.5%
WR TOTAL:	14678406	15944456	17365372	19037299	25%
ANDHRA PR.	5543550	6484552	7522647	8601369	11.1%
KARNATAKA	2889277	3288951	3707166	4216606	5.5%
KERALA	2892008	3159362	3521481	4026040	5.2%
LAKSHADWEEP	2158	2444	2559	2785	0.0%
PONDICHERRY	158856	166669	173816	188982	0.2%
TAMIL NADU	5654105	6158947	6605761	7120805	9.2%
SR TOTAL:	17139954	19260925	21533430	24156587	31%
GRAND TOTAL:	57853906	63500707	69998025	77182293	100%

Table 9: Growth in LPG Customer Base of Oil Companies

STATE/U.T.	2001-02	2002-03	2003-04	Average
CHANDIGARH	1.27%	1.02%	3.66%	1.98%
NCTD DELHI	3.09%	3.84%	4.41%	3.78%
HARYANA	9.76%	10.60%	8.72%	9.69%
HIMACHAL PR	6.77%	7.86%	8.48%	7.70%
JAMMU & KASHMIR	11.36%	11.58%	10.30%	11.08%
PUNJAB	15.47%	12.36%	10.91%	12.91%
RAJASTHAN	9.46%	10.40%	11.08%	10.32%
UTTARANCHAL	5.83%	7.76%	6.38%	6.66%
UTTAR PR.	9.67%	10.70%	9.95%	10.11%
NR TOTAL:	8.93%	9.41%	8.94%	9.09%
ANDMAN & NICO.	6.08%	10.45%	10.17%	8.90%
ARUNACHAL PR.	5.06%	6.30%	5.05%	5.47%
ASSAM	10.66%	10.63%	6.10%	9.13%
BIHAR	14.14%	14.70%	12.67%	13.84%
JHARKHAND	3.95%	10.12%	13.20%	9.09%
MANIPUR	10.15%	9.56%	5.58%	8.43%
MEGHALAYA	6.48%	8.28%	5.60%	6.79%
MIZORAM	5.43%	5.83%	5.07%	5.44%
NAGALAND	16.49%	14.25%	8.11%	12.95%
ORISSA	11.80%	15.38%	12.62%	13.27%
SIKKIM	14.36%	22.85%	13.91%	17.04%
TRIPURA	8.67%	11.63%	7.13%	9.14%
W.BENGAL	4.56%	9.30%	10.05%	7.97%
ER TOTAL:	8.04%	11.21%	10.18%	9.81%
CHHATISGARH	9.78%	13.27%	14.88%	12.64%
DADRA & N.H.	10.77%	10.14%	0.43%	7.11%
DAMAN & DIU	2.90%	-6.14%	14.75%	3.84%
GOA	4.47%	3.72%	5.41%	4.54%
GUJARAT	4.71%	6.41%	7.12%	6.08%
MADHYA PR.	10.77%	9.63%	10.37%	10.25%
MAHARASHTRA	9.94%	9.78%	10.31%	10.01%
WR TOTAL:	8.63%	8.91%	9.63%	9.05%
ANDHRA PR.	16.97%	16.01%	14.34%	15.77%
KARNATAKA	13.83%	12.72%	13.74%	13.43%
KERALA	9.24%	11.46%	14.33%	11.68%
LAKSHADWEEP	13.25%	4.71%	8.83%	8.93%
PONDICHERRY	4.92%	4.29%	8.73%	5.98%
TAMIL NADU	8.93%	7.25%	7.80%	7.99%
SR TOTAL:	12.37%	11.80%	12.18%	12.12%
GRAND TOTAL:	9.76%	10.23%	10.26%	10.09%

Table 10: Double Barrel Connections as % of LPG Connections

STATE/U.T.	2001-02	2002-03	2003-04
CHANDIGARH	68.37%	65.42%	65.96%
NCTD DELHI	63.12%	62.99%	62.26%
HARYANA	67.88%	65.89%	63.99%
HIMACHAL PR	48.95%	48.80%	48.03%
JAMMU & KASHMIR	50.95%	48.79%	48.55%
PUNJAB	70.29%	66.38%	63.44%
RAJASTHAN	74.68%	75.96%	68.11%
UTTARANCHAL	46.86%	46.85%	45.21%
UTTAR PR.	62.81%	60.19%	57.10%
NR TOTAL:	64.06%	62.49%	59.68%
ANDMAN & NICO.	79.68%	81.79%	84.04%
ARUNACHAL PR.	75.62%	77.61%	76.39%
ASSAM	56.38%	53.98%	51.74%
BIHAR	70.94%	65.49%	63.35%
JHARKHAND	69.18%	70.24%	66.29%
MANIPUR	73.03%	75.03%	73.92%
MEGHALAYA	80.75%	81.83%	79.17%
MIZORAM	63.65%	64.89%	63.18%
NAGALAND	83.44%	82.11%	76.84%
ORISSA	65.58%	61.69%	58.90%
SIKKIM	35.06%	41.64%	45.32%
TRIPURA	54.59%	51.67%	49.01%
W.BENGAL	64.20%	62.90%	58.55%
ER TOTAL:	65.06%	62.98%	59.81%
CHHATISGARH	73.12%	69.00%	63.10%
DADRA & N.H.	86.54%	83.74%	56.00%
DAMAN & DIU	44.01%	53.31%	45.55%
GOA	73.57%	72.38%	71.73%
GUJARAT	68.37%	66.65%	63.84%
MADHYA PR.	66.46%	63.31%	59.80%
MAHARASHTRA	60.02%	57.51%	54.06%
WR TOTAL:	63.81%	61.34%	57.92%
ANDHRA PR.	51.17%	45.79%	42.25%
KARNATAKA	60.57%	57.87%	49.43%
KERALA	63.23%	61.19%	50.69%
LAKSHADWEEP	64.81%	67.96%	70.88%
PONDICHERRY	68.81%	66.32%	N/A
TAMIL NADU	75.96%	73.35%	67.44%
SR TOTAL:	62.84%	59.01%	54.66%
GRAND TOTAL:	63.75%	61.20%	57.69%

Table 11: LPG Sales (in MT) by Oil Companies

STATE/U.T.	2000-01	2001-02	2002-03	2003-04	%of Total In 2003-04
CHANDIGARH	28618	29982	29981	30524	0.3%
NCTD DELHI	459364	475287	509658	553093	6.1%
HARYANA	227546	261115	307718	357222	3.9%
HIMACHAL PR	58210	61842	66769	74055	0.8%
JAMMU & KASHMIR	65105	75161	83532	91179	1.0%
PUNJAB	311055	371898	424355	488224	5.4%
RAJASTHAN	266612	308260	345641	390437	4.3%
UTTARANCHAL	43805	123994	109626	349117	3.8%
UTTAR PR.	742010	736834	874592	749946	8.3%
NR TOTAL:	2202326	2444373	2751872	3083796	33.9%
ANDMAN & NICO.	2836	3277	3762	4142	0.0%
ARUNACHAL PR.	7395	7850	8602	9386	0.1%
ASSAM	111567	121520	137717	146359	1.6%
BIHAR	173427	165888	190018	221519	2.4%
JHARKHAND	26699	63321	72860	82540	0.9%
MANIPUR	13845	13660	15605	17708	0.2%
MEGHALAYA	8385	8944	9954	10484	0.1%
MIZORAM	13505	14421	16426	17124	0.2%
NAGALAND	7794	9387	10697	11101	0.1%
ORISSA	70219	81912	95372	113562	1.2%
SIKKIM	4078	4854	5873	6725	0.1%
TRIPURA	12769	14327	15735	17514	0.2%
W.BENGAL	360321	385989	423861	458715	5.0%
ER TOTAL:	812840	895349	1006482	1116879	12.3%
CHHATISGARH	38053	57288	72352	84933	0.9%
DADRA & N.H.	1946	2068	5486	7894	0.1%
DAMAN & DIU	2422	2132	4353	4262	0.0%
GOA	32447	33824	35959	38604	0.4%
GUJARAT	433126	462616	507914	540006	5.9%
MADHYA PR.	264666	289976	315871	355844	3.9%
MAHARASHTRA	1008386	1075383	1208863	1322569	14.6%
WR TOTAL:	1781046	1923287	2150798	2354111	25.9%
ANDHRA PR.	507546	590770	641729	713827	7.9%
KARNATAKA	367146	411766	461423	546683	6.0%
KERALA	255688	308105	355305	392164	4.3%
LAKSHADWEEP	216	261	0	294	0.0%
PONDICHERRY	20425	18570	18567	23483	0.3%
TAMIL NADU	640081	717447	773099	857926	9.4%
SR TOTAL:	1791102	2046920	2250123	2534378	27.9%
GRAND TOTAL:	6587313	7309930	8159275	9089164	100.0%

Table 12: Volume Growth in Total LPG Sales (y-o-y)

STATE/U.T.	2001-02	2002-03	2003-04	Average
CHANDIGARH	4.77%	0.00%	1.81%	2.19%
NCTD DELHI	3.47%	7.23%	8.52%	6.41%
HARYANA	14.75%	17.85%	16.09%	16.23%
HIMACHAL PR	6.24%	7.97%	10.91%	8.37%
JAMMU & KASHMIR	15.45%	11.14%	9.15%	11.91%
PUNJAB	19.56%	14.11%	15.05%	16.24%
RAJASTHAN	15.62%	12.13%	12.96%	13.57%
UTTARANCHAL	183.1%	-11.59%	218.46%	129.98%
UTTAR PR.	-0.70%	18.70%	-14.25%	1.25%
NR TOTAL:	10.99%	12.58%	12.06%	11.88%
ANDMAN & NICO.	15.56%	14.79%	10.10%	13.48%
ARUNACHAL PR.	6.15%	9.59%	9.12%	8.28%
ASSAM	8.92%	13.33%	6.28%	9.51%
BIHAR	-4.35%	14.55%	16.58%	8.93%
JHARKHAND	137.2%	15.06%	13.29%	55.17%
MANIPUR	-1.34%	14.24%	13.48%	8.79%
MEGHALAYA	6.67%	11.29%	5.32%	7.76%
MIZORAM	6.78%	13.90%	4.25%	8.31%
NAGALAND	20.44%	13.96%	3.77%	12.72%
ORISSA	16.65%	16.43%	19.07%	17.39%
SIKKIM	19.03%	20.99%	14.51%	18.18%
TRIPURA	12.20%	9.83%	11.31%	11.11%
W.BENGAL	7.12%	9.81%	8.22%	8.39%
ER TOTAL:	10.15%	12.41%	10.97%	11.18%
CHHATISGARH	50.55%	26.29%	17.39%	31.41%
DADRA & N.H.	6.27%	165.29%	43.88%	71.81%
DAMAN & DIU	-11.97%	104.17%	-2.08%	30.04%
GOA	4.24%	6.31%	7.36%	5.97%
GUJARAT	6.81%	9.79%	6.32%	7.64%
MADHYA PR.	9.56%	8.93%	12.65%	10.38%
MAHARASHTRA	6.64%	12.41%	9.41%	9.49%
WR TOTAL:	7.99%	11.83%	9.45%	9.76%
ANDHRA PR.	16.40%	8.63%	11.24%	12.09%
KARNATAKA	12.15%	12.06%	18.48%	14.23%
KERALA	20.50%	15.32%	10.37%	15.40%
LAKSHADWEEP	20.99%	-99.95%	n/a	-39.48%
PONDICHERRY	-9.08%	-0.01%	26.47%	5.79%
TAMIL NADU	12.09%	7.76%	10.97%	10.27%
SR TOTAL:	14.28%	9.93%	12.63%	12.28%
GRAND TOTAL:	10.97%	11.62%	11.40%	11.33%

Table 13: Bulk Sale Growth in LPG (y-o-y)

STATE/U.T.	2001-02	2002-03	2003-04
CHANDIGARH	N/A	N/A	N/A
NCTD DELHI	-23.81%	18.44%	-49.87%
HARYANA	-39.84%	479.73%	43.41%
HIMACHAL PR	-100.00%	N/A	N/A
JAMMU & KASHMIR	27.78%	391.30%	-53.10%
PUNJAB	-59.36%	-16.69%	64.35%
RAJASTHAN	16.44%	105.49%	-35.42%
UTTARANCHAL	-63.32%	91.37%	280.45%
UTTAR PR.	-44.20%	815.78%	-38.85%
NR TOTAL:	-24.63%	235.31%	-7.41%
ANDMAN & NICO.	N/A	N/A	N/A
ARUNACHAL PR.	N/A	N/A	N/A
ASSAM	82.24%	-47.29%	-91.10%
BIHAR	-59.41%	-100.00%	N/A
JHARKHAND	171.02%	60.87%	-13.73%
MANIPUR	N/A	N/A	N/A
MEGHALAYA	N/A	N/A	N/A
MIZORAM	N/A	N/A	N/A
NAGALAND	N/A	N/A	N/A
ORISSA	N/A	N/A	N/A
SIKKIM	N/A	N/A	N/A
TRIPURA	N/A	N/A	N/A
W.BENGAL	-43.75%	116.72%	-71.31%
ER TOTAL:	-24.38%	59.48%	41.11%
CHHATISGARH	N/A	-100.00%	N/A
DADRA & N.H.	N/A	N/A	66.69%
DAMAN & DIU	N/A	N/A	-4.00%
GOA	-43.62%	27.62%	-16.28%
GUJARAT	-42.00%	106.87%	-44.08%
MADHYA PR.	-28.00%	-24.81%	67.39%
MAHARASHTRA	-10.69%	106.97%	2.14%
WR TOTAL:	-28.02%	106.15%	13.92%
ANDHRA PR.	-6.18%	-14.43%	25.15%
KARNATAKA	-24.73%	11.64%	-0.74%
KERALA	189.78%	69.57%	-82.74%
LAKSHADWEEP	N/A	N/A	N/A
PONDICHERRY	-75.23%	-92.79%	-37.31%
TAMIL NADU	-52.33%	200.52%	208.35%
SR TOTAL:	-2.07%	45.45%	6.30%
GRAND TOTAL:	-20.74%	99.07%	-8.60%
Bulk Sales in MT	99393	197861	180840

Table 14: Kilograms of Packed LPG Sold per Connection

STATE/U.T.	2000-01	2001-02	2002-03	2003-04
CHANDIGARH	104.7	108.3	107.2	105.2
NCTD DELHI	142.5	143.1	147.7	153.6
HARYANA	117.5	123.6	128.0	135.5
HIMACHAL PR	72.0	71.7	71.8	73.4
JAMMU & KASHMIR	81.2	84.1	83.7	82.9
PUNJAB	120.8	125.9	128.0	132.7
RAJASTHAN	113.4	119.7	119.6	123.5
UTTARANCHAL	42.9	115.5	94.7	283.3
UTTAR PR.	126.8	115.0	121.9	95.4
NR TOTAL:	116.9	119.4	121.8	125.5
ANDMAN & NICO.	103.9	113.1	117.6	117.5
ARUNACHAL PR.	93.4	94.4	97.3	101.1
ASSAM	109.4	107.6	110.3	110.6
BIHAR	144.4	121.4	121.4	125.7
JHARKHAND	44.8	102.0	106.0	106.6
MANIPUR	102.4	91.7	95.6	102.8
MEGHALAYA	134.3	134.5	138.2	137.9
MIZORAM	106.5	107.9	116.1	115.2
NAGALAND	115.3	119.2	118.9	114.1
ORISSA	96.7	100.9	101.9	107.1
SIKKIM	83.7	87.1	85.8	86.2
TRIPURA	94.3	97.4	95.8	99.5
W.BENGAL	115.1	118.4	118.5	117.1
ER TOTAL:	110.5	112.9	113.9	115.0
CHHATISGARH	75.7	103.8	115.8	118.3
DADRA & N.H.	115.3	110.6	116.1	132.1
DAMAN & DIU	103.4	88.4	173.2	148.1
GOA	95.4	100.6	101.8	105.4
GUJARAT	107.2	113.9	112.6	116.7
MADHYA PR.	113.1	112.2	111.7	113.8
MAHARASHTRA	124.9	121.8	121.8	121.3
WR TOTAL:	116.3	117.3	117.5	118.6
ANDHRA PR.	90.2	90.0	84.5	82.1
KARNATAKA	123.5	122.9	122.2	127.6
KERALA	86.8	93.3	94.5	96.4
LAKSHADWEEP	100.1	106.9	N/A	105.7
PONDICHERRY	105.0	105.8	106.4	124.0
TAMIL NADU	112.0	116.0	115.6	116.3
SR TOTAL:	102.6	104.6	102.3	102.9
GRAND TOTAL:	111.7	113.6	113.7	115.4

Table 15: Per Connection Growth in Packed LPG Sales

STATE/U.T.	2001-02	2002-03	2003-04	Average
CHANDIGARH	3.5%	-1.0%	-1.8%	0.2%
NCTD DELHI	0.4%	3.3%	4.0%	2.5%
HARYANA	5.2%	3.5%	5.9%	4.9%
HIMACHAL PR	-0.5%	0.1%	2.2%	0.6%
JAMMU & KASHMIR	3.7%	-0.5%	-1.0%	0.7%
PUNJAB	4.2%	1.7%	3.6%	3.2%
RAJASTHAN	5.6%	-0.1%	3.3%	2.9%
UTTARANCHAL	169.5%	-18.1%	199.2%	116.9%
UTTAR PR.	-9.3%	6.1%	-21.7%	-8.3%
NR TOTAL:	2.10%	2.01%	3.10%	2.4%
ANDMAN & NICO.	8.94%	3.93%	-0.06%	4.3%
ARUNACHAL PR.	1.04%	3.09%	3.87%	2.7%
ASSAM	-1.66%	2.56%	0.27%	0.4%
BIHAR	-15.97%	0.07%	3.47%	-4.1%
JHARKHAND	127.77%	3.92%	0.53%	44.1%
MANIPUR	-10.43%	4.27%	7.48%	0.4%
MEGHALAYA	0.17%	2.78%	-0.26%	0.9%
MIZORAM	1.29%	7.62%	-0.78%	2.7%
NAGALAND	3.39%	-0.26%	-4.01%	-0.3%
ORISSA	4.34%	0.91%	5.14%	3.5%
SIKKIM	4.08%	-1.51%	0.53%	1.0%
TRIPURA	3.25%	-1.61%	3.89%	1.8%
W.BENGAL	2.80%	0.10%	-1.13%	0.6%
ER TOTAL:	2.10%	0.94%	0.93%	1.3%
CHHATISGARH	37.07%	11.55%	2.19%	16.9%
DADRA & N.H.	-4.06%	4.92%	13.84%	4.9%
DAMAN & DIU	-14.45%	95.92%	-14.49%	22.3%
GOA	5.46%	1.19%	3.57%	3.4%
GUJARAT	6.27%	-1.17%	3.67%	2.9%
MADHYA PR.	-0.78%	-0.45%	1.87%	0.2%
MAHARASHTRA	-2.48%	0.02%	-0.48%	-1.0%
WR TOTAL:	0.86%	0.19%	1.00%	0.7%
ANDHRA PR.	-0.20%	-6.12%	-2.83%	-3.1%
KARNATAKA	-0.55%	-0.57%	4.48%	1.1%
KERALA	7.49%	1.28%	2.01%	3.6%
LAKSHADWEEP	6.83%	N/A	N/A	6.8%
PONDICHERRY	0.84%	0.56%	16.54%	6.0%
TAMIL NADU	3.53%	-0.34%	0.64%	1.3%
SR TOTAL:	1.97%	-2.18%	0.52%	0.1%
GRAND TOTAL:	1.66%	0.16%	1.48%	1.1%

**Table 16: Full Cost Estimate of LPG Per Cylinder at Four Metros
based on Imported LPG as on 5th November 2004**

	Delhi		Kolkata		Mumbai		Chennai	
Cost Element/ Price	Full Costs	%age	Full Costs	%age	Full Costs	%age	Full Costs	%age
Landed Cost (at Port)	303.59	64.44%	303.59	59.08%	303.59	62.20%	303.59	63.33%
Marketing Margin	2.46	0.52%	2.46	0.48%	2.46	0.50%	2.46	0.51%
Marketing Cost	6.15	1.30%	6.15	1.20%	6.15	1.26%	6.15	1.28%
Stock Loss	0.86	0.18%	0.86	0.17%	0.86	0.18%	0.86	0.18%
Working Capital	1.83	0.39%	1.83	0.36%	1.83	0.37%	1.83	0.38%
EX -MI PRICE AT PORT	314.89	66.83%	314.89	61.27%	314.89	64.51%	314.89	65.69%
Terminalling Charges	5.46	1.16%	5.46	1.06%	5.46	1.12%	5.46	1.14%
Additional Ocean Freight	0.28	0.06%	0.28	0.05%	0.28	0.06%	0.28	0.06%
Filling Costs	20.60	4.37%	20.60	4.01%	20.60	4.22%	20.60	4.30%
Cylinder Depreciation	18.11	3.84%	18.11	3.52%	18.11	3.71%	18.11	3.78%
Bulk Freight- Port to plant	20.45	4.34%	20.45	3.98%	20.45	4.19%	20.45	4.27%
BP COST PRICE	379.78	80.61%	379.78	73.90%	379.78	77.81%	379.78	79.23%
ISSUE PRICE								
NRF								
State Specific Cost	0.03	0.01%	3.86	0.75%	4.08	0.83%	7.01	1.46%
ASSESSABLE VALUE	379.81	80.61%	383.64	74.65%	383.85	78.64%	386.79	80.69%
Excise Duty (@8%)	30.38	6.45%	30.69	5.97%	30.71	6.29%	30.94	6.46%
Education Cess (@2%)	0.61	0.13%	0.61	0.12%	0.61	0.13%	0.62	0.13%
BP PRICE (incl. duty)	410.80	87.19%	414.94	80.74%	415.17	85.06%	418.35	87.28%
Packed Deliver Charges	10.00	2.12%	10.00	1.95%	10.00	2.05%	10.00	2.09%
Billable before Sales Tax	420.80	89.31%	424.94	82.69%	425.17	87.11%	428.35	89.36%
Sales Tax Rates	8.00%		17.00%		10.30%		8.00%	
Sales Tax Amount	33.66	7.15%	72.24	14.06%	43.79	8.97%	34.27	7.15%
Dealer's commission	16.71	3.55%	16.71	3.25%	16.71	3.42%	16.71	3.49%
Price incl. Commission	471.17	100.00%	513.89	100.00%	485.68	99.50%	479.33	100.00%
Resale Tax rate					0.50%	0.00%		
Resale Tax Amount			0.00		2.43	0.50%	0.00	
RETAIL SELLING PRICE	471.17		513.89		488.11	100.00%	479.33	
ROUNDED OFF RSP	471.15		513.90		488.10		479.35	

Table 17: Retail Selling Price at Four Metros as of 5th November 2004

	Delhi	Kolkata	Mumbai	Chennai
ISSUE PRICE	216.10	216.10	216.10	216.10
NRF	1.42	2.27	0.00	0.00
State Specific Cost	0.03	3.86	4.08	7.01
ASSESSABLE VALUE	217.54	222.23	220.17	223.11
Excise Duty (@8%)	17.40	17.78	17.61	17.85
Education Cess (@2%)	0.35	0.36	0.35	0.36
BP PRICE (incl. duty)	235.29	240.36	238.14	241.32
Packed Deliver Charges	10.00	10.00	10.00	10.00
Billable before Sales Tax	245.29	250.36	248.14	251.32
Sales Tax Rates	8.00%	17.00%	10.30%	8.00%
Sales Tax Amount	19.62	42.56	25.56	20.11
Dealer's commission	16.71	16.71	16.71	16.71
Price incl. Commission	281.62	309.63	290.41	288.13
Resale Tax rate			0.50%	
Resale Tax Amount		0.00	1.45	0.00
RETAIL SELLING PRICE	281.62	309.63	291.86	288.13
ROUNDED OFF RSP	281.60	309.65	291.85	288.15

Table 18: Gross and Net Subsidy on a LPG Cylinder in Four Metros

	Delhi	Kolkata	Mumbai	Chennai
Gross Subsidy	189.55	204.25	196.25	191.20
Taxes in Total costs				
<u>Central Taxes</u>				
Import duty (@5%)	14.46	14.46	14.46	14.46
Excise duty & cess	30.99	31.30	31.32	31.56
<u>State Taxes</u>				
Sales Tax	33.66	72.24	43.79	34.27
Resale Tax	0.00	0.00	2.43	0.00
Taxes at full cost	79.11	118.00	92.00	80.29
Net Subsidy to the consumers	110.44	86.25	104.25	110.91
Net Subsidy by Oil Co.+ Central Government				
	130.06	128.81	131.26	131.02
Net Subsidy by Oil Co.				
	162.27	161.40	163.68	163.68
<u>Central Taxes</u>				
Import duty (@5%)	14.46	14.46	14.46	14.46
Excise duty & cess	17.75	18.13	17.97	18.21
<u>State Taxes</u>				
Sales Tax	19.62	42.56	25.56	20.11
Resale Tax	0.00	0.00	1.45	0.00
Taxes currently collected	51.83	75.15	59.43	52.77
Tax Revenue Loss	27.28	42.85	32.57	27.52

Fig.1

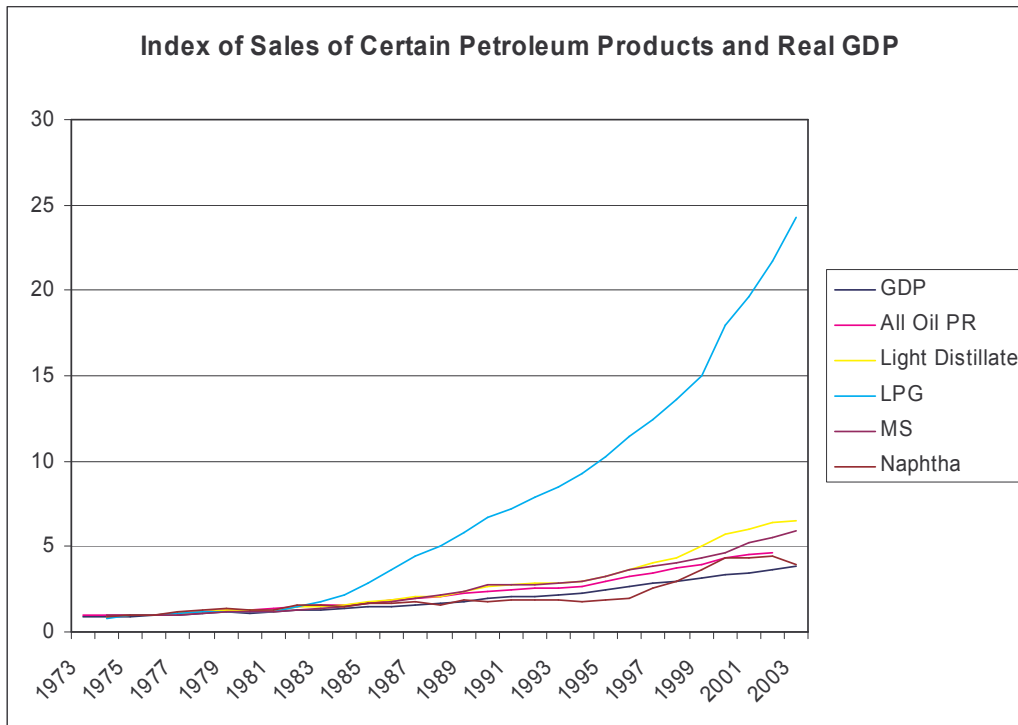


Fig.2

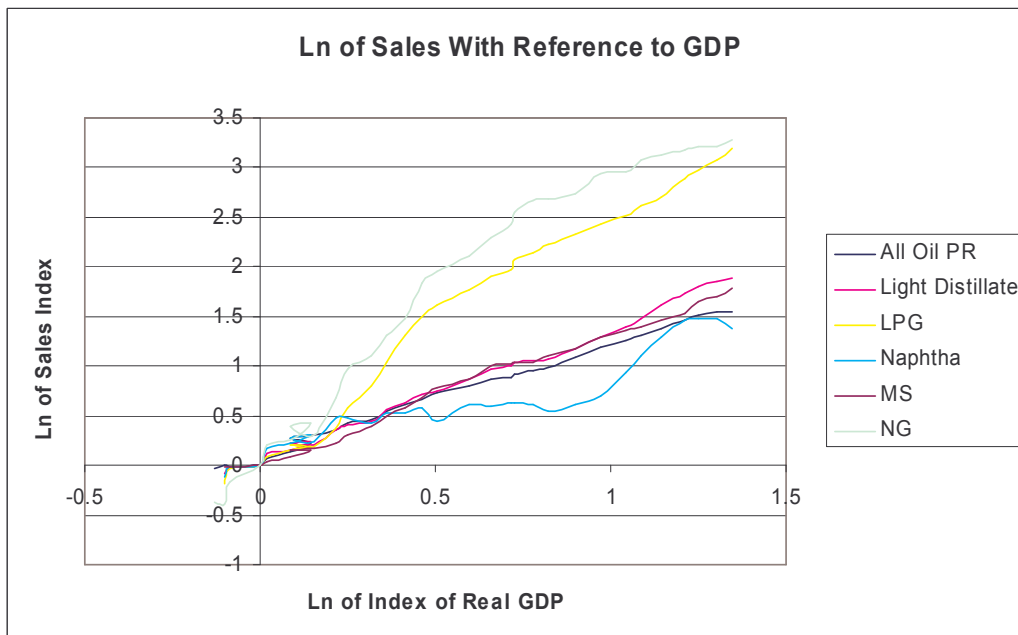


Fig.3

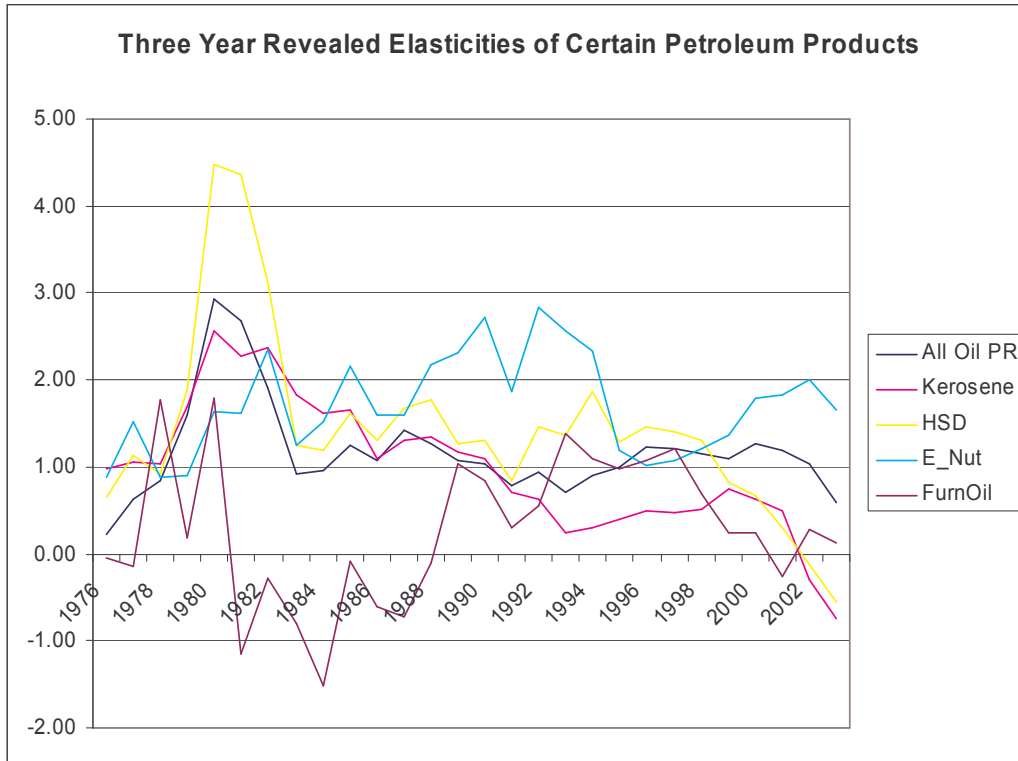


Fig.4

