

# Moderation of Petroleum Fuel Price in Indian Scenario-A Constructive Approach

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**Abstract.** There is an immense economic dependency on petroleum products in every developing country and the Indian situation is not much different. Most of the oil needs of India are met through imports and a smaller portion is realized by home production. A study of oil prices in the global market shows substantial uncertainty and fairly large fluctuations both towards lower and higher sides. However, in the context of Indian petrol prices, there has been a continuous and steady increase with significant overtones on the society and its load on energy. The purpose of this study is to analyze the reasonability of such continuous growth in prices in India in correlation with the global market trends. The factors considered for study include factors arising through supply chain, global market management, and operational inefficiencies along with few other factors of governance.

**Keywords:** Oil prices, crude oil, supply chain of oil.

## 1. Introduction

The consumption of crude oil is growing steadily over the past decade in India and has reached a level around 3.5 million barrels per day (MBD) as per the data of the year 2011-12. In Indian scenario most of the demand for crude oil is met through the import amounting to a volume as much as 70-80% of the overall demand. In addition to this there are natural reserves also being utilized which contribute to the national demand or requirements. In order to ramp up the forward looking demands of petroleum, efforts are on way with exploration programs expecting to reduce the burden of import of petroleum products. The crude oil either from the local reserves or imported is converted into several bi-products and the motor fuel is one of the key component and issue that is pressurizing the society.

This study is aimed at analyzing the vital parameters affecting the petroleum price governance. It has been observed that in the past decade there were significant changes in the crude oil prices in the global market. It is obvious to expect the impact of these fluctuations in the petrol prices in India as well. However, the trend of variation of petroleum prices of the global market and in Indian context did not bear enough coherence by which a justifiable economic model of petroleum price governance was not realized in the last five years. The petrol prices have been continuously increasing in the last decade in India, despite several favorable oscillations occurred in international level. Manish (2011) in Economic times, quoted that there have been as many as six upward revisions of the prices over eight months during 2010-2011. The article further reaffirmed that motor fuel prices in India are among the highest worldwide and these escalations have put immense pressure on the economy and the common man. Researchers have been comparing the petrol prices in India with those of other nations including the neighboring countries (Articles by Asian Correspondent (July 2010), Times of India (September, 2011), Speak up India (May, 2012), etc). Some of them question the higher price tags in India when compared to those of the neighboring countries where the procurement and distribution mechanisms are similar (Habeebur Rahman, 2011). The dynamic lifting of motor fuel prices to a level, by which a citizen can buy only 1000 litres of petrol with his whole per capita income, has put forward severe questions of sustainability of ordinary people in India. These higher prices of petrol have created a major stumbling block for the successful progress of the country where majority of the citizens are below the GDP level. The data used for this study is extracted from the annual report (2010-11)

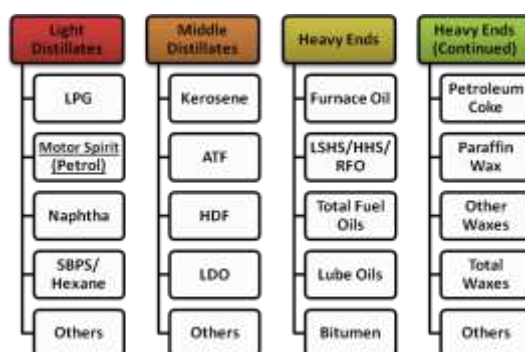
(Annual Bulletin: Indian Petroleum & Natural Gas Statistics, 2010-2011) and various other available international data resources.

The motivation for this study is to comprehend and analyze the pricing strategy adopted by the petroleum product governing systems in India. The objective is to know if the prices borne by the consumer are justified or not with respect to the cost of the crude oil, import duties, production processes, transportation expenses, etc, until it reaches them. It is an effort to analyze the various factors influencing the selling price of petrol and possibly find a solution that could help cut down the burden of a common man on a daily basis. This study will attempt to see the impact of major parameters included in the formation of total retail price. Possible recommendations will be projected that can be considered for the better control of fuel prices in Indian scenario. The proposed analysis will include both internal and external factors influencing the price structure of various petrol grades which we generally call as motor fuels.

The bi-products obtained from the crude oil will be discussed in section 2. A review of the cost structure will be discussed briefly in section 3. Section 4 will discuss about the crude oil prices and the petrol prices in India for the last decade. Section 5 will present the need for the change in the pricing strategy and major inferences will be discussed in section 6. Section 7 describes the need of a lean supply chain in the Indian scenario. Finally constructive recommendations and conclusions are given in section 8.

## 2. The intricacy of Crude Oil

Before studying the cost structure of petrol, it would be imperative to closely watch the economics of the composition of crude oil. Crude oil actually breaks down into a variety of bi-products which are categorized into light distillates, middle distillates and heavy ends. The breakdown of the categories is shown in Figure 1.



Source: 2010-11 Annual report of Ministry of Petroleum, India.

Fig. 1: Crude oil composition/petroleum products.

Figure 2 provides the percentage breakdown of the variety of products produced from crude oil which also includes light distillates that constitutes to 25.82%. The bi-products of light distillates are further listed in Figure 3 that also includes the proportion of motor spirit (petrol) which is around 10%.

PRODUCTS	%
Light Distillates	25.82
Middle Distillates	49.16
Total Fuel Oils	10.64
Lubes	0.52
Bitumen	2.66
Others	4.00
<b>Total Production</b>	<b>92.78</b>
RBF & Losses/inventories	7.22
Crude Throughput	100

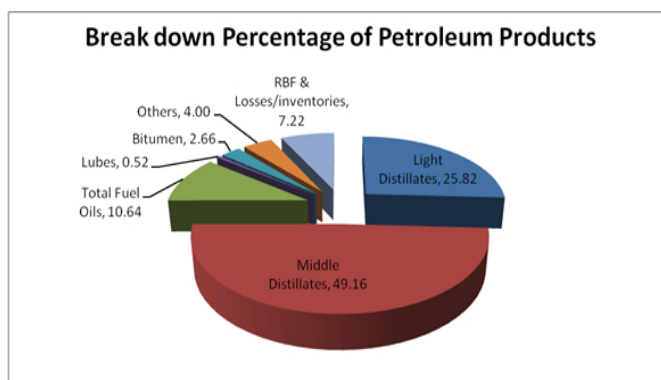


Fig. 2: Products distilled from Crude Oil.

Light Distillates	%	Overall
LPG	16.3%	4.20%
Motor Spirit	38.3%	9.89%
Naphtha	37.7%	9.73%
SBPS/Hexane	0.2%	0.05%
Others	7.7%	2.00%
<b>Total</b>	<b>100.0%</b>	<b>25.82%</b>

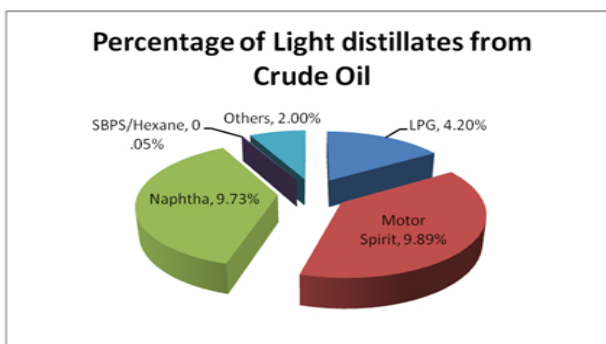


Fig. 3: Breakdown of Light Distillates

### 3. Price structure of Petrol in India

In the following the cost distribution of the petrol prices will be discussed and will be based on the annual report which is also used for other details in this study. The final price taken by the customers actually can be divided into two main components. The first being the cost incurred in purchasing the crude oil and the operational costs incurred by the refineries. The second and equally important component is the additional charges and taxes that accumulate towards the final price taken by the consumer.

The supply chain costs involved in realizing crude oil at the refineries and the operational costs involved in refining this crude oil quantities cannot be adjudged accurately due to the lack of visibility of such data publicly. However, cost details of the second component are available from the annual report (2010-2011) that include breakdown of surcharges and taxes for four major cities of India (Delhi, Kolkata, Mumbai and Chennai). Table 1 gives the details of Price Build-up (Rs./Kl) for Motor Spirit (Petrol) in major cities as on 1st April, 2011. The major accumulations are at Storage point price, Assessable value, Subtotal, RPO price, Sales tax, Surcharge on ST and Dealer commission.

Table 1: Breakdown of surcharges and taxes for four major cities of India towards the consumer price of petrol.

	Delhi	Kolkata	Mumbai	Chennai
<b>Revised ex-storage point price</b>	<b>32356.25</b>	<b>32356.25</b>	<b>32356.25</b>	<b>32356.25</b>
State surcharge	4	605	276	795
BMC surcharge	0	0	859	0
Siding Charge	106.6	104.88	0	0
Rly/Ocean/Freight	91.96	144.73	0	0
RPO surcharge	36	36	36	36
RPO Charge	4.36	4.36	4.36	4.36
Price adj factor	0	84.79	-53.01	-218.86
<b>Assessable value</b>	<b>32599.17</b>	<b>33336.01</b>	<b>33478.6</b>	<b>32972.75</b>
Basic Excise Duty	0	0	0	0
ADE+SADE	0	0	0	0
<b>Sub Total</b>	<b>32599.17</b>	<b>33336.01</b>	<b>33478.6</b>	<b>32972.75</b>
FDZ Charges	44	44	44	44
Basic Excise Duty	0	0	0	0
EDN Cess	14780.5	14780.5	14780.5	14780.5
<b>Sub Total</b>	<b>47423.67</b>	<b>48160.51</b>	<b>48303.1</b>	<b>47797.25</b>
Delivery charges beyond FDZ	0	49.2	0	0
Toll Tax	0	16	0	0
<b>RPO Price</b>	<b>47423.67</b>	<b>48225.71</b>	<b>48303.1</b>	<b>47797.25</b>
Sales Tax	9728.33	12056.43	12558.81	12905.26
Surcharge on ST	0	1000	1000	0
Dealer Commission	1218	1218	1218	1218
Retail Selling Price Rs./Kl	58370	62500.14	63079.91	61920.51
<b>Retail Selling Price Rs./Ltr</b>	<b>58.37</b>	<b>62.5</b>	<b>63.08</b>	<b>61.92</b>

Source: 2010-11 Annual report of Ministry of Petroleum, India (Public Document).

The contributing factors for the petrol prices can now be easily categorized as minor contributors and major contributors. The minor contributors include State surcharge, BMC surcharge, Siding Charge, Railway/Ocean/Freight, RPO surcharge, RPO Charge, Price adjustment factor, FDZ Charges, Delivery charges beyond FDZ, Toll Tax, Surcharge on ST, Toll Tax, Dealer Commission and others. However the major contributors are only two, EDN Cess and Sales Tax. The minor and major contributing percentages for the major cities are shown in Table 2 below along with the ex-storage point price contribution.

Table 2: Major and minor contributors of petrol price for four major cites of India.

Contributors	Delhi		Kolkata		Mumbai		Chennai	
	Rs/Kl	%	Rs/Kl	%	Rs/Kl	%	Rs/Kl	%
Ex-storage point Contribution	32356.25	55.4	32357.25	51.8	32358.25	51.3	32359.25	52.3
Minor Contributors	1504.92	2.6	3305.96	5.3	3382.35	5.4	1875.5	3.0
Major Contributors	24508.83	42.0	26836.93	42.9	27339.31	43.3	27685.76	44.7
Total	58370	100	62500.14	100	63079.91	100	61920.51	100

#### 4. Global Crude Oil Prices Vs Petrol Prices in India

There have been significant price fluctuations in the crude oil prices in the global market in the past decade. Figure 4 gives a quick picture about these fluctuations on a half yearly basis and similar trend is also observed in the yearly average data obtained from the records of petroleum ministry (Annual Bulletin, 2010-2011), provided in Figure 5. A huge increase in the crude oil prices was observed during the year 2008 and it's a known fact that it hit several countries who suffered economic set back.

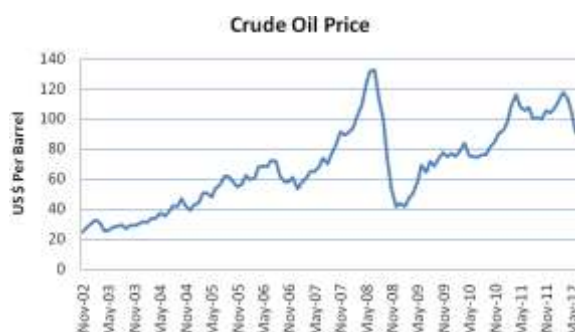
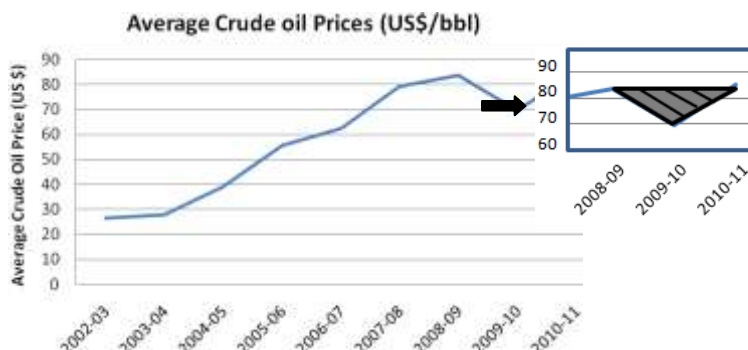
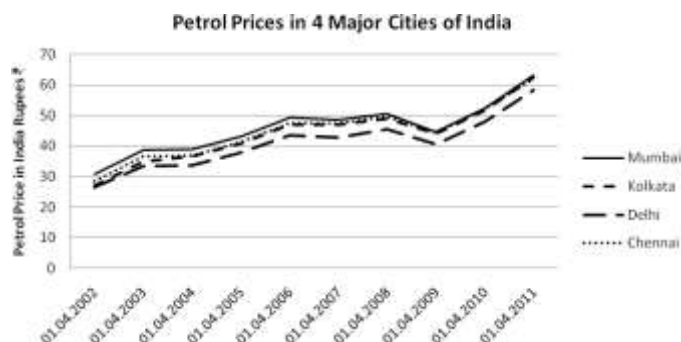


Fig. 4: Global crude oil prices from 2002 to 2012 (Courtesy: <http://www.indexmundi.com>)



Source: 2010-11 Annual report of Ministry of Petroleum, India.

Fig. 5: Global crude oil prices from 2002 to 2012 as per Ministry report.



Source: 2010-11 Annual report of Ministry of Petroleum, India.

Fig. 6a: Petrol prices from 2002 to 2012 as per Ministry report.

It can be seen in Figure 5 during the periods of 2008-09 and 2009-10 that there was a sharp fall in the crude oil prices and then increased during the period 2009-10 and 2010-11. It is also clear in Figure 6a that there has been continuous increase in the petrol prices from April 2009 to April 2011. The inset in Figure 5 clearly shows that over a period of 2 years, price fell to a lower level and reached the initial level depicting the fact that the importing system never had a loss by any means. Despite this fact, there was a continuous revenue generation from the consumers with increased selling prices throughout the mentioned period. It can be argued that similar decrease in petrol was reflected in petrol prices as well. However, it is clear in Figure 6a that the subsequent increase in petrol prices from 2009 does not correspond to the trend of increase in oil prices or even the currency exchange rate of Indian rupee versus American dollar (Shown in Figure 7).

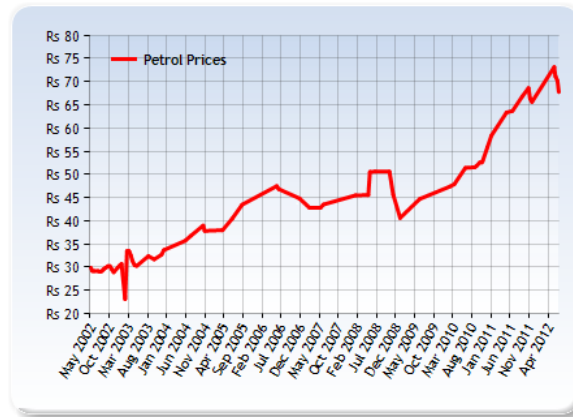


Fig. 6b: Petrol Price chart for Delhi from 2002 to 2012. (Courtesy: <http://www.mypetrolprice.com/>)

Figure 6b shows the graph for the petrol prices in the capital of India, New Delhi. It can be observed that the cost per litre petrol in mid of 2008 was around Rs.50 which could have been due to the steep increase in the crude oil prices which later reduced following slide in the crude oil prices to reduce to Rs. 40. The price of petrol started growing after 2009 which did not reflect the global oil prices. It is difficult to attribute this steep increase to any factor while the major factor of oil price shows no influence. It may be argued that the fluctuation in exchange rates perhaps would be the component to drive this increase in petrol price.

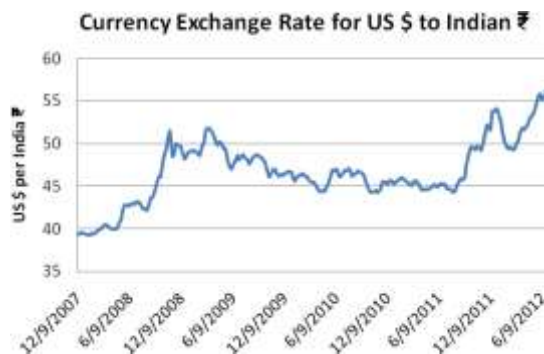


Fig. 7: Currency Exchange Rates from 2007 to 2012 (Courtesy: <http://www.oanda.com>)

Figure 7 shows the exchange rate of US dollar for 5 years. While the exchange rate was at the higher end of around Rs 50 in the second half of year 2008 and the first half of 2009 it has been fluctuating around Rs 45 until the fourth quarter of 2011. Through this observation it can only be concluded that the increase in the petrol price had no significant influence from the exchange rates at least for the period between 2008 and 2011. This is the period when there were two major escalations observed in petrol prices, one around the beginning of 2009 and another in the beginning of 2011 (Figure 6b).

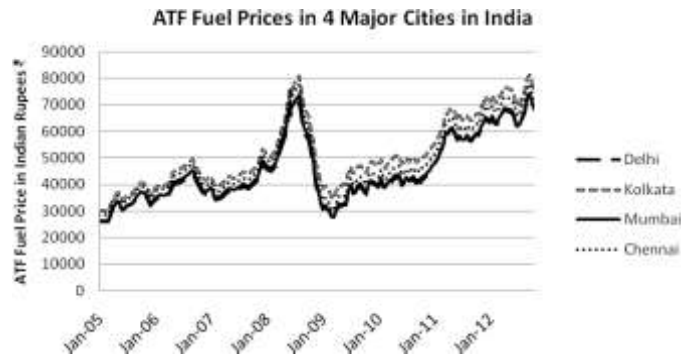


Fig. 8: ATF prices in India from 2005 to 2012.

A thorough study is thus needed to analyze the current cost structure and identify areas where we need to exercise clear measures to eliminate unrelated cost additions to the petrol price. Particularly when this commodity has become such a necessity affecting the livelihoods of more than 1 billion people, any reduction can help them have a better day. Further to add, at least this commodity should not become a source of income for the government impacting daily trade. As a democratic welfare nation, segmented social protection policies are required in the case of energy because India still remains to be a poor agro economic society while excluding the major cities and associated social systems. The parity of social systems which can be seen in developed countries or developing countries with lesser population is not available in Indian suburban and rural natural structure.

### 5. Non-Optimal Pricing Strategy

The increase in prices for any commodity is obvious with time and will show increasing trend. Similarly, the increase in the petrol prices from 2002 to 2008 showed reasonable increasing trend and let's say the slope was of the order of  $30^\circ$ . It should have shown similar trend for the years after 2008 but a significant drift took place and sudden increase in petrol prices and the trend slope increased to the order of  $45^\circ$ . Another significant drift took place in 2010 and took the slope to the order of  $60^\circ$ . The drifts discussed are demonstrated in Figure 9.

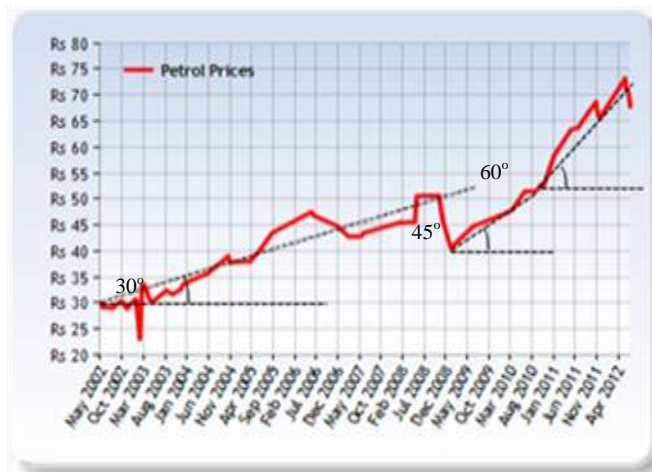


Fig. 9: Drifts observed in Petrol prices in India from 2009 to 2012.

The three distinct slopes for different periods of time actually depict the revenue generated over the period of time. The slope in period 1 is the expected revenue according to the trend. The two consecutive increases in the slopes Q2 and Q3 show in the figure can be quantified and shown what amount of revenue was generated by selling petrol at those high prices. If the initial slope of Q1 is extended, the difference

between Q1 and Q2 and Q1 and Q3 reflect the revenue made out of the consumers which could have been avoided by appropriate planning of oil procurement.

## 6. Major inferences of the study

After a thorough study of the crude oil price and the prices of petrol in India it is necessary to compare their natural trends. Based on the inflation rates, currency exchange rates and other economical and political conditions of any country it is rational to expect an increasing trend of price for any commodity. Therefore it is not unusual to see the increasing trend in the petrol prices in India as well. However, the growth rate should be similar to that of the crude oil prices. Let us consider the two charts given in Figure 10(a) and 10 (b) which shows the linear growth trend lines for both universal crude oil prices and the petrol prices in India.

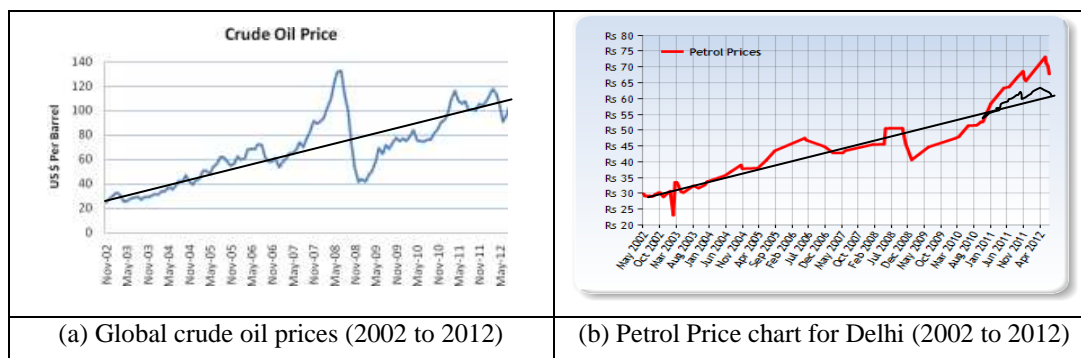


Fig. 10: Linear Growth Trend Comparison

The continuous line in both the figures 10(a) and 10(b) shows that the increase in prices of both crude oil and the petrol price. The price trends were both coherent and correlated until 2009. However, a sudden increase in the slope of the trend line (Figure 10(b)) can be observed after 2009 which has taken the consumers by surprise. The prices of petrol soared up close to Rs. 75 in the mid of 2012. The expected increase in price of petrol based on the correlated trend with crude oil indicates the possibility of reaching a selling price between Rs 60 and Rs 65 under the influence of known parameters of economy. This is at least 10% to 15% less than the current selling price.

The other possible reason for such escalations could also be the buffer management. Poor buffer management often tends to increase the overall cost of any commodity which has a continuous demand over time.

## 7. Need for Lean operations in petroleum industry suitable for India

Once the petrol is sent to the storage from the refineries, there is no value added and is used in the same shape by the customer. However, it is evident that this basic commodity is subject to several additional charges (toll, etc) other than the sales tax.

Researchers have raised the concern of building an efficient supply chain model for petroleum industry. Mark (2006) had mentioned that the effectiveness at managing this supply chain seems to be in stark contrast to the inability to convince customers and others that they are offered fair value for money. It is out of the scope of this study to elaborate on the supply chain model. However, as a fundamental basis, it is recommended that the profit margin should not exceed say, 10% or any reasonable proportion which should be the bare minimum to cover only the operational costs and more importantly to help reduce the cost to the consumer. The transportation costs involved in the supply of petrol should follow the cost pattern assigned for transportation of explosive material in military departments (non-profit secure logistics approach). The reason towards such recommended approach is to ultimately make the petrol price as low as possible to the common consumer.

There is an immediate need to scale down the entire supply chain cost which may include activities like redesigning the manufacturing process, and categorizing the petrol into two broad categories of basic and luxury products. Our study will only focus on the categorization of the petrol that actually would help the

common man to reduce his overhead of buying costly fuel that cuts his profit margin. Before we proceed, it would also be wise to understand the various grades of petrol and those available in India, mostly classified based on Octane Rating.

Octane Rating or octane number is a standard way of measuring the performance of a motor or aviation fuel. Generally, high-compression engines that have higher performance use fuels with a higher octane rating. The higher the octane rating, higher the quality, purity, refinement, efficiency and higher combustion capacity of petrol. Therefore, different grades of Petrol are produced based on whether used in a motor bike or spacecraft. The commonly used Octane ratings of petrol are 87, 88, 89, 90, 91, 93 and 97. The lowest octane rating (87) is commonly used for motor bikes as unleaded and the higher octane rating (97) is used for super bikes in India with a commercial name of Speed 97. Obviously, high Octane fuels are more expensive because of high levels of refinement. Is it wise to impose higher octane fuels for all types of people ranging from low income group to high income group? The question is relevant as the type of vehicles used by the low income group belongs to low power engines. It is necessary to contemplate generating lower cost fuels for lower income group who would like to use a transportation of medium efficiency, not in the range of reaching a speed of 100km per minute. Such low torque engines are the ones which need to be popularize in the rural segment where 65% of the Indian population lives. It may require a suitable type of petrol at lower affordable cost for this group.

## **7.1. Proposed Categories of Petrol Grades for Indian Consumers**

### **Low Grade Petrol**

The low grade petrol if measured on the scale of the purity of the petrol can be of the range of 80-85 (instead of the common 87 to 98 grades) measure of petrol purity. The reduction in the grades directly corresponds to the quality of the product and more importantly the reduced price. While this product can be produced cheaper than the general grade petrol, it has its own issues. The most important issue is the impact of the use of this petrol on the performance and maintenance of the automobile engines. If argued that the small scale engines (<1000CC) can cope up with the difference in the quality at a little lower efficiency mode, they still might need a small redesign to minimize the efficiency loss. For example, the engine might need a redesign of the carburetor, piston rods, piston rings, etc. The second most important issue is that of the possible increased pollution into the environment. While the redesign of the engine would increase carbon emission, a simple technique to minimize this increase is by designing a simple filter added to the exhaust of the automobile which can mitigate the carbon count.

### **General Grade Petrol**

The general grade petrol will be either the same 91 grade petrol used in India or it can further be improved to grade 95 for higher efficiency. This grade should be used by those automobiles whose capacity is more than 1000CC.

The importance of this categorization can have a significant impact on the pricing of the petrol. The lower grade which directly impacts the poor and the middle class can be sold at a very low price with a service oriented motive. However, the general grade can be sold at a higher price that can include higher sales tax to generate revenue and cover the supply chain costs. However, it has to be noted that production and distribution of either of the products should maintain a lean supply chain.

### **How to maintain a lean supply chain for petrol?**

A separate study should be done to find efficient ways in refining the petrol from the crude oil and more importantly efficient means and methods should be found to store and transport petrol to the consumers. Efficient buffer storage strategies can have a significant impact on the pricing strategies of any product including petrol. The impact can be even more significant as the price fluctuations in the international oil pricing play a vital role in buying strategies which depends on the buffer storage infrastructure.

## **8. Recommendations**

The aim of this study is to assist the minimization of petrol prices for a common man. To achieve this, several steps have to be taken with utmost precaution. Since the whole population of more than 1 billion



people is impacted by any increase in the petrol prices, it has to be protected as an important and valuable product mostly imported from Middle East countries. Researchers have already recommended that it is imperative to change the traditional mindset that treated petrol and diesel as luxury goods and start considering new policies to benefit the common man (See Manish (2011)).

In the following we propose some recommendations that can facilitate in making policies that can help decrease the petrol prices.

- Foremost, the sale of this product should promote competitive independence in this industry. Petrol market should be handled as a monopolistic competition governed by the government. A statutory bill should be passed in the parliament to formally regulate the cost structure for the sales and distribution for petrol.
- Suggest a modified lean supply chain management to keep the economic bias of fuel prices stable.
- Open FDI with bidding for supply for oil under least pricing strategies and national level regulations.
- Steps should be taken to reduce the distribution costs to a non-profit level.
- Step should be taken to devise a sales tax structure for fuel prices differentiating low and high income groups, as per the recommendations for different grade fuels through different supply outlets.
- National planning is required to utilize alternative power sources like electricity for major transport links like Railways which can obviously reduce the petroleum products consumption.
- Summarily it calls for initiation of rural and semi urban fuel stations to cater the needs of lower and middle income group having non-luxury cars.

## 9. References

- [1] M. Manish. Rationalise tax structure to stabilise spiralling fuel prices. Economic Times, March 17, 2011. (<http://economictimes.indiatimes.com/opinion/policy/rationalise-tax-structure-to-stabilise-spiralling-fuel-prices/articleshow/7723534.cms>)
- [2] V. Sriram. What is the real cost of petrol in India? Asian Correspondent, July 2010. (<http://asiancorrespondent.com/36913/what-is-the-real-cost-of-petrol-in-india/>)
- [3] Times of India “For petrol, Indians shell out the most in the world”, September 2011. ([http://articles.timesofindia.indiatimes.com/2011-09-18/india/30171849\\_1\\_litre-diesel-prices-petrol-prices](http://articles.timesofindia.indiatimes.com/2011-09-18/india/30171849_1_litre-diesel-prices-petrol-prices))
- [4] Kris. Petrol Prices in India when compared to the other countries. 2012. (<http://speakupindia.in/2012/05/petrol-prices-in-india-when-compared-to-the-other-countries/>)
- [5] P. Hafeezur Rahman. Petrol price comparison with other countries against India. November, 2011.
- [6] Annual Bulletin, Indian Petroleum & Natural Gas Statistics. Government of India, Economic Division, New Delhi, 2010-2011. (<http://www.indiastudychannel.com/resources/146404-Petrol-price-comparison-with-other-countries.aspx>)
- [7] G. Mark “Building World-class Supply Chain Capability in the Downstream Oil Business” Business Briefing: Oil & Gas Processing Review 2006, pp. 29-32.