CHAPTER-IV
Imagine a world where one does not have to bear the perils of vehicular pollution. No spasmodic coughing when near a gargantuan truck; a battered, worn-out car that seems to have been unwashed ever since it was picked up from the showroom; or a rickety auto rickshaw; or even more a blue line (the veritable four-wheeled monstrous bus roaming scot-free on the roads of Delhi), that wastes no opportunity at spewing venom (read clouds of polluted smoke).

Pollution has definitely been the bane of contemporary society and is a great topic for debate at all levels. In the last couple of years, the importance of environment conservation has assumed never-before relevance. People and institutions alike, have been battling it out of 'cleaner, greener world.; With the perspective, one should take a closer look at Delhi, the world's third most polluted city. Even here, the last couple of years have witnessed a greater devotion and awakening towards the protection of environment. The battle for strictly applying the Euro norms and the drive to switch-over to CNG as an alternative fuel are some of the examples of the endeavours made by the denizens of the capital towards creating a greater eco-friendly environment.
Pollution due to petroleum products used in transportation is an ever increasing problem for Delhi and other metropolitans. Pollution due to transportation can be divided into two main categories—Air pollution and Noise pollution. Some environmentalists also quote, odour pollution as third and major component.

Technical experts have suggested that the use of CNG as an alternative fuel of automobiles. They have estimated that apart from being less hazardous, it is also environment friendly, can helped in reducing the levels of pollutant emissions and is quite cost effective. Its extensive use in automobiles has the efficacy to reduce Indian’s excessive dependence on petroleum imports.

The concept of natural gas as an automotive fuel started around 1930. Research has proved that it can be used safely.

Many countries are known to be using CNG as an automotive fuel. These include USA, Canada, UK, Italy, Thailand, Iran, Australia and New Zealand. While in most countries, its usage is restricted to private vehicles, in countries like Australia and America, it is the fleet operators who find it useful. More than 50 countries in the USA operate their fleet vehicles on CNG. In Italy about a quarter of a million vehicles are running on CNG, primarily due to the high cost of
petrol. France, too had a taste of CNG as an automotive fuel during World War I. But, not much emphasis was given to CNG, due to the use of LPG and a taxation structure on CNG. Canadian Western Natural Gas Company started a CNG conversion programme in 1970 by converting about 100 vehicles in Edmonton city. The council of Canada participated in the programme by introducing three Chevrolet half-ton India too witnessed the great CNG excitement, a couple of years ago. It was perceived that cities like Delhi and Mumbai would face lesser air pollution by the turn of the country. In Delhi, cars were to be provided with 80 outlets while about 0.1 million vehicles would be able to fill in the gas, instead for petrol and diesel. Last year, in the month of April, Chief Minister of NCT Mrs. Sheila Dixit Promised that Delhi would have adequate supply of CNG by march 2000. Enthused, filling stations started being setup by the Indraprastha Gas Ltd., a joint venture of the Gas Authority of India. Ltd. (GAIL) and the Bharat Petroleum Corporation Ltd. (BPCL). Maruti udhyog Ltd. (MUL) planned to promote CNG vehicles. Newspaper were ecstatic with news that the running cost of Omni Taxis with CNG engine where as low as 59 paise per kilometer, making it more economical that taxis, what with an average fuel consumption of 19.6 km. Per kg.
And cost of Rs 11.30 per kg.

Big names jumped on to the bandwagon. Ashok Leyland offered to supply buses fitted CNG engines to the Delhi government, to enable it to replace its existing fleet by more environment-friendly vehicles, by April 1, 2001, the deadline set by the Supreme Court. CNG-driven Matiz and Cielo cars were planned to hit Delhi roads in big way. Not one to be left behind, Daewoo motors planned to launch CNG kits in the Capital, to be fitted into its various models.

Also the Supreme Court gave directives that more than 2000 pre-1999 models of taxis and auto rickshaws had to be phased out by March 31, 2000, and an equal number of post-1999 models to be phased out by March 31, 2001. So find an alternative for people who run the risk of losing their livelihood, the department of environment and transport carried out a joint study and proposed to fit all auto rickshaws with CNG kits. A similar proposal was thought of to run public transport buses CNG engines.

Great were the expectations but, as has already happened to most CNG-run dreams in other parts of the world, the Indian reverie never really concretized itself. 10 years after CNG was introduced as an alternative green vehicle fuel in Delhi, a limited number of private
vehicles have actually switched over to it. CNG network, introduced in Delhi under an ambitious pilot project by GAIL, in 1992, has failed to take off.

As toxic emission increase steadily in the four metros with a simultaneous increase in vehicular fleet doubling air pollutants in the coming years, use of clean fuel remains untapped with only a few thousand vehicles running on them. Though alternate clean fuel technologies like CNG have been available for quite a few years only a thousand cars in Delhi and 9000 cars and buses in Mumbai have switched to them mainly due to the high cost of CNG Kits, absence of fuelling stations and lack of a power marketing strategy by the government. As there are just nine CNG stations at Delhi and almost negligible in other parts of India, very little can be done at this point of time. Another major barrier is the lack of awareness in the public. Though most of the vehicles are running on duel fuel, lack of easy accessibility has pickup trucks. However, the increase in the cost of natural gas adversely affected the CNG conversion programme. As early as 1937, the Victorian State Electricity Commission of Australia considered the use of CNG for vehicle fuel. Similarly, the South Australian Gas Company converted 17 vehicles of the their fleet to
operate on CNG, but due to the high costs of kits and cylinders the conversion of CNG could not make much headway.\textsuperscript{2}

4.1. MEANING OF COMPRESSED NATURAL GAS (CNG)

Natural or marsh gas is a product of the decay of organic material. It is usually found in petroleum fields, but also occurs anywhere that organic material is left to decay, such as landfill sites and swamps, even during digestion in animals (see flatulence). The primary component of natural gas is methane, the shortest and lightest hydrocarbon molecule. Due to the heat and attack by the active species, the methane reacts to a methyl radical (CH\textsubscript{3}), which reacts to formaldehyde (HCHO or H\textsubscript{2}CO). The formaldehyde reacts to a formal radical (HCO), which then forms carbon monoxide (CO). The process is called oxidative pyrolysis:

\[
\text{CH}_4 + \text{O}_2 \rightarrow \text{CO} + \text{H}_2 + \text{H}_2\text{O}
\]

Following oxidative pyrolysis, the H\textsubscript{2} oxidizes, forming H\textsubscript{2}O, replenishing the active species, and realizing heat. This occurs very quickly, usually is less than a millisecond.

\[
\text{H}_2 + \frac{1}{2} \text{O}_2 \rightarrow \text{H}_2\text{O}
\]

Finally, the CO oxidized, forming CO\textsubscript{2} and releasing more heat. This process is generally slower then the other chemical
steps, and typically requires a few to several milliseconds to occurs.

\[ \text{CO} + \frac{1}{2} \text{O}_2 \rightarrow \text{CO}_2 \]

Natural gas is important as a major source for electricity generation through the use of gas turbines and steam turbines. Environmentally, natural gas is a relatively clean-burning fuel, although it does produce greenhouse gases. It is important to make the distinction that while natural gas is cleaner than other fossil fuels, it is ultimately unsustainable. The extraction and transporting phase adds pollution to our environment, and has been blamed for birth defects and other health effects.\(^3\)

The major difficulty in the use of natural gas is, its transportation: Natural gas pipelines are the preferred means of transport, but this is impractical across oceans. Liquefied natural gas tankers have also been used, but there are some concerns about safety and economy. In many cases, as with oil fields in Saudi Arabia, the natural gas which is recovered in the course of recovering petroleum can not be profitably sold and is simply burned at the oil field (known as flaring). This wasteful practice is
now illegal in many countries, specially since it adds greenhouse
gas pollution to the atmosphere, and since a profitable method
may be found in the future. The gas is instead re-injected back
into the ground for possible later recovery, and to assist oil
pumping by keeping underground pressures higher.

Natural gas is often stored as compressed natural gas or
CNG, for use in rural homes without connections to piped in
public utility services, or with portable grills. CNG is used as a

In any form, a strong bad scent is deliberately added to the
otherwise colorless and odorless gas, so that leaks can be detected
by the smell before an explosion occurs. In mines, sensors are
used and mining apparatus has been specifically developed to
avoid ignition source (e.g. Humphrey Davy, lamp).

One experimental idea is to use the methane gas that is naturally
produced from land fields to supply power to cities. Tests have shown
that methane gas could be a financially sustainable power source.

You can cook with it and heat your house with it. You may even
power a car or truck with it. So what is it? natural gas. Like oil
(petroleum) this common fuel comes from underground. However, natural gas as the name implies, is a gas much like air, rather than a liquid like petroleum. It has been found to be one of the most environmentally friendly fuels, and its popularity is growing.

Natural gas is mostly made-up of methane, about 95% of the natural gas in California. The other 5 percent is made up of various gasses along with small amount of water vapor. These other gases include butane, propane, ethane and other trace gases. Methane is a hydrocarbon, meaning its molecules are made up of hydrogen and carbon atoms. Its simple, one carbon, molecule structure (CH₄) makes possible its nearly completes combustion.

Because of its clean burning nature and the fact that it is not made from petroleum, gasoline and diesel, are many automakers around the world are developing vehicles to run on gas. Cars, vans, buses and small trucks generally use natural gas that has been compressed (called compressed natural gas or CNG) and stored in high-pressure cylinders.

4.2. CNG Vs DIESEL Vs ULSD

Just two days after the Supreme court ruled that it would not entertain any relaxation of the July 28, 1998 order to move the entire
bus fleet of Delhi to CNG, Tata Energy Research Institute (TERI) opened up the diesel vs CNG debate by issuing a pamphlet Delhi's Transport and the Environment: shaken but not stirred to create confusion and delay implementation.

TERI rests its entire opposition to CNG on the basis of one set of measurements obtained from a London bus tested in Millbrook in 1996/1997 for the London Transport Buses. This study claims to have found that a Euro II diesel bus, running on ULSD (sulphur content of 0.005 percent) and fitted with a continuously regenerating trap (CRT) - to control particulate emissions- achieves lower emissions than CNG buses.

What TERI omits to say is that after publication this study has come under serious scrutiny by other agencies that have found it flawed in terms of the methodology used. Various experts commenting on the London bus study say that it compares apples with oranges and does not give full details on the condition of the bus that was tested. The International Association for natural Gas Vehicles (IANGV) has criticized this report on the ground that the difference in particulate matter emissions "most probably originates from excessive oil consumption of the CNG bus used by London Transport Buses. No
detailed information on the condition of the test vehicles is available. 6

TERI then flashes results from yet another study conducted in 1998, by an Expert Reference Group (ERG) set up in western Australia to recommend the best fuel for buses in Perth. This “study” conclude on the basis of a literature survey that ULSD (with 0.005 per cent sulphur) with a CRT is the best option from an environmental point of view. At the same time, the report on the basis of the same London bus study concludes that even diesel with a sulphur content of 500 ppm (0.05 percent, that is, same quality as the diesel currently available in Delhi) and with an oxidation catalyst is better than CNG when it comes to particulate emissions. 7

The selective use of information by TERI is astounding because while using these studies to discredit the Supreme Court’s decision, TERI conveniently fails to mention that another study – a more recent one – done in March 2000, this time under the aegis of the Australian government, has trashed the ERG’s 1998 study.

This new report entitled “Lifecycle Emissions Analysis of Alternative Fuels for heavy Vehicles” by the Australian government’s Council for Scientific and Industrial Research Organization (CSIRO) clearly states “We used a risk-weighted scoring system, based on
estimates of human health risk to rank the fuels. On a life-cycle basis, the gaseous fuels (LPG and CNG) give the lowest contribution to air pollution on this criterion.\textsuperscript{8} Diesel is very low in the list of ten fuels they considered. The report has even questioned the method employed in the earlier 1998 study and says that the only data available for estimating emissions of vehicles using low sulphur diesel is based on only one London transport bus. The report clearly brings out that CNG is much cleaner than both low sulphur diesel and ULSD in terms of all pollutants except non-methane volatile organic compounds.

Still trying hard to discredit CNG, TERI flashes another study conducted by the New York state Department of environmental conservation along with Johnson Matthey, the Manufacturer of CRTs, that compares emissions results of diesel buses based on their tests with the test results of CNG buses borrowed from tests done elsewhere in the US and Canada. It gives no clue about the conditions of the CNG buses used in the study.\textsuperscript{9}

Though TERI uses this study to promote diesel buses, it understates the fact that the study has considered diesel buses that are fitted with CRTs and running on 30 ppm sulphur (0.003 percent)
diesel. After all this, TERI advocates Euro II diesel buses with oxidation catalysts for Delhi.\textsuperscript{10}

Bus operators in Delhi, the Delhi transport department and the Union ministry of petroleum and natural gas (MOPNG), and their supporters are still hoping that if Euro II diesel with 500 ppm sulphur (0.05 percent) somehow can be labeled as a clean fuel they won’t have to do anything extra than run their old buses on the diesel already available in the capital. MOPNG is canvassing for the use of diesel with 500 ppm sulphur and Euro II diesel bus technology instead of CNG. It claims that this would reduce emissions by 70 percent from Euro I level, but further reduction in sulphur content of diesel would not have any substantive effect on emissions. Therefore, the ministry believes that CNG is unnecessary if Euro II diesel buses are available.\textsuperscript{11}
A recent study from the Council for Scientific and Industrial Research Organisation, Australia shows CNG is a much better option than diesel of 50 ppm sulphur content both in terms of public health risk and greenhouse gas emissions.

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Emission in grammes per kilometer</th>
<th>Carbon monoxide</th>
<th>Non-methane volatile organic compounds</th>
<th>Oxides of nitrogen</th>
<th>Particulate matter</th>
<th>Particulate emission relative to CNG emission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low sulphur diesel (500 ppm sulphur)</td>
<td>1.32</td>
<td>0.50</td>
<td>14.72</td>
<td>0.22</td>
<td>340 percent higher than CNG emission</td>
<td></td>
</tr>
<tr>
<td>Ultra low sulphur diesel (500 ppm sulphur)</td>
<td>1.41</td>
<td>0.52</td>
<td>14.32</td>
<td>0.16</td>
<td>220 percent higher than CNG emission</td>
<td></td>
</tr>
<tr>
<td>CNG</td>
<td>0.66</td>
<td>2.75</td>
<td>9.87</td>
<td>0.05</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>


Tests done across the world show that even with a major reduction in sulphur content in diesel particulate emissions reduce only marginally.

Diesel begins to compare with CNG only when ULSD, that is, diesel with sulphur content below 30 ppm (0.003 percent) comes as a package with advanced diesel technology, and state of the art engine emission control systems including CRTs. But this option is still not
commercially viable.

What holds promise for diesel vehicles is the application of state of the art CRTs in combination with other catalytic converters and ultra low sulphur diesel with less than 30 ppm sulphur. This combination of technology and fuel is coming into only those markets where very stringent emissions standards have been legislated such as California, the rest of the US and in some countries of Europe like Sweden. Such a combination is also seen as necessary to meet the Euro IV emission standards for heavy-duty vehicles to be implemented in 2005.

The United States Environment Protection Agency (USEPA) informs that only a combination of diesel particulate filter and a catalytic converter or a catalysed particulate filter with ULSD is capable of meeting stringent particulate emission norms like that of the US Tier 2 emission standards that will be implemented in USA from 2004 onwards.12

USEPA has already mandated diesel with sulphur content of only 15 ppm (0.005 percent) to enable this combination of diesel technology to penetrate the market. This quality of fuel is absolutely essential for sophisticated particulate traps to be effective enough to
control more than 90 percent of diesel particulate matter emissions, it says. 13

This debate can be made clearer after going through the given Table.

<table>
<thead>
<tr>
<th>Study done by</th>
<th>Reduction in diesel sulphur content</th>
<th>Reduction in particulate emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Auto Oil Programme</td>
<td>From 300 ppm to 30 ppm</td>
<td>9 percent</td>
</tr>
<tr>
<td>USA-BASED southwest Research Institute</td>
<td>From 300 ppm to 10 ppm</td>
<td>21.6 percent Number of particles larger than 0.1 micron was found to go down with reduction in sulphur levels, but number of particles smaller than 0.1 micron increased.</td>
</tr>
<tr>
<td>Motor Test Centre, Sweden</td>
<td>3,000 ppm to 50 ppm</td>
<td>5-12 percent</td>
</tr>
<tr>
<td></td>
<td>3,000 ppm to 10 ppm</td>
<td>14-22 percent</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>From 355 ppm to 35 ppm</td>
<td>4.4 percent</td>
</tr>
<tr>
<td>New Zealand</td>
<td>From 500 ppm to 50 ppm</td>
<td>5.1 percent</td>
</tr>
<tr>
<td>Department of Environment and Transport for the Regions, Government of UK6</td>
<td>From 350 ppm to 10 ppm</td>
<td>Number of particles emitted by a Euro I heavy-duty diesel engine increased. EuroII diesel engine emitted more particles smaller than 56 nanometre when sulphur content of diesel was reduced to 10 ppm from 50 ppm sulphur diesel than on 50 ppm sulphur diesel.</td>
</tr>
</tbody>
</table>
4.3. ADVANTAGES AND DISADVANTAGES OF GNG

Internationally, CNG is identified with certain advantages and disadvantages.

(A) ADVANTAGES

1. Very easy on the engine, giving longer service life and lower maintenance costs.
2. Reduces the demand for finite petroleum supply
3. Reduces exhaust emission pollution
4. Improves fuel consumption and engine efficiency. When CNG and air in the right proportions are brought together, they mix thoroughly and rapidly, thereby improving the combustion efficiency, while the engine stays clean internally
5. Dry gaseous fuel does not dilute the lubricating oil, thus saving on oil filters and oil chargers

Some specific disadvantages of CNG are as follows

(B) DISADVANTAGES

CNG technology is in a state of evolution and therefore changing all commercial vehicles to single-fuel CNG might not be feasible. The entire investment in changing the vehicles to CNG mode and acquiring new vehicles within a short span will lead to ageing of all
the vehicles at approximately the same time. A huge cost required to set-up the infrastructure for CNG in a very short span is bound to reflect in budgetary deficit. Further, any mishap of disruption in a 1200 km pipeline supplying CNG can bring the entire public transport in Delhi to a standstill. A dedicated CNG vehicle can be stranded on the way for want of gas due to limited number of CNG filling stations. Therefore, a dedicated CNG vehicle has to be close to a refueling facility, limiting its driving range. According to the SC order the entire public transport is to be converted to only single-mode CNG and hence dual fuel technology cannot be operated in Delhi for public transport. (However later the Sc has clarified that taxis and auto-rickshaws with 4-stroke engines could run on low benzene petrol, but buses could only ply with CNG in Delhi.) As, at present, CNG facilities are not available outside Delhi, tourist and transit buses that ply outside Delhi do not have access to CNG outside the city. Currently there are other problems: (a) it takes hours for refueling of CNG vehicles because of long queues due to inadequate number of filling stations. (b) Most of the filling stations in Delhi are located in the southern half of the ring road because of which the vehicles have to travel a long way for filling gas and (c) Paucity of trained mechanics
for CNG kits have made repairs expensive. Commitment is required on the part of the government, to improve the infrastructure quickly to eliminate the long queues.  

Some specific disadvantages of CNG are as follows.

1. Driving complaints due to loss of power with CNG. Dynamometer tests indicate that CNG-fuelled vehicles have 10-15% lower power output than petrol engines.

2. Increased exhaust-valve wear in CNG-operated vehicles are anticipated due to the drying effect of the gaseous fuel

3. Limited service availability

4. High cost of conversion

5. The additional weight of CNG cylinders does pose a problem

6. Inability to make an impression on the common man

4.4. BHURE LAL COMMITTEE AND ITS RECOMMENDATIONS

The Bhure Lal Committee, which was constituted by an order of the court on 1st April 1999. The Bhure Lal Committee, was a five member panel, headed by food corporation of India, Bhure Lal to re-examine the process of conversion of diesel vehicles into CNG. It has to examine the process of conversion of diesel vehicles into CNG and also to examine the process from the emission as well as the safety
viewpoints. Said environmentalists, Anil Aggrawal. "The panel had in its earlier report clarified it is not against conservation, but against bad conversion which does not meet emission and safety standards. This report indicated that more than 90% of nitrogen oxide and respirable particulate matter are from vehicle exhausts over Delhi caused by diesel emissions, which are a serious health hazard, in particular diesel particulate are toxic air contaminants and chronic exposure can lead to lung cancer. Thus the report caused serious concern, especially as air pollution affects the right to life of citizens. After taking note of the report of Bhure Lal Committee, the court issued certain direction in order dated 16th April 1999, which included a direction to the additional solicitor General to submit an affidavit on the number of diesel and petrol-driven vehicles registered in the National Capital Region (NCR) from 1997 to 1999. This information was required so as to allow the court to decide whether registration of diesel vehicles is suspended and to examine possibilities of making modifications in vehicular exhaust systems in order to achieve Euro II norms or stricter norms. These norms require modifications to reduce emission of Sulpher content and to reduce the extent of the harmful effect of diesel emissions. The court further held that:
1. Not with standing the enactment of the Environment (Production) Act. 1986, the decline in the quality of the environment continues. This prime facie shows a failure on the part of the authorities to perform their obligations under the constitutional scheme and the mandate of the Act. Pollution levels continue to increase. In particular, persons are switching to diesel because it is cheaper. This has caused a phenomenal rise in environmental pollution in the NCR.

2. Due to the gravity of the situation and the serious effect of the diesel exhausts on the health of citizens it is appropriate to make a number of orders to restrict the number of diesel vehicles.

3. All private vehicles, which conform to Euro II norms, may be registered in NCR without any restriction. All private vehicles shall conform to Euro I norms by 1st June 1999 and to Euro II by 1st April 2000. With effect from 1st may 1999 only 250 diesel-driven vehicles per month and 1250 petrol driven vehicles per months may be registered in the NCR, till 1st April 2000 and only where they conform to Euro I norms. These directions are made only as an interim arrangement till
further orders the ban on the registration of diesel-driven taxies shall be enforced. No diesel taxies shall be registered with immediate effect unless it conforms to Euro II norms. The union of India is granted liberty to seek variations of these orders if necessary. Further, Bhure Lal committee which is requested to examine the matter further must submit its report/recommendations in eight weeks after granting automobile manufacturers likely to be affected by these directions, and opportunities to make submissions.

The court was viewed that we direct the Bhure Lal committee to examine this question and permit the parties to submit their written representations to the committee in that behalf. The committee may submit report to this court in that behalf and also indicate as to which fuel can be regarded as "clean fuel" which does not cause pollution or is otherwise injurious to health.¹⁷

There commendations of the Bhure Lal committee, which is also known as the Environment Pollution (prevention and control) Authority (EPCA). It is also stated that direction issued by the Bhure Lal Committee have, thus, legal sanction and when accepted and incorporated by this court become a part of its order, binding on all
parties. Besides, directions given for safeguarding health of the people, a right provided and protected by Act. 21, of the constitution, would override provisions of every statute including the Motor vehicle Act, if they militate against the constitutional mandate of Act. 21. We must, however hasten to add that norms fixed under Motor vehicles Act are in addition to and not in derogation of the requirements of Environment Protection Act. If the owners of the Stage carriage buses choose to ignore the directions issued by this court on 28th July, 1998, they did so at their own peril. We wish to re-emphasise that those of the Private bus operators, who have chosen not to comply with the court's orders and have not taken any steps for conversion of the vehicles to the CNG mode are not entitled to any indulgence from the court. They must thank themselves for the situation in which they find themselves.18

The committee head, Bhure Lal, said that the setting up of the automated pollution inspection and certification centers would be the biggest achievement as far as pollution control was concerned in Delhi, as this would guarantee fool-Proof checking of emission levels of the vehicles plying in the city. "The pollution under control (PUC) centers are of no use any more," he said. 19
The committee said on the parking policy, that the court should direct civic agencies like MCD, NDMC, DDA and the Delhi government to submit a composite parking policy. It came down heavily on growing number of private vehicles, misuse of mixed land-use policy with commercial use of residential spaces, and mushrooming malls without parking spaces, for the present parking mess in Delhi.  

The committee further told to the court that “pending finalisation of the policy the government be barred from allowing any further mixed land-use development in the city. All commercial development in residential areas must be immediately stopped.”

4.5. EXPERT COMMITTEE ON AUTO FUEL POLICY

In a meeting taken by the Prime Minister on 30th August, 2001, it was decided that a committee of expert of national repute, headed by Dr. R.A. Mashelkar, Director General, Council of Scientific & Industrial Research (CSIR) may be constituted to make recommendations to the Government on an appropriate auto fuel policy and related issues.

The Committee was constituted on 13th September, 2001, to recommend an “Auto Fuel Policy” for major cities and the rest of the
country, to devise a road map for its implementation, and recommend suitable auto fuels, automobile technologies and fiscal measures for ensuring minimization of the social cost of meeting environmental quality and institutional mechanisms for certification of vehicles, fuels as also monitoring and enforcement measures.22

The Committee comprised eminent experts in the fields of environment, energy, vehicular technology, public finance, management, and representatives of key Ministries/Organisations viz.; Environment & Forests, Central Pollution Control Board, Non-Conventional Energy Sources, Road Transport & Highways, Heavy Industry, Consumer Affairs, Agriculture and Petroleum & Natural Gas.

4.4.1. GUIDING PRINCIPLES FOR EXPERT COMMITTEE

The Committee set for itself the following guiding principles:

(i) Public Health is a prime concern. Air quality is a crucial factor in determining public health. Air quality depends upon several factors of which vehicular pollution is an important factor. The contribution of vehicles to overall pollution depends on factors such as the state of existing vehicles and their relative population, fuel quality & pricing,
system of inspection and maintenance, traffic management, state of roads, availability of bye passes, land use patterns including sitting of the parking depots, etc. The specific choice and quality of auto fuel constitutes one of the factors that influences air quality and, in turn, public health. Therefore, a truly holistic approach was required to draw out a sound policy.

(ii) Evidence based analysis backed up by scientifically validated data, especially under Indian conditions, should be the cornerstone of any sound policy.

(iii) There are costs involved to everyone that includes the Government, the fuel producer, the auto producer, and the user. One can have infinite desires but there are only finite resources! Therefore, minimization of social cost was considered to be one of the key guiding principles.

(iv) India has to build on the currently available infrastructure, by getting the maximum out of the current assets to reach the goals of deriving the public health objectives for the people of India.

(v) Transparency in arriving at the policy was most crucial.
Therefore, major stakeholders including NGOs and government organizations, and the public at large were to be asked to give their views. A special website was set up to reach out to people.

(vi) Rather than a rigid and prescriptive policy, a flexible policy, which allows a multi-fuel and multi-technology option for reaching prescribed emission norms, was considered desirable.

(vii) Although time would be a constraint to launch exhaustive fresh studies, it was felt that some studies in gap areas had to be undertaken. One such study on “Urban road traffic and air quality” in the seven mega cities was assigned to Central Road Research Institute / National Environmental Engineering Research Institute / Indian Institute of Petroleum. 23

4.4.II. THE APPROACH ADOPTED BY EXPERT COMMITTEE

The Committee decided to adopt the following approach:

(i) Four sub-groups were formed, which consisted of Committee members and subject matter specialists, for studying the following aspects in detail:
(i) Air quality and vehicle emission norms.

(ii) Motor vehicle technologies.

(iii) Auto fuel quality.

(iv) Economic and financial issues.

(ii) The report “Road map for vehicular emissions and auto fuel quality standards” of the Inter-Ministerial Task force, headed by Chairman, CPCB was taken into account by the Expert Committee.

(iii) The Committee took into account the on-going work on ethanol blending in petrol and use of bio-fuels in transportation by the groups constituted by the Ministries of Petroleum and Natural Gas and Non-Conventional Energy Sources.

(iv) The Committee also examined the reports prepared by various Ministries and other agencies on the subject of vehicular emission norms and auto fuel quality.

(v) The Committee also took into account the methodology followed by the European Union for Auto Oil Programme –I and II.

Although substantial work has done over the past 5-6 years to
improve the auto fuel quality, India has not had a comprehensive “auto fuel policy” per se, which is based on holistic considerations. With the fast increasing population of motor vehicles, concern for air quality has increased. The Government of India has been seized of the problem. Citizen groups and voluntary groups, driven by environmental concerns, have sought the intervention of courts in the matter. The Auto Fuel Policy is designed to serve these concerns.24

The Committee has taken cognizance of the actions taken in the past few years on emission norms and auto fuel quality improvements, including the Supreme Court’s directives on these issues. It has noted that Euro I equivalent emission norms and auto fuel quality are statutorily required from 1st April, 2000 in the country and in the four metro cities, Euro II equivalent emissions norms and auto fuel quality are in force. Emission norms for CNG and LPG vehicles have also been notified. Oil companies have implemented major programmes for up gradation of petrol and diesel quality in the past few years with an investment of approximately Rs. 10,000 crore. The resulting improvements are the supply of unleaded petrol in the entire country, reduction of sulphur content in petrol and diesel, improvement in cetane number in diesel with the effect that the petrol
The quality of the auto fuel in the country is comparable to or better than most of the countries in the Asia Pacific region.²⁵

The Committee has interacted with a large number of stakeholders, NGOs, Government agencies, industry associations, consumer interest groups, and individuals and sought their views and submissions.

4.4.III. RECOMMENDATIONS OF THE EXPERT COMMITTEE ON AUTO FUEL POLICY

In accordance with the terms of reference, the Committee is providing in this Interim Report, a framework of an Auto Fuel Policy which addresses issues of vehicular emission norms, a road map for implementing the norms, auto fuel quality, fiscal incentives which should be given to the automobile and oil industry for up-gradation of technologies and other attendant measures that need to be taken to make a decisive impact on air quality. Directions have also been provided on other aspects of the Committee’s mandate.²⁶

1. Auto fuel policy should be dynamic and reviewed at intervals of about five years. The policy needs to be guided by evidence based analysis, based on sound scientific principles and should also be based on cost effectiveness. It
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should give all stakeholders an opportunity to bring out their views for consideration.

2. Development of an Auto Fuel Policy is a complex exercise. It calls for an assessment of the future trends in emissions and air quality requirements, and establish a consistent framework within which different policy options to reduce emissions can be assessed. It ought to provide a foundation for the transition towards longer-term air quality objectives. It should, therefore, identify environmental objectives for air quality, forecast future emissions, establish emission reduction targets and appropriate functional relationships, collect input data on cost and benefits, and identify potential measures to reduce emissions. The Committee suggests that appropriate institutional arrangements may be made where such activities can be appropriately and competently handled.

3. Vehicular emission standards need to be such that they, together with other mix of measures, will produce the desired effect in a cost effective manner without putting an undue burden on the common man.
4. The recommended Auto Fuel Policy is based on targeted vehicular emission standards for various categories of vehicles, allowing use of different technologies and fuels, which can meet the emission standards. In the developed world and elsewhere, vehicular emission standards and auto fuel quality necessary to meet the standards alone are prescribed, giving choice to the public, manufacturers, owners and operators of motor vehicles to choose the vehicle type and the fuel. The Committee recommends that the same policy be adopted for India.

5. The Government should decide only the vehicular emission standards and the corresponding fuel specifications without specifying vehicle technology and the type of fuel.

6. The Committee recommends the following roadmap for implementation of vehicular emission norms and auto fuel quality.

(i) Brarat Stage-II norms which are in place in the four mega cities of Delhi, Mumbai, Kolkata & Chennai should be introduced in the other three mega cities of Bangalore, Hyderabad and Ahmedabad as early as
possible but not later than the end of 2003.

(ii) Bharat Stage-II norms would be introduced in the entire country from 1st April, 2005.

(iii) Euro-III equivalent emission norms for all categories of vehicles (excluding two and three wheelers), detailed by the Committee, should be introduced in seven mega cities from 1st April, 2005.

(iv) Euro-III equivalent emission norms for all categories of vehicles (excluding two and three wheelers), should be extended to other parts of the country from 2010. The necessity and the feasibility of extending the Euro III equivalent emission norms prior to 2010 should be reviewed in the light of the experience gained after introduction of Bharat Stage-II norms in the entire country.

(v) To meet Bharat Stage II and Euro III equivalent vehicular emission norms, matching quality of petrol and diesel, detailed by the Committee, should be simultaneously made available.

7. There is a need to provide relaxation to regions like the
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North-East, having low pollution levels, and to the refineries processing Assam crude oil.

8. Sulphur content in Euro III equivalent specifications of diesel and petrol are 350 ppm max. and 150 ppm max., respectively. Aromatics content in Euro III equivalent specification of petrol is 42% max. Analysis of investment and distribution logistics issues for reducing sulphur content in both petrol & diesel to 50 ppm max. and aromatics in petrol to 35% max. in Euro-III equivalent specs auto fuels should be undertaken pending notification of Euro IV specifications in the European Union.

8. In addition to petrol and diesel, CNG and LPG are permitted to be used as auto fuels. The Government has further decided to blend ethanol with petrol. Alternative fuels like di-methyl ether, bio-diesel, hydrogen, electric and fuel cell vehicles etc., are at various stages of experimentation. The Committee recommends that these need to be encouraged, giving the choice of fuel and vehicle technology to the customers and any combination of fuel and vehicle technology, which meets the prescribed emission norms should be acceptable.
9. The Committee recommends that the fiscal regime applicable to the auto fuels should be directed towards achieving the economic pricing of various fuels, instead of presently prevailing distorted pricing. This would help in long term planning and supply of quality products.

10. Low emission vehicles and the compatible fuels are not the only factors which would have a bearing on air quality. The Committee recommends putting in place other cost effective measures such as comprehensive inspection and certification system for in use vehicles with private sector participation, fitment of emission reduction devices in the existing vehicles, traffic management, construction of by passes etc.

12. The Committee recommends setting up of upgraded and additional emission testing facilities and establishment of surveillance and checking of emission warranty systems for new vehicles.

13. Environmental concerns are such that to put in place the new emissions norms, substantial investments need to be made to produce appropriate quality fuel and the vehicles. The committee recommends preferential treatment to the oil and
auto industry in matters relating to:

(a) customs duty on imported capital goods, equipment and machinery needed for upgradation of technology/facilities,

(b) excise duty on indigenously manufactured capital goods, equipment and machinery needed for upgradation,

(c) 100% depreciation on plant and machinery put up for upgradation,

(d) soft loans for technology modernization / upgradation projects, and

(e) adequate incentives, such as tariff differentials and other measures to enable domestic industry to compete with imports.

14. The committee notes that there is an information and data gap on application of the state-of-the-art technology for the latest fuel quality improvements and optimization in refineries, vehicular emission control systems, cost-price relationship and fiscal incentives that can be offered to reduce pollution from in use vehicles. The committee also notes the absence of institutional arrangements between
Indian institutions and foreign universities and agencies in these areas. Such deficiencies need to be attended too.

15. Research and development support especially for high energy density batteries, controllers, insulated gate bi-polar transistor (IGBT), inverters, new generation of electric motors, including DC and induction motors and new types of vehicles design taking into account aerodynamic considerations, together with financial support, should be provided.

16. The Committee recommends providing fiscal and financial incentives, both to the manufactures and users, of electric vehicles, to make these vehicles competitive.

17. A programme for alternative fuel vehicles being pursued by MNES with components of policy support, fiscal and financial incentives, R&D support and other measures that makes zero emission vehicles commercially viable needs to be drawn. Details of the same would be examined and recommendations would be made in the final report.

18. The next-stage emission norms for 2 / 3 wheelers to be introduced through out the country from 2005 is being
deliberated by the committee and will be recommended in the final report.

19. The Committee is of the view that institutional mechanisms need to be set up to address, on a continuous basis, the issues related to emission norms, fuel quality, emission warranty, inspection certification programmes, approval of emission control devices and retrofits etc. Appropriate recommendations in this regard will be made in the final report.

20. The committee is of the view that well-defined fuel economy standards need to be put in place for new vehicles. Suitable standards would be recommended in the final report.  

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NOTES AND REFERENCES

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5. Ibid


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14. WWW. Energyquest.ca.gov/transportation/CNG.html.

15. The Times of India, New Delhi, 29th September, 2001.


17. Ibid.


20. Ibid.

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22. See the expert committee report on auto fuel policy.

23. Ibid.

24. Id at P. 2.

25. Ibid.

26. Id at P. 10,

27. Id at P. 12.

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