

Chapter 8

CONCLUSION AND SUGGESTIONS

The use of the automobile is here to stay even though the degree of potential of its emissions to adversely affect human health is insurmountable. Most developed countries have now largely contained some of these emissions, as a result of technological changes in vehicle parts and fuel content. However, this is not yet the case in developing countries, although improvements in some are taking place through technology transfer and local effort. No country or city, however, has yet been able to overcome the other persistent transport problem, traffic congestion – all elements of unsustainable automobile use, despite the harmful impact this has on stress and productivity.

Where it has been financially affordable, the policy response to this distress has often involved large investments in roads, expressways and toll ways. Instead of easing the problem, these mega-projects appear to have facilitated car use, resulting in more cars on the roads. Therefore, it is not surprising that global vehicle numbers are predicted to increase ten-fold from 2008 to 2050. Meanwhile the mounting evidence concerning climate change and the contribution of greenhouse gases to worsening this development has increasingly alarmed the global community.

India is economically an upcoming nation in the international scene and a prospective global superpower at that. Such prospects are predicted for India on a solid basis of its growing influence on the Global Economic Scenario. Such influence has been facilitated by the growth in the production of goods and services and that too, cheap. Comparisons with China, on this particular aspect, have always been argumentative and these arguments have never reached a sound conclusion, given the credible proponents on both sides of the debate. The group subscribing to a practical view that both India and China would be jointly bestowed the title, has even

coined the term 'Chindia' to describe the union of the future superpowers.

India has been infested with a large population so is China. Present day trade pundits interpret population in terms of human resource and according to such interpretation, India and China are blessed. Both the countries have a robust economy since the last decade of the twentieth century but China, at present, is better placed than India in terms of Gross Domestic Product, Foreign Exchange Reserve and Balance of Payments. These economic fundamentals exhibit and determine the economic health of a nation. International Market analysts predict that the resilience of the Indian economy (demonstrated recently by the growth rate hovering between 6 and 8 percent during Recession) would leave behind China in sustaining the economic growth in the coming years. China, a communist state, ensures proper implementation of laws, less political interference and standard work culture which are basic ingredients of proper economic climate. India has been a few notches lower on this count. Both countries have abundant supply of cheap labour and natural and mineral resources waiting to be exploited in the right way. The clincher lies with India because it is a democratic country, largest and most vibrant. In the long run India is expected to reach the goal of transforming itself into a global superpower riding on the bandwagon of being a democratic country.

Manufacturing has been one of the strengths of Indian economy and automobile manufacturing industry has been one of the fastest growing among such industries. The surge in the economic activity was initiated in 1991 when the Indian National Congress, a political party with the Gandhi-Nehru legacy, came to power after a few unstable coalition governments. These coalition governments had driven the economy, which was already in the vice grip of the bureaucratic red-tape, to shambles. The new Congress Prime Minister, Shri P.V.Narasimha Rao started the process of liberalising the Indian economy with a fresh slew of economic reforms. He was ably guided and efficiently aided by the then Finance Minister and the present

Prime Minister, Dr. Manmohan Singh. India was a happening country in regard to the investment markets. All trade routes were leading to the land of Gandhi and every country's commercial society was in the effort of grabbing piece of the action.

The first visible signs of the new economic policies of the then Government of India was the entry of a large number of multinational automobile manufacturing companies. They were in the form of Suzuki, Toyota, etc., from Japan, General Motors and Ford from the United States and companies from European countries.

It is seen in Chapter five that these developments were alarming to the environmentalists who had just gone through the tedious grind of the United Nations Conference on Development and Environment, 1992. Their fears were not unfounded since a number of documents, which dealt with the agenda of arresting environmental degradation, had been signed and ratified by several member of the United Nations. International Instruments signed among them were the United Nations Convention Framework on Climate Change (UNFCCC) and the controversial Kyoto Protocol. In these documents there was a clear mandate that greenhouse emissions, which was causing Global Warming, had to be cut down especially by the developed countries, designated as Annex I parties. The shifting of their industrial activities into the developed countries was seen as a ploy to manage their carbon accounts by the lovers of the clean and healthy environment. There was some truth in this belief since the Kyoto Protocol had exempted the developing countries or the Non-Annex I Parties from capping their greenhouse gas emissions. Moreover, the automobile industry would be providing a double whammy to the environment of a country like India. The automobile manufacturing industry itself would be leaving a large carbon footprint while manufacturing the cars for use and once the cars are out on the roads they would be polluting the atmosphere due to their use of fossil fuels such as petrol and diesel.

While developed countries still account for the largest share of transport emissions, the transport sector's emissions from developing countries, particularly in Asia, have been growing rapidly. According to an Asian Development Bank Report (2009), Transport-related CO₂ emissions are expected to rise 57 per cent over the 25 years to 2030. The ADB report notes that increases from developing countries are expected to contribute to 80 per cent of this growth as car (and light truck) ownership become more widespread. The private car continues to be the predominant transport mode globally, particularly in developed countries. Along with economic growth and development, car dependence is on the rise – at a faster pace – in developing countries as well. The growth of car ownership is likely to follow the growth of per capita income, particularly in the rapidly growing developing countries. Globally, light duty vehicle numbers are predicted to increase ten-fold from 2008-2050. The automobile is increasingly the favoured modes for passenger transport but is also significantly the most damaging.

The potential consequences of climate change are profound, particularly on people in the less developed countries. The question is therefore not whether climate change is happening, but what to do about it. Earlier there were some conventions on the protection of the Ozone layer, for example the Vienna Convention for the Protection of the Ozone layer, 1985 and the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987. Vehicles were a large contributor of hydrocarbons, a gas which is responsible for making a hole in the ozone layer, but focus was put mostly on Chlorofluorocarbons (CFCs) and other ozone depleting substances.

Presently, the answer lies in a double strategy. We need to reduce emissions of greenhouse gases, which will mean altering how we live and do business. We also need to realistically assess the implications of the changes that are already upon us and adapt accordingly.

Emissions from an individual car are generally low, relative to the smokestack image many people associate with air

pollution. But in numerous cities across the country, the personal automobile is the single greatest polluter, as emissions from millions of vehicles on the road add up. Driving a private car is probably a typical citizen's most "polluting" daily activity.

The adverse effects of emissions produced by the transport sector can be minimized by the implementation of concerted local, national and international efforts. These efforts, if implemented wisely, can also reduce dependence on fossil fuels. Although the focus in this is on reducing CO₂ emissions from the transport sector, simultaneous action to reduce other sectors' share of greenhouse gas emissions must also be in place. Otherwise, any gains achieved by a reduction in car use will be easily offset by inaction in other sectors.

Earlier, the laws regulating the use of motor oils were there in India but proper framework of laws or policies regulating vehicular technology had not taken root. Even those laws regulating the use of fuel or adulteration of fuel had nothing to do with the prevention and control of vehicular pollution. They aimed majorly at the economic aspects of the trade, like fair price and distribution but neglected the public health effects. These laws only looked at the minimising the loss of revenue to the government from such unregulated use of fuels and to a large extent to conserve the stocks of such fuel due to the fear of them being depleted. In the later twentieth century most of the environmental laws which were earlier aimed at conserving depleting natural resources buttressed the campaign by making the Public health issue as one of its ingredients.

India is famous for timely legislating of laws, mostly in the form of regulations, in all aspects of governance. The benefit arising out of it being a secular, socialist and a democratic republic has facilitated laws to be enacted for every problem visible in the horizon. The Parliament is functional but it is working a lot less than expected to and that too, is mostly spent by the parliamentarians on capturing eyeballs of television audiences by disrupting the proceeding of the house. This has been happening often since House activities have been

telecasted live. But still enactments of specific statutes regulating the activities which have a negative impact on the environment of the country are timely enacted.

In Chapter two which deals with Statutory Laws it is seen that on this particular front, environmental laws have never been found wanting. The only drawback in the whole process of executing the provisions of these statutes lies in their enforcements. The enforcement of these laws has been very poor and sometimes the higher courts have expressed their desperation by pulling up these enforcement agencies and their heads. A prime example of this kind of a situation was clearly manifested when the Supreme Court pulled up the bureaucracy in charge of the Transport department and its allied organisations in *M.C.Mehta v Union of india*¹ when the Secretary, Department of Transport, Government of Delhi failed to remove buses which were more than eight years old and were not using Compressed Natural Gas (CNG) as fuel to run such buses. The lackadaisical attitude of the Delhi Government and its machinery, a common trait of governance in India, was severely lambasted by the Apex Court. The Court threatened to summon the Chief Minister and the Transport minister. The Court even reminded the Officials both elected and appointed that the mandate of the Constitution cannot be ignored and the health of the citizens should be the prime consideration above all other issues. The Supreme Court in one of its orders have reminded the people administering the nation that they owe their present positions to the people of the country and as such whatever step they take in the name of governance shall be for the benefit of the masses.

Among a large number of legislations which practically help in regulating the activities degrading the environment, the legislations which specifically aid in curbing the menace of vehicular pollution, the main feature of sustainable automobile use, are by far, few.

¹ (2001) 3 SCC 763.

The Environment (Protection) Act, 1986 together with the Environment (Protection) Rules, 1986 is a heavyweight legislation in the arena of environmental laws and in regard to protecting and improving the environment. It has also been called an umbrella legislation since it deals with the environment, which includes, among other things and in general, air, water and land. The Act empowers the Central Government to take steps and measures in protecting and improving the environment and such functions are in addition to the general function of preventing and controlling environmental pollution.

The Environment (Protection) Act, 1986 has been found to have a minimum role to play in curbing the menace of vehicular pollution since it was legislated keeping in mind the perils of environmental pollution by hazardous industries, operations and processes. But this does not mean that preventing and controlling vehicular pollution or promoting sustainable use of automobile is not in its radar. Mainly section 3 of the said Act has a huge role to play in matters of pursuing sustainable automobile use and the Courts are reminding the executive to follow the mandate of the Act religiously. The Environment Pollution (Protection and Control) Authority (EPCA), a committee headed by the retired bureaucrat, Shri Bhurelal, has been a point in question.

According to the mandate of the Environment (Protection) Act, 1986, it was the job of the Government, *inter alia*, to constitute such authorities but the Apex Court had to prod them to perform this function. The job done by the EPCA in controlling vehicular pollution, a determining characteristic of sustainable automobile use, especially in Delhi, is there to be appreciated by all. There also the Central Government siding with the vested interests in the form of automobile manufacturers, oil companies, etc, played spoilsport when the question of converting diesel buses into CNG operated ones arose. When the debate of determining the clean fuel to be used in the public transport buses was raging, the Ministry of Petroleum, instead of endorsing the report of EPCA (a committee constituted by it)

went to the extent of campaigning for the cause of Ultra Low Sulphur Diesel (USLD). And it was shameful that the pro-ULSD lobby in the CNG-ULSD war was projecting Low Sulphur Diesel (LSD), a more dirty variety of diesel, as Ultra Low Sulphur Diesel. Further they were also not sure whether they could provide with technology for the use of such ULSD, which could derive the gains in terms of pollution control, in the times to come.

The emission standards laid down under the Environment (Protection) Rules, 1986 for vehicles in found in the Schedules. The Air (Prevention and Control of Pollution) Act, 1981 also has the power to prescribe vehicular emission standards under section 17 (1) (g). The vehicular emission standards laid down under the Environment Protection Act, 1986 and its Rules is prevalent among them. The more comprehensive emission standards and the procedure of testing such emissions have been provided in Rules 115, 115-A, 115-B and 116 of the Central Motor Vehicle Rules 1989.

The Air Act, which was enacted keeping in mind the pollution caused by the industries, does not have a major role to play in preventing and controlling vehicular pollution. The provision of section 20 of the said Act clearly indicates the delegation of its function of preventing, controlling and abating air pollution caused by automobiles to the Motor Vehicles Department.

The Motor vehicles Act, 1988 together with the Central Motor Vehicle Rules, 1988 and the respective State Motor Vehicle Rules are more than adequate to prevent and control the menace of vehicular pollution one of the main characters of unsustainable automobile use in India. The only lacuna lies in the enforcement of these laws efficiently. The enforcement agencies in the form of the Motor Vehicles Department, the Pollution Control Boards (both the State and Central) and the police enforces the law but to a limited mandate and does not take such enforcement to its logical and anticipated conclusion. The provisions of the said Motor Vehicles Act and Rules are

applied by these designated agencies in a slipshod and perfunctory manner. A prime example of this is the issue of Pollution under Control (PUC) certificate.

The State Governments have the power to establish certified emission testing centres at designated places in their respective jurisdiction. The establishment of such testing centres are mostly outsourced to private parties. These parties are strictly guided by the Government through their department concerned as per statutory norms. Matters like the standard of the testing equipment, the qualification of the person operating the testing equipment, the emission standard required for issuing a valid PUC, etc. The problem does not lie in the setting up of a Smoke emission Control Testing Centre but it starts when the centre becomes functional.

Earlier, the person in charge of the testing centre would issue valid PUC certificates without examining the respective vehicle. The person incharge of the motor vehicle would bring with him the registration and other relevant documents to the testing centre and the PUC certificate would be issued. Later, a change in the procedure was brought about. A photograph bearing the registration plate of the tested vehicle had to be taken within the PUC certificate. The photograph of the registration number plate was inseparable form the certificate. The new procedure disallowed the person incharge of the motor vehicle from obtaining a PUC certificate without bringing his vehicle to the testing centre. However, this statutory obligation to be followed while procuring a valid PUC certificate is easily circumvented while filling the particulars in respect of the vehicle's smoke density. This means that the person in charge of the vehicle may take the motor vehicle to the certified emission testing centre but there is no guarantee that the figures entered in the certificate are those that resulted from the test. It is heard from several vehicle owners that the certificate is issued after the photo is taken in the certificate without applying the equipment in the tail pipe of vehicles. There is already a solution for this in Rule 116 of the Central Motor Vehicles Act, 1989. The said Rule states that a Police Inspector, not below the rank of

Sub-Inspector, or a Motor Vehicle Inspector can apply the smoke test on an automobile which already possesses a valid PUC certificate using standard certified instruments. If the automobile is found non-complying with the standards laid down by Rules, the person incharge of such automobile is asked to rectify the fault within a week's time and the PUC certificate in his possession is rendered invalid. In the event of ignoring such directions given by the designated officials, the faulty motor vehicle's registration may be suspended.

To implement the provisions of law properly in matters of spot testing of vehicles and countering the foul play indulged into by the unscrupulous testing agencies, a large number of personnel are required. The more practical way of applying the said provisions in the quest for preventing and controlling vehicular pollution is to take random testing of vehicles periodically. Another drawback faced by these enforcement agencies in the application and execution of said laws is the dearth of manpower in the rank and file of the implementing bodies.

In *M.C.Mehta v Union of India*, the Hon'ble Supreme Court was expressly clear in stating that the existing provisions of the Motor Vehicles Act and the relevant Motor Vehicle Rules above named are sufficient to clothe the members of the Police force and the transport authorities with ample powers to control and regulate traffic in an appropriate manner and to see to it that no vehicle used in a public place pose any danger to the public in any form whatsoever. The requirement of maintaining the vehicle the automobile in a manner prescribed and its road worthiness judged by its performance of not posing any danger to the public has to be ensured by the authorities under the enactment. In Chapter three, it is seen that the Apex Court has further gone on to say that this positive conclusion of preventing and controlling the unsustainable automobile use can be arrived at without taking recourse to the general powers of maintaining law and order available to the Police officers under the Police act and the Criminal Procedure Code. It is also to be noted here that to overcome the crippling situation arisen out of the

unsustainable use of automobile in the form of traffic jams resulting to vehicular pollution and the strength of the implementing agencies is found inadequate in a given area, the requirement of more men for carrying out strict enforcement of the relevant provisions of the said law can be met by delegating such authority to other persons. In such circumstances the overall supervision and monitoring will always remain with the delegating power, the statutory enforcement agencies.

In view of the clarifications made in the order in *M.C.Mehta's* case mentioned above, the Supreme Court expected that the concerned authorities would mobilise the support needed amply by delegating their powers of enforcement to other officers and personnel of allied departments. And at times of exigencies, such functions can be delegated even to responsible members of the public after basic training and proper guidance. This Supreme Court order of mobilising extra manpower at times of abovementioned crisis clearly suggests that administrative resource crunch and inadequate infrastructure should not be an impediment in the enforcement of law and the directions given by the courts with an aim to obtain desired results.

The Motor Vehicle rules of both the Centre and the States have been framed in such a manner that the person in charge of an errant vehicle can never breakout and go scot-free after violating the prescribed pollution norms. This is possible because a valid pollution under control certificate, whether acquired fairly or unfairly, does not deter an Motor Vehicles Inspector or a Police Officer (who is not be not below the rank of a Sub-Inspector) from directing driver or the person in charge of such vehicle submit the said vehicle for testing the smoke emissions. The law has provided for such measures to clarify that a valid pollution under control certificate is not conclusive proof that the automobile in question is complying with the standards laid down by the Motor vehicles Act, 1988 under Rules 115 (Emission of smoke, vapour etc., from petrol and diesel vehicles), Rule 115-A (Emission of smoke and vapour from agricultural tractors driven by diesel engines) and Rule 115-B (Mass Emissions

Standards for Compressed natural Gas driven vehicle) of the Central Motor Vehicle Rules, 1989.

The law not only provide for testing a vehicle to find out whether the emission norms are complied with but if it fails to comply with the standards laid down in the Rules while holding a valid pollution under control certificate, It can be asked to rectify the due to which the vehicle has failed to pass the emission tests. The procedure has been comprehensively laid down in Rule 116 of the Central Motor Vehicle Rules, 1989. The Rule provides for allowing the errant vehicle represented by the person in charge of such vehicle to rectify the fault arising out of mechanical defect or by use of substandard fuel and get back to the authority for further testing. This process is carried on until the fault is repaired and the emission standards are complied with. There are consequences for such violations. The initial violation of the provision would render the person in charge of such vehicle to pay a fine under section 190 of the motor Vehicles Act 1988. Failure to rectify the fault within the time allowed (seven days) necessitates the suspension of the certificate of registration and finally utter failure to comply with the directions of the authority checking such vehicle could also render the vehicle's registration to be cancelled. Therefore a vehicle not complying with the emission standards laid down by the Motor Vehicles department under the relevant Act and Rules will not be issued a valid pollution under control certificate unless the fault is repaired. The already valid PUC certificate possessed by the person in charge of the faulty vehicle is rendered void. Further, if the certificate of registration has been suspended according to procedure, then it stands suspended as long as the automobile fails to comply with the emission norms laid down by the Government through its Transport department under the Motor Vehicles Act, 1988 and relevant Central and State Rules.

Another factor, earlier argumentative but presently accepted, that has led to the growth of vehicular pollution is the quality and type of fuel used for powering the automobiles. This particular aspect had been overshadowed by the issue of the

depleting resources of fossil fuels and their future supply and was thus lying neglected. Until the late twentieth fossil fuels were the main resources used in generating power and other elements moving the wheels of economic growth. In India, mainly industries and other economic fundamentals which were in need of power for production raised the demand of fossil fuels, in the form of coals or petroleum. This led to the Government to manage the supply keeping in mind the depleting fossil fuel reserves and the incoming of alternate sources of power generation. The approach of the Indian government to scout alternative power generation sources, more so clean fuel technology, gave rise to the increase of hydropower projects and recently the Civil Nuclear Agreement with the United States of America. The transformation of fuel use, both in type and quality, was not carried out in isolation. The looming danger of Global Warming and its consequential Climate Change reality also boosted the agenda of such transformation. In these circumstances, the country's movement towards clean fuel technology in the industrial arena and alternate and environmentally clean sources of power generation has gained momentum. The goal aimed to be achieved by India and almost all the countries of the world with growing industrial economy is to be only dependent partially on fossil fuels. This development has exposed the reality of the part played by automobiles in speeding up the drying of fossil fuel resources. The use of fossil fuel and its resulting greenhouse gas emissions has put the running of automobiles under the glare of the global environmental forum.

The Mashelkar Committee which framed the National Auto Fuel Policy was severely criticised by most of the Green Activists but some experts on the field of fuel and the pollution concerned with it have found the Report of the committee to be one of the best among the reports of the various committee set up for the similar issue of fuel quality.

The Committee proposed step by step of conversion of the vehicular emission norms from Euro I to Euro IV which were already in vogue in the European automobile emission circles.

The report which was prepared in the year 2002 when the Euro I (Nationwide in 2000) was already implemented in India. Euro II norms were to be implemented in the National Capital Region, Delhi and twelve other cities by 2001 but was done so by April 1, 2003. According to the National Auto Fuel Policy, the Euro III norms were to be in place in the four metros and nine other cities by April 1, 2005 and Euro II all over the country which was timely carried out by the government. The Euro IV norms saw the light of day in the thirteen cities, namely, Delhi, Mumbai, Kolkata, Chennai, Bengaluru, Hyderabad, Ahmedabad, Pune, Surat, Kanpur, Lucknow, Sholapur and Agra on April 1, 2010 whereas Euro III was vehicular emission norms countrywide on the same date. Some critics of the report proposed leapfrogging the whole process of implementing the Euro norms but advocates of the National Auto Fuel Policy subscribed to the phase by phase approach and cautioned leapfrogging the whole process would have dire financial implications on the exchequer of a developing country like India.

Simultaneously, another raging debate was taking place at that time and that too was in relating to the type of fuel to be used by the Public transport in Delhi. The Choice was between the Compressed Natural Gas, in short CNG (conversion for which the court had already passed orders) and the Ultra Low Sulphur Diesel (ULSD).

As seen in Chapter six that the Hon'ble Supreme Court directed the Environment Pollution (Prevention and Control) Authority (EPCA) vide order March 26, 2001 to examine and indicate as to which fuel can be regarded as 'clean fuel', which does not cause pollution or is otherwise injurious to health.

There were supporters equally for both types of fuel, that is, the CNG and the ULSD. The Tata Energy Research Institute (TERI), major automobile manufacturers and oil industry have all been on the roll, advocating ULSD and arguing that the experts who recommended CNG clearly did not know their science or public policy. The pro-ULSD lobby and the Ministry of Petroleum and Natural Gas were advocating that the use of

ULSD as fuels for the Public Transport buses in Delhi was less polluting than CNG. Actually they were misrepresenting Low Sulphur Diesel (LSD) as ULSD. LSD contains 0.05 percent sulphur and USLD contains 0.001 percent of sulphur. This means that LSD contains 500 parts per million (ppm) of sulphur whereas USLD contains 10 ppm of sulphur which was available in the developed countries only. Again the USLD fuel could be accepted as a cleaner fuel if the trap technology² was used.

The EPCA headed by Shri Bhurelal unambiguously recommended the use of CNG to drive public Transport buses. They added that ULSD with trap technology is comparable with CNG emissions and could be considered an option for diesel vehicles. This is why EPCA recommended to the Supreme Court that ULSD could be defined as clean fuel but not alone, as a package with particulate traps, advanced vehicle technology and, most importantly, a verifiable system of preventing adulteration because without this the clean diesel could be even dirtier than what we have today and the trap would be useless.

The pro-ULSD group which included even the Central Government was exposed when they filed written submissions with the EPCA saying that the technology could not be included in the near future. The Ministry of petroleum and Natural Gas stated that actual USLD could not be produced domestically nor were they ready to import it.

In all this happenings the role of the Central Government siding with the polluters was in bad taste. This entire hullabaloo gave an opportunity to Late Anil Agarwal the then Director of Centre for Science and Environment, New Delhi as follows:

“We do know the following: CNG is hated by bus drivers because it cannot be siphoned off like diesel. CNG is hated by fuel pump owners because it cannot be adulterated. CNG is hated by officials and politicians because there are no spot purchases to be made. Imported diesel is a lucrative business because of the

² The technology, uses very (ultra) low sulphur diesel with a particulate trap and a catalyst. If the sulphur level is higher, the efficiency of the particulate trap is very low.

kickbacks on each litre purchased. On top of all this, there are the interests of oil companies and diesel auto makers who stand to lose business. Caught between this web of interests is the poor auto driver who stands in line for hours to get the gas that the vested interests don't want to provide. Real Ram Rajya, I must say."

Delhi transport department has informed EPCA that the phase out plan for diesel buses mandated by the Hon'ble Court was completed in November 2003 when the last diesel bus had gone off the road. Delhi government had given some more time till March 31, 2003 to the CNG kit installers to complete conversion of some of the old diesel buses. The process of conversion of old diesel buses is now complete in Delhi now the process is already carried out in other cities of the countries including the four metros. Among them, Kolkata has been the latest city to bring it under its transportation plans the conversion agenda.

In July, 2009, the city of Kolkata was burning when the West Bengal Government tried, half-heartedly, to enforce the court's order of emptying the Kolkata streets' of three wheelers driven by the two-stroke engine. The said order of the court was reasonable when it said that two stroke engine could be allowed to run if they converted to CNG. The whole exercise was given a political colour and the Bengal government had to go slow, but the strict directions of the court made it approach the two-stroke autowallahs with a rehabilitation programme of financing those willing to convert or buy new four-stroke auto rickshaws. The State government was also relieved of its burden of overhauling its public transport system when the Central government under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) granted them luxury buses with the aim of pulling commuters out of cars and putting them into the buses and other forms of public transport.

If the Government was serious and keen in supplying ULSD nationwide then a large number public transport buses could have saved the time and money required in converting to CNG

compliant engines. If bringing such measures are on the anvil the ULSD fuel should not be LSD in the garb of ULSD and an efficient trap technology should be made mandatory for buses using the said fuel instead of CNG.

Talking about fuel quality and the type of fuel to be used as an alternative, the issue of technology does not remain far from it. To bring a transformation in the use of fuel type and using other sources of energy to drive automobiles, Technology has to be compatible simultaneously.

Throughout the 1950s and 1960s, various federal, state and local governments in the United States conducted studies into the numerous sources of air pollution. These studies ultimately attributed a significant portion of air pollution to the automobile, and concluded air pollution is not bounded by local political boundaries. At that time, such minimal emission control regulations as existed in the U.S. were promulgated at the municipal or, occasionally, the state level. The ineffective local regulations were gradually supplanted by more comprehensive state and federal regulations. By 1967 the state of California created the California Air Resources Board (CARB) and in 1970, the U.S. Environmental Protection Agency (EPA) was formed. Both agencies now create and enforce emission regulations for automobiles, as well as for many other sources. Similar agencies and regulations were contemporaneously developed and implemented in Western Europe, Australia, and Japan.

In the United States the Clean Air Act 1970 forced technological innovations on the foreign and domestic automobile industry. It required the EPA to set tailpipe standards that reduced hydrocarbons (HCs), nitrogen oxide (NOx) and CO pollution in automobile exhaust by at least 90 percent from 1970 baseline which includes some controls on HC and Co emissions. No technology existed at the time to meet the 90 percent standards. The industry responded by developing the "catalytic converter", which fits on the end of the tailpipe and converts HC, NOx, and CO into carbon dioxide, water vapour and nitrogen gas.

It is common knowledge that automobiles that are run on diesel are more burdensome to the ambient air than petrol ones. In India, all heavy commercial transport is run on diesel and presently registration records show that there is a spurt in the growth of diesel cars.

The reasons, diesel is cheap and more fuel efficient. Maruti Udyog Limited, a popular car manufacturing in India having the highest number of annual car sales and distinctly identified with the petrol car segment has diverted into making diesel cars. This gives a clear indication for the times to come in the context of vehicular pollution.

India follows the European emission standards, though with considerable time lag. The technologies, indirect injection system (IDI), the Direct Injection (DI) and the most advanced direct fuel injection systems fuels like the Common Rail Direct injection (CrDi) system and the Electronic Unit Injectors (EUI), to meet these standards, are well known. However, there is a noticeable variance in the steps taken by India and Europe while graduating through the successive stages of the European norms. The technology pattern of improvement undertaken by the Indian Automobile industries is broadly consistent with those observed in Europe but it is still marred by the selective omissions of certain dominant features at a given stage of transition.

The mindset of the Indian automobile manufacturers is to stretch technology to the limit with as much optimization as possible to maintain a competitive price until more fundamental shifts become absolutely necessary. This approach has been discarded in manufacturing vehicles for sale in the foreign shores where standards of vehicle safety and emission compliance are religiously observed and prices are not an issue in respect to those standards. In the absence of strong regulations, the industry avoids paths needed to hasten the changeover to more advanced technologies, and this delays the process of meeting clean emission targets already in implementation.

Petrol cars, powered by the spark ignition engine technology has developed quite significantly over the decades compared to diesel technology but now the difference with diesel is narrowing down. Earlier when the movement of sustainable automobile use was initiated, the first development was the direction of the courts to make unleaded fuel across the country. Fear of outdated the old engines were due to the use of such fuel was unfounded but the court made cars more fifteen year old unfit to be driven in the city limits of Delhi which is slowly covering other urban areas.

The advent of the Euro-II standards saw the death of the carburettor technology overnight in passenger cars as it was replaced with Multi Port Fuel Injection (MPFI), the superior fuel injection system. Even exhaust gas recirculation (EGR) and multi-valve systems began to feature in these models at this stage. Two-way catalytic converters were replaced with TWCs with closed-loop system. The wide gamut of changes that the MPFI made possible improved driveability, better fuel economy and emissions.

While speaking about technology, The Bus Rapid Transit (BRT) Corridor presently under experiment in the Delhi and some other cities of India comes to one's mind. The BRT has been successfully implemented in most of the Latin American countries like Columbia. Its main objective is to move people and not cars. According to the BRT, there is specific bus lanes designated for public transport buses and it disallows other form of vehicle to ply on them. This makes the corridor free of traffic jams, which are usually caused by smaller vehicles and makes travelling by buses time saving.

The other form of public transport largely advocated for minimising traffic jams and thus maintaining ambient air quality is the Metro Rail. The Metro has provided a huge breather for the urban mobility planners of the cities like Kolkata and Delhi. Plans are afoot to carry out similar projects now in Delhi Mumbai, Chennai, Bengaluru, and Hyderabad. These cities, too, have been facing the same plight of Delhi in matters of traffic

jams and consequent air pollution. The Metro is the first railway project to be registered by the United Nations Framework Convention on Climate Change under the Clean Development Mechanism. It reduces electricity requirement by 30 percent and has claimed 'carbon credits', amounting to Rs.1.2 crore annually for the use of regenerative braking system³ in its trains. But some critics favour the BRT to the Metro and such preference is not without proper research. Number crunchers have found a well developed Bus Rapid Transit Corridor is more money saving than the Metro. The construction of the Metro on the basis of per kilometre is very high. The cost fluctuates depending on whether tracks are to be laid underground or overground. The other factor which makes the public transport as a formidable choice is accessibility.

The Government of India's flagship programme, the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) which has been undertaken to streamline the typical urban problems like pollution, health, sanitation, etc, has been achieving a fraction of success in tackling the menace. This mission programme has been a big contributor to the BRT in the form of providing luxury buses to State Governments to use it in the corridors, if available. One of the reasons for people refusing to use public buses is the condition of these buses and the discomfort it provides while travelling. Thus, the grant of new buses by the Central government is also part of the project to pull out people from cars and put them on public transport buses. In the field of earning carbon credits, a successful BRT system like the 'TransMilenio' of Bogota, Columbia, is projected to earn US\$ 20 million between 2006 and 2012.

In India, BRT projects are coming up in Ahmedabad, Bhopal, Indore, Jaipur, Pune, Visakhapatnam, Vijayawada and Bengaluru. Unlike Delhi, most of these projects are being funded by the Central government under the JNNURM.

³ Under this system, whenever a train applies breaks, the kinetic energy released starts a machine known as converter-inverter. This machine acts as an electric generator, which supplies electric energy back to the overhead electricity lines and the regenerated electrical energy that is supplied to the overhead lines is used by other accelerating trains.

In parallel to this development, the Government of India announced a National Urban Transport Policy in 2005 which states that:

- *Encouraging integrated land use and transport planning in all cities so that travel distances are minimized and access to livelihoods, education, and other social needs, especially for the marginal segments of the urban population is improved.*
- *Bringing about a more equitable allocation of road space with people, rather than vehicles, as its main focus.*
- *Enabling the establishment of quality focused multi-modal public transport systems that are well integrated, providing seamless travel across modes.*
- *Encourage greater use of public transport and non-motorized modes by offering Central financial assistance for this purpose.*

Interestingly, the Government of India can afford to have a more stringent emission norms in the case of petrol driven cars since it is popularised as the rich man's fuel and they can be made to pay the world class refinery charges to be included in the price, however, the fear is that this segment may be pushed towards buying diesel vehicles which are already on the rise. The signs shown by the present government are positive when it recently de-regularised petrol pricing and allowed it to be dictated by market forces. The next target of the government is to release pricing of diesel from the clutches of State regulation, a welcome but difficult move given the political dynamics of the country.

The Global oil crises arising out of various factors as wars and unstable oil producing countries has had its bearing on the dependence of Fossil fuels. The direction to be taken for finding a solution for this crises as well as lowering poisonous emissions from automobiles has been to scout for Alternative fuels. The search for the efficient alternative-fuelled vehicles began almost

simultaneously with the development of the gasoline-powered engine. Earlier, because of its efficiency, however, the gasoline-powered engine quickly stymied most attempts to design and commercialise alternative fuelled vehicles.

Alternative fuels, among other things, are found in the form of biofuels, like biodiesel, ethanol etc. In addition to this, Electricity, Hydrogen are also been under research and development and some amount of success has been achieved in them, however, in matters of reducing vehicular pollution, electric cars also pollute but indirectly. This means that even though the electricity powered vehicle is pollution free, the power used to run the vehicle is generated from polluting power plants.

Countries are charting the course of integrating the use of alternative fuels in automobiles and other fuel requiring processes in their larger economic agenda. The Indian Government's Climate Action Plan has put the Ministry of renewable energy on the forefront of this endeavour. The present Union government, in its earlier term (2004-2009), had even framed a Biofuel Policy in pursuant to the Common Minimum Programme, a Charter for running a coalition government. The use of Biodiesel in State Transport Corporations and the mixing of a certain portion of ethanol, a fuel product from sugar, with regular conventional fuels are part of that policy. The United States already has an Alternative Motor Fuel Act, 1988.

The Food and Agriculture lobby has been very sceptical about the programme of promoting biofuels as alternative fuels. Their argument has been that land for cultivation food grains would be slowly but steadily encroached by plants required to produce biofuels and further use of sugarcane and maize in preparing ethanol would create a crises for these products. A minor relief was seen when it was found out that Jathorpa, a biofuel plant could be grown in barren lands unfit for agriculture.

The success of the programme of utilising the prospects of Alternative fuels, basically the bio fuels depends upon the

cooperation and interest of the private vehicle owners using it for personal or commercial purposes. Both in India and the United States of America, the beginning has been made by the Government agencies running Commercial Transport by running a certain section of their fleet on biofuels.

The path is clear that the automobiles have to be used in a sustainable manner. Automobiles should also be brought out of the clutches of fossil fuels, especially petrol and diesel. To achieve this objective, alternative fuel policies which are already in place should be applied vigorously and corresponding technology must be developed. On this Count judiciary has been very active since the mid-eighties and as such has been achieving desired results in this area in particular and the air pollution scenario in general.

The 1970s was a watershed decade for the legislations concerned with protecting and improving the environment and furthering preventing, and controlling environmental pollution. A number of developments connected with the issue of environment took place in the global arena. Though the protect the environment movement was already on track, the first and most distinctive measure taken by the world community was the holding of the United Nations Conference on Human Environment in June 1972 at Stockholm, Sweden. This gave the world a comprehensive international instrument relating to the protection of the environment in the form of the Stockholm Declaration.

At home in India, the signing of the Stockholm Declaration brought about a meaningful amendment in the Indian Constitution, namely the Constitution (Forty-second Amendment) Act, 1976. The 42nd Amendment Act, 1972, among other things, inserted Articles 48-A and 51A (g) in the Constitution of India.

Article 48 A extended Part IV of the Indian Constitution by adding the States endeavour to protect the environment and its various features as a directive principle of State Policy. Further Article 51A (g) in part IV A of the Constitution of India made

protection of the environment in any form as a fundamental duty of every citizen of India. In addition to this the enactment of Air (Prevention and Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986, too, is also credited to the Stockholm Declaration.

The reinforcement of the Constitution in matters dealing with the protection and improvement of the environment by the 42nd Amendment Act, 1976 was to have a far reaching impact in the coming years. Meanwhile, winds of 'judicial activism' were sweeping throughout the country in the late 1970s. Such developments were taking place due to mainly the end of the emergency imposed on 25th June 1975 by the then Prime Minister, Shrimati Indira Gandhi and the appointment of socialist minded judges in the Supreme Court.

The main contribution made by such judicial activism was the invention of Public Interest Litigation, a writ of an informal kind. Now the corridors of justice were accessible to the deprived lot among the country's citizens. They were saved from the grind of going through the tedious formal proceedings just to make their voice heard in the portals of courts having writ jurisdiction, namely, the High Courts and the Supreme Court. The judges of these courts liberalised the writ procedures to such an extent that they started treating letters and newspaper reports as petitions. Good times had arrived for the masses seeking justice in any form from State action as long as it was unconstitutional or atleast 'ultra vires' the Constitution.

Another important development that took place in the late eighties in the legal arena was the interpretation of the fundamental right under Article 21 of the constitution. Article 21 guaranteed a person his right to life and personal liberty unless deprived according to procedure established by law. A fundamental right with a single line statement turned out to be a diverse and substantial body of rights. The plain and simple right of animal existence developed into right to move around freely, right against bonded labour, right to a proper trial, right to livelihood, right to education, right to privacy, right to

information, etc. In the light of this progressive development, the right to a clean and healthy environment was an obvious extension of Article 21.

The inclusion of right to a clean and healthy environment within the ambit of the right to life under Article 21 can be credited to *Subash Kumar v State of Bihar*. However, the culmination of this right can be traced back as far as *Ratlam Municipality v Vardichand*. Later Oleum gas leak case, Bhopal Gas Tragedy, Doon valley case further steadied the positive development and the environmental movement in the country benefitted. Finally in the matter of preventing and controlling vehicular pollution (the main ingredient of unsustainable automobile use), Shri M.C. Mehta's petition filed in the Supreme Court hit the nail in the head.

The writ petition, namely, Writ Petition (Civil) No. 13029 of 1986, gave a severe boost to the morale of the environmentalists who had been shouting hoarse in regard to the perils of vehicular pollution to human health. It resulted in a series of judgements in the form of orders and directions vide which the citizens of Delhi in particular and the population of India, in general could breathe easy again. Some of these judgements went on to become the most favoured and nationally accepted policies of promoting sustainable use of Automobile in India. One landmark interim order of the Supreme Court arising out of the abovementioned petition [W.P. (C) No. 13029 of 1985] was the direction given to the Central Government to constitute an authority under section 3 of the Environment (Protection) Act, 1986. Under the said order the Central government constituted the Environment Pollution (Prevention and Control) Authority or the EPCA.

The EPCA, under the Chairman ship of Shri Bhurelal, has been functioning since its inception in January 1998. The EPCA became the fabled 'genie' of the Supreme Court in dealing with the matters of Vehicular pollution in the National Capital Region (NCR), Delhi and the ramifications of which was experienced by almost the whole of India. The credibility factor of the Bhurelal

Committee is so high that any matter, direct or incidental, related to vehicles and its sustainable use is referred to it by the Apex Court to arrive at a justifiable conclusion. And the EPCA has never let the court down on this endeavour.

In pursuant to the various order of the Apex Court directing the EPCA to prepare reports, a number of comprehensive documentary reports have been produced by it. Proposal for Emission Controls on Petrol Two-Stroke Engine Driven Two and Three Wheelers (October 1999); Report on Standards for CNG Vehicles and Refilling Stations (July 2001); Report on Clean Fuels (July 2001) determining the clean fuel between the Compressed natural Gas and Ultra Low Sulphur Diesel; Second Generation Reforms for Air Pollution Control in Delhi (April 2003); Final Report on Particulate Pollution Reduction Strategy in Seven Critically Polluted Cities (January 2004); 2nd Final Report on Particulate Pollution Reduction Strategy in Seven Critically Polluted Cities (February 2005) are some of the Reports prepared by it which has amply aided the Supreme Court in issuing directions to the Government in taking steps of in preventing and controlling vehicular pollution with the objective of promoting sustainable automobile use for a clean and healthy environment.

Statutorily the Government of India is empowered to constitute the EPCA under the Environment (Protection) Act, 1986 but the apathy of the Government was clearly manifested when the Apex Court had to strictly direct it vide an order in fulfilling its statutory obligation. The EPCA can be equally credited with Supreme Court in bringing about the improvement in the ambient air quality of Delhi in particular and of the country in general.

The Supreme Court has brought the whole area of environmental issues through Article 21 of the Constitution on centre stage of Environmental jurisprudence. Further *M.C.Mehta v Union of India (Delhi Pollution Case)* was the perfect vehicle in taking the demand of providing a clean, healthy and pollution-free air to another level when the Apex Court issued result

oriented directions and landmark judgements in the matter of curbing vehicular pollution thereby promoting sustainable automobile use.

According to the Report submitted on March 31, 2002 by the National Commission to Review the Working of the Constitution, a recommendation, *inter alia*, has been proposed to add a new clause, namely, clause 3 in Article 21. The clause states that whoever has been illegally deprived of his right to life or personal liberty shall have an enforceable right to compensation. It can be safely said that this recommendation has been made keeping in mind the trend followed by the Hon'ble Supreme Court in various cases, namely, *Rudul Shah v State of Bihar*,⁴ *Stephen M. Hongary v Union of India*,⁵ *Bhim Singh v. State of Jammu and Kashmir*,⁶ *Saheli v. Commissioner of Police, Delhi*,⁷ where recognising the liability of the State to pay compensation to a victim of State atrocities depriving life and personal liberty under Article 21 of the Constitution.

In Chapter five the Common Law remedy is discussed. There it is shown that Compensation is actually the domain of the Tort Law which says that a person whose legal right is violated can bring an action for damages in monetary terms. This is a branch of law governing actions for damages for injuries to certain kind of rights, like rights to personal security, property and reputation. The award of pecuniary reparation for such injuries was the subject of regulation by the laws of all communities ancient and modern. The law of tort is properly unexplored area in combating pollution in general and vehicular pollution in particular. The victims of unsustainable automobile use, whether direct or circumstantial, can be brought under the ambit of this law. Some of the torts apt to challenge the unsustainable automobile use and the rights violated by its effects are under Nuisance, Negligence and Strict Liability.

⁴ AIR 1983 S.C. 1086.

⁵ AIR 1984 S.C. 1026.

⁶ AIR 1986 S.C. 494.

⁷ AIR 1990 S.C. 513.

The tort of Strict liability, converted to Absolute liability after the Oleum Gas Leak Case, has opened up avenues to explore ways to compensate the plaintiff-victims affected by unsustainable automobile use but the problem has been to pin the blame on determinate persons and make them defendants. Tort is a remedy against private wrongs and action has to be brought against a definite body. The automobiles contributing to the wrong of vehicular pollution is large and committed by an indeterminate number of persons, further all such vehicles may not be regular in contributing to it because these are all mobile sources. Chances are brighter to bring action against transport agencies that have depots for stationing their vehicles in large numbers and they pollute while they are stationary there.

The 'sustainable automobile use' is a facet of the Sustainable Development principle and comes under its concept. Taking this concept further, there is a need for the applications of the *polluter pays* and the *precautionary principles*, both practical theories of Sustainable Development. Such applications can be carried out when the owner of the motor vehicle fails to check the smoke emission of vehicles; physically maintain vehicle properly; use of Euro norms compliant engines; Use the prescribed fuel which is designated as clean fuel; etc.

Further, there is scope for applying the concept of the 'Remoteness of Damages' in respect to unsustainable automobile use. Remoteness of Damages is a concept under which the law of torts deals with the fixing of liability on the wrongdoer for remote consequences of his actions by applying the test of reasonable foresight. According to this test, if the consequences of a wrongful act could have been foreseen by a reasonable man, they are not too remote. If on the other hand, a reasonable man would not have foreseen the consequences, they are too remote.

Applying this test in situations where unsustainable use of automobile is involved, an action for negligence, nuisance, etc. can be collectively brought by the sufferers against the persons in charge of vehicles in a particular area who have failed to

properly maintain their vehicles . Even if there are procedural difficulties in doing so then at least the automobile manufacturers can be brought within the ambit of this principle by the government on behalf of the people suffering from air pollution related diseases such as lung cancer, asthma, bronchitis, etc., if vehicles of such car manufacturers have been violating norms while coming out of the assembly lines. An analogy can be drawn from the recent legal developments in the world, especially, the United States of America, in respect to payment of compensations. The American courts are ordering tobacco companies to pay compensations to the cigarette smoking victims of lung cancer on the basic premise that these companies failed to adequately sensitise, caution and educate the smokers regarding the fatal consequences cigarette consumption.

In conclusion it can be seen that the hypothesis of excessive unregulated use of vehicles despite several laws is upheld. The need for sustainability for vehicular use is the need of the hour.

SIKKIM

Environmental pollution is one of the major problems that the world community is facing and the irony is that environmental pollutants, whether it be of air, land or water, are the results of man's own actions. Environmental degradation has been a chronic problem throughout the country and concerted efforts are being made by various authorities to curb the menace of pollution of the environment. Consistent and vigorous efforts are being taken both in the field of policy formulation and enforcement to protect and improve the environment, further preventing, controlling and abating environmental pollution.

The Sikkim scenario has been reflected in Chapter seven. The twenty-second state of India is located in the southern foothill of the Himalayas and it, too, hasn't been left untouched by the vagaries of global warming and climate change – a direct fall out of the universal environmental pollution. The problem of environmental pollution in Sikkim may not be in the gravity

being faced by other States but the menace of pollution in its towns, especially Gangtok, is increasing on a day-to-day basis due to the rise in population – partly by inter-state influx and partly by intra-state migration.

Recommendations and Suggestions in Sikkim

Sikkim, a landlocked State of the Indian union, is bereft of industries due its geographical location but the same reason has made it to be a prospective tourist haven. Its potential of being a tourism dominated economy lies in the very geographical location which discourages the establishment of other typical industries like manufacturing.

The environment of Sikkim is a given, taking into consideration its climate and its location in the foothills of the Himalayas and ranging from an altitude of almost sea level to sometimes mountainous height. The Sikkim Government has been advocating the cause sustainable tourism with policies underlined for eco-tourism. The State government is very well informed to maintain its pristine environment and as the saying goes not to bite the hand that feeds.

In present times according to which the earth has aged, there is a dearth of quality tourist destinations provided by the countries in the world. Thus, there is a huge opportunity for Sikkim to grab the proverbial tourism pie. Though this opportunity has been exploited accordingly, more needs to be done and is being done by the State Government. On this count, the financial aid and logistical support of the Government of India, especially, the Ministry of Tourism is also laudable.

New places of interests are under development; Religious monuments are being constructed targeting pilgrims; periodical tourist festivals are being held with a variety of themes including food, flowers, etc. All these measures have shown positive results and brightened up the prospects of tourism being the mainstay of the Sikkimese economy. The latest report of the Sikkim Government Tourism department has shown that the number of tourists visiting Sikkim annually has crossed well over the six lakh figure. This figure includes both the domestic and

the international tourists. This obviously bears a great burden on the basic infrastructure, especially the air, water, land, roads, etc. Among the various consequences of abovementioned growth, the impact of the transportation activities connected with the carriage of goods and passengers would be great. Caution is advisable in framing policies in matters relating to boosting the tourism. Such approach should be holistic in nature and coordination between various agencies and stakeholders is very important.

The problem of environmental pollution has already been projected before the authorities concerned and the difficulty of checking and curbing it would rise if a well planned strategy to protect and improve the environment is not developed and put in place. This does not mean that the various authorities and departments concerned - Environment, Forests and Wildlife Management, the Sikkim Pollution Control Board, Transport, Urban Development and Housing, the Panchayats, the recently constituted Municipal bodies in various urban areas, etc - are not making an effort, but the point lies in the results. The desired results do not seem to be achieved. There are some knee jerk actions taken by the department concerned, for example, a rule stating that a new vehicle cannot be registered unless a parking place for such vehicle is owned by the new vehicle purchaser. This does not make the growing vehicular population and the pollution that it brings but such a move will generate flak towards the government. The idea is simple, the people in general and the vehicle owners (present and prospective) or users should be made aware regarding the problem arising out of such luxuries like owning vehicles. Such awareness campaign should not be aimed at making the citizens understand the effects of such pollution on public health but to change both lifestyle and attitude towards owning or driving a vehicle and the consequential responsibility connected to it.

Law plays a very important role in a democratic set up and as such legislation and enactments should be very much in the core agenda of environmental governance. Such laws and enactments should be in the form of regulation and not in the

form of prohibition. This makes one part of the process to curb the menace of vehicular pollution. The enforcement of law in Sikkim is cut above the rest of the country. The situation is, thus, due to the State's adequate and dedicated police force and a peace loving society. This helps in the proper and meaningful implementation of laws. Incidentally, in the area of fuel regulation, there has not been a single reported case of fuel adulteration, given the relatively large consumption of vehicular fuel in Sikkim. Here, a point of focus should be put on the vehicles, especially taxis, going out of and coming into Sikkim. Fuel sold outside Sikkim, especially Siliguri in West Bengal, has chances of being adulterated due to a large number of fuel pumps and a lax regulating authority there. This problem is further compounded by the fuel sold in black market along the National Highway 31A (on the west Bengal side) connecting Sikkim with the rest of the country through West Bengal. The regulators, with an aim to curb this menace, can direct the drivers of vehicles, especially taxis, to produce cash memos of fuel bought in the licensed fuel stations so that atleast they do not use fuel sold illegally which is cheap but adulterated and thus bear heavy on the environment of Sikkim.

Next, proper designated parking place should be declared. Gangtok and other towns of the State has got a vibrant and disciplined police force and they have been properly utilised by the government to reduce traffic jams and maintaining free flow of traffic during rush hour. The only problem underlying this exercise is that the police particularly manning traffic and other traffic related issues should be properly sensitised about the problem of traffic jams. They should be able to distinguish between actual road hoggers and incidental traffic violators. Every offender should not be treated in the same manner or, as they say, painted with the same brush.

After the formation of the Gangtok Municipal Corporation (GMC) in April 2010, the erstwhile Department of Urban development and Housing Department has been providing the logistical support to the GMC. Recently, under its project of

Comprehensive Mobility Plan⁸ for Gangtok, the UD & HD Department has made a comprehensive Report with the technical guidance of DDF Consultants Private Limited, New Delhi. It is clearly stated in the report that traffic in Gangtok is the one of the important contributor to environment degradation of the town of Gangtok. It further adds that the road to an integrated Urban Transport Policy for Gangtok is fraught with difficulties but the cost of not carrying on with the process of integrating would be far higher than that of doing it.

Therefore, it has recommended the following initiatives, similar to that of the National Urban Transport Policy:

- Developing pedestrian facilities by connecting prominent areas by stairs wherever possible to increase the walk ability thus decreasing motorised trips by increased share of walk
- Pedestrianizing important portions of the core city area and linking them with strategic parking places to encourage people to walk in such areas
- To identify mobility corridors along which high performance public transport system to be developed on the basis of a technical and economic feasibility and route rationalisation of the existing service.
- Improving operations of public transport so that there is significant shift towards public transport.
- Providing alternate routes for those having to enter the core city area even when their journey begin or end in that part of the city. This is to be done in the form of corridors to enable the core city area to be by-passed.
- Providing bypass routes for long distance commuter and truck traffic so that they do not have to travel through city roads.
- Policy level intervention that would discourage the use of personal motor vehicles.

⁸ Comprehensive Mobility Plan (CMP), Gangtok, Sikkim, Draft Report, DDF Consultants Private Limited, New Delhi

The following strategy needs to be adopted to meet the various goals mentioned above, set for Gangtok.

Development of Mobility Corridors: Roads have to be classified based on their functionality as Arterial, Sub-Arterial, Collector/Distributor and local streets which are important to standardise the design and management of the roadways. In Gangtok, the road hierarchy exists but they are not maintained according to required standards. By designating roads as mobility corridors, these corridors should get priority for increasing mobility as well as to ensure desirable speeds of traffic.

Public Transit Improvement Strategy: The existing share of public transport is 2 percent in Gangtok and in the future it is estimated to go down if nothing is done. One of the strategies identified as part of the vision is to increase public transport share to 80 percent. To increase public transport trips to 80 percent various technology alternatives like augmenting existing operations, Route Rationalising of existing operations, etc are being considered.

Pedestrian Strategy: In Gangtok, There is non-existence of non-motorised transportation because of its non feasibility. A significant portion (43 percent) of the trips is made completely by walk. Sidewalks and stairs have valuable community benefits. The following measures have been suggested by the CMP Report:

- Footpath and stairs to be constructed on the proposed mobility corridors and also the secondary arterial roads. It should also be provided in all residential roads, wherever possible.
- Encroachments on footpaths are to be removed. Other obstructions like telephone and electric poles to be relocated.
- The footpath should be designed in such a way that it would be accessible by children, old aged people,

women, etc. However, the design should also discourage the two-wheelers from using it.

- Footpaths at all busy intersections must be provided with handrails to enforce pedestrian cross at zebra crossings which should be clearly marked at signalled intersections.
- Street lighting should be adequate so that women and children feel safe to use the footpaths at night.

In the matter of the kind of public transport suitable for Gangtok city, the report is very clear that City-bus service with demarcated or Bus priority lanes is the best form of public transportation for Gangtok. This conclusion was reached after weighing the options like Metro Rail System, Light Rail Transit System, Tramway Systems, High Capacity Bus Systems (HCBS) on dedicated lanes or Bus Rapid transit (BRT), Sky Bus System. The finances for the eligible projects may be made available from the funds established under the Sikkim Transport Infrastructure Development Fund Act, 2004 and partly from the revenue collected under the Sikkim Ecology and Environment Cess Fund Act, 2005.

The Government of Sikkim under the able-leadership of the 'green' Chief Minister, Shri (Dr.) Pawan Kumar Chamling, with a 'now or never' attitude, has been steering the State administration with a vision to make Sikkim poverty free and fully literate by 2020. He and his government are very clear regarding the theory that a robust economic growth is the harbinger to fulfil his desired objectives of making Sikkim poverty-free by 2013. Sikkim being an industrially backward State with no high hopes of improving the present situation on that field, tourism has to compensate for that. The prospects are bright keeping in mind the State's pristine environment complemented by breath taking locales and having a small population. Here it is pertinent to mention that a programme of planting trees have been undertaken under the State government's Green Mission (Presently integrated with the National Green Mission plan of the Ministry of Environment and

Forests, Government of India) to counter atmospheric pollution and obtain environmental benefits. The programme involves every citizen from all walks of life to plant trees in their neighbourhoods and such planting is funded by the government.

The dream of the Chief Minister to make the citizens of the State economically independent is practically achievable, however correspondingly, the protection of the environment should be the State's priority. In the context of Sikkim, promoting the use of automobile in a sustainable manner would be a major advantage towards the goal of making Sikkim a green and pollution-free State. Such ideal situation would not only be keeping the state clean and healthy but will also make it possible to attract more tourists to Sikkim. The Sikkim government through its Chief Minister has been demanding a peace bonus from the Centre since long and economic well being of the State's citizen through the growth of the tourism industry would be helpful in maintaining that peace and tranquillity in the State. Further, Peace is transitory, therefore, instead of claiming a bonus for peace, Shri Chamling can rightfully demand special 'green' funds from the Central government (at a time when the present Ministry of Environment and Forests is headed by an 'environmental friendly' Minister, Shri Jairam Ramesh) to buttress the exchequer of the State.

Laws are never adequate in regulating the activities of human beings and the legal framework of sustainable automobile use in India can never achieve its desired goal of a healthy and pollution free environment until the participation of the people is guaranteed. In addition to laws promoting the use of alternative fuels (CNG, bio-fuels, etc.) and Mass public transit, the Governments worldwide have framed various policies by which people can be discouraged to use their cars or even if compelled to or when necessity arises, to use it sparingly. For example, international cities like Singapore and England have imposed congestion tax on vehicles for entering busy streets at peak hours.

In 1975, Singapore introduced, the Area Licensing System (ALS) centred on road pricing to reduce congestion in the Central Business District (CBD) of this city-state. The scheme required advance purchase of a licence to enter the restricted zone during morning peak hours (0730 to 0930) at a cost of \$S3 (later changed to \$S4) a day (or \$S60 per month, later changed to \$S80). As a paper-based system, ALS requires verification at the entry posts. Non complying vehicles are issued a fine slip sent by mail to the owner's home. At the same time, to discourage car use, public parking charges in the restricted zone have been raised and an additional surcharge has been levied on private parking operators. As a result of ALS implementation, the inbound traffic volume in the CBD during morning peak hours is still lighter than it was before ALS implementation three decades ago.⁹

The greater London (central zone) Congestion Charging Scheme was introduced in February 2003. The scheme requires vehicles that drive within a clearly defined zone of central London between 0700 to 1800 hours on Monday through Friday to pay a £8.00 daily congestion charge. The charge serves as an encouragement to car users to choose other forms of transport. Revenues from the charge are spent on transport facilities.¹⁰

In Seoul, most arterial roads are heavily congested throughout the day. Building new roadways to an extent that they will mitigate the traffic congestion of Seoul is constrained by the lack of land and the high cost of construction. The Seoul Metropolitan Government (SMG) has taken measures to reduce traffic congestion in the inner city and to shift the transportation modal choice in favour of public transportation by (i) expansion of road railway networks and (ii) vehicle-related taxation, congestion pricing, parking fees and private car-use restraints.¹¹

⁹ Source: A.T.M. Nurul Amin, *Reducing Emissions from Private Cars: Incentive Measures for Behavioural Change (2009)*, Prepared for Economics and Trade Branch, Division of Technology, Industry and Economics, United Nations Environment Programme (September 2009), p.70.

¹⁰ *Ibid* at 64

¹¹ *Ibid* at 65.

Japan introduced the "Low Emission Vehicle Initiative" as an action-based programme based on a law passed to promote green purchasing. As part of the programme, low-emission vehicles (fuel-cell vehicles) have been adopted as official cars by various government ministries. The use of LEVs as required by the green purchasing programme has contributed to the reduction of emissions from mobile sources. More importantly, the government has set an example to its citizens concerning the need for environmental awareness.¹²

China, which was affected by air pollution before the Beijing Olympics (2008) was to be held, experimented with the programme under which registration plates with odd and even numbers were to be used on alternate days to lessen vehicular traffic and avoid traffic jams.

In 1985, China, against the backdrop of a widening gap between transport demand and supply, initiated Beijing's integrated road transport system development programme which was directed at "substituting [for] private travel". In doing so, it adopted a two-pronged strategy: (i) building mass transit and (ii) creating disincentives to car use. Intra-city public transport and rail transport were the chosen modal strategies for reducing car use, whereas, among other incentive measures, increased parking fees were imposed, especially in eight central areas of the city.¹³

In the United States where waste is a way of life, people have changed their taste in vehicles. Earlier Americans used to drive large vehicles popularly called 'gas guzzlers' and American Auto Industry were not known for manufacturing small cars. Presently their compelled choices, necessitated by the recession and the global warming perils, have shifted to small cars. In the event, Asian small car manufacturers are having a field day there, and further, famous American car manufacturers like Ford and General Motors (Interestingly both these car manufacturers together with the Daimler company filed for bankruptcy recently

¹² *Ibid* at 96.

¹³ *Ibid* at 74.

and are currently on a lease of life granted by the U.S. Government through a stimulus bail-out package) have started outsourced manufacturing smaller versions of their globally famous models.

In India, among other measures taken by the Government, taxes are being lowered for vehicles whose polluting capacity is less than other cars. The Government of India has also proposed to exempt customs and excise duties on Hybrid cars. Petrol prices have been brought out of government control since June 2010 though giving the same treatment to diesel prices may take some time. Earlier, under government price regulation of oil, Public Sector Oil companies were facing huge losses due to the subsidy granted by the government on fuels, including petrol, diesel, liquified petroleum gas and kerosene.

Thus, we can say that the means of reducing the impact of automotive use – cleaner fuels, greener vehicles, public transit, walking and cycling – all require behavioural change. At the same time, technology and investment in infrastructure can also be effective tools to achieve these changes. For example, if technological innovations make cleaner fuel less expensive, it will be easier for individuals to switch to using them. Similarly, investment in public transit, good pedestrian walkways and bicycle ways also has the potential to influence many urban residents to move from cars to these highly desirable transportation modes.