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2.1 An Automobile industry in India an Overview

Though Service sector in India has major contribution in GDP, Automobile industry has its own consistent growth and has managed to retain its contribution in GDP. The Indian Automobile and its ancillary industry have emerged as a fastest developing sector of the Indian Manufacturing industry. It is estimated that India would become one of the top five auto component economies by 2025. According to KPMG report 2010 India is a home to a vibrant automobile of more than 40 million vehicles. It has been one of the few worldwide which saw growing passenger car sales during the recession time. In fact, in 2009-10 it has recorded its highest volumes ever. It is believed this upward trend will be sustained in the foreseeable future due to a strong domestic market and increased thrust on exports.

Continued high level growth of the Indian economy and automobile sector, is must for improving the lives of millions of Indians. However, with growth also comes the responsibility of meeting the associated challenges of fast depletion of traditional energy sources, rising energy costs, increasing oil import bill and the impact of mobility on the environment. In recent era the automobile sector has been one of the major reasons behind global warming due to its high carbon emissions. On this backdrop it has become necessary to initiate and implement green marketing practices
in Automobile and ancillary industries in order to reduce its harmful impact on environment.

The Automotive Industry globally is one of the largest industries and because of its deep forward and backward linkages with the rest of the industry; it has as strong multiplier effect and is one of the major drivers for economic growth. (NEMM 2020). The Indian automotive industry has made tremendous progress in the last decade. India has today emerged as the 6th largest vehicle manufacturer globally with the automotive industry contributing 21% approximately excise duty collection. This sector is important for economic growth and development because of its high contribution to the national GDP, employment generation and it meets the needs of the logistics and transportation industry, which is the life line of the economy. The growth of the auto industry which, at present, contributes 22% to the manufacturing GDP will be critical for realizing the target, envisaged in the new Manufacturing Policy, of increasing the share of manufacturing in overall economy to 25% by 2022. (NEMM 2020)

**Automobiles Segment: Product categories of the Automobiles Segment**

The Automobile segment comprises of the following four broad categories of vehicles

- Passenger Vehicles
- Commercial Vehicles
- Three-wheelers
- Two-wheelers

Two-wheelers, being the most popular means of personal transport, alone account for about 75% of the total automobile production in India, while passenger vehicles account for nearly 16% of the production. However, owing to their lower sales realisations, two wheelers account for only around 32% of the sales in terms of value while passenger vehicles account for around 62% of the same.
With the gradual liberalization of the automobile sector in India since 1991, the number of manufacturing facilities has grown progressively. The Indian automotive industry produces a wide variety of vehicles: passenger cars, light, medium and heavy commercial vehicles, multi-utility vehicles such as jeeps, two wheelers that include scooters, motorcycles and mopeds, three wheelers, tractors and other agricultural equipments. The Indian automobile industry is dominated by two wheelers, which account for 75% of the total vehicles sold in the country. In the passenger car segment, India is mainly a small car market.

**Evolution of an Indian Automotive Industry**

The Pre-1980s era was defined by a closed market, availability of outdated models and limited supply of vehicles leading to limited growth of the market. The industry was in its nascent stages without any significant players in the market and neither was there a significant base of customers. Automobiles were largely unaffordable and objects of desire for most people.
This changed in the next few years of 1983 to 1993 wherein Maruti Udyog Limited entered the Indian Automotive Sector. The era saw the formation of several joint ventures in the space of commercial vehicles and auto components. With the de-licensing of the automotive sector in 1993, several global players entered the market as a consequence of which the market grew, leading to stiffer competition and a large variety of products for the customers to choose from - currently, the Indian customer has over 30 Auto Original Equipment Manufacturers (OEM’s) to choose two wheelers, three wheelers, passenger vehicles and commercial vehicles from; and this is only expected to grow further, with the recent advent of foreign players such as Volkswagen, BMW and Renault-Nissan.

**2.2 Value Chain of the Automobiles Segment (OEM, Tier 1, Tier 2 level Suppliers)**

The Automobile segment, comprising of the OEMs, is at the topmost Tier of the Automotive Industry with a wide network of Tier I, II, and III level suppliers supporting the OEMs for end product production. In terms of activity, Manufacturing
is the key function in the Automobile segment, owing to nearly 60-70% of the manpower engaged in this activity at the manufacturer’s end (direct employment). Indirect employment generated by this sector is considerable as personnel are employed in functions such as sales, finance, insurance, etc. In terms of criticality, capturing the customers’ requirements and translating them into products that would sell in the market is the most challenging part of the value chain. In fact, players who are able to develop expertise in this area command a significant edge in the market and this is one of the key reasons why foreign players have been able to make place in the Indian market. Increasing consumer discerns and growing cost competitiveness has forced OEMs to manage the brand and outsource the rest. This has also resulted in increased tierisation of the automotive industry.

Fig 2.3: Auto Component Industry Profile

![Auto Component Industry Profile](image)

Source: ACMA 2012

2.3 Recent Performance of the Sector

In 2010-11, the total turnover of the automotive Industry stood at USD 73 Billion (Rs 3, 27,300 crores)(SIAM Data) of which the turnover of the vehicle industry was USD 53.1 billion2 (Rs 2, 39,000 crores) with a 26% growth on year to year basis. The turnover of the auto component industry, in 2010-11 was USD 40 Billion (Rs.
The export of vehicles and auto components during 2010-11 stood at USD 6 Billion and 5 Billion respectively. In 2010-11, the contribution of the automotive industry to the Manufacturing GDP and the excise duty was at 22% and 21% respectively. The global recession of 2009 impacted the global automotive industry in a big way. Demand in traditional global automotive markets has declined and remains sluggish. However, the demand from emerging economies continues to be high with India becoming the second fastest growing automotive market after China. The global economic downturn of the recent past has firmly shifted the centre of gravity of the automotive industry to the east. It is predicted that the future growth of automotive industry will primarily come from the emerging economies which include the BRIC nations viz. Brazil, Russia, India and China along with Thailand, Iran and Mexico.

In 2010-11, the total global demand of passenger vehicles was 73 million units, of which the volume in India was 2.4 million units (4%). It is estimated that by 2020, Asia, Pacific and Africa region will witness a demand of 54 million passenger vehicles out of a total global demand of 108 million units (50%), of which the demand from India will be 10 million units (8%). Further, in 2020, the market/production for commercial vehicle, tractors and two wheelers in India is expected to reach 2.7 million, 1 million and 34 million units respectively, thereby making India the third largest vehicle market in the world. This will translate to an overall industry turnover of USD 162 billion, with the component industry attaining a turnover of USD 113 billion. However, for this potential to be fully realized, a lot of effort, both by the industry and the Government, will be required.

2.4 Automobile Industry in the light of Green Marketing:

Many leading economies have recently launched policy initiatives to promote electromobility. E-mobility presupposes innovations that are both radical and systemic, as new charging infrastructure, new mobility concepts and new interfaces with the energy system are needed. The paradigm shift affects an industry that is the backbone of manufacturing in many countries. Policymakers therefore need to strike a difficult balance between competing objectives: to mitigate climate change, reduce urban air pollution, enhance energy security and strengthen the competitiveness of national auto industries. Also, they need to ensure that investments in new vehicles, more efficient batteries and public charging infrastructures are undertaken.
simultaneously and in a coordinated way. China, France, Germany and India deal with these challenges differently. It traces policy differences back to initial industry characteristics, specific political priorities and patterns of economic governance.

The automobile constitutes an industrial product that engenders both considerable economic wealth creation and serious burdens to the natural environment. Although governments worldwide regard the capacity of the auto industry to generate jobs as a political asset to be preserved, they have also pressured car manufacturers to improve environmental performance. The industry has responded to stricter governmental regulations, voluntary agreement and collaborative R & D initiatives by seeking to adopt cleaner manufacturing technologies and investigating in environment-related research. In addition, competitive pressures ensure that every major high-volume car manufacturer is working towards increased levels of resource productivity.

**Various forms of green innovations used by automobile companies are as follows:**

There are various green marketing practices initiated and implemented by Automobile industry. Automobile companies have environmental opportunities in the entire value chain starting with supplier, company operations, distribution channel, end customer, product end of life cycle and disposal but mainly focus is on implementation of green practices in to various company operations as shown in the fig. below.

**Fig. 2.4 Environmental opportunities in Entire Value Chain**
Along with the company operation other various forms of green innovations have been used by automobile companies are as follows:

Development of hybrid technology, installation of CNG kits in small cars, practicing 3R- reduce, reuse, and recycle, promoting green procurement at supplier end, implementing ELV compliance and life cycle assessment (LCA) system, development of alternative fuel engine technologies, ways to reduce CO2 emission. So these all lead to optimum utilization of scarce resources along with practicing continuous innovations of environment friendly product will work as a lifeline for businesses. This will ultimately lead to sustainable development and to organizational excellence.

2.5 Green Marketing: Global Perspective

A growing number of companies are making the paradigm shift in values - from anthropocentric to biocentric (which means from company centric to eco centric) not only because it is the right thing to do environmentally, but it synergistically benefits the bottom line. Ciba-Geigy, Coca Cola, ConAgra, Dow, Du Pont, Dwight-Church, Electrolux, S.C. Johnson, Kroeger, McDonald’s, Mitsubishi, Norsk Hydro, Nippon Steel, Pacific Gas and Electric, Procter & Gamble, 3M, and Westinghouse are just a few of the companies that have experienced the benefits of a biocentric economic philosophy (Kleiner,1991; Porter,1991).But the battle has just begun. These companies and many of their colleagues have begun the journey. There are many miles yet to go and the path is strewn with many stumbling blocks- ecological, economic, technological, political, and cultural. Marketers, because of their catalytic position can and should take a leadership position; not only with their companies’ profit, but to preserve the earth and its biosphere. The old ways are no longer adequate. It’s time to think a new. We need to reorder our values to a paradigm that recognizes the partnership of humankind and earth. If humans are to have harmony with the earth, its resources, and its biosphere, then we should have the foresight to appreciate its underpinning character. We need each other, not only for survival but also for continued growth-economically, socially, mentally, biocentrically, and spiritually (Ginsberg and Bloom, 2004).
In view of global climate change, many companies across the world strives to implement environment friendly practices in different forms below are few examples of leadership of automobile and other industries.

**Kodak** has released a new green and yellow leaf logo to signify the environmental benefits of its products. Restaurants can reduce their environmental impact and tell their 'green' story to consumers by participating in the Green Seal certification program for green restaurants.

**China's Suning** Appliance is partnering with **South Korea's LG Group** to develop 'green' household appliances for the Chinese market. U.S. consumers are buying the same or more environmentally responsible products, regardless of region, age, gender or state of the economy. French home builders are increasingly looking for affordable green materials as demand for traditional construction materials declines in favor of more environmentally friendly offerings. USA Colleges are using their green credentials to burnish their reputations with prospective students. More potato growers in Europe are looking to expand their green marketing efforts in reaction to increasing demand from consumers. Swiss Communication Equipment providers are concentrating more on environmental awareness and concern. Companies recognize that while it pays to be green by acting in an environmentally responsible way, it is important for companies to communicate their green credentials.

**Korean Hyundai Motor** adopted a zero wastewater discharge system at its plant to become a clean production facility. They have introduced a comprehensive manufacturing environment management system to oversee various environment-related performance indicators related to production. They include greenhouse gas emissions, water use, and discharge of air pollutants, water pollutants and waste.

**BMW** reduced use of resources and emissions levels per vehicle by 26% between 2006 and 2010. This figure exceeds the target set for 2010.

**HONDA’s green innovation:** Honda has been delivering its products to its customers all over the world to share its joys with them, while at the same time making every effort to solve environmental problems, recognizing the impact it has on the global environment. Company was determined to continue fulfilling its environmental responsibilities, which are now increasing in their importance, while serving more than 20 million customers.
CO2 reduction targets and progress of Honda in 2010: Honda is working to further develop its technology to reconcile the threat of global climate change with the growing demand for mobility. Company’s overall goal is to manufacture products with the lowest in-use CO2 emissions at plants with the lowest CO2 emissions per unit of production. Product CO2 emission: Due to a shift toward smaller automobiles and enhanced engine efficiency, Honda has reduced the CO2 emissions of its automobiles, which can be seen in figure 2.5.

**Figure (2.5)The Honda LCA(Life Cycle Assessment) System**

![Image](image-url)

Honda established the Honda LCA System in Japan to measure the environmental impact of products from manufacturing to disposal. Applying this system, Honda is working to reduce environmental impact. One of the key elements Honda is monitoring is CO2 emissions. Based on emissions measurements, Honda is setting targets for production, purchasing, sales and service, administration, transportation and other domains, and implementing effective initiatives to reduce emissions.

**Enhancing product and production efficiency**

To address the issue of climate change, Honda has led the industry in establishing worldwide CO2 emission reduction targets and implementing initiatives to attain them. Believing that the internal combustion engine will remain the principal source of mobility power until at least the year 2020, Honda views fuel efficiency and fuel economy enhancement as a key issue. Stringent regulations such as Corporate Average Fuel Economy (CAFE) standards have been introduced in the U.S., Europe and other regions to mandate fuel economy improvement for automobile fleets.
Recognizing the need for global initiatives, Honda is moving from measuring regional fuel economy averages to measuring global fuel economy averages, and from fuel economy averages based on vehicle categories to average targets for its entire worldwide vehicle line up. Honda is also committed to further improving the efficiency of its worldwide manufacturing processes and reducing CO2 emissions. To this end, in 2006, Honda established global targets for average per-unit CO2 emissions in manufacturing and is working steadily to reach these targets.

**Ford Motor Green Initiatives**

Ford Motor Company is requiring ISO 14001 certification from all of its suppliers with manufacturing facilities. ISO 14001 is the environmental management standard under which independent auditors evaluate an organization’s environmental performance in a systematic way. Ford developed and provided ISO 14001 Awareness Training to allow suppliers to benefit from Ford's experience in achieving ISO 14001 certification at its plants. The company also has a supplier-owned reusable container program in place to reduce packaging waste for its North American plants. As part of its World Excellence Award process, Ford Motor Company has created Environmental Recognition awards that recognize suppliers for outstanding environmental achievement and innovation. The company also established an internal Global Supply Environmental Management Forum to develop global supply initiatives across all its brands and regions to provide suppliers with a unified set of environmental requirements, tools, and training.

Last but not least, 10 Greenest Cars to buy list for 2013, Greener Cars.org used tailpipe emissions, fuel consumption and gas emissions that effect climate change as their criteria for judgement. The list is ranked from one to ten, with the cars that make the least environmental impact at the top of the list.

1) Toyota Prius C  
2) Honda Fit EV  
3) Toyota Pirus  
4) Toyota Pirus Plug-In Hybrid  
5) Honda Civic Hybrid  
6) Honda Insight  
7) Volkswagn Jetta Hybrid  
8) Mercedes-Benz Smart
9) Scion iQ
10) Ford Focus Electric

The Kelly Blue Book (KBB) list of "best" green cars doesn't include any information about a standard set of criteria that was used to judge the hybrid and plug-in electric vehicles that are included on the list. This is especially suspicious since the list uses ranking numbers. The outstanding qualities of the KBB 1 pick for best 2013 green car are "range, practicality, refinement and value. Perhaps this was the criteria used for all vehicles on the KBB top ten list, or perhaps the auto manufacturing advertising dollars had some influence.

2.6 Green Marketing Awareness In India In Relation To Automobile Industry

Although it is difficult to become 100% environment friendly, an Indian automobile industry is trying to cope with the challenge of implementing ecology in holistic way from production to consumption due to growing concern of consumers. Automobile manufacturers therefore need to strike a difficult balance between competing objectives: to mitigate climate change, reduce urban air pollution, enhance energy security and strengthen the competitiveness of national auto industries.

Foreign auto companies – such as German Volkswagen, BMW, and Mercedes Benz, American Ford and GM, European Volvo and Renault, and Japanese Honda and Nissan – in India have brought world-class sustainable practices to the country. "The Indian market is characterised by a growing awareness of environmentally friendly and efficient technologies that reduce fuel consumption and CO2 emissions. In India, too, the limit values for emissions are becoming ever stricter. German OEMs (Original Equipment Manufacturers) offer new cars and light trucks with less fuel consumption and more fuel efficiency than ever.

The main purpose of the green marketing is to strengthen ecological marketing strategy by providing more ecological products as well as becoming more environmental friendly while producing those goods. (De Craecker 2009) The car manufacturers are the second biggest actors of the pollution in the world, mostly by the use that the consumers do of their products. Transportation accounts for about 23%-26% of global emission out of which the personal transport or cars are responsible of 10% of the CO2 released in the atmosphere. So a transition to a cleaner and greener transport is imperative in order to address the climate change (Pillai,
2011). Indeed, the exhausts represent 80% of the total amount of pollution created by a car. (FEBIAC, 2008). A car is a complex product. It is the result of a combination of more than 1500 pieces, produced in many different materials like steel, PVC, aluminium. The actual constraints for car producers are to propose an attractive product for people and at the same time to develop this one in accordance with all the rules; rules that we notably find in the domain of security and environmental legislations (FEBIAC, 2008).

Automobile industry’s main focus is on sustainable development through optimal resource allocation, energy efficiency and recycling. India, like China, is one of the fastest growing automobile markets and vibrant economy in the world. India is emerging fast as hub for Global Vehicle Programs. It is expected that by 2020, auto component industry will be USD 113 billion (ACMA 2012-13). Growing Engineering and IT capability for designing and manufacturing presents huge opportunity to partner in product and process innovation. It also presents opportunity to outsource for OEMs (Original Equipment Manufacturers) and Tier 1 vendors. (ACMA 2012-13). In 2010, the Government of India announced an intensive scheme to promote the development and sale of electric vehicles in India. Broadly speaking the decision was to give a 20% rebate on ex-factory price of electric vehicles. Hybrid vehicle parts are exempted from basic custom duty and concessional central excise duty of 4% provided to specific parts of electric vehicles in 2010 budget. In the 2011 Union Budget, a set of new incentives were declared for electric vehicles (environment friendly vehicles) - full exemption of basic custom duty and concessional excise duty of 4% to batteries imported for electric vehicles in replacement market. The auto component industry had to be content with a meager growth of 5.6 percent during 2012-13, with turnover of INR 2,16,100 crores (USD 39.7 billion), notwithstanding the average inflation of over 3% in vehicles prices. (ACMA 2012-13)

**Examples of Leadership: Indian Perspective**

**Maruti Suzuki’s green innovations:**

Maruti Suzuki has strived towards offering high quality, latest technology and value for money products to its customers. Recently, the company has introduced a peppy k series engine for its new car. The company plans to design cars that are fuel efficient and lower on CO2 emissions. It also has plans to develop hybrid, electrical, and multi-
fuel engines. Re-enter Europe Maruti Suzuki re-entered European market with a
global car that is fuel-efficient and lower on CO2 emissions.

The company has now started using CNG Kits. They have introduced this technology
in small car which fulfils the CSR of going Green. The company has launched CNG
kit for small car, its highest selling small car. The company as a proactive move is all
set to make its entire fleet of cars adhere to ‘end of life vehicles’ (ELV) specifications
by 2010 by doing away with the usage of hazardous substances during production of
cars and their components. The company uses next generation KB series Engine in its
Hatchback cars. The company added Virtual Design Review to its R&D activity to
enable virtual validation to reduce cycle time and development cost. In the field of
alternate fuel technology, the company developed LPG system for MPI engine.

Ecological Environment: Practicing 3 R: Practicing 3 R 3R- reduce, reuse, and
recycle. Continuous process of promoting 100% recyclable and reusable car parts.
Targets reducing fresh water consumption and implement rain water harvesting.

Promoting Green Procurement: Promoting Green Procurement Encourages its
customers to act upon environment friendly approach. The company conducts regular
training and education programmes at the supplier end. Sessions are also held at all
possible places comprising people from all arenas of the car industry.

Promoting Energy Conservation: Promoting Energy Conservation Education, and
improvement initiatives are taken on the shop floor. The company has introduced
three-coat-one-bake painting system at its facility. The company is moving towards
making its entire fleet of cars green with advanced and efficient technologies.

Organizational Excellence: Certification and Awards: Certification and Awards 1999-
Certified for establishing and maintaining EMS as per ISO 14001:1996 standards. The
company was again recertified for the same in 2002. Certified for changing its EMS

Golden Peacock award for Environment Management in 2007 was honoured by
World Environment Foundation.

Honeywell: Honeywell offers a full automation solution for alternative fuel plants.
Leveraging a partnership with UOP, Honeywell has intimate knowledge of process
technologies including catalytic cracking, hydrocracking and hydrotreating, while leadership in the chemicals and life sciences markets provides expertise in dehydration, fermentation and distillation. Honeywell can deliver automation solutions optimized around these process technologies to deliver operational readiness, efficiency and reliability along with environment protection to customers worldwide. In addition, Honeywell has a unique model for bringing new plants to full production faster.

Hence, we can conclude that green marketing concept is evolving at a rapid pace in India. Although the government and many private companies have been making an effort to bring about a green mindset among the people and promote green products, a lot still need to be done to make green products truly viable and workable in India. Activeness about green marketing by government, companies, customer & society as a whole should be amplified as environment should be top management priority.

2.7 Green Marketing Awareness to Automobile Industry In Pune.

After the study, we have found that the various companies in Pune are taking initiatives in the area of green marketing in their mainstream company operations. Some companies are initiating it as a part of their corporate social responsibility. So listed below are the automobile companies who have taken green drive.

**Tata Motors:** Tata Motors is continuously taking efforts towards environment protection through soil and water conservation programmes and extensive tree plantation drives. Company is committed to restoring and preserving environmental balance, by reducing waste and pollutants, conserving resources and recycling materials. Company has set up an effluent treatment facilities in its plants, to avoid release of polluted water into the ecosystem. In Pune, the treated water is conserved in lakes attracting various species of birds from around the world thus turning the space into a green belt. With the intention of protecting the environment, Tata Motors has upgraded the performance of its entire range of four and six cylinder engines to meet international emission standards.

**Praj Industries** Praj is a global Indian company that offers innovative solutions to significantly add value in bio-ethanol, alcohol, brewery plants, process equipment and water and wastewater treatment systems for customers, worldwide. Company is
also in the process of upgrading their units and R&D centres to "green" technology to save energy and emit less harmful substance. They are also working on upgrading their products to more energy saving from the current ones.

**Bajaj Auto Ltd.:** Bajaj has implemented the DTSi(Digital Twin Spark Ignition)technology, the mother technology for DTS-Fi and DTS-Si engine is highly fuel efficient. The engine technology also helps in reducing emissions and keeping the environment clean & green. Company’s plants have adhered to ISO 9001 (Quality systems) and ISO-4001 (Environment system). Investments have been made in Effluent Treatment Plant (ETP) has been to separate industrial & domestic effluent resulting in better quality of treated water. Further by installing tertiary plant, the treated water is again recycled. Bajaj Auto is determined to increase fuel economy and curb emissions across its entire product line up. Alternate fuels are good for the environment, reducing emissions and dependence on oil. The company has also developed three wheelers which use alternate fuels such as CNG and LPG.

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**Wind Power:** Bajaj Auto entered into Wind Power in January 2000 and invested approximately Rs. 300 crores over the next 3 years. The rationale behind the investment was to provide a natural hedge against rising energy costs and to contribute to a clean energy initiative which was nascent in the state of Maharashtra. With this initiative approximately 90% of Bajaj’s power requirements for Plants within the state of Maharashtra, is met through Wind Power. The DTSi technology, the mother technology for DTS-Fi and DTS-Si engine is highly fuel efficient. The engine technology also helps in reducing emissions and keeping the environment clean & green.

**Manufacturing plants:** Bajaj has world class manufacturing plants at Waluj and Pantnagar and a state of art plant at Chakan where a wide range of two-wheelers and three-wheelers are manufactured. These plants have adhered to ISO 9001 (Quality systems) and ISO-14001(Environment system) certification. All the plants are
actively involved in afforestation with Plantation work in & around plant premises. Company also had made investments in Effluent Treatment Plant (ETP) to separate industrial & domestic effluent resulting in better quality of treated water. Further by installing tertiary plant, the treated water is again recycled.

**Bharat Forge:** As Bharat Forge evolves, company is expanding and strengthening its position on the global stage, balancing commercial ambitions with environmental concern. Propelling its dynamic evolution is "innovation." Company’s R&D team has been developing technologies to minimize the carbon footprint and produce light weight products that translate into lower energy consumption. Bharat Forge along with KPIT Cummins has indigenously developed new hybrid technology solution that enables both existing and new vehicles to dramatically increase fuel efficiency and engine performance, while significantly decreasing greenhouse gas (GHG) emissions.

Bharat Forge is environmentally conscious and is committed to creating, maintaining and ensuring a safe & clean environment. Company attempt to make its processes & businesses more environmentally friendly, which means less consumption and re-use as much as possible. Since 1998, the company has invested in Renewable Energy Project generating Green Energy. Added to this it is buying Green Energy Power, which put together is approximately 30% of Bharat Forge, Mundhwa plant consumption. This usage of Green Energy is considered to be a reduction of Carbon Emission to the extent of approximately 30,000 tons per annum and this is recognized & certified by United Nations Framework Convention on Climate Change (UNFCCC) under Kyoto Protocol.

**Cummins India Ltd:** This company has taken initiative in waste management programmes as a part of it, A Six Sigma Project on waste management has been launched focusing on re-use of plastic generated internally. Project promises the following deliverables: Partnering with a small scale engineering company called Kulkarni Engineers for manufacturing plastic bags which would be used by Cummins for packaging engine components. It has been estimated that out of the 3 tons of plastic scrap generated per month, nearly 1.5 tons of plastic can be recycled, which after processing yields nearly 1.2 tons of essential plastic granules. The plastic granules could be used for manufacturing new plastic bags. In addition to saving
natural resources, the project provides employment to three differently challenged individuals.

**Mahindra Group:** This group had launched project Mahindra Hariyali in which 1 million trees would be planted nation-wide by Mahindra employees and other stakeholders including customers, vendors and dealers.

**Volkswagen:** Environmental protection relating to the automobile includes all measures to protect and preserve the natural bases of human lives. Proactive environmental protection prevents the occurrence of negative influences such as noise and emissions through advance planning or new technologies (water-soluble paints, advanced engine management, economical driving). Corrective environmental protection avoids the negative effects of existing conditions (such as effluent treatment, catalytic converters, noise insulation). In the automotive industry, environmental protection starts when a new vehicle or production facility is planned and built, and continues through to the reprocessing and recycling of the materials previously installed or used. The driver can also make a contribution during use through economical and conscientious operation.

**2.8 Government Initiatives:**

In view of the huge potential of the automotive sector, the Government of India jointly with the industry prepared a ten year strategic vision plan for the industry - the Automotive Mission Plan 2006-16 (AMP 06-16) which was formally released by the Prime Minister in January, 2007. The AMP 06-16 lays down a 10 year roadmap for the automotive industry covering every aspect of its growth ranging from broad direction on fiscal policies, emissions, safety and globalization in terms of technical standards, enhancing competitiveness, skill development, testing and homologation, Research & Development.

**Automotive Mission Plan (AMP) 2006-2016:**

AMP envisages that by 2016, India will emerge as the destination of choice in the world for the design & manufacture of automobiles and automotive components. The sector is targeted to reach $145 billion by 2016 with doubling of the contribution of the sector to the National GDP from around 5% in 2006 to 10% in 2016 and
additional employment generation opportunities for 25 million people in the entire value chain. As on date, the automotive industry is on track to meet most of the AMP targets for 2016. The AMP document captures the expectations and responsibilities of all the stakeholders for a common end objective and is a shining example of how Government -Industry collaborative approach can transform an industry sector. The approach and ethos of AMP has been adopted even more rigorously for developing the NEMMP 2020 document.

**India’s National Electric Mobility Plan 2020** (source: press information bureau, Government of India, 9 January, 2013) Hon’ble Prime Minister Dr. Manmohan Singh revealed the National Electric Mobility Mission Plan (NEMMP) to reduce the environmental impact of the automotive industry.

The NEMMP 2020 is a detailed plan based on an in-depth primary data study conducted jointly by government, automotive industry and academia/research institutes. The NEMMP is vital for reducing our dependence on fossil fuels, 80% of which is imported leading to massive foreign exchange deficit.

Here is ‘In a Nutshell’ version of India’s plans to become a global leader in EVs by 2020

Target: 1. To put 6-7 million EVs on road by 2020; 4-5 million are expected to be two-wheelers. 2. Reduce dependence on fossil fuels. 3. To promote cleaner technologies.

The reason behind doing this is, India’s excessive appetite for fossil fuel has an adverse impact on the environment and even on our foreign exchange reserves. Successful implementation of NEMMP will result in 2.2 – 2.5 million tones of fossil fuel savings by 2020, that’s a monetary saving of Rs 30,000 crore. It will also lower vehicular emissions and decrease carbon di-oxide emissions by 1.3% to 1.5% by 2020. The production of hybrid and electric vehicles in India is an investment that will deliver economic growth, quality jobs and a cleaner future.

**Execution Plan:** Both the government and the automotive industry will jointly invest Rs 23,000 crores to develop the EV eco-system in India. The government will invest close to Rs 14,000 crores over the next 5-6 years. The automakers will invest close to Rs 8,000 crores.

India will deploy support measures that will quicken up the process of consumer acceptance of EVs.
Support from developed Nations: Germany is going to help India achieve its target. The Germans are strong supporters of electric mobility. Currently, Germany has about 1,500 EVs operating on German roads. By 2020, Germany aims to put at least one million electric vehicles on their roads. Thanks to these efforts, German cities are among the greenest in Europe. An Indo-German Joint Working Group (JWG) on Automotive Sector has been established to intensify cooperation in the development of efficient automotive technologies and alternate fuels and drives.

**ARAI (Automotive Research Association of India) Guidelines:** ARAI Pune is a co-operative industrial research association established by the automotive industry with the Ministry of Industries, Government of India. The Automotive Research Association of India (ARAI) has been playing a crucial role in assuring safe, less polluting and more efficient vehicles. ARAI provides technical expertise in R & D, testing, certification, homologation and framing of vehicle regulations. ARAI has given guidelines to the automobile companies for emission reduction that they should take initiatives in the following areas as shown in the diagram.

**Figure 2.6 Emission reduction initiatives**

![Emission reduction initiatives diagram]

- Improving Energy efficiency
- Fuel and Emission Standards
- Inspection, Certification and Maintenance
- Retrofitment
- Alternative fuels
- Vehicle technology for more eco-friendly vehicles
- Infrastructure & logistics for better traffic management
- Driver behaviour

Source: ARAI (ISA vision summit Feb 2013)
Figure 2.7 Implementation of Environment norms in automobile industry

Source: ARAI (ISA vision summit Feb 2013)

ARAI being an governing body it made some norms like BS-II/BS III, BSIV, alternative fuel like CNG/LPG for vehicles for emission control.
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