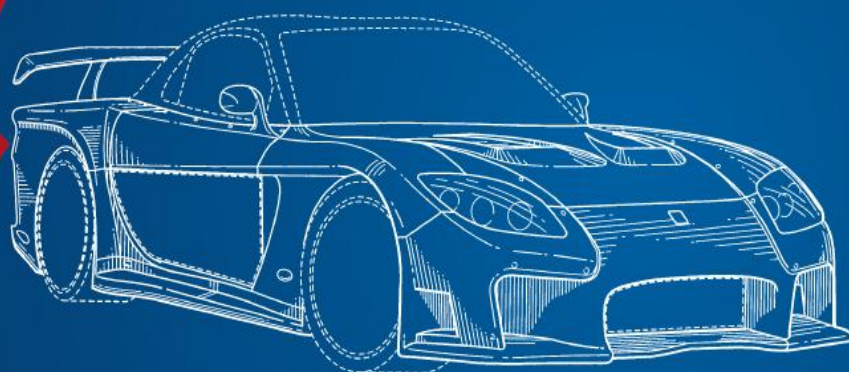




Report of the Working Group
on Automotive Sector
for the
12th Five Year Plan (2012-2017)

Department of Heavy Industry
Ministry of Heavy Industries and Public Enterprises



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Report of the Working Group on Automotive Sector for the 12th Five Year Plan (2012-2017)

Executive Summary

Planning Commission constituted a Working Group on Automotive Sector for the 12th Five Year Plan (2012-2017) under the chairmanship of Secretary, Department of Heavy Industry. The Composition and Terms of Reference are provided in Annexure. Three sub-groups one each on Automotive Mission Plan (AMP), Auto Component and Electric Mobility were constituted. The methodology consisted of inviting information/suggestions from all the stake holders, such as industry associations, centres of excellence and Govt. departments etc. The inputs were collated and deliberated upon in-depth at various fora, before finalizing the report.

Approach to the 12th Five Year Plan: Automotive sector as an engine to propel manufacturing to a high growth trajectory

In the present stage of economic development of the country, the manufacturing sector is expected to absorb a much larger workforce, relieving agriculture of the excessive burden and also contribute more to the national GDP. However, contrary to expectations, the growth of manufacturing sector in India has remained slow. It is likely to achieve only about 7.7. per cent growth in the XI Plan as against the targeted rate of 10-11 per cent. This is also substantially less than the overall GDP growth of about 8.2 percent that XI plan is expected to achieve. The share of the manufacturing sector in GDP is only 15 per cent in India, compared with 34 per cent in China.

The National Manufacturing Plan which seeks to change the growth pattern of India's manufacturing sector, calls for focusing on a number of areas and has identified auto sector as having the competitive advantage and potential to fuel rapid growth of manufacturing.

An overview of the Indian Automotive sector - a strategic sector of Indian economy

- ❖ With a CAGR of over of 15% during the last 5-7 years, the automotive sector is aptly described as the next sun rise sector of the Indian economy.
- ❖ The contribution of this sector to the National GDP, with liberalization, has risen from 2.77% in 1992-93 to about 6% now. It provides direct and indirect employment to over 13.1 million people.

- ❖ In 2010-11, the total turnover of the automotive Industry stood at USD 73 Billion (₹3, 27,300 cr.) and its contribution to the Manufacturing GDP and the excise duty was 22% and 21% respectively.
- ❖ India surpassed France, UK and Italy to become the 6th largest vehicle manufacturer globally in 2010-11. Today, it is the largest manufacturer of tractors, second largest manufacturer of two wheelers and 5th largest manufacturer of commercial vehicles and is emerging as a global automotive hub.

Terms of Reference (ToR) wise summary of recommendations

(i) To articulate the mid and long term goals to be achieved in the sector

- Pursue the goals stated in the Auto Policy 2002 and the Automotive Mission Plan 2006-16, which continue to be relevant and may be broadly reckoned as the long and mid term goals respectively of the sector.
- Revisit the Auto policy 2002 formulated by the Government of India so as to address the need for a long term perspective beyond 2010 particularly in the vision statement and the objectives.

ii) To review the progress achieved vis- a- vis the Automotive Mission Plan 2006-16 and identify areas and concerns that need to be addressed to achieve milestones set in the Mission Plan

- Maintain continuity and implement the recommendations of the Automotive Mission Plan (AMP 2006-16) that hitherto remain unaddressed, as for instance, formulation of a Long term Emission Roadmap beyond 2010 based on Auto Fuel Policy, simplification and rationalization of labour laws to ensure availability of human resources with the requisite skill and competence, upgradation and debottlenecking of road, port and power infrastructure.

iii) Key issues to be addressed

- a) **Ability of industry to innovate and to attain global standards in operational efficiency**

- Encourage the industry to continue to innovate and attain global standards of operational efficiency by providing an enabling environment in which government policies promote domestic competition and growth, and stimulate innovation.
- Promote international cooperation in emerging areas of automotive technologies particularly electric mobility

b) The gaps that inhibit the potential of the automotive sector to grow along all segments of the value chain

- Address infrastructural bottlenecks, inadequate availability of skilled labour and pending reforms in labour laws which are among the key factors inhibiting the potential of the Indian industry to grow up the value chain.

c) The requirement of skilled manpower

- Enhance supply of manpower from the various training and educational institutions matching the industry's skills requirements. Increase interaction between such institutes and the industry would also help in minimizing the gap between skill requirement and the availability. Develop the curricula of these institutes in consultation with the industry.
- Extend sustained support to Automotive Skill Development Council (ASDC) for implementing skill development programmes to augment the availability of Human resources with the requisite skill and competence.

d) Roadmap for safety and environmental standards and regulations in the 12th plan

- Put in place a Long term Emission and Fuel availability roadmap beyond 2010 based on Auto Fuel Policy that spells out the strategy with regard to the following:
 - ✓ Availability and usage of various auto fuels including LNG, Hydrogen and Biofuels.
 - ✓ Utilization of different fuels in the transport sector to meet our national priorities of emission control, energy security as well as

fuel efficiency; whether gaseous fuels like CNG and LPG etc. would be earmarked for use by the transport sector all over the country.

- ✓ Whether or not to promote diesel, a subsidized fuel, for personal transport applications.
- ✓ Universal application of a single norm in the country, across the states and upgradation of the infrastructure to enable this.

e) Deepening competence in manufacture of fuel efficient cars and electric vehicles including the hybrid segment

- Take the initiative on electric mobility forward; promote Research and development incentivize manufacture and use of electric vehicles.

f) Building the “ Made in India” brand for Indian Automobile and auto components in the world market

- Promote showcasing and marketing of capabilities of the country’s auto sector through, participation in International Auto Shows, road shows Buyer-Seller Meets, investors meets, publications and dissemination of information for investors and buyers.

iv) To consider AMP II as a part of long term goal setting

- Formulate Automotive Mission Plan II 2017-27 as a sequel to AMP 2006-16, to carry forward the unfinished agenda and to facilitate the achievement of long term goals envisioned for the sector in the Auto policy as well as AMP. The exercise may be finalized during 2014-15, and may be preceded by a mid term review of AMP 2006-16 which may be taken up during 2012.

v) To assess the likely capacity and production of the automobile sector for the period 2012-17 and to state the critical infrastructure needs of the industry that are required to be addressed in the 12th plan

- Make concerted efforts to achieve the projected capacity and production of the automobile sector for the 12th plan period 2012-17 which are as follows:

Projected capacity and production by 2016-17

Segment	Capacity (in no.)	Production (in no.)
Passenger vehicles	9,372,838	6,909,797
Commercial vehicles	2,397,257	1,741,122
Three wheelers	1,746,596	1,416,457
Two wheelers	31,483,904	25,019,509

- Debottleneck and upgrade infrastructure through the concerted efforts of all stakeholder ministries and departments-Roads and Highways, Ports, Power etc.
- vi) **To project the incremental investment required in the automotive sector in the 12th plan to achieve the goals at (i)**
- Facilitate the investment of around ₹ 190000 cr. estimated to be the incremental investment required to achieve the goals envisioned for the automotive sector through the concerted endeavours of all.
- vii) **To evaluate the progress of the National Automotive and R & D Infrastructure project in terms of its objectives and deliverables. Also to assess the state of R & D and innovation in the sector**
- Extend budgetary and other support to ensure expeditious completion of NATRIP and the commissioning of the centres.
- viii) **To examine issues concerning competitiveness of Indian auto component industry in the context of increased competition and dynamic technological environment and to recommend measures to address the related issues. Also to consider specific measures for the development of SMEs in the auto component sector to enable them to emerge as competitive business entities**
- Formulate stable and long term trade policies that enhance the overall competitiveness and export potential of auto component sector. Facilitate the emergence of the country as a preferred component manufacturing hub and ensure that domestic manufacturing in auto

component sector does not dwindle due to trade liberalization through trade agreements

- Support the Auto Component Industry through policy and programmatic interventions to scale up and strengthen its capacity, and build R& D competence.

ix) To specify the milestones to be achieved during the 12th plan period in order to achieve the longer term goals as laid out in TOR (1) above

- Achieve the projected performance parameters in respect of domestic sales and export turnover as well as the objectives envisaged under the Automotive Mission plan

Projected performance in 2016-17

In ₹ 000 cr.			
Year	Domestic Vehicle Sales Turnover	Vehicle Exports	Total OEMs Turnover
2016-17	460.0	81.02	541.02

- Achieve the following specific targets for 2016 envisaged under the AMP for the industry:
 - ❖ To continue to be the world's largest tractor and three wheeler manufacturer in the world.
 - ❖ To continue as world's second largest two wheeler manufacturer.
 - ❖ To emerge as the world's fifth largest car producer (as compared to the seventh largest currently).
 - ❖ To become world's fifth largest commercial vehicle manufacturer.
 - ❖ To double the contribution of automotive sector to the National GDP from around 5% in 2006 to 10% in 2016.
 - ❖ Provide employment to 35 million persons.
 - ❖ To export USD 35 billion by 2016.
- Proposed Milestones as regards policy interventions
 - ❖ Revisit the Auto policy 2002

- ❖ Formulate AMP II 2017-27
 - ❖ Put in place a Long term Emission and Fuel availability roadmap beyond 2010 based on Auto Fuel Policy
 - ❖ Roll out GST regime
- x) **To work out specific plans and programmes including fiscal and other policy prescriptions to enable the industry achieve its growth potential**

Programmatic interventions

a) **National Mission for Electric Mobility**

With the launch of the National Mission for Electric Mobility in March 2011 the country has decided to fast track all initiatives on electric mobility. An Empowered body has been set up at the apex level in the form of **National Council for Electric Mobility (NCEM)** chaired by the Minister Heavy Industries & Public Enterprises which will be aided by the **National Board for Electric Mobility (NBEM)** chaired by Secretary, Department of Heavy Industry. The National Council and the Board will be serviced by the NATRiP Implementation Society (**NATIS**)/**National Automotive Board**, which is being created.

Mission targets and the road map for the future: The Department of Heavy Industry commissioned in collaboration with the Industry a study with M/s Booz & Company as the knowledge partner. The objective of the study was to develop a mission plan and roadmap for promoting the adoption of a range of electric mobility solutions for India, which can enhance national fuel security, provide affordable and environmentally friendly transportation and enable the Indian automotive industry to achieve global manufacturing leadership.

The “**National Automotive Board**” is in the process of being set up as an autonomous society under the administrative control of DHI. It will help steer, coordinate and synergize all the efforts of the government in important ongoing and new initiatives for automotive sector especially in the area of electric mobility, intelligent transport systems, automotive testing, collaborative R & D and for implementation of the recommendations of the Automotive Mission Plan 2006-16. Budgetary support to the tune of ₹ 2.02 cr

will be required for the functioning of the Board during the first three years only.

b) Technology Up gradation & Development Scheme (TUDS) for Auto Component industry.

A new scheme viz. “**Technology Up gradation & Development Scheme (TUDS)**” is mooted for approval and implementation during the 12th plan to help auto component companies access finance at reduced rates of interest for their modernization/ upgradation / technology acquisition, thereby helping them to become more competitive. The proposed scheme envisages the creation of an **Auto Component Technology Development Fund (ATDF)** which would be used for financing 50% of the project cost by way of soft loan, with an interest subvention of 4% to be met from fund corpus. The investment required by component industry for the five year period 2012-13 to 2016-17 is estimated at ₹ 15,000 cr., of which ₹ 7,500 will be contributed by the industry and the remaining ₹ 7,500 cr. will be financed through soft loans from financial institutions with 4% interest subvention that is proposed to be borne by the Government of India. The proposal has been a part of the pre-budget recommendations of the Department of Heavy Industry in respect of the automobile industry. The phasing of requirement along with the cost of interest subvention is given below:

(₹ in cr.)

	2012-13	2013-14	2014-15	2015-16	2016-17
Quantum of soft loan from financial institutions	1,000	1,250	1,500	1,750	2,000
Cost of 4% subvention per year	40	50	60	70	80

c) Automotive Component Cluster Development Programme for process and productivity improvement of Automotive Component manufacturing companies

With a view to strengthen the competitiveness of small and medium-sized automotive component manufacturers, mainly Tier-2 and Tier-3 and other

lower tier automotive component suppliers in the automotive value chain across the country, a proposal to implement a Cluster Development Programme on the lines of the GOI-UNIDO-ACMA Programme, implemented earlier from 1999-2009, is under consideration in DHI. It will cover 460 auto component companies and help them overcome challenges related to low productivity, insufficient and inconsistent quality, scalability and to become more efficient, reliable and cost-effective suppliers. The three phase programme costed at ₹ 21.8 cr. is envisaged to run for 6 years from 2012-13 to 2017-2018.

Policy interventions

- Implement the Goods and Services Tax (GST) regime early which is expected to rationalize the tax structure and do away with the cascading effect of multiplicity of taxes.
 - Remove implementational bottlenecks in the Auto Hub policy and Automotive Freight Train Operators Policy of the Indian Railways. Provide railway siding to various Auto Hubs and improve handling facilities. Introduce special wagon designs in consultation with the Automotive industry to meet its requirements
 - Evolve a National Policy on Vehicle Retirement and End-of-Life and Recycling. Introduce automotive infotronics and ITES leveraging the country's strengths in ICT for facilitating seamless travel on the highways and expressways.
 - Extend Inspection and Maintenance (I & M) Regime which presently exists for only commercial vehicles, to cover all other categories of vehicles.
- xi) To suggest/ recommend programmes /schemes that are to be terminated in the 11th plan or initiated or continued in the 12th plan period together with the broad budgetary implications, if any**
- a) National Automotive Testing and R&D Infrastructure Project (NATRiP)**
- NATRIP implementation was envisaged to be completed by 30th September, 2011. Due to unavoidable delays and consequent escalations, the Union

Cabinet in April, 2011 has approved the revised project completion date of 31st December, 2012 from the earlier approved completion date of 30th September, 2011 and the revised cost estimate of ₹ 2288.06 cr. in place of the original approved cost estimate of ₹ 1718 cr.

- b) Initiate and implement Technology Up gradation & Development Scheme (TUDS) for Auto Component industry, Automotive Component Cluster Development Programme for process and productivity improvement of Automotive Component manufacturing companies and other R& D initiatives.

Financing the Auto sector roadmap for 12th Five Year Plan

Twelfth plan (2012-17) budget for Automotive sector						
						(₹ in cr.)
Area	2012-13	2013-14	2014-15	2015-16	2016-17	Total
	1	2	3	4	5	
NATRIP	991.82 [#]					991.82 [#]
For Testing infrastructure	60	90	30	50	75	305
On-going /planned commitments e.g. 1. Automotive Component Cluster Development Programme 2. Operational expenses of National Automotive Board (NAB)	25	35	45	50	50	205
R&D Projects on electric mobility (xEV)	90	75	150	200	225	740
Technology Up gradation & Development Scheme (TUDS) for Auto Component industry - cost of interest subvention	40	50	60	70	80	300
Total budgetary requirement	1216.82	250	285	370	430	2541.82

Balance fund of the outlay already approved by the Government, assuming that ₹ 112.80 cr. sought under RE 2011-12 will be made available.

- Make available budgetary wherewithal to the tune of ₹ 2541.82 cr. to enable the industry to achieve the mid and long term goals envisaged for the sector.

xii) Any other matter considered integral to the above

- Simplify and rationalize labour laws to enable the industry to meet its requirement and enhance productivity
- Widen the scope of existing promotional/incentive schemes such as Focus Market Scheme, Focus Product Scheme, Market-linked Focus Product Scheme, etc. to cover more products (tariff lines) and markets and increase the rate of rebate under these schemes to enhance the industry's export competitiveness.

Working Group on Automotive Industry for formulation of the 12th Five Year Plan (2012 - 17)

Indian Automobile Industry: An Overview

1. Introduction

- 1.1. The Automotive Industry is globally one of the largest industries and a key sector of the economy. Owing to its deep forward and backward linkages, it has a strong multiplier effect and acts as one of the important drivers of economic growth.
- 1.2. With the gradual liberalization of the automotive sector in India since 1991, the number of manufacturing facilities has grown progressively. It produces a wide variety of vehicles: passenger cars, light, medium and heavy commercial vehicles, multi-utility vehicles such as jeeps, two wheelers such as scooters, motor-cycles and mopeds, three wheelers, tractors and other agricultural equipments etc. With a CAGR of over 15% during the last 5-7 years, it is aptly described as the next sun rise sector of the Indian economy. In fact, in the last ten years, the volumes, exports and turnover have increased by 3.8, 19.6 and 6 times respectively. The contribution of this sector to the National GDP has risen from 2.77% in 1992-93 to close to 6% now.
- 1.3. Over the years, the Indian automotive industry has become quite resilient and despite the down turn witnessed due to economic slowdown during 2007-09, it was amongst the first few manufacturing sectors to recover and has registered impressive growth figures in the recent past. In fact the global recession of 2007-09 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.
- 1.4. At present, there are 19 manufacturers of passenger cars & multi utility vehicles, 14 manufacturers of commercial vehicles, 16 of 2/3 wheelers and 12 of tractors besides 5 manufacturers of engines in India. This includes virtually all the major global Original Equipment Manufacturers (OEMs) and also home grown companies. In 2010-11, India surpassed France, UK and Italy to become

the 6th largest vehicle manufacturer globally. Today, it is the largest manufacturer of tractors, second largest manufacturer of two wheelers, 5th largest manufacturer of commercial vehicles and the 4th largest passenger car market in Asia. During 2000-11, India exported 2.35 million vehicles to more than 40 countries which included 0.45 million passenger cars and 1.54 million two wheelers. Today, the automobile industry provides direct and indirect employment to 13.1 million people.

- 1.5. In 2010-11, the total turnover of the automotive Industry stood at USD 73 Billion (₹ 3, 27,300 cr.)¹ of which the turnover of the automobile industry was USD 53.1 billion² (₹ 2, 39,000 cr.) with a 27% growth on year to year basis. The turnover of the auto component industry, in 2010-11 was USD 40 Billion (₹ 1,79,320 cr. approx.)³. The export of vehicles and auto components during 2010-11 stood at USD 6 Billion and USD 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.
- 1.6. As already indicated, in future the growth in the global automotive industry will come mainly from the emerging economies. In 2010-11 the total global demand of passenger vehicles was 73 million units, of which the volume in India was 3 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 9 million units (8%)⁴. Further, in 2020, the market for commercial vehicle and two wheelers in India is expected to reach 2.7 million and 30 million respectively, thereby making India the third largest vehicle market in the world. This will translate into 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.

¹ SIAM Data.

² This also includes a portion of turnover of auto component industry. Therefore the sum of turnover of automobile and auto component industries separately is more than the turnover indicated for the whole industry.

³ ACMA Data.

⁴ J D Power, E&Y)

2. Since automobile products are the second leading discretionary purchase made by a consumer, after house purchase, the fortunes of the automobile industry are closely linked with that of the general growth of the economy, disposable incomes and consumer confidence. Therefore, it is not surprising that the high growth rates witnessed in the Indian automobile industry for the past few years have coincided with similar high GDP growth rates recorded by the country along with growth in incomes. The increasing purchasing power of rural India, accelerated development of roads and highways are factors that will help fuel further demand for mobility and vehicles. The demand for automobiles is also dependent upon various other factors such as availability and cost of finance, vehicle density, demographic profile of the market and the earning capacity. At present, India has amongst the lowest vehicle densities globally at 11 cars per thousand persons and 32 two-wheelers per thousand persons. This is very low as compared to other comparable economies. Thus, there is a huge potential market for automobiles that is yet to be tapped. The majority of the population of the country is young with high aspirations and with rising income levels due to economic growth and ready availability of finance, the demand for automobiles in the foreseeable future is expected to remain buoyant.
- 2.1. 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 though mid size and big car sale is continuously rising in recent years.
- 2.2 **Installed Capacity:** The automobile industry especially after liberalization, has installed a robust capacity. Table 1 below shows the installed capacities segment wise.

Table 1 - Installed Capacity in Different Segments (in numbers)

Sr. No.	Segment	Installed Capacity in 2008-09
1.	Four Wheelers	3,880,000
2.	Two & Three Wheelers	14,310,000
	Grand Total	18,190,000

At present, the installed capacity of the four wheeler industry (comprising passenger vehicles and commercial vehicles) is over 4 million units and that of two & three wheeler industry is over 15 million units with overall investment of over ₹ 80,000 cr. The industry has mainly developed in clusters which have large number of companies along with their vendor base, the major automotive hubs being in Pune region, Maharashtra, NCR, Chennai, Uttarakhand and Gujarat which is emerging as the latest major automotive hub. The investments and the installed capacities, cluster wise (in major hubs only excluding three wheelers) are given in Table-2 below:

Table 2 – Installed capacities of two and four wheelers in auto hubs

Region	Company	Installed Capacity	Type of Vehicle	Investment (in ₹ cr.)
NCR	Maruti Suzuki	1,200,000	Cars	3,625
	Hero Motor Corp	2,000,000	Two Wheelers	4,500
	Honda Motorcycle & Scooters India	1,600,000	Two Wheelers	800
	Honda Sael Cars, India	120,000	Cars	1,620
		4,920,000		10,545
Maharashtra	Tata Motors	5,44,000	Trucks, Cars, Uvs	6,000
	M&M	300,000	Trucks, Uvs	5,000
	Bajaj	1,200,000	Two Wheelers	2,000
	GM	300,000	Cars	2,400
	Volkswagon	1,10,000	Cars	3,600
	Tata Fiat	1,60,000	Cars	4,000
	Mercedes	10,000	Bus Chassis, Cars	350
		1,810,000		23,350
Region	Company	Installed	Type of Vehicle	Investment

		Capacity		
Tamil Nadu	Hyundai	600,000	Cars	7,700
	Renault Nissan	400,000	Cars	4,500
	Ashok Leyland	60,000	Trucks, Buses	2,000
	Daimler	36,000	Trucks, Buses	4,000
	Ford	200,000	SUVs, Cars	3,600
	Royal Enfield	70,000	Motorcycles	350
	BMW	10,000	SUVs, Cars	200
	Mitsubishi	24,000	SUVs, Cars	540
	Ashok Leyland-Nissan	100,000	LCVs	4,300
		1,500,000		27,190
Karnataka	Toyota	210,000	Cars, UVs	1,650
	Ashok Leyland	50,000	LCVs	500
	Tata Marcopolo	30,000	Buses, Mini Vans	325
	TVS	50,000	Two Wheelers	500
		340,000		2,975
Uttarakhand	Tata Motors	500,000	LCVs	1,000
	Ashok Leyland	75,000	Trucks	1,100
	Bajaj Auto	1,200,000	Motorcycles	300
		1,775,000		2,400
Gujarat	Tata Motors	250,000	Cars	2,000
	GM	110,000	Cars, LCVs	1,800
	Ford	240,000	Cars	4,000
	Peugeot	165,000	Cars	4,000
	AMW	50,000	Trucks	1,500
		815,000		13,300
Jharkhand	TataMotors	144,000	Trucks	3,000
		144,000		3,000
Total		11,304,000		82,760

2.3 Production and Export of automobiles during the last five years: The automotive production trend during the last five years is given in Table 4.

Table 4 – Production of vehicles

Category	2006-07	2007-08	2008-09	2009-10	2010-11	5-yr. CAGR (%)
Commercial Vehicles	519,982	549,006	416,870	566,608	752,735	14.0
Two Wheelers	8,466,666	8,026,681	8,419,792	10,512,889	13,376,451	11.9
Three Wheelers	556,126	500,660	497,020	619,093	799,553	13.0
Grand Total	11,087,997	10,853,930	11,172,275	14,049,830	17,916,035	13.0

The export of vehicles has also increased significantly, during the last two years mainly due to the export of cars, two / three wheelers. Presently, vehicle exports account for 13% of our production with 5-year CAGR of 24%. The performance of exports during last 5 years is given in Table 5 below:

Table 5 – Export of Vehicles (in nos.)

Category	2006-07	2007-08	2008-09	2009-10	2010-11	5 year CAGR (%)
Passenger Vehicles	198,452	218,401	335,729	446,146	453,479	21%
Commercial Vehicles	49,537	58,994	42,625	45,007	76,297	13%
Two Wheelers	619,644	819,713	1,004,174	1,140,184	1,539,590	25%
Three Wheelers	143,896	141,225	148,066	173,282	269,967	29%
Grand Total	1,011,529	1,238,333	1,530,594	1,804,619	2,339,333	24%

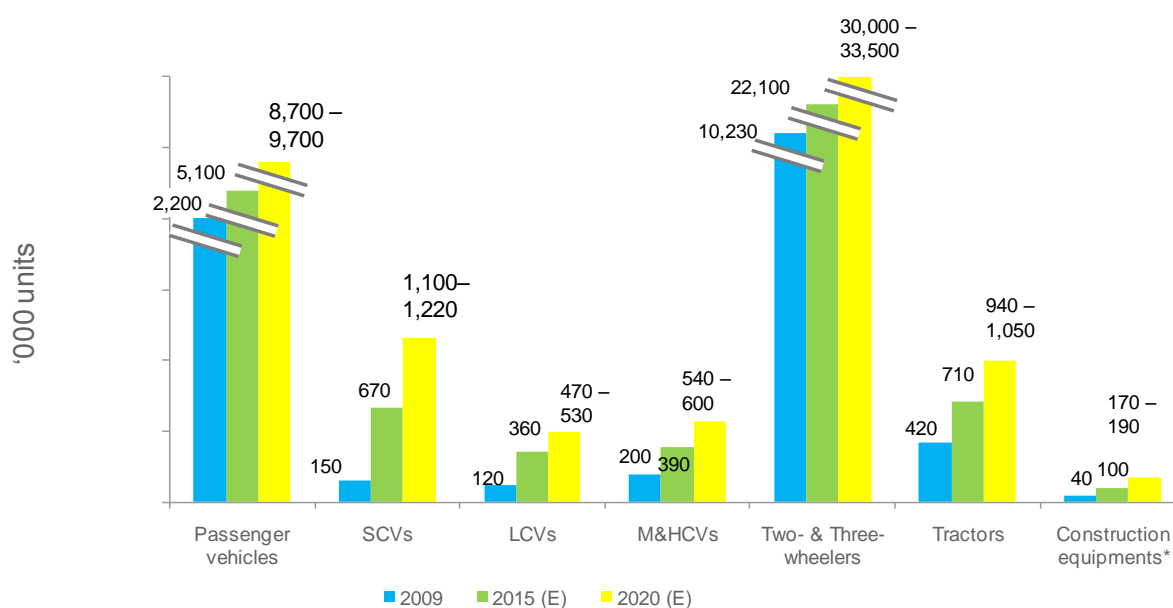
3. Industry outlook: Vision 2020

- **Passenger vehicles** - projected to be 5 million units by 2015 and over 9 million by 2020 driven by domestic demand and as a global hub for export of small cars.
- **Commercial vehicles** – volumes of over 1.4 million by 2015 and over 2.2 million by 2020. Small Commercial Vehicles (SCV), a relatively new segment,

expected to grow 28% annually over the next few years.

- **Two and three wheelers** – expected to double to 22 million units by 2015 and reach 30 million by 2020 driven by present low penetration levels, expanding rural sales and growth in exports.
- **Tractors** – projected to be over 0.7 million by 2015 and over 1 million by 2020 with steady growth expected in domestic and export volumes.
- **Construction equipment** – likely to grow 2.5 times to 0.1million units by 2015 and almost double again to 0.18 million by 2020 driven by the expected growth in infrastructure sector.

Fig: Vehicle production in India - Projections



*Includes backhoes, track excavators, wheeled loading shovels, vibratory rollers and liftall

Source: SIAM, EY estimates

These volumes will catapult India to the position of one of the top 5 vehicle producing countries in the world.

Terms of Reference (TOR)- 1:

(i) To articulate the mid and long term goals to be achieved in the sector

The **long term goals of the sector** were initially reflected in the **Auto Policy** of the Government formulated in 2002 which envisioned to establish a globally competitive automotive industry in India and to double its contribution to the economy by 2010. The policy aimed at promoting integrated, phased, enduring and self-sustained growth of the Indian automotive industry. Stated below are the objectives of the policy which are indicative of the country's aspirations in the automotive sector:

- (i) Exalt the sector as a lever of industrial growth and employment and to achieve a high degree of value addition in the country;
- (ii) Promote a globally competitive automotive industry and emerge as a global source for auto components;
- (iii) Establish an international hub for manufacturing small, affordable passenger cars and a key center for manufacturing Tractors and Two-wheelers in the world;
- (iv) Ensure a balanced transition to open trade at a minimal risk to the Indian economy and local industry;
- (v) Conduce incessant modernization of the industry and facilitate indigenous design, research and development;
- (vi) Steer India's software industry into automotive technology;
- (vii) Assist development of vehicles propelled by alternate energy sources;
- (viii) Development of domestic safety and environmental standards at par with international standards.

Though the vision statement of the Auto policy might appear to be limited as it did not have a long term horizon beyond 2010 in terms of growth envisaged, a closer reading of the policy objectives will show that they were far sighted in qualitative terms and continue to be relevant even today. Revisiting the policy in terms of envisioning a growth strategy beyond 2010 may however be considered.

The **mid term goals** in respect of the sector are articulated in the **Automotive Mission Plan 2006-16**, a ten year strategy and plan prepared jointly by Government and industry and formally released by the Prime Minister in January 2007. The Plan laid down a 10 year roadmap for the 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, R&D etc.

The Automotive Mission Plan 2006-2016 envisaged that by 2016 India will emerge as the destination of choice in Asia for the design & manufacture of automobiles and automotive components. The output of the India's automotive sector was projected at USD 145 billion by 2016, doubling the contribution of the industry to the National GDP from around 5% in 2006 to 10% in 2016 and providing employment to 25 million persons additionally. The AMP has set the following specific targets for the industry for 2016:

- To continue to be the world's largest tractor and three wheeler manufacturer in the world
- To continue as world's second largest two wheeler manufacturer.
- To emerge as the world's fifth largest car producer (as compared to the seventh largest currently) and
- To become world's fifth largest commercial vehicle manufacturer.
- Automotive sector would double its turnover ratio to India's GDP in ten years.
- To export USD 35 billion by 2016

Since close to five years have already elapsed with regard to the AMP 2006-16, work has been initiated by the Department in close association with the industry for formulating the goals beyond 2016 in the shape of AMP-II (2017-2027). The industry associations have undertaken an exercise recently in forecasting the possible level of growth and targets that should be achieved by 2020 (ACMA's Vision 2020 Report). In addition, the Government has decided that efforts shall be made to make significant shift towards Hybrid and Electric Mobility for which the National Electric Mobility Mission targets are to be adopted soon. This marks a major paradigm shift for the

industry as far as long term planning and growth prospects are concerned. The projected levels of adoption of electric and hybrid vehicles in the country have already been estimated through a detailed study based on primary data research by the Department in association with the industry. The details of this have been captured in the relevant TOR. These details will also be incorporated in the preparation of AMP-II, which is proposed to be finalised during 2014-15.

Terms of Reference (TOR)- 2

To review the progress achieved vis- a- vis the Automotive Mission Plan 2006-16 and identify areas and concerns that need to be addressed to achieve milestones set in the Mission Plan

The **Automotive Mission Plan 2006-2016**, a ten year plan of action was conceived out of a felt need for a roadmap to steer, coordinate and synergise the efforts of all stakeholders in order to accelerate and sustain the growth in the automotive sector, by inter alia, removing the impediments coming in the way of its growth.

It was the outcome of an extensive, in-depth dialogue with all stakeholders (the industry, the planners, the academia and all concerned central and state authorities) over a period of fifteen months. Five Working Groups were constituted to map the challenges, set targets and evolve a mission mode for implementation of the agreed mile stones. They examined policy parameters and a wide range of issues including upgrading infrastructure of production, induction of technology, labour law reforms and employment related issues, R&D needs, change of fiscal and policy parameters, human resource development, growth of domestic demand and exports and environment and safety concerns. Their findings and recommendations were considered by five IMGs. The recommendations of the IMGs, duly vetted by the respective Ministries, were put in the public domain for a wider debate and more inclusive recommendations. The final outcome was put before the Development Council of Automobile and Allied Industries, which unanimously endorsed it.

It is widely acknowledged by all stakeholders that the AMP has immensely contributed to the growth of the sector in recent years and has been a guiding spirit behind the interventions on the part of all concerned. Many of the recommendations of the AMP have since been implemented during 2006-2010 leading to a healthy growth of the industry and a robust external environment which has provided a vital support system for the industry. Some of them are as follows:-

- a) Maintaining a differential lower Excise Duty on small cars
- b) Consistent and stable international trade policies that include a favourable Customs Duty structure on an MFN level, consistent policies for negotiations under FTAs and at WTO.

- c) Setting up of National Automotive Testing and Research Infrastructure Project (NATRIP)
- d) Progressive up gradation to BS IV emission norms by 2010, supported by availability of better quality fuels.
- e) Establishment of the Automotive Skills Development Council (ASDC)
- f) Focus on alternate fuel vehicles leading to the launch of National Mission for Electric Mobility in the country.
- g) Encouragement to R&D through Income Tax deductions on R&D expenditure.

The following table also highlights the **performance of the sector vis-à-vis AMP targets**:

Head	Units	2007-08	2010-11	AMP Targets (2015-16)	Actual Growth Rate	Growth rate required as per AMP
Revenue	USD bn	54	73	145	11%	10%
Employment*	mn	10	13	35	5%	13%
Domestic Vehicle Mkt	USD bn	34	47	100	11%	11%
Vehicle Exports	USD bn	3.5	6	12	20%	13%
Share to GDP	%	5%	6%	10%	6%	7%
* Base figure for employment is for 2004-05						

Areas and concerns that need to be addressed to achieve milestones set in the Automotive Mission Plan

There are other recommendations of the AMP which remain to be implemented during 2012 to 2016 which will cover the first 4 years of the 12th Five Year Plan period. Some of the areas that need to be addressed are identified below:

Salient Pending AMP Recommendations
Simplification and rationalization of labour laws to ensure availability of Human resources with the requisite skill and competence
Infrastructure to be upgraded to remove bottlenecks in Road, Port, Power, etc
Formulation of a Long term Emission roadmap beyond 2010 based on Auto Fuel Policy

Although the Indian Automotive Industry has been growing at an impressive rate over the last few years, there are specific areas of concern that need to be addressed. These are briefly enumerated as under:

- i) In the Auto Component sub sector, India will need import of auto components to the tune of USD 5 billion in 2010-11. The negative trade deficit in auto components has been growing continuously. This is mainly on account of the following facts:
 - a) Increased competition from other low cost countries specially China. The Indian industry is currently hampered by lower efficiencies, especially in tier 3-4 levels and higher transaction costs of doing business in India in this sector.
 - b) Lack of design capabilities with the domestic industry has led to major OEMs sourcing the requirement of parts for their new launches and variants from abroad.
 - c) Lack of adequate capacity coupled with the inability of the industry to upscale its capacity forcing the auto component industry to meet a large portion of domestic demands through imports.
- ii) In view of the above, it is imperative that Auto Component Industry is supported through interventions like ACMA Technology Development Fund, ACMA-UNIDO Cluster Development Programme, enhanced availability of adequately skilled manpower, stability of policies especially with regard to on-going Foreign Trade Agreements (India EU-BTIA) etc.

Terms of Reference (TOR)- 3

Key Issues to be Addressed

a) Ability of industry to innovate and to attain global standards in operational efficiency

Drivers of innovation: The automotive industry in India has come a long way from its nascent state at the time of independence in 1947 to its present dynamic form. Today, the industry produces a wide range of automobiles and auto-components catering to both the domestic as well as foreign markets. The increased competition on the home turf stemming from a multitude of automobile and auto-component manufacturing players, demand for technologically superior products from customers as well as the growing acceptance of their products in the foreign markets have encouraged the Indian auto manufacturers to upgrade their technological capabilities, either through in-house research and development (R&D) efforts or through other means of technology acquisition.

The competitiveness in the sector due to a liberalized policy environment, the low production cost advantages and an expanding market characterized by low vehicle penetration has enhanced the capacity of the industries to innovate and upgrade. The industrious efforts of Indian auto manufacturers are earning acclaim worldwide. For example, the world's cheapest car unveiled by the Indian 4-wheeler manufacturer Tata Motors received the attention of auto manufacturers around the world. 'Made in India' brand is gaining increasing acceptance in the global export markets.

Market forces and consumer preferences will drive vehicle innovation that will dwarf the changes over the previous three decades. These changes are occurring across all areas of the vehicle, from powertrain through to electronics and driver-assist systems. While manufacturers and suppliers continue to push new technologies to gain a competitive advantage in the marketplace, consumers are increasingly looking for refinement of the driving experience.

Domestic Indian companies have developed strong manufacturing capabilities that have helped them till now in keeping costs low and quality under control. As volumes increase, Indian component manufacturers will have to scale up their operations and further improve quality, cost and delivery performance to global standards demanded by customers.

It is imperative to provide an enabling environment to the industry in which government policies encourage growth, promote domestic competition, stimulate innovation and also help it to attain operational efficiency. In order to optimize the manufacturing competitiveness of the industry, broadly the following aspects need to be addressed:-

- i. A moderate, stable and rational domestic tax structure that eliminates multiplicity of taxation at the Central, State and Municipal levels. Early implementation of GST is critical.
- ii. Removal of taxation on inter-state movement of goods to make the Indian market a genuine “free trade area” domestically.
- iii. A stable Import Tariff structure consonant with the AMP that encourages investments rather than trade in fully built vehicles.
- iv. Continuation of lower Excise Duty (in future GST) for manufacture of vehicle types that are a national priority for the country e.g. small cars, MUVs, two wheelers and commercial vehicles which are used for transportation for the masses and the common man.

World over, automobile industries and Governments are making large investments in alternate fuel and drive trends including electric mobility on account of depleting fossil fuel reserves, increasing cost of fuel and concern over the impact of mobility on environment. These areas are also of great concern to India in view of its growing economy and the consequent rapid growth in the transportation sector. The current capability in the country in the areas of electric mobility is highly limited and needs to be encouraged not only for meeting the above concerns but also with a view to keep the Indian Automotive Industry in tandem with the global trade. An assessment of the capabilities of Indian manufacturers as also the current on-going

programme undertaken by the Government in this regard has been detailed in the portion related to the chapter on electric mobility.

Imperatives for the Indian Auto Component Industry

Scaling up of Business: Scaling up of operations will be a challenge for smaller component manufacturers facing constraints in raising capital, attracting talent and accessing technology. A number of areas that would therefore need to be addressed, some immediately, by the Indian component players, are:

- **Raise capital** – balance sheets have to be strengthened by divesting non-performing and non-core assets and by optimizing the debt / equity structure.
- **Scale capacities** – manage cost and flexibility of new assets to successfully navigate any market cyclicalities. Flexible production systems and supply chain agility and scalability need to be addressed in parallel.
- **Access Technology** – a major challenge for the MSMEs.
- **Build R&D competence** - build/enhance product development, design and engineering capabilities and incorporate the frugal engineering elements across the design and manufacturing value chain.
- **Develop organizations** - to manage significantly increased complexity and risk from larger capital outlays, industrial relations environment, larger customer base or customer concentration, product portfolio performance and new technology development/absorption.

a) The gaps that inhibit the potential of the automotive sector to grow along all segments of the value chain

The Indian automotive industry is being rapidly integrated into the global automotive supply chain. Global automotive companies are looking at India not only for its burgeoning consumer market but also as an efficient supplier base. The globalisation of value chains raises major policy challenges for emerging economies like India, that of how to continue moving economic activity further up the value chain to ensure it can continue to compete and prosper in the global environment and not remain confined to low technology manufacturing. Moving up the value chain implies a continuous process of change, innovation and productivity growth.

Technological innovations and skill development are required to be encouraged in order to promote growth across the entire value chain. At the OEM level, measures could be taken to provide a fillip to domestic manufacturing as against imports. This would help in creating opportunities for businesses across the automotive value chain.

Some key factors inhibiting the potential of the Indian industry to grow across the value chain that need to be addressed are:

- Infrastructural bottlenecks
- Inadequate availability of skilled labour
- Pending reforms in labour laws

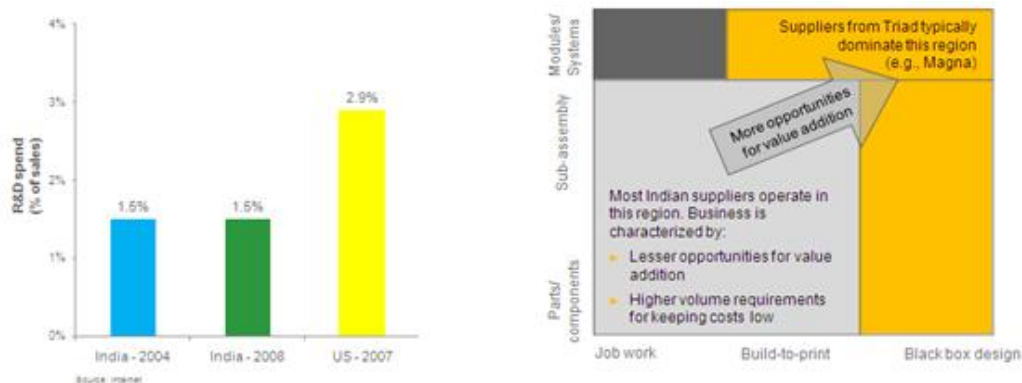
Though there are signs of these gaps diminishing, a lot still remains to be done to bridge them.

Imperatives for the Auto Component Industry

Indian component suppliers need to move up the value chain: Many Indian component manufacturers are competing in the lower value-added space and produce parts/ components on either job work⁵ or build-to-print basis. Relatively larger component manufacturers that produce higher value-add components usually have build-to-print capabilities. Such manufacturers depend on either the OEM or on their JV partners for technical/ product design capabilities.

R&D capabilities in Indian component industry vis-à-vis those in advanced countries

⁵ Job work refers to the practice wherein, besides providing product designs to the supplier, the OEM also provides complete support in setting up the tooling. In the case of build-to-print, the OEM only provides the supplier with product designs. A black box design capability is defined as one wherein the OEM outsources the complete component design to the supplier.



In future, product design, testing and validation capabilities are expected to become even more important as OEMs rely more on their suppliers for product design. This need is driven by shortening product life cycles, introduction of new products/variants and increasing localization.

Lower scale of the Indian industry aiding fast import growth: The strong growth of the domestic component industry has been accompanied by a much stronger growth of component imports into India. Imports, at ₹ 30,500 Cr.⁶, comprised almost 27% of the domestic demand in 2009-10. A majority of the recent increase in imports have been attributed to lack of capacity with Indian component suppliers.

FTAs will make imports more competitive: Many countries, including India, wishing to improve their exports prospects are pursuing bilateral routes and hence bilateral and regional FTAs are proliferating. Last year, India signed a FTA with ASEAN and Japan as well as a Comprehensive Economic Partnership Agreement (CEPA) with South Korea. A component category-wise review of the ASEAN FTA and the Korean CEPA indicates that imports in the *others* category would increase the most. Almost all tariff lines under the *others* category are included, which comprise 22% and 41% of imports from these regions respectively.

Besides the recently concluded Japan, ASEAN and Korean TAs, other FTAs are under negotiation. These include the ones with EU, Australia and Canada. Almost 70% of component imports into India are from countries with which India either has a FTA or is planning to have one soon. Even though the FTAs give an equal opportunity to the Indian players in terms of exports, the import duty on raw materials results in an inverted duty structure that makes certain Indian components (those dependent on

⁶ Source: DGCIS (excluding tyres and batteries)

imported raw materials) uncompetitive in both domestic and export markets.

a) The requirement of skilled manpower

Ensuring availability of trained manpower is of critical importance. Adequate infrastructure is needed to ensure availability of trained manpower.

Reasons affecting vocational training in India

Inadequate course content	<ul style="list-style-type: none"> • Most courses have outdated content • Content is not aligned with industry requirements • Course content is not revised regularly
Absence of qualified teachers	<ul style="list-style-type: none"> • Poorly-trained • Low salary • Inadequate industry exposure • Unmotivated and uninspiring
Inadequate infrastructure	<ul style="list-style-type: none"> • Outdated and inadequately maintained equipment and machines • Few equipment, leading to insufficient practical training for students • Low practical content in course structure
Low industry participation	<ul style="list-style-type: none"> • Industry requirement not captured in course design or teaching • Few industry tie-ups for providing practical exposure • Inadequate on the job training
Absence of quality assurance	<ul style="list-style-type: none"> • No scientific framework for quality assurance of content design and delivery, trainers and infrastructure • Absence of standardisation of skills and certification

The industry has realized the criticality of skill development for the automotive industry. ACMA, Federation of Automobile Dealers Associations of India (FADA) and SIAM along with the Ministry of Heavy Industries & Public Enterprises and the National Skill Development Corporation (NSDC) have set up an Automotive Skills Development Council (ASDC) to complement the existing vocational education system for the Indian Automotive Industry in meeting the entire value chain's requirements of appropriately trained manpower in quantity and quality across all levels on a sustained and evolving basis. As per AMP 2006-16, the industry is expected to require an additional 25 million work force by 2016.

ASDC, since registered under the Societies Registration Act XXI of 1860 has embarked upon a one year Pilot Project under which 3 trades are being addressed to

demonstrate proof of concept. The initial funding of ₹ 75 lakh for the pilot stage during the first year has been provided by the National Skill Development Corporation. Expenditure during the next two years would be around ₹ 8.50 cr., to be met with ₹ 6 cr. from NSDC and ₹ 2.50 cr. from Department of Heavy Industry from the auto cess fund.

It is recommended that Government, through NSDC or Department of Heavy Industry should continue to support in a sustained manner by way of participation as well as resources during the 12th Five Year Plan period.

Auto Component Industry in India

The Indian auto component industry can potentially grow to over ₹ 5 lakh cr. (USD 110 billion) by the year 2020, driven by the growth in vehicle production. Of this, the domestic turnover would be around ₹ 4 lakh cr. (USD 80 billion) and an export potential of around ₹ 1.4 lakh cr. (USD 29 billion). The auto component industry can thus be an engine of India's economic and manufacturing sector growth, potentially contributing 3.6% of GDP by 2020, up from the current level of 2.1%. To achieve this potential, the industry would require additional skilled manpower of over 1 million people and investments of over ₹ 1.6 lakh cr. (USD 35 billion) during this period.

The government may explore the possibility of supply of manpower from the various training and educational institutions matching the industry's skills requirement. Increasing interaction between such institutes and the industry would also help in minimizing the gap between skill requirement and the availability. The curricula of these institutes should be developed in consultation with the industry. The infrastructural and faculty capacities of these institutes will also need major improvements.

a) Roadmap for safety and environmental standards and regulations in the 12th plan

i) Fuels and Emissions Roadmap

While the Ministry of Heavy Industries is in the process of preparing a National Strategy for the introduction of Electric/Hybrid Mobility in the country, there are a number of specific initiatives that could be taken during

the 12th Five Year Plan to reduce emissions from the traditional IC engine vehicles.

Over the last decade, the auto industry followed a Fuel Roadmap that has helped it to move away from the use of leaded fuels and usher in the era of BS Norms in the early 2000s. The industry has progressed from BS 1 level to BS IV for four wheelers in 13 main cities in April 2010. The National Auto Fuel Policy evolved in 2004 by Ministry of Petroleum & Natural Gas was the main driver in bringing about this transformation. However, the country does not have any Fuel or Emissions Roadmap beyond 2010. Due to the absence of a roadmap, it is not clear as to when the BS IV norms would be implemented across the country. Currently, a dual emission norm is being followed in the country which has created a number of challenges in terms of dual technologies in the automotive industry as well as difficulties in free movement of vehicles from big cities to the smaller cities and rural areas. While EU, US etc. are continuously upgrading their emission norms, the Indian automotive industry does not have a clear direction or strategy for reducing emissions after 2010.

There is therefore an urgent need now for evolving the Emissions and Fuel Availability Roadmap beyond 2010. Moreover, it would be critical that the new future norms are applied across the country on a uniform basis rather than introducing new fuels in a graded manner. Point-wise recommendations are as follows:-

- i. Single norm across the country.
- ii. Minimum gap of four years between each successive stage of emission norms may be built into the emission roadmap.
- iii. Norms to be applicable for new models one year after fuel is available across the country.
- iv. For existing models, the new emission norms will come into effect one year after emission norms for new models are introduced.
- v. New norms should be announced well in advance to enable industry to plan for the requisite technologies and commit investments.

- ii) Furthermore, there is a lack of clarity on the use of different types of fuels for automotive applications. Gasoline and diesel have been the traditional fuels being used for automotive applications since the inception of the industry. However, in recent times, the following questions have been raised:-
- Whether diesel, a subsidized fuel, should be promoted for personal transport applications.
 - Whether gaseous fuels like CNG and LPG etc. would be earmarked for use by the transport sector on a National level.

As a consequence, there are different perceptions at various levels and India is seen as discouraging use of diesel fuel for personal transport. On the other hand, EU has been strategizing use of diesel in order to reduce their CO₂ emissions and to reduce overall fuel consumption in view of the inherent higher fuel efficiency of diesel. In the absence of clarity in these areas, the Indian industry is unable to take future investment decisions whether they should make long term investment in diesel, CNG, LPG technology or not.

It is imperative that Government should come out with a clear pricing policy on the use of different types of fuel for the automotive sector so that the industry could take its investment decisions based on market forces rather than on uncertain availability of fuels and fuel pricing policies.

- iii) The country also needs to evolve a national strategy to develop CNG infrastructure and allocate gas towards transportation to meet CO₂ reduction commitments and achieve energy security. CNG use, with or without subsidies, is a very powerful cost effective tool for CO₂ reduction recognized by the world and would also help in reducing oil imports.

It is recommended that the 12th Five Year Plan should come out with a clear strategy paper on availability of different fuels in the transport sector to meet our national priorities of emission control, energy security as well as fuel efficiency.

a) Deepening competence in manufacture of fuel efficient cars and electric vehicles including the hybrid segment

Driven by a growing concern over the fast depletion of fossil fuels, increasing prices of crude oil, environmental degradation and climate change world over, Governments and automotive industries are making large investments towards developing vehicles based on alternative drives and fuels including electric mobility. The Government of India has recently approved the setting up of two fully empowered bodies viz. National Council for Electric Mobility (NCEM) and National Board for Electric Mobility (NBEM) to be chaired by Minister (HI&PE) and Secretary (DHI) respectively for moving ahead in the field of electric mobility in the country. The Department is also in the process of finalizing the policy recommendations for moving ahead with the Electric mobility mission in the country. A detailed report indicating the steps taken and the initiatives to be taken towards expeditious implementation of the initiatives is annexed (**Annexure- A**).

b) Building the “ Made in India” brand for Indian Automobile and auto components in the world market

Rapid strides in information and communication technologies has enabled consumers to compare quality and prices of various products available in the market without much effort. This along with the growth in their disposable income has made them brand conscious. The marketing war presently revolves round brands and any new entrant needs to have a specialised focus on Brand Building in the market.

The Indian automobile sector is focusing on creating a brand image for itself in both domestic and international markets and position itself with a unique identity. Building the “*Made in India*” brand would require showcasing and marketing of the capabilities of the country’s auto sector through road shows, investors meets, publications and dissemination of information for investors.

The Industry Associations, SIAM and ACMA, have a key role to play in this. They have been doing their bit through participation in International Auto Shows, setting up Buyer-Seller Meets, organizing Private exhibitions for large customers etc. There is a need to continue these efforts and also design new services and initiatives to meet the changing needs of the industry in terms of creating a global brand for the industry. Industry and Government need to work hand in hand in this regard.

Building Brand India therefore calls for an inspiring vision and suggestions are as follows:

- **Market Exposure and development:**

The small and medium companies in auto component sector do not have enough resources to create awareness about their companies through participation in overseas trade shows. Growing capabilities of the industry need to be supported through active participation in specialized Auto Shows both in OE and aftermarket.

2. Export Cluster Development Programme:

To initiate new programme like creation of a consortium of Cluster companies to hand- hold for export development. The industry associations should be encouraged to take up this role.

3. New Technology:

SMEs need to enhance their product and process capabilities through joint ventures, collaboration and technical tie ups. Knowledge, specialization, innovation and networking will determine the success of the SMEs in this globally competitive environment.

4. Global Footprint:

A number of suppliers are taking the acquisition route in order to expand internationally. Indian suppliers find a number of advantages in taking over foreign companies. International suppliers give access to advanced technology and global clients, which are difficult to bag otherwise. An international acquisition gives an offshore manufacturing facility to the Indian Manufacturer as well as a global footprint. Thus offshore manufacturing facilities can often be used for high-end manufacturing while low-end components can be supplied from the Indian center. It helps retain customers at different levels of value chain. It could also incentivize appropriately Merger and Acquisitions (M&A) by Indian companies abroad for manufacturing operations. This is also necessary to reduce the risk to domestic manufacturing.

Terms of Reference (TOR)- 4

(iv) To consider AMP II as a part of long term goal setting

Automotive Mission Plan II

As the AMP period (2006-16) is to expire in the penultimate year of the twelfth plan, need is felt for formulating a decadal road map for the future beyond 2016 to carry forward the process, complete the unaccomplished agenda and also to egg on the stakeholders in the direction of achieving the long term goals.

Although there are a host of issues affecting the growth and development of the Auto industry, the AMP II should focus on, inter alia, the following broad areas and undertake reforms for improvement in these areas:

- Expansion of Demand, Brand Building and Infrastructure
- Enhancing Competitiveness in Manufacturing & Technology
- Promotion of International Business (Exports)
- Human Resources Development
- Environment & Safety Norms

The above mentioned areas may also be focused in the 12th Five Year Plan so that we do not deviate from the long term goals.

The Working Group recommends that during the plan period and well before the AMP 2006-2016 expires, it may be desirable to draw up AMP II to cover the period 2017-2027. The exercise, to be finalized during 2014-15, may be preceded by a mid term review of AMP 2006-16 which may be taken up during 2012-13.

Terms of Reference (TOR)- 5

- (v) To assess the likely capacity and production of the automobile sector for the period 2012-17 and to state the critical infrastructure needs of the industry that are required to be addressed in the 12th plan

It is expected that the automotive industry will grow quite rapidly over next five years and is expected to reach production volumes of almost 6.9 million passenger vehicles, 1.7 million commercial vehicles and more than 25 million two wheelers.

FORECASTED VEHICLE PRODUCTION (in nos)				
Year	Passenger Vehicles	Commercial Vehicles	Three Wheelers	Two Wheelers
2010-11	2,987,296	752,735	799,553	13,376,451
2011-12	3,435,390	865,645	879,508	14,847,861
2012-13	3,950,699	995,492	967,459	16,481,125
2013-14	4,543,304	1,144,816	1,064,205	18,294,049
2014-15	5,224,799	1,316,538	1,170,626	20,306,394
2015-16	6,008,519	1,514,019	1,287,688	22,540,098
2016-17	6,909,797	1,741,122	1,416,457	25,019,509
2017-18	7,946,267	2,002,290	1,558,103	27,771,655
2018-19	9,138,207	2,302,634	1,713,913	30,826,537
2019-20	10,508,938	2,648,029	1,885,304	34,217,456
CAGR	15%	15%	10%	11%

FORECASTED CAPACITY (in nos)				
Year	Passenger Vehicles	Commercial Vehicles	Three Wheelers	Two Wheelers
2008-09	3,063,998	783,668	814,800	13,661,700
2009-10	3,523,597	901,218	896,280	15,164,487
2010-11	4,052,137	1,036,400	985,908	16,832,581
2011-12	4,659,957	1,191,860	1,084,499	18,684,164
2012-13	5,358,951	1,370,639	1,192,949	20,739,423
2013-14	6,162,793	1,576,235	1,312,244	23,020,759
2014-15	7,087,212	1,812,671	1,443,468	25,553,042

2015-16	8,150,294	2,084,571	1,587,815	28,363,877
2016-17	9,372,838	2,397,257	1,746,596	31,483,904
2017-18	10,778,764	2,756,845	1,921,256	34,947,133
2018-19	12,395,579	3,170,372	2,113,381	38,791,318
2019-20	14,254,916	3,645,928	2,324,719	43,058,363
CAGR	15%	15%	10%	11%

Note: The above capacity increases are normalized over a period of 5 years. The actual capacity increases may not take place on a year-to-year manner as depicted above

Critical infrastructure needs that are required to be addressed

Vigorous thrust has to be provided for the upgradation of our roads and highways infrastructure to overcome the deficit that has accumulated over the last few decades.

The Golden Quadrilateral and the East West Corridors which still have gaps, need to be fully completed. During the 12th Plan period, it is suggested that up gradation of all major 4-lane highways into 6/8 lane highways should be taken up to keep pace with the constantly increasing highway traffic. Secondly, there is a need for greater focus on developing State Highways and Rural Roads to improve rural connectivity.

Additionally, the 12th Five Year Plan could look at introducing automotive infotronics and ITES for facilitating seamless travel on the highways and expressways. This may include electronic tolling and clearances at checkpoints and nakas.

In order to encourage the Hub and Spoke system of road freight movement, it is also necessary to set up large Freight Terminals on the outskirts of every city which can be used as a base for large multi-axle trucks and to carry out the trans-shipments of freight using smaller trucks for point to point deliveries within the cities. This will avoid the entry of large multi-axle trucks into the cities and would streamline the freight transport system, city traffic, avoid congestion as well as accidents in the cities.

Another critical area where infrastructure needs to be developed is in regard to transportation of vehicles through railways. Currently, more than 90% of the deliveries of vehicles from the OEMs to the dealers take place through road transport. The industry has been in dialogue with the Railways to transport finished vehicles by rail. The Ministry of Railways has also announced a policy for creating Auto Hubs in major cities. However, this policy has not yet yielded the desired results due to the lack of clarity on the policy and also due to the absence of the last mile connectivity

from the Hub to the OEMs. There is also a need to urgently implement the Automotive Freight Train Operators Policy by clarifying the various implementation aspects including new wagon design approval and the commercial aspects, which should be taken up under the 12th Five Year Plan period. Effective implementation of these policies can result in shifting more than 25% of the vehicle deliveries through the railways. This would significantly reduce the cost of transportation as well as cost of fossil fuels used for road transport.

In order to encourage exports, there is a need to develop and improve port infrastructure by creation of specialized ports for handling vehicle exports.

- i. Creation of specialized automobile export ports near Mumbai and Chennai, each equipped to handle output of 5 lakh vehicles annually by 2015
- ii. Earmark space for parking, vehicle repair at these ports to accommodate at least 20,000 vehicles at a time - like the proposed multi-level facility at Chennai port.

The Department of Heavy Industry has supported the R&D efforts in the Automotive Sector by funding various R&D project proposals through automotive cess funds that are allocated to the DCAAI under the Department. This has led to significant capacity creation within the various testing centres under DHI like ARAI, iCAT etc. and has benefitted the Industry. Some of these efforts are operational on the field; for instance, the Intelligent Transport System Project undertaken in Chennai has yielded very good results for the State Transport Undertaking. In addition, many of the projects undertaken by ARAI have resulted in commercialization and creation of IPRs.

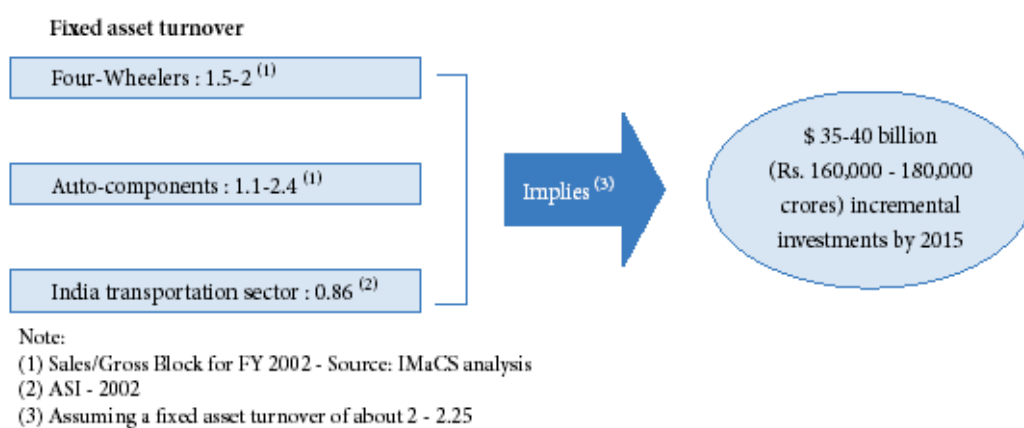
With focus now being placed on encouraging electric mobility, in order to take this effort ahead, it is essential that new standards, regulations and automotive testing infrastructure are put in place. Based on the estimates arrived at in the detailed study undertaken jointly by DHI with Industry, an estimation of the possible resources required has been made and is dealt with subsequently in this document. The Department is in the process of exact detailing of the new testing infrastructure requirements in this regard.

Terms of Reference (TOR)- 6

(vi) To project the incremental investment required in the automotive sector in the 12th plan to achieve the goals at (i)

As per the Automotive Mission Plan 2006-2016, the sector needed an incremental investment of about USD 35 – 40 billion (₹ 160,000-180,000 cr.) by 2015 in addition to about ₹ 85000 cr. of investment in the sector.

Figure 01: What does the output mean in term of investments?



Source: Automotive Mission Plan 2006-2016

Assuming the same rate of investment (approximately 13% as per AMP), by 2016-17, the automotive industry is expected to require an incremental investment of around ₹ 190,000 cr.

Terms of Reference (TOR) - 7

- (vii) To evaluate the progress of the National Automotive and R & D Infrastructure project in terms of its objectives and deliverables. Also to assess the state of R & D and innovation in the sector

Background Note on National Automotive Testing R & D Infrastructure Project

The National Automotive Testing R & D Infrastructure Project was approved by the Cabinet on 25th July 2005. NATRIP envisages setting up of world-class automotive testing and homologation facilities in India at a total investment of ₹ 1718 cr. The main facilities will come up in the three automotive hubs of the country, in the south, the north and the west. The project *principally* aims at (i) creating critically needed automotive testing infrastructure to enable the Government in ushering in global vehicular safety, emission and performance standards, (ii) deepening manufacturing in India, promoting larger value addition leading to significant enhancement of employment potential and facilitating convergence of India's strengths in IT and electronics with automotive engineering, (iii) enhancing India's abysmally low global outreach in this sector by de-bottlenecking exports and (iv) removing the crippling absence of basic product testing, validation and development infrastructure for automotive industry.

2. The project envisages setting up of the following facilities:-

- i. A full-fledged testing and homologation center within the northern hub of automotive industry at Manesar in Haryana
- ii. A full-fledged testing and homologation center within the southern hub of automotive industry at a location near Chennai in Tamil Nadu
- iii. Up-gradation of existing testing and homologation facilities at Automotive Research Association of India (ARAI), Pune and at Vehicle Research and Development Establishment (VRDE), Ahmednagar in Maharashtra.
- iv. World-class proving grounds or testing tracks on around 4,000 acres of land, including summer and winter pads, the locations of which would be decided with technical assistance from a reputed global consultant to be appointed on the basis of global tendering process.

- v. National Center for Testing of Tractors and Off-Road Vehicles together with national facility for accident data analysis and specialized driving training in northern part of the country, at Rae Bareilly, in Uttar Pradesh.
 - vi. National Specialized Hill Area Driving Training Center as also Regional In-Use vehicle management Center at Dholchora (Silchar) in Assam.
3. The investment of ₹ 1718 cr. had been proposed to be funded jointly by the Government and the Industry, based on recommendations of the Expenditure Finance Committee, in the following manner.
- A. Plan Support by the Government*
- | | | |
|-----------------|---|-----------|
| By way of grant | : | ₹ 817 cr. |
| By way of loan | : | ₹ 273 cr. |
- B. Contribution from automotive Cess*
- | | | |
|--|---|-----------|
| (to be Collected from the auto industry) | : | ₹ 510 cr. |
|--|---|-----------|
- C. User Charges to be paid by auto industry* : ₹ 118 cr.
- Total Project Cost (A+B+C) : ₹ 1718 cr.**
4. Recently in April, 2011, the Cabinet Committee on Economic Affairs has approved the revised cost estimate of ₹ 2288.06 cr. for the NATRIP in place of the original approved cost estimate of ₹ 1718 cr. due to the budget escalation of ₹ 570.96 cr. on account of the Foreign Exchange variation, Statutory Levies, rise in input costs, Other Factors like change in Scope of Supply etc. The total escalation of ₹ 570.06 cr. has been approved in the following manner:
- I. Plan Support by the Government**
- | | | |
|-----------------|---|---------------|
| By way of grant | : | ₹ 427.29 cr. |
| By way of loan | : | ₹ 142.77 cr.* |
- II. Contribution from automotive Cess**
- | | | |
|------------------------------------|---|--------------|
| (Collected from the auto industry) | : | Nil |
| Sub-total (A+B) | : | ₹ 570.06 cr. |
- III. Additional loan component on account of short recovery of user charges** : ₹ 95.51 cr.
- Total Project Cost (A+B+C) : ₹ 665.57 cr.**

* ₹ 157.48 crore of investment as an interest free loan by Government with 7 years moratorium, repayable in 8 annual installments. It is proposed that the exact formulation for the apportionment of this loan to the various centres will be decided by the GC, NATiS or the governing board of National Automotive Authority that is proposed to be set up after the completion of the NATRiP centres.

Expected Benefits of Natrip

5. NATRIP is aimed at addressing one of the most significant constraints of Indian automotive sector and is, therefore, likely to provide a major impetus to manufacturing in India, significantly unlocking employment potential in this sector. Some of the key benefits expected from the project, *inter alia*, would be:-
 - a. Availability of world class infrastructure to test vehicles and components against existing and emerging automotive standards expected to become mandatory till 2015, to significantly enhance vehicular safety, emissions and performance.
 - b. Bolstering efforts of the Government to usher in global vehicular safety, emission and performance standards in India leading to modernization of industry.
 - c. Convergence of India's strengths in Information Technology and electronics with automotive engineering, to expand India's global presence in this key sector.
 - d. Deepening of automotive manufacturing in India, promoting larger value addition and thereby significantly enhancing employment generation in this sector.
 - e. Enhancement of India's abysmally low global outreach in this sector by de-bottlenecking exports and making them more competitive.
 - f. Facilitation and promotion of larger R&D efforts within India by not only Indian automotive industry but also by global automobile and component manufacturers who are expected to take advantage of this pre-competitive R&D infrastructure.

- g. Significant enhancement in current fiscal contribution of this sector to the general exchequer.
 - h. Bringing about large savings out of annual outflow of around ₹ 180 cr. being currently spent to test the exportable vehicles at overseas facilities.
 - i. Significant contribution towards the cause of India's emergence as a global outsourcing base for automobiles and auto components in furtherance of the Auto Policy objectives.
6. Proposal of NATRIP has been formulated with intensive and extensive discussion with various stakeholders including concerned ministries of Government of India, industry associations, notably SIAM, ACMA and TMA during the last three years. The project profile, constituents and funding modalities have been under deliberation at the official level in the Planning Commission since November 2003 and in the Finance Ministry since February 2004. Department of Road Transport and Highways of the Ministry of Shipping, Road Transport and Highways being the nodal department for automotive standards and homologation testing has been closely associated with the project formulation activities as a participant of the Inter-Ministerial Steering Committee set up for this purpose. The Planning Commission gave its in-principle approval to the project in March 2004.

Progress of Natrip So Far

7. The project was to be implemented in two phases of three years each beginning 1st September 2005 as per DPIR. However, due to the belated availability of land at Manesar, Indore, ARAI, Pune & Rae-Bareilly, the project timelines had to be re-worked suitably. The revised timelines for project completion were also on account of other factors like handing over of land at various sites by the state governments, obtaining various clearances, shifting of utilities, rehabilitation of project affected people etc.
8. Now, most of these issues/bottlenecks have been resolved except for acquisition of land at Rae Bareilly. As of now, a number of facilities have already been commissioned, these include the following.

S. No	Facility	Site/Location	Date of Completion	Approx. Value (₹ in cr.)
1.	EMC Lab	VRDE, Ahmednagar	Jan, 2009	31.75
2.	Hill Road Track	Dholchora, Silchar	Sept, 2008	15.00
3.	Hill Driving Institute, Mechanics Institute and Inspection and Maintenance Centre	Jaffirbund, Silchar	Sept, 2011	35.00
4.	Installation of homologation equipments	ARAI, Pune	Sept, 2006	21.88
5.	Commissioning of PWT-1 MACD Labs	G-ARC, Chennai	April, 2011	11.00
6.	Commissioning of PWT-1 MACD Labs	ICAT, Manesar	Sept, 2011	8.00
7.	Commissioning of PWT-2 ETC1 & ETC2 Labs	ARAI, Pune	July, 2011	8.00
8.	Commissioning of Accident Data Analysis Centre	Rae Bareli	Jan, 2011	2.00

9. In addition, as on date, tenders worth more than ₹ 1800 cr. have been floated and tenders worth around ₹ 1300 cr. have been awarded. So far, NATIS has received total funds of ₹ 1170.44 cr., out of which ₹ 995.77 cr. have been utilized/committed and left with only ₹ 174.67 cr. as on 30th Sept, 2011. The detailed physical outcomes are placed at Annex III.
10. In view of the unavoidable delays and consequent escalations, the Union Cabinet in April, 2011 has approved the revised project completion date of 31st December, 2012 from the earlier approved completion date of 30th September, 2011 and the revised cost estimate of ₹2288.06 cr. in place of the original approved cost estimate of ₹ 1718 cr. The revised schedule of readiness of NATRIP facilities as projected before the Union Cabinet is placed below at **Annex I**. The revised funding pattern is placed below at **Annex II**.

11. The revised timelines are expected to be met by NATRIP, however, on account of insufficient funding during 2011-12 (a sum of ₹ 355.38 cr. has been allocated against the total demand of ₹ 1131.85 cr.), the pace of the project has had to be suitably moderated, so as to avoid the crisis of non availability of funds. Accordingly, this may also invariably have an adverse impact on the budget and the schedule of completion of the project.

12th PLAN budget for NATRiP

12. The **budgetary outlays for NATRiP for the 12th Plan** and the Annual Plan are based on the Detailed Project Implementation Report (DPIR) submitted by the Global consultants and approved by the Governing Council of NATRiP Implementation Society. The IEBR is also based on the projections of revenues and excess of income over expenditure for each of the centres as given in the DPIR. The information for the Eleventh Plan has been based from the start of the project in the 11th plan from the year 2007-12.

I & EBR OF NATRIP FOR 12TH FIVE YEAR PLAN 2012-17

Five Year Plan	Year	Total Outlay (Amt. ₹ in cr.)		
		Budgetary Support	Internal Resources	Total
10th Five Year Plan (2002-2007)	2005-06	182.33	0.00	182.33
	2006-07	130.00	0.00	130.00
11th Five Year Plan (2007-2012)	2007-08	0.00	0.00	0.00
	2008-09	125.00	0.00	125.00
	2009-10	145.59	2.00	147.59
	2010-11	232.14	2.00	234.14
	2011-12	355.38	9.00	364.38
12th Five Year Plan (2012-2017)	2012-13	1095.13	9.49	1104.62*
	TOTAL	2265.57	22.49	2288.06

*** Funding pattern for the 12th Five Year Plan**

Source	Original Funding Pattern (1)	Escalation Pattern approved by Union Cabinet (2)	Further changes approved by Union Cabinet (3)	Total final Amt (1+2+3) (4)	Amt funded under the 10 th & 11 th five year plans (5)	Funding pattern for 12 th five year (4-5)
Grant	817.00	427.29	510.00	1754.29	1170.44	583.85
Loan	273.00	142.77	-	415.77	-	415.77
Automotive Cess	510.00	-	(-) 510	00.00	-	0.00
User Charges	118.00	-	(-) 95.51	22.49	13.00	9.49
Loan in lieu of user charges	-	-	95.51	95.51	-	95.51
TOTAL	1718.00	570.06	0.00	2288.06	1183.44	1104.62

Encouragement to R&D, New Product and Technology Development have to be taken up on a priority basis. Technology in the Auto industry is rapidly changing with ever evolving regulations on emission and safety, increasing industry responsibility towards society and the need for moving towards alternate energy sources.

Presently, most policies for promoting R&D in the country are focused on encouraging “in-house R&D” conducted in the CSIR approved in-house R&D units of companies. Last year, the Income Tax deductions available on R&D expenditure have been extended to R&D outsourced to institutions approved by the Government. While this has certainly paid some dividend, it still does not create a competitive environment for promoting full-scale development of vehicle platforms as compared to other competing economies.

R&D policies will have to be re-aligned from “where” the R&D is being done to “who” owns the IPR. It should not matter where the R&D is being conducted in a globalising industry. An automobile is a very complicated engineered product and in order to develop sophisticated components like engine, transmission, styling etc, specialist agencies have to be engaged most of which are located in the developed countries. Expenditure incurred in such R&D should also be permissible for tax benefit as long as the IPR rests with the Indian company.

The Indian auto component industry is one of the front runners for grabbing the global auto components outsourcing market and is poised to grow by over four-fold to USD 113 billion by 2020. Exports of the auto component industry for the current year is expected to be worth USD 5 billion in 2010-11 and are expected to grow to USD 30 billion by 2020. India's share in the global auto components market is expected to rise from 0.9 per cent in 2008–09 to 2.5 per cent in 2015.

In view of the fact that NMCC had directed DST to prepare the technology road map for electric mobility, DHI is coordinating with DST to bring together key industry R&D leaders; auto researchers to fine tune and prioritize the R&D projects to be taken up along with the detailing of these projects. In terms of Cabinet approval recently accorded, the required structure for supporting NCEM and NBEM in NATIS for the time being and subsequently by NAB is being created. The approval of EFC for NAB has also been obtained.

Terms of Reference (TOR)-8

- (viii) **To examine issues concerning competitiveness of Indian auto component industry in the context of increased competition and dynamic technological environment and to recommend measures to address the related issues. Also to consider specific measures for the development of SMEs in the auto component sector to enable them to emerge as competitive business entities**

Domestic Indian companies have developed strong manufacturing capabilities that have helped them till now in keeping costs low and quality under control. As volumes increase, Indian component manufacturers will have to scale up their operations and further improve quality, cost and delivery performance to global standards demanded by customers.

Scaling up of Business: Scaling up of operations would be a key challenge for smaller component manufacturers who face constraints in raising capital, attracting talent and accessing technology. A number of areas would therefore need to be addressed, some immediately, by the Indian component players, as they need to

- **Raise capital** – balance sheets have to be strengthened by divesting non-performing and non-core assets and by optimizing the debt / equity structure
- **Scale capacities** – manage cost and flexibility of new assets to successfully navigate any market cyclicity. Flexible production systems and supply chain agility and scalability need to be addressed in parallel
- **Access Technology** – a major challenge for the MSMEs
- **Build R&D competence** - build/enhance product development, design and engineering capabilities and incorporate the frugal engineering elements across the design and manufacturing value chain
- **Develop organizations** - to manage significantly increased complexities and risks from larger capital outlays, industrial relations environment, larger customer base or customer concentration, product portfolio performance and new technology development/absorption

In addition, specific issues/concerns faced by the MSME in the auto component sector are:

Challenges :

- a) Capacity Expansion / Scaling-up is a problem due to :
 - i. Non-availability of easy access to Capital
 - ii. Poor logistics / infrastructure in auto component hubs
 - iii. Inadequate uninterrupted supply of power / Quality of Power
- b) High Raw Material Prices
- c) Lack of dedicated R&D, testing and design facility
- d) Lack of awareness on foreign markets / access to foreign markets
- e) Access to Technology for Upgradation including ICT
- f) Challenge of Manpower – both in terms of skill & availability
- g) High Logistics cost for exports

Government's support required in :

- a)
 - i) Access to Capital : Request for Easy Access to Finance for all manufacturing requirements
 - ii) Logistical & Infrastructure development in auto component hubs
 - iii) Uninterrupted Supply of Power for manufacturing activities in auto component hubs such as NCR, Pune & Chennai

b) High Raw Material Prices :

There has been a sharp rise in the prices of raw materials particularly steel due to which input cost has risen substantially for the SME companies. Raw material prices will have to be matched with the global prices to provide a level playing field.

c) Requirement of dedicated R&D, testing and design centre :

Dedicated R & D, Testing and Design Centres to service the auto component subsector either owned / created by the Government or created under the PPP mode is a need of the hour.

Terms of Reference (TOR)-9

- (ix) To specify the milestones to be achieved during the 12th plan period in order to achieve the longer term goals as laid out in TOR (1) above

Indian Automotive Industry

In terms of value, the targets for domestic sales turnover and exports are as follows:

In ₹ '000 cr.			
Year	Domestic Vehicle Sales Turnover	Vehicle Exports	Total OEMs Turnover
2012-13	273.4	39.07	312.47
2013-14	311.1	46.89	357.99
2014-15	354.3	56.27	410.57
2015-16	403.6	67.52	471.12
2016-17	460.0	81.02	541.02

The above data is based on SIAM estimates.

Auto Component Industry Performance - Estimation for 2012-17

(USD billion)

	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR 2012-17
Domestic Market Size	52.6	58.3	64.5	71.4	79.1	10.7%
Turnover	48.7	53.9	59.8	66.3	73.6	11%
Exports	7.3	8.7	10.3	12.3	14.6	18.8%

Proposed Milestones as regards policy interventions

- ❖ Revisit the Auto policy 2002
- ❖ Formulate AMP II 2017-27
- ❖ Put in place a Long term Emission and Fuel availability roadmap beyond 2010 based on Auto Fuel Policy
- ❖ Roll out GST regime

Terms of Reference (TOR)-10

- (x) To work out specific plans and programmes including fiscal and other policy prescriptions to enable the industry achieve its growth potential

a) **National Mission for Electric Mobility**

With the launch of the National Mission for Electric Mobility in March 2011 the country has decided to fast track all initiatives on electric mobility. An Empowered body has been set up at the apex level in the form of **National Council for Electric Mobility (NCEM)** chaired by the Minister Heavy Industries & Public Enterprises which will be aided by the **National Board for Electric Mobility (NBEM)** chaired by Secretary, Department of Heavy Industry. The National Council and the Board will be serviced by the NATRiP Implementation Society (**NATIS**)/**National Automotive Board**, which is being created

Mission targets and the road map for the future: The Department of Heavy Industry commissioned in collaboration with the Industry a study with M/s Booz & Company as the knowledge partner. The objective of the study was to develop a mission plan and roadmap for promoting the adoption of a range of electric mobility solutions for India, which can enhance national fuel security, provide affordable and environmentally friendly transportation and enable the Indian automotive industry to achieve global manufacturing leadership.

b) **Constitution of National Automotive Board**

National Automotive Board is in the process of being set up as an autonomous society under the administrative control of DHI. It will help steer, coordinate and synergize all the efforts of the government in important ongoing and new initiatives for automotive sector especially in the area of electric mobility, intelligent transport systems, automotive testing, collaborative R & D and for implementation of the recommendations of the Automotive Mission Plan 2006-16. Budgetary support to the tune of ₹ 2.02 cr. will be required for the functioning of the Board during the first three years only.

Background:

1. The National Automotive Testing, Research & Development Infrastructure Project (NATRiP) was approved by the GoI for setting up state of the art automotive testing and R&D infrastructure in the country in order to usher in new automotive regulations and for bridging the vital automotive testing infrastructure gap necessary for spurring the growth of automotive industry in India. The project envisages up-gradation of three existing centers and setting up four new centers at a total cost of ₹ 2288 cr. by December, 2012. The project is in advance stages of completion and certain facilities have been finished and commissioned also.
2. The setting up of a central authority for the automotive sector, in the form of NAB, was envisaged at the conceptualization stage of NATRiP itself (DPIR stage). Further, during the process of seeking approval for the project, both at the stage of the EFC meeting as also during inter-ministerial consultations at the time of cabinet note stage, the department had indicated that a central authority/agency for regulating, monitoring and supervising the automotive testing and homologation work at these centers (existing and upcoming) will be set up in due course. It was further indicated that this authority will function as an accreditation agency for the centers, undertake future planning for the growth of these centers, be the neutral and independent certificate issuing agency for the tests conducted in these centers and also take up the task of providing expertise, technical advice and secretariat assistance for automotive regulations development, policy formulation etc. It was informed that the proposal in this regard would be brought before the government for approval in due course.
3. Although at the time of setting up of NATRiP, it was initially conceived that this agency would take the shape of a statutory authority with regulatory functions. However, subsequently during detailed stakeholder deliberations in the Development Council for Automobile and Allied Industry (DCAAI) and in Governing Council (GC), NATIS, it has been decided that it would be better to set up a “non-statutory” single umbrella body for taking up supervision, coordination, future planning and monitoring of the testing and homologation centres under DHI, their future development and for facilitating the optimal

utilization of the facilities in these centers through catalyzing collaborative R&D activities. It is envisaged that NAB will also facilitate the key future initiatives of DHI relating to the automotive sector. These functions are essential for maximizing the benefits from the huge investments made by the government and also critical to the growth of the auto sector. NAB will also function as an important source of technical data, expert advice and technical inputs for formulation of automotive regulations and government policies for auto sector. Therefore, in view of the objectives and functions now proposed for the NAB and since the authority for carrying out these functions need not flow through it's being a statutory body; the intent for creation of NAB is no longer to assign any regulatory function to it. In fact, while conceiving NAB and its role/ functions, great care has been taken to ensure that there is no duplication of functions with any other existing agency and that NAB does not infringe upon the domain of any other Ministry/Department.

Further, efforts have been made so that the benefits arising out of creation of NAB are maximized by ensuring that NAB acts as a facilitator for assisting not only DHI but also all other Ministries and Departments in executing their functions relating to the automotive sector. This is important as the automotive sector is significantly impacted by issues that are dealt by various Ministries/Departments which have strong inter-linkages requiring a holistic approach. For instance the growth and development of the sector is specifically impacted by issues relating to quality of fuels (fuel policy dealt by MoPNG), emissions & safety regulations (dealt by DRT), fuel efficiency norms (Dealt by DRT & Mop/BEE), Foreign trade agreements (MoC), required key future interventions (mainly dealt by the nodal department – DHI) etc. However, most of these Ministries/Departments do not have any permanent expert agency to assist them, for instance the DRT is dependent upon an adhoc arrangement with ARAI, Pune (a center under DHI) for the purpose of formulation of domestic automotive regulations (emissions & safety) and the international automotive regulation commitments of the country (WP-29). Accordingly, NAB being the repository of domain knowledge, technical expertise, rich experience generated through the various automotive testing and R&D centers under DHI will be well placed for assisting various

ministries/departments and thereby also facilitate a more holistic treatment of various important inter-related issues relating to the sector. Setting up of NAB will therefore also prove to be a critical intervention in realizing the huge future potential of the Indian automotive Industry, through ensuring that key required interventions, required policies and future automotive regulations are optimal and are introduced well in time.

Justification:

1. In accordance with the above, the National Automotive Board is proposed to be set up as an autonomous society, under the administrative control of DHI. The setting up of one single umbrella organization in automotive sector, i.e. the National Automotive Board would be essential for ensuring optimal returns on investments made in NATRIP, achieving the targets envisaged in the AMP-2006-16, spurring collaborative R&D in the country, ensuring effective roll out of required policies that are based on well researched holistic treatment of issues and efficient implementation of key planned initiatives which will help India realize the full potential of its automotive sector. NAB is proposed to be the nodal professional agency with technically specialized manpower to help steer, coordinate and synergize all the efforts of the government and also collaborate with all stakeholders especially with regard to the important ongoing and new initiatives in the area of electric mobility, intelligent transport systems, automotive testing, collaborative R & D and for implementation of the various important recommendations of the Automotive Mission Plan 2006-16. This structure will not only provide synergy and improve collaborative working amongst the various stakeholders but also help avoid duplication and more effective application of scarce resources. This body will be the repository of knowledge, competence, expertise and technical knowhow which shall also provide data and tender expert advice to the government to help shape its policy formulations and schemes to make these more effective.
2. NAB will facilitate and be the catalyst for fulfilling the important recommendations as envisaged in the AMP. In addition, NAB will also play a pivotal role in the other key future initiatives of the department for the

automotive sector. The key functions of NAB are broadly categorized as **(i)** to help capacity building for the new centres, establish healthy competition amongst the various centres under DHI, maintaining required quality of service being offered, benchmarking of facilities and also synergizing their functioning to ensure optimum returns on the investments made by the government. **(ii)** For coordinating, regulating, monitoring and future planning the various automotive testing and homologation work the testing centres under DHI. **(iii)** To be the repository of technical data, domain knowledge and expertise for providing expert advice, technical inputs and secretariat assistance for key future initiatives of DHI for the automotive sector and also for assisting other stakeholder ministries like MoRTH, MoEF in their activities. **(iv)** Facilitate collaborative R&D activities leveraging the state of the art facilities at these centers in partnership and with active involvement of the industry and the academia. Accordingly, the list of core and other functions sought to be carried out by this body are given in **Table – 1** below:-

Table 1: Role and Functions of NAB

<u>CORE-FUNCTIONS</u>	<u>OTHER FACILITATIVE FUNCTIONS</u>
<p>A. Capacity building, standardization of Test Procedures, Technical Audit/Accreditation and Upgradation needs of the Test Centres.</p> <p>B. Facilitating Collaborative Automotive R & D.</p> <p>C. Development of Skill Sets in the Area of automotive Testing and R & D.</p> <p>D. Framework for Fair Competition.</p> <p>E. Alternative Mobility: Electric & Hybrid Vehicles</p> <p>F. Intelligent Transportation System (ITS).</p> <p>G. New Vehicle Assessment Programme (NVAP)</p> <p>H. Framework for End of Life Vehicles (ELV).</p> <p>I. Aid preparatory activities for setting up of the National Automobile Design Institute, if found feasible based on DFR to be commissioned by NAB and approved by DHI.</p> <p>J. Winding Up of Residual Issues of NATIS.</p>	<p>A. Providing Regular Institutional Support for Regulation Development:</p> <p>B. Certification of Vehicles and Components:</p> <p>C. Support for Implementing Inspection & Certification Regime in India</p> <p><i>(Note: These above activities shall continue with the respective departments with NAB providing support services)</i></p>

3. Recently, the cabinet while approving the National Mission on Electric Mobility (NMEM) has also approved the role of NAB as the secretariat and advisor to the National Council and the national Board for Electric Mobility. This is going to be one of the major activities to be undertaken by NAB.

Proposal in Brief, expenditure and outcomes:

1. The setting up of NAB involves only the creation of posts, sanction for setting up of an autonomous society under DHI and the support of ₹ 2.02 cr. for the first three years only from Cess funds allocated to the department.
2. The proposal does not envisage any CAPEX and it is estimated that NAB will become self sufficient in three years time. The structure, no. of posts etc are summarised in Annexure 1.
3. The expenditure and revenue projections are summarised in **Table 2 & 3** below:

Table - 2

Revenue particulars	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16
Certification & Accreditation	1.40	1.69	2.03	2.39	2.97
R&D Projects (to be executed by centers)	1.25	1.75	1.95	2.55	2.85
Consultancies & Training	0.36	0.44	0.53	0.62	0.75
Revenue from NCAP, ELV & Alternative Mobility (Electric & Hybrid Vehicles)	0.44	0.94	1.67	2.32	2.83
Total revenue from operations (i)	3.45	4.82	6.18	7.88	9.4

Table - 3

Expenditure particulars	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16
Manpower Costs (a)	2.30	2.73	3.22	3.38	3.55
Initial Setting up expenses (b)	0.15	0.20	0.20	0.25	0.40
Operational & Establishment Expenses (c)	2.25	2.54	2.88	3.11	3.61
Total expenditure (a+b+c) (ii)	4.70	5.47	6.30	6.74	7.56
Excess of Income over Expenditure (i-ii)	-1.25	-0.65	-0.12	1.14	1.84

c) Automotive Component Cluster Development Programme for process and productivity improvement of Automotive Component manufacturing companies

With a view to strengthen the competitive advantage of clusters by supporting small and medium-sized manufacturers in the automotive component industry in India to help them overcome challenges related to low productivity, insufficient and inconsistent quality, scalability and to become more efficient, reliable and cost-effective suppliers, the GOI-UNIDO-ACMA Cluster Development Programme was implemented for a decade from 1999-2009. About 133 SMEs were covered in the 10 year three phase Programme. Funding was provided by DIPP for the first 5 years and then by DHI for the next 5 yrs. The programme came to an end in December 2009. As the existing cluster projects funded by DIPP addressed highly localized needs of industry in a specific geographical area, UNIDO Partnership Programme under DIPP was limited to some regions and geographical areas and did not cover the entire country.

In view of the good feedback and popularity of the programme amongst the auto component manufacturing companies there has been a strong demand for the continuation of the programme. A proposal for extending the programme is under consideration which will cover 460 auto component companies mainly SMEs. The

programme was envisaged to run for 7 years from 2010 to 2017 divided into three phases with phase I covering 150 companies from 2010-13.

Target Beneficiaries:

The beneficiaries of the Partnership Programme will be the automotive component manufacturers in cluster locations across India. Given the structure of the industry, the core target group will be concentrated at the enterprise level, i.e. indigenous Tier-2 and Tier-3 automotive component suppliers and other (lower tier) SMEs in the automotive value chain. It is foreseen to work at the national level in a number of relevant cluster locations. More specifically, the project will target a total of 460 companies across India (clusters/regions to be determined in consultation with DHI, considering all four regions of the country including the new automotive component clusters being formed in the hill states and in the State of Gujarat), which will be assisted in three project phases and counseling cycles.

A number of institutions at the level of each cluster make critical physical (machines, equipment) and institutional infrastructure (training facilities) as well as support services available to small and medium-sized automotive component suppliers. At the level of each cluster, relevant institutions will be integrated into project activities and their relevance be enhanced through institutional capacity building and the provision of specialized technical services. These could include local chambers of commerce, district-based industrial associations and their training centers and facilities, as well as relevant quality, research, training and educational institutions and service providers (including existing Centres of Excellence).

Expected Outcomes and Outputs:

The project envisages the following outcomes over three project phases:

- A broad range of Indian automotive component manufacturers in the target clusters will apply state-of-the-art methodologies for process and productivity improvement and become more productive and competitive in the global marketplace.
- Trained national experts and business support institutions will provide high-quality, sustainable services to local automotive component suppliers in the

fields of continuous improvement, quality issues, and lean manufacturing tools.

ESTIMATED BUDGET (ALL PHASES, COVERING APPROXIMATELY 460 COMPANIES, IN USD): Duration: 2011 – 2017 in three phases

BL	Description	Phase I 2012-13	Phase II 2014-15	Phase III 2016-17	TOTAL
11	international experts	270,000	250,600	130,600	651,200
13	support staff	45,000	30,000	30,000	105,000
15	project travel	500,400	460,800	372,000	1,333,200
16	mission costs	32,400	18,600	24,800	75,800
17	national expertise	1,598,800	991,600	991,600	3,582,000
21	sub-contracts	220,000	205,000	215,000	640,000
32	study tours	35,000	35,000	0	70,000
33	in-service training	151,400	91,600	81,600	324,600
34	conferences	0	0	20,000	20,000
45	equipment	34,000	0	0	34,000
51	miscellaneous	10,000	10,000	10,000	30,000
	evaluation	120,000	50,000	50,000	220,000
	Total	3,017,000	2,143,200	1,925,600	7,085,800
	Minus Industry Contribution (38% average)	1,146,460	814,416	731,728	2,692,604
	Total, net of PSC	1,870,540	1,328,784	1,193,872	4,393,196
	Plus UNIDO Programme Support Costs (13%)	243,170	172,742	155,203	571,115
	Total, including PSC in USD	2,113,710	1,501,526	1,349,075	4,964,311
	Total in rupees crore				21.8

Further, the Cess Committee headed by Secretary (DHI) on R & D projects in its meeting held on 31.5.2010 gave an in principle approval to Phase I of the UNIDO program, subject to the condition that an in-depth analysis and examination of the evaluation of past experience of the scheme as well as individual components and the outlay etc. shall be done by DHI. Based on this, approval shall be given for release of funds. Moreover, close monitoring and evaluation of the project shall be done to ensure full realization of the projected outcomes. Further, ARAI and NATRiP will explore the possibilities to develop counsellors for future requirements of the auto component industry in the country. The proposal with the duration between 2010-2017 is under consideration in DHI.

d) Technology Up gradation & Development Scheme (TUDS) for Auto Components and setting up of Auto Component Technology Development Fund (ATDF):

The long-term competitiveness of the auto component industry in India is a major concern, as is the ability of the industry to invest in technology up gradation, especially in case of the SMEs. According to industry estimates, the auto component industry needs to invest ₹ 15,000 cr. over the next five years towards technology and R & D to maintain and enhance its competitiveness. The industry has requested for an interest subvention scheme for a five-year period amounting to ₹ 7,500 cr., wherein the industry would invest an amount equivalent to what it receives from the Government. The scheme could be initiated with a sum of ₹ 1,000 cr. in the first year and the amount could be progressively enhanced based on the response and requirement of the industry.

The following domains have been identified for R& D and technological intervention:

Light Weighting:

Considering the fact that reserves for fossil fuels are not inexhaustive, there is a considerable focus the world-over on ensuring that the vehicles are fuel-efficient. This is leading to the usage of low-density metals, high strength light alloy (HSLA) steel structures, plastics and composites in component manufacturing.

Engine and power train:

India is emerging as a major engine manufacturing location. This offers opportunities to develop more efficient power train technologies. On one hand, new technological developments in this domain will be driven by fuel-efficiency as far as ICE technology is concerned. On the other, the focus on electric vehicles and its variants is also posing a new challenge the world-over. India needs to prepare itself for these challenges.

Manufacturing technologies:

Process improvements by investing in appropriate technologies that allow for efficient production, testing and validation will also lead to cost competitiveness.

A Technology Up gradation and Development Scheme for Auto component industry would help the industry to undertake these technology related investments.

Countries like Korea, Japan, Canada, Thailand and France have taken a large number of steps to help their respective auto components industry undertake such investments.

The creation of an **Auto Component Technology Development Fund (ATDF)** for operating the **Technology Up gradation & Development Scheme (TUDS) for Auto Components** will help auto component companies access finance at reduced rates of interest for their modernization/ upgradation / technology acquisition thereby helping them to become more competitive. This fund would be used to provide financial support to companies by financing 50% of the project cost by way of soft loan, with an interest subvention of 4% to be met from fund corpus. The firms using this facility would put in balance 50% of the capital required. Auto Component Manufacturers Association (ACMA) have indicated that the level of investment required by component industry for the period 2012-16 would be ₹ 15,000 cr., of which ₹ 7,500 cr. is proposed to be financed through soft loans with interest subvention. The proposal has been a part of the pre-budget recommendations of the Department of Heavy Industry in respect of the automobile industry. The phasing of requirement along with the cost of interest subvention of 4% is given below:

	2012-13	2013-14	2014-15	2015-16	2016-17
Quantum of soft loan	1,000	1,250	1,500	1,750	2,000
Cost of 4% subvention per year	40	50	60	70	80

The total cost of subvention would depend upon period of repayment of loan and the operational modalities of the scheme can be worked out upon its approval. A detailed write up on the scheme is at **Annexure B**.

The **policy prescriptions/interventions** suggested are given below:

i. National Policy on Fleet Modernisation and Vehicle End-of-Life

The total vehicle population in India is over 125 million out of which over 90 million are two wheelers, 8 million are commercial vehicles, and almost 18 million are passenger cars. At present, India does not have a robust national policy on retirement of vehicles or end-of-life of vehicles. Consequently, vehicles that are even 20 or 25 years old continue to run on the roads leading to huge losses to the country on account of higher fuel consumption, higher emissions as well as compromising the safety of the vehicle occupants and other road users.

The Government may incentivise replacement of vehicles registered before the year 2000 when the first emission norms were introduced. This would cover a total of 45 million vehicles (5 million cars, 3 million commercial vehicles, 31 million two wheelers and 6 million other vehicles) i.e. 40% of the vehicle population. The incentives could be in the form of rebate in Cenvat both at centre and state level or as was done in the case of Delhi for Public Transport Vehicles, waiver of road tax, and provision of subsidized finance could be adopted.

Such a scheme would considerably reduce the road centric pollution in the country as nearly 80% of pollution is caused by vehicles more than 10 years old. In the recent past China has carried out such an exercise and Germany has announced a Euro 2 bn package for replacement of old vehicles, which has also successfully stoked demand.

Most countries in the developed world have clear end-of-life regulations supported by a robust Inspection & Certification system.

During the 12th Five Year Plan, a National Policy on Vehicle Retirement and End-of-Life may be evolved. Some specific recommendations are as follows:-

- I. Only those vehicles that comply with recent emission norms i.e. two norms before the current applicable norm should be allowed on road e.g: If Euro IV is implemented, only vehicles meeting Euro II and above should be allowed on road. If this is not done, the existence of old vehicles would depress the freight rates and thereby act as inhibitor to entry of new technology vehicles in the fleet, which are safer and less polluting. The initiative on implementation can save about 200 Kl/day in fuel and reduce emissions by

about 230 MT/day. Increased sale of normal new vehicles will neutralise the revenue foregone

- II. Target replacement of 300,000 vehicles and 0.5 million two wheelers
- III. Introduce 50% rebate in CENVAT at Centre and VAT at State level

ii. Recycling Policy

Vehicle recycling in India is carried out mostly manually in the un-organised sector without any consideration for the environment and safety of the people. The oil and liquids are drained causing contamination, environment degradation, health hazard for the people working and under recoveries of the material.

NATRIP in association with the Industry has setup the first pilot dismantling center in GARC in Chennai this year. The centre will work on dismantling of vehicles in a scientific and environment friendly manner. The Centre will also come up with a business model appropriate for India.

It is recommended that necessary enabling provisions may be put in place for establishment of the recycling industry, as the number of vehicles to be recycled would considerably increase in numbers in the years to come.

❖ **Interventions for enhancing capability to create IPR, products - Technology Development**

Encouragement to R&D, New Product Development and Technology Development has to be taken up on a priority basis. Technology in the Auto industry is rapidly changing with ever evolving regulations on Emissions and Safety, the increasing responsibility of the industry towards society and the need for moving towards alternate fuels and powertrains. Traditionally, the Indian automobile and auto-component industry have operated on a build-to-print basis. The capability to design complete vehicles “platform-up” has emerged relatively recently with the domestic development of vehicles by Indian OEMs.

So far, most of Government grants for R&D are being given for consortium projects for development of technologies to a pre-competitive level. This policy has not delivered the expected results and although a number of such schemes are currently

being operated by various Ministries, not many successful examples of new products or new technologies are available. It is therefore important that these policies are constantly reviewed. Keeping in line with the international models existing in e.g. Canada, Australia, EU, China etc, it is recommended that Government funding for development of new products like alternate fuel vehicles and their components should also be made available to individual companies for developing a commercial product. This would ensure assured tangible results for the funding provided within a timeframe. Government can establish a mechanism for approving such projects and also to exercise supervision /oversight to ensure that the projects are proceeding as expected.

The Sub Group on AMP within the Working Group, had proposed that the Government should set up a ₹ 5000 crore corpus fund to provide finance at lower rates to companies for R&D, technology development and/or acquisition and new product development. The quantum of grants should be 100% for fundamental research; 75% for pre-competitive research/development and 50% for commercial product development.

The point-wise recommendations are as follows:-

- a) Extend the scope of IT deduction to all R&D expenditure whether incurred in-house or externally.
- b) Zero taxes/levies on technology transfers (products, features, alternate fuel, etc.)
- c) Recommendations arising out of the EV/HEV Study, as adopted by NCEM/NBEM, to be implemented.

❖ **Automobile Exports**

Export targets, challenges, existing policy framework and interventions required for the automobile industry.

In terms of value, the targets for exports are as follows:

Year	Vehicle Exports (in ₹ '000 cr.)
2012-13	39.07
2013-14	46.89
2014-15	56.27
2015-16	67.52
2016-17	81.02
2017-18	97.23
2018-19	116.68
2019-20	140.01

The above data is based on SIAM estimates.

The **constraints faced by India's automobile exporters and suggested measures to address the same** are outlined below:

a) Embedded Taxes

The supply chain of a vehicle manufacturer consists of multiple tiers of vendors and in the course of transactions till the supply of component to the manufacturer, some taxes remain unabated, for various reasons, creating a disadvantage for Indian exports.

A suitable scheme that addresses the cascading the impact of indirect taxes, including state and municipal levies, is required for improving competitiveness and encouraging exports.

b) Infrastructural deficiencies

Infrastructural bottlenecks with respect to Port, Road and Rail connectivity need to be addressed. There are constraints like those relating to export documentation, export credit / finance availability, risk coverage, etc.

Appropriate policy measures aimed at removing these bottlenecks would help in creating a conducive environment for our exports.

c) Credit Availability

Financing is an integral part of Vehicles Business - both for the Commercial and Passenger vehicles. Manufacturers in India, unlike their competitors in

other countries, find it difficult to get long term finance for 3- 5 years period beyond the usual duration of upto one year, as per the existing arrangements.

In absence of adequate sources of long term finance, many of the automobile manufacturers in India are trying to target countries in Africa, Middle East and Latin America. However, manufacturers are finding it tough to compete with Chinese manufacturers who enjoy the benefit of easy and low cost funds.

The Government needs to consider having a set up either through EXIM Bank or other leading Government owned banks to provide long term finance for vehicle exports to support Institutional bulk deals as well as Retail Financing.

d) Limited coverage of automobiles in the existing schemes

The existing schemes cover only a few automobile tariff lines and a few target countries. To enhance the industry's export competitiveness, the coverage of the existing schemes should be expanded so as to cover the automobile sector tariff lines comprehensively.

The scope of Focus Market Scheme, Focus Product Scheme, Market-linked Focus Product Scheme, etc. should be widened.

e) High Tariffs in Export Destination Countries

Vehicle manufacturers in India are exploring new markets and, in some countries, they are faced with constraints/ high duty structure which may not be applicable to their competitors.

For instance, Chile is emerging as a very important export destination for vehicles, especially for companies like Maruti Suzuki India, Mahindra & Mahindra, Tata Motors, etc. While Chile has no local production with its market entirely dependent on imports, it has FTAs with many of the important automotive manufacturing countries like US, Japan, China, Korea, Brazil, etc. Vehicles imported from these countries enjoy the benefit of zero percent import duty, whereas Indian exports attract import duty. This needs to be addressed.

f) Automotive Non-Tariff Barriers

Vehicle exports from India face several non-tariff barriers. These could be related to customs valuation & practices, import quotas & licensing, discriminatory automotive taxes, investment restrictions, service barriers, technical barriers to trade, etc. The table given in Annexure, highlights the nature of NTBs faced by vehicle exporters.

Several schemes under the Foreign Trade Policy of India provide encouragement to vehicle exporters directly or indirectly:

i. Duty Exemption/Remission Schemes

- a. Duty Drawback Scheme – The Central government notifies the Drawback rates for various products either on a general basis (all industry rates) or for individual exporters (brand rates) as the case may be. Drawback sanctioned under section 75 has a two tier system involving (i) fixation of rates by the Directorate of Drawback in the Central Board of Excise and Customs and (ii) disbursement of drawback amount by the Customs Houses and/ Central Excise Commissionerate.

There are minimum procedural issues with realizing the benefit under All Industry Rate. However, due to narrow base, the All Industry Rates are meager as compared to actual quantum of taxes embedded. For example, the current All Industry Rate for Commercial Vehicles is 1% whereas the overall quantum of taxes embedded in FOB is around 5%

The Brand Rate does not consider some of the taxes as the Scheme is supposed to compensate the Custom Duty and unabated Excise Duty at actuals. Also, there are several practical limitations and problems in its working and the scheme has limitations to address the taxes embedded in the chain of vendors. It has certain deficiencies, broadly at two levels – legal deficiencies and procedural deficiencies.

ii. Existing Promotional Measures/ Incentive Schemes

These schemes cover several of automobile tariff lines and markets. However, there has been request from the industry for expansion in scope of these

schemes to cover more markets and products. Also, the request has been to increase the rate of rebate under these schemes.

- a. Focus Market Scheme (FMS) - While several countries have been added in the scheme coverage could be expanded to include some more export destinations such as Bangladesh, Chile, Columbia, Israel, Indonesia Philippines and Sri Lanka.
- b. Focus Product Scheme (FPS) - While Electric Vehicles and some Two Wheeler Parts are covered under this scheme, the coverage should be expanded to include other automobile tariff lines. The incentive given under the Focus Product Scheme should be at par with the incentive given under the Focus Market Scheme (i.e. 3% of FOB).
- c. Market Linked Focus Product Scheme (MLFPS) - The scope of the scheme should be expanded to include the following:
 - Countries - Bangladesh, Chile, Indonesia, Israel, Netherlands, Spain, Sri Lanka, and UK in this scheme.
 - Products - HS Code 840820, 840732, 840733, 840734, 870323.

Also, the scheme should be extended to cover exports of CKD kits. It is recommended that the benefit as in other schemes, should be at least 3% instead of current level of 2%. This will help incentivize Indian vehicle exports and make them more competitive.

- a) Status Holders incentive Scrip - Under FTP para 3.16 to 3.16.4, Status Holders of specified sectors including Engineering Sector excluding Automobiles have been entitled to incentive scrip @ 1% of FOB value of exports made during 2009-10 and during 2010-11 in the form of duty credit. This benefit is over and above any duty credit scrip claimed/availed under this chapter. Policy should allow benefit of 1% of FOB value under Status Holders incentive Scrip to Automobiles as automobile sector is playing an important role in the investment and upgradation of technology in the Indian Economy.
- b) Reduce documentation for filing Brand Rate and duty drawback claims.
- c) Reduce customs duty rate under EPCG to 1%.

- d) Reduce documentation requirements while exporting to neighboring countries.
- e) Provide higher export incentives to value added components such as engine manufacturing in the country to enable the company to set up plant in India and start exporting worldwide.
- f) Minimum Alternate Tax (MAT) may be waived for export earnings- which is available in many other 'Export Focus' developing countries.
- g) Infrastructure Development – Rail, Sea Port and Airport Cargo Development should be focused upon including last mile connectivity and reduction in turn-around time.
- h) Credit availability - The Government needs to consider having a set up either through EXIM Bank or other leading Government owned bank to provide long term finance for vehicle exports to support Institutional bulk deals as well as Retail Financing.

Terms of Reference (TOR)-11

- (xi) To suggest/ recommend programmes /schemes that are to be terminated in the 11th plan or initiated or continued in the 12th plan period together with the broad budgetary implications, if any

a) National Automotive Testing and R&D Infrastructure Project (NATRiP)

NATRIP implementation was envisaged to be completed by 30th September, 2011. Due to unavoidable delays and consequent escalations, the Union Cabinet in April, 2011 has approved the revised project completion date of 31st December, 2012 from the earlier approved completion date of 30th September, 2011 and the revised cost estimate of ₹ 2288.06 cr. in place of the original approved cost estimate of ₹ 1718 cr.

- b)** Initiate and implement Technology Up gradation & Development Scheme (TUDS) for Auto Component industry, Automotive Component Cluster Development Programme for process and productivity improvement of Automotive Component manufacturing companies and other R& D initiatives.

Financing the Auto sector roadmap for 12th Five Year Plan

Twelfth plan (2012-17) budget for Automotive sector						(₹ in cr.)
	2012-13	2013-14	2014-15	2015-16	2016-17	
Area	1	2	3	4	5	Total
NATRIP	991.82 [#]					991.82 [#]
For Testing infrastructure	60	90	30	50	75	305
On-going /planned commitments e.g.						
3. Automotive Component Cluster Development Programme						
4. Operational expenses of National Automotive Board (NAB)	25	35	45	50	50	205
R&D Projects on electric mobility (xEV)	90	75	150	200	225	740
Technology Up gradation & Development Scheme (TUDS) for Auto Component industry -cost of interest subvention	40	50	60	70	80	300
Total budgetary requirement	1216.82	250	285	370	430	2541.82

Balance fund of the outlay already approved by the Government, assuming that ₹ 112.80 cr. sought under RE 2011-12 will be made available.

The above projections are based on current ongoing schemes, estimation of normal R&D expenditure incurred by DHI based on historical data, testing requirements for future regulations and estimates relating to electric vehicle R&D projects, arrived at through detailed study undertaken by DHI with Industry.

Terms of Reference (TOR)-12

b) ANY OTHER MATTER CONSIDERED INTEGRAL TO THE ABOVE

a) Legal Issues

- ❖ There is a threshold limit for an application for brand rate fixation. Duty suffered must not be less than 125% of all industry rate due for the product. If it is even 124%, the application gets rejected.
- ❖ Exporters operating in the automobile industry often have several tiers of vendors. They source some sub-aggregates from company 'x'. Company 'x' sources some components from Company 'y'. And Company 'y' sources some raw material from Company 'z'. However, the present drawback rules and procedures do not recognize such tiers of vendors.

e) Procedural Issues

- ❖ De-centralisation of the Brand Rate fixation authority (March 2003 decision), from Drawback Directorate at Delhi to jurisdictional offices of Commissioners of Excise, is a major issue for the automobile industry. The automobile industry manufactures the major aggregates at the factories from sub-aggregates or components sourced from vendors spread across the country. As such, the manufacturers have to ensure 'verification' of vendor import data by several tiers of their jurisdictional excise offices and 'accumulate' these verification reports at their factory's jurisdictional excise offices. This can be a very time consuming process, sometimes taking more than a year to get a 'brand rate' fixed.
- ❖ "Brand Rate" by its very nature, gives a very narrow definition to export product. If the first shipping bill describes an export product as "XXXX", then all SBs must describe the product as "XXXX". However, in reality, products are described in different nomenclature in different regions of the world.

- ❖ A Brand rate, when sanctioned, is valid for a limited period. It is often not possible to complete an export contract within a given time period.

Suggested Interventions for Reforms in Labour Laws

a) ESI Act 1948

ESI hospitals do not have facilities to provide treatment in case of critical diseases. Lack of proper infrastructure in hospitals and poor services in ESIC office is adding to the difficulties of employers and employees.

Suggestions:

- ❖ Infrastructure and services should be upgraded to the status of the other hospitals.
- ❖ Providing option to Corporate/ Employers to run their own schemes which are at par or above the ESI standards (e.g. PF Trust, Gratuity Trust).
- ❖ Identifying Private hospitals to provide tie-up with ESIC wherein the insurer will get free services.

b) Trade Union Act 1926

Tenure of the office bearers of the Trade Union may be 3 years. This will help to get good productivity and overall healthy atmosphere in the industry.

c) Model Standing Orders 1946

- ❖ Considering the present fluctuating business scenario, training period under the Act may be for a period of 36 months
- ❖ Consumption of alcohol, tobacco etc. to be included under Section 24 of the act.
- ❖ Clause of 240 continuous working days may be eliminated and automatic permanency should not be allowed

d) Others

- ❖ Factory's Act: Recent regulations about liabilities of Occupier and Factory Manager need to be reviewed as they are highly punitive.

- ❖ There are 145 labour laws to be adhered to by the companies. There are 45 Central Acts and 16 associated rules that deal directly with labour.
 - Need to have central regulations across the country.
 - Implement recommendations of second National Labour Commission and CII.
 - Requirement of prior permission for temporary or permanent lay-offs and retrenchment may be done away with.
 - Interests of workers may be protected with Supplementary Unemployment Benefits (SUB) fund. Employees and companies can contribute to build the fund.

Schedule – Readiness of Natrip Facilities

FACILITY	ARAI, Pune	VRDE, Ahema- dnagar	iCAT, Manesar	GARC, Chennai	NATRAX, Indore	NIAIMT, Silchar	NCVRS, Rae Bareilly
PASSIVE SAFETY LAB	DEC 2011	-	SEP 2011	MAR 2011	-	-	-
POWER TRAIN LAB	DEC 2011	-	MAR 2011	MAR 2011	JUL 2011	-	DEC 2012*
EMC LAB	-	JAN 2009 Completed	SEP 2011	JUN 2011	-	-	-
FATIGUE & CERTIFICATION LAB	DEC 2011*	-	SEP 2011	SEP 2011	-	-	DEC 2012*
TEST TRACKS	-	DEC 2010	DEC 2011	SEP 2011	DEC 2012	-	DEC 2012*
MODEL I&M, MECHANICS TRAINING CENTRE	-	-	-	-	-	Dholchor a Campus - Comple ted SEP 2008	-
						Jaffirbun d Centre Comple ted OCT, 2010	
ACCIDENT DATA ANALYSIS CENTRE	-	-	-	-	-	-	SEP 2010- Comple ted

* Subject to availability of land & start of work by December 2010.

NATRIP

Revised Funding Pattern a Approved By Union Cabinet In April, 2011

Source	Original Funding Pattern (1)	Proposed Escalation Pattern (2)	Further changes proposed (3)	Total final Amt (1+2+3)
Grant	817.00	427.29	510.00	1754.29^^
Loan	273.00	142.77	-	415.77
Automotive Cess	510.00	-	(-) 510	00.00
User Charges	118.00	-	(-) 95.51	22.49
Loan in lieu of user charges*	-	-	95.51	95.51*
TOTAL	1718.00	570.06*	0.00	2288.06

^^ includes the reallocation of ₹ 510 cr. as grant from Auto Cess to Plan Grant

* Additional loan to offset the short recovery of the user charges.

**Table indicating the Physical Outcomes
(Completed & Projected)**

I.	
Name of Centre	Silchar Investment: ₹ 74.58 cr.;
Land Procurement	<i>Site –I Dholchora</i> <i>65 acres of land procured</i> <i>Site-II Jaffirbund</i> <i>20 acres of land procured for I & M centre and Mechanics Training Institute.</i>
Civil Works	<i>Site –I Dholchora</i> <ul style="list-style-type: none"> • Completed – Hill Track, facility Building, Driving Simulator <i>Site-II Jaffirbund</i> <ul style="list-style-type: none"> • Boundary wall – Completed • Earth Work – Completed • I & M Building – Completed • Training Tracks – Completed • Remaining buildings- HQ & Canteen- Dec, 2011
Installation of Equipments	I&M Station, Driving Simulator, Mechanics Training Institute –completed –Oct, 2010
Special Achievements	<ul style="list-style-type: none"> • The Dholchora facility inaugurated on 16th Jan, 2010 • The 1st Defensive Driver Training course is completed in association with SIAM • Training of MVI, Assam State on Modern Transport Technologies: two courses conducted
II.	
Name of Centre	Global Automotive Research Centre (GARC) , CHENNAI Investment: ₹ 618.83 cr.;
Land Procurement	<i>Payment , Acquisition and transfer of land to DHI</i>
	<ul style="list-style-type: none"> • Boundary wall ₹ 5.25 cr. completed in August, 2008. • Tracks Tender awarded in April, 2010.

Civil Works	<ul style="list-style-type: none"> • Five non-technical buildings and three power-train labs for mileage accumulation - completed.
Installation of Equipments	<ul style="list-style-type: none"> • <i>Tender awarded for Power train- Chassis Dyno, Engine Dyno, Emission Analyzer & Climatic Chamber; EMC, Advanced Passive Safety, NVH & Fatigue Lab</i>
Special Achievements	<ul style="list-style-type: none"> • Commissioning of MACD Labs– Sept, 2010.
III.	
Name of Centre	International Centre for Automotive Technology (iCAT) Manesar Investment: ₹ 556.96 cr.;
Land Procurement	<ul style="list-style-type: none"> • Physical possession for the additional land of 46 acres from HSIIDC was done in March, 2009.
Civil Works	<p><i>Manesar Site I</i></p> <ul style="list-style-type: none"> • Civil works for the Fatigue & Certification Labs in the existing land is in full swing and is expected to be completed by March 2011. • General Storage & Client Workshop and 3 Powertrain labs for mileage accumulation – completed <p>Manesar Site II</p> <ul style="list-style-type: none"> • Manesar-2 -boundary wall -₹ 1.60 crore -completed. • Tender for EMC & Passive Safety Building at Manesar awarded in July, 2010 • Test track tender awarded in April, 2011
Installation of Equipments	<ul style="list-style-type: none"> • <i>Tender awarded for Power train- Chassis Dyno, Engine Dyno, Emission Analyzer & Climatic Chamber; EMC, Passive Safety, NVH & Fatigue Lab</i>
Special Achievements	<ul style="list-style-type: none"> • Commissioning of MACD Labs – April, 2011.
IV.	
Name of Centre	National Centre for Vehicle Research & Safety (NCVRS), Rae Bareilly. Investment: ₹ 99.08 cr.;

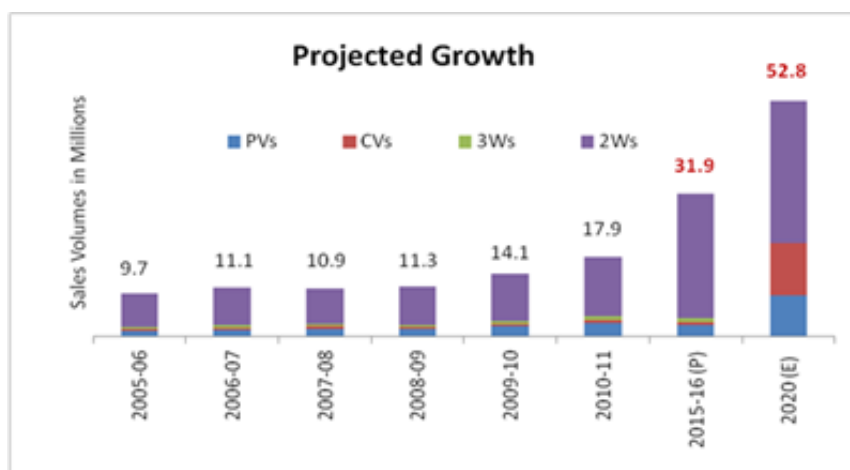
Land Procurement	<ul style="list-style-type: none"> • DHI & NATRiP have been pursuing land allocation with the U.P. Government and had identified several sites in Rae Bareilly. However, the land could not be allocated as yet, since the permission of the State Government is required. Land acquisition is now delayed by over 76 weeks. • <i>SAIL has given in principal approval for sub-leasing of about 90 acres of land in Malvika Steel Plant in Jagdishpur recently acquired by SAIL.</i> • Alternatively, an Accident Data Analysis Centre (ADAC), has being put up by NATRiP under the National Centre for Vehicle Research & Safety (NCVRS) at the premises of ITI Ltd., Rae Bareli in Uttar Pradesh. • Land yet to be made available. A time of 24 months would be required to complete the construction and commissioning of facilities from the time land is made available.
Civil Works	Not started yet due to non-availability of land
Installation of Equipments	Not started yet due to non-availability of land
V.	
Name of Centre	National Automotive Test Tracks (NATRAX), INDORE Investment: ₹ 621.28 cr.;
Land Procurement	<p><i>Acquired the Land and transferred to DHI</i></p> <ul style="list-style-type: none"> • The GoMP has transferred the Land of 4140 acres at Pithampur to Department of Heavy Industry. • Rehabilitation plans worked out with state Govt for the people getting displaced from the remaining part of the land.
Civil Works	<ul style="list-style-type: none"> • Boundary wall -Completed. • Track tender awarded in April, 2010 • Buildings tenders awarded
Installation of Equipments	<ul style="list-style-type: none"> • <i>Power train & vehicle dynamics equipment tenders awarded.</i> • <i>Fatigue tender- under approval</i>

VI.	
Name of Centre	VRDE, Ahmednagar Investment : ₹ 46.67 cr;
Land Procurement	Nil – no additional land is required at VRDE
Civil Works	<ul style="list-style-type: none"> • The new EMC lab funded under NATRIP for ₹ 31.75 cr. has been completed, inaugurated and operationalized. • On going civil work on the brake test pad funded under NATRIP of ₹10.54 cr. for completion by Dec, 2011.
VII.	
Name of Centre	ARAI, Pune Investment: ₹ 270.66 cr.;
Land Procurement	<p>The permission for use of forest land has been obtained. The building permission has been filed by ARAI to Pune Municipal Corporation (PMC). Clearance of Maharashtra Govt. was obtained on 27th August 2010. After Gazette notification several objection have been raised and still to be resolved.</p> <p>An alternate land (55,000 sqm.) has been sub-leased from Volkswagon India Pvt. Ltd. This has also been approved by MIDC in May, 2011 and possession of this land has been taken over by ARAI. It is expected to receive the approval for building plan and site layout from MIDC shortly so as to commence civil works by December 2011.</p>
Civil Works	<ul style="list-style-type: none"> • Civil work (₹ 55 cr.) tendering- Oct, 2011 • Civil work completion Dec, 2012
Installation of Equipments	<ul style="list-style-type: none"> • Equipment of ₹ 21.88 cr. installed • Passive Safety Lab – Awarded Sept, 08 • P. Train -1- Chassis Dyno Awarded – Dec, 09 • P. Train -2 – Engine Dyno Awarded May, 09 • P. Train -3- Analyzer – Award July, 09 • P. Train - 4–Retender • Fatigue Lab (FAT1 & FAT2)– Awarded • NVH Lab – Awarded June, 11
Special Achievements	<ul style="list-style-type: none"> • Commissioning of PWT-ETC1 & ETC2 Labs– July, 2011

ARAI R&D Road Map for 2012-17

1 Indian Auto Industry Growth, mid & long term goals :

Indian automobile industry is at the core of India's manufacturing sector and is being driven by the growth in the economy, infrastructure development and advances in environmental technology. It is going through a phase of rapid change and high growth. The industry volumes grew by about 27% year-on-year during 2010-11. Below chart indicates the change in the sales volumes during the last six years vis-a-vis projected volumes for 2015-16 (as per Automotive Mission Plan 2006-2016) and estimated volumes for 2020 (as per ACMA Vision 2020).



Source: SIAM, AMP 2006-2016 and ACMA Vision 2020

2. Growth Drivers & Challenges :

Future growth of automotive technology is expected to be driven by safety, reliability, comfort, performance, fuel efficiency and environmental concerns. However, sustaining this mobility growth requires addressing some vital areas with concentrated efforts and focus from all the stakeholders. The challenges to this mobility growth include imperatives due to safety, environment, reliability, and affordability; changing technological perspectives like mechanics to electronics and staying connected – need to be networked; improving competitiveness; building R&D capabilities; and developing qualified HR on large scale.

Automotive technology has evolved considerably over the last century. As the technology is striving for further developments, there are new challenges and problems that are being faced. The main issues that the automotive industry is facing today include

- Increasing fuel consumption and rapidly declining conventional fuel resources
- Increasing environmental hazards caused directly from vehicle emissions as well as from the related industries and technology
- Increasing safety concerns from vehicle crash and pedestrian safety
- Recyclability of the materials used in the vehicles
- Cost effectiveness

In order to address these challenges, in the upcoming decades, the automotive industry would focus on the following major objectives:

- Continual weight reduction of vehicles
- Non-conventional power resources as less pollutant alternatives for conventional fuels and hybridization of non-conventional power resources with conventional fuel technology
- Increased crashworthiness of vehicles and more intelligent automotive and transport technology
- Continuous development of existing and new materials and processes in order to produce the components that are cost effective and recyclable

3. ARAI Road Map :

ARAI, as an R & D organization of the Industry, undertook a survey to understand R & D areas, which the Industry would like ARAI to work in, in short and long term. Based on these inputs and study of currently available and upcoming technologies in automotive industry worldwide, ARAI has developed an R & D Road Map. The primary objective of this Road Map is to develop R & D capabilities in terms of competency including human resources; capacity in terms of facilities required; and to develop cost effective and appropriate technology solutions for Indian conditions. It is planned to implement this Road Map through 2 major development programmes, viz.

- Hybrid Electrical Vehicle
- Light Weight Passenger Bus

This will be implemented in a phased manner, i.e. in three phases. Out of this, first 2 phases are spread over the next five years. The estimated outlay towards manpower and experiment costs, but excluding capital equipment and civil infrastructure, towards these two programs is expected to be around ₹ 100 to 120 cr. Out of this, outlay for Phase 1 is expected to be around ₹ 40 to 50 cr. and the remaining would be required for Phase 2. Both the programs would cover following six major automotive technology / engineering areas.

- a. Power Train
- b. Vehicle Structure / Dynamics
- c. Noise, Vibration & Harshness (NVH)
- d. Safety
- e. Electronics
- f. Light Weight Materials

Both the programmes vis-à-vis identified areas will be implemented through various multi-disciplinary projects covering one or more of the following aspects:

a. Power Train:

- Electric Power Pack
- Compressed Natural Gas engine
- Advance Combustion - PPC/HCCI
- After treatment - Diesel Particulate Filter, Lean NO_x trap
- Alternate/diesel fuel engine development
 - Hybrid Electric
 - Electric vehicle
 - Dual fuel CI
 - Hydrogen boosted gasoline
- Bio-fuel engine development
- Advance Combustion - Partially premixed charge combustion
- After treatment - Selective catalytic reduction

Expected Outcome: Improved fuel economy, low emissions

b. Vehicle Structure / Dynamics:

- Electric Power steering
- FEA –FE Fatigue
- Suspension selection and parameter optimization
- Laboratory Simulation/Validation for Vehicle/ Components durability testing
- Vehicle Road Interaction study and analysis - Development of 3D Road Profile Measurement System and Measurement of Road/Test Track Profiles
- Virtual Simulation
- Design & development of air suspension
- Development of safety features like RUPD
- Developing competency in vehicle ride & handling performance and analysis
- Prototype K&C Measurement
- Hardware-in-loop techniques for development and validation of semi-active suspension, brakes /Quarter car, suspension tuning
- Structure Fatigue/ developed for durability
- Aggregate durability test
- Hydraulic Power Steering
- Design Validation of new component fatigue and durability

Expected Outcome: Improved vehicle ride comfort and vehicle handling, reduced product development time

c. Noise, Vibration & Harshness (NVH):

- Noise Source identification
- Intake & Exhaust Optimization
- Transfer path analysis
- Evaluation of Noise and Vibration Transfer Functions
- Intake & exhaust system optimization
- Tyre/Road interaction
- Transfer path analysis for tyre to seat

- Sound quality & synthesis for minimum noise in electric mode
- Squeak & Rattle Test
- Seat design and development using SEA software.

Expected Outcome: Noise reduction, vibration isolation

d. Safety:

- Voice activation Seat belts
- Active head Restraints
- Passive safety - Rear Seat belts
- Active safety / Intelligent Lighting system
 - AFS with halogen type light source
 - LED based rear lighting system
- Passive safety
 - Occupant detection systems
 - Seat safety design
 - Accelerator Force Feedback Pedal
- Active safety / Intelligent Lighting system - lane departure warning, intelligent interior lighting

Expected Outcome: Increased passenger safety, improved vehicle lighting

e. Electronics:

- CRDI EMS development
- Energy storage devices for EV/HEV
- Configuration of EV/HEV subsystems
- Networking, BCM, diagnostics
- ISS: From PoC to Product level development for ABS, ESC
- ISO 26262 functional safety for ECUs
- BMS (battery management System)
- MCU
- HEV (Hybrid Electric Vehicle) drive train
- ECU for After treatment devices, fuel economy and emission control devices
- OBD

Expected Outcome: Increased fuel economy, low emissions, increased passenger safety

f. Light Weight Materials:

- Composites with different volume fraction and technique
- Material Characterization
- Use of Forging and Forming technology
- Development of HSS materials
- Generate Databank on Chemical, Mechanical, Physical & Dynamic properties of Automotive Grade High Strength Steels (HSS) & Aluminum Alloys - Phase –II
- Development of Light weight material by new casting technology
- Characterization of polymer
- Component design for fly ash composites
- Alternate material development
- Material Failure Analysis
- Component Design for New plastic and Composites
- Corrosion
- Coating systems

Expected Outcome: Weight reduction, increase fuel economy, cost efficient technologies, increase vehicle / component life

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Auto Component Industry

Technology Upgradation and Development Scheme (TUDS)

The domestic components industry possesses competitive advantage due to its low cost capabilities. As the cost advantages get slowly neutralized in future, the Indian industry will need to enhance its competitiveness in other areas. The industry already faces major threat from imports that are currently at 30% of the total domestic consumption of components and are further increasing.

Today, a majority of vehicles and components are designed and developed overseas, creating a gap in local knowledge and expertise. Consequently, the Indian auto component industry is largely a 'build to print' industry. It is only with adequate investments in technology, that the domestic component industry can be a world-class industry capable of meeting tough customer requirements and competitive imports.

Expected high growth rate in vehicle production and shorter product lifecycles increasingly require a supply base capable of developing components with modern, cost effective technology. The global nature of the auto components industry necessitates that Indian component manufacturers invest in development of products that are energy efficient and conducive to the environment. It is in these areas where all major manufacturers/ countries are currently investing in.

The industry also needs to focus on product improvement activities, technology demonstration studies and field trials, value engineering activities, bench marking for gap analysis, acquiring appropriate technology for surface treatment, plating and coating, etc. It is also necessary for industry to develop "infrastructure" such as design software, prototyping, testing facilities, tools, dies and moulds and modern high accuracy machines.

The auto component industry is a highly capital and technology intensive industry. The single most important factor inhibiting technology upgradation/ modernization has been the lack of scale and high cost of capital. To support this, the government needs to consider setting up a Technology Upgradation & Development Scheme for the auto components industry. This scheme would provide inexpensive capital to the

component industry, especially the SMEs that make up a bulk of the industry, to access the much needed technology.

SMEs face tough challenges in raising capital

A recent study⁷ by a research agency confirmed that the SME sector is low on the agenda of the country's banks. The bulk of the expansion in SME companies is funded by the promoters themselves. The study also highlighted the notion that SMEs are not over-leveraged.

It is estimated that Indian banks funded on an average around 60% of the SME sector's incremental working capital and long-term borrowing needs. The remaining 40% shortfall is funded, overwhelmingly, by the promoters' own funds, apart from internal accrual, which was the next most oft-resorted avenue to financing. The third route is to lean on suppliers to extend short-term and often informal credit agreements.

Traditionally, SMEs' source of capital has been banks, which often ask for high collateral. The other route for raising money is through private equity which too is increasingly going towards larger investments in more lucrative sectors⁸. Another research agency revealed that there was only one early stage deal (under USD 50 million), by a private equity fund in India in 2010, compared with four in 2009.

SMEs play a vital role in India's economy and employ a large number of unskilled and semi-skilled people while supporting bigger industries by supplying raw material, goods and services. As per RBI's May 2010 figures, there were nearly 26 million enterprises in this sector which accounted for 45% of manufactured output and 8% of gross domestic product. They also contributed close to 40% of all exports from the country.

The recent Vision 2020 document of ACMA envisages that the auto component industry in India may well be over USD 110 billion by 2020 – 3.6% of the Indian GDP

⁷ Source: Crisil. The Crisil study was based on the analysis of over 2,000 SMEs' balance sheets in the financial years 2007-08 and 2008-09, with adequate representation by region, industry sector, and other parameters such as the nature of the enterprise and business operation

⁸ Source: VCC Edge

from the current 2.5% and create an additional employment of over 1 million people. Given the significance of this industry to the Indian economy, its employment potential and the huge backlog of technology upgradation, the TUDF would provide the necessary impetus for modernization and enhance its viability and competitiveness in domestic and international markets.

This scheme would also help in achieving the Automotive Mission Plan (AMP) 2016 objectives:

- To emerge as the destination of choice in the world for design and manufacture of automobiles and auto components.
- To achieve USD 25 billion worth of auto components exports by 2016.
- Encourage technology deployment for lowering air pollution and reduce energy consumption.

Efforts by other countries in increasing the competitiveness of their automotive industries

Korea

- Korea plans to develop expertise in 37 key auto parts and has invested in Automotive Parts Innovation Center in Ulsan.
- In 2010, it has planned to establish a fund worth USD 11 million to support R&D and commercialization of electric vehicles.
- This fund is in addition to USD 350 million of R&D funds for use in 2010-2013 to develop environmentally friendly vehicles.

Japan

- In 2009, the New Energy and Industrial Technology Development Organization provided USD 215 million to develop next generation batteries for use in hybrid and electric vehicles.

Canada

- In 2008, Ontario's tooling and auto parts industries received USD 1.2 million in provincial funding to increase competitiveness.
- In 2007, government provided USD 9 million to Linamar for a R&D project worth USD 30 million.

Thailand

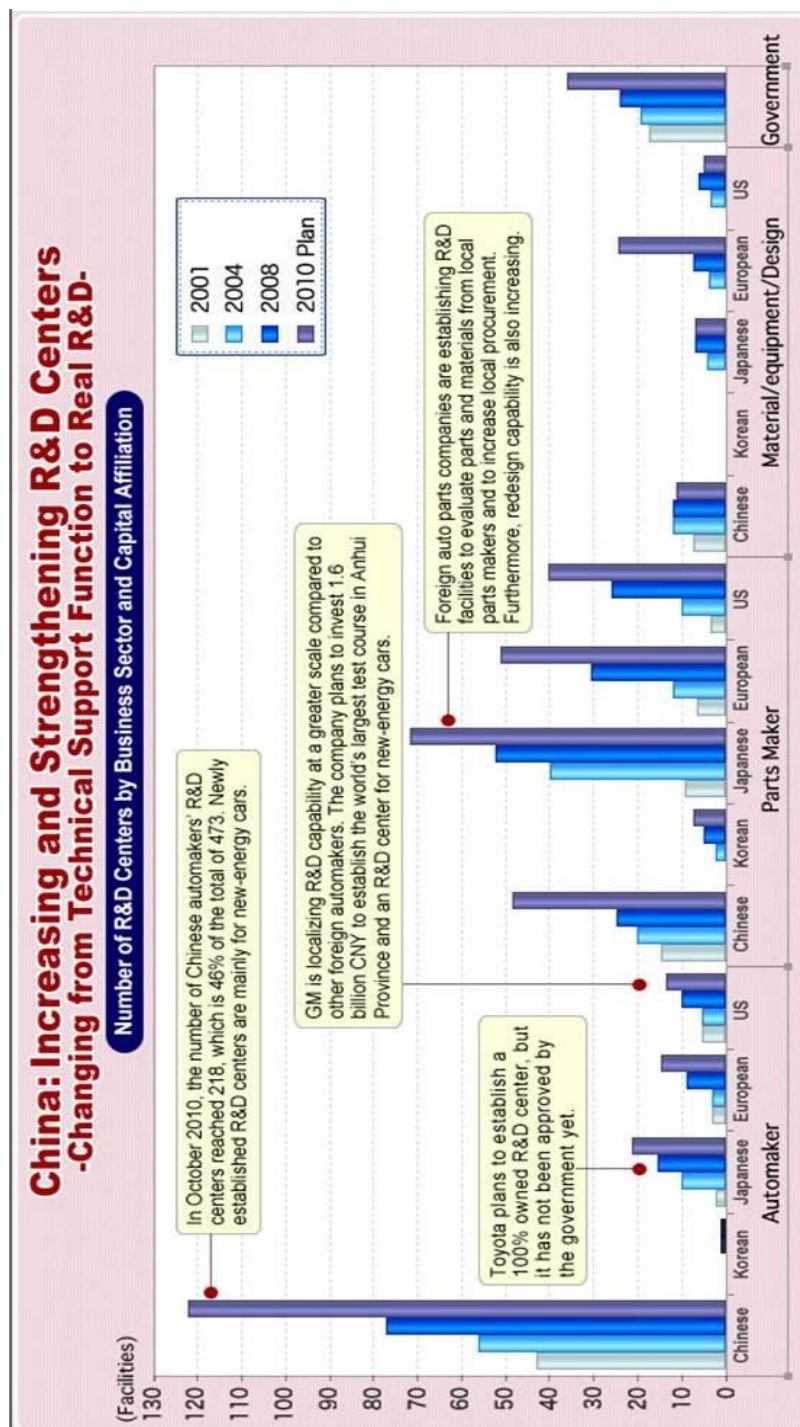
- Extended USD 120 million to support 26 auto parts projects.
- Export of auto parts grew 386% between 2002-2007, reached USD 4 billion.

France

- In 2006, the Government announced USD 526 million investment to spur innovation and research in the automotive industry in areas like clean technology and human resource training.

China is aggressively increasing and strengthening its auto R&D base across the value chain

Figure: China's R&D development evolution



Source: ACMA Vision 2020

Recommendations

Sustained R&D efforts have become a core component of strategy for automotive players worldwide. Even amidst recession, global OEMs maintained their R&D spend.

Table: R&D spend by global OEMs- Top 5 (2008)

Company	R&D spend as % of sales
Toyota	4.4%
General Motors	5.4%
Ford	5.0%
Honda	5.6%
Volkswagen	3.3%

However, as a % of turnover, leading OE suppliers have maintained a higher spend on R&D than OEMs.

Table: R&D spend by leading global OE suppliers

Company	R&D spend as % of sales
Delphi	11.0%
Visteon	5.0%
Robert Bosch GmbH	9.4%
Denso Corporation	9.1%
TRW Inc.	6.0%
ZF Friedrichshafen AG	7.1%

Automotive sectors in developed economies spend 5-7% of turnover on R&D annually. By 2015-16, the size of Indian auto component industry is expected to be ~ ₹ 3.0 lakh cr. Hence, to achieve and maintain a competitive position in the global automotive supply chain, Indian auto component industry will need to spend

(assuming 5% of net sales towards R&D) ₹ 15,000 cr. for technical upgradation and development.

Considering that over 70% of the auto component companies are in the SME category, government support for R&D is critical. **It is therefore proposed that a Technology Upgradation and Development Scheme (TUDS) be created to support the growth of Indian auto component industry's research and development initiatives.**

i. Financial Assistance

The Indian government can support half of the total envisaged R&D investment/ expenditure by setting up a ₹ 7500 cr. Technology Upgradation & Development Scheme. The scheme could be used over the period FY 2012-16 to support companies as they modernize/ upgrade technology and thereby allow them to become more competitive technologically.

Table: Year-wise financial assistance proposed

FY12	FY 13	FY 14	FY 15	FY 16
₹ 1000 Cr.	₹1250 Cr.	₹ 1500 Cr.	₹ 1750 Cr.	₹ 2000 Cr.

Table: Focus area-wise financial assistance proposed

Focus Area	Investment Required (₹ cr.)
Light Weighting	2,000
Engine & Powertrain	2,500
Manufacturing technologies	3,000

With a focus on modernization and improving manufacturing technology, the scheme would allow companies to upgrade existing manufacturing infrastructure such as machines, inspection and testing equipments, tooling, and dies, as well as, development and application of new manufacturing processes. These could include

the use of new and composite materials, automation of processes, acquiring of intellectual property in such processes, etc.

Such a scheme would allow industry-institute collaboration for activities focusing on product/ technology design and development as well as give the necessary impetus to firms to upgrade existing manufacturing facilities, develop application of new manufacturing processes, use of new/ composite materials, automation of processes and acquiring of intellectual property.

ii. Structure of financial assistance

It is envisaged that TUDF would provide financial support to companies by financing 50% of the project cost by way of a soft loan, at a nominal rate of interest. It would therefore truly support companies to modernize upgrade technology in this globally competitive environment.

iii. Implementation mechanism

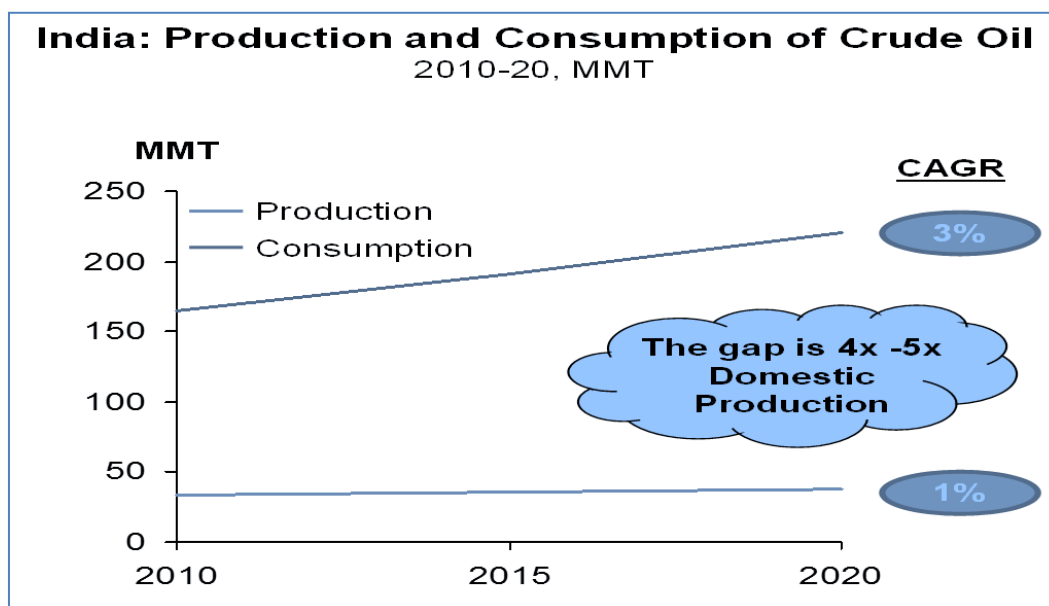
Project appraisal, monitoring and review committee.

Electric Mobility Initiative:

1. Introduction:

- a. **Need for shift towards electric mobility:** Driven by growing concerns over fast depletion of fossil fuels, increasing prices of crude oil, environmental degradation and climate change, world over Governments and automotive industries are making huge investments towards developing vehicles based on alternative drives and alternative fuels including electric mobility. As a result of sustained high GDP growth, India's primary energy consumption is expected to increase by 70% in the next ten years⁹. The gap between domestic crude oil production and consumption is widening, leading to increase in imports and consequent impact on the trade deficit. This poses a serious challenge to India's energy (fuel) security. India's projected production and consumption of crude oil up to 2020 is given in **exhibit 1** below:

Exhibit 1



- b. The transportation sector alone accounts for about one-third of the total crude oil consumption and the road transportation accounts for more than 80% of this consumption, hence greater adoption of xEVs (full range of electric

⁹ MoPNG

vehicles that include hybrids, plug in hybrids and pure electric vehicles) can provide significant contribution in enhancing energy (fuel) security and also mitigate the impact of transportation on the environment.

- c. World over different countries have followed different strategies for promoting electric vehicles (xEVs). While US has been primarily focusing on both demand and supply side incentives, with government directly subsidizing private initiatives, Japan and France have been focused on creating supporting charging infrastructure for xEVs with more limited support on demand and supply side incentives. In contrast, China has a very comprehensive and large scale program for adoption for e-mobility – and plans to spend tens of billions of dollars, primarily to support PHEVs and BEVs (lately, there is talk to support HEVs also).
- d. The various initiatives taken in the country to promote electric mobility could not take off and yield the desired results mainly due to the lack of synergy, lack of continued support and ownership at the top levels of the government and the industry, higher cost of EVs, challenges in battery technology, limited range of EVs, lack of infrastructure, consumer mindset etc.

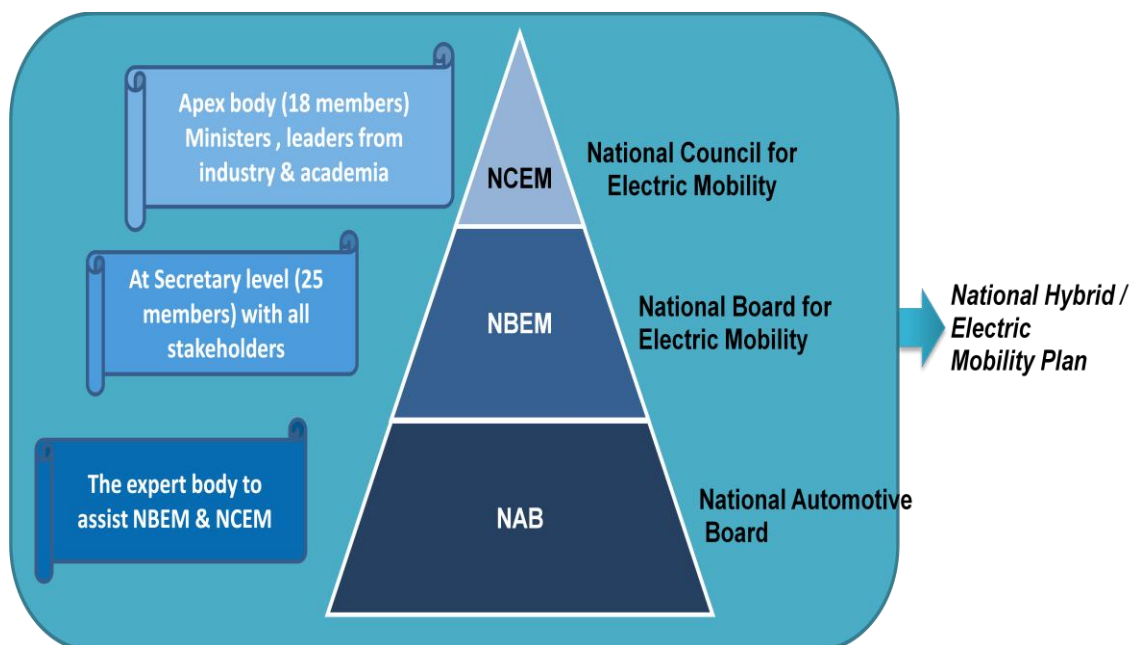
2. The National Mission for Electric Mobility: The Government of India recognizing the fact that at present the level of barriers to greater adoption of Electric Vehicles (EVs) are immense and given the importance of the initiative decided to launch the **National Mission for Electric Mobility**. The adoption of the mission mode approach will give the initiative the desired high level ownership (Both in Government and the Industry), continued government intervention/support, continued long term commitment from all stakeholders and a synergized - holistic approach to the complex issues involved with the program.

- e. Further, as a first step an enabling mechanism for ensuring fast decision making and for greater collaboration amongst various stakeholders, empowered bodies have been set up at the apex level in the form of **National Council for Electric Mobility (NCEM)** and the **National Board for Electric Mobility (NBEM)**. The council comprises of Ministers from the key Central

Ministries/Departments, eminent representatives from the industry and academia and will be chaired by the Minister (Heavy Industries & Public Enterprises). The Council will be aided by a 25 member **National Board for Electric Mobility** comprising of secretaries of stakeholder Central Ministries/Departments with representation from industry and academia.

- f. The National Council and the Board will be serviced by the NATRiP Implementation Society (**NATIS**)/**National Automotive Board**, which is being created, and will comprise of domain and technical experts. This mechanism would provide a common platform; enable fast decision making, encourage industry-academia-government collaboration, and also approve and monitor all allocations that are made from the Government of India for development of EVs. The setting up of the NAB has already been approved by the EFC. This would ensure synergize between the efforts being made by different agencies, help avoid duplication and also enable prioritization of allocation of scarce resources by the Government. The enabling structure approved by the government is depicted as **exhibit 2** below.

Exhibit 2



3. Setting up of the Mission targets and the road map for the future: Earlier, while seeking the approval of the union cabinet for the initiative, DHI had undertaken a

highly detailed study for the possible interventions. However, this was primarily based on secondary data like international studies, focus group discussions, expert opinions, extensive literature review etc. Therefore to chart out the future roadmap and for finalizing the National Hybrid / Electric Mobility Mission plan, the Department of Heavy Industry in collaboration with the Industry commissioned a rigorous study for based on primary data with M/s Booz & Company as the knowledge partner. The overall objective of the study was to create a national level mission for the electric mobility framework with clearly defined goals and milestones by year 2020 similar to the lines of Automotive Mission Plan: 2006-2016. The study was provided the goal to *develop a mission plan and roadmap for promoting the adoption of a range of electric mobility solutions for India, which can enhance national fuel security, provide affordable and environmentally friendly transportation and enable the Indian automotive industry to achieve global manufacturing leadership.*

- a. The study involved detailed interactions and involvement of various stakeholders including the various Ministries/ Departments, State Governments/ STUs, industry, experts, academia, research institutes etc. The study has been finalized and its findings and the possible suggested interventions will be presented for scrutiny, deliberations, further refinement at the various levels before it is approved by the NEBM and the NCEM which will adopt the final blueprint to deliver tangible outcomes for the next 10 years in terms of the targeted number of hybrid/electric vehicles plying on the road, technology-options, reference-vehicle specifications, safety and type-approval standards, regulations, vehicle tax-structure, tariff policy etc.
- b. **Details of the Electric Mobility Study:** The study used consumer survey covering 7000 respondents across 16 cities, including the tier 1, tier II and Tier III & IV cities, interactions with 12 focus group across the nation covering all vehicle segments and 190 also conducted interviews covering all automotive stakeholders including the Government (Central Ministries & Departments, State governments etc), industry (both OEMs and suppliers), research institutes and associations etc. Based on these and other inputs such as the price-performance evolution of xEVs and global demand perspective the study

has provided possible scenarios for level of penetration of electric mobility in the future (up to 2020), the key interventions required from the Government and the Industry, the possible levels of investments required and the likely return on these investments.

4. Key Findings of the study:

a. Global Scenario:

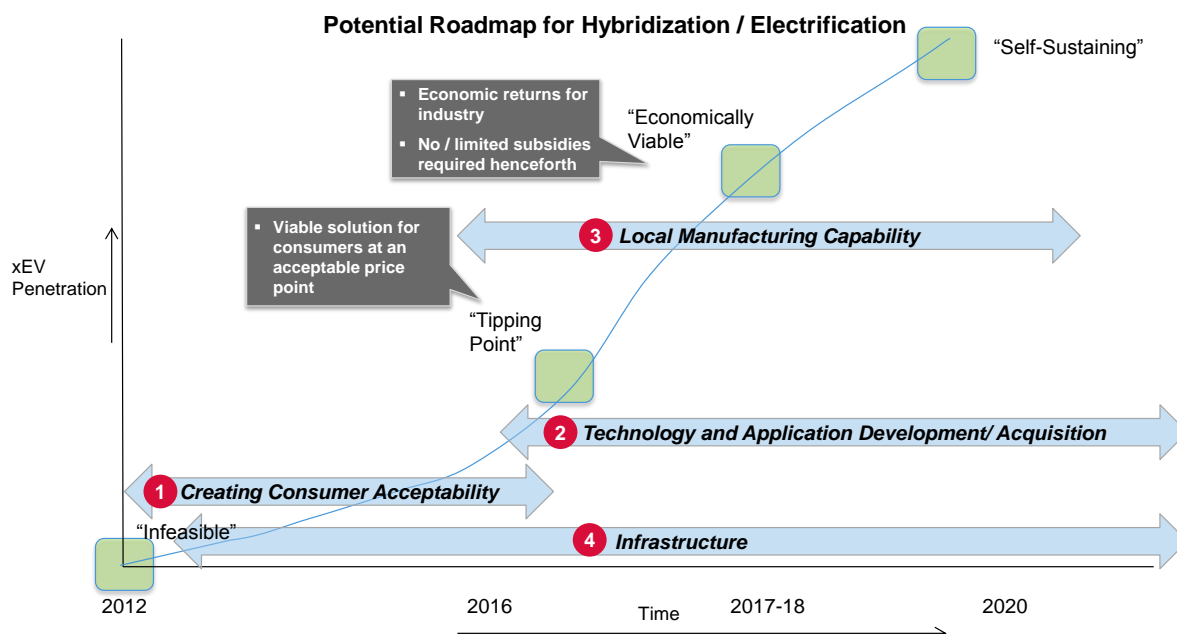
- World over Governments are playing a key role in facilitating greater adoption of electric mobility through both demand and supply side interventions, facilitation of R&D and putting in place the required infrastructure. The analysis of the strategies adopted by different countries reveals that (i) USA aims to have 1 million PHEVs by 2015 and has been focusing on both demand and supply side incentives and has also been directly subsidizing private initiatives, which includes USD 2.5 Billion grant for battery development and USD 2.4 Billion loan to OEMs for xEV production (ii) China plans to have 5 million xEVs by 2020 and has earmarked USD 15 billion over next three years for R&D on vehicles and components, USD 4.4 billion over next 10 years on pilot projects and USD 5 billion for half million public chargers (iii) Japan has targeted 2 million xEVs by 2025 and has earmarked USD 250 million over next three years R&D on vehicles and components and (iv) France aims to have 2 million BEVs and PHEVs by 2020 and their strategy is focused on building public charging infrastructure and customer incentives.
- As per study, the total **global demand for four wheelers and two wheelers, which is at present at 45 million and 43 million units, is expected to increase to 70 million and 76 million units respectively by 2020.** It is expected that the current level of penetration for electric (includes hybrid & PHEV) four and two wheelers which is at present at **2% and 38-40%** respectively may shift to **7-19% and 36-34%**¹⁰ respectively by 2020. This will translate to **5.2-13 million and 27 million electric four and two wheelers by 2020.**

¹⁰ The slight reduction for the electric two wheelers projected for 2020 is mainly on account of the decreasing trend for electric two wheelers seen in China.

- b. Barriers to adoption of electric mobility:** The barriers to greater adoption of electric mobility world over are mainly the higher cost of acquisition, challenges relating to batteries, consumer acceptability, performance standards of EVs (range, speed, acceleration etc) with respect to traditional IC engine based vehicles, lack of charging infrastructure etc. As far as the road map for greater adoption of electric mobility for India is concerned the four key barriers which need to be overcome have been grouped as under:
- i. Consumer Acceptability,
 - ii. technology development
 - iii. Manufacturing investments
 - iv. Infrastructure.

The report has proposed that creation of market through greater consumer acceptability, which includes addressing issues relating to price of acquisition of electric vehicles and various other demand generating measures, will need to be taken up at right earnest followed by measures for spurring localization of manufacturing and greater investment for R&D, technology acquisition. The efforts for addressing the infrastructure related issues will need to be addressed continuously from the very start of the road map. The potential roadmap for hybridization/electrification is depicted as **exhibit 3** below:

Exhibit 3



It is viewed that one of the most important requirement for the xEV roadmap will also be the need to put in place the required standards, test procedures and testing infrastructure as this will be essential first requirement for developing the industry and generating a viable mechanism for providing incentives.

c. Basis for arriving at the future scenario for India: The study has relied on consumer surveys, Total cost of Ownership (TCO) model, examination of the issues relating to the present higher acquisition costs, lower performance of standards of electric interaction and the possible impact of these factors on product acceptability, detailed interaction with OEMs, automotive experts, R&D experts, current and future scenario for the growth of automotive sector globally and in India, developments in the area of electric mobility taking place in India and abroad etc for making the projections of likely levels of electric vehicles in India by 2020.

d. The important findings from the consumer surveys: The major observations emerging from the consumer surveys carried out indicate the following broad points:

- Highest preference was expressed for HEVs, followed by PHEVs and BEVs – due to lack of charging requirement, high range, lack of battery replacement etc.

- Consumers are most sensitive to acquisition price of xEVs – which indicates that demand incentives are likely to be effective in market development of xEVs
- Consumers are also sensitive to running cost of xEVs – implying that OEMs should focus on improving fuel efficiency for HEVs, and spreading awareness of the same
- Consumers did not express very high preference for rapid charging or quick charging options, hence pilots could be conducted for public rapid / fast charging terminals to monitor adoption of xEVs, before full roll-out
- Tier 1 and 2 cities expressed highest preference for xEVs in 2W and 4W segments, citing low maintenance cost and high mileage
- Consumers chose cash subsidies and discounts on battery replacements as the preferred methods for incentives.

e. The important assumptions used in the TCO model: The study has also used the Total Cost of Ownership (TCO) model. As per this the initial vehicle acquisition cost, running costs/fuel costs, total vehicle miles travelled, maintenance costs, incentives have been taken into account to arrive at the TCO for different power-trains. It is assumed that the consumer will make the most economic choice to arrive at the conclusions. The major assumptions made in the (TCO model) are as under:

- Fuel efficiency improvement - 2% per annum for ICE
- Petrol price assumed as increasing from ₹ 63 in 2011 to ₹ 126 in 2020 (based on EIA World Energy Outlook 2010 estimate); for high fuel price case, petrol price assumed as increasing to ₹ 185 in 2020
- Residential electricity price – ₹ 4.5 per Unit, commercial electricity price – ₹ 8 per Unit in 2011, growing at 5% p.a.
- Battery performance (range) improvement 8% till 2015; 4% beyond 2015
- 4W xEVs, Bus xEVs and LCV hybrids are assumed to be based on li-ion battery; 2W BEVs, 3W xEVs, LCV BEVs/ PHEVs are assumed to be based on lead acid battery

- 4W BEV maintenance cost ₹ 0.1/ km
- 4W A2 BEV price 2011 – ₹ 10 lakh (high price case); ₹ 8 lakh (low price case); A3 BEV price 2011 – ₹13 lakh¹¹
- Acquisition cost difference for 4W hybrid – ₹ 90,000
- 2W BEV scooter price 2011 – ₹ 63,000 (for a durable high speed model); 2W BEV bike price – ₹ 90,000¹
- Bus price (2011) – ₹ 1 cr. (HEV), ₹ 1.2 cr. (PHEV), ₹ 1.25 cr. (BEV)
- 3W price (2011) – ₹ 1.5 lakh (HEV), ₹ 2.7 lakh (HEV), ₹ 3.75 lakh (PHEV)

e. **The possible total potential for xEVs in India by 2020:** Based on the above parameters, it is estimated that the total potential demand for the full range of electric vehicles in India will be in the range of **5-7 million units** in new vehicle sales by 2020. This will include **3.5-5 million** pure electric **two wheelers**, **1.3-1.4 HEV vehicles** (4W, buses, LCVs) and **0.2-0.4** other pure electric vehicles (4W, buses, LCVs). However, on their own these levels of penetrations are not expected to be achieved and will therefore require government intervention. This level of penetration that is possible is depicted in the **table 1** below:

Table 1

Vehicle / Technology Segment	Potential for xEVs (M Units)
BEV 2W	3.5 – 5
HEV Vehicles (4W, Bus, LCV)	1.3 – 1.4
Other BEV Vehicles (3W, 4W, Bus, LCV)	0.2 – 0.4
Total	5-7

g. **The possible future scenarios for India – Electric Mobility - 2020:** In case of India, the study has examined the status quo scenario and two possible scenarios for xEV sales, which differ in potential BEV sales penetration by 2020. While in the High Gas / High HEV scenario the study has taken **35% CNG** penetration, **15-20%**

¹¹ Refers to expected price if OEMs bring the commercial product to the market based on current price and performance. Source used: EIA, SIAM, Global Insight, Argonne national Lab, OEMs, experts, dealer interviews, Booz & Co. Analysis.

HEV/PHEV penetration and **2%** BEV penetration in vehicle sales. In the High Gas / High HEV / High BEV scenario, a BEV penetration of **5%**¹² has been considered.

h. The vehicle segment wise findings of the study: The insights gained from the OEMs, research institutes and suppliers indicates that **(i)** the low demand for xEVs in Indian market is due to high price, performance anxiety, lack of infrastructure and low awareness **(ii)** HEVs seem to be preferred due to higher range and no charging issues as compared to PHEVs and BEVs **(iii)** Amongst the various vehicle segments the easiest uptake of xEVs will be for buses, two wheelers followed by four wheelers and three wheelers. The key findings of the study, vehicle segment wise is summarized as under:

I. Four Wheelers:

- Due to high sensitivity to price and running costs, cash incentives and fuel efficiency can be effective levers for imparting demand for 4 wheeler HEVs.
- Improvements in technology and **global scale effect are expected to bring down lithium ion battery costs in the future**. It is estimated that about **5-7% YoY decline in battery prices** in future, will translate to price level of **USD 325 - 430/kWh by 2020**. However, these prices would still remain higher than equivalent price expectation of the **Indian consumer (USD 210-275/ kWh)** leading to a higher acquisition cost than consumer expectation. This would be especially true for BEVs, due to highest battery size.
- Consumer research has revealed that overall there is a high latent demand for xEV cars (25-30%) with a **higher preference of HEV (~14-15%)** and PHEV (~9-10%) cars over BEV cars (~5%).
- Most importantly, **consumers have expressed significant sensitivity around acquisition price**, with greater preference at lower price. This makes a case for cash incentives even stronger.
- Tier 1 and 2 cities have expressed a greater willingness to adopt xEVs compared to Tier 3 and 4 cities.

¹² 4% market share assumes ₹ 8 lakh price for BEV A2 car, while 0.5% market share is obtained when ₹ 10.8 lakh price is taken for BEV A2 car

- Consumers have expressed **maintenance cost, battery cost, pickup, top speed and charging time as major factors** considered while buying xEVs. However, cash and tax benefits have been preferred by consumers over these peripheral benefits.
- The total cost of ownership analysis for 4Ws, which was developed with extensive industry input, indicates that:
 - i. On its own, the xEV potential for 4Ws in India will not be reached by 2020; demand incentives are required
 - ii. With these incentives, **mild hybrid and full hybrid EVs can have a latent demand of ~20% by 2020.**
 - iii. **BEVs** can have a latent demand varying from **2-4.5%** based on the ability of OEMs to supply it at low or high cost.
 - iv. **PHEVs** can have **~4%** latent demand by 2020.
- Incentives are required to lower the price difference between xEVs and IC Engine (ICE) vehicles. These incentives can be a fraction of the difference in acquisition cost between xEVs and petrol/diesel vehicles. They can be based on battery size, and vehicle technology (HEV / PHEV / BEV).
- The demand incentives may be structured as under:
 - i. These may include the mandating of xEVs in government fleet, public transportation to create initial demand
 - ii. Proposed demand incentives of:
 - ₹ 25,000 for mild HEVs
 - ₹ 50,000 for full HEVs
 - ₹ 1 Lakh for PHEVs
 - ₹ 1 Lakh for low-performance BEV, ₹ 1.5 Lakh for high-performance BEV
 - iii. The Proposed Incentive can be made available to the first 200,000 vehicles per year (with 75-90% for HEVs and PHEVs and balance 10-25% for BEVs), subject to localization and quality for the first five years only i.e. up to 2017.
 - iv. These can be subject to local assembly of vehicles, minimum safety, warranty and quality standards approved by an authorized automobile testing institution, and increasing domestic value addition (calculated from bill of

material of domestic components). Minimum localization can be prescribed for each technology with a requirement of minimum annual increase.

- v. These can also be structured around criteria like battery size, performance etc.
- To encourage domestic manufacturing of components, current import duty benefits should be phased out over a period of time.
 - Supply side incentives can also be provided to encourage OEMs and suppliers to build assembly and manufacturing plants in India.
 - **Currently, in India, OEMs and component manufacturers have very limited technology** and manufacturing capability, as a result of which, most of the xEV components are imported from abroad.

II. **Two Wheelers**

- As per consumer research, high preference has been expressed for battery operated 2Ws (~55-60%).
- Similar to the 4W segment, consumers are most sensitive to acquisition price which is the most important decision factor. In addition, consumers have also shown sensitivity to recharging time.
- There is a high latent demand for battery operated two wheelers specifically in tier 1 and 2 cities.
- Based on TCO analysis also BEV 2W can have significant demand by 2020, this is aprox. 20% for BEV scooters and 15% for BEV bikes by 2020. This corresponds to 5 Million units by 2020 constituting 16% of total demand of 32 million two wheelers.
- Consumers have expressed **maintenance cost, battery cost, pickup, top speed and charging time** as the major factors considered while buying xEV 2 wheelers.
- Existing high end lead acid battery based scooters have lower acquisition and operational costs compared to petrol scooters; their performance is also comparable to a basic petrol scooter.
- Currently, **there aren't any commercial xEV motorbikes** in India due to higher performance expectations of the consumers and the high potential price for such vehicles.

- However, consumers have expressed high acceptability for BEV motorbikes as well.
- As high cost of battery replacement is one of the key concerns, incentive on battery cost could also be effective in increasing adoption.
- Incentives are needed for initial adoption and to generate scale since acquisition price impacts customer decision. Hence, incentives need to be given for a specified number of 2Ws for the next 5-6 years. Similar to 4Ws, investments are required for research in electric motors, and battery cells over the next 5 years. Investments are also required to establish a testing facility for components. This is dwelt in greater detail in subsequent section.

III. Buses

- **Higher preference** has been expressed for **hybrid buses** by consumers compared to PHEV and BEV buses.
- Like most other segments, consumers have expressed **sensitivity around acquisition price**. Hence cash incentives would be effective.
- Cash subsidies and toll discounts could prove effective in creating demand for xEV buses. In addition, since there is significant scale effect for xEV buses, demand incentives could decline over a period of five to six years. Further details are indicated in subsequent paragraphs.
- Further, concern has been expressed about high **charging time**. Setting up fast or rapid charging stations for buses could be a good lever in promoting xEV adoption.
- These buses have evinced interest in state road transport corporations in cities like Bangalore and Delhi.
- **Demand assurance** can play a critical role in promoting hybrid / electric buses, specifically in intra-city operations, metro feeders etc. Hybrid buses for a proportion of new demand for intra-city buses can be mandated.
- STUs purchase ~22,000 buses per annum. ~ 50% or **11,000 buses are intra-city**. A proportion of this annual procurement can be hybrid buses based on city tier (high for tier 1 cities).

- The **premium bus segment (low floor A/C) can be a target for xEVs buses, as price points are high (₹ 1-1.3 cr. for xEVs compared to ₹ 60-70 Lakh for ICE bus)**. Prices for xEV high floor bus is very high compared to a high floor ICE bus (~₹ 70-80 Lakh compared to ₹ 25-30 Lakh for ICE). Hence xEV adoption in this segment is expected to be difficult.
- Pilots should be conducted for hybrid / electric buses, benefits should be monitored closely before full-scale roll-out. Establishment of fast and rapid charging stations at bus stops may be required for BEV/PHEV buses.
- Investments are also required for research in battery cell, electric motor and component testing infrastructure for xEV buses.

IV. **Light Commercial Vehicles**

- In addition to **acquisition price, consumers have shown sensitivity to running costs**. Therefore, cash incentives on acquisition costs is likely to be effective in generating demand.
- Lower charging time is also important and leads to an increase in latent demand. Tier 1 and 2 cities have a higher preference for xEV LCVs.
- Demand incentives shall be required to reach sufficient scale to lower costs for hybrid / electric light commercial vehicles, as per total cost of ownership analysis. Incentives can be given to specified number of units per year for the next 5-6 years, after which they can be phased out. Further details on this given in subsequent paragraphs.
- These vehicles can be used in niche applications such as airport pick-ups, transportation within factory premises etc. Rapid charging stations may need to be established to increase adoption of such vehicles.

V. **Three Wheelers**

- **Acquisition price remains their major concern** in this segment as well. Running cost and charging time are also areas of major concern to consumers. Higher preference has been expressed in Tier 2 and 4 cities.
- With demand incentives, 3 W BEVs latent demand can be more than 2% by 2020.

- Low speed 3W BEVs can be used in pockets with high traffic, small campus and small towns. The detailed demand incentive strategy is given in subsequent paras.
- Such vehicles can be incentivized by providing free and additional permits for the next few years, after which these can be phased out.
- These BEVs should be approved by a govt. approved testing agency; performance guidelines should also be set (e.g., min top speed, min passenger carrying capacity, min range etc.).
- Many consumers expressed concerns over range which can be covered by such battery operated 3Ws, these can be mitigated through roll-out of fast and rapid charging terminals and public charging infrastructure.

5. Interventions required to make this a reality: The various interventions that will be required from all the stakeholders in order to achieve the level of xEV penetrations is given as under:

- i. **Broad classification of possible policy interventions:** The possible policy interventions suggested by the report have been broadly classified in five major heads as under:
 - **Demand generation:** example mandating xEV in government fleet, public transportation etc
 - **Demand Incentives:** Incentivize the sales of xEVs by giving incentives to consumers and manufacturers through cash subsidies, tax incentives peripheral benefits such as road tax exemption etc.
 - **Research & Development:** Fund research programs with OEMs /component suppliers to promote localization of xEVs.
 - **Manufacturing:** Incentivize domestic manufacturing through suitable policies such as high import duties for xEVs and components,
 - **Infrastructure Support:** Subsidize the power requirement and charging infrastructure for xEVs.

ii. **Summary of the suggested interventions and investments for different vehicle segments:**

The summary of the various interventions suggested in the study for different areas relating to demand generation, research & development, infrastructure etc along with the approximate range of corresponding investments required during the next ten years for different segments of vehicles is summarized in **Table 2** below:

Table -2

Total investment Proposed for the next 10 years											
(₹ in cr.)											
Area	4W		2W	3W		Buses		LCV		Total	
	HG/HEV	HG/HE V/BEV	HG/HEV	HG/HEV	HG/HE V/BEV	HG/HEV	HG/HE V/BEV	HG/HEV	HG/HE V/BEV	HG/HEV	HG/HE V/BEV
Demand Incentives	4900-5000	5600-5700	5200-5300	400-500	700-750	600-650	500-550	875-925	900-1000	11,975-12,375	12,900-13,300
R&D Investments	500-550	500-550	500-550	-	-	550-580	550-580	-	-	1550-1680	1550-1680
Power Infrastructure	700-800	1200-1300	3300-3400	40-50	75-85	5-10	20-30	55-65	90-100	4100-4325	4685-4910
Charging Infrastructure	700-800	950-1000		40-50	70-80	5-10	10-20	70-80	115-125	815-940	1145-1225
Total*	7200-7300	8700-8800	10000-10500	500-600	800-900	1100-1200	1200-1300	1400-1500	1700-1800	20200-21100	22400-23300

* Includes amounts for fuel procurement for power generation (aprox. figures)

From the above table, it is seen that the level of investments required, which includes demand incentives, R&D investments, power infrastructure, charging infrastructure etc, over the next ten years for reaching the penetration levels proposed is as under:

Table 3

Sr No	Segment	Investments required
1	4 wheelers	₹ 7000 –9000 cr.
2	Two Wheelers	₹ 10,000 –10,500 cr.
3	Buses	₹ 1,100 – 1,300 cr.
4	Light Commercial Vehicles	₹ 1,400 –1,800 cr.
5	Three Wheelers	₹ 500 –900 cr.
6	Total	₹20,000 –23, 500 cr.

iii. **Demand Generation and demand incentives:**

The summary of the total demand generation incentives suggested for the different vehicle segments for the next ten years is given in **table 4** on the next page:

Table 4

Total investment Proposed for the next 10 years											
(₹ in cr.)											
Area	4W		2W	3W		Buses		LCV		Total	
	HG/HEV	HG/HEV/BEV	HG/HEV	HG/HEV	HG/HEV/BEV	HG/HEV	HG/HEV/BEV	HG/HEV	HG/HEV/BEV	HG/HEV	HG/HEV/BEV
Demand Incentives	4900 - 5000	5600- 5700	5200- 5300	400- 500	700- 750	600- 650	500- 550	875- 925	900- 1000	11,975 -12,375	12,900 -13,300

iv. **Details of proposed demand incentives:**

The study has considered two scenarios – HG/HEV and HG/HEV/BEV, with the second scenario have higher penetration of BEVs (pure electric vehicles). The range of investments required for the demand generation for the HG/HEV scenario is ₹ 11,975 –12,375 cr. (i.e. approximately ₹ 12,000 cr.) and that for the HG/HEV/BEV scenario is ₹ 12,900 –13,300 cr. (approximately ₹ 13,000 cr.). The segment wise details of the proposed demand incentives for different segments are summarized below:

a. Four Wheelers:

- i. These may include the mandating of xEVs in government fleet, public transportation to create initial demand
- ii. Proposed demand incentives:
 - a. ₹25,000 for mild HEVs
 - b. ₹ 50,000 for full HEVs
 - c. ₹ 1 Lakh for PHEVs
 - d. ₹ 1 Lakh for low-perf. BEV, ₹ 1.5 Lakh for high-performance BEV
- iii. The Proposed Incentive can be made available to the first 200,000 vehicles per year (with 75-90% for HEVs and PHEVs and balance 10-25% for BEVs), subject to localization and quality for the first five years only i.e. up to 2017.
- iv. These can be subject to local assembly of vehicles, minimum safety, warranty and quality standards approved by an authorized automobile testing institution, and increasing domestic value addition (calculated from bill of material of domestic components). Minimum localization can be prescribed for each technology with a requirement of minimum annual increase.
- v. These can also be structured around criteria like battery size, performance etc.
- vi. **Phasing:** The phasing for the localization / local value addition and that for the incentives (in terms of volumes of vehicles) to be continued is indicated in **exhibit 4** and **5** as under:

Exhibit 4 – Phasing for localization

BEV Vehicle Mfg. Localization Plan

(Min local value for xEV Components to qualify for incentive)

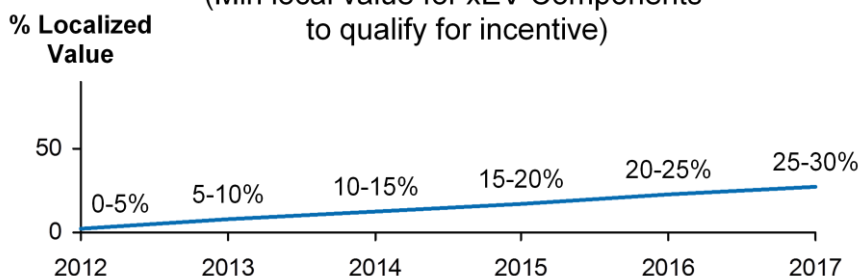
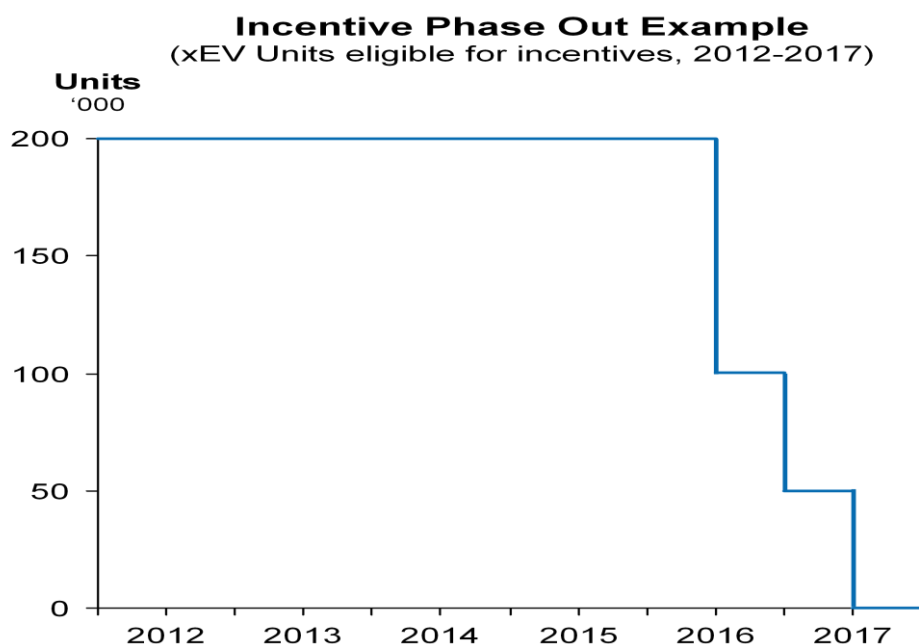


Exhibit 5 – Phasing of the incentives



b. Two Wheelers:

- i. Proposed demand incentives of:
 - a. ₹ 5,000 – 7,500 per HEV / low speed BEV (0.5 – 1.5 kWh)
 - b. ₹ 5,000 – 7,500 per high speed, low durability BEV (1.5 – 2.5 kWh)
 - c. ₹ 10,000 – 12,500 per high speed, high durability BEV (1.5 – 2.5 kWh)
 - d. ₹ 15,000 per BEV motorbike,
- ii. The Proposed Incentives can be made available to the first 1 million vehicles every year, subject to localization and quality, safety, warranty requirements and will be phased out by 2017, as in the case of four wheelers. It has also been proposed that the demand incentives can also be based on the battery size, performance etc. This will allow adequate scale to be created for the OEMs so as to make this market self sustaining.
- iii. **Phasing:** The phasing for the localization / local value addition for the two wheelers and that for the incentives (in terms of volumes of vehicles) to be continued is indicated in **exhibit 6** and **7** below:

Exhibit – 6 – Phasing of the incentives for two wheelers

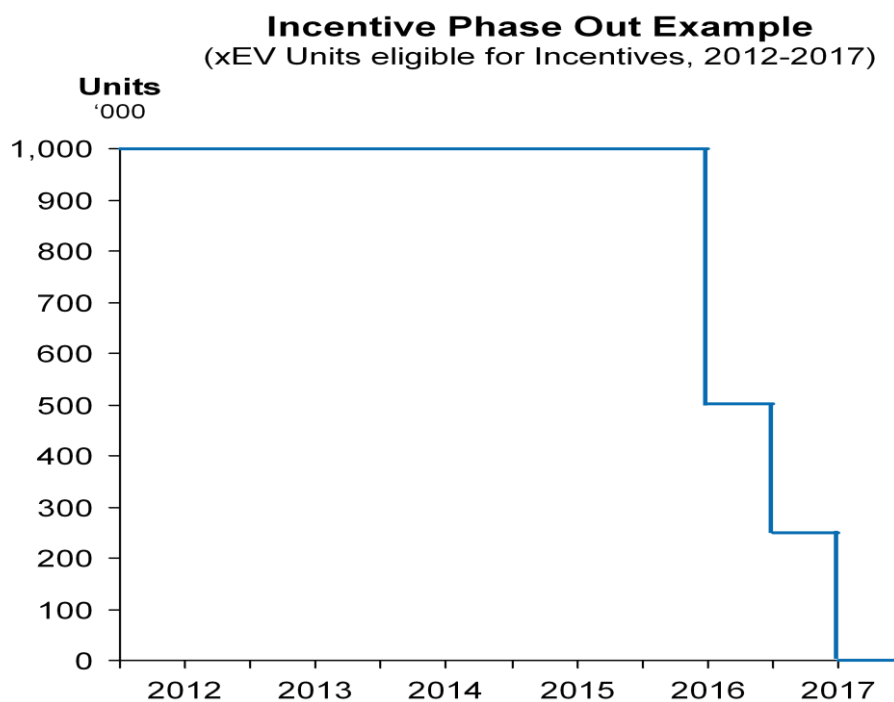
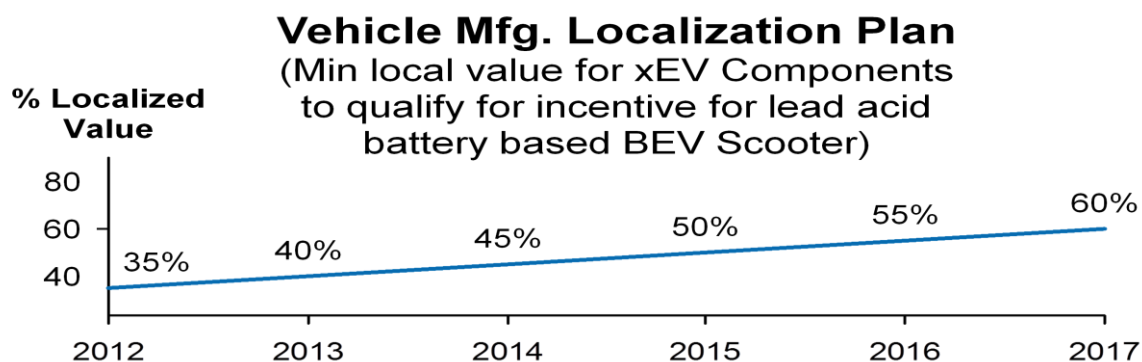


Exhibit – 7 – Phasing of the incentives for two wheelers

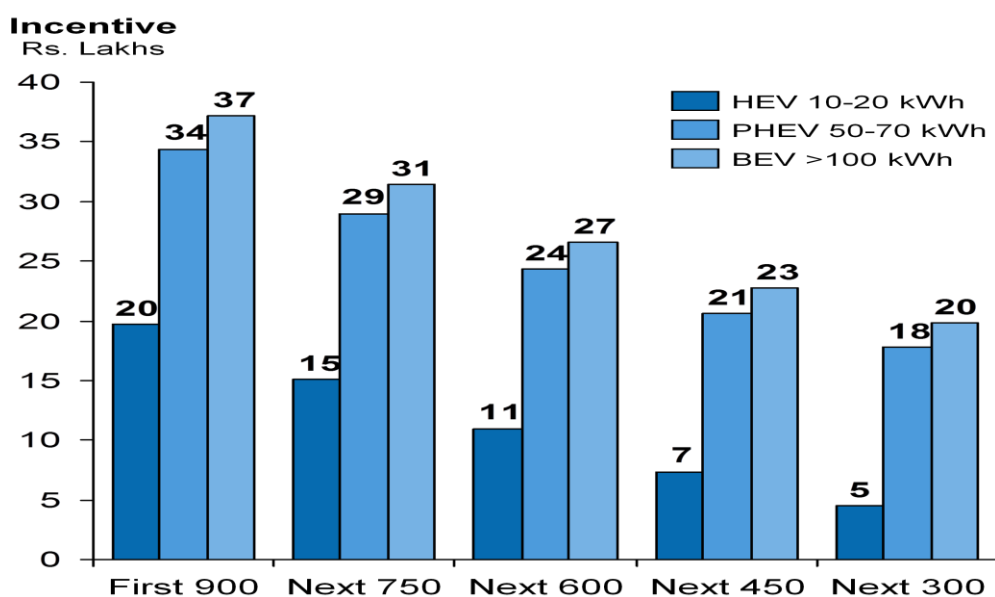


c. xEVs in Bus segment:

- i. Proposed demand incentives for premium buses:
 - a. ₹ 20-5 lakh for HEV (decreasing annually)
 - b. ₹ 34-18 Lakhs for PHEVs
 - c. ₹ 37-20 Lakhs for BEVs
 - d. ₹ 15, 000 per BEV motorbike,

- ii. It has also been proposed that the level of incentives should continue to decline with increasing volumes as depicted below:

Exhibit 8

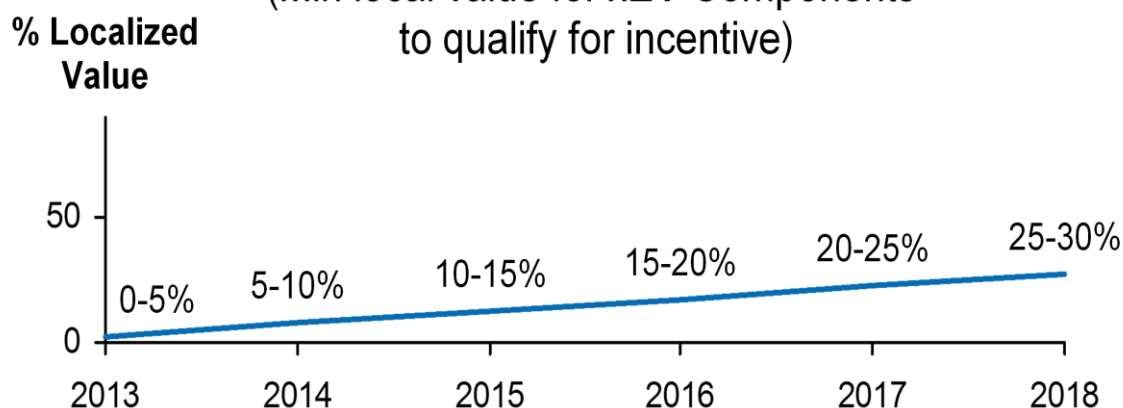


- iii. It is estimated that scale of about 3000 buses should provide enough scale to OEMs to bring down the costs by 20-25%. Therefore, the proposed Incentive can be made available to the first 3000 buses starting 2013, subject to localization, quality and minimum performance standards etc, then these can be withdrawn.
- iv. **Phasing:** The introduction of xEV buses can be done on pilot project basis, for cities such as Delhi, Mumbai, Bangalore etc, wherein the benefits and adoption by consumers can be monitored so that issues, if any, can be rectified before full scale commercialization. The phasing for the localization plan is depicted as under in **exhibit 9**.

Exhibit 9

Vehicle Mfg. Localization Plan

(Min local value for xEV Components to qualify for incentive)

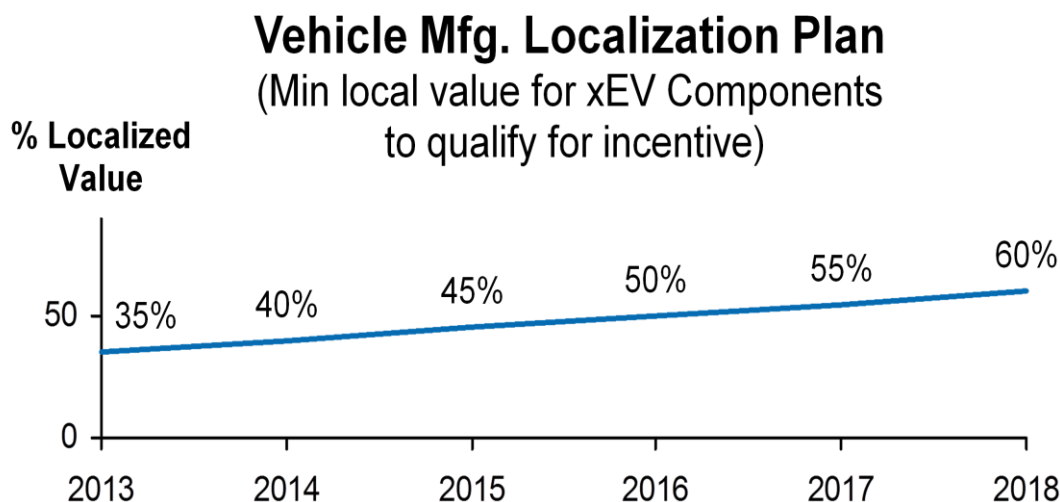


d. Light Commercial Vehicles (LCVs):

- i. Proposed demand incentives:
 - a. Mandate xEVs in government fleet,
 - b. Incentives of Rs 50,000 per vehicles for HEV (0.5-3 KWh) and ₹ 100,000 per vehicle for BEV (> 7 Kwh) to be given to the first 50,000 units from 2013 onwards for five years. The ratio of incentives can be 80-70% by volume for HEVs and 20-30% for BEVs.
 - c. Incentives to be phased out in 2017 with 25,000 units in H1 and 12,500 units in H2 of 2017.
 - d. Incentives can be based on battery size, technology and performance
 - e. Incentives will be subject to localisation, minimum safety and quality standards and performance benchmarks.

ii. **Phasing:** The phasing of the incentives will be 50,000 units per year for five years with phase out in 2017. The phasing plan suggested for the localization is given in **exhibit 10** as under:

Exhibit 10



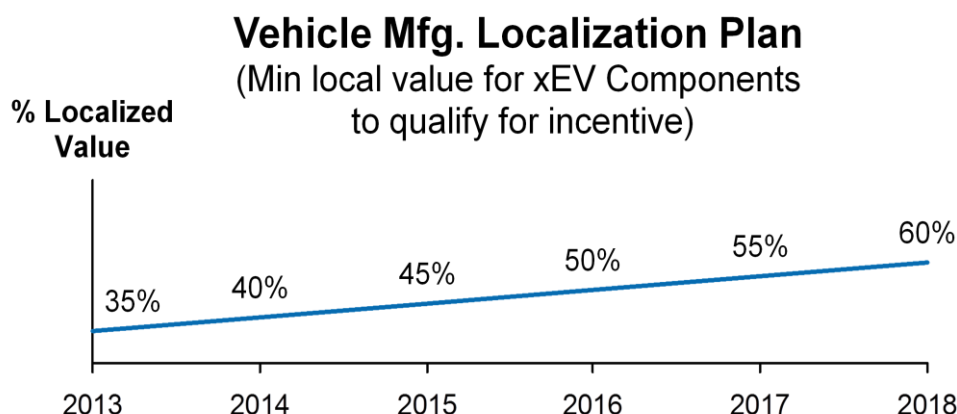
e. Three Wheelers:

i. Proposed demand incentives for three wheelers:

- a. Mandate BEVs in public transportation in certain areas of cities to create initial demand for OEMs.
- b. Free permits and incentives of ₹ 10,000 can be given to 20,000 BEV 3Ws per year from 2012 to 2016 after which this can be phased out in 2017 by extending this facility to 10000 vehicles in H1, 2017 and 5000 in H2, 2017.
- c. The incentives/free permits will subject to localisation, minimum safety, quality and performance standards to be checked by a government approved testing agency.
- c. Incentivise first 20,000 vehicles per year starting 2013 subject to localisation and quality.

ii. **Phasing:** The localization phasing can be structured in terms of **exhibit 11** on the next page:

Exhibit 11



f. Proposed mechanism for implementing demand Generation:

i. Broad principles behind demand generation incentives:

While the choice, extent and level of interventions and their micro detailing will be done in due course, however some of the broad principles that can be used in devising the mechanism for demand incentives are as under:

- a. Domestic manufacturing will need to be incentivized and local value addition conditions by linking the demand generation incentives with the degree of localization of xEV components (0-5% to 25-30% in 5 years for BEVs) will need to be inbuilt into incentive schemes.
- b. Quality and performance standards will be insisted upon for getting/qualifying for demand incentives. This will also entail setting up of new regulations and standards in number of areas where these do not currently exist. The testing infrastructure gap will therefore need to be identified and put in place for enforcing these standards.
- c. Demand incentives will be made available for the initial market creation only, and once this is achieved these will be phased out.
- d. Cap on the number of vehicles to be provided the incentive per year is also being proposed. It is also envisaged that the demand incentives should be made technology neutral as far as possible.

ii. Implementation structure:

- a. In terms of the cabinet decision while all interventions will be approved by NBEM and NCEM, however, the existing structures, agencies, organizations currently having expertise in different areas, identified above, that are related to implementation and roll out of demand incentives will be used. NATIS/NAB (once set up) will assist the NBEM/NCEM in the approval and monitoring process. Therefore, for instance the existing automotive regulation making structure in DRT will be used, for finalizing the new regulations and standards that are required. These will be notified through the CMVR administered by DRT and implemented through the automotive testing facilities under DHI.
 - b. For this the automotive testing facilities will be augmented. This exercise is being taken up separately and has been dealt in greater detail under the heading of R&D.
 - c. The roadmap for all these activities will be decided in consultation with the related stakeholders and will be approved by the NBEM/NCEM.
 - d. Similarly, the strategy, time line and roadmap for standard setting and testing for other areas like batteries etc will be decided in consultation with concerned stakeholders and approved by the NBEM/NCEM.
- g. Funding source:** The investments indicated for demand incentives takes into consideration all the vehicle segments covered along with the level of incentives proposed both in terms of quantum and no of vehicles to be covered. This proposal is based on the principle that acquisition cost of xEVs is much higher and needs to be sub-vented through appropriate incentives to ensure creation of minimal market size that is viable for the industry to invest in product development and for creation of local manufacturing facilities. While this logic is not contested, however, a decision on the following key points will be taken at the level of the NBEM/NCEM before the possible scenarios for funding are worked out:
- i. The vehicle segments to be taken up for demand creation/incentives,

- ii. The possible solutions (HEV, PHEV, BEV) that will be promoted in each vehicle segment to be covered,
- iii. The form of incentives (tax breaks, excise duty concessions, direct cash subsidies, subsidies on batteries etc) and the quantum that will be offered/provided.
- iv. The number of vehicles to be covered, the duration and phasing of the schemes for ensuring adequate market is created for the industry to be self reliant,
- iv. Nature of non-financial incentives to be provided, direct demand generation measures, possible mandating of xEVs in certain areas/locations etc.

During the stage of seeking approval of the government for the NMEM, it was indicated in **Para 4.4.2** that *“The various Ministries including DHI, DST, MNRE, DRT, MoEF, MoUD have undertaken/are undertaking a number of initiatives in the area of electric mobility, sustainable mobility, alternate fuels and drives, sustainable development, mitigation of the impact on the environment and climate change etc. It is proposed that the resource requirements for undertaking these initiatives for promoting electric mobility pertaining to different departments will continue to be undertaken by the concerned Ministries through their respective budgetary allocations for these programs. In case of new programs, schemes, projects, initiatives etc. the approval of the government will be taken separately once these are approved by the NCEM. The additional resource requirements are proposed to be met from various sources such as the funds for technology development, propagation of renewable energy sources activities, climate change mitigation, automobile cess etc.”* Therefore, it is proposed that a number of these schemes/ incentives will be rolled out through the existing mechanisms and agencies currently undertaking this. For instance the roll out of incentives for hybrid buses can be undertaken through the JNNURM scheme through which the stimulus package for direct demand generation for buses was rolled out earlier. Therefore, the Ministries/ Departments concerned will integrate these requirements in their planning and budgeting exercise. Given the integrated –

one platform approach being followed through the setting up of the NCEM/NBEM, this should not pose a major problem. Since during the inter-ministerial consultations at the time of seeking cabinet approval, some Ministries had also suggested the creation of a specific fund for various projects, schemes etc to be taken up under this initiative, this aspect will also be examined and taken up with planning commission, finance ministry etc, if required.

- h. Phasing during next five years:** The phasing of the demand incentives for the next five years and the degree of localization that is sought to be achieved has already been indicated in the analysis of the various vehicle segments. The specific decision of NCEM and NBEM on this issue will be taken for the approach to be adopted.
- iv. Research & Development:** The summary of the demand generation measures suggested for the different vehicle segments is given below:

 - a. Areas in electric mobility where India can undertake R&D:** The study, through focused group discussions, deliberations with OEMs, automotive experts, research institutes and based on survey of the developments in India and the world has broadly indicated the quantum of R&D expenditure required and the areas where R&D efforts in India can make a difference. Further, amongst the five key components of xEVs (battery cell, battery management system, electric motors, power electronics, transmission system), India's right to win (in R&D) was evaluated based on current capabilities, financial investment required and global competitive intensity. Due to presence of a mature software and electronic industry, players in electrical machines, low to medium financial investment required and low global competitive intensity, India has higher right to win in battery management system, electric motor and power electronics compared to other components. These components could be prioritized for R&D in the five to ten years.
 - b.** Based on the above analysis, a few areas that can impact the affordability and adaptability of xEV technologies which can be taken up for R&D in India and are therefore important for India are listed below:

- i. Developing low-cost batteries through new chemistries
 - ii. Customize battery management systems for Indian weather and traffic duty cycles
 - iii. Developing low-cost and localized power electronics for HEV / PHEV (motor speed controllers, more efficient regenerative braking etc.)
 - iv. Developing low-cost motors by use of non-rare earth magnets
 - v. Increasing energy density of induction based motors
 - vi. Developing low-cost transmission technologies e.g. double clutch systems, better integration of components.
 - vii. Light weighting
- c. **Investments required for R&D efforts:** It has been estimated that the level of investments/funding required in four wheelers, two wheelers and buses segments would be in the range of ₹ 500-550 cr. for each of these segment. It is also envisaged that no separate major R&D investments would be required for three wheelers and LCVs. Therefore the total level of funding would amount to approximately ₹ 1680 cr. over the period of next five years, including ₹ 180 cr. for component and vehicle testing infrastructure. As this is an initial estimate, it is also proposed that periodic review of the programs would be conducted for modifications/expansions etc. The summary of the likely R&D investments required is given in **Table 5** as under:

Table 5

Total investment Proposed for the next 5 years (₹ in cr.)											
Area	4W		2W	3W		Buses		LCV		Total	
	HG/ HEV	HG/HEV/BEV	HG/ HEV	HG/ HEV	HG/HEV/BEV	HG/ HEV	HG/HEV/BEV	HG/ HEV	HG/HEV/BEV	HG/ HEV	HG/HEV/BEV
R&D Investments	500-550	500-550	500-550	-	-	550-580	550-580	-	-	1550-1680	1550-1680

- d. **Segment wise distribution of R&D expenditure:** The detailed segment wise and area wise investments in R&D proposed is summarized in **Table 6** below:

Table 6

		Component Research					Component Development					Component and Vehicle Testing Infrastructure				
Sr No	Area	4W	2W	3 W	Bus	LCV	4W	2W	3 W	Bus	LCV	4W	2W	3W	Bus	LCV
1	Battery Cell	200	200		200							50	50	-	80	-
2	Battery Mgmt System						OEM/Manufacture Investment									
3	Power Electronics						OEM/Manufacture Investment									
4	Electric Motor	125*	125*		125*		125*	125*		125*						
5	Transmission						OEM/Manufacture Investment									
	Total	325*	325*		325*		125	125		125		50	50		80	

- e. **Proposed mechanism for implementing the R&D interventions:**

- i. **Strategy of Collaborative R&D to be adopted:**

- a. The R&D initiative will be taken up on a collaborative approach with NATIS/NAB (once set up), the existing automotive R&D centers under it and DST playing the key pivotal role.
- b. While the Government can fund the basic research required for battery cells and electric motors, etc OEMs can invest in product development for other components.
- c. The CAR (Collaborative Automotive R&D) program instituted in 2005, under the “CAR program committee” chaired by Prof P Rama Rao, former Secretary, DST is being run by TIFAC/DST with the association of DHI for undertaking consortia based pre-competitive automotive R&D projects. This program has seen 11 academia-industry consortia research projects involving 14 national labs/institutes, 15 companies and 10 technology intensive SMEs. The total amount of funds deployed for the CAR activity is Rs 35 crores over past 8 years. Recently, CAR-Fraunhofer (Germany) collaboration has also been initiated with five focused areas that include (i) Propulsion (ii) Manufacturing (iii) Automotive electronics (iv) Advanced Materials. In addition, four projects have also been shortlisted for taking up in the 12th plan under this program, these include (i) Multi-Join – techniques or joining different materials (ii) Software Standard for Small cars (iii) Simulator for electric drive vehicles (iv) 3-dimensional automotive visual inspection system.
- d. The existing well established collaborative R&D model used by CAR (Collaborative Automotive R&D) program under TIFAC/DST of forming project consortia will be used for which key stakeholders including the industry, academia, outside research institutes will be taken on board to form the consortia. This will be spear headed by NATIS and NAB (once set up). In addition, the study has also proposed a number of possible consortia models that can be adopted.
- e. For this purpose deliberations with DST/TIFAC have already been held. It has been agreed that the existing CAR program run by TIFAC will be shifted to NATIS/NAB (once it is set up). It is conceived that while

TIFAC/DST will focus on technology foresight and project nucleation, NATIS/NAB, DHI will focus on project implementation with certain degree of overlap built for smooth functioning.

- f. DST has also shown keen interest in focusing its resources and labs for undertaking the effort in shape of a much bigger R&D program which will include a number of specific projects and may also involve acquiring of technology, if required. It is envisaged that in addition to the automotive testing & R&D labs other labs under DST will also be involved as per requirement.
 - g. While the study has identified the key areas where R&D efforts need to be made, however a more detailed exercise is being undertaken with DST and the industry to identify the specific R&D projects, their budgets and time lines.
- ii. **Component and Vehicle testing infrastructure:** The current and the upcoming level of automotive testing infrastructure in the country will need to be augmented. This will be required not only for R&D purposes but also for testing of the newer regulations and standards that will be required to be introduced (e.g. test equipment for e-motors and battery test beds etc.). The ongoing automotive testing and R&D infrastructure up-gradation project (NATRiP) may therefore need to be expanded to cover these newer areas. As per the estimations made in the study the level of investment required may be in the range of ₹ 180 cr. This investment can be merged with the current ongoing up-gradation exercise under the NATRiP project. This will require further detailing and approval of NCEM/NBEM.
- iii. **Implementation structure & Mechanism:**
- a. As in the case of demand creation related initiatives, the R&D strategy, roadmap and the various R&D initiatives/projects will also be approved by the NBEM and NCEM. However, the existing structures, agencies, organizations currently having expertise in this area, such as the NATIS and its constituent centers, DST etc will be used. NATIS/NAB (once set up) will assist the NBEM/NCEM in the approval and monitoring process.

- b. The up-gradation of existing automotive testing and R&D facilities as required will be taken up and the facilities and labs under DST will also be partnered.
- c. The consortia approach used by TIFAC under the CAR program will be adopted and with maturing of the facilities under DHI, the CAR program will now be shifted to NATIS/NAB (once set up).
- f. **Funding:** In terms of the Industries Development (Regulation) Act, 1951, the automotive industry has also been notified by the government, in 1983, for the purposes of levy of automotive Cess to be used for the growth and development of the automotive industry. Accordingly, the Development Council for Automotive Allied Industries has been set up in the Department of Heavy Industry. The Cess on automobiles (1/8th of 1%) that is levied is collected along with excise collections and is required to be made available to the department for the various initiatives required to be undertaken for the automotive industry. It is estimated that the Cess on automobiles collected for the last ten years is in excess of ₹ 1000 cr. Last year the automotive cess collected was approx. ₹ 225 crores. However, a sum of only ₹ 25 cr. per year is being made available to the department every year under the head of Automotive Cess (non Plan). This is being used to fund pre-competitive automotive R&D projects and other schemes. It is viewed that the requirement of funds for building new facilities, administrative expenditure is setting up of a team in NATIS/NAB and also for meeting a portion of R&D expenditure requirement will be met from the head of automotive Cess. The requirement from this head for 2012-13 is proposed to be kept at ₹ 175 cr. This budget is proposed to be increased slightly on a yearly basis. The Department of Science and Technology has also indicated that it is willing to fund the electric mobility R&D program from their budget allocations. In addition, specific project proposals for funding will also be made to the planning commission as and when required.
- g. **Phasing during next five years:** Based on the inputs of the study, the Department of Heavy Industry proposes that a budget of ₹ 175 cr. per year, increasing by ₹ 25 cr. yearly, will be made available from the automotive cess for the next five years for automotive R&D purposes. Majority of this will be

used to fund xEV R&D activities and required testing infrastructure. While specific detailing will be undertaken subsequently, it is viewed that efforts will need to be made for putting in place majority of the required additional testing infrastructure required by 2013-14. According, the indicative phasing of the expenditure towards this is indicated in **table 7** below. The specific detailing and the approvals required will be taken up separately. In addition, DHI will utilize the major portion of the balance Cess funds for the various xEV related R&D projects that are identified and approved by the NCEM/NBEM. The indicative possible phasing of expenditure for this, after deducting the funds required for the ongoing programs is given in **Table 7** below. The balance required funds to the tune of ₹ 630 cr. will be made available from DST and/or with the approved allocation from planning commission once the specific projects etc. are finalized and approved.

Table 7

Phasing of the R&D spend by DHI from Auto Cess							(₹ in cr.)
Sr. No	Area	2012-13	2013-14	2014-15	2015-16	2016-17	Total
1	Cess R&D Budget	175	200	225	250	275	1125
2	For other on-going /planned commitments	25	35	45	50	50	205
3	Balance Available	150	165	180	200	225	920
4	For Testing infrastructure	60**	90**	30**	50	75	305**
5	For xEV R&D Projects	90*	75*	150	150	150	615
6	Total for xEV	150	150	150-175	150	150	920

* Given the fact that DST facilities/labs would also be participating, some projects that are not dependent upon augmentation of testing facilities can be suitable prioritized to achieve the targets.

*** Further, It is also expected that certain R&D projects may involve procurement of equipment which could also serve the purposes of testing. This will be suitably taken care of during the detailing stage.*

v. Retro fitting options for on road vehicles: Recently, it has been seen that a number of Indian automotive companies have developed retro-fitment solutions for converting ordinary IC engine based vehicles to hybrid vehicles. The solutions provided so far have used ordinary Lead acid batteries with focus on battery performance optimization through advance battery management systems. It is reported that some of these solutions have recorded fuel efficiency levels of more than 30%. These test reports have been validated by ARAI and rigorous field trials are being conducted on various car models. In addition, the Department of Heavy Industry has also sponsored a R&D program for development of retro fitment hybrid kit for LCVs. In this regard it is important to note that:

- a. A very large population of on road vehicles also needs to be addressed for tackling the twin issues of fuel efficiency and impact on the environment. While various strategies like a rigorous I&C regime coupled with “End of Life” of vehicles regime would be effective, options for possible retro-fitment kits that allow hybridization of existing IC engine based vehicles currently on the roads would also be extremely important.
- b. Government support would be required for the large scale adoption of his option. This would include:
 - i. Early setting of the minimum performance and safety standards,
 - ii. Appropriate regulations under the CMVR will need to be notified,
 - III. Gap in the testing infrastructure required to support the new regulations, performance and safety standards will be required to be set up,
 - IV. As these kits are likely to be expensive, in order to encourage the early adoption of retro-fitment devises for hybridization some support to the consumer would be required.
 - V. In order to avoid sub-standard devices being sold or improper fitment proper mechanism would need to be put in place.

- c. This is an important activity/strategy that will need to be supported and taken up in conjunction with the manufacture and sale of new xEVs.
- vi. **Infrastructure:** Estimation has been made regarding the charging infrastructure and the additional power infrastructure requirements that will be needed to support the level of penetration of xEVs being proposed by 2020. It is seen that moderate investments in infrastructure would be required by 2020 to achieve the potential for xEVs in India. These investments could be made after rolling out some pilot programs to evaluate whether public charging stations (e.g., parking stations, malls etc.) actually has a significant impact on xEV adoption. In segments like buses, these investments can also be made in pilot programs first, before rolling out on a larger scale. Further, it is also estimated that the requirement of additional power generation capacity in India for electric vehicles is not expected to be very high. As per KPTL, it is estimated that for **1 M BEV cars** with ~10-20 kWh battery size, the additional power requirement is about **1 GW generation**, which over the total installed base is not a very high proportion. As per the study, it is viewed that in order to achieve the XEV potential for India by 2020, less than **1 GW of extra power generation capacity** would be required¹³.

I. Strategy & Implementation structure: The following options will be need to considered:

- i. Standards for charging infrastructure will need to be set up at the earliest. This is essential not only for ensuring minimal quality and safety standards but also to enable early achievement of economies of scale for different components. This activity can either be taken up through the CMVR/DRT process or through BIS.
- ii. The government can also formulate the guidelines and specifications mandating charging infrastructure requirement for new constructions. This can initially be started with Government and public buildings/infrastructure and then expanded to cover commercial and residential buildings subsequently.

¹³ Assuming 20% of electric vehicles charge during peak power load periods

- iii. The charging infrastructure roll out will be undertaken on a pilot project mode. This will allow the associated economic models to be tested and strategy recalibrated, if required.
 - iv. The charging infrastructure intervention will be rolled with MoUD taking the lead and with the active involvement of state governments and union territories.
 - v. Various strategies followed worldwide that include subsidies for charging equipment, streamlining the charging installation permitting process etc would be evaluated for adoption in India.
 - vi. The different business models for setting up and operating charging infrastructure adopted abroad need to be evaluated in the pilot project stage for their possible feasibility in India.
 - vii. The feasibility of linking renewable energy generation programs (solar, wind energy) with charging infrastructure would also be explored.
- ii. **Funding:** The amount of investments needed for setting up the required infrastructure up to 2020 (both power and charging infrastructure), vehicle segment wise, is summarised in **table 8** on the next page:

Table 8

Total investment Proposed for the next 10 years											
(₹ in cr.)											
Area	4W		2W	3W		Buses		LCV		Total	
	HG/HEV	HG/HEV/BEV	HG/HEV	HG/HEV	HG/HEV/BEV	HG/HEV	HG/HEV/BEV	HG/HEV	HG/HEV/BEV	HG/HEV	HG/HEV/BEV
Additional Generation Capacity	150 – 225 MW		600 MW	10 - 15 MW		< 5 MW		10 – 20 MW		775 – 865 MW	
Power Infrastructure (Rs)	700-800	1200-1300	3300-3400	40-50	75-85	5.-10	20-30	55-65	90-100	4100-4325	4685-4910
Charging Infrastructure (Rs)	700-800	950-1000	-	40-50	70-80	5.-10	10-20.	70-80	115-125	815-940	1145-1225

- i. As in the case of funding of the demand generation measures, it is proposed that these schemes/ incentives will be rolled out through the existing mechanisms and agencies currently undertaking this. Therefore, the Ministries/ Departments concerned will integrate these requirements in their planning and budgeting exercise. Given the integrated – one platform approach being followed through the setting up of the NCEM/NBEM, this should not pose a major problem. However, since during the inter-ministerial consultations at the time of seeking cabinet approval, some Ministries had also suggested the creation of a specific fund for various projects, schemes etc to be taken up under this initiative, this aspect will also be examined and taken up with planning commission, finance ministry etc, if required.

6. **The likely Outcomes/Benefits from the xEV initiative:** The electric mobility initiative is likely to not only result in significant savings in liquid fuel consumption, petroleum import bill but will also result in greater energy

efficient vehicles being adopted resulting in mitigation of impact of mobility on the environment. There are likely to be significant reductions in emissions and also net decrease in CO₂ emissions on a “well to wheel” basis. The support and direction from the government will also ensure that the domestic industry grows and does not become technologically and competitively obsolete. This will ensure greater value addition in the country, increase manufacturing and generate significant additional employment. In fact, this initiative is not only absolutely essential but needs to be rolled out immediately as most countries worldwide have already moved far ahead in this area.

i. **Summary of Key Benefits from xEVs:** The highlight of the key benefits projected by the study likely to be achieved with the indicated level of penetration of xEVs by 2020 is summarized as below:

- **Fuel Security** - India can achieve annual savings of ~ ₹ 13,000 - 14,000 cr. in 2020 by targeting 5~7 M sales penetration of xEVs across 2Ws, 4Ws, Buses, LCVs, and 3Ws
- **Environmental impact** – Adoption of this level of xEVs could help achieve potential reduction of 1.3-1.5% in CO₂ emissions, compared to ICE vehicles by 2020. The expected level of reduction in emissions and CO₂ by adoption of xEVs is summarized in **Annexure XII**.
- **Employment Generation** – Through local manufacturing of xEVs, at least 60,000 – 65,000 additional jobs can be generated by 2020 (over and above the jobs created by conventional vehicles)
- **Affordable xEV Solutions** - By providing demand incentives, along with support for R&D and local manufacturing, government can facilitate creation of affordable xEV solutions which can meet consumer expectations
- **Local Manufacturing Capability** - Local manufacturing can be supported through domestic production incentives, along with specifying clauses in demand incentives which require increasing localization of xEV components

ii. **Analysis of the ease of implementation and benefits for different vehicle segments:**

An analysis matrix indicating the level of likely fuel benefits, ease of implementation, total investments involved and the Net Present Value (NPV) of benefits (Net benefits) for each vehicle segment is given in **Table 9** on the next page:

Table – 9

Analysis		Four Wheelers	Two Wheelers	Buses	Three Wheelers	LCVs
Fuel Benefits	HG/HEV (fuel saving by 2020)	1.1 MT	4.9 MT by 2020	0.5 MT	0.2 MT	0.3 MT
	HG/HEV/BEV (fuel saving by 2020)	1.6 MT		0.6 MT	0.3 MT	0.5 MT
Ease of Implementation	CAPABILITIES	Low to Moderate	Moderate to High	Moderate	Moderate	Low
	PRICE PERF. GAP	Moderate to High	Low to Moderate	High	High	High
	INVESTMENT	Significant investments required by OEMs	High as volumes are high.	Moderate	Moderate	Moderate
Total additional direct new jobs	Numbers	26000-30000	22,000	1150-1200	1200	7200-8000
Total Investments (next 10 years)	Rs Crores	7000-9000	10,000 – 10,500	1100 - 1300	500-900	1400-1800
NPV of benefits (Net Benefits)	Rs Crores	4800-7100	28,000	3300 -3700	1200-1700	1500-3000

- i. **Savings of Liquid Fuel:** The possible savings in the liquid fuels as a consequence of the level of penetration of xEVs by 2020 is given in **table 10** below:

Table 10 Level of fuel savings in 2020

	2W	4W	BUS	LCV	3W
Vehicle Sales in 2020 ('000 units)					
HEV / PHEV	-	1275	2	120	-
BEV	4800	170-320	0.3-0.7	30-50	20-30
Fuel Savings due to xEVs in 2020 (Million Tonnes of Liquid Fuel)					
Fuel Savings	1.4	0.4-0.65	0.16-0.19	0.09-0.16	0.06-0.09

As per this estimate in 2020, the total population of 6-7 million xEVs will result in total oil savings to the tune of 2.2 – 2.5 MT. This will translate into a ₹ 13,000 – 14,000 cr. liquid fuel savings by 2020. This is depicted in the **table 11** below:

Table 11 – Summary of scenario analysis – savings from potential xEVs

	High Gas /HEV	High Gas/ HEV/ BEV
Annual Crude Oil Savings over status quo scenario	~ ₹ 13,000 cr.	~ ₹ 14,000 cr.
Reduction in CO2 emissions over status quo scenario	~ 1.3 %	~ 1.5 %

- ii. The fuel savings projected in **Table 10 & 11** above will be achieved on account of higher penetration of xEVs only and do not include the possible liquid fuel savings due to the higher penetration of CNG. The inputs and assumptions pertaining to penetration of xEV, future total vehicles sales, average distance travelled, fuel efficiency achieved etc used for arriving at the fuel saving scenario is summarized in the **table 12** below:

Table 12 – major Assumptions for calculating fuel savings

		% Penetration (2020)			Sales (Million)		% Mileage improvement over ICE		Annual Mileage improvem-ent		
		HEV	PHEV	BEV	2011	2020	HEV	PHEV			
2W	High HEV	NA		15%	11.8	32	30%	40%	2%		
	High HEV/BEV										
3W	High HEV			2%	0.5	1	25%	40%			
	High HEV/BEV			3%							
4W	High HEV	11%	4%	2%	2.5	8.5	24%	65%			
	High HEV/BEV			4%							
Prem Bus	High HEV					2%	0.004	0.014		32%	40%
	High HEV/BEV			5%							
LCV	High HEV	8%	-	2%	0.3	1.5	20%	35%			
	High HEV/BEV			4%							

In addition, the study has assumed that the Retrofits will have 80% of the fuel efficiency gain compared to OEM produced HEV / PHEV, the Fuel efficiency of ICE has been taken as: 2w – 65 kmpl, 3w – 38 kmpl, 4w – 12 kmpl (petrol), Premium Bus – 2.4 kmpl, LCV – 18kmpl

v. Reduction in CO₂ emissions: In order to calculate the possible CO₂ reductions as a result of the projected shift to xEVs, the well to wheel approach has been adopted. As per this the CO₂ emissions on account of emissions related to materials (production), electricity generation (well to tank), fuel efficiency (tank to wheel) have been considered.

vi. Manufacturing: It is proposed that a phased approach will be followed for increasing the localization/indigenous content and local value addition. In view of the

current status of the industry capability, level of investments required, lead time required to attain economies of scale it has been proposed that initially in phase 1, the industry would focus on domestic assembly of vehicles, with imported components. However investments in R&D should be initiated in this phase. After this stage, the industry would concentrate on higher indigenization of components, and local sourcing of components should start. In 8-10 years, complete local manufacturing eco system of battery, electric motor and power electronics could be developed. As OEMs in India develop these capabilities, they can also consider exports to markets outside India. In order to support this strategy, insistence of increasing local content for being eligible for subsidies/incentives has been suggested in demand generation measures. The localization phasing plan along with the time line for phasing-off the subsidies has already been indicated under the section dealing with the demand generation measures.

vii. Summary of the projected net benefits:

The total investments required for covering all vehicle segments is estimated to be in the range of ₹ 20,500 –23,000 cr. It is estimated that the total net benefits from xEV initiative would be in the range of ₹ 39,000 – 43,000 cr. The adoption of battery operated 2Ws seem to have the largest return across all segments. The cumulative benefits, vehicle segment wise are summarized in Table 13 on the next page:

Table 13

Vehicle Segment	2 Wheelers		3 Wheelers		4 Wheelers		Bus		LCV	
Scenario	High HEV	High HEV/B EV	High HEV	High HEV/B EV	High HEV	High HEV/B EV	High HEV	High HEV/BEV	High HEV	High HEV/B EV
Net Benefits (NPV in ₹ cr.)	28,000 ¹⁴		1,200	1,700	4,800	7,100	3,300	3,700	1,500	2,700
Cumulative liquid fuel savings (2011-2020)	4.9 MT		0.2 MT	0.3 MT	1.1 MT	1.6 MT	0.5 MT	0.6 MT	0.3 MT	0.5 MT
Ease of Implementation	Moderate to High		Moderate		Low to Moderate		Moderate		Low	
Total Investment (Rs. Crores)	10,200		550	900	7,200	8,700	1,100	1,200	1,400	1,800

¹⁴ Includes the BEV strategy for motorbikes as well, which account for majority of BEV 2W sales

Abbreviations

ACMA	-	Automotive Component Manufacturers Association of India
AMP	-	Automotive Mission Plan
ARAI	-	Automotive Research Association of India, Pune
ASDC	-	Automotive Skills Development Council
ASEAN	-	Association of Southeast Asian Nations
ATDF	-	Auto Component Technology Development Fund
CAGR	-	Compound Annual Growth Rate
CII	-	Confederation of Indian Industry
CNG	-	Compressed Natural Gas
CSIR	-	Council of Scientific and Industrial Research
DHI	-	Department of Heavy Industry
DIPP	-	Department of Industrial Policy & Promotion
DPIR	-	Detailed Project Implementation Report
EU	-	European Union
FADA	-	Federation of Automobile Dealers Associations of India
FTA	-	Free Trade Agreement
G-ARC	-	Global Automotive Research Centre (GARC), Chennai
GDP	-	Gross Domestic Product
GST	-	Goods and Service Tax
HI&PE	-	Heavy Industry and Public Enterprises
ICAT	-	International Centre for Automotive Technology (iCAT), Manesar
ICE	-	Internal Combustion Engine
IMG	-	Inter Ministerial Group
India EU	-	BTIA -India European Union Bilateral Trade and Investment Agreement
ITES	-	Information Technology Enabled Services

ITS	-	Intelligent Transportation System
LCV	-	Light Commercial Vehicle
LNG	-	Liquefied Natural Gas
LPG	-	Liquefied Petroleum Gas
M&A	-	Merger and Acquisitions
MAT	-	Minimum Alternate Tax
MSME	-	Micro, Small and Medium Enterprises
MUV	-	Multi Utility Vehicle
NCEM	-	National Council for Electric Mobility
NBEM	-	National Board for Electric Mobility
NATRIP	-	National Automotive Testing and R&D Infrastructure Project
NCR	-	National Capital Region
NSDC	-	National Skill Development Corporation
NTB	-	Non Tariff Barriers
OEM	-	Original Equipment Manufacturer
R&D	-	Research & Development
SIAM	-	Society of Indian Automobile Manufacturers
SME	-	Small and Medium Enterprises
SUV	-	Sports Utility Vehicle
TOR	-	Terms of Reference
VRDE	-	Vehicle Research and Development Establishment, Ahmednagar
xEVs	-	(full range of electric vehicles that include hybrids, plug in hybrids and pure electric vehicles)