

AUTOMOBILE INDUSTRY PERSPECTIVE ON CHALLENGES OF ENERGY DEMAND AND MITIGATION MEASURES

**DILIP CHENOY
DIRECTOR GENERAL
SOCIETY OF INDIAN AUTOMOBILE MANUFACTURERS**

**Integrated Environmental Strategies - India
Strategies for Addressing Local and Global Emissions**

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PERSPECTIVE ON CHALLENGES OF ENERGY DEMAND AND MITIGATION

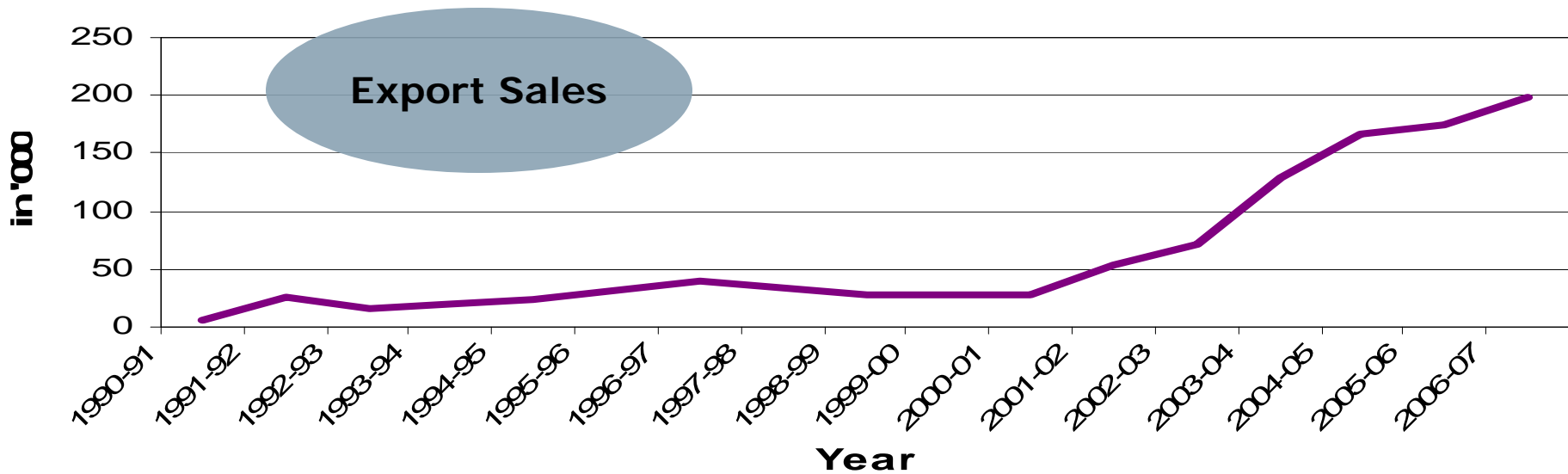
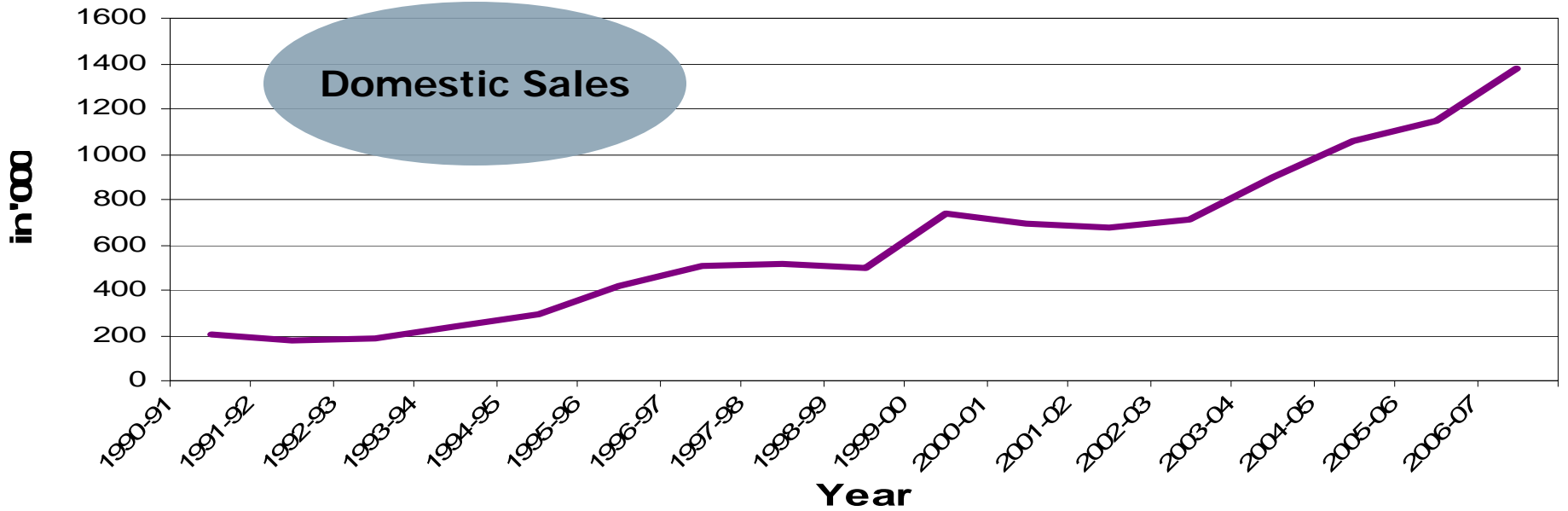
MEASURES

- Automobile Industry some facts
- The Automotive Mission Plan 2016
- Development of Emission regulation in India.
- Mobility : Global Challenges and Requirements
- India: The mobility context
- Sustainable Mobility Solutions : Integrated Approach
- Sustainability: Need for an Integrated Approach –in Transport
- Fuel Efficiency & Fuel Consumption
- Development of Fuel efficiency norms in India.
- Conclusion

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AUTOMOBILE SALES - GROWTH

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VEHICLE PRODUCTION IN INDIA IS LOW

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Figures In '000

	Cars			Commercial Vehicles		
	2001	2006	CAGR %	2001	2006	CAGR %
US	4,879.12	4,366.22	-2.2	6,545.57	6,897.77	1.1
Europe	17,423.25	18,073.78	0.7	2,678.09	3,225.12	3.8
Germany	5,301.19	5,398.51	0.4	390.49	421.11	1.5
Japan	8,117.56	9,756.51	3.7	1,659.63	1,727.72	0.8
South Korea	2,471.44	3,489.14	7.1	474.88	350.97	-5.9
China	703.52	5,233.13		1,630.92	1,955.56	
India	548.41	1,473.00		160.05	546.81	

Source: OICA

From almost similar level, China now produce 3.5 times more cars. It produces 3.5 time more commercial vehicles also.

PASSENGER VEHICLES PENETRATION

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City	Cars / 1000 people
Germany	550
France	495
Japan	490
US	475
Malaysia	253
South Korea	219
Mexico	135
Brazil	96
Thailand	51
Indonesia	16
Philippines	9
India	7
China	6

Passenger Vehicle penetration in cities is also low

City	Cars / 1000 people
Delhi	85
Chennai	51
Bangalore	41
Jaipur	40
Vadodara	36
Hyderabad	32
Mumbai	23
Kolkata	23

Source MoRTH 2004, Census & Analysis

Source: WARD's

Two wheeler penetration in cities is also low

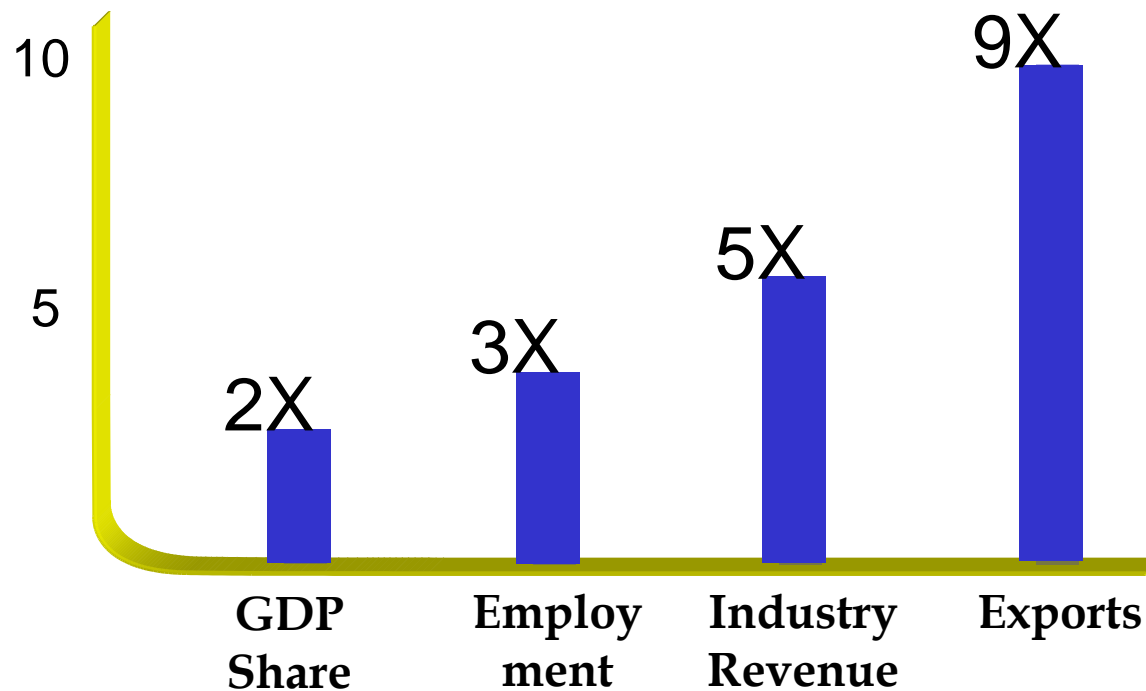
Countries	2W / 1000 people
Thailand	286
Malaysia	258
Italy	166
Japan	100
Spain	90
Indonesia	90
Switzerland	77
Germany	69
China	59
India	43
US	18

City	2W / 1000 people
Vadodara	275
Jaipur	219
Bangalore	216
Chennai	196
Delhi	173
Hyderabad	165
Mumbai	35
Kolkata	27

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- “To emerge as the destination of choice in the world for the design and manufacture of automobiles and automotive components. The output of India’s automotive sector will be USD 145 billion, contributing to more than 10% of India’s Gross Domestic Product and providing employment to 25 million persons additionally by 2016”.

1. Investment support
2. **Infrastructure development**
3. Incentives to expand Domestic Demand
4. International markets development support : Exports
5. **Innovation : R & D incentives**
6. **Implementation of Emission road map**
7. **Internationalisation of safety norms**
8. **Incentivising modernisation of fleet**
9. **Inspection & Certification system**
10. **Information Technology application: computerisation of RTOs**
11. Improving Productivity & Human resources

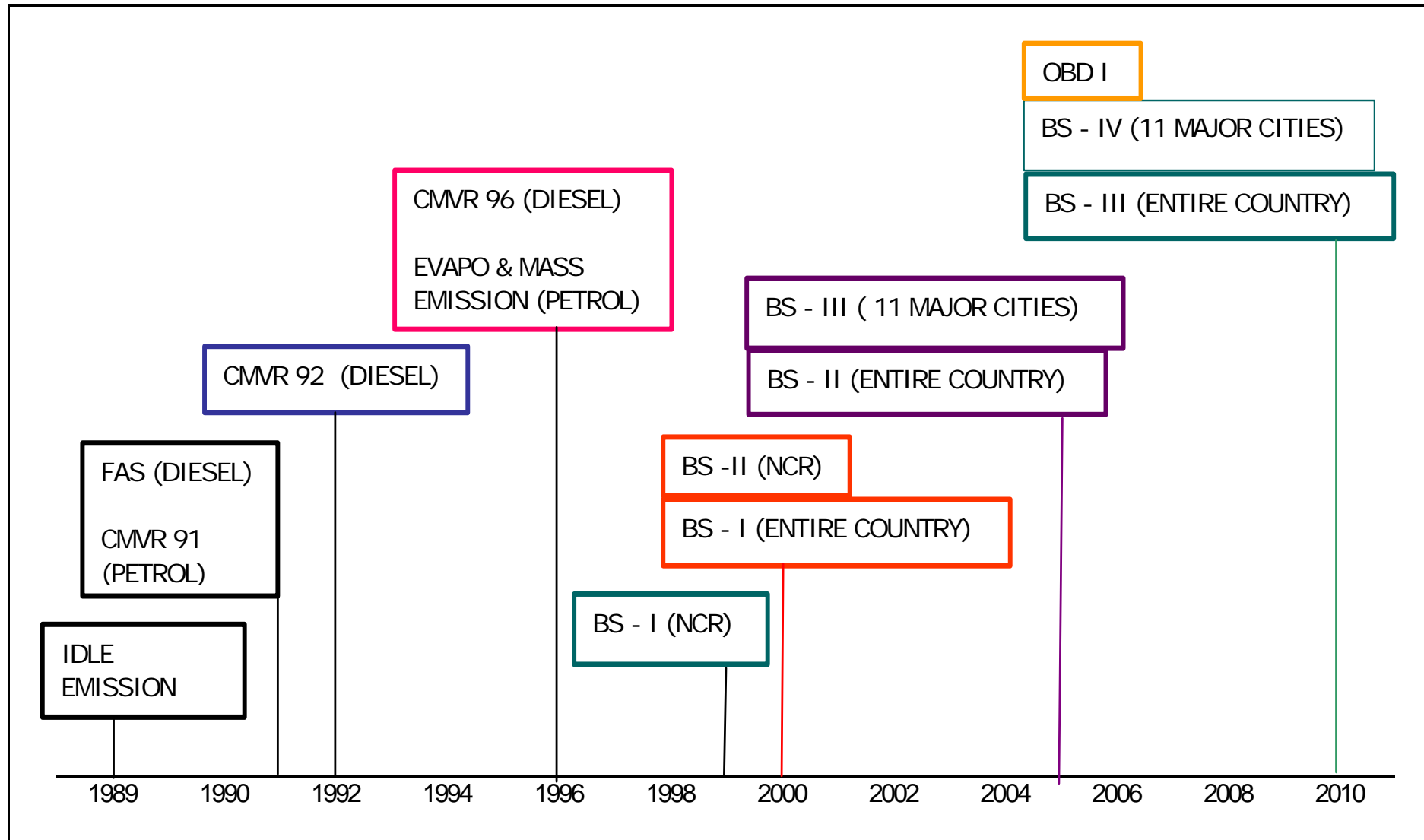


- India would emerge as the world's
 - 7th largest car producer
 - 4th largest position in world truck manufacturer
 - Remain 2nd largest two wheeler manufacturer

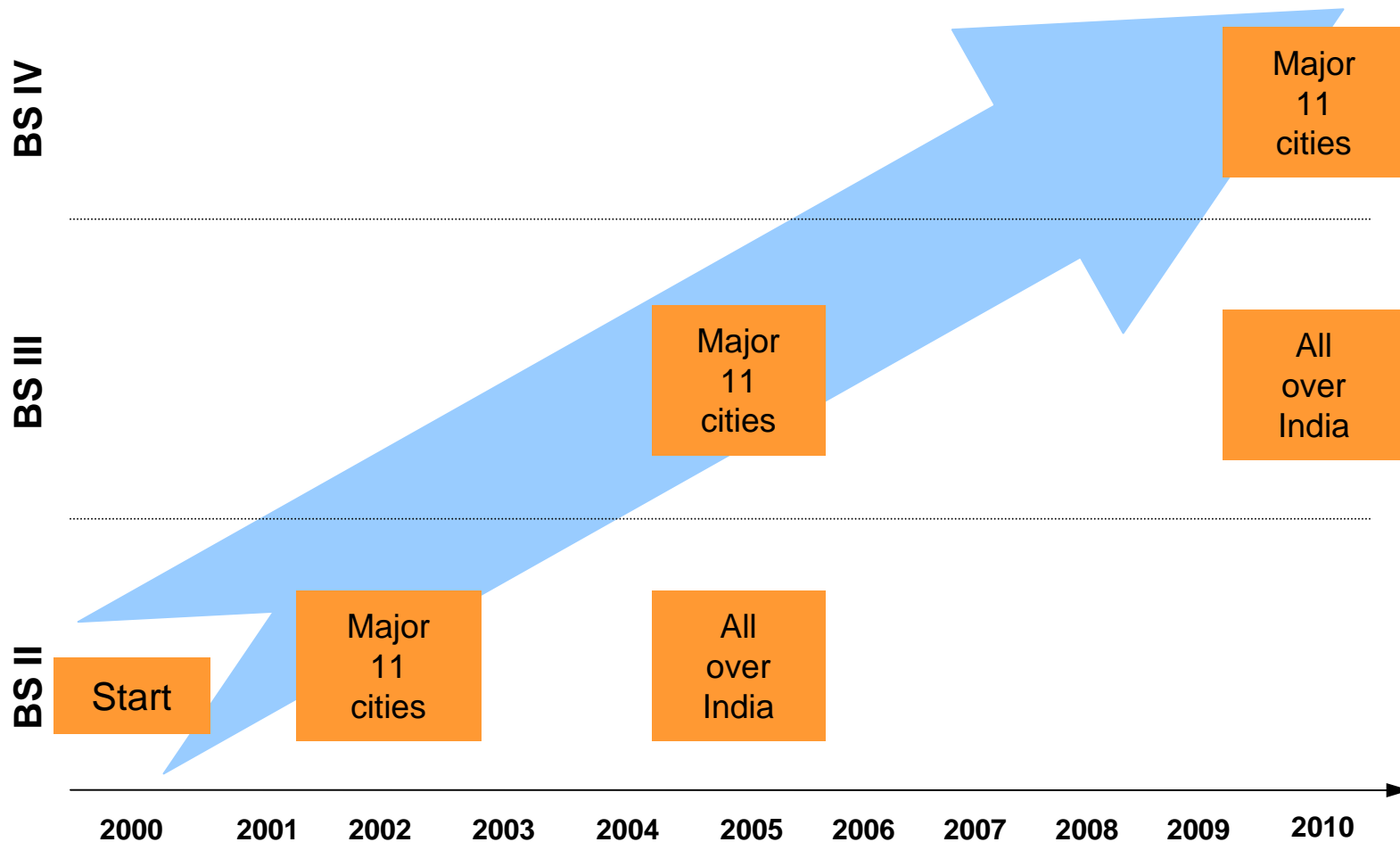
Regulations should help in meeting the overall projections of Automotive Mission Plan

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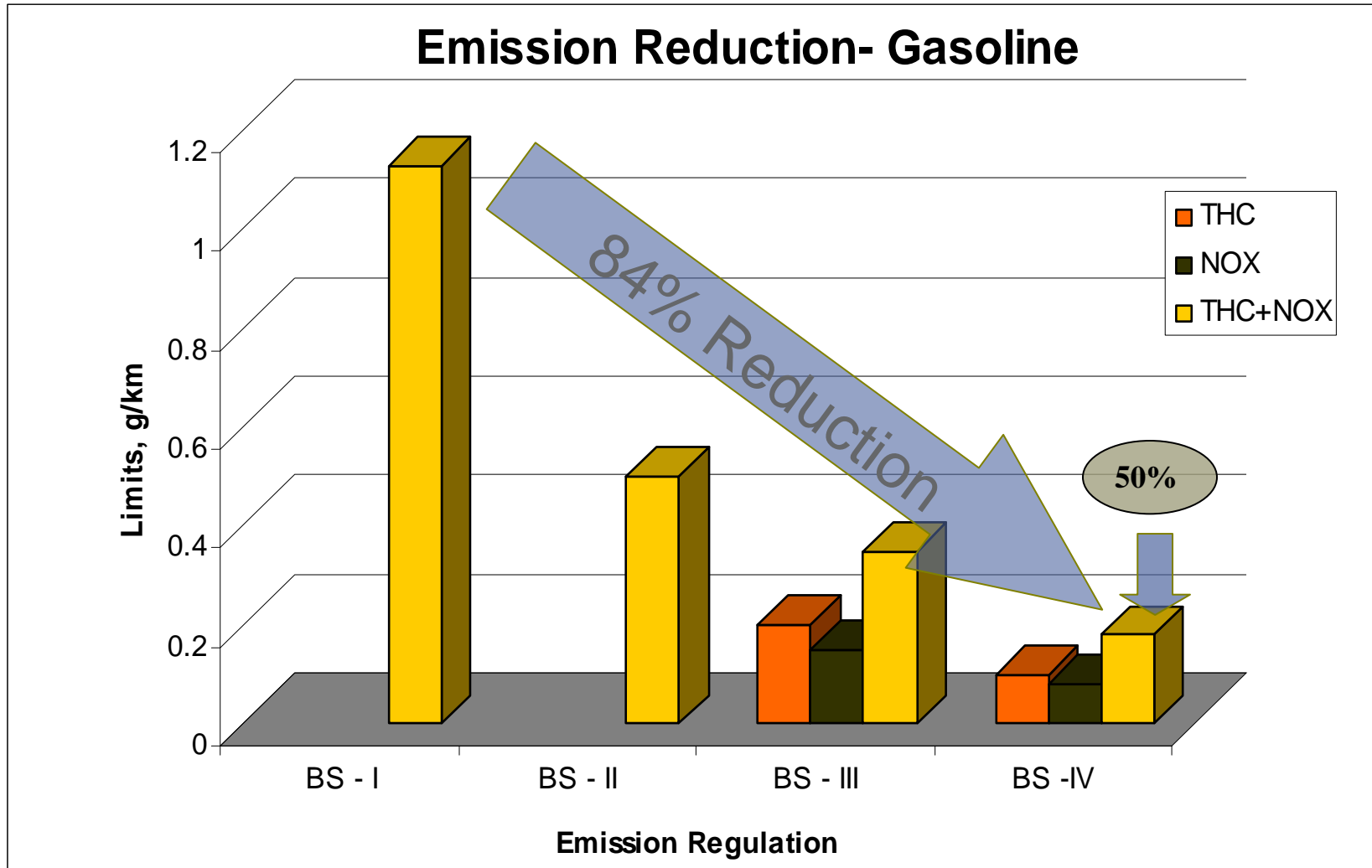
EMISSION REGULATIONS IN INDIA



- ❑ Pre BS to Euro IV in 14 Years (Europe 22 Years)
- ❑ Following European Regulations with a gap of 5 yrs.



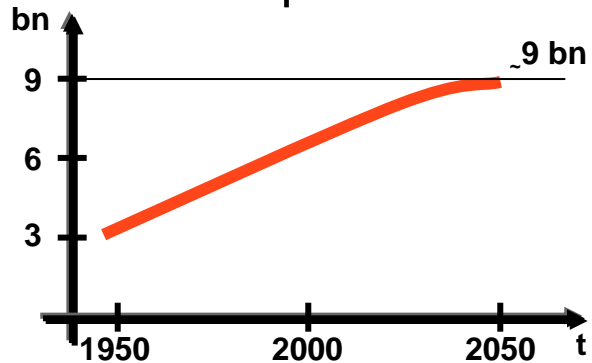
- ❑ Reduction of THC + NO_x by 84 % from BS I Level
- ❑ Reduction of CO by 68% from BSI Level



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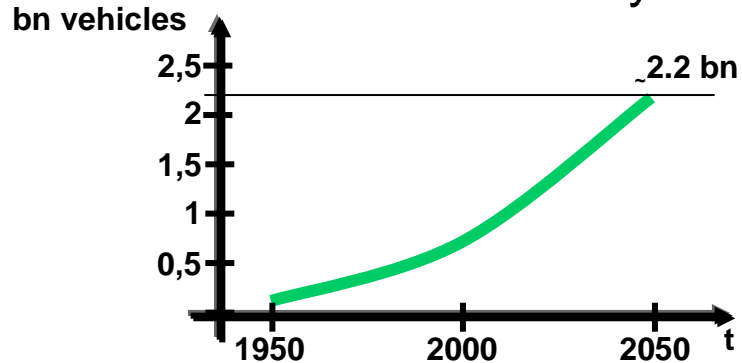
MOBILITY . GLOBAL CHALLENGES AND REQUIREMENTS

World Population



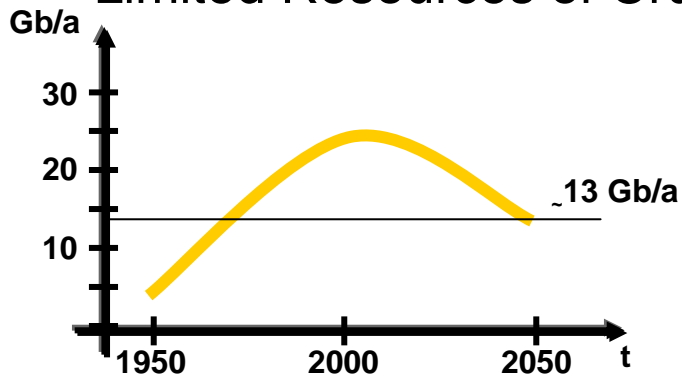
Source: Prognosis UNO

Worldwide Mobility



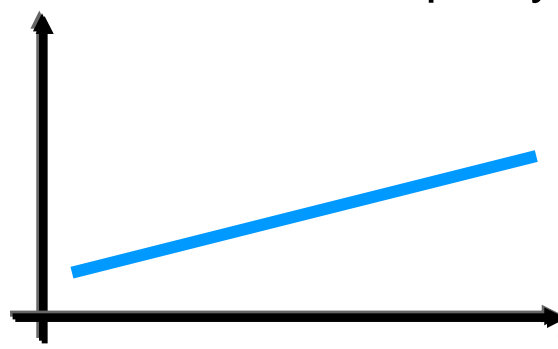
Source: Downs 2002

Limited Resources of Crude Oil



Source: ASPO 2004

Wealth and Prosperity



REQUIREMENTS

DETERMINE THE DEVELOPMENT OF FUTURE VEHICLES

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Global Challenges

FACTS

- Increasing world population
- Increasing energy demand
- Limited energy supplies
- Environmental effects of energy use



CONSEQUENCES

- Development of new technologies
- Efficient use of energy
- Use of all energy carriers
- Use of environment protecting technologies

Requirements for Vehicle

LEGISLATION

- Consumption
- Safety
- Emissions
- Noise

CUSTOMER

- Manufacturing cost
- Driving pleasure
- Operating cost
- Sound



Recycling

Resources

ENVIRONMENT

Main Focus

**Reduction of Emissions (incl. CO₂-Emission)
and Consumption**

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- ❑ India most populous country by 2040
- ❑ 700 million persons below age of 35
- ❑ Over 550 persons below the age of 25
- ❑ India home to 18% of population but 2.42% of area : Mega Cities inevitable
- ❑ 70% of Indians live in Rural Areas: Migration has led to increase in urban population
- ❑ 500 million people would account for 60% of spending in 2025; 60% of vehicles sold in 22 cities
- ❑ Low vehicle penetration

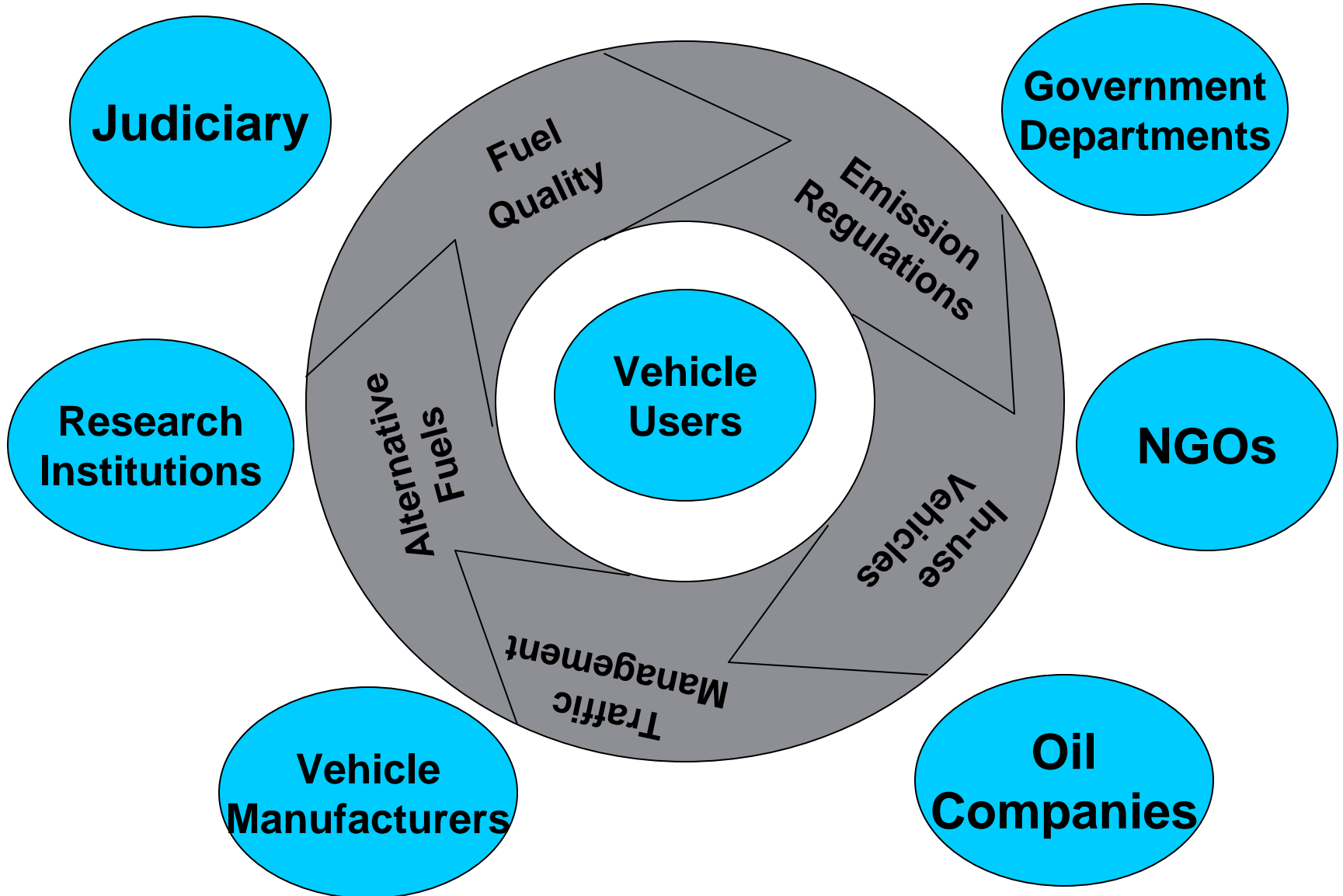


Rapid urbanisation : mega slums, quality of life, social harmony, environmental impact

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- ❑ Habitation Planning & Zoning
- ❑ Integrated Transport (Everywhere to Everywhere)
 - **Investment Planning**
 - **Standardization**
 - **Public Private Partnership**
 - **Create Transport Regulator**
 - **Bus plus other modes**
- ❑ Improve Walking Conditions
 - **Accord priority to walking & NMT**
 - **Develop asset management system for side walks management and maintenance**
 - **Regulator for enforcement of utility works & encroachments**
- ❑ Enhance Institutional, Regulatory & Technical Capacity
 - **Plan Integrated Transit Authority**
- ❑ Automotive infotronics : ITS
- ❑ Access Management

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- ❑ 1. Multiple modes: Rail, Road, Water, Air, Metro
- ❑ 2. Transport in Concurrent list
- ❑ 3. Different jurisdictions
 - Village
 - Town/City
 - Municipal Corporation
 - Transport Department
 - State Highways
 - National Highways
 - Cantonment
 - Boarder Roads

- ❑ Multiple Acts
 - Central Motor Vehicles Act
 - State Motor Vehicles Rules
- ❑ Overlapping Ministries
- ❑ Limited Authority : Eg Overloading
 - Police
 - RTO's
- ❑ Public Road Transport viewed as Buses
- ❑ Need for long term road map for Emissions

TRANSPORTATION

- ❑ Taxes : Excise Duty, VAT, Road Tax, Passenger Tax
- ❑ Roads seen as revenue source
 - Nationalised / Non Nationalised Roads
- ❑ Buses most regulated sector: Fares, wages
- ❑ Modern Buses Expensive
- ❑ States do not have resources
- ❑ Finance not available for small operators
- ❑ Could Telecom Model be applicable ?

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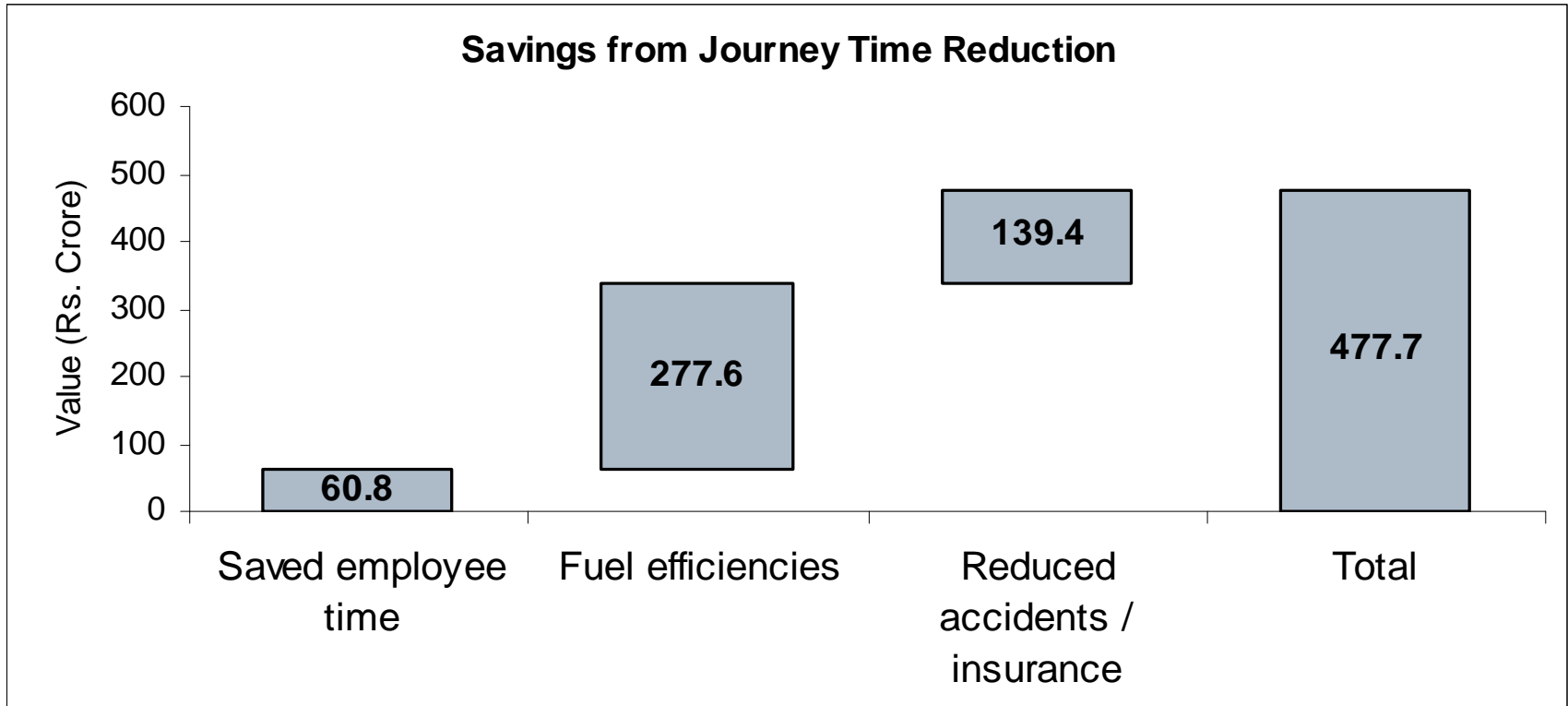
- ❑ Energy security and Global Warming are the two main reasons.
- ❑ In India, Emission Regulations are becoming tighter and so will the Safety Regulations in near future. **This will have some implications on the energy efficiency of the vehicles.**
- ❑ Suitable learning needs to be drawn from the drawback of the similar regulations adopted in Europe, USA and Japan..

- ❑ Per capita consumption of energy is very low with respect to automobile segment.
- ❑ Fuel efficiency has been the major driving force in the automobile market in India.
- ❑ Indian Vehicles have as good fuel efficiency as any in the rest of the world. For two wheelers, it is one of the highest.

Fuel Efficiency only one of the many factors

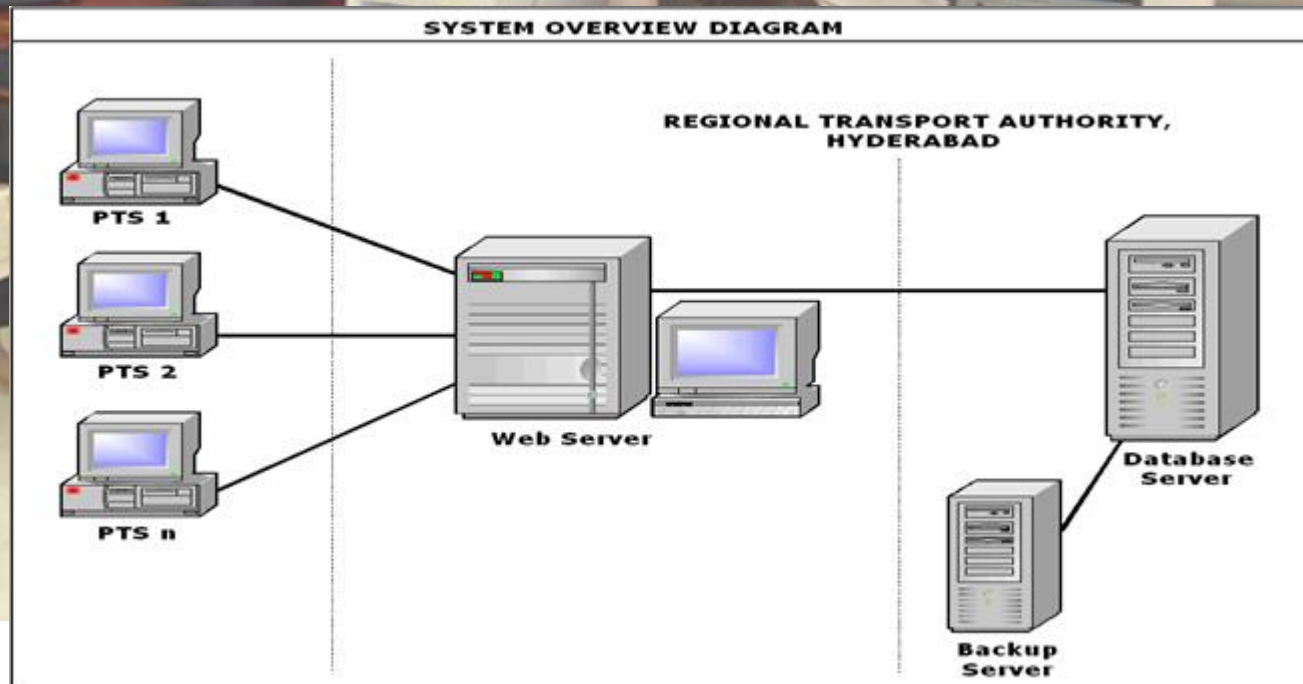
- ❑ Safety Regulations
 - New Safety regulations increases weight of vehicle
 - Mandating Air conditioning would increase consumption
- ❑ Roads : Availability & Condition
 - Frequent braking while driving due to badly maintained road
 - Increase rolling resistance
 - Surface quality of roads – State, Rural
 - Lack of infrastructure increases congestion & reduces speeds
- ❑ Inspection & Maintenance programme
 - Old vehicles on road : Lessons from China, Europe, Japan
 - To check vehicle condition
- ❑ Driving Habits
 - 5-30% of saving could be observed
- ❑ Fuel Adulteration & Pricing
 - Vehicle performance deteriorates
- ❑ Emission Standards : Future Trade offs

Need integrated approach



Pilot Project on Networking

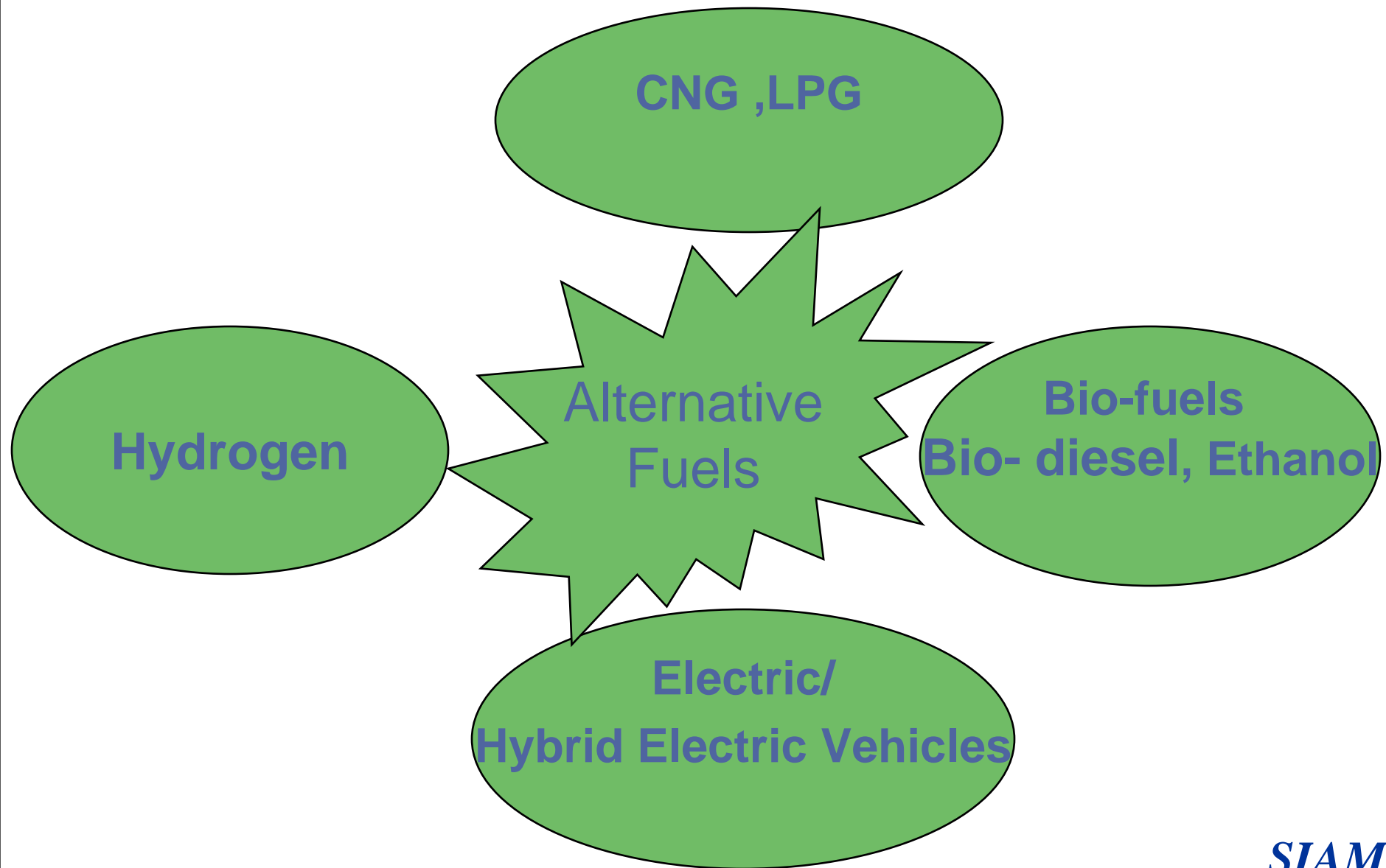
- For data collation & analysis
 - 7 PUC Centres in Hyderabad Networked
 - Launched on 9th January 2004
 - Supported by USAID (United States Agency for International Development)



Congratulate the Government for taking this forward

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PORTFOLIO OF ALTERNATIVE FUELS *SIAM*





Drivers

Enablers

Risk

Time Line

**Investment
Required**

Time Frame	Technology
Short term	<i>Ethanol, CNG, LPG</i>
Medium term	<i>Bio-diesel, EV, HEV</i>
Long term	<i>Hydrogen/ Fuel Cell</i>

- Fuel efficiency norms linked to incentives were there in the 1980's.
- Standing Committee on Implementation of Emission Legislation (SCOE)
 - SCOE has set up a committee to develop FE regulations for India
 - SIAM is a member of this committee
 - SIAM had initiated work on the same
- BEE Initiative & Others
 - SIAM & its members participated in the first meeting
 - SIAM included in the Steering Committee and Technical Committee
- SIAM is participating in all Government/ other meetings on FE

- Look at the current level of efficiencies
- Need a long Term well defined plan
- Should aim at defining
 - Standard criteria
 - Classifications
 - Test cycles
 - Methodology of measurement

- Japanese Example:
 - Target FE regulations set for **2015 in 2004**
 - Consideration on the Technology development for meeting emission regulations of 2009.
- Mandatory vs Voluntary

- Energy security Aspect: Answers will guide the way...
 - How are road maps developed in other countries and what is time frame.
 - What is the consumption of Fuel by auto industry.
 - What is the vehicle parc and vintage
 - What could be the fuel efficiency of old vehicles
 - How much reduction is achievable as a long term goal by reducing Fuel consumption of New vehicles
 - What if old vehicles are phased out
 - What types of fuels are used
 - What if auto industry switch to alternate fuel vehicles. How much will the dependence reduce on Crude oil.
 - Price sensitive market to new and costly technologies
 - Penetration of new technologies in developed markets
 - Alternate to modes of transportation or cargo movement

Should market forces be allowed to operate or regulation would lead to better results

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- ❑ Issues of global warming and local emissions are key challenges that need to be addressed.
- ❑ The solutions are complex and there is no one correct answer.
- ❑ A variety of fuels and mix of technologies would coexist. Fuel quality and vehicle technology are linked.
- ❑ An integrated approach works best : Focusing on new vehicles only will not solve the problem.
- ❑ Infrastructure improvements need to increase dramatically
- ❑ Over time, owner/ Driver action would yield the best results.
- ❑ Develop an effective integrated public transportation system
- ❑ Move beyond transport : focus on city and town

THANK YOU!
DCHENOY@SIAM.IN

S. No	Country / Region	CO ₂ (Mt)			Contribution of Transport (%)
		Total	Power Generation	Transport	
1	World	26,079	10,587	5,112	19.60
2	USA	5,769	2,403	1,759	30.49
3	Japan	1,211	454	252	20.81
4	OECD Europe	4,078	1,409	976	23.93
5	India	1,103	629	98	8.88

Source: World Energy Outlook for the year 2004
International Energy Agency

Total Contribution from Transport in India in Overall CO₂
Emission Worldwide - **0.37%**

- ❑ Size & maturity of the Indian Industry does not permit adoption of all alternative technologies simultaneously
- ❑ - Evaluate various options & growth paths
- ❑ - Identify technologies to be adopted in short, medium & long terms.

- ❑ SIAM Task Force on Alternative Energy Driven Vehicles evaluated various technology options to evolve a time phased road map for introduction of Alternative Fuel Technologies

EVALUATION: ALTERNATIVE TECHNOLOGIES

					Fuel Cell						
	Ethanol	Bio-diesel	EV	HEV	On-board Reformer	Stored Hydrogen	IC-Hydrogen	Solar	CNG	LPG	Conv. Fuel
Scale of 10 rating											
Drivers (*0)	12	13	17	13	14	17	16	20	10	9	7
Enablers (*1)	43-46	36	40	40-43	20	13	24	15	46	43	53-56
Risk (*2/3)	28	26	20	23	9	9	19	3	28	28	30
Time-line (*2/3)	30	26	24	17	6	6	14	3	29	29	30
Investment (*2)	8	7	7	5	2	2	7	1	9	9	10
Weighted Total (120)	98-101	85	83	77-80	34	27	60	21	102	99	113-116

* Means weightage given to each factor