



## Tata Motors Passenger Car Business Unit

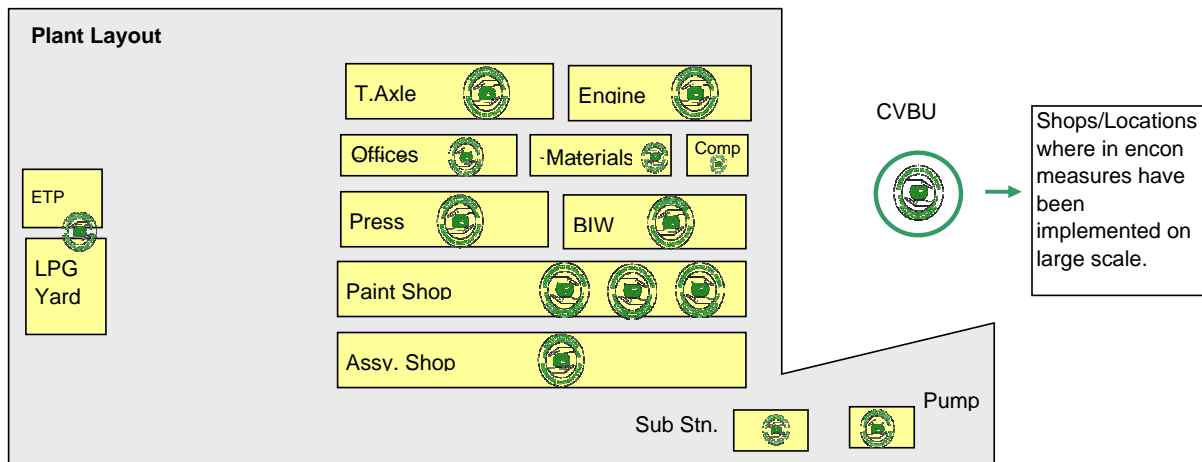


### Unit Profile

- Tata Motors, one of India's largest private sector companies, is the leading commercial vehicle manufacturer with significant presence in the multi-utility and passenger cars segments. The company has an annual turnover of over Rs 80 billion.
- The Passenger Car division was born out of a vision to offer the Indian customer all the comfort of a big car, at the price of a small car.
- The widely successful Tata Indica, a Euro 2 compliant vehicle, is the country's first indigenously designed, developed and manufactured passenger car. In December 2002, the company launched the Tata Indigo, a sedan. It also makes several other passenger vehicles, including the Safari, Sumo and Sierra
- Tata Motors has a strong client following not only in India but also in the Middle East, Asia, Africa, Australia, Europe and America.
- The company has manufacturing plants at Jamshedpur, Pimpri and Chinchwad near Pune, and Lucknow in UP.

### Plant Profile

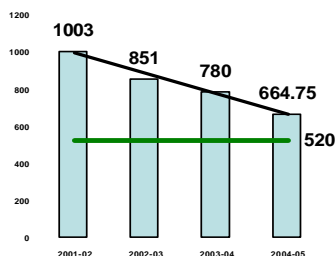
Spread of Plant	- 178 acres.
Production Level	- 126005 Units (2003-04)
Total turn over	- Rs. 2478 Crores
Total shop Sub-stations	- 27 Nos.
Total connected load	- 65 Mw.
Maximum demand	- 15 MVA



## Energy Consumption:

Year	Annual Energy Consumption						Prodn. (Units)	Specific Energy Consumption		
	Electrical		Thermal					Electrical	Thermal	
	Kwh (Million)	Rs (Million)	Fuel Type	Tons/K L	Rs (Million)	Kwh/Car		Kg/Car	Lits/Car	
2000/01	54.86	234.6	LDO	673	9.9	46720	1174	45	14.4	
			LPG	2086	47.37					
2001/02	64.73	262.46	LDO	828	14.7	64541	1003	28.52	12.82	
			LPG	1841	31.2					
2002/03	69.72	282.69	LDO	1052	16.4	81892	851	26.14	12.84	
			LPG	2141	35.7					
2003/04	98.72	399.8	LDO	768	12.3	126005	780	24.47	6.09	
			LPG	3084	52.4					
2004/05	113.53	381.7	LDO	578	13.1	170800	664.75	25.68	3.38	
			LPG	4387	100					

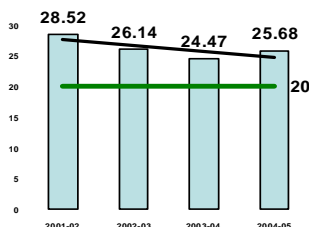
### Car Plants Electricity Consumption (Kwh/Car)



#### 'Encon' Initiatives, 2004-05

- No significant addition to connected load during capacity expansion
- Down sizing and Installation of energy efficient motors
- Installation of Variable Frequency Drives for variable loads
- Installation of energy efficient lighting schemes

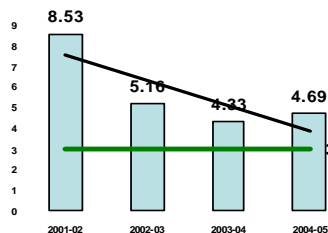
### Car Plants LPG Consumption (KG/Car)



#### 'Encon' Initiatives 2004-05

- Thermography Audits
- Reduction of non useful mass in baking ovens and furnaces
- Use of cleaner fuels for Paint Shop burners
- Combustion efficiency enhancement by optimisation of Air to Fuel ratio

### Car Plants Water Consumption (Cubic Meter/Car)

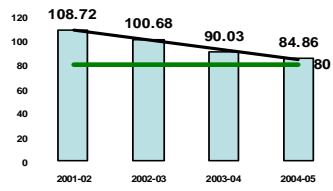


#### 'Encon' Initiatives 2004-05

- Rain Water Harvesting
- Recycling of Paint Booth Water
- Leak detection and prevention programme

### Car Plants Compressed Air Consumption (Kwh/Car)

### Car Plants Compressed Air Consumption (Kwh/Car)



#### 'Encon' Initiatives 2004-05

- Need based operation of PCBU/CVBU Compressors
- Leak detection and prevention programme

## Energy Conservation Commitment, Policy and Organizational Setup:

### Energy Policy:

We, at Tata Motors, are committed to optimum use of Energy and Fuel.

1. By using Energy Efficient Alternatives, methods and Eco-friendly Technology, by adopting diligent & effective maintenance & work Practices to ensure quality & reliable supply.
2. To minimize and eliminate the wastage in every segment of operations.
3. To make an effort to continuously reduce the cost of service by adopting effective "Energy Management System".

### Environment Policy:

#### ENVIRONMENTAL POLICY

TATA Motors reaffirms its commitment to minimize the adverse impacts of its products, operations and services on the environment.

Towards this end, it shall strive to:

- Establish sound environment objectives and targets & a process of reviewing them.
- Comply with all applications legal / regulatory & other Environment requirement.
- Reduce the emission levels of vehicles in full compliance of the regulatory norms & proactively work with the industry, Government, other related industries & agencies to bring in international practices.
- Use of environmentally sustainable technologies & practices for prevention of pollution and the continual improvement in environment performance.
- Conserve natural resources and energy by minimizing their consumption & "wastage.
- Minimize wastage generation, enhance recovery & recycling of material and develop Eco-friendly wastage disposal practices.
- Building awareness of our work force, customers and vendors on Environment issues.

This policy is communicated to all our employees and made available to public / stake holders on request.

Ratan N. tata  
Chairman 2001

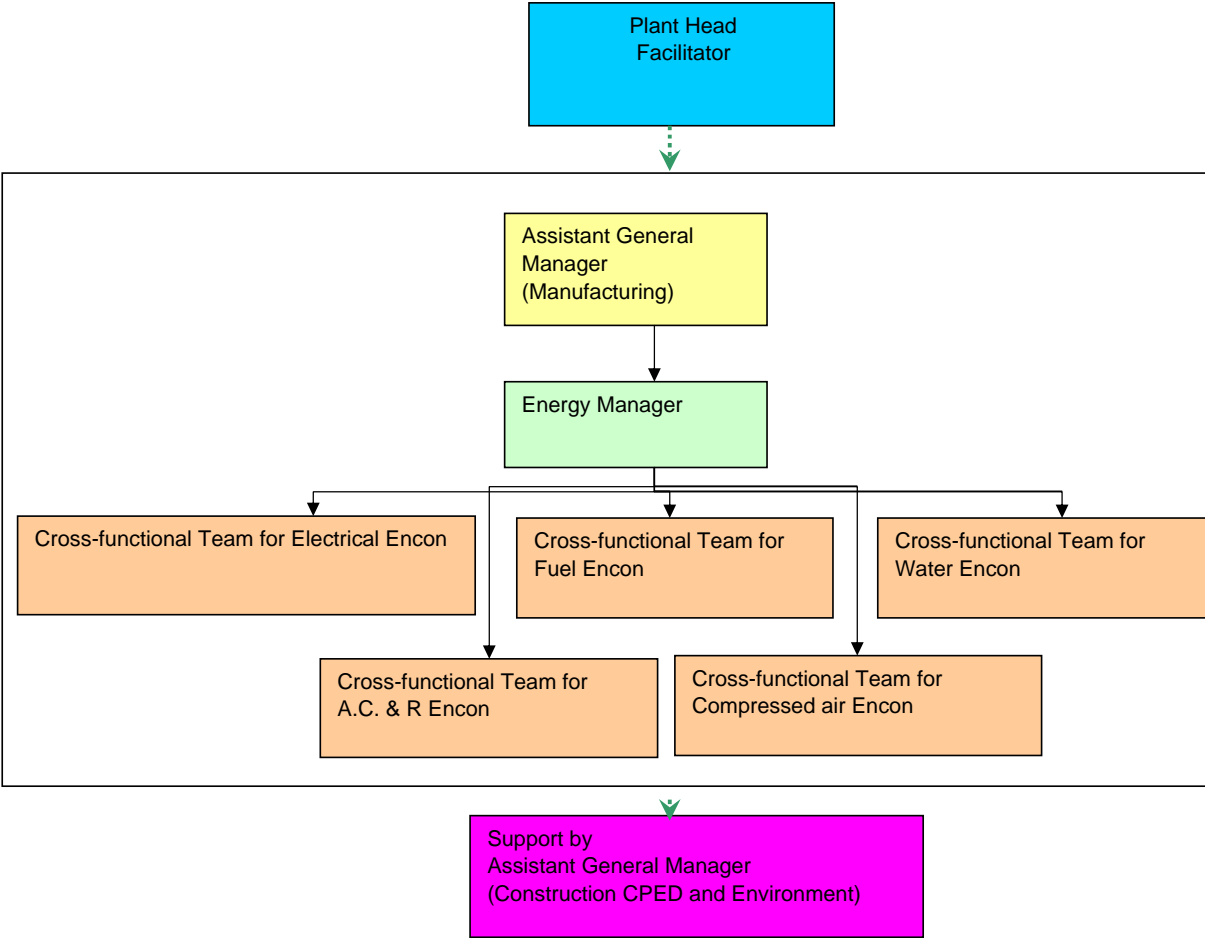
### TATA CODE OF CONDUCT

#### Section (8) – Health Safety and Environment

" A Tata company shall strive to provide a safe and healthy working environment and comply, in the conduct of its business affairs, with all regulations regarding the preservation of the environment of territory it operates in.

A Tata company shall be committed to prevent the wasteful use of natural resources and minimize any hazardous impact of the development, production, use and disposal of any of its products and services on the ecological environment."


Encon Cell Constitution



Energy Conservation Achievements

Passenger Car Business Unit bagged 'Excellent Energy Efficient Unit Award' consecutively for 2001-02 and 2002-03 at National Level competition organised by Confederation of Indian Industries (CII) along with 'Most Useful Presentation Award' for 2002-03. Unit received CERTIFICATE OF MERIT AWARD, for 2003-04 from BEE at the hand of Honorable Prime Minister of India Dr. Manmohan Singh.

## Encon Details

	Year	Encon Projects Implimented (Nos)	Investment Made (Rs Lakhs)	Savings Achieved (Rs Lakhs)	Specific Consumption		
					Electricity	LPG	LDO
					KWH/Car	Kg/Car	Lits/Car
	1999-00	11	334	1055	1387	47	16.76
	2000-01	33	61.5	244.2	1174	45	14.44
	2001-02	28	6.6	119.9	1003	28.5	12.82
	2002-03	33	100	124.7	881	26.1	12.84
	2003-04	25	554	297.7	780	24.5	6.09
	2004-05	08 (Technology Upgradation)	13680.34	807.93	664.75	25.68	3.38

### Major Encon Projects Implimented during 2004-05

#### 1. Installation of Energy Efficient Motors

Location: Paint Shop Air supply Units and Humidification Pumps

Project Duration: Sept 2004 to March 2005

Project Description: Down sizing and Installation of Energy efficient Motors at 21 different applications



Savings Achieved: 1995 Kwh/day (I e 3 Kwh/Car for prodn of 650 Cars/Day)  
of motor rating to the load and use of High efficiency Motors)

(As a result of match

Investment: 60 Lacks Pay back period: 2.5 Years ( Annual saving of 2464323)

#### 2. Reduction in specific consumption of all energy elements by cycle time improvement

Location: All processes in Paint Shop

Project Duration: April 2004 and Dec 2004

Project Description: Installation of Robots and replacement of conveyors for enhancement of through put time in Paint Shop

Savings Achieved: 18200 Kwh/Day (I e 28 Kwh/Car for 650 Cars/ day)

Investment made: 5400 Lacks (Capex budget for 750 Cars/day)

Payback period: 2 years



Robotic Painting to reduce cycle to 67 seconds from earlier 86 seconds



#### 3. Installation of single parabolic dark light reflectors

Location: Canteen, Conference halls and offices

Project Duration: Nov 2004 and Dec 2004

Project Description: Conversion of 2\*40 W tube lights to 1\*40 W tube lights keeping the illumination level constant with the use of high efficiency tube light reflectors

Savings achieved: 120 Kwh/Day (I e .16 Kwh/Car for the production level of 650 cars/Day)

Investment made: .34 Lacks

Payback period: .25 years

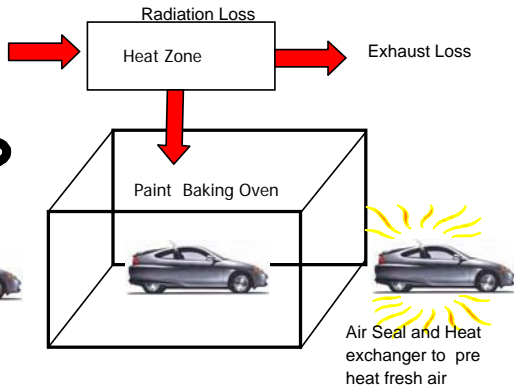
**Inhouse Thermography : An innovative way of Energy Conservation**

Project Title :

**Inhouse Thermography : An innovative way of Energy Conservation**



Air Seal and doors



Paint baking ovens in Indica Paint Shop were equipped with Airn seals and doors at both Oven entry and Exit t take care of heat loss taking place from both places.

To identify and areest the heat loss taking place through radiation from oven walls was a challenge as the surface area is large and some of the areas were not accessible.

Innovative way to identify weak insulated areas on oven walls :

Use of Thermal Imaging Camera to identify weak insulation areas and therby arrest the same by attending leakages and replacing worn out insulations

Savings Achieved: 63 Tons (LPG) ie @ 10 Lakhs Ruppees

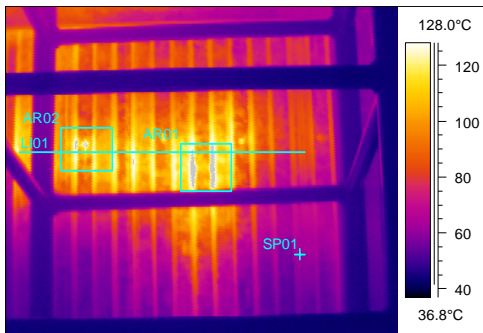
Please see the photographs attached on Next Sheet:

**Paint Baking Oven:**

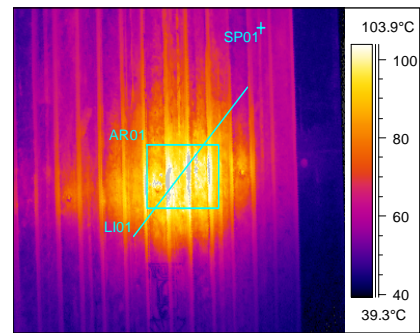


Wall of Oven when viewed through naked eyes

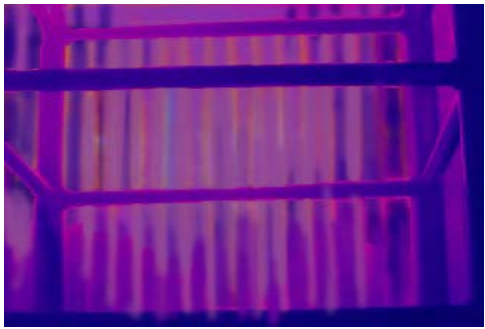
Wall of Oven when viewed through thermography camera



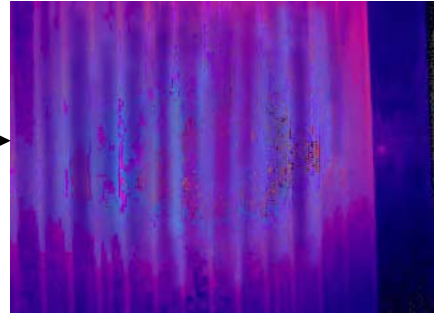
Location Descriptions:- Paint Shop Surfacer Paint Oven/ Heat zone-1 (north side) AR01 Temperature (max.)137.3°C  
 Observations:- AR01 & AR02 are showing the hot zones on right side middle portion.  
 SP01 shows the normal temperature observed on the shell which is 60 °C



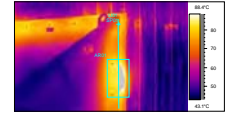
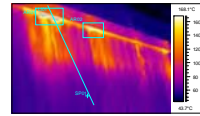
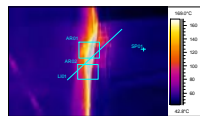
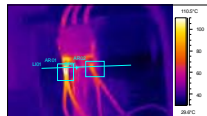
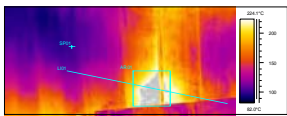
Location Descriptions:- CED Oven HZ-1 / East side  
 AR01 Temperature (max.)113.6°C  
 Observations:- AR01 shows a localized hot spot, where as the normal temperature observed on the same surface is around 60°C only.  
 Corrective Measures:- Attended the welding leakage and replaced the lining



Wall of oven when viewed through Thermography camera after attending the insulation and replacing the worn out insulation

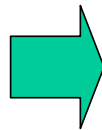


Some more thermography images taken across the plant:



Project Title :

**Conversion of LDO fired Hot Water Generators to LPG fired ones**



On LDO supply before conversion

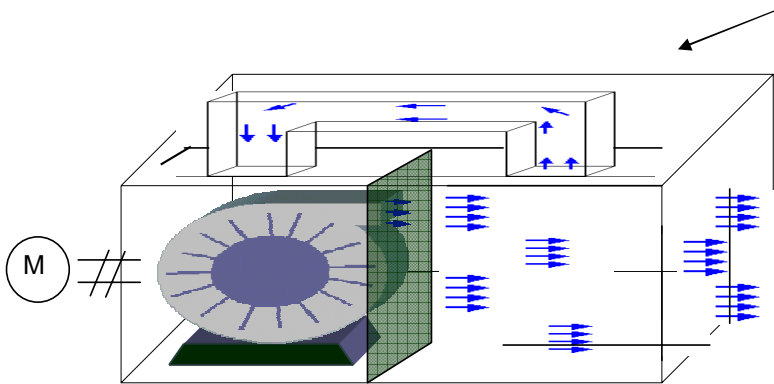
On LPG supply after conversion

LDO	Cost Comparison	LPG (Propane)
10200	Kcal/Kg	10900
18.5	Fuel Cost (RS/KG)	17.0
171	Fuel Cons (KG/HR)	156.38
5694254	Fuel Cost per year	4785238
1016	Elect cost per year	0
5695270	Expenses per Year	4785238
	Annual Saving/Gen	910032
	Net Saving for 5 Gen/year	Rs. 4550160.00

Net Annual Saving achieved after conversion of 5 generators on LPG supply: 45 Lakhs  
 Other environmental benefits achieved are:  
 No soot formation as LPG is cleaner fuel than LDO  
 No need to maintain separate stock of LDO as it is not required elsewhere in plant  
 Elimination of LDO pumping cost

Project Title :

**Installation of Variable Frequency Drives for Paint Booth Blowers and Pumps**

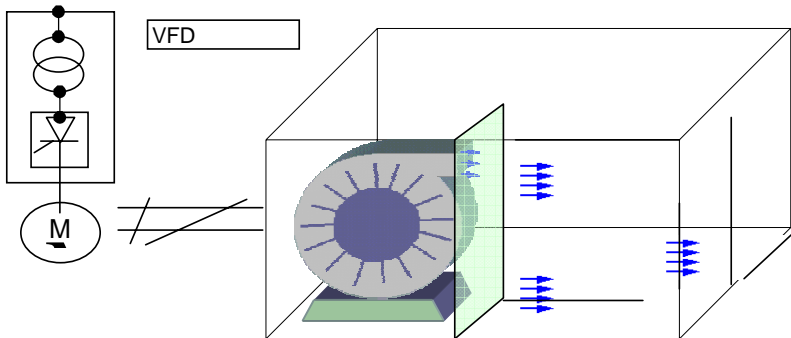


Bypass damper : Resulting in waste of energy as part of air is recirculated to control the output.

Before VFD installation

Air Supply Blower with Bypass damper to control the flow of air in Paint Booth

**Use of VFD resulted in to enormous energy saving as output air is controlled by controlling the speed of the blower**



After VFD installation

Total Applications Selected	25 Nos.
Total Savings Achieved	454 Kwh
Annual Saving ( 12 Hrs.per day for 300 working days )	1634400 Kwh
Annual Savings in Rupees ( Rs. 4.08 / Kwh )	Rs. 6668352
Total Investment	Rs. 65 Lakhs
Pay Back period	11 Months
Savings Per Car ( For 1,30,000 cars/ Annum )	Rs. 52/-

**Energy Conservation Plans and Targets**

**Encon Plans**

Energy Conservation Measures (Planned)	Anticipated savings in		Approx. investment (Rs.lakhs)	Project Commencement & Completion year
	Energy Value (specify units)	Rs. Lakhs		
1) Conduct Third Party Energy Audit	400000 Kwh	16.2	20	2005/2006
2) Extensive use of Thermography audits for	180000 Kg (LPG)	36	Investment already made in 2004/05	2005/2006
3) Implementation of various cycle time reduction projects.	6000000 Kwh 300000 Kg (LPG)	303	Investment already made in 2004/05	2005/2006
4) Installation of Asian E Tubelights	1600 Kwh	0.07	1	2005/2006
5) Implementation of various power supply quality enhancement	180000 Kwh	7.29	1	2005/2006

**Encon Targets**

Year	Electrical*	Thermal*	Reduction over the year 2003-04	
			Electrical%	Thermal%
2004-05 (Base year)	664 Kwh/car	26 Kg/Car	-	-
2005-06	531 Kwh/car	21 Kg/Car	20%	20%
2006-07	425 Kwh/car	17 Kg/Car	40%	40%

**Environment and Safety**

## Environment and Safety

### List of major environmental improvements made during 2000-05

Tata Motors has led the Indian automobile industry's anti-pollution efforts by introducing cleaner engines. It is the first Indian company to introduce vehicles with Euro Euro II norms and I. Its joint venture with Cummins Engine Company, USA, in 1992 was a pioneering effort to introduce emission control technology in India.

Tata Motors has set up effluent treatment facilities to avoid release of polluted water into the environment. In Pune the treated water is conserved in lakes that attract various species of birds from around the world, thus turning the space into a green belt.

The company's endeavors in environment protection include soil- and water-conservation programmes and extensive tree plantation drives.

At Tata Motors, carrying out process changes for improving our environmental performance is continuous process. Top Management commitment to ensure that our operations have the least environmental impact is reflected in our Quality Policy signed by our Chairman Mr. R. N. Tata.

#### QUALITY POLICY

Tata Motors is committed to maximizing customer satisfaction and strives to achieve the goal of excellence, by continual improvement, through ongoing design and development, manufacture and sale of reliable, safe, cost-effective, quality products and services of international standards, using environmentally sustainable technologies, for improving levels of efficiency and productivity within its plants and ancillaries.

Tata Motors also has commitment towards improving the quality of life of its employees, both within and outside its plants and offices, through improved work practices and social welfare schemes.

Ratan N. Tata

Chairman December, 2000

Our 'Quality Policy' underlines our commitment to the manufacture of quality products using "environmentally sustainable technologies".

The 'Environmental Policy' makes specific commitment to prevention of pollution and management review of the environment management system.

#### ENVIRONMENTAL POLICY

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Towards this end, it shall strive to:

- Establish sound environment objectives and targets & a process of reviewing them.
- Comply with all applications legal / regulatory & other Environment requirement.
- Reduce the emission levels of vehicles in full compliance of the regulatory norms & proactively work with the industry, Government, other related industries & agencies to bring in international practices.
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On this background of management of management commitment to pollution prevention and environment protection, Tata Motors is constantly striving to set new standards in the environmental performance of its products and processes.

#### LIST OF GREEN INITIATIVES FOR PRODUCTION:

·Oven exhaust from paint baking operations is burned in LPB fired ‘Thermal Exhaust Air Incinerators’, for complete combustion of Volatile Organic Compound (VOCs) and other un-burnt hydrocarbons in the oven exhaust, before discharge in atmosphere

·The painting setup (Booth, Oven, Automatic Painting Machines etc) installed is suitable for both solvent and water based painting process. A complete switch over to water based paints is planned when water based paints of required quality can be procured in sufficient quantities from indigenous paint manufacturers

·The application of primer electro-coat on car bodies is carried out through ‘dip’ type cathodic electro – deposition (CED) process. Paint transfer efficiencies of the water based CED paint are highest for ‘dip type painting processes’, which ensures resource conservation and minimal waste generation

·‘Heat Wheels’ are installed for recovering waste heat from exhaust air

·LPG, a cleaner burning fuel with low SO<sub>2</sub> emissions is used for majority of the process heat requirements

·The effluent treatment technology includes high rate DSM screens, Parallel Plate Separator (PPS) type- oil water separators and clariflocculators, trickling filters with special plastic packing media with large surface area and centrifuge for sludge handling. Tertiary treatment is given to the treated waste-water in the Recycling Plant by means of pressure sand filter, activated carbon filter and de-mineralisation plant

·Designed and implemented water recycling system for Paint Booths & Pre-treatment plant

·Use propane a much purer in place of LPG from November 2002

·Eliminated use of Glass fiber bag filters by replacing with synthetic media

·Installed Thinner recollection system for Paint booths in June 2002. This has eliminated contamination of atmosphere and water

·Use of Vermiculture for decomposing decompose organic food waste, turning the waste into a nutrient-rich material capable of supplying necessary nutrients to help sustain plant growth. This method is simple, effective, convenient, and noiseless. It saves water, energy, landfills, and helps rebuild the soil. The worms ability to convert organic waste into nutrient-rich material reduces the need for synthetic fertilizers.

Nature’s ability to complete the life cycle process gets violated when we send food down the garbage disposal, or bury it in a landfill. We deplete the soil and deprive nature from rehabilitating itself when we bypass this natural life cycle recycling process.

Tata Motors developed vermiculture bed in January 2003, and is now being used for processing various organic wastes generated in plant.

These recycling activities have the unique feature of having a positive social impact also, as they are managed by Co-operative Societies, created with the intention of providing employment to needy relatives of our employees

·Retrofitment of LDO fired Hot Water Generators to that of LPG fired ones with the help from M/s Thermax Ltd the OEM of Hot Water Generators. Initiative has resulted in to considerable reduction of Total Particulate Matter (TPM) being exhausted from the chimneys of Hot Water Generators.

· Developed Petrol and Diesel engines for the Indica platform with enhanced performance meeting Euro III with EOBD (European On-Board Diagnostic) and development of Engines meeting Euro IV norms with common rail technology for Diesel Engines is in progress.

Additional projects for Petrol Engines to meet Euro IV emission norms are also in progress.

·Rain Water Harvesting project implemented at Car Plant with an investment of 1.5

lakhs ruppees resulted in to saving of precious water resource. Company could able to harvest 48200 meter cubes of water in financial year ending on 31 st March 2005.

**List of Certifications (ISO-9000/14000), Encon, Environment, Quality, Productivity and other Awards won during 2000-2005**

Tata Motors PCBU Car Plant received ISO 9001:2000 and ISO 14000 Certification by BVQI in July 2003

**PCBU Car Plant won the prestigious Certificate of Merit award for the excellent work in Energy Conservation in Automobile sector from BEE at the hands of Honorable Prime Minister of India, Dr Manmohan Singh for its commendable work in 2003-04.**

**. Tata Motors PCBU received prestigious "Excellent Energy Efficient Unit" Award during the National level competition held by CII in November 2003, company also bagged Best Presentation Award on the rating given by all other participating companies.**

Tata Motors received the first CSIR Diamond Jubilee Technology Award for Indica Car for 2004-05

Tata Motors received the 'Company of the Year' Award as part of the Economic Times Award on Corporate Excellence.

Tata Motors received the 'Car Maker of the Year Award' for 2004-05

The ICICI Bank and Overdrive Awards, 2003, voted Tata Indigo as the 'most exciting new car' of the year

·The Tata Indigo was adjudged the 'best value for money car' at the prestigious CNBC Auto Car Auto Awards 2003

·The Tata Indigo was adjudged the 'best value for money car' at the prestigious CNBC Auto Car Auto Awards 2003

·Tata Indica won the 'voice of the customer award' for 'best diesel small car' at NFO Automotive India 2002

**· Tata Motors PCBU Car Plant received the prestigious ' Excellent Energy Efficient Unit' Award in CII's National level competition held in December 2002.**

·The Center for Science & Environment (CSE), New Delhi initiated a "Green Rating of Indian Industry Project" for Automobile sector in 1999. The purpose of the same was to benchmark Indian Automobile industry for its environment friendliness taking in to account manufacturing process and product. The final rating was made public by Dr. Manmohan Singh, Ex- Finance minister in October 2001. Tata Motors has been placed in overall 12th position among the 26 participating companies, with a rating of ' Two leaves' which is the same as average industry rating, the highest industry rating awarded is 'three leaves'

· Tata Motors, Pune received the 'MCCIA-Dr. R J Rathi Award' for 'Environmental Pollution control in Industry' for the year 2001

· The Technology Development Board of the Department of Science and Technology, Government of India, recognized the indigenous development and successful commercialization of the Indica car by awarding Tata Motors the 'national award for successful Commercialization of indigenous technology by an industrial concern' for 2000

· Tata Motors received the 1999 national award for R&D efforts in the mechanical engineering industries sector

· Tata Motors was awarded the EEPC regional top exporter's trophy

· Tata Motors received the 'all-India trophy for highest exporter' 1998-99 in the capital goods exporters (non-SSI) category