



# HYUNDAI MOTOR INDIA LIMITED

## Sriperumbudur, Tamil Nadu

### Unit Profile

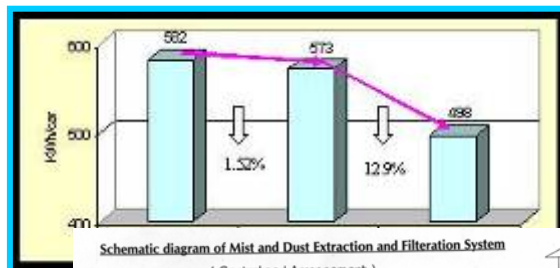
HMIL, which commenced commercial production in Sept.1998, is the second largest Automobile Company in India producing **Santro, Accent, Elantra, Sonata & Terracan cars including the newly launched car "Getz"**. HMIL is a 100% subsidiary company of Hyundai Motor Company, South Korea, which is globally positioned at **7<sup>th</sup> rank**. The annual sales turnover is over **Rs.5,700 crores** and market share is **about 25%** in small, medium and Luxury car segments. At present HMIL has an enhanced production capacity of 250,000 cars per annum after plant expansion and the capacity utilisation in year 2003~2004 was about **114 %** with production capacity of 150,000 cars per annum.

Our cars are exported to most of the countries in Europe, Latin America & Asia

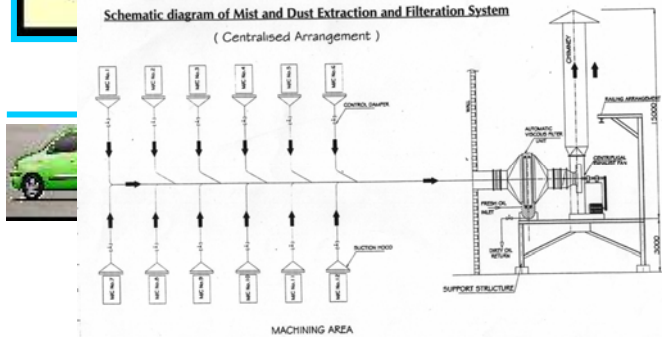
### Energy Consumption details:

DESCRIPTION	UNIT	2001-02	2002-03	2003-04
Annual car production	Nos	93,888	112,527	171,136
Total Electrical Energy consumption/annum	Lakhs KWh	546.75	644.42	852.56
Specific Energy consumption-Electrical	KWh/car	582.35	572.68	498.18
Total Thermal Energy consumption/annum	Million Kcal	26,922.86	31,692.3	40,327.47
Specific Energy consumption-Thermal	Million Kcal/car	0.2868	0.2816	0.2356
Total Manufacturing Cost	Lakhs Rs	290,719	274,093	422,134
Total Energy cost	Lakhs Rs	2,953.74	3,564.51	4,618.538
Energy cost as %age of Total Manufacturing cost	%	1.02	1.30	1.09

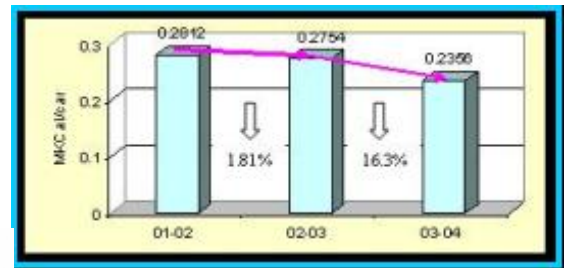
### SEC REDUCTION - ELECTRICAL



Schematic diagram of Mist and Dust Extraction and Filtration System (Centralised Arrangement)



### SEC REDUCTION - THERMAL



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## REDUCTION IN SPECIFIC ENERGY CONSUMPTION OVER 2001 ~ 2002

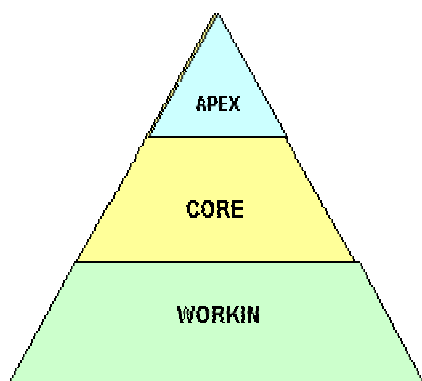
- SEC has reduced in spite of construction of new shop floors and expansions including additional power & lighting

- a) Does your organisation have an Energy Conservation Cell?
- HMIL has constituted Encon cell in the year 2000
- b) If yes, who heads the EC Cell? Whether energy conservation is his exclusive or additional responsibility? To whom he is reporting?
- Energy Manager heads the Encon cell. In addition to Operation & Maintenance of Electrical Utility system, Energy Manager holds the responsibility of Encon cell. He is reporting to the Sr.GM (Production) who is the plant in charge.
- c) Give salient features of EC Cell's constitution, functions, amount of finances available, achievements, future plans and strategy followed to implement energy conservation/ efficiency programmes and policies, etc.

## Energy Conservation Commitment, Policy and Set up

HMIL is committed to Total Energy Management and prevention of energy wastage. Because of this commitment, Encon features have been incorporated in the design stage itself and also there have been continuous efforts to reduce the energy consumption right from the date of commissioning of the plant. HMIL's **Energy Management Policy** reflects its commitment towards Encon Mission & its plan to achieve the mission set.

### ENCON SET UP



- ◆ **Apex group**
- ◆ Indicates the involvement and commitment of the top Management.
- ◆ Supports & encourages Encon activities.
- ◆ Comprises of MD, President, DyMD and all Directors.
- ◆ **Core group**
- ◆ Comprises of middle level Management includes all Dept.Heads
- ◆ **Working group**
- ◆ Comprises of co-ordinators from various Departments at all levels.
- ◆ They identify the problems, look for continuous improvement, conduct brain storming discussions, arrive at remedial measures and implement the same by involving all employees.
- ▲ The performance is monitored continuously reviewed

The above groups work in *close co-ordination* to achieve the end result of Energy Saving.

Hyundai Motor India believes not only in implementing latest Energy Conservation



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techniques to achieve the target but also to sustain the same by providing adequate training and awareness on the project implemented. The Encon activities are monitored by a well structured set up called energy cell. The cell continuously monitors the Encon activities of the company and reports the achievements to the top management on periodical basis.

## Energy Conservation Achievements -

During the period 2001 – 2004, HMI HMI implemented **95** energy saving proposals generated through Energy audits and employee suggestion schemes. Total saving of **Rs. 633.70 lakhs** was achieved with an investment of **Rs.283.10 lakhs** with a payback period of **6 months**. This has resulted in a reduction of **14.45%** in Specific Energy Consumption over last three years.

The major Projects implemented during 2003 ~ 2004 are given below.

### 1. Installation of power factor improvement capacitors in shop floors (LT) & Main Sub Station (HT)



#### BACKGROUND :

- Statutory regulation is to maintain the power factor  $> 0.9$
- HMIL maintained p.f. at  $0.94 \sim 0.95$
- Additional machineries were installed in phased manner for increased production

#### OBSERVATION :



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- System p.f. was becoming lower than 0.94
- There was no p.f.improvement capacitors in Body shop

#### ACTION TAKEN:

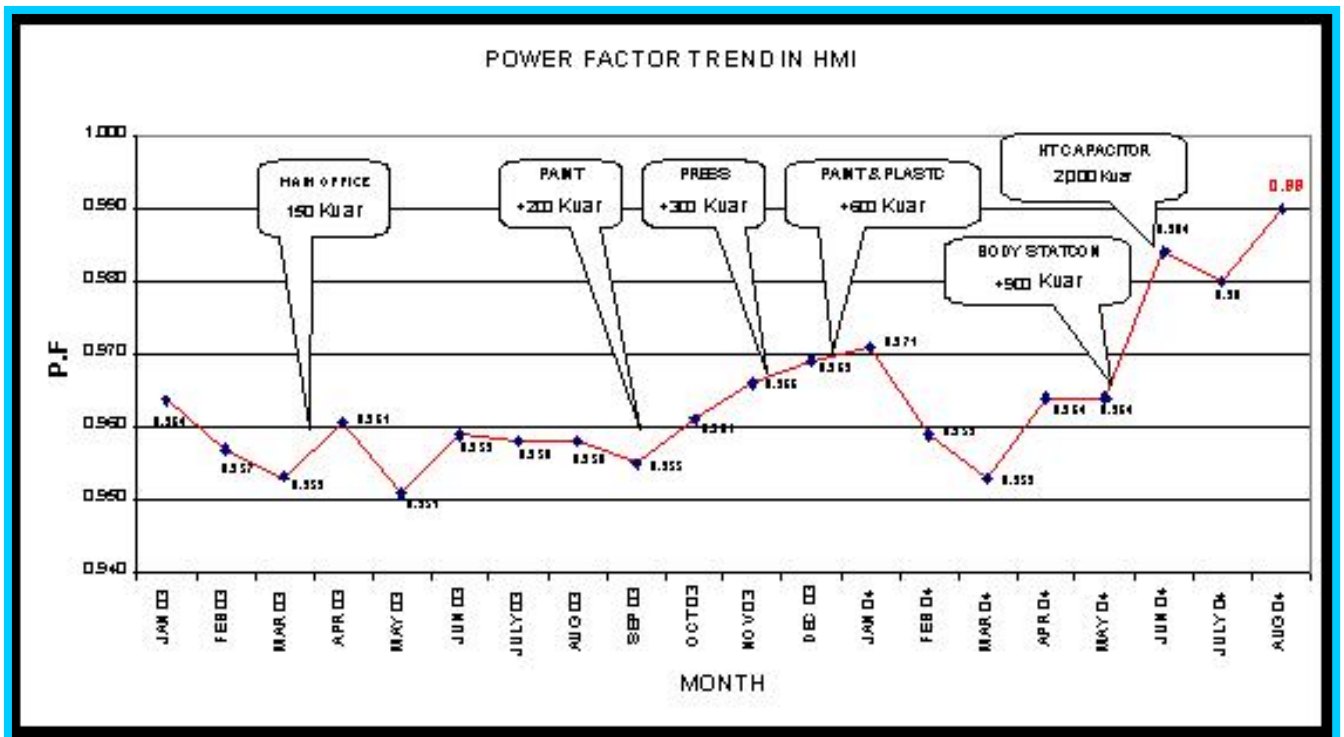
- Installed p.f.improvement capacitors in various shop floors such as Paint shop, Bumper Paint shop, Press shop and canteen.
- “STATCON” p.f. improvement capacitors (900 KVAR) were installed in Body shop
- 2,000 KVAR HT capacitor was installed in 11 KV sub station.
- System p.f.is being maintained at 0.98 ~ 0.99
- Apart from saving in losses, HMIL is benefited by incentive for maintaining p.f.above 0.95

#### PAYBACK:

- Annual savings (cost saving as incentive) : Rs.93.67 lakhs
- Investment made : Rs.84.14 lakhs
- Payback : 11 months

#### IMPACT

It was observed that the p.f.improved from 0.94 ~ 0.95 to 0.98 ~ 0.99 (refer p.f.graph)



2. Illumination improvement in shop floors by installing high lumen fluorescent lamps, high lumen metal halide lamps & providing Stainless Steel reflectors to Fluorescent lamps.



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**BACKGROUND :**

- Less illumination in shop floor working areas and inspection areas
- Lead to fatigue and lesser productivity.
- Affected Quality of product.



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### OBSERVATION

- It was observed the shop floor lux level for general lighting was poor at 80 and inspection line lux level was at 450 against above 180 and 700 lux respectively

### ACTION TAKEN:

- Installed of 1,307 nos stainless steel reflectors in twin tube light fittings to obtain better illumination in inspection lines
- Replacement of 159 nos 400 W high lumen metal halide lamps and avoiding additional installation of 40 nos metal halide lamps in shop floors
- Provided 901 nos Energy efficient lamps in fluorescent lamps for better illumination
- This avoided installation of additional light fittings and in turn avoiding additional power consumption.

### PAYBACK:

- Annual savings : Rs.10.03 lakhs
- Investment so far : Rs.6.5 lakhs
- Payback : 8 months

### IMPACT

It was observed that the lux level was increased to the recommended value

## Energy Conservation Plans and Targets for 2004 ~ 2005

Future plans of Energy conservation in HMIL include the following.

Sl.No.	Plan	Annual Saving			
		Lakh KW/h	Gas (m <sup>3</sup> )	HSD (KL)	Lakh Rs
1	Installation of VFD for ASU fans	1.36			21.33



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2	Installation of VFD for Treated Water Pump	0.09			0.45
3	Installation of Lighting energy savers to shop floor lighting panels	2.36			11.11
4	Reducing the specific energy of compressed air generation	7.70			34.80
5	Down sizing of Body shop cooling tower pumps	0.92			4.19
6	Reducing the speed of cooling fans of ovens	1.15			5.20
7	Down sizing of motors with Energy Efficient Motors	1.74			7.88
8	Energy saving by proper leakage management	2			9.20
9	Del-star for under loaded motors	0.42			2.00
10	Reducing exhaust losses	1.67	86.61		16.93
11	Improve the combustion efficiency of Heat Treatment furnace		200.17		21.66
12	Improving the combustion efficiency of burners in Paint shop		43.30		4.68
13	Revamp the insulation of Al.melting furnace no.1			23.8	4.00
14	Increase the loading of the melting furnace			33.06	5.59
15	15 MW Captive Power Plant	163.04			600.00
16	Providing 400 nos. Energy efficient lamps in florescent lamps for better illumination	0.83			3.07
17	Replacement of 600 nos conventional chokes with electronic choke in florescent lamp fittings	0.35			1.28
18	Variable Frequency Drive for AC plant AHU chiller pumps in Main Office	0.18			0.67
<b>TOTAL</b>		<b>183.81</b>	<b>330.08</b>	<b>56.86</b>	<b>754.04</b>

By adopting the above Energy Conservation measures, HMIL will be able to achieve the set target SEC of 473 KWh/car

## MAJOR ENVIRONMENTAL IMPROVEMENTS MADE DURING 2001- 2004

HMI management considers Safety, Health and Environment (SHE) as the key factors for its



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success. We have related Safety, Health & Environment with Production and Productivity and with our positive approach towards Environment, we have achieved the desired level of Environmental Standards in HMI.

With continuous thirst towards becoming the World's best environment friendly company, we have taken appropriate measures to keep pollution away from our premises by ensuring clean and green environment, by investing on eco-friendly products & systems and by fulfilling the Central and State Pollution Control Board norms on environment.

#### a) Infrastructure Facilities:

- Installed a full-fledged **Wastewater Treatment Plant** of capacity 1,400 m<sup>3</sup>/day with an investment of **Rs. 5 Crores** to treat the process, sewage and coolant oil waste generated from the factory.
- Constructed **5 Rain Water Harvesting Ponds** with a capacity to collect **91,000 KL** of rain water
- Installed 6 nos x 2,000 lpd **Solar Water Heating** systems in our canteen for washing & cooking purposes with an investment of **Rs.18 lakhs** and this helps in preserving natural resources.
- Installed an **Incinerator** with a cost of **Rs.40 Lakhs** to burn waste paint and waste oil for avoiding land and water contamination.
- As an alternate to incineration, in co-ordination with other companies formed a committee in the name, **Industrial Waste Management Association** to establish a **Landfill Site** to scientifically dispose the hazardous waste.
- Installed a **Meteorological Station** to record temperature, wind velocity & direction, humidity & rainfall [5 Nos. of **Permanent Ambient Air Quality Monitoring Stations** to check the Sulphur Dioxide, Nitrogen Oxide, and Suspended Particulate Matter (SPM)]
- **Water scrubber** has been installed in Paint booth to control Paint particles generated during Painting process. Central water system is provided to collect Paint generated in Paint process & disposed as per TNPCB guidelines (Hazardous Waste Management)
- Installed a **Sewage Treatment Plant** with an investment of **Rs.66 lakhs** and with a capacity of **600 m<sup>3</sup>/day** to reuse the sewage water for landscaping which facilitates us to conserve water and reduce depletion of natural resource
- **Environmental lab** was set up to test the quality of ambient air, water & effluent.

#### b) Development of Green belt:

- Developed adequate **Green Belt** inside HMI with lawn (45,000 m<sup>2</sup>), flowering shrubs (5,400 m<sup>2</sup>) & trees (13308 Nos.) like Shelter, Ornamental & Fruit bearing (Coconut, Lemon, Sathukudi, Mango & Banana) and we use treated effluent for the purpose of Irrigation, which is a positive impact.



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- We have sponsored **1,000 Tree Saplings** for planting at Kancheepuram and we are in constant touch with the Conservator of Forests to get tree saplings for our plant towards abatement of pollution and environmental improvement by industries
- Further, it is proposed to develop a lawn area of 5,000 m<sup>2</sup> and plant 1000 trees in the year 2004.
- As per the TNPCB consent, 12.5 hectares area of greenery development is sufficient whereas we have already developed more than **25 hectares of greenery** area and planning to improve further.
- A **Farm House** with a Plant Nursery, which meets our entire requirement of tree saplings, shrubs etc. has been developed.
- We also introduced the **Go Green Campaign** involving our employees, by which they plant a tree sapling on their birthday.

### C. Environmental Policy

All the employees have been made aware of environmental policy through training sessions. The policy has been displayed at prominent locations within the plant and also displayed at the main gate for the visitors and interested parties

EMS Policy and Objectives including Environmental Management Programs are being reviewed at the respective Department level and the same is being communicated to the Management Representative and the top Management Quarterly.

### d) Statutory Legislation

All statutory legislation is adhered as per TNPCB norms and the following are regularly monitored and reports are sent.

- Ambient Air Quality Monitoring
- Stack Monitoring
- Volatile Organic Compounds
- Meteorological Station
- Quantity of Effluent treated in the Waste Water Treatment Plant.
- Water Cess

### e) Environmental Improvements Undertaken

- 1) In Body shop, **Fume Extraction System** has been provided for the CO<sub>2</sub> Welding machine to reduce air pollution and to provide better working environment.
- 2) In Engine & T/M shop, **10 nos Fume Extraction System** has been provided at a cost of **Rs.2 crores** to limit dust & mist level in the shop and to provide better working environment.



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- 3) 28 nos **Roof Wind Ventilators** have been installed for ventilation of Boiler House.
- 4) We have provided **Scrubber System** in Aluminum Foundry to reduce the stack emission.
- 5) Flue gas analyser was installed to maintain the O<sub>2</sub> level for better combustion efficiency of Boiler
- 6) In Press shop, the nozzle size was reduced to reduce the consumption of oil while drawing. By this land contamination was prevented and natural source depletion avoided.
- 7) Installed new Robot in the Paint Top Coat Booth, which has **reduced the over spray paint consumption** and thereby reduced water pollution.
- 8) In Body shop, Silicon Spray was replaced with Non Silicon Spray to prevent ozone depletion.
- 9) In Body shop, manual cleaning activity with pyro clean anti rust oil was transferred to TI Metal for automatic cleaning. By this oil wastage was reduced and land contamination prevented.
- 10) In Aluminium Cylinder Head, Powder type coverall 11 flux, which creates dusty environment was changed to Granular type coverall GR2516 to reduce air pollution.
- 11) **Rapid Environment Impact Study** conducted in 1997 for the existing plant before construction. **Environmental Impact Assessment** done by NEERI in 2004 to assess the environmental condition.
- 12) Vehicles with Pollution Under Control certificates only are allowed inside factory.
- 13) We use **lead free water based paint** in Paint shop

**f) Technology Improvements :**

- 1) Our Santro is the First model in India in small car segment to have Multi Point Fuel Injection system. (MPFI)
- 2) Our Engine emission has been designed to meet EURO-II, EURO-III and EURO-IV emission norms.
- 3) Our Euro-III and Euro-IV cars will meet Life Cycle Requirement.



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- 4) Introduced three way catalytic converter to control the emission level.
- 5) Provided Anti Knock Sensor in all our cars.
- 6) Provided Exhaust Gas Re-circulation for the Accent Diesel model cars.
- 7) Introduced O<sub>2</sub> Analyser before and after catalytic converter in premium model.
- 8) Our cars are 50 % better in terms of emission norms due to Latest Engine Technology, DLI, 4 Hole Injector & Computer controlled Engine Management.
- 9) We have plans of alternate fuel as done in our mother plant, HMC, Korea namely, Fuel Cell Vehicles, Hybrid Electric Vehicles, Electric Vehicles & Light Weight Vehicles
- 10) Introduced new Diesel Technology Engine – Common Rail Direct Injection (CRDi) Engine with 40 % improvement on emission.
- 11) We are using Ozone Depletion Substance Free R134a (HFC) gas in our vehicle's air conditioner system to protect ozone layer.

#### g) Reuse And Recycle:

- Filter backwash water used for gardening purpose (60 KL/day)
- Installed a Reverse Osmosis Plant with an investment of **Rs.1.5 Crores** and with a capacity of **550 m<sup>3</sup>/day** to recycle the Treated effluent back to Process water, which facilitates us to conserve water and reduce depletion of natural resource.
- We are utilizing the treated effluent water for the irrigation purposes.
- R.O.permeate water is used for cooling tower & Boiler
- We are using recyclable products in our cars, such as Brake Oil Reservoir, Air Duct, Wind Shield Washer Reservoir etc.,
- We are reusing the Waste Wood to make office furniture and for community development activities such as providing benches and desks for the village schools in and around Hyundai as a charity measure.

#### h) Waste Management:

- Waste like used oil, used thinner, used batteries are being sold to TNPCB & MoEF authorised dealers.
- Paint sludge generated from the paint shop being stored on the impervious concrete enclosed floor to avoid any land contamination.
- Other house hold waste, metal scrap & plastic waste components are being sold to HMI approved outside vendors.



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- We are storing all the hazardous waste generated from our plant in a **RCC impervious enclosed platform** to avoid any land contamination.

Waste generated from the shop floors are being collected in different coloured bins as follows :

- **Green bin** - Bio Degradable waste
- **Blue Bin** - Recyclable waste
- **Red Bin** - Hazardous waste



All the employees and contract workers have been educated on waste segregation at source.

The segregated waste is being disposed to the waste matter yard, where all these waste are being stored separately for further disposal (Sales & landfill).

### i) Training

All the employees & contractors are given training on 'Environment Management System' (EMS) in the following programme.

- ◆ Quality School Training
- ◆ Training for Contractors
- ◆ Basic Orientation Training for Technicians
- ◆ Advanced Training Programs for contractors

### j. Future Plans

- Insisting all Vendors of HMI to go for ISO 14001 Certification.
- Regularly conducting Environment programs for our Vendors and Suppliers.
- Conducting Environment Awareness Campaign in the neighbouring villages.
- Conducting Environment Competition for the School children.
- New R.O. Plant to treat 700 m<sup>3</sup>/day of Effluent water.

### k. Safety

HMI believes in 'Safe working leads to better productivity' concept and follows the safety rules strictly.

The following special campaigns are undertaken annually.

1. National Safety Day



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2. World Environment Day
3. Cut Injury Prevention Campaign (CIP campaign)
4. Safe Driving campaign

Following documents developed and maintained for safe working all over the company and

1. Periodical safety inspection and audit is conducted
2. Hot work permit system
3. Cold work permit system
4. Preventive maintenance procedures
5. Start-up and shut-down procedures
6. Joint safety inspection procedure

Prepared “Safety Manual” and it available in the local language and is distributed to all our employees.

Hazard Identification and Risk Assessment is done as follows

1. HazOp study – Propane storage yard and propane handling areas.
2. Risk analysis study
3. Rapid electrical safety audit for the hazardous installations.
4. Safety inspections – All areas.
5. Safety audit – All material handling equipment
6. Accident Investigations

Checklist is prepared for doing inspection. The inspection is carried out jointly by Safety, Maintenance dept. and user dept. Non-conformance was reported to top management for remedial action.

Safety Audit System is practiced periodically as follows

1. Audits Team Members : Safety Engineer, Maintenance team member, User dept. member & Dept. Head
2. Frequency : Once in 3 months.
3. Reports are submitted to Sr.G.M. – Production
4. It will be reviewed during weekly meeting & corrective action taken.
5. External safety audit has been conducted during August 2002.

HMIL is concerned about safety of Contractor Employees also.

Material Safety Data Sheets

1. MSDS are displayed near to the storage areas



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2. Training was given to all the concerned about the hazards involved in the chemicals.

HMIL prepared “On-Site Emergency Plan” and through periodical Mock drill, our On-site emergency plan was tested. Once in a year mock drill is conducted.

While doing external audit the effectiveness of our on site emergency plan also evaluated.

HMIL has well equipped Occupational Health Centre.

The company has decontamination facilities available for the workers

1. Fresh air supply unit provided for suppressing contaminants.
2. Individual machines are provided with effective exhaust system

## List Of Certifications And Awards- Encon, Environment, Quality & Productivity

### ***a) Energy Conservation:***

✎ **Energy Efficient Unit Award in 2001**

*Awarded by : Confederation of Indian Industry*

✎ **National Energy Conservation Award in 2002**

*Awarded by : Ministry of Power, Government of India, New Delhi.*

✎ **Energy Efficiency Excellence Award in 2003**

*Awarded by : ENFUSE Association of India.*

### ***b) Environment:***

✎ **5 Leaves Award in 2001**

*Awarded by : Centre for Science & Environment, New Delhi*

✎ **ISO 14001 Certification – Environment Management System in 2003**

*Certified by : TUV, Germany.*



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- ✎ “EcoFirst” for best Industrial Environment in Kancheepuram District  
*Certified by : Kanchi Health & Education Society, Kancheepuram*

**c) Safety:**

- ✎ Safety Appreciation Award in 2001  
*Awarded by : National Safety Council*
- ✎ Commendation Award for Leadership and Excellence in Safety, Health and Environment in 2003  
*Awarded by : Confederation of Indian Industry*

**d) Quality:**

- ✎ ISO 9001:2000 & QS-9000 Certification in 2000 & 2002  
*Certified by : TUV, Germany.*
- ✎ No.1 car for Customer Satisfaction in IQS (Initial Quality Survey) in 2001 & 2002 for Small & Mid-segment cars  
*Certified by : JD power Asia Pacific*
- ✎ Best small car in 2000 & 2001  
*Awarded by : JD power Asia Pacific*
- ✎ Most appealing small car for ‘Santro’ in APEAL study 2000, 2001 & 2002  
*Certified by : JD power Asia Pacific*
- ✎ Most appealing car in APEAL study for Accent in 2001 & 2002  
*Certified by : JD power Asia Pacific*
- ✎ Best Premium compact car in 2002  
*Certified by : JD power Asia Pacific*

**e) Others:**

- ✎ Highest Exporter in 1999 ~ 2000  
*Certified by : Engineering Export Promotion Council*



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- ✦ **Best advt.campaign award in 1999**  
*Awarded by : Advt.Club, Kolkata*
  - ✦ **Global Advt.Marketing Effectiveness award in 2000**  
*Awarded by : New York Festivals*
  - ✦ **Most Improved car for Accent CRDi in 2002**  
*Awarded by : CNBC Auto Car India*
  - ✦ **Manufacturer of the Year in 2002 & 2003**  
*Awarded by : CNBC Auto Car India*
  - ✦ **Employer-Employee Relationship award for the Year 2002 ~ 2003**  
*Awarded by : Rotary Club of Madras*
  - ✦ **Juri Award for CRDi in 2003**  
*Awarded by : Business Standard*
  - ✦ **Car Maker of the Year in 2003**  
*Awarded by : ICICI Overdrive Awards*
  - ✦ **Managerial Excellence for Manufacturing Sector in 2003**  
*Awarded by : Madras Management Association*



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## ORGANIZATIONAL SETUP FOR ENERGY CONSERVATION

### ENERGY CONSERVATION CELL?

HMIL has an Energy Conservation Cell, which includes the Top, Middle & the Work Force. The Organization structure of the Energy Conservation Cell is attached herewith.

SALIENT FEATURES OF EC CELL'S CONSTITUTION, FUNCTIONS, AMOUNT OF FINANCES AVAILABLE, ACHIEVEMENTS, FUTURE PLANS AND STRATEGY FOLLOWED TO IMPLEMENT ENERGY CONSERVATION/ EFFICIENCY PROGRAMMES AND POLICIES, ETC.

- ◆ Hyundai strongly believes that the ENCON can be achieved only by Teamwork.
- ◆ ENCON cell involving cross-functional teams (CFT) with people at all levels including Managers, Engineers, and Supervisors & Workmen as members.
- ◆ Small Group Activity (SGA) teams are formed at various Departments to implement activities like machine automation, loss prevention & cost reduction.
- ◆ Encon knowledge acquiring & sharing of information through discussions, seminars, displays & plant visits.
- ◆ All Encon plans are discussed & reviewed in shop floor Production meetings.
- ◆ Employees participation in Encon through employees suggestion scheme and giving cash Award for best suggestion & Publishing suggestions in the in-house magazine.
- ◆ Creating awareness among all the employees by celebrating Encon day and conducting Encon competitions.

### ENCON SET UP

#### Apex group

- ◆ Indicates the involvement and commitment of the top Management.
- ◆ Supports & encourages Encon activities.
- ◆ Comprises of MD, President, DyMD and all Directors.

#### Core group

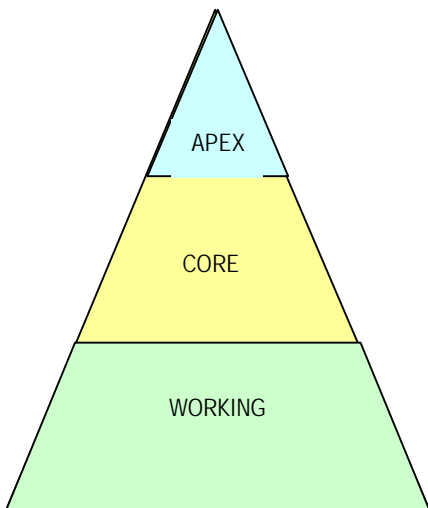
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#### Working group

- ◆ Comprises of co-ordinators from various Departments at all levels.
- ◆ They identify the problems, look for continuous improvement, conduct brain storming discussions, arrive at remedial measures and implement the same by



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## ROLE OF ENERGY MANAGER

- ◆ Establish & ensure proper functioning of Encon cell
- ◆ Preparation of Annual Encon plan & obtaining Budget approval from Management
- ◆ Act as facilitator & driving force for Energy Conservation activities
- ◆ Fix SEC targets, monitor & analyse for any deviation
- ◆ Effective monitoring of action plan and the proposals already implemented.
- ◆ Compare SEC with National & International standards
- ◆ Initiate to install latest monitoring and data recording system
- ◆ Analyse equipment performance with respect to Energy efficiency.
- ◆ Calibrate instruments for accurate measurement of Energy consumption.
- ◆ Conduct training program and nominate personnel to external programs
- ◆ Support for Energy audit agencies for conducting Energy audits.
- ◆ Co-ordinate with them for implementation of proposals
- ◆ Exchanging of information with Energy managers of other Industries.
- ◆ Report to BEE & other statutory bodies
- ◆ Collect all suggestions / ideas, conduct feasibility study, payback analysis, implementation of projects and reviewing the same.
- ◆ Encouraging in-house suggestion & motivating them by giving awards for best suggestions.
- ◆ **To create knowledge bank on Encon technology** development in National & International levels in various Industries and to adopt the same wherever possible.

To update all Govt. Acts with respect to Encon & deliberate the same to Management.



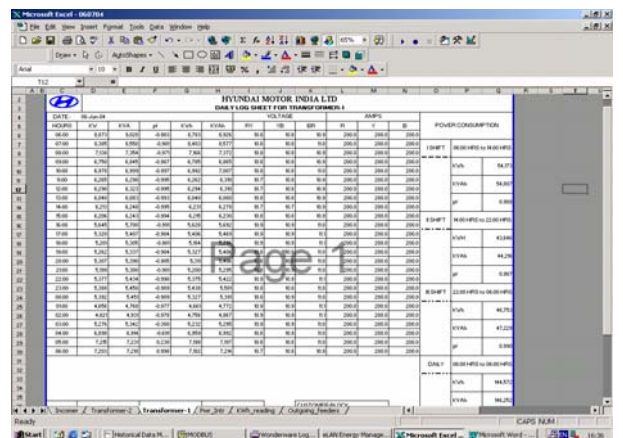
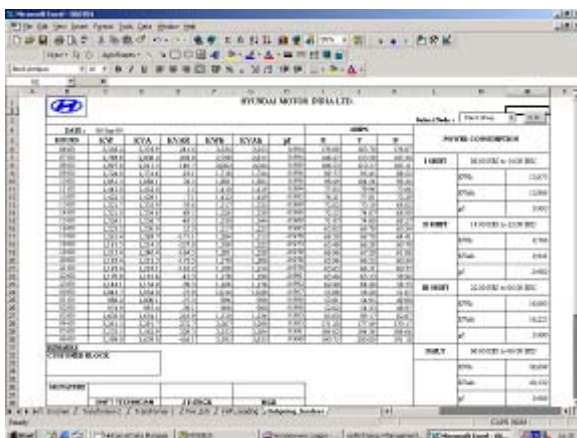
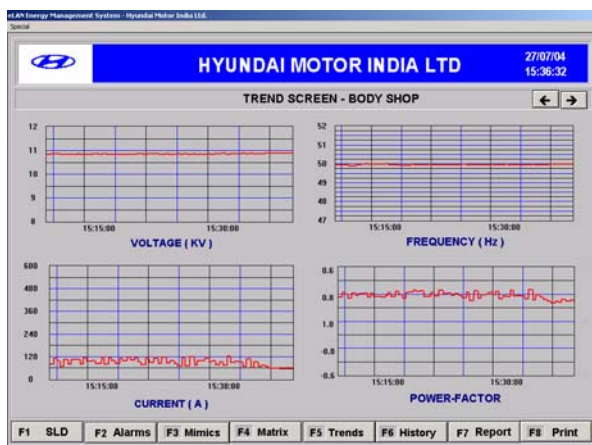
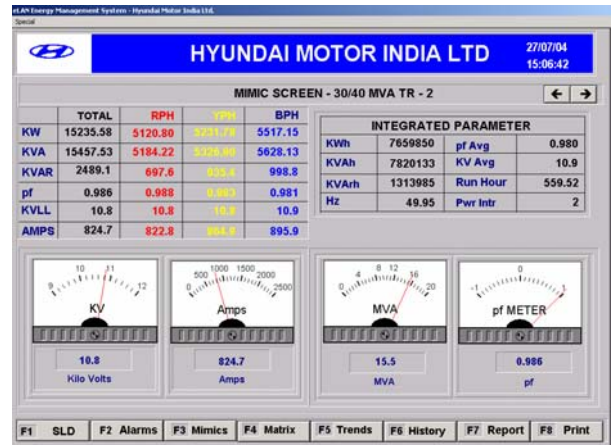
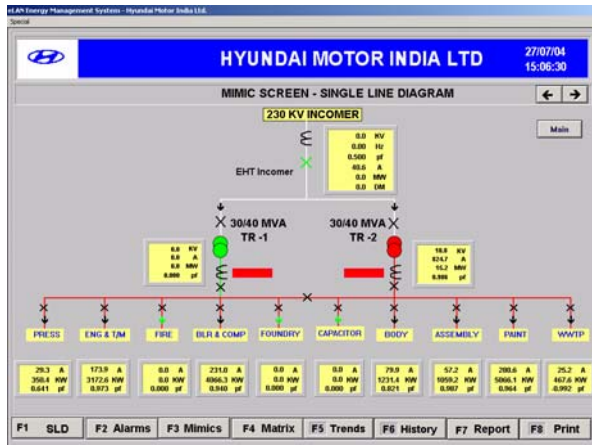
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d. DOES YOUR UNIT HAVE ENERGY ACCOUNTING AND MONITORING PROCEDURES AND SYSTEM IN PLACE. WHICH DEPARTMENT IS RESPONSIBLE TO MAINTAIN SUCH RECORDS - EC CELL OR ANY OTHER?

- ◆ INSTALLED PC BASED ONLINE ENERGY MONITORING SYSTEM (EMS) WITH software to monitor all the Electrical parameters and energy consumed by each shop floor on hourly, daily & monthly basis.



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<i>Previous System</i>	<b>Present System</b>
Electromechanical type	Digital meters
Less Accuracy	High Accuracy
<b>Error-high</b>	Error-Less
Reading to be taken manually	Automatic Reading
Selected parameters are recorded	All the parameters are recorded
Routine job	System to handle repetitive task



- ◆ Digital energy meters & Flow meters (20 nos) to accurately measure the consumption of Utilities.



- ◆ Installed flue gas analyser to monitor O<sub>2</sub>, CO & NO<sub>x</sub> to ensure complete combustion of fuel and thereby reducing the thermal consumption.
- ◆ Walk-through surveys done at regular intervals to eliminate energy wastage.



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◆ 'Daily water report' for controlling the water consumption in shop floors.

**WATER MANAGEMENT**

Prepared	Checked	Approved

July 27, 2004

**1. Previous day status**

Date	Consumption Ton	Supplied by				Total Cost Rs.
		Source	Cost Rs / Ton	Qty	Ton	
26-Jul-04		SIPCOT				
		HMI Borewell				
		SIPCOT Openwell				
		Lorry Tanker				
* Landscape+Construction						

**2. SIPCOT Management**

Source	Max. water availability/day Ton	Actual Supplied/day Ton	Remarks
Borewell near Chembrambakkam pond (13 Nos.)			SIPCOT storage tanks present stock - 1500 Tons.SIPCOT is making additional 8 nos.of Borewells.

**3. HMI Management**

(i) Source

Source	Max. water expected/day Ton	Actual supplied Ton	Status
5 Bore wells & 1 Open well			
RO Recycled Water			
SIPCOT Openwell			
Tanker			
<b>Total</b>			

(ii) Storage facility

Storage tanks	Capacity Ton	Present stock Ton	Remarks
Raw water tank			
Treated water tank			
Recycled water tank			
Earthen Pond			
<b>Total</b>			<b>Water consumption target - 1800 M<sup>3</sup></b>
<b>No.of days stock</b>			

Date	Shopwise consumption in M <sup>3</sup>											Total consumption / day	Remarks
	Press	Body	Paint/Plastic/Bumber	Assembly	ETM	Foundry	Utility	Canteen	Toilet/sinks	Landscape + Construction	Others		
26/Jul/04	5	80	710	105	125	50	200	315	70	25+0	102	<b>1787</b>	

\*Others: Waste matter yard / Firefighting/PDI/Ware house/Training centre

To : ED(ADMN.) / Sr.GM(P)



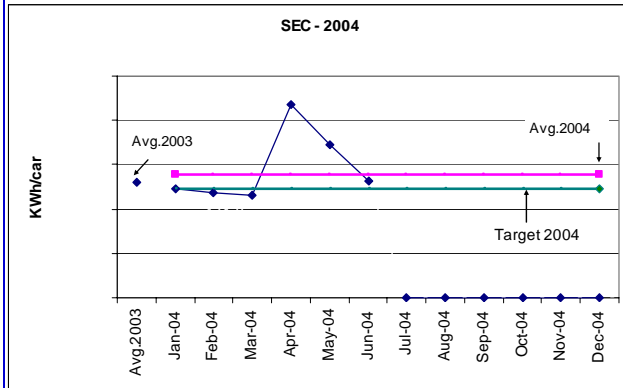
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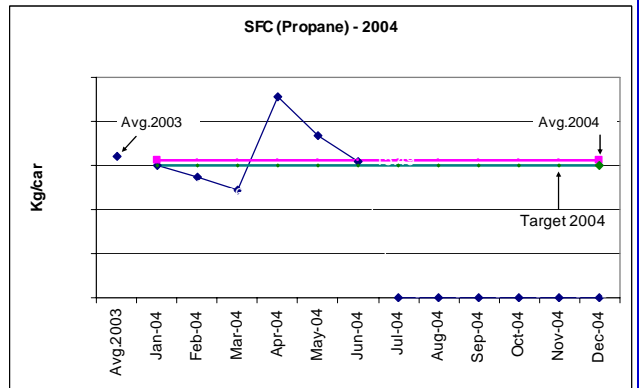


- ◆ Weekly Utility consumption, cost & production data are compared with previous week.
- ◆ Encon activities are being monitored and reported to Management in the weekly review meeting.
- ◆ **Actual SEC is compared** with target SEC every month.

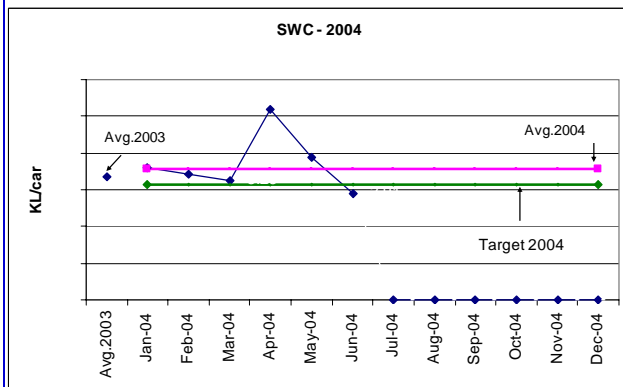
Specific Energy Consumption - 2004



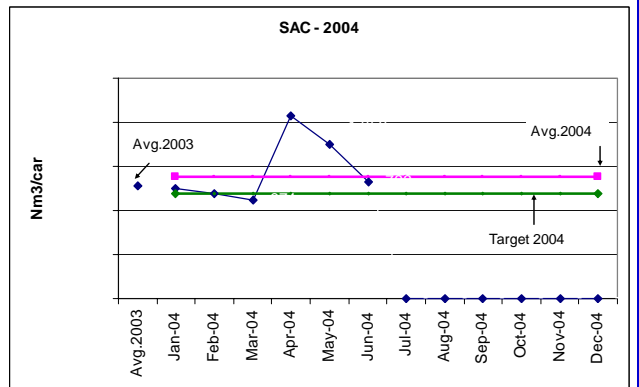
Specific Fuel Consumption (Propane) - 2004



Specific Water Consumption - 2004



Specific Air Consumption - 2004



- ◆ **Display of Utility consumption & cost** details in all shop floors to create awareness among employees.

UTILITY CONSUMPTION REPORT			
SHOP: ENGINES & TM		MONTH: JUL-03	
		CONSUMPTION	COST IN Rs.
POWER	KWH	1230853	5436834
AIR	NM3	2367635	1536295
PROPANE	KG	14938	0335048
STEAM	KG	188140	223293
WATER	KL	2878	78575
ACTUAL / CAR	KGGE	3334	0597
TARGET / CAR	KGGE	3523	6547

ENERGY SAVED IS PROFIT MADE



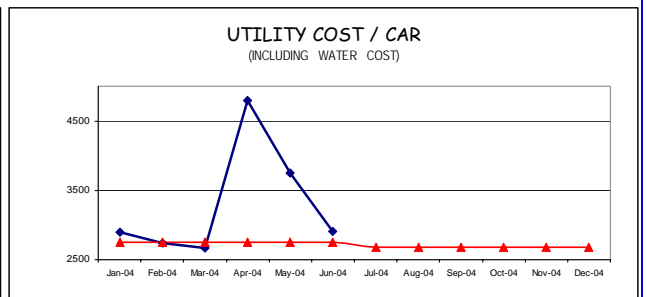
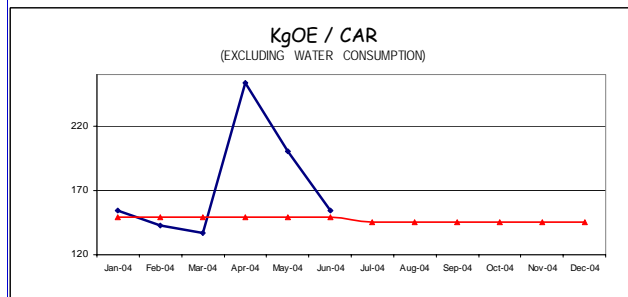
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- ◆ The best performance will be the bench mark for the particular shop & becomes guideline.
- ◆ Submission of **Monthly Utility report** to the top Management. (refer Format below)

<b>UTILITY REPORT</b>											
#											
UTILITY		Unit	AVG.2003	Jan-04	Feb-04	Mar-04	Apr-04	May-04	Jun-04	Jul-04	Avg.of 2004
	Car Production	PLAN	12,462								16929
		ACTUAL	12,809								14,619
<b>Power</b>	<b>Kwh / Car</b>		523.17								558
	Power Consumption	KWh	6,698,776								6,150,313
	Power Cost	Rs	29,304,535								26,129,634
	<b>Power Cost / Car</b>		2,297.17								2,472
	Utility Cost ( Rs / Kwh)		4.39								4.43
<b>Propane</b>	<b>KG / Car</b>		16.05								9.56
	Propane Consumption	KG	206,416								227,500
	Propane Cost	Rs	4,422,099								6,329,329
	<b>Propane Cost / Car</b>		423.59								433
	Utility Cost ( Rs / KG)		26.40								27.94
<b>Water</b>	<b>KL / Car</b>		3.36								3.39
	Water Consumption	KL	42,991								41,950
	Water Cost	Rs	916,621								1,742,501
	<b>Water Cost / Car</b>		71.61								119.20
	Utility Cost ( Rs / KL)		21.32								35.59
<b>Furnace Oil</b>	<b>Ltrs / Car</b>		3.58								6.98
	F O Consumption	KG	71,466								102,018
	F O Cost	Rs	976,112								1,401,894
	<b>F O Cost / Car</b>		76.26								95.80
	Utility Cost ( Rs / Ltrs)		13.56								15.74
<b>Diesel</b>	<b>Ltrs / Car</b>		1.25								1.02
	Diesel Consumption	Ltrs	15,950								14,917
	Diesel Cost	Rs	330,127								347,208
	<b>Diesel Cost / Car</b>		26.42								29.77
	Utility Cost ( Rs / Ltrs.)		21.20								23.29
<b>Total Utility cost</b>		<b>Rs</b>	<b>27,057,491</b>								<b>43,964,729</b>
<b>Utility Cost per DAY</b>		<b>Rs</b>	<b>1,221,675</b>								<b>1,516,025</b>
<b>Total Utility cost/Car</b>		<b>Rs</b>	<b>2,895</b>								<b>3,144</b>
<b>Target Utility Cost</b>		<b>Rs</b>	<b>2,926</b>								<b>2,752</b>
<b>Utility KgOE / Car (Excl. Water)</b>			<b>157</b>								<b>169</b>
<b>Target Utility KgOE / Car (Excl. Water)</b>			<b>157</b>								<b>147</b>



KgOE UNIT CONVERSION: 1 KgOE = 4 KWH, 1 KgOE = 1.087 LTR OF DIESEL 1 KgOE = 0.965 KG OF F.O, 1 KgOE = 0.833 KG OF PROPANE



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e. HAS YOUR UNIT/ORGANISATION DECLARED ITS 'ENERGY MANAGEMENT POLICY'? IF YES, PLEASE ATTACH A COPY OF THE SAME.



## ENERGY POLICY

Hyundai Motor India's "Energy Management Policy" is committed to Total Energy Management and prevention of energy wastage through,

- ◆ **Continual upgradation of technology** for producing world class Energy efficient Cars.
- ◆ **Conservation & optimal utilisation of natural resources** by adopting Reduce, Reuse and Recycle methods.
- ◆ **Continuous training** to enhance the Energy Conservation awareness to all the employees.
- ◆ **Practice Energy efficiency** through out the plant operations.

**MANAGING DIRECTOR**

DESIGNATED 'ENERGY MANAGER' .

M.SARAVANAN, ENERGY MANAGER,  
HYUNDAI MOTOR INDIA LTD.  
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