

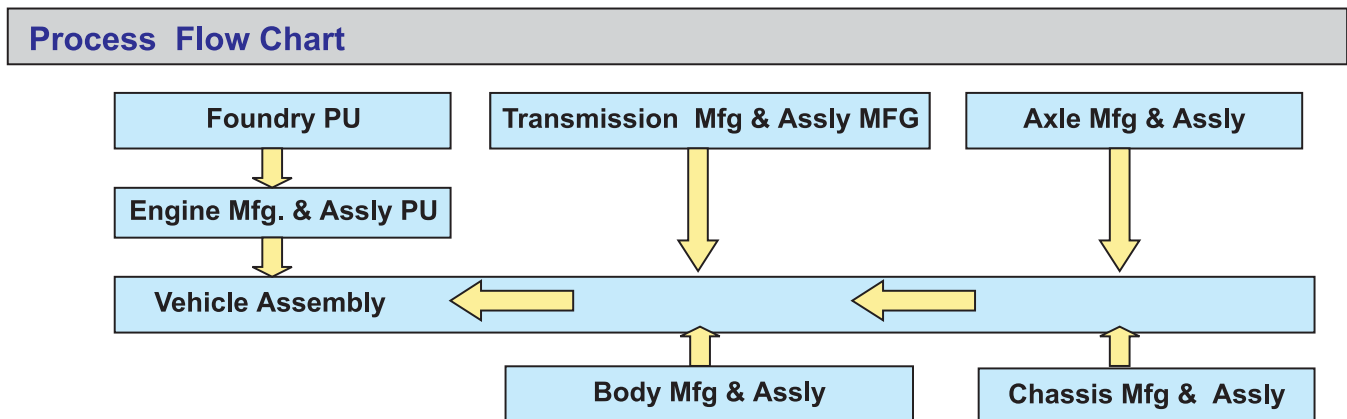
MAHINDRA & MAHINDRA LIMITED Kandivli (East), Mumbai (Maharashtra)

Unit Profile

M&M's automotive division is in the business of manufacturing and marketing utility vehicles and LCV's with total sales turnover of around 4600 crores is the leader in this segment, with a market share in excess of 50 per cent. M&M automotive division has four manufacturing plants. In Maharashtra, its plants in Mumbai and Nasik manufacture Multi-utility vehicles, and engines are produced at the Igatpuri plant. Light commercial vehicles and three-wheelers are manufactured at the Company's plant at Zaheerabad in Andhra Pradesh.

M&M Auto Sector, Mumbai plant received QS (Quality-system) 9000 Certificate in the year 2000. M & M plants in Mumbai and Igatpuri are ISO 14001 certified by RWTuV in the year 2002. The Mumbai plant has been recommended for the TPM excellence award from Japanese Institute of Plant Maintenance (JIPM) in the year 2003. M & M is the first Automobile Company to be recommended for TS 16949 certification by RWTuV in the year 2003.

"Scorpio" is M&M's first indigenously developed Sports Utility Vehicle launched in June 2002 and has been universally acclaimed. Scorpio is declared "Car of the Year" by CNBC Autocar, BBC Wheels and Business Standard Motoring in the year 2003. The company's automotive division also exports its products to several countries in Africa, Asia, European & Latin American countries.

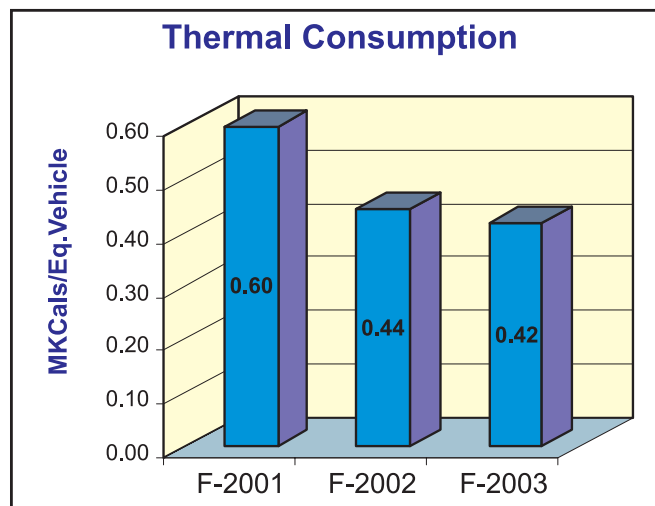
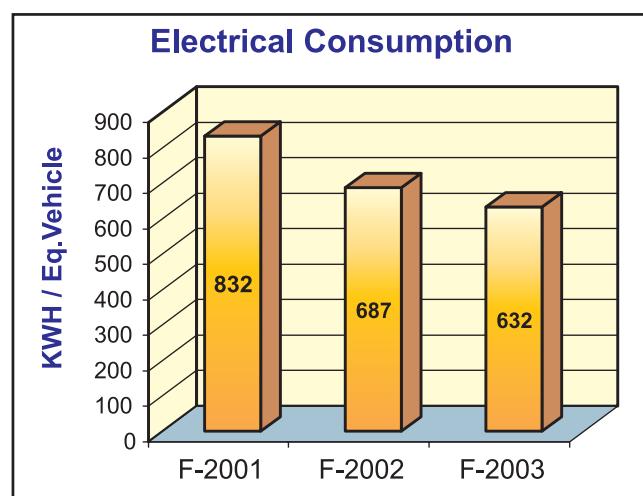


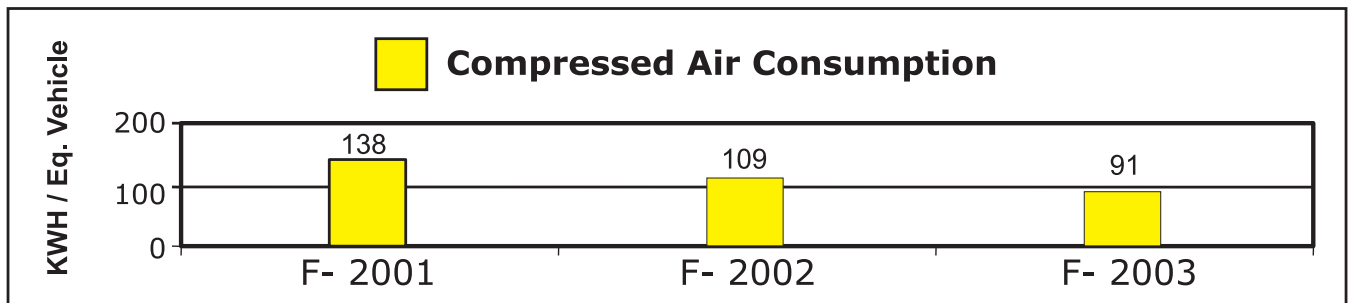
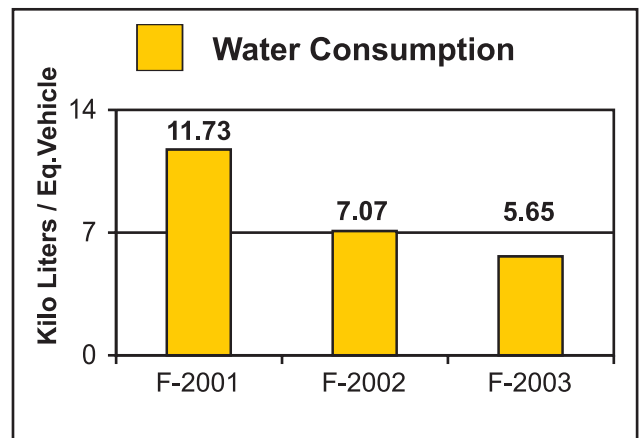
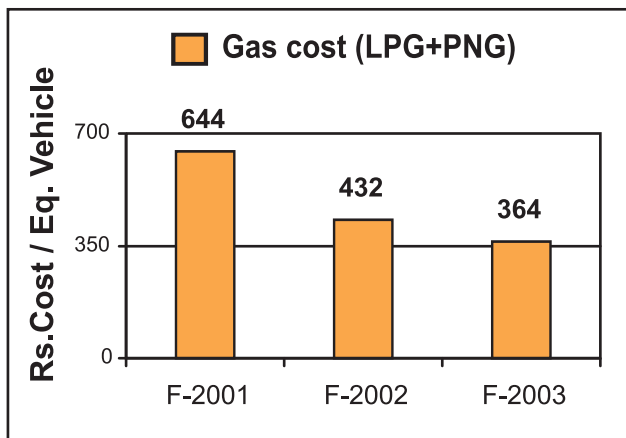
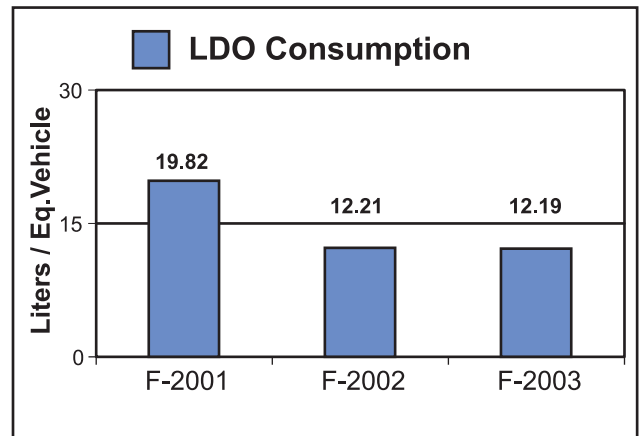
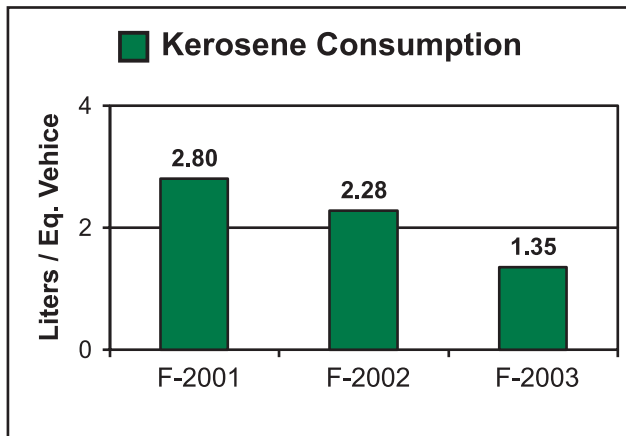
Energy Consumption

There has been a steady decrease in the Electrical & Thermal Energy consumption per equivalent vehicle due to the implementation of various energy conservation measures.

DESCRIPTION	UNIT	2000-2001	2001-2002	2002-2003
Annual Eq. Vehicle production	Nos.	37258	37148	42508
Total electrical energy consumption /annum	Lakhs kWh	310	255	269
Specific energy consumption – Electrical	Units/Eq. Vehicle	832	687	632
Total Thermal(Fuel) Consumption/annum	MKCals	22181	16420	17784
Specific energy consumption – Therma (Fuel)	MKCals /eq. Vehicles	0.60	0.44	0.42

YEAR	ELECTRICITY		THERMAL (FUEL)	
	Consumption (kWh / Eq. Vehicle)	% reduction over 2000-2001	Consumption (MKCals/ Eq. Vehicle)	% reduction over 2000 – 2001
2000-2001	832	-	0.60	-
2001-2002	687	17%	0.44	26%
2002-2003	632	24%	0.42	30%





Energy Conservation Commitment, Policy and Set up

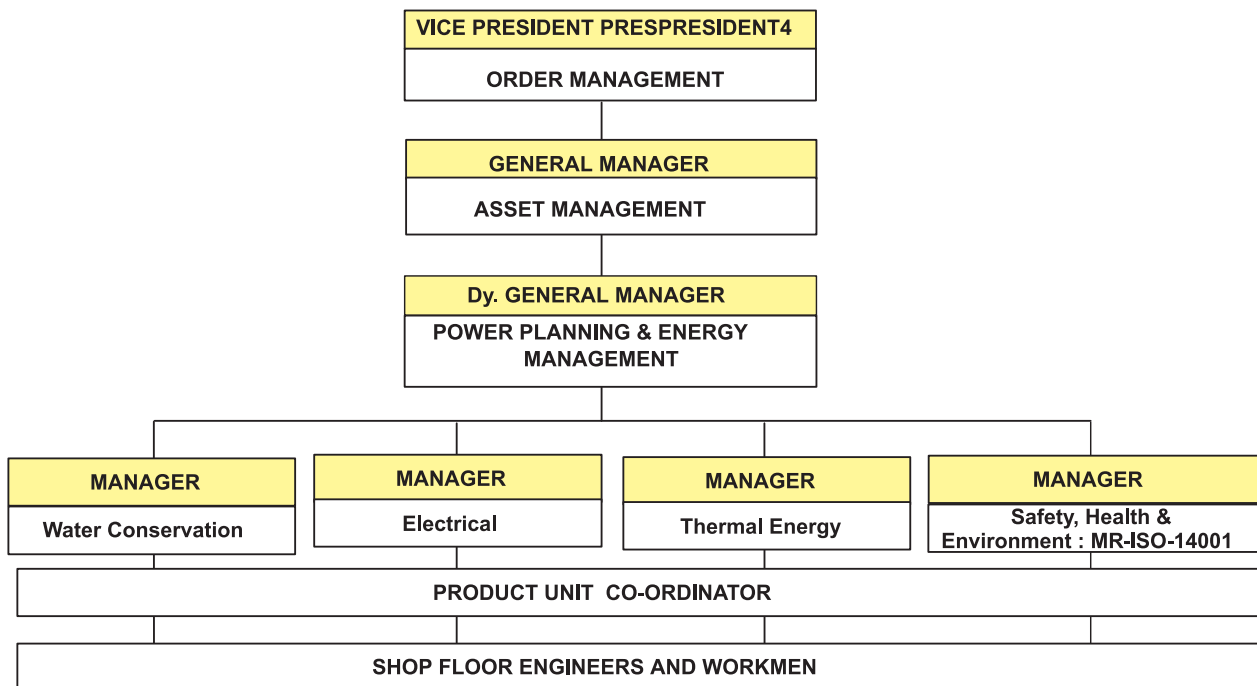
Mahindra & Mahindra Ltd, Auto Sector considers Energy Saving as a multi disciplinary approach. The company's energy profile consists of Electricity, Gas, Light Diesel Oil, High Speed Diesel Oil, Kerosene and Water also. Budget provisions are made exclusively for Energy projects. Energy conservation plans, policy and structure are reviewed periodically.

Energy Conservation week is celebrated every year from 14th December to 21st December. A poster and slogan competition on energy saving and in-house seminar is conducted. The importance of energy conservation is emphasized through various forums and TPM (Total Productive Maintenance) Methodology.

ENERGY MANAGEMENT POLICY

- Promote Energy Saving and conservation of resources.
- Use of non-conventional sources of energy.
- Comply with the Energy Legislation and other regulations.
- Promote use of Energy Efficient Alternatives and use of alternate fuels.
- Communicate Energy Management Policy to all employees and encourage their involvement through training and participation.
- Create awareness among all employees for innovative ideas towards Conservation of energy.
- Minimize waste generation and promote disposal, reuse and recycling in an Environment friendly manner.
- To make an effort to reduce the cost continuously every year by adopting effective “Energy Management System”

ECON CELL STRUCTURE



Energy Conservation Achievements

During the period 2000-2003 ,Mahindra & Mahindra has implemented around 259 energy saving proposals through Engineering initiatives, workmen's suggestion schemes, auditor's suggestions and TPM methodology resulting into total savings of Rs. 416 lakhs with an investment of Rs. 96 Lakhs. This has resulted in a reduction of 24% in specific electrical energy consumption and 30% in specific thermal energy consumption. In water conservation also the unit has reduced the consumption by 24%.

Major projects implemented during the year 2002 – 2003 are listed below:

ENERGY CONSERVATION PROJECTS

1. CONSERVE AIR SYSTEM FOR COMPRESSOR

Without Conserve air System

Power Consumption for the month	=	109403 units
Metal poured in MT for the month	=	632 MT
Average power consumed / MT of metal poured	=	173 units / MT

With Conserve air System

Power Consumption for the month	=	125377 units
Metal poured in MT for the month	=	850 MT
Average power consumed / MT of metal poured	=	148 units /MT

**Total metal poured - 6000 MT /Annum.
Saving = Rs 6.14 Lakhs / Annum**



2. A.C. VARIABLE FREQUENCY DRIVE FOR AIR MAKE UP UNIT IN PAINT SHOP

Investment : Rs. 5.50 Lakhs

Before Installation :

Blower running current 87 Amps (55 KW)

After Installation:-

Blower running current 48 Amps (28 KW)

Saving in energy = 432 kWh per day.
= Rs. 1770 per day

Saving = Rs. 5.30 Lakhs / Annum.



3. CONVERSION OF CHASSIS OVEN ELECTRICAL TO PNG

Cost of conversion	=	Rs. 4.30 Lakhs
Cost of electricity	=	Rs. 8.40 Lakhs / Annum
Cost of PNG	=	Rs. 4.00 Lakhs / Annum

Saving = Rs. 4.40 Lakhs / Annum



4. THERMOPAC CONVERSION LDO TO PNG

LDO consumption	=	1050 Ltrs / Day
Cal. Value of LDO	=	10500 Kcal / Ltr
Pipe Natural Gas consumption	=	1300 M3 / Day
Cal. Value of PNG	=	8400 Kcal / m3
Cost of conversion	=	Rs. 6.50 Lakhs
Cost of LDO	=	Rs.55Lakhs/Annum
Cost of PNG	=	Rs.35 Lakhs/Annum
Saving	=	Rs. 20 Lakhs/Annum



5. CONTINUOUS GAS CARBORIZING FURNACE-2 CONVERSION

(FROM LPG TO PNG FIRING)

The burner orifice were modified to make them suitable for use of PNG. The ball valves, flow meters, regulators were replaced.

Cost of modification : Rs 6.76 Lakhs.

Cost benefit Analysis :

Cost of LPG = Rs 58.27 Lakhs

Cost of PNG = Rs 39.58 Lakhs.

Saving = Rs 18.69 Lakhs / Annum



Other Projects implemented during 2002-2003

- Use of air cooled AC unit instead of water cooled at 1st Fl. EDP by eliminating use of water pump and cooling tower.
- Providing temperature controller for cooling tower fan motor at Foundry Compressors.
- Use of lower wattage tubes in offices.
- Removal of unwanted motors.
- Continuous to intermittent motors by using Programmable Logic Controls.
- Photo Cell control for Lighting.
- Combining scattered activities.
- Timers for blowers / heaters.
- Stoppage of idle running of motors.
- Interlocking circuit provided to water pump to switch off along with Compressor.
- Electronic chokes for lighting at Metal Finishing - Body Shop.

With the implementation of above energy conservation measures, Plant achieved monetary saving of Rs.169 lakhs in 2002-03 which is about 12% of total energy cost and overall saving of Rs.416 lakhs in last three years with an investment of Rs. 96 lakhs.

Energy Conservation Plans and Targets

Energy Conservation Measures (Planned)	Anticipated savings In Energy (Rs. lakhs)	Approx. Invevestment (Rs. lakhs)	Project commencement & completion year
Energy Alert System for Air Compressors.	4.50	3.00	2004
Use of PNG instead of LDO for second Thermopac.	6.50	2.00	2004
Conversion of CGC-1 furnace in Heat Treatment from LPG to PNG.	14.54	7.00	2004
Conversion of RX-Gen at Heat Treatment from LPG to PNG.	4.00	2.50	2004
Automatic Power Factor Controllers to reduce Maximum Demand during peak hours.	6.00	2.00	2004
Conversion of Red Primer Oven from LDO to PNG.	10.00	8.50	2004
Temperature Controllers for all cooling towers.	4.80	0.60	2004
Heat Recovery System for Exhaust.	6.00	4.00	2005
Efficient Air Handling Units.	5.00	5.50	2005
Conversion of conventional machines to CNC machines.	5.50	4.00	2005
Conversion of 90 kW oven in Foundry from electric to PNG.	9.00	6.00	2005
Use of efficient compressed air system.	24.00	30.00	2005
Use of Energy Efficient motors.	9.00	7.00	2005
Variable Frequency Drive for Paint Shop Blowers.	11.00	5.50	2006
Effective Air Conditioning System.	8.00	6.00	2006
New technology for Induction Furnace.	5.00	4.50	2006
Installation of wind mill as per Govt. Policy.	1000.00	800.00	2006

All other initiatives like Kaizens, Suggestion schemes, Engineering initiatives will continue. By adopting the above energy conservation measures, M & M will be able to achieve the set target of 569 kWh / eq. vehicles by the year 2006.

Environment and Safety

M&M is committed to the protection of the environment by Prevention of Pollution and continual improvement in the Environmental Performance. The company has successfully installed Environmental Management System and got

the certification of ISO 14001 in the month of August 2002 from M/s. RWTuV India. The process of implementation was initiated in November 2001, during which following efforts were undertaken and on going efforts are continuously on as per the Environmental Policy:

- **Minimize generation of waste.**
- **Conservation of resources.**
- **Recycling & re-use.**

The company has installed an Effluent Treatment Plant (ETP) and a Sewage Treatment Plant (STP) for wastewater from Paint Shop and other means. It is monitored continuously as per Maharashtra Pollution Control Board (MPCB) norms.

- The company has minimized the wastage of natural resources by use of recycled STP treated water for Gardening

Industrial Safety is an essential & integral part of every operation at Mahindra & Mahindra limited, Mumbai. M&M's Mumbai plant has received the prestigious International Safety Award, "The Oscar of Safety World" "The Sword of Honour" from the British Safety Council, London. Objective of safety dept. is to ensure and attain a target to achieve zero accident Rate.

Following programs are introduced to attain zero accident:

The system of nominating members from each Product Unit for safety sub-committee is introduced. These safety sub committee members submit report on the actual work done in respective product unit to the Safety Department.

- PU Head's conduct safety meetings with their module managers, cell leaders, once in a week for 1/2 hour. (Minutes of the Meetings and Action Plan prepared are sent to the General Manager - Operations & Safety Department.)
- Regular Safety Patrol Rounds to locate unsafe conditions, unsafe Acts, thorough investigation of accidents, counseling to injured person, strict enforcement of safety rules, procedures including work permit system and use of personal protective equipment.
- In TPM (Total Productive Maintenance) safety pillar is one of the active pillar which has resulted to bring down the accident rate of Mumbai plant to zero.

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