

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

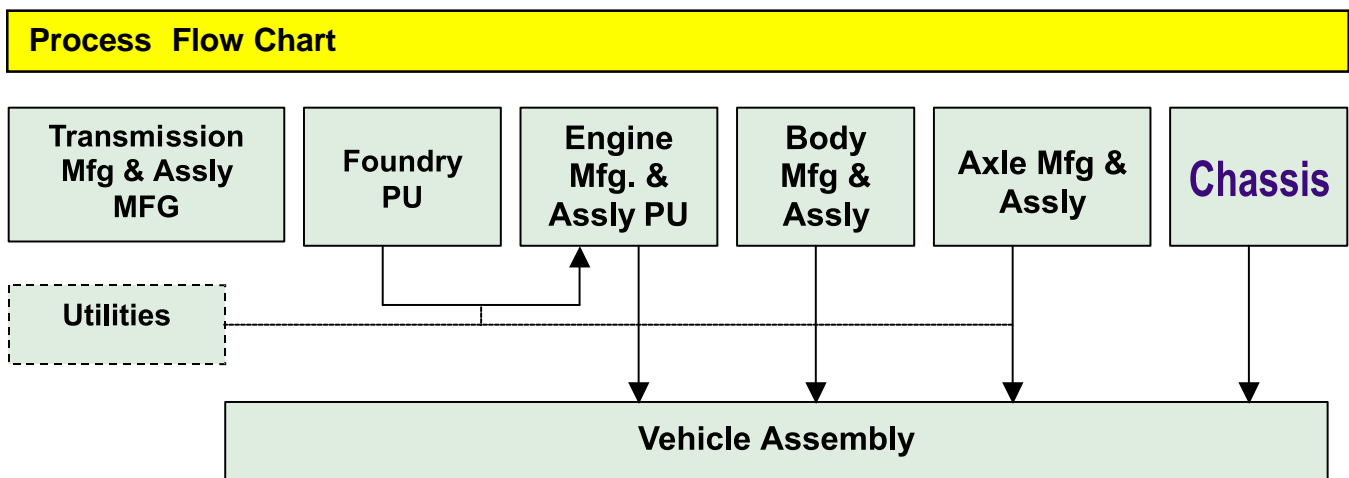
Unit Profile

Mahindra & Mahindra Limited is the flagship company of around Rs. 8000 Crores Mahindra group, which has a significant presence in the key sectors of the Indian Economy. The company caters to the Indian & Overseas Market with a presence in Automobile, Farm Equipment, Information Technology, Trade & Finance related services and Infrastructure Development.

There are four manufacturing plants of M&M automotive sector. In Maharashtra, the plants at Mumbai and Nasik manufacture Multi-utility and Sports Utility Vehicles. Engines are produced at Igatpuri plant. Light commercial vehicles and three-wheelers are manufactured at Zaheerabad plant in Andhra Pradesh.

The Mumbai- Based M&M Auto Sector manufacturing plant at Kandivli, received the QS (Quality-system) 9000 Certificate in the year 2000. It is also ISO 14001 certified by RWTuV in the year 2002. The Mumbai plant has received the TPM excellence award from Japanese Institute of Plant Maintenance (JIPM) in the year 2003. It is also a member of the Mumbai Hazardous Waste Management Limited for the safe disposal of waste. The plant adheres to all safety standards to achieve zero accidents. M & M is the first Automobile Company to be recommended for TS 16949 certification by RWTuV in the year 2003. The Kandivli plant has also received the first place in the 'National Energy Conservation Award', for the automobile sector given by the Union Ministry of Power in 2003.

In the year 2003 -04 Automotive Sector vehicle production and sales touched an all time high. Total vehicle sales crossed the 100,000 mark for the first time.

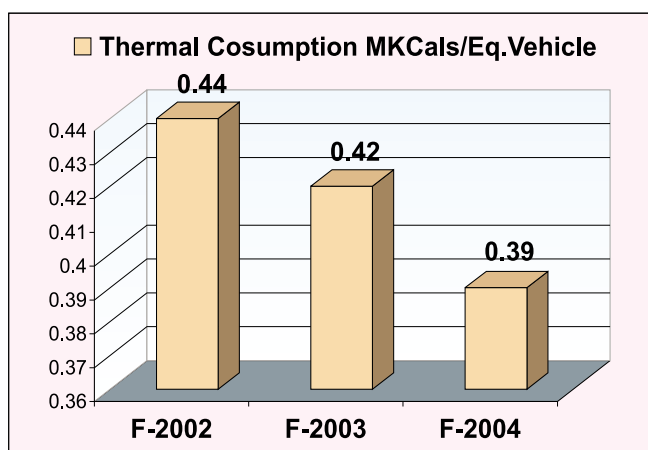
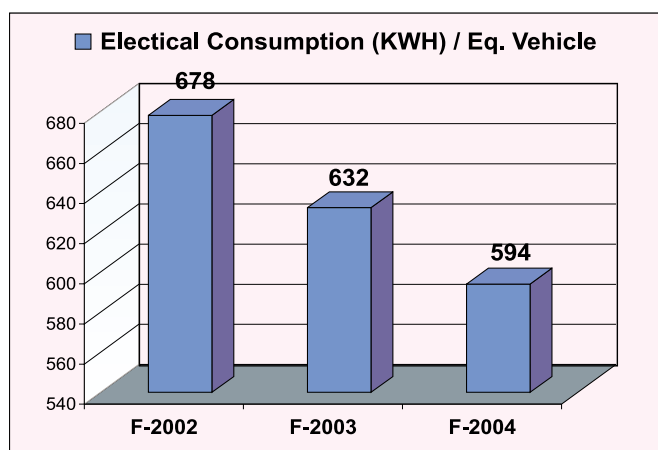


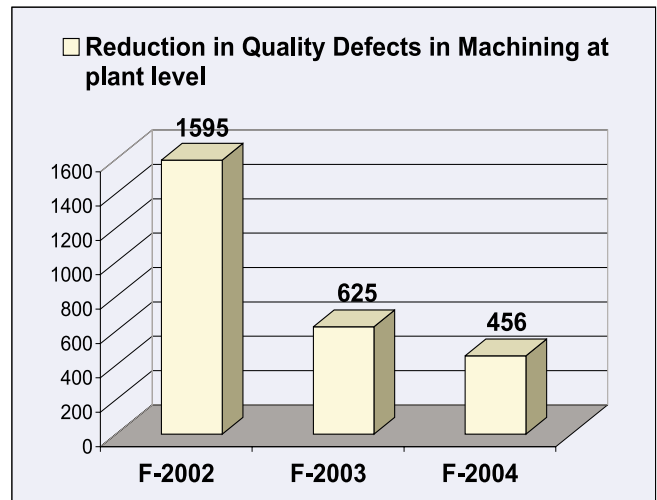
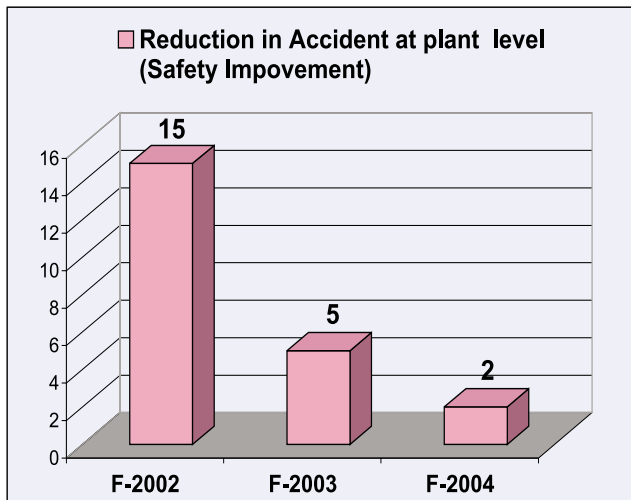
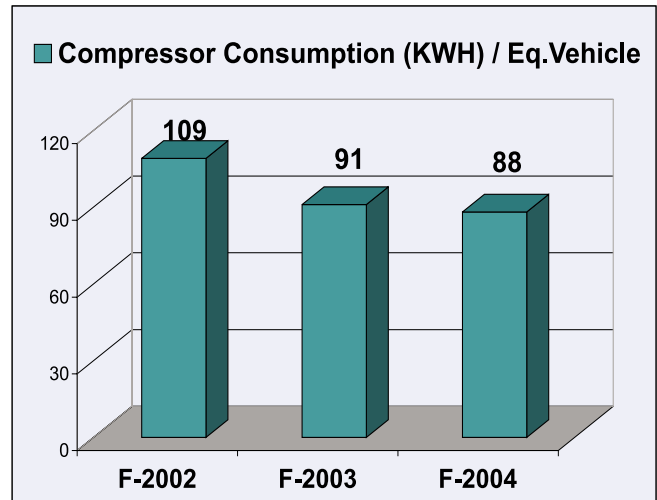
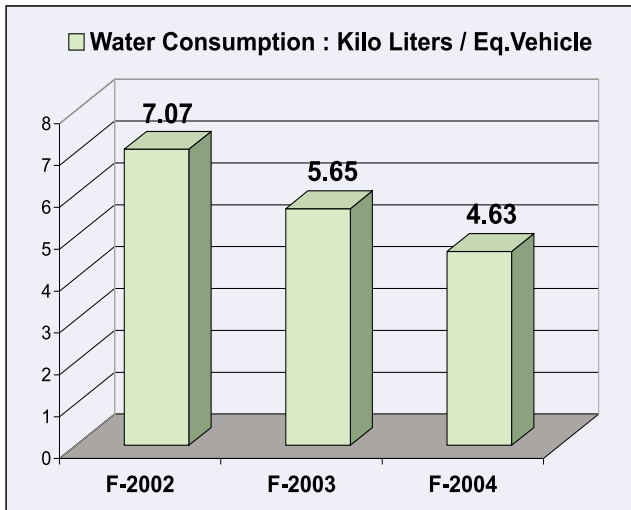
Energy Consumption

Owing to the implementation of various energy conservation measures and Kaizens, there has been a steady decrease in Electrical and Thermal energy consumption per Eq. vehicle at M&M Kandivli Automotive plant.

DESCRIPTION	UNIT	2001-02	2002-03	2003-04
Annual Eq. Vehicle production	Nos.	37148	42508	52184
Total electrical energy consumption /annum	Lakhs / kWh	255	269	310
Specific energy consumption – Electrical	Units/Eq. Vehicle	687	632	594
Total Thermal(Fuel) Consumption/annum	MKCals	16420	17784	20592
Specific energy consumption – Thermal (Fuel)	MKCals /eq. Vehicles	0.44	0.42	0.39

YEAR	ELECTRICITY		THERMAL (FUEL)	
	Consumption (kWh / Eq. Vehicle)	% reduction over 2001-02	Consumption (MKCals/ Eq. Vehicle)	% reduction over 2001 - 02
2001-02	687	-	0.44	-
2002-03	632	8%	0.42	5%
2003-04	594	14%	0.39	11%





Energy Conservation Commitment, Policy and Set up

The unit energy profile consist of Electricity, Gas, Oil, Light Diesel Oil , High Speed Diesel Oil , Kerosene and Water. In-house energy conservation cell which consists of representatives of each dept. meet every month to discuss new ideas and ongoing projects. Quality, Safety & Environment issues are also discussed.

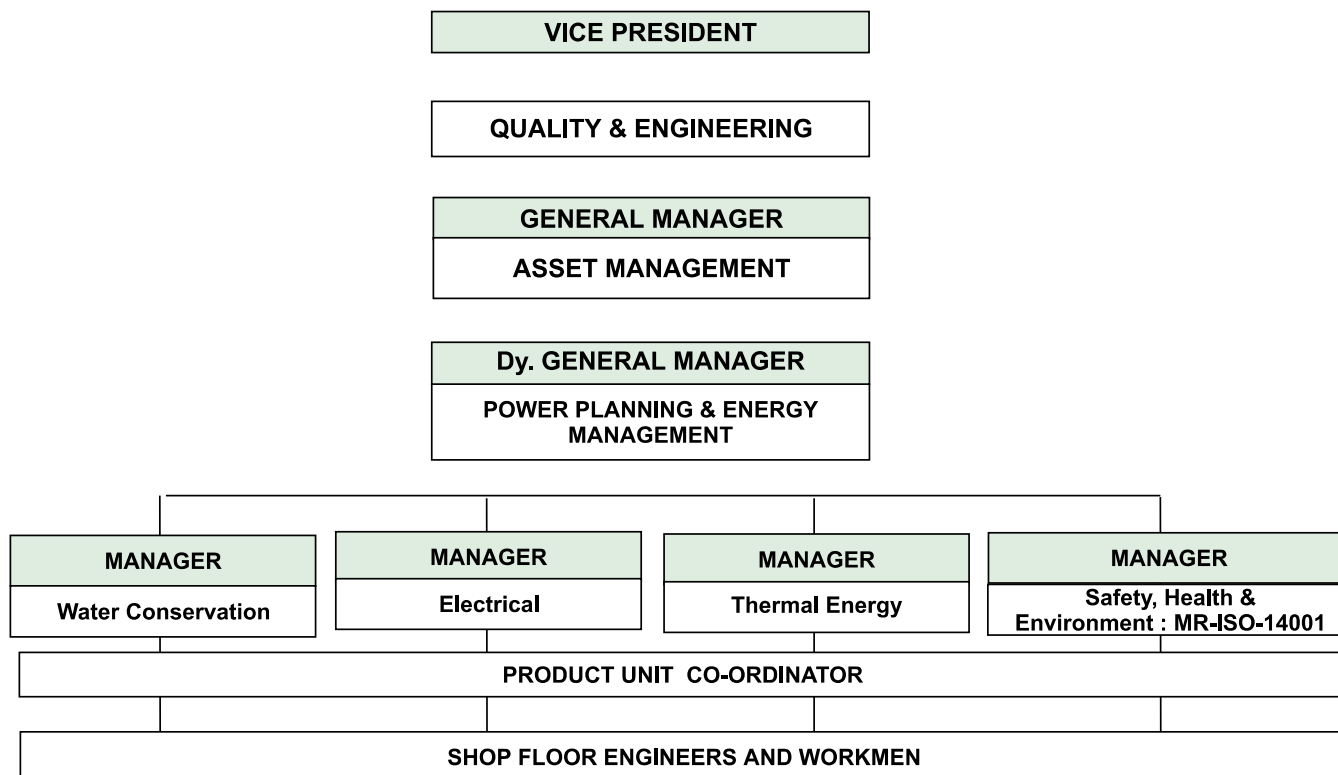
Top management plays an important role in energy conservation. Budget provisions are made exclusively for Energy Conservation projects. Each project is reviewed periodically.

Executives are sent to participate in various energy conservation seminars to explore he possibilities of new ideas like alternate sources of fuels, use of non- conventional energy. A poster and slogan competition on energy saving was conducted, In-house seminar conducted. Under TPM (Total Productive Maintenance) Methodology energy loss is given utmost importance.

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 2001-2004, Mahindra & Mahindra has implemented around 300 energy saving proposals through Engineering initiatives, workmen's suggestion schemes, auditor's suggestions and TPM methodology resulting into total savings of Rs. 482 Lakhs with an investment of Rs. 84 Lakhs. This has resulted in a reduction of 14% in specific electrical energy consumption and 11% in specific thermal energy consumption.

Major projects implemented during the year 2003 – 2004 are listed below:

Energy Conservation Projects

1. Automatic Power Factor Controllers for reduction in maximum demand.

Investment	:	Rs. 2.00 Lakhs
Without Automatic Power Factor Controllers		
Transmission PU	:	Max.Demand : 873 kVA
Paint shop	:	Max.Demand : 623 kVA
With Power Factor Controllers		
Transmission PU	:	Max.Demand : 737 kVA
Paint shop	:	Max.Demand : 585 kVA
Saving	:	Rs 7.80 Lakhs / Annum



2. Energy alert system for air compressors

Investment	:	3.00 Lakhs
Before Installation	:	
Power Consumption for Month	=	2.03 Lakhs kWh
Eq. Vehicle produced for Month	=	3952
Avg. Units / Eq.vehicle	=	51
After Installation:-		
Power Consumption for Month	=	2.02 Lakhs kWh
Eq. Vehicle produced for Month	=	4904
Avg. Units / Eq.vehicle	=	41.4
Annual Eq. Vehicles	=	52184
Annual saving	=	Rs. 20 Lakhs



3. Energy saver screw compressor.

Before Installation :		
Power Consumption for Month for Reciprocating compressors	=	0.79 Lakhs kWh



After Installation:-

Power Consumption for Month for
Screw compressor = 0.60 Lakhs kWh

Annual saving = Rs. 9 Lakhs

4. Turbine air ventilators in place of roof extractor

Investment : Rs. 0.18 Lakhs (2 Nos Req.)

Before Installation:

Roof Extractor : Electrical Consumption : 0.11 Lakhs kWh

After Installation :

Electrical Consumption - Nil

Saving = Rs. 0.44 Lakhs / Annum



5. CGC Furnace in Heat Treatment

Ceramic Fiber Insulation & Conversion- LPG to PNG

Before Conversion

LPG Consumption = 2.20 Lakhs Kg / Annum
Cost of LPG = Rs. 40.74 Lakhs / Annum

After Conversion

PNG Consumption = 2.45 Lakhs scm / Annum
Cost of PNG = Rs. 22.05 Lakhs / Annum
Saving = Rs. 18.69 Lakhs / Annum

Provided Ceramic Fiber
Insulation for Reduction
in Heat Loss

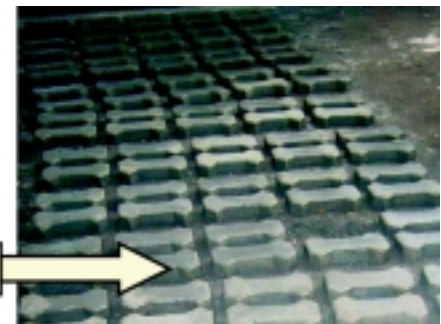


6. Innovative Technique: Creating wealth from waste (Moulding of Bricks from Foundry Waste)

The Problem :

- Lot of waste like slag, carbon soot is generated in the foundry which was previously sent out of the factory at throw away price. The plant started using the Foundry waste to mould bricks for road repairing.

Bricks made from Foundry waste



The results:

Test results for the samples are encouraging and fulfilling the minimum mandatory strength criteria conforming to IS codes of practice. Compared to the market rates the blocks manufactured by the unit will be cost effective by at least 40%.

Other Projects implemented during 2003-2004

- Changeover Relay for Energy Saving Gear Box for 250 watts SON street light fitting.
- Use of 28watts tubes instead of conventional 40 watts tubes.
- Replacing 60 watts M/C lamp with 11 watts lamps at Engine,Axle,Body & Transmission PU.
- Reconditioning conventional machines to CNC machines like 1651 Kirloskar Grinder, 1639 Voumard Internal Grinder, 1690 HMT Hobbing machine.
- Provided photo sensors for conveyor at Gear Carrier Machining Line in Axle PU.
- Automation of Foundry Compressor to Switch ON - OFF as per pressure requirement.
- Ceramic fibre Insulation for Muffle furnace.
- Elliminated use of Rotary Hurth Furnace in Heat Treatment.
- Use of PNG instead of LDO for second thermopac.
- Providing Core Busters for Heat Recovery in CGC-1 furnace in Heat Treatment.
- Provided Recuperator for Heat Recovery in CGC-1 Furnace in Heat Treatment.
- Eliminated use of Muffle Furnace for slot quenching operation.
- Provided electrical float valve to reduce water consumption for Municipal water tanks.
- Use of treated ETP water for gardening purpose.
- Recovery of waste packing material and selling back to vendor at Engine PU.
- Use of waste material of wind shield panel as a raw material for air deflector panel at Press Shop.
- Conversion of P4 engine with MDI 3200 engine for Forklift to reduce pollution level from 85 HSU to 35 HSU.Saving use of diesel per forklift. (Total 8 nos converted.)

With the implementation of above Energy conservation measures, Plant achieved monetary saving of RS. 184 Lakhs in 2003-04 which is about 12% of Total Energy Cost and overall saving of Rs.482 Lakhs in last three years with an investment of Rs.84 Lakhs.

Energy Conservation Plans and Targets

Energy Conservation Measures (Planned)	Anticipated savings In Energy (Rs. lakhs)	Approx. Investment (Rs. lakhs)	Project commencement & completion year
Instillation of VFD for body top coat exhaust air blowers in paint shop.	5.94	3.00	2005
Efficient Air Handling Units.	5.00	5.50	2005
Conversion of 90 kW oven in Foundry from electric to PNG.	9.00	6.00	2005
Install VFD for circulating air blower in paint drying oven	0.24	0.50	2005
Install waste heat recovery for CGC-2 furnace and preheat quench oil.	7.72	10.00	2005
Improve insulation and minimize radiation loss in red primer line.	2.73	5.00	2006
Conversion of conventional machines to CNC machines.	5.50	4.00	2006
Using Fuel cells for power & heat generation.	104.00	600.00	2006
Replace engine testing fresh air blowers with high efficiency blowers.	0.47	0.90	2006
Use of Energy Efficient motors.	9.00	7.00	2007
Effective air conditioning system by atomization using STEFA Control .	8.00	6.00	2007
Installation of wind mill as per Govt. Policy.	1000.00	800.00	2007

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 525 kWh / eq. vehicles and 0.36 MKCals / eq. vehicles by the year 2007

Environment and Safety

For enhancing the Safety standard, company continued its various initiatives on Safety Awareness including Safety Audit, Risk Analysis etc. Health Care to the employees by providing medical check-ups is also organised.

Safety

Safety Patrol Rounds in all units of auto sector are taken on monthly basis by Safety committee members to identify near miss cases. POKA YOKE (Mistake proofing) has been implemented on machines to eliminate accidents. Training & competence program's are conducted to educate and create awareness amongst the employees and the contractors. Through TPM the unit has achieved Zero Major Accidents at Kandivli due to various safety measures taken.

Environment

Kandivli plants is already accredited to Internationally recognized Environmental Management System. i.e. ISO-14001. Environmental Management Program identifies projects, where improvements are achieved on continual basis using a Cross Functional Team (CFT) approach.

Hazardous Waste (M&H) Rules, 2003 compliance with Environmental Legislation and Regulation is maintained in Auto Sector. According to Ozone depleting substances rule in 2000, Kandivli plant has started converting air-conditioning equipment to environment friendly CFC free R134 gas. The plant celebrates world environment day on 5th June every year.