

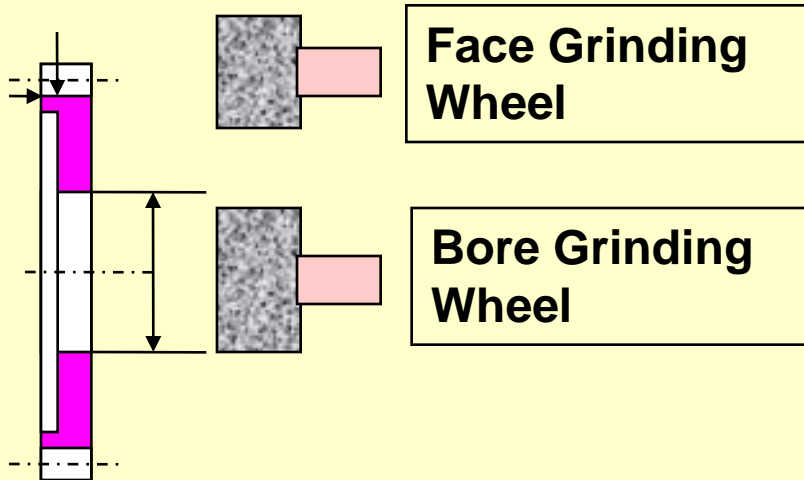
Energy	Base Year 2003-04	Achieved 2007-08	Targets 2008-09
Electricity	67.54 Kwh/veh	36.72 Kwh/veh	33.08 Kwh/veh
LPG	2.53 Kg / veh	2.4 Kg / veh	2.2 Kg / veh
LDO	0.83 Ltr / Veh	Zero	Zero
Compressed Air Electrical consumption	8.9 Kwh /veh	6.40Kwh /veh	6.08 Kwh /veh
Water	0.89 m ³ / veh	0.54 m ³ / veh	0.51 m³ / veh

Sr. No.	Activity	Methodology	Tools used
1	Audit	To identify areas of energy conservation potential	Weekly / Monthly data through Pie charts & brainstorming
2	Analysis	To identify equipments & Processes where energy conservation is possible	Daily/weekly KWh, pressure, flow, volume etc. recording through bar charts, graphs
3	Action Plan	Identify activities for individual equipments with time frame	Resource planning & activity charts
4	Implementation	Action for procurement & implementation	6W2H Way Activity Charts
5	Evaluation	To analyze plan V/S Actual	Gap Analysis & countermeasures
6	Sustenance	To Monitor the results	Internal Audits

ENCON through change in process from Bore Grinding to Bore Honning

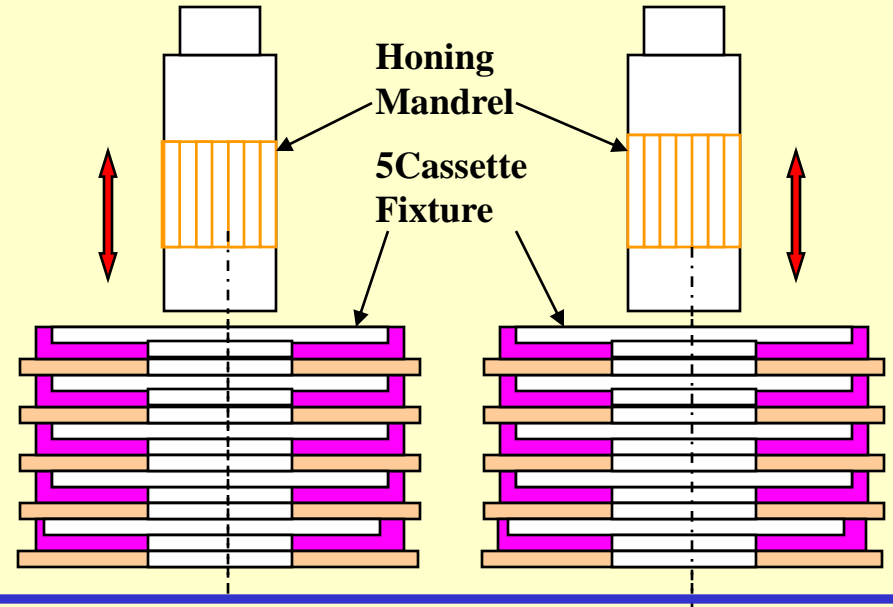
Before

Bore & Face Grinding : 1 Part / Cycle



After

Two Spindle Bore Honing 10 parts / Cycle

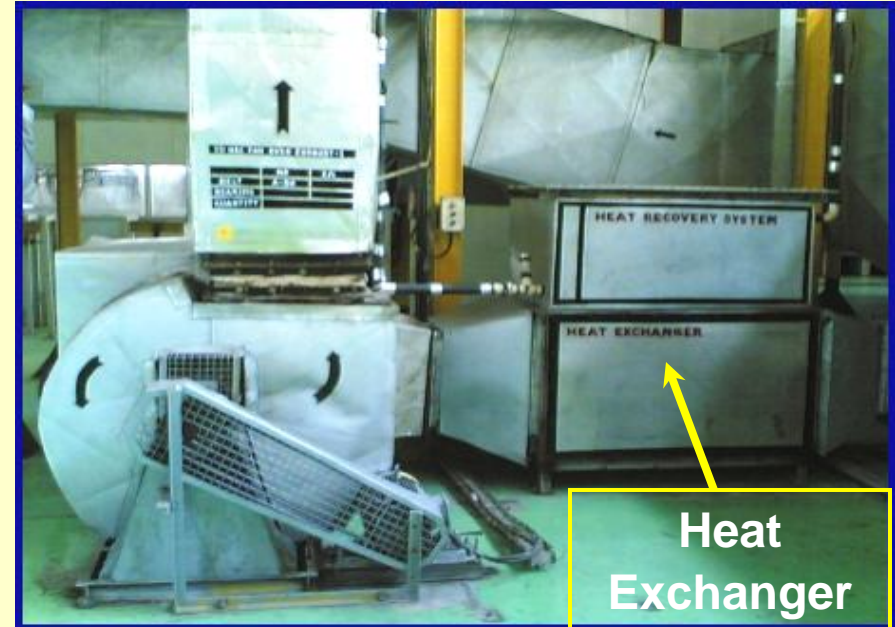


Primary Helical gear Bore & Face grinding was carried out on 4 Grinding Machines. Output : **1700** jobs / shift

Now , Bore Honning operation is being done on Honing Machine. Output : **2500** jobs / shift

Energy saving : Rs.14 Lacs /Year
Investment : Rs.4 Lacs

Heat recovery at Low Temperature in Paint shop ED Oven

Before**After****Heat
Exchanger**

Flue gases of ED Oven 120-140 deg Cent. No heat recovery system.

LPG Saving : 87 Kg /day

Energy Saving :Rs.10.7 Lacs/ Yr

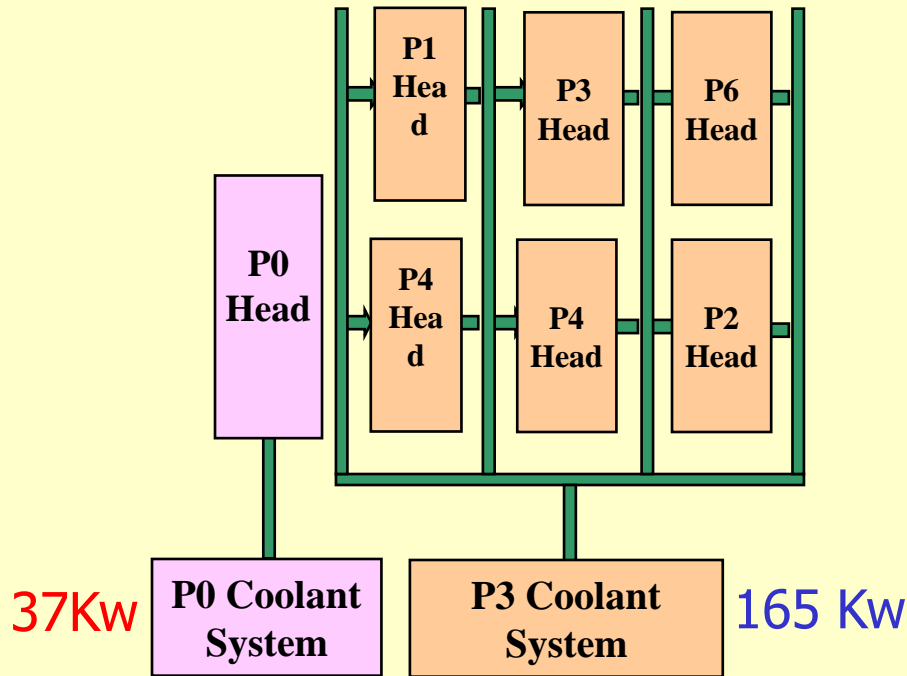
Investment : Rs. 9.75 Lacs

Heat Recovery system is installed for maintaining hot water tank temperature . Now flue gas temperature reduced to 100 Deg.Cent.

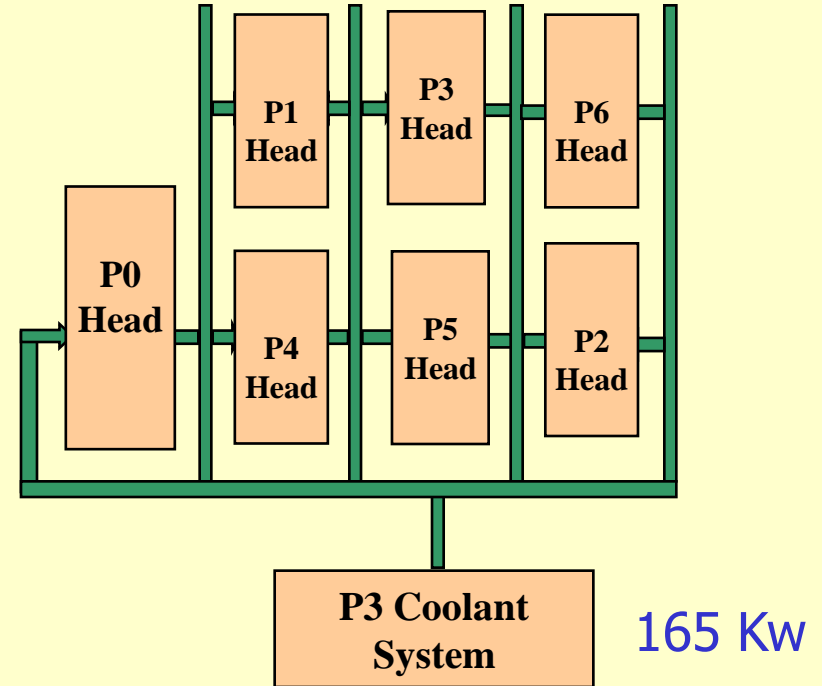
**Scope for horizontal Deployment-
3 Places**

Energy saving through elimination of one coolant system

Before



After



Two coolant systems for Seven Cylinder Head cells

One coolant systems for Seven Cylinder Head cells

Energy Saving : Rs. 6 Lacs / Year
Investment : Rs. 10 Lacs

Process Change : Anodic ED process changed to Cathodic ED Process for Quality, Productivity .

Before

Pre-treatment



Anodic ED



Top colour coat

Anodic ED process-270Kw,
Productivity: 829 Sets / Day

After

Pre-treatment



Cathodic ED



Top colour coat

Cathodic ED process-120Kw,
Productivity: 944 Sets / Day

Energy Cost : Before :Rs.20 / Veh , After : Rs. 8.10 / Veh

Energy Saving : 8.3 Lacs Kwh /Year , Rs. 33.1 Lacs /Year

Investment : Rs. 210 Lacs

Cost saving through elimination of work station & change in process from Teeth Honning to Teeth shaving

Before



Cutting Tool Hone

Gear Hobbing & Gear teeth Honning
No.of work station: 4
Output: 366 jobs /workstation

After



Cutting Tool Shaving Cutter

Gear Hobbing & Shaving
No.of work station: 1
Output: 2200 jobs

Energy Cost : Before Rs. 1.30 / veh. After Rs. 0.44/veh.
Energy saving : 2.5 Lacs Kwh/Yr., Rs. 9.8 Lacs / Yr
Investment : 250 Lacs

Optimisation Of Process: Lacquer Line Processes are integrated for productivity Improvement.

Before



2 Fuel Tank /Hanger
Output:2500 tanks/ shift

After



4 Fuel Tank /Hanger
Output:5000 tanks/ shift

Energy Saving: LPG	: 0.37 Lacs Kg / Yr, Rs. 15 Lacs / Yr
: Electrical	: 3.6 Lacs Kwh / Yr, Rs. 15.6 Lacs / Yr
Investment	: 1.5 Lacs

Installation of Air Pressure Booster

Before

Separate Compressors for turbine bearing air in Paint Shop.

After

Provided air pressure booster.

Saving : Rs. 4.1 Lacs / Yr

Investment : Rs. 0.6 Lacs

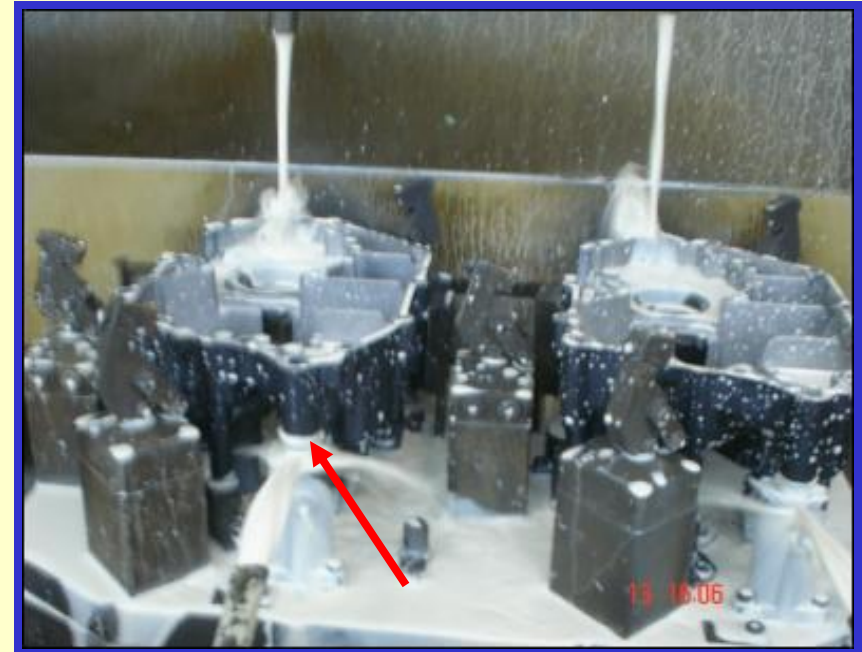
Elimination of Compressed Air for Cleaning

Before



For rest Pad cleaning use of
Compressed Air

After



Rest Pad cleaning using Coolant
auto flushing on 170 Machine

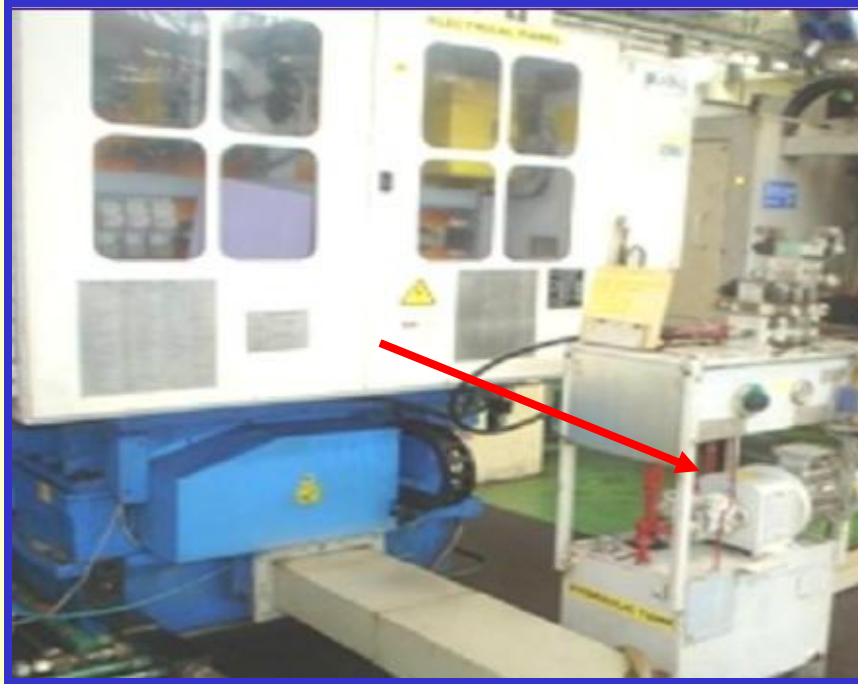
Compressed air Saving : 20 Lacs CF

Saving : Rs 2.0 Lacs / Yr

Investment : Rs. 1.8 Lacs

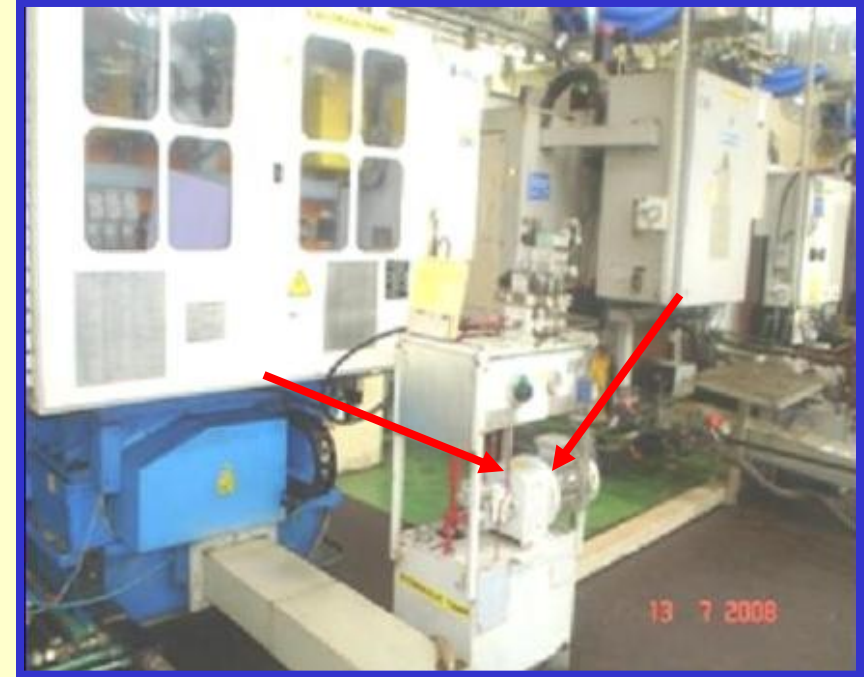
Integration of Hydraulic power Pack

Before



One Machine , One Power Pack

After



Two Machine , One Power Pack

Saving : Rs 8.2 lacs / Yr

Investment : Rs. 2.5 Lacs

CNC Back Light “ A Small Energy Potential” but Deployed Horizontally TO 128 Machines

Before



CNC LCD Screen is continuously ON,
as CNC Back Light is Continuous On.

After

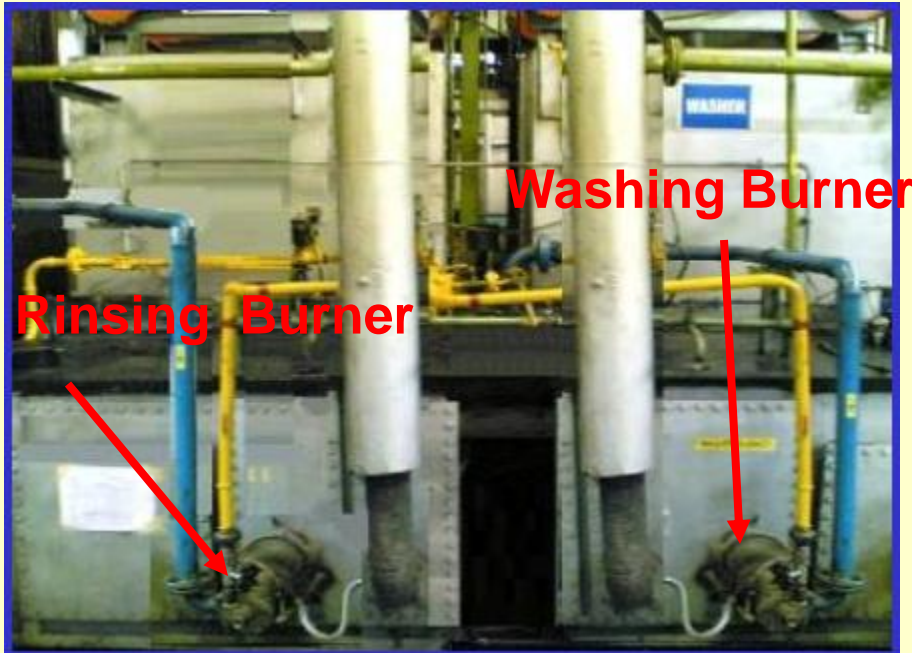


Screen Saver Circuit added to off CNC
Screen Back Light automatically after
preset time of 5 Min

Energy saving :Rs.0.48 Lacs / Yr
Investment : Nil

LPG Energy saving by Integration Of process in Heat treatment

Before



Two Burners, One for Washing Tank,
One for Rinsing Tank

After



Exhaust of Washing Burner connected
to Rinsing Tank , One Burner Removed
For Rinsing Tank

Saving :Rs 7.2 lacs / Yr

Investment : Rs.0.1 lacs

Our Innovative Project Use of LPG heating for Bin washing Published In CII Bulletin Year -2007

UNEP RISE CENTRE
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CII

Confederation of Indian Industry

USAID
U.S. DEPARTMENT OF STATE

Energy Efficiency Bulletin

Case Study Bulletins from CII-Sohrabji Godrej Green Business Centre

Replacement of Electrical Heating of BIN Washing System with LPG Heating System

Bulletin No. 8

September 2007

Company details

Bajaj Auto Limited is one of the major producers of two wheelers and three wheelers in India, having 3 manufacturing units at Akurdi, Waluj and a state of the art plant at Chakan.

Bajaj Auto Limited is also a large exporter of two wheelers and three wheelers.

Background

Electric heaters convert nearly 100% of electricity into heat. But electricity is a form of "high quality heat" as it can be used for various applications. Hence the major disadvantage of electric heating is that the cost of heating through this mode is comparatively higher compared to other modes of heating.

Typically calculation of Rs / MM kCal enables comparison of different sources of heating. At Bajaj Auto Ltd, Waluj the power cost was Rs 3.5 per kWh & the cost of electric heating was Rs 4200 / MM kCal. The plant used a 36 kW heater in their bin washing machine of capacity 1000 liters, to heat water to a pre set temperature of 80°C.

Project details

This project mainly involved avoiding electric heating for Bin washing machine and replacing it with natural aspirated LPG Heating System.

Advantages of LPG heaters

LPG is one of the most preferred sources of thermal heat. LPG eliminates the environmental risks associated with fuel spillage and provides cleaner, convenient power for a range of heating equipment.

The major advantage of LPG heaters is that the cost of heating with this mode is lesser compared to electricity. The calorific value of LPG is 13500 kCal/kg and that of electricity is 860 kCal / kWh. Efficiency of thermal heating is lower, at 80 % where as with electricity the same is around 98 %. Taking even this into account, the cost of heating with LPG is around Rs 3200/MM kCal where as with electricity it is around Rs 4150/MMkCal.



Photograph of LPG connection

Features

The comparative cost of heat using electric heating & Thermal source (LPG) is as follows:

Cost of electric heating - Rs. 4200/MMkCal @ Rs. 3.50/kWh

Cost of LPG heating - Rs. 3200/MMkCal @ Rs. 25/Kg of LPG

This indicates that electrical heating is 1.3 times costlier than LPG heating for the same amount of heat output. The project takes advantage of this comparison and ensures cost savings due to switch over from electrical heating to thermal heating.

Issues faced during implementation

No major issues were faced during the implementation of the project. The project conceptualization took about 3 months. Implementation of the project and hooking up with the existing system was done during a weekly maintenance shut down.

Comments from the plant team

The project was implemented by Bajaj Auto Limited, Waluj in the year 2005.

The idea of using thermal source of heating instead of electrical energy came from the operation team. LPG was chosen as the source because it is a relatively "Clean" fuel.

Financing of the project

The plant invested about Rs 0.175 million (USD 0.0044 million) for implementation of the project. The investment was taken up fully with internal funds.

Results of the project

The annual energy savings achieved due to implementation of the project was Rs 0.15 million (USD 0.0038 million). The investment required was Rs 0.175 million (USD 0.0044 million) with a simple payback period of 15 months.

Cost benefit analysis

- Annual savings – Rs 0.15 millions (USD 0.0038 million)
- Investment – Rs 0.0175 millions (USD 0.0044 million)
- Payback – 15 months

Benefits of the project

- Reduction in cost of heating
- Increase in productivity

About CII & CII-Godrej GBC

CII is a non-government, not-for-profit, industry led and industry managed organisation, playing a proactive role in India's development process. Founded over 112 years ago, it is India's premier business association, with a direct membership of over 6500 organisations from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 90,000 companies from around 350 national and regional sectoral associations.

CII-Godrej GBC is a Centre of Excellence in Energy Efficiency, Green Buildings, Renewable Energy, Water, Environment & Recycling and Climate Change activities in India.

About 3 Country Energy Efficiency

The Project "Developing Financial Intermediation Mechanisms for Energy Efficiency Projects in Brazil, China and India" aimed to substantially increase investments in energy efficiency by the domestic financial sectors in Brazil, China and India.

The project was a partnership between the World Bank, the United Nations Environment Programme (UNEP) through the UNEP Rise Centre on Energy, Climate and Sustainable Development (URC), and institutions in Brazil, China and India. Additional information is available at www.3country.org.

This Energy Efficiency Bulletin comprises of a series of case studies on successful energy efficiency projects implemented by Indian industry. The bulletin is supported under the "3 Country EE" initiative and by USAID.

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Solar water Heating System

Before

Make up water for treatment tank was added at room temperature in PTCED line in motor cycle Plant

After



Make up water is heated by Solar water heating system which reduces load on LPG water heater

LPG Saving : 3396 Kg / Year

Saving : Rs.1.4 Lacs / Year

Investment : Rs. 5 Lacs

Installation of Natural Air Draft ventilators in Machine shops

Before



Electrical exhaust fans for
Fumes removal in shops

After



Natural Air Draft Ventilators
along with Transparent roofs-
Qty: 300 No.s

Saving : Rs. 6 Lacs / Year
Investment : Rs. 20 Lacs

Generation of Electrical Energy with Windmill Power Project

At SATARA & SUPA area in Maharashtra Wind mills are installed for Electrical Power Generation. This is Being operated at Corporate level

Year	Installed Capacity (MW)	Windpower Generated (L Kwh)
2005-06	65	1006.87
2006-07	65	1111.27
2007-08	65	984.48

Electrical Kwh Generated is being Adjusted in our Plants electrical Bills.
Mostly We are Paying Only demand charges

INSTALLATION OF BIO GAS PLANT---- Canteen

Before

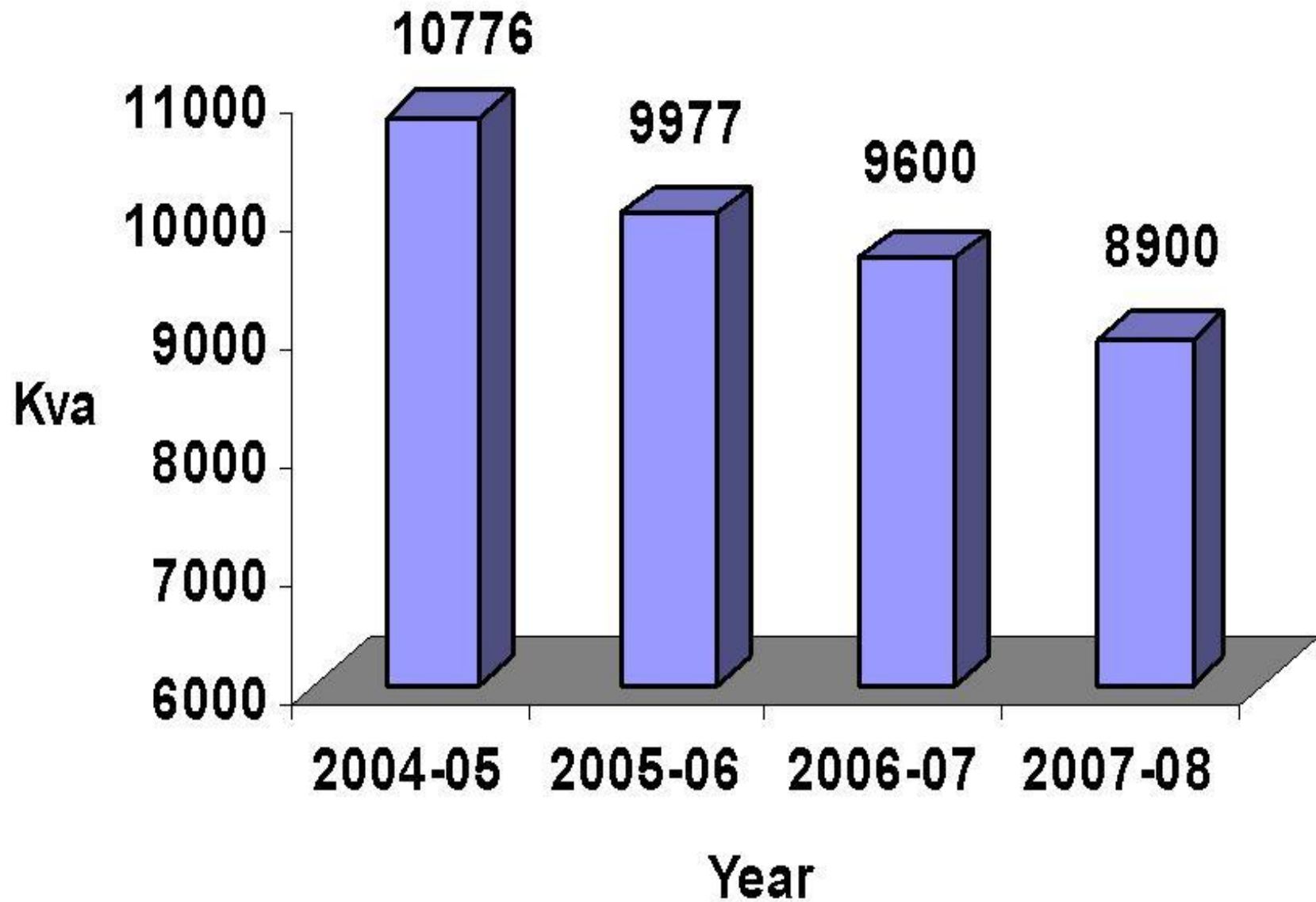
After

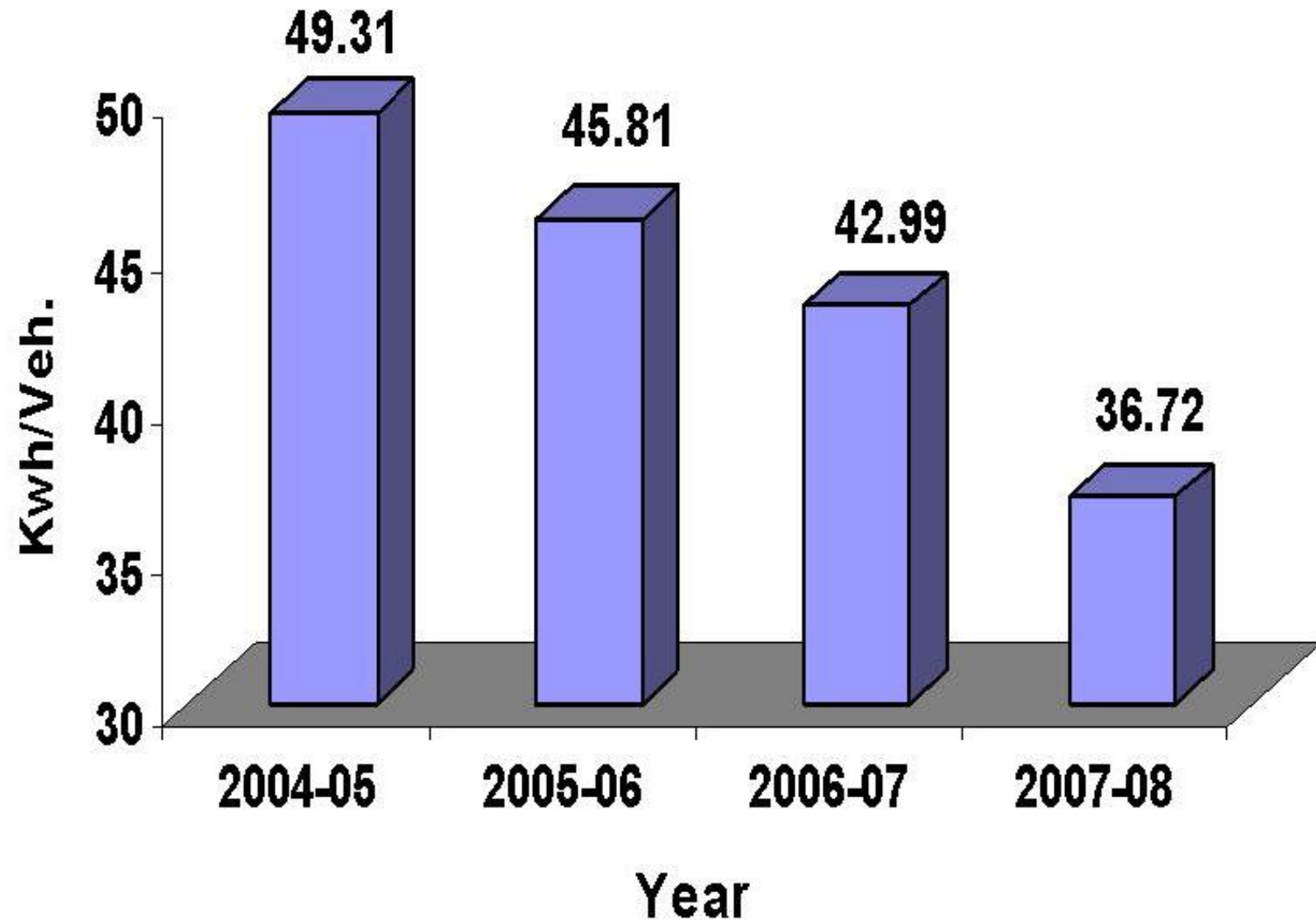
LPG GAS USED FOR
CANTEEN

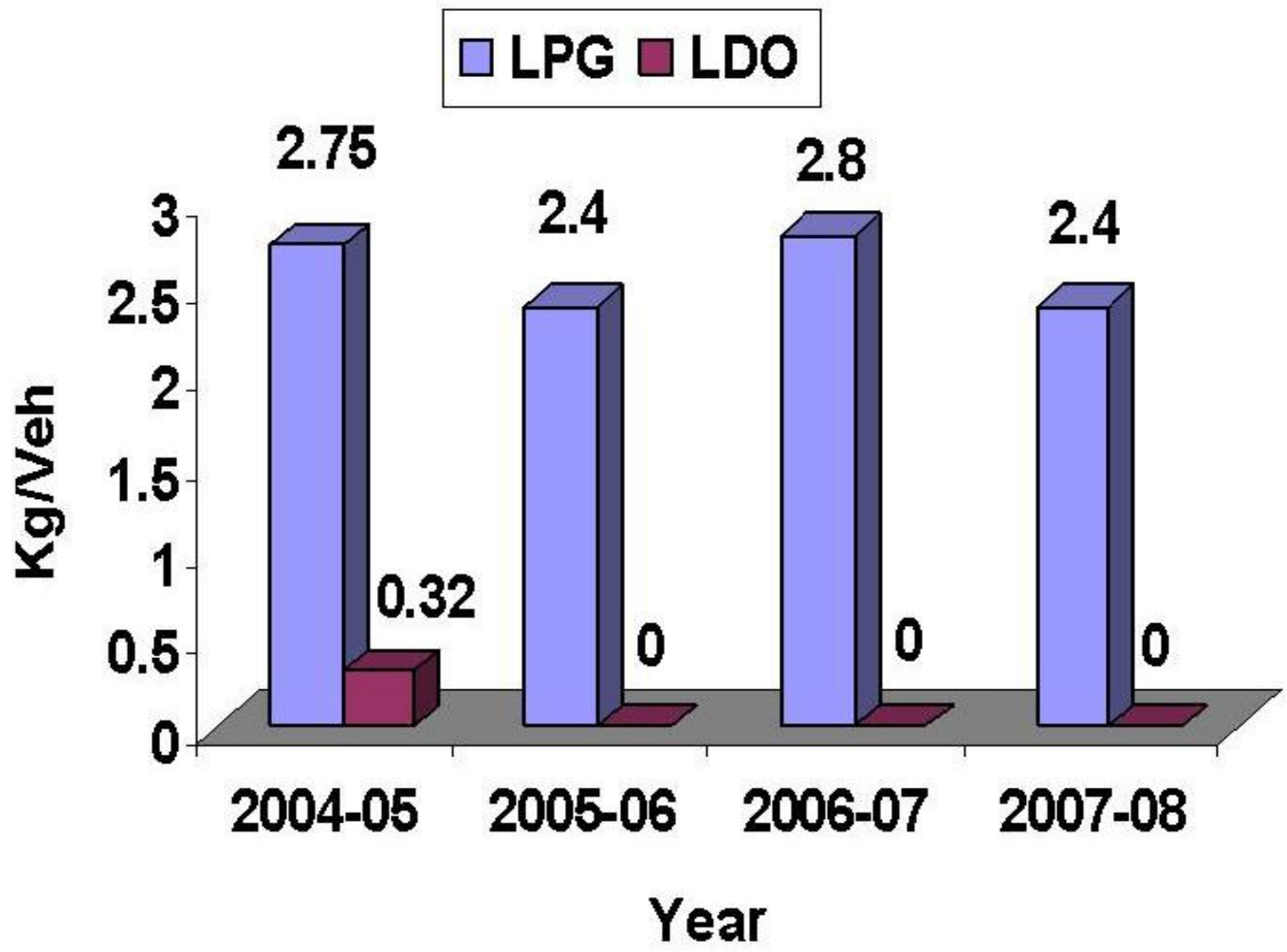


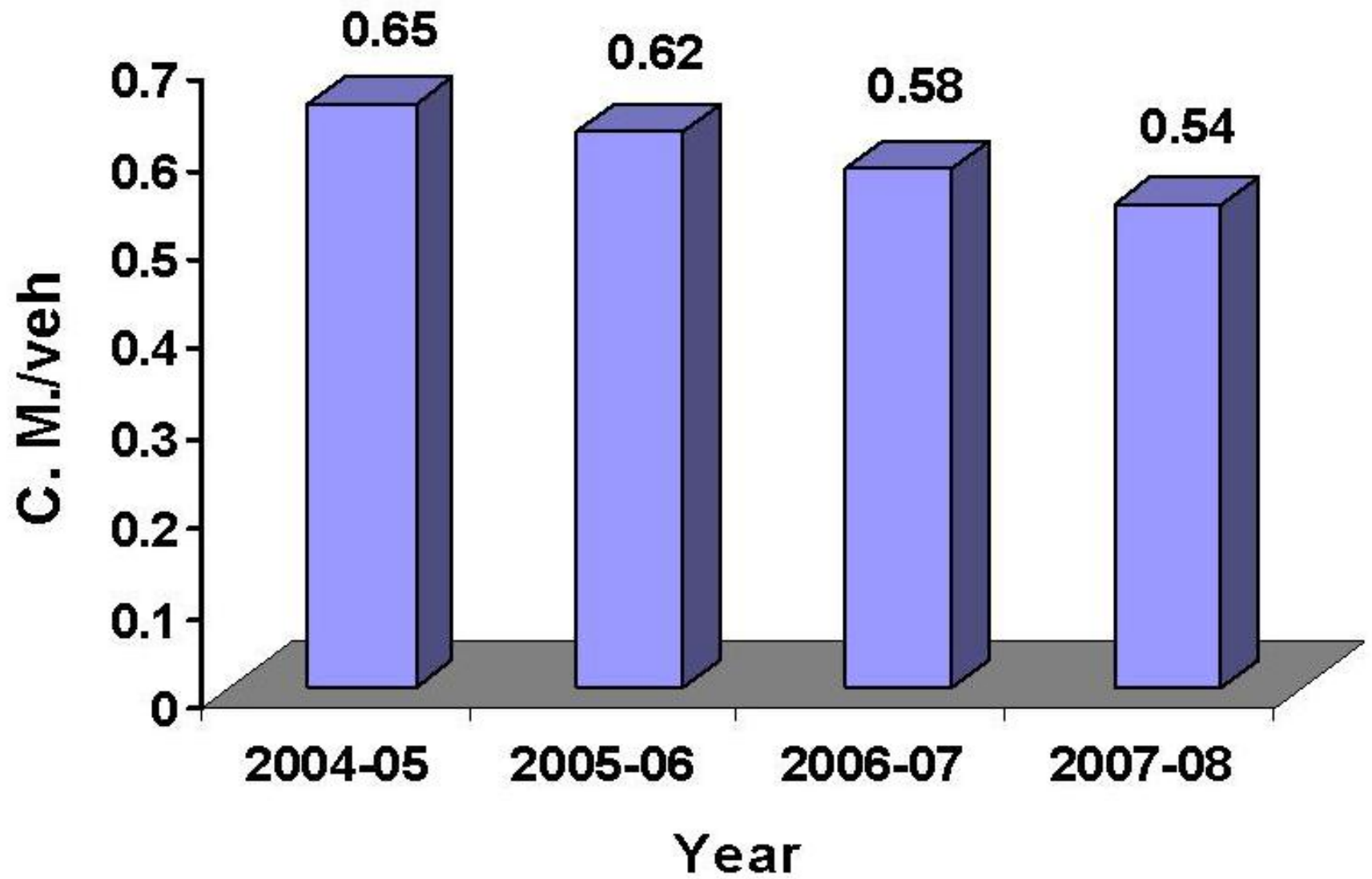
Saving – 22 Kg /day LPG

Saving = Rs 2.6 Lacs / Annum









Task Lighting in machine shops**Before**

Use of Structure Tube lights (2*40 Watt) at 5 meter height

After

Use of 36 W Tube light at 1 Meter Height

Sr. no	Award Year	Award	Awarding Agency
1	2008	Energy Efficient unit award at National Level	CII- GBC
2	2007	Excellent energy efficient unit award at National Level	CII- GBC
3	2007	TPM Excellence award	JIPM
4	2007	OHSAS 18001-1999 certificate	BVQI
5	2006	Excellent energy efficient unit award at National Level	CII- GBC
6	2006	2 nd Prize in Encon competition at State level	MEDA
7	2006	National Water management Award	CII-GBC
8	2005	Energy Efficient unit award at National Level	CII- GBC
9	2005	Excellent water efficient unit award at national level	CII- GBC
10	2004	State Level award for Excellence in Energy conservation & Management	MEDA
11	2004	Excellent energy efficient unit award at National Level	CII- GBC
12	2003	Excellent energy efficient unit award at National Level	CII- GBC

TPM Excellence Award-2007



- **Measuring Instruments are installed at each manufacturing Areas.**
- **Electrical Power consumption for air Compressors & required CFM are monitored on daily basis.**
- **Power, Fuel & Water consumption are reported daily at shop floor / user department.**
- **Detailed Energy index reported division wise for necessary corrective actions on monthly basis.**
- **Cross Functional Team Meetings are conducted weekly for monitoring productivity, Quality & Energy reduction plans to review progress and sharing of thoughts.**
- **Cell cost meetings are conducted Monthly to monitor cell wise expenses like Tools, Energy & Consumables.**
- **Water consumption reviewed Monthly for planning further improvements and monitoring existing plans.**
- **Conducting Audit for Air leakage / Water leakage and Immediate Preventive actions.**
- **Annual reports of Energy saving generated to set goals for next year.**