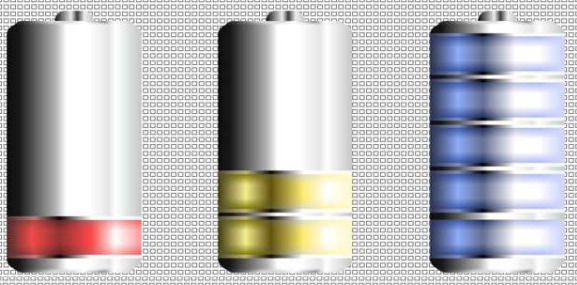
Tata Motors Pantnagar

Earth is on RESERVE

Economize today, ENERGIZE TOMORROW !!!



Team Members:

1. Mr. Sanjay Waghchaure (AGM- Production – Weld)
2. Mr. Vivek Gupta (Energy Manager, Head – Energy Cell)
3. Mr. Prakash Sachdeva (Manager – Utility & Construction)

Contents

TML Pantnagar Products

Capacity
5 Lac Vehicle
per Year

Introduction – Tata Motors Pantnagar

- Est.in 2007: Products from 0.5 ton (Micro truck) to 31 tons (Medium & Heavy Commercial) category
- India's first plant to setup with integrated vendor park (953 Acre total, Vendor park 361 Acre)
- **GREEN CO "Gold" certified** plant with "**LEED INDIA- Gold**" rated Administration building
- Advance manufacturing system, Robots for manufacturing in Weld shop & Painting process , Fully Automatic Coordinate Measuring Machine (CMM), State of the art training center
- A true Zero liquid discharge plant having RO plant to recycle process water effluent back to paint process and online monitoring system
- Green design & Energy efficient features such as , Insulated pre-engineered buildings, Wind ventilators,20% Green coverage , 07 Nos artificial lakes, 30% VFD motors, latest technology machines etc

Awards & Recognition (Recent): Tata Motors Pantnagar

2016

GOLDEN PEACOCK ENVIRONMENT MANAGEMENT AWARD 2016

2015

GOLDEN PEACOCK ENVIRONMENT MANAGEMENT AWARD 2015

GREEN CO GOLD 2015

Good Green Governance Award 2015

Energy policy & Organization

TML is the first automobile company in India to achieve ISO 50001:2011

Energy Policy

Tata Motors (CVBU) reaffirms its commitment to minimize the use of energy through continual improvement of its energy performance.

Towards this end it shall strive to:

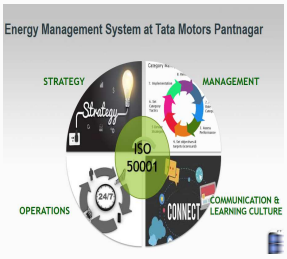
- create & establish framework for achieving energy objectives & targets
- select, purchase and use appropriate energy, efficient equipments, services and eco-friendly technologies
- evaluate and compare with appropriate bench mark
- comply with applicable legal & other requirements
- build awareness on efficient energy use amongst our work force, customers, dealers, vendors and society

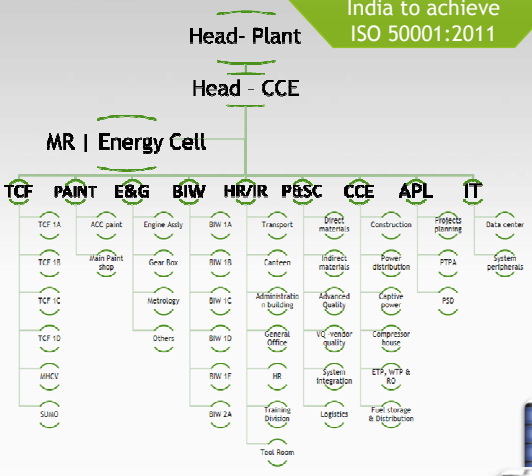
This policy has been communicated to all our work force & shall be made available to the public / stakeholders on request.

Date : August 21, 2012

TATA

Executive Director
Tata Motors - Commercial Vehicles





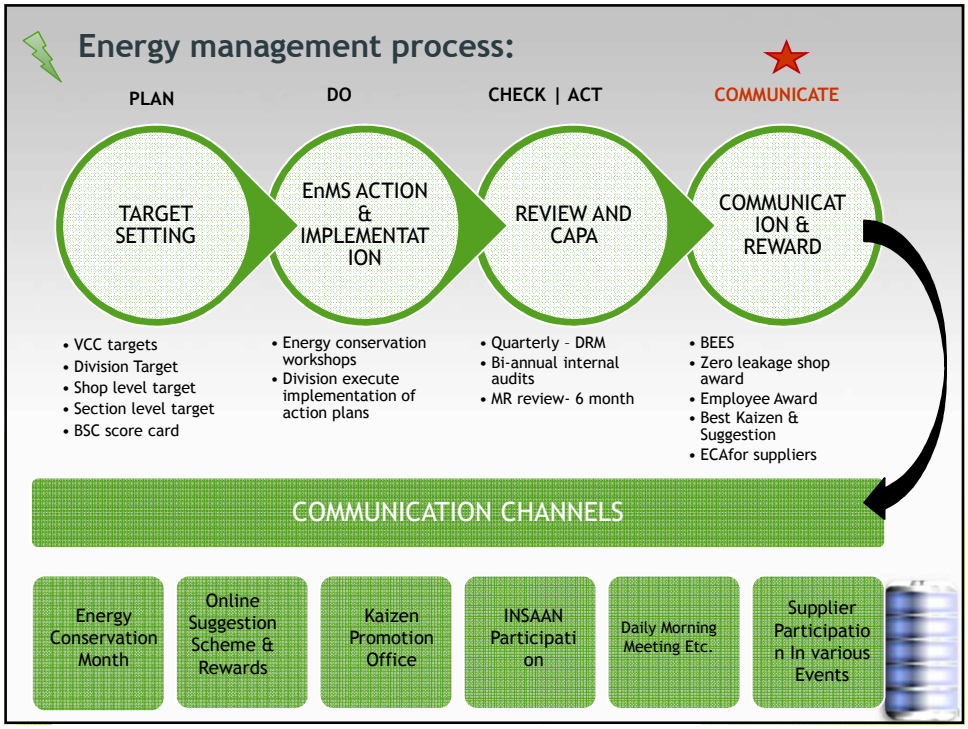
Energy Monitoring Systems :

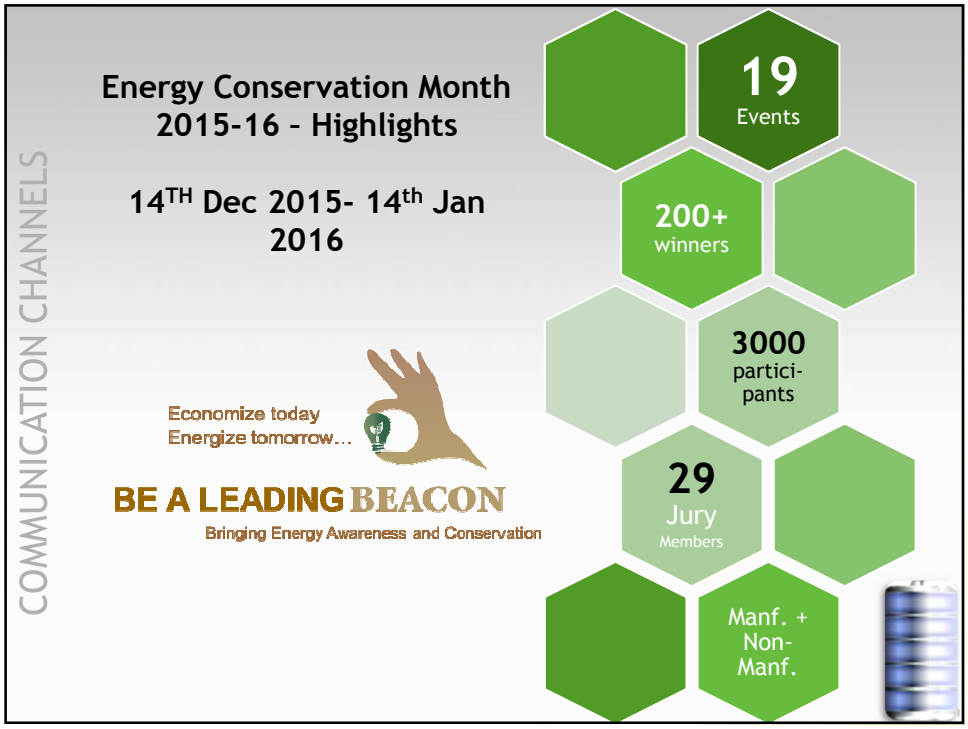
ONLINE	Daily	Monthly	Quarterly	Bi-annual	Annual
• Web based - Power and Fuel	• Morning meet • Share folder on company server	• RCM report • Monthly - Divisional	• EnMS DRM	• EnMS internal audits	• EnMS Management review

ISO 50001 - Energy management system
ENERGY MANAGEMENT share folder
KTL - online manual

DRIVERS:

1) Energy & Environment conservation month
2) Kaizen – 02 nos per person per month
3) Suggestions - 02 nos per person per month

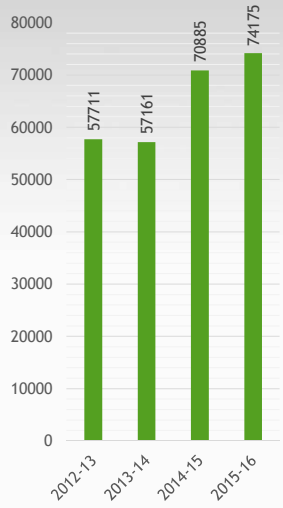

Energy management process:
PLAN
DO
CHECK | ACT
COMMUNICATE
TARGET SETTING
EnMS ACTION & IMPLEMENTATION
REVIEW AND CAPA
COMMUNICATION & REWARD
• VCC targets
• Division Target
• Shop level target
• Section level target
• BSC score card
• Energy conservation workshops
• Division execute implementation of action plans
• Quarterly - DRM
• Bi-annual internal audits
• MR review- 6 month
• BEES
• Zero leakage shop award
• Employee Award
• Best Kaizen & Suggestion
• ECAfor suppliers
COMMUNICATION CHANNELS
Energy Conservation Month
Online Suggestion Scheme & Rewards
Kaizen Promotion Office
INSAAN Participation
Daily Morning Meeting Etc.
Supplier Participation In various Events


COMMUNICATION CHANNELS
Energy Conservation Month 2015-16 - Highlights
14TH Dec 2015- 14th Jan 2016
Economize today
Energize tomorrow...
BE A LEADING BEACON
Bringing Energy Awareness and Conservation
19
Events
200+
winners
3000
partici-
pants
29
Jury
Members
Manf. +
Non-
Manf.

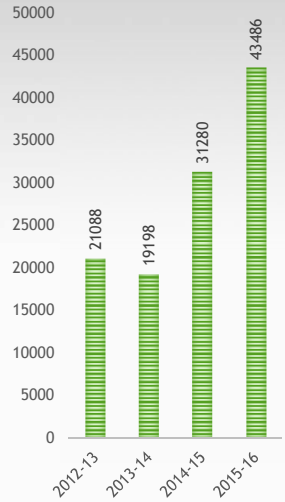
COMMUNICATION CHANNELS

Employee involvement through Suggestion scheme

Generated



Implemented



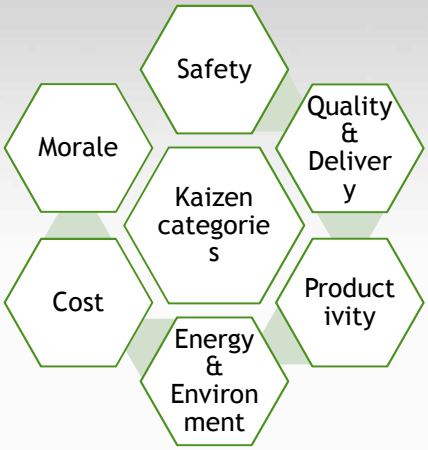
02 Kaizen per employee target

Approx. 7- 10% on Energy conservation

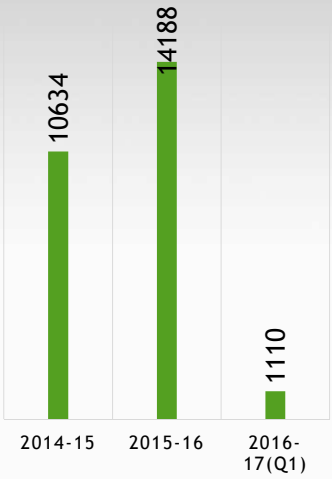
COMMUNICATION CHANNELS

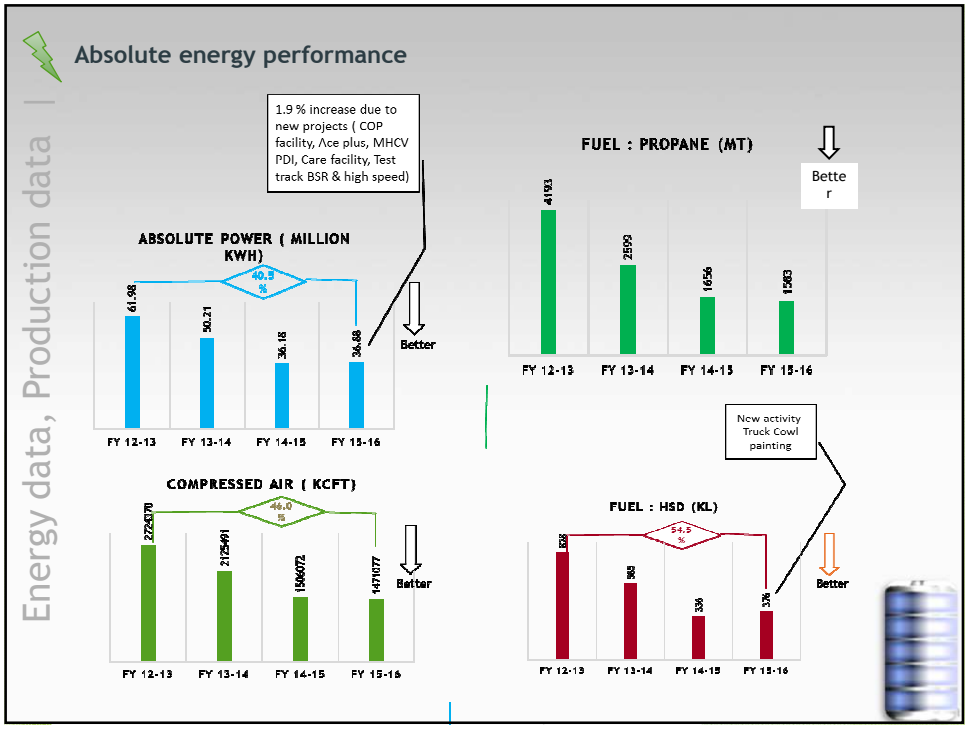
Kaizen:

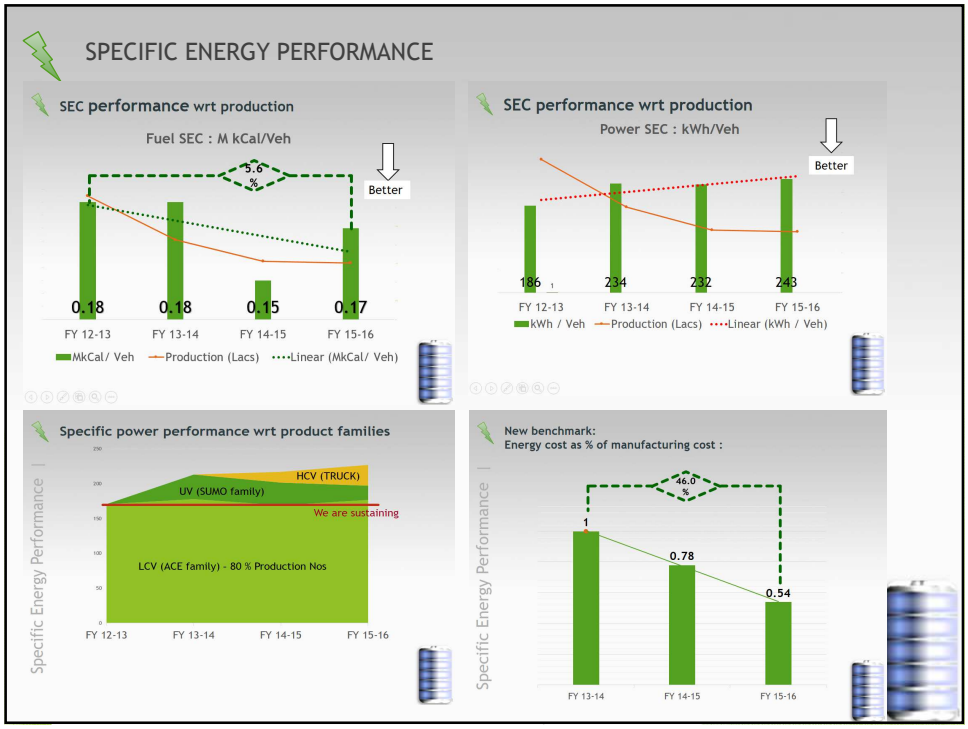
02 Kaizen per employee- in PMS



Kaizen implemented Year on Year

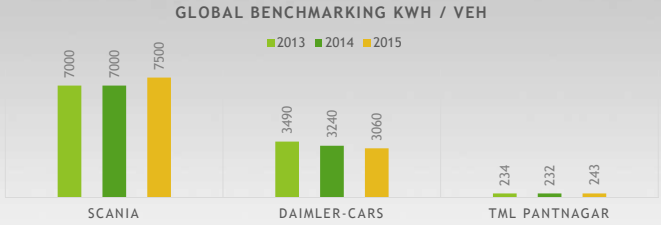



Absolute energy performance
Energy data, Production data
1.9 % increase due to new projects (COP facility, Ace plus, MHCV PDI, Care facility, Test track BSR & high speed)
ABSOLUTE POWER (MILLION KWH)
40.5 %
61.98
50.21
36.18
36.68
Better
FY 12-13
FY 13-14
FY 14-15
FY 15-16
FUEL : PROPANE (MT)
Better
41923
25993
16556
15063
FY 12-13
FY 13-14
FY 14-15
FY 15-16
New activity Truck Cowl painting
COMPRESSED AIR (KCFT)
46.0 %
2724370
2125491
1506072
1471077
Better
FY 12-13
FY 13-14
FY 14-15
FY 15-16
FUEL : HSD (KL)
54.5 %
Better
FY 12-13
FY 13-14
FY 14-15
FY 15-16

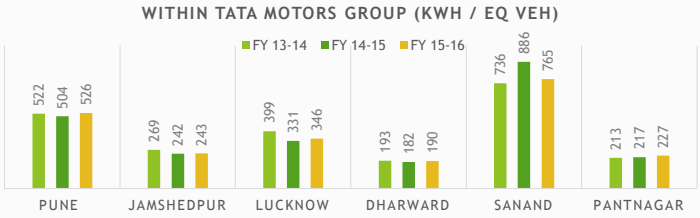

SPECIFIC ENERGY PERFORMANCE
SEC performance wrt production
Fuel SEC : M kCal/Veh
5.6 %
Better
0.18
0.18
0.15
0.17
FY 12-13
FY 13-14
FY 14-15
FY 15-16
MkCal/ Veh
Production (Lacs)
Linear (MkCal/ Veh)
SEC performance wrt production
Power SEC : kWh/Veh
Better
186
234
232
243
FY 12-13
FY 13-14
FY 14-15
FY 15-16
kWh / Veh
Production (Lacs)
Linear (kWh / Veh)
Specific power performance wrt product families
Specific Energy Performance
HCV (TRUCK)
UV (SUMO family)
We are sustaining
LCV (ACE family) - 80 % Production Nos
FY 12-13
FY 13-14
FY 14-15
FY 15-16
New benchmark:
Energy cost as % of manufacturing cost :
Specific Energy Performance
46.0 %
1
0.78
0.54
FY 13-14
FY 14-15
FY 15-16

Benchmarking |

Benchmarking : Global

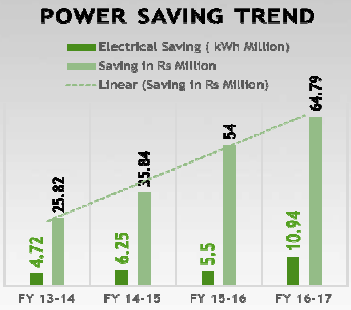


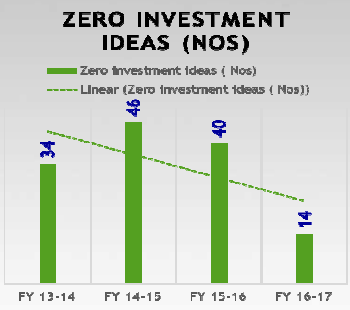
Benchmarking : Within TML - Plant to Plant

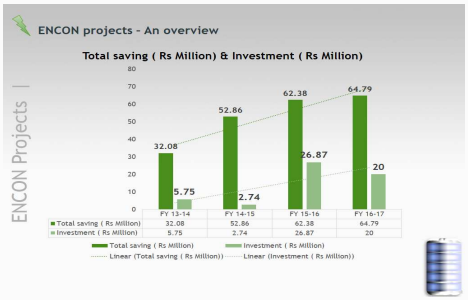


ENCON Projects |

ENCON projects - An overview







Few energy management programs

ENCON Projects |

Few energy management programs : Comp.Air Pr. Optimization for individual IT welding guns

Problem: Continues compressed air supply @ 05 Bar is provided to all welding guns. Where it can be set to desired pressure as per recommendation.

Opportunity: Compressed air saving by adjusting the welding gun force as per sheet thickness

Action: Reset pressure at each individual IT welding gun as per sheet thickness. Range (3.5 Bar to 04 Bar)

Saving details: 212 IT guns Saving of 815 KSCF/ 2445 kWh /Rs 12226 @ 2147 Nos of bodies.

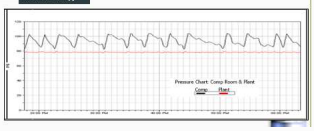
Few energy management programs : Transport stacking of frames

Issues
- Less stacking capacity
- Rework in ~60-70 % Frames

Improvements & Benefits
- Zero Rework & Rejection
- As stack height increased to 6, logistics cost savings of ~43 lakhs annually

43 Lakhs of diesel saved annually+ 30000 wooden planks!

Compressed Air Control Air IFC System



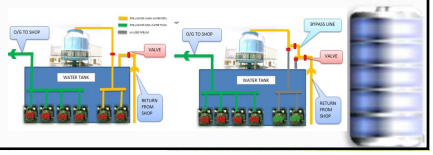
Few energy management programs : Cooling tower pipeline modification

Problem: Loss of pressure head in return water line of cooling tower due to design inefficiency causing running of water circulation pumps.

Design modification can switch Off 02nos water circulation pumps.

Action: Modified pipeline design to directly feed return water to inlet to cooling tower after analyzing available pressure head.

Saving details: Annual energy saving – 1.4 L kWh (INR 8 Lac /year) 115 t Co2



Green Supply chain : Impact analysis

ENCON Projects |

Functions	Activity / Process -	Type of Energy
Logistics	Efficient Transportation of material to TML Pantnagar	Fuel Energy
Scheduling	Ensure timely availability of material with environmental friendly packaging	Electrical energy
Warehouse	Efficient Scheduling of Logistic - TAT reduction more than 20%	Fuel Energy
SQ	Localization of parts, Reduction in warranty issue, Reduction in the inspection by the improvement in part quality , Supplier defect PPM reduction	Fuel Energy/Electrical energy
IDM-Purchase	Evaluation of supplier on Energy performance of equipment	Electrical Energy

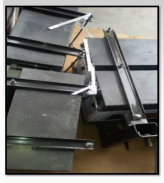
Few energy management programs : Packaging & stacking of Fuel tanks

BEFORE

AFTER

80000 Ltr of annual diesel savings
10000 kgs of foam saved.

Few energy management programs : Transport of Batteries



Advantages :
1) 5000 wooden pallets annually
2) Fuel saving due to stacking of battery frames

INNOVATION MANAGEMENT

Innovation triggers & systems

Processes

- Suggestion scheme
- Kaizen promotion cell
- Energy conservation month

Events - award and recognition

- Best Innovative project award
- Monetary reward for employees
- Best suggestion & Kaizen Awards

Employee engagement & Training

- Energy management system
- Energy & Environment month celebration
- Training on Innovation management
- Technology day

Innovative projects

Problem: In painting process, for every different color model, color change needs to be done in each painting robot and hand gun. The color change frequency was very high - upto 143 times a day

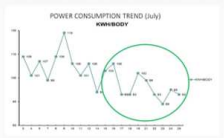
Opportunity: Poor capacity utilization and energy wastage due to :
1) Body gap between two different color bodies
2) No of color change

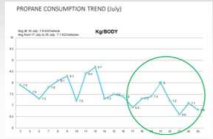
Action: Color grouping done with careful planning and coordination with all pre & post operations and creating a buffer management in between lines for high model matrix - 18 models & 18 colors on single line

Saving details: saving of 8.5 kWh /vehicle & 0.64 KG / Vehicle propane consumption.
Yearly saving kWh = 1275000 kWh / Year = INR 7012500 per year & propane saving KG= 96000KG = INR 6201600 per year

Color matrix preparation and % contribution of each color | Identify factors responsible for color change (fish bone diagram) | Prioritization of causes | Understanding current situation and problems wrt infrastructure, management , stake holders | WBS mezzanine floor modification and schedule changes in 6 storage lines (15 body shells each) | Color selection and coordination at sanding line | Actions by PPC

Results:





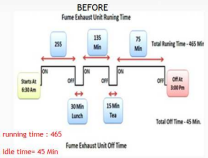
Innovative projects

Problem: Fume extractor fan run continuously to expel fume at welding station

Opportunity: Stop idle running of fume extractor in:
1) Waiting for product
2) Quality check time
3) Body transfer time

Action: Provided controller interlinked with welding gun controller, when ever welding gun operator, fume extractor run.

Saving details: Idle run time reduction : 420 Min
Energy Saving : 48000kWh / Year per PE (02 shift)
Cost saving : Rs 2.5 Lac per Year



Innovative projects

Foldable Pallets for Gearbox

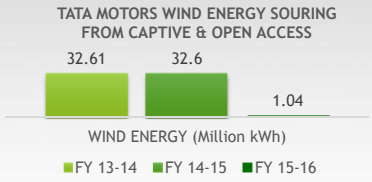
Huge diesel fuel savings due to multiple stackability of foldable pallets
3600 Ltr to 9500 Ltr HSD saving (2 to 5. 25 lakhs)

Renewable energy & Utilization of Waste

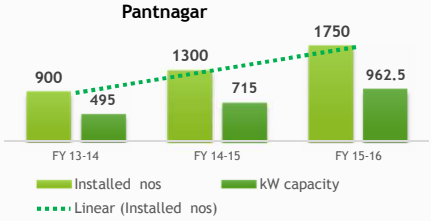
Tata Motors Limited, the second Indian company to join RE100

RENEWABLE ENERGY |

WIND ENERGY



Wind ventilators installation at TML Pantnagar



SOLAR ENERGY

Solar power:

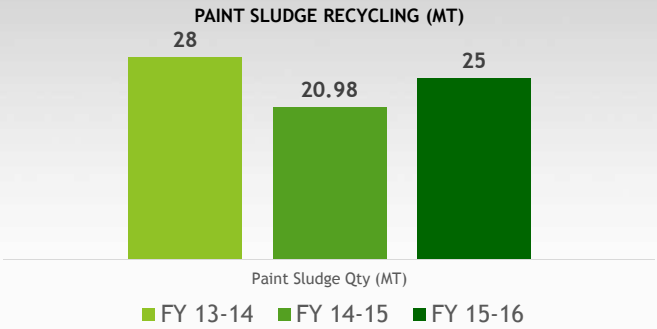
- Long term power purchase agreement with service provider for all plants including TML Pantnagar
- Projected capacity of 5 MWp.
- First phase 223kWp done at Pune plant.

Solar water hot water system (5000 liters per day) for canteen at Tata Motors Pantnagar (2010)

Renewable energy & Utilization of Waste

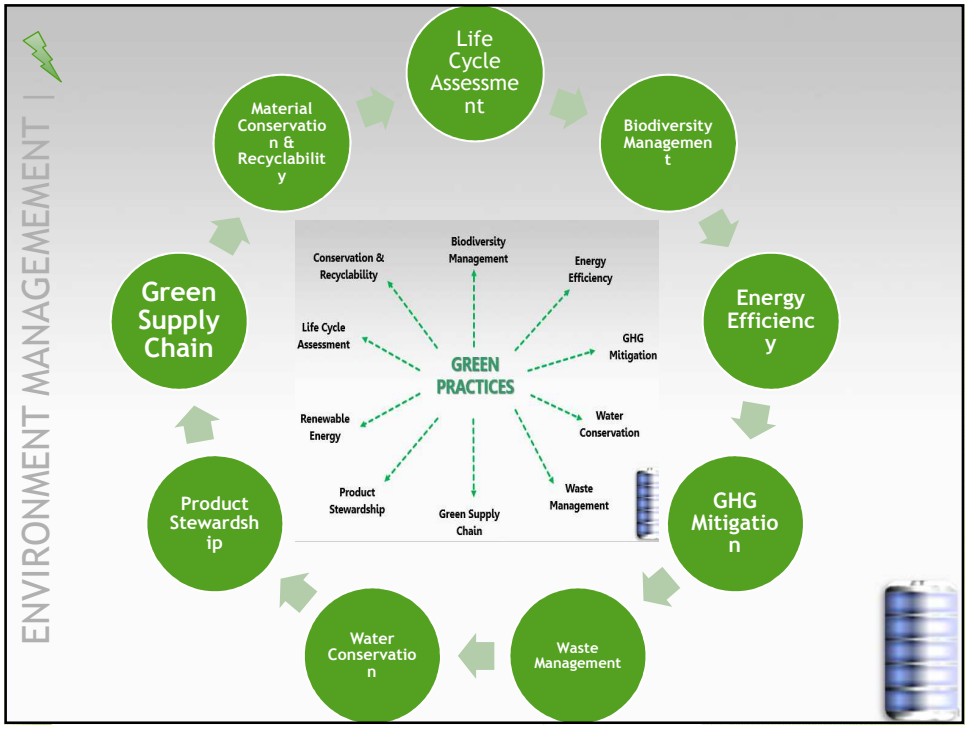
UTILIZATION OF WASTE |

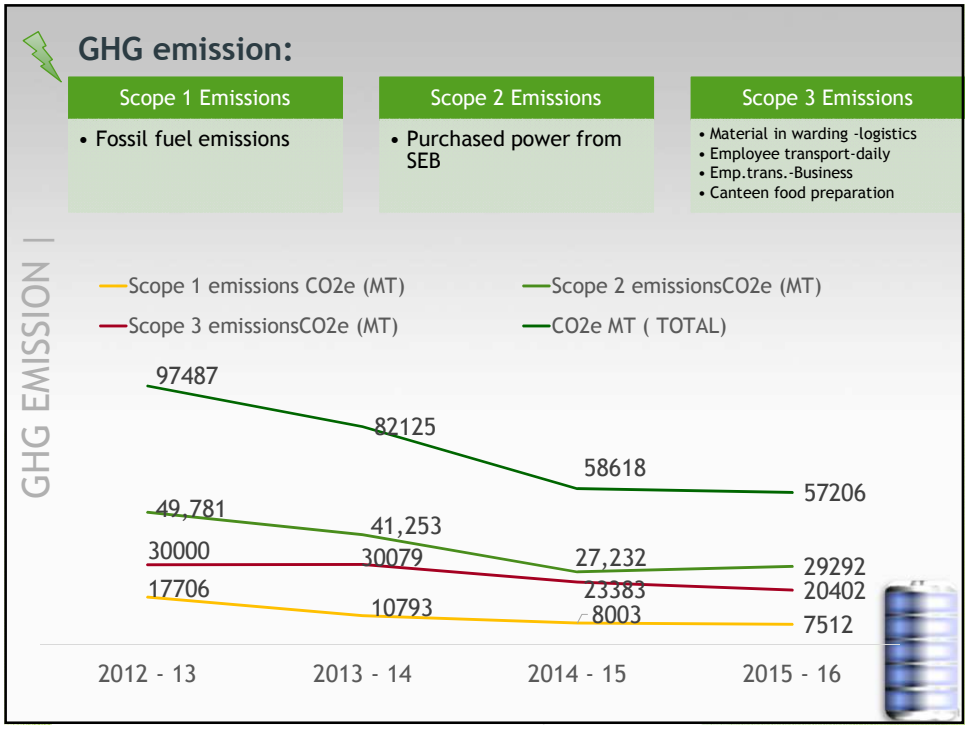
UTILISATION OF WASTE



Project in pipeline:

1) Purchase orders given to ACC cement & Ambuja Cement for coprocessing of paint sludge
2) Biomass converter for canteen waste to generate fuel gas which is in consideration of management for implementation.


ENVIRONMENT MANAGEMENT
Life Cycle Assessme nt
Biodiversity Managemen t
Energy Efficienc y
GHG Mitigatio n
Waste Management
Water Conservatio n
Product Stewardsh ip
Green Supply Chain
Material Conservatio n & Recyclabilit y
GREEN PRACTICES
Biodiversity Management
Energy Efficiency
GHG Mitigation
Water Conservation
Waste Management
Green Supply Chain
Product Stewardship
Renewable Energy
Life Cycle Assessment
Conservation & Recyclability


GHG EMISSION
GHG emission:
Scope 1 Emissions
• Fossil fuel emissions
Scope 2 Emissions
• Purchased power from SEB
Scope 3 Emissions
• Material in warding -logistics
• Employee transport-daily
• Emp.trans.-Business
• Canteen food preparation
Scope 1 emissions CO2e (MT)
Scope 2 emissionsCO2e (MT)
Scope 3 emissionsCO2e (MT)
CO2e MT (TOTAL)
97487
82125
58618
57206
49,781
41,253
27,232
29292
30000
30079
23383
20402
17706
10793
8003
7512
2012 - 13
2013 - 14
2014 - 15
2015 - 16

Few examples : Solid waste management

Co Processing of Hazardous waste

- Reduces greenhouse-gas emissions
- Reduces the environmental impact of extraction
- Conserves natural (non renewable) energy and material resources
- Future liability

Few examples : Waste reduction - Packaging of silencers

BEFORE

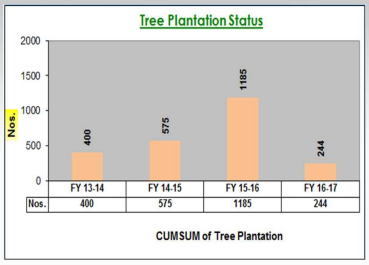
AFTER

Polythene and Foam Saving for 15000 silencers

Few Examples: Life cycle assessment

Life Cycle Assessment (LCA) is a method/tool for the estimation of the environmental and human health impacts that are connected with a product / with a service / with a process / with a technology over the whole life cycle from cradle to grave.

Few examples : Tree plantation

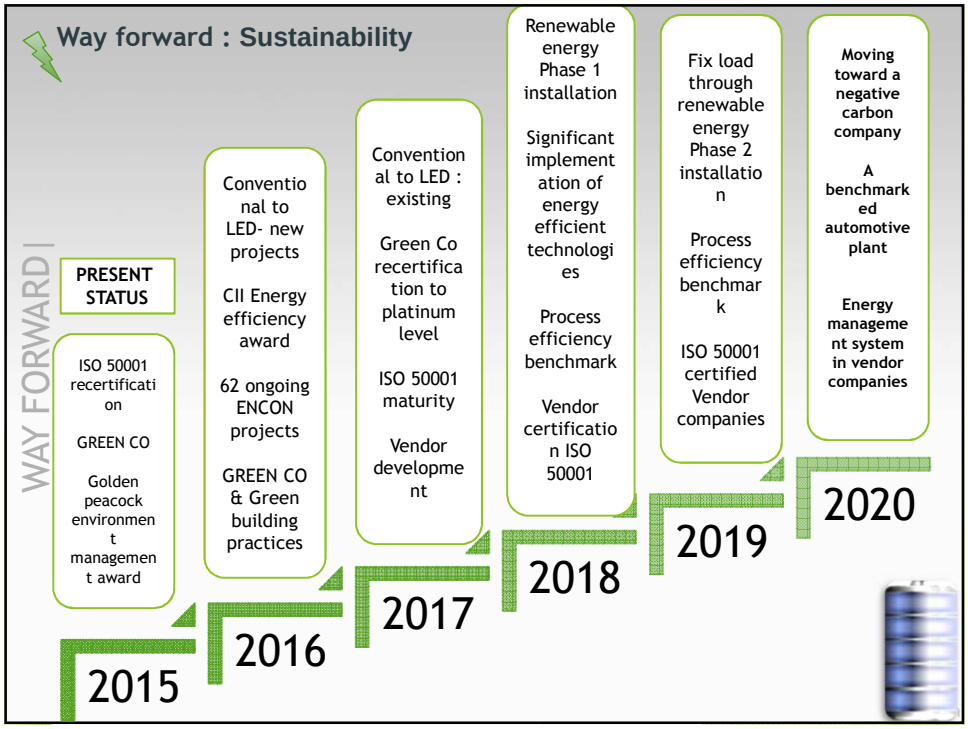


Enabling factors for team work:

TEAM WORK |

- Employee engagement through various systems i.e. SDT (self directed teams)
- Cross functional reporting
- Employees Performance management system
- Cross functional teams
- Organization culture of participation and freedom

Project - 1	Project - 2	Project - 3	Project - 4	Project - 5	Project - 6	Project - 7	Project - 8	Project - 9
Supervisor	Senior Management	Middle Management	Engineer	Supervisor	Workmen	Supervisor	Engineer	Workmen
To reduce energy cost by design modification of water recirculation system.	Waste heat recovery system at RTO of ED oven in paint shop.	Energy saving by installing timer control in main line of compressed air for DUMORE Gauge application.	Energy saving by reducing idle running through off delay timer for smoke/ fume extraction system.	Energy saving by installing VFD for exhaust fan control for air supply.	Energy saving by timer installation for Fan control	Energy saving by reducing idle running of FRC (Friction roller wheel conveyor) motor	Energy saving by revising the clamp pressure setting in welding gun (IT gun)	Energy saving by optimum loading and utilization of Fume extractor


Way forward : Sustainability
WAY FORWARD |
PRESENT STATUS
ISO 50001 recertification
GREEN CO
Golden peacock environment management award
2015
Conventional to LED- new projects
CII Energy efficiency award
62 ongoing ENCON projects
GREEN CO & Green building practices
2016
Conventional to LED : existing
Green Co recertification to platinum level
ISO 50001 maturity
Vendor development
2017
Renewable energy Phase 1 installation
Significant implementation of energy efficient technologies
Process efficiency benchmark
Vendor certification ISO 50001
2018
Fix load through renewable energy Phase 2 installation
Process efficiency benchmark
ISO 50001 certified Vendor companies
2019
Moving toward a negative carbon company
A benchmarked automotive plant
Energy management system in vendor companies
2020