



Confederation of Indian Industry



GreenCo Forum – Delhi

26 August 2016

JCB India GreenCo Journey

- Certified in **ISO 14001:2004** since December 2006
- JCB signed CII- **Code for Ecologically Sustainable Business Growth** in September 2009
- JCB India participated in developing the **CII, Green Rating in 2010**
- Participated in **CII Exim Bank Award in 2009 & 2011**
We have received Significant Commitment to Excellence
- **Water Audit from CII Water Institute in 2010**
- Participated in Frost & Sullivan **Manufacturing Excellence Award. Year 2015 – Platinum Award.**



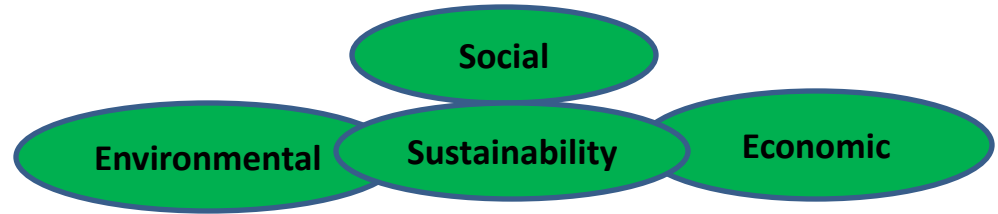
- **2015, CII Greenco Rating Assessment** from CII, GBC, Hyderabad
Silver Rating Award
- **Frost & Sullivan Sustainability 4.0 Award 2016**
- **Times of India Group Machinist Super Shop Floor Award 2016 Green Manufacturing – Runner Up Award**
- **National level Energy conservation 1st Award** in General Category by Bureau of Energy Efficiency, Govt of India in December 2010



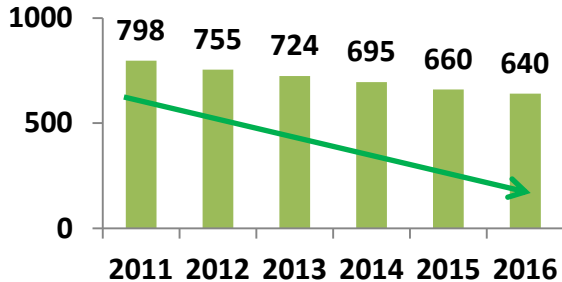
| 5 Years Business Strategy | Environment & Sustainability | | | | | |
|--|------------------------------|-------------|-------------|-------------|-------------|--|
| BUSINESS UNIT - BHL | Objectives | | | | | Comments |
| | 2016 | 2017 | 2018 | 2019 | 2020 | |
| Director's Audit score | Completed | Completed | Completed | Completed | Completed | Joint Audit with H&S. Once in a Month |
| Compliance Audits | 100% | 100% | 100% | 100% | 100% | Two external & one internal IMS audits done. *Cross departmental audits once in a month along with Safety audit. |
| ISO 14001 | Zero Majors | Zero Majors | Zero Majors | Zero Majors | Zero Majors | Re- Registration in 2015, Upgrade to 2015 Version in 2016 |
| Associate IEMA/Adviser Competence | | | | | | Masters Degree in Ecology & Environment |
| Associate IEMA CDP/Adviser Competence | | | | | | Module Covered in Managing Safely |
| IEMA Cert Environment for Senior Executives | | | | | | Module Covered in Managing Safely |
| Waste - Recycling | 100% | 100% | 100% | 100% | 100% | ETP / STP water is used for Horticulture. No discharge from plant. |
| Waste - Reduced Packaging/ Hazardous Waste | 4% | 3% | 5% | 5% | 5% | |
| Waste - Incineration to Energy Recovery | 0% | 0% | 0% | 0% | 0% | No waste heat recovery is planned. |
| Water Conservation | 5% | 5% | 5% | 5% | 5% | Over Previous Year |
| Energy Conservation - Energy/Utility Reduction | 3% | 2% | 5% | 5% | 5% | Over Previous Year |
| Carbon Management - GHG reduction | 3% | 2% | 5% | 5% | 5% | As per the target taken in Eco Code for green house gas reduction. Targets for renewable energy also taken |
| Carbon Management - Transport and Logistics | NA | NA | NA | NA | NA | Scope 3 emissions are not considered. |
| Zero Complaints | 0 | 0 | 0 | 0 | 0 | Although audits are done at group level it is the responsibility of BUs to manage and evaluate their compliance to legislation |
| Zero Enforcement | 0 | 0 | 0 | 0 | 0 | |
| Zero Prosecution | 0 | 0 | 0 | 0 | 0 | |
| Best Practice | 2 | 2 | 1 | 1 | 1 | External Assessments CII - GBC, CII - CSD, F&S |

Our Sustainability initiative has focus on Ten indicators of Sustainability

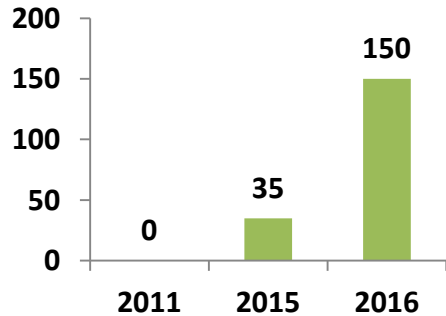
| Parameters |
|--|
| Energy Efficiency |
| Water Conservation |
| Renewable Energy |
| GHG Emission Reduction |
| Material conservation (Recycling & Recyclability) |
| Waste Management |
| Green Supply Chain |
| Product Stewardship |
| Life Cycle Assessment |
| Others (Ventilation, Surroundings, Site selection) |



Three elements of Sustainability



Energy Consumption – KWH/Machine
20% Reduction in 5 Years



Renewable Energy. 450 KW by 2018

Actions

- **Solar Power** for **Street** and **Office** Lighting
- **Energy Efficient Chillers** and AHUs
- Paint shop **Carrier optimisation**
- **Energy efficient Air compressor** in Power house
- **LED** Lights
- **Timers** installed on Fans and Lighting at Shop floor
- **Awareness**

More Actions

- **Renewable Energy** increase from 35 KW to 450 KW from 2015 to 2018 – CSR Raised 150 KW – 20.12.2016
- **250+ KW load elimination** thru innovative process/technology changes 20.12.2016
- Replacement of Air Cooling motors with **Highly energy efficient motors** 10 Motors by 20.12.2016
- **Elimination** of Mini Paint Shop – 1.8.2016



- **Optimisation of AHUs in old Assembly Shop.** Two 80 K CFM efficient AHUs installed in place of Three old 80K CFM Units
- **Saving of 840Units /Day** in summer
- **Total Saving of 170K Units in year**



- **450 Fluorescent Tube lights replaced with LED Tube lights.** These consume 50% less energy
- Load reduction of 9KW achieved
- **Annual saving of 54K units**



- **Use of energy efficient T5 and LED lights** in the office area and plant lighting
- A total of 156 Lights have been installed ABU, TBU & LDC resulting in **saving of 510KWH per day**



- **Installation of energy efficient air compressor** in power house.
- Specific power consumption reduced from 0.2154Kw/CFM to 0.1788 Kw/CFM
- **Saving of 57250Kwh/Annum**



- Replacement of 25 Nos. **400 watt Mercury lights with 216 watt T5 energy efficient tube lights in inspection bay** at Hot test
- Approximate **saving of 33120 Kwh/ Annum**



- Substitution of package A.C of 40 T capacity with localized A.C of 21 T in Marketing office **Approximate saving of 81600 Kwh / Annum**



- **Organic Waste Treatment Plant** : 1600 kg Biogas Production
- **Natural Lighting** : Energy saving / lux level Improvement in
 - Mfg. Office, Manufacturing
 - Old Fabrication Shop/Engine office



- **Solar PV** installation
 - Street Lighting
 - Building



- Enhancing **Natural light inside Office**
- **4KWH of electricity saved** daily from **one sheet**
- **200 Kwh electricity saved per day** through Natural light

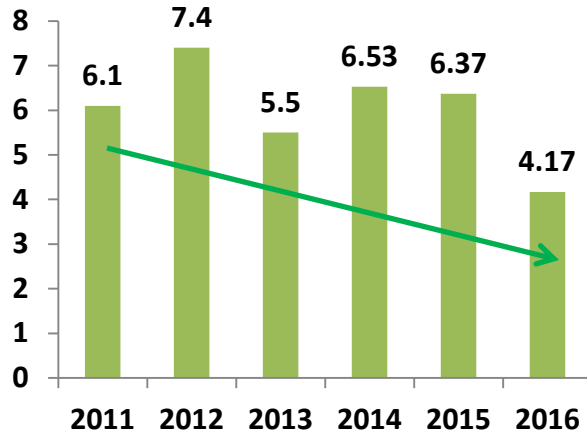


- **Solar water heater** for canteen activities
- Pilot project of **Capacity 2000 ltrs per day**
- Works efficiently even on cloudy days
- **Saving – 28000 Kwh / Annum**



- **65 Solar Lights**, 19 W each
- **Solar Power Plant – 35 KW**
- **2016 – 150 KW**

Reduce, Reuse & Recycle approach



Water Consumption – KL/Machine
31% Reduction from 2011

Recycle

- **ETP STP treated water** is recycled for **horticulture use**
- High TDS bore well water mixed with ETP STP treated water. Used for horticulture

Reuse

- DM water from **Water Rinse Tank 2** is reused in **Tank -1**
- **RO Reject** water used in **Horticulture**
- **Chiller condensate** is used in **AHU** / in place of DM water in Paint shop

Reduce

- **Water less coil coolers** for DG set
- Paint Shop **Load Bar optimisation, Nano Technology**
- **Double stage to single stage** machine washing in PDI
- **Low flow hand wash** and Water less wash rooms
- Water consumption monitoring and sharing on monthly basis.

More Actions

- Use of ETP / STP **Treated water in Process** – 20.12.2016
- Machine washing – **Dry wash** bio – degradable chemicals

Paint shop



Load bar optimization

- Earlier loader arms were loaded on individual fixture
1.48 Carrier for one 3dx machine
- Now Loader arm has been integrated with Main frame fixture
1.30 Carrier for one 3dx Machine
- Owing to load bar optimization **Running hours of paint shop reduced**
- **Saving of 10KL to 15 KL of Water per day**

Nano Technology

- **Nano Technology instead of Zinc Phosphating** in PT
- **Water required for Zinc Phosphating – 64 KL**
8 Tanks of 8KL each
- **Water required for Nano Technology – 48 KL**
6 Tanks of 8 KL each
- **Water Savings : 16 KL**



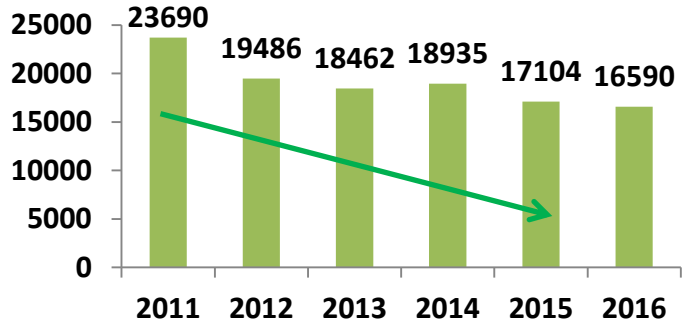
- **Water less coil coolers** installed in DG sets
- **Engine Test Cell** is also operating on **coil coolers**



- **Chiller condensate from Engine plant** is reused as DM water Approximate generation 30KL per month. Also used in AHU



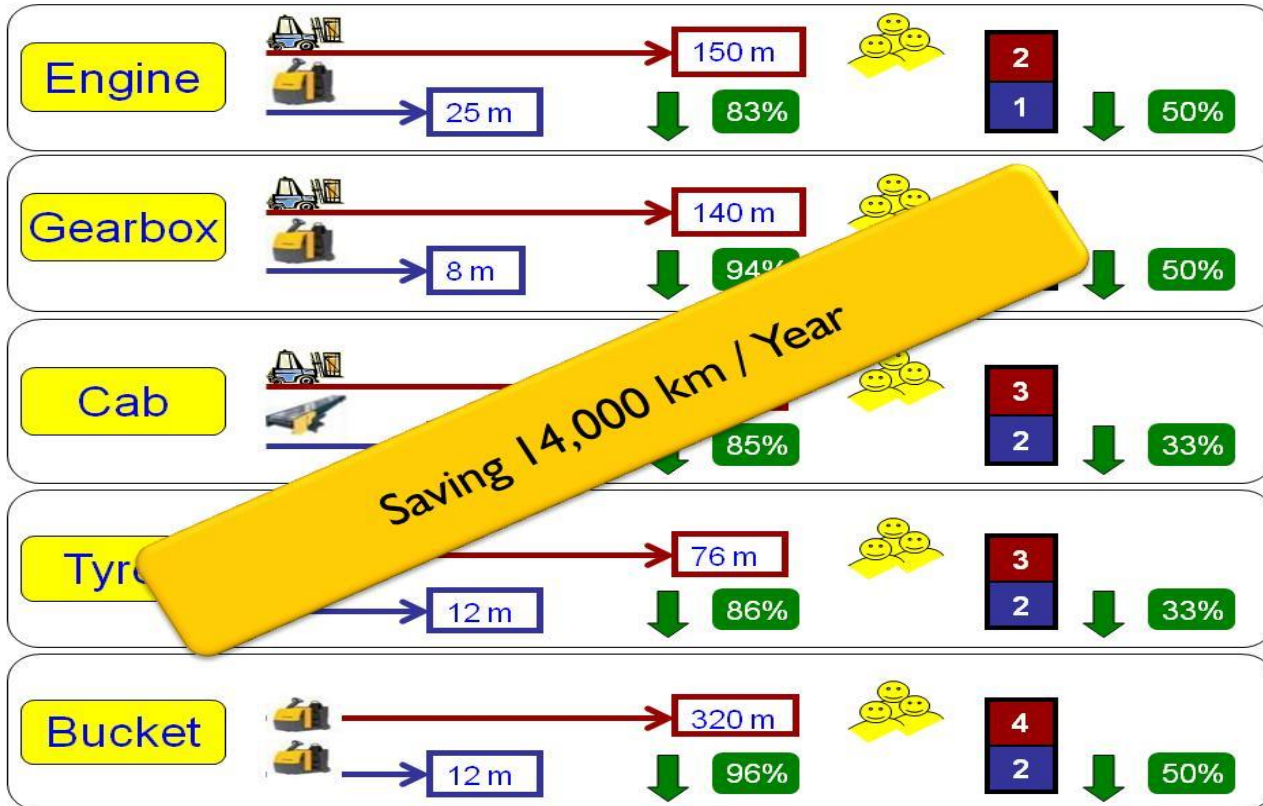
- **Centralised water distribution** through pump house
- Earlier water tanks were located at different locations
- Piping and distribution optimised
- **All supply and use is Metered and Monitored**



CO2 Emission in Tons
28% Reduction from 2011

- **PNG as a fuel in Paint Shop Oven** in place of HSD
 Savings : 200 Tons of CO₂ /Month
- **State board power utilization** improved from at 55 % to 75%
 Resulted in Fuel reduction by 22%
- **Reduction of Diesel Consumption during Production Testing of Engines**
22 Minutes Cycle Time – HSD Consumed – 2.80 Ltrs / Engine
Current – 4 Minutes Cycle Time – 0.51 Ltrs / Engine
Saving of 2.29 Ltrs / Engine. @110 Engines = 252 Ltrs /Day
- DG sets Efficiency improved from 3.63 units / L to 3.67 units / L
- **Forklift Free Assembly Shop**
- **Eliminated 14000 Kms Forklift movement** per annum

Eliminated the use of Forklift for inside feeding of components

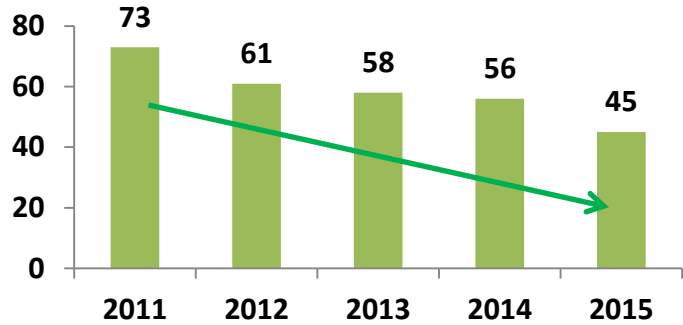


Material Conservation Initiatives & Projects

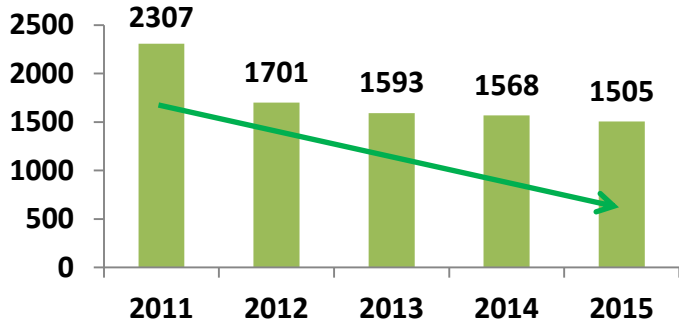
| Sl. No. | Year | Plan /Actual | Project Description | Change Element | Key Parameter that is leveraged | Impact on Material conservation. Green Project |
|---------|------|--------------|--|---|-------------------------------------|--|
| 1 | 2015 | Actual | Bushes from Rapsri- Alternate RM | Alternate Raw Material with less of Copper & Zinc added | Efficient utilization of metal | Using cheaper metal |
| 2 | 2015 | Actual | Bucket Plate 16 mm to 15 mm | Plate thickness from 16 mm to 15 mm | Design optimization | steel consumption Reduction by 4 Kg/m |
| 3 | 2015 | Actual | Stabilizer Ram Hybrid Hose | one single hose is replaced with combination of tube & Hose | Redundancy elimination | Less use of Rubber |
| 4 | 2015 | Actual | Pivot & Stop Casting to Forging. | Part Made by Forging in place of Casting | Lesser heating, Local Manufacturing | Local Manufacturing |
| 5 | 2015 | Actual | Loader tower, Bonnet Mtg Boss Weld plate elimination | intermediate part deleted | Redundancy elimination | Wt. reduction of 0.4 Kg/mc |
| 6 | 2015 | Actual | 14.00x25- Tyre in 12 PR Rating | Ply Rating Change from 20 PR to 12 PR rating | Over spec. elemintion | Reduction of 18 kg/ mc. |



Engineering team Leads the VAVE Projects and identifies and implements projects related to Material



Hazardous Waste Generation in Tons
38% Reduction from 2011



Solid Waste Generation in Tons
35% Reduction from 2011





- **Nano Technology** for pre-treatment in Paint Shop
 - Reduce water consumption
 - **Eliminate Sludge Generation**
- **Liquid painting substituted with Powder Painting**
- **Paint sludge generation eliminated**

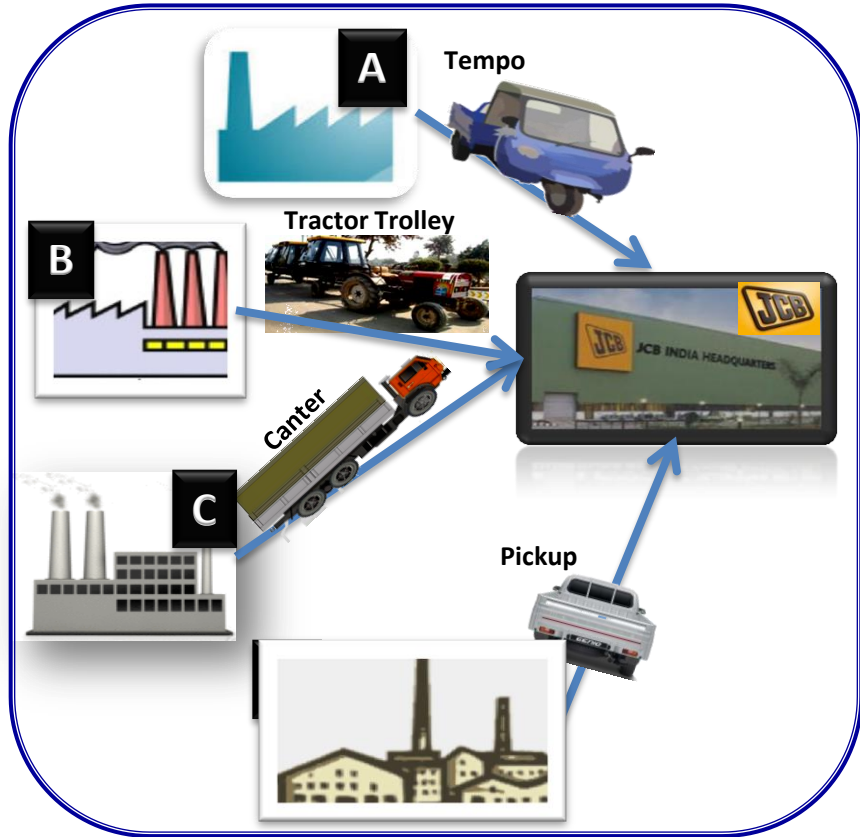
- **Zero Leak project** implemented by Quality



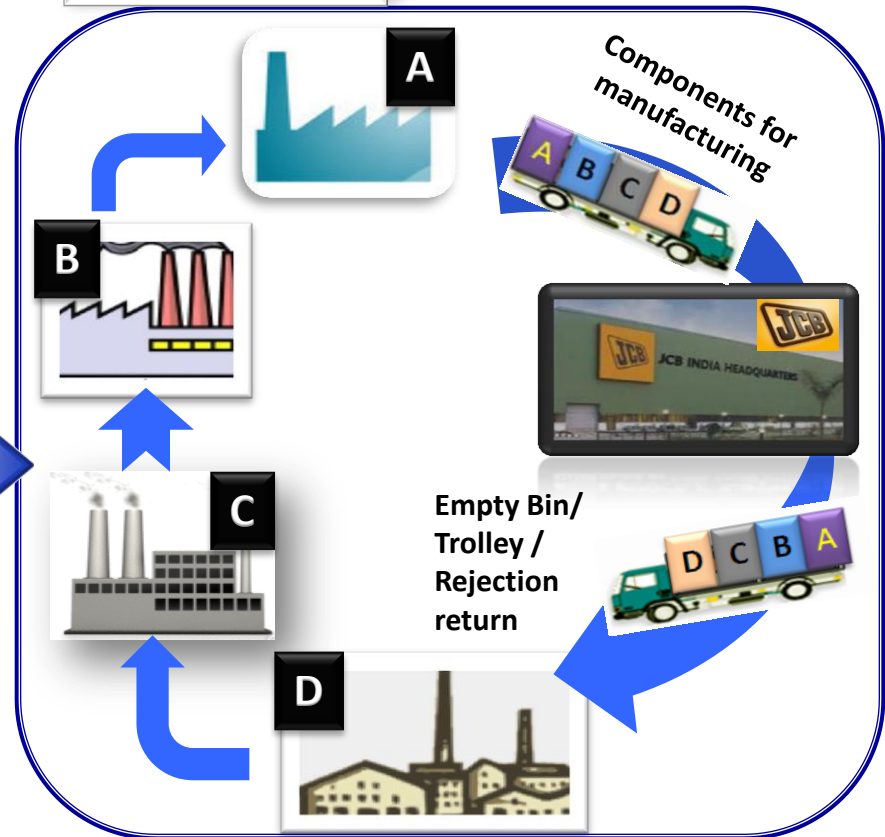
- **Wood scrap generation** in plant at 1500 machines is approximately **120 tonnes per month**
- **M/s Wipro Infrastructure** was identified as a biggest source of wood scrap accounting to 30% of the entire wooden scrap
- **Eliminated wooden packaging for Rams.** Use of Reusable Pallets.
- **36 Tons of Wooden packaging eliminated per month**
- Other major sources of wood scrap are Imports / Husco Hydraulics / Parker / Hydro Control /

Green Supply Chain

Supplier Delivered Model



Milk Run Model



Supplier Delivered Model



Tractor
Trolley



Tempo



Pick Up



Milk Run Model



2.5 Tonner



3.5 Tonner



9 Tonner

Supplier Delivered Model

Traffic Incoming

>250 vehicles entries / day

Diesel Consumption (Avg. monthly)

70,125 ltrs.

Freight Payment avg. yearly

Rs. 9,488,738

Frequent Follow ups

Telephonic / personal visits

Supply Chain visibility - Lesser

Strained relationship



Milk Run Model

Traffic Incoming

78 vehicles entries / day

58% reduction

Avg. monthly Diesel Consumption

29,250 ltrs.

58% reduction

Freight Payment avg. yearly

Rs. 8,592,183

9% reduction

Advance information Proactive alerts

Reduced personal visits

Defined accountability

Improved relationship

Single machine on Truck

2 Mcs on Trailer

CMVR Compliant : Length : 18 Mtrs / Height : 4.50 Mtrs / Width : 2.6 mtr

Benefits

Delivery Standard

Safe

Reduction in lead time

30%

Reduction in Transit damages

95%

Real time tracking

GPS enabled

3 Mcs on Trailer

Carbon Foot Print : Diesel Consumption reduced

| Ballabgarh to Hubli - 1850 kms | 1Mc. / Truck | 2 Mc. / Truck | 3 Mc / Truck |
|--------------------------------|--------------|---------------|--------------|
| Fuel Avg - Kms / Ltr | 4 | 3 | 2.5 |
| Fuel Consumption | 463 | 617 | 740 |
| Per Mc. Fuel Consumption | 463 | 308 | 247 |
| HSD Consumption Reduction | | 33% | 47% |

PACKAGING IMPROVEMENTS : 2015

OBJECTIVE - SAFE HANDLING & MOVING FORWARD TOWARDS GREEN FOOT STEPS

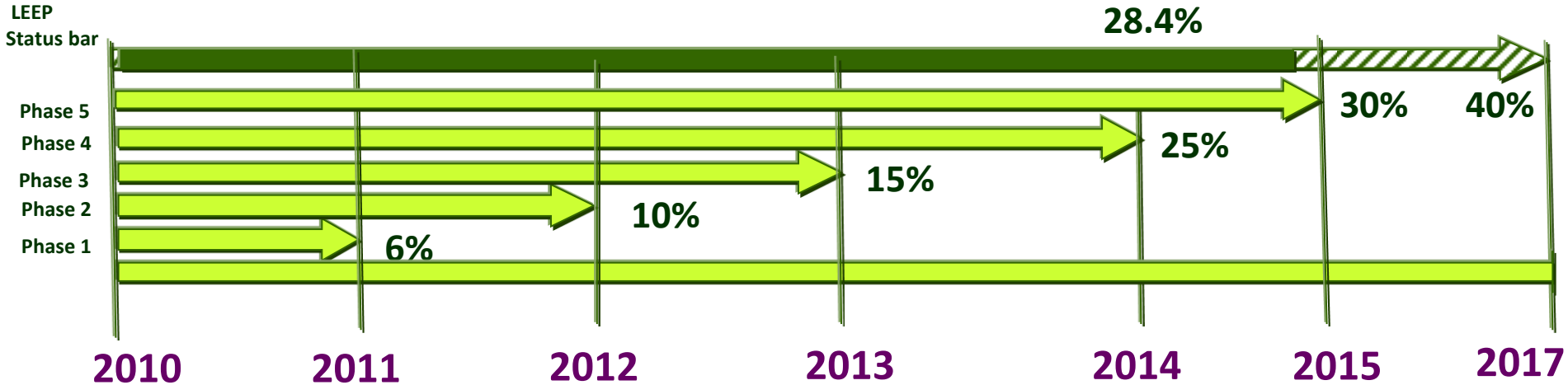
| S.NO | PART NO. | PART DESCRIPTION | SUPPLIER | EARLIER PACKING CONDITION | REVISED PACKING CONDITION | Before | SNAPS | STATUS | Remarks |
|------|-----------|------------------|-------------|--|--|--|--|------------------|---------------------------------|
| 1 | 332/Y2747 | RIM | sswl | WOODEN PALLET-RIM COMES IN WOODEN PALLET | PLASTICK PALLET-RIMS COMING IN PLASTIC PALLET(RETURNABLE PALLET) |  |  | Under Obsevation | Wood Eliminate |
| 2 | 30/925526 | Engine fan | BORGWARNER | CARD BOARD-FAN TRANSFER TO TROLLEY | TROLLEY-FAN COMING IN TROLLEY AS PER JCB REQUIREMENT |  |  | completed | Cardboard Eliminate |
| 3 | 811/10025 | Pin | Vishal | PALLET/LOOSE(POLYTHENE)-MATERIAL TRANSFER TO TROLLEY | TROLLEY- PIN COMING ON TROLLEY AS PER JCB REQUIREMENT |  |  | completed | Polythene eliminate |
| 4 | 320/08030 | Gear | Hitech Gear | CARD BOARD-MATERIAL TRANSFER TO BIN | BIN-BIN COMING FROM VENDOR |  |  | completed | Cardboard + polythene Eliminate |
| 5 | 333/Y0845 | FOAM | INDICA | JOOT BAG-FOAM COMES IN JOOT BAG. | PLASTIC BOX-SEALING COMING IN PLASTIC BOX(RETURNABLE PACKING) |  |  | completed | Joot Bag eliminate |
| 6 | 332/y8521 | Precleaner | Saket | POLYTHENE -Material transfer polythene to Bin | TROLLEY-Material directly supply in trolley. |  |  | Completed | Polythene eliminate |
| 7 | 333/y2857 | Precleaner | Saket | POLYTHENE -Material transfer polythene to Bin | TROLLEY-Material directly supply in trolley. |  |  | Completed | Polythene eliminate |
| 8 | 331/14805 | HOSE CLAMP | SAKET | LOOSE - PART TRANSFER TO TROLLEY | BIN-PART COMING IN BIN |  |  | Under Obsevation | Card Board Eliminate |



Leadership through Energy Efficient Products

- ❖ Fuel efficiency improvement across all range in India
- ❖ Best in class fuel efficiency
- ❖ 40% reduction roadmap over 2010-2017
- ❖ Reduction in carbon foot print





Savings per machine is 1.9 L/Hour*

Total saving per machine /per year = $1.9 \times 3000 = 5700$ Liter

Total Carbon dioxide saved per machine/year = $5700 \times 2.74 = 15618$ Kgs

Total Carbon dioxide saved per year on 20000 machines = 312360 TON

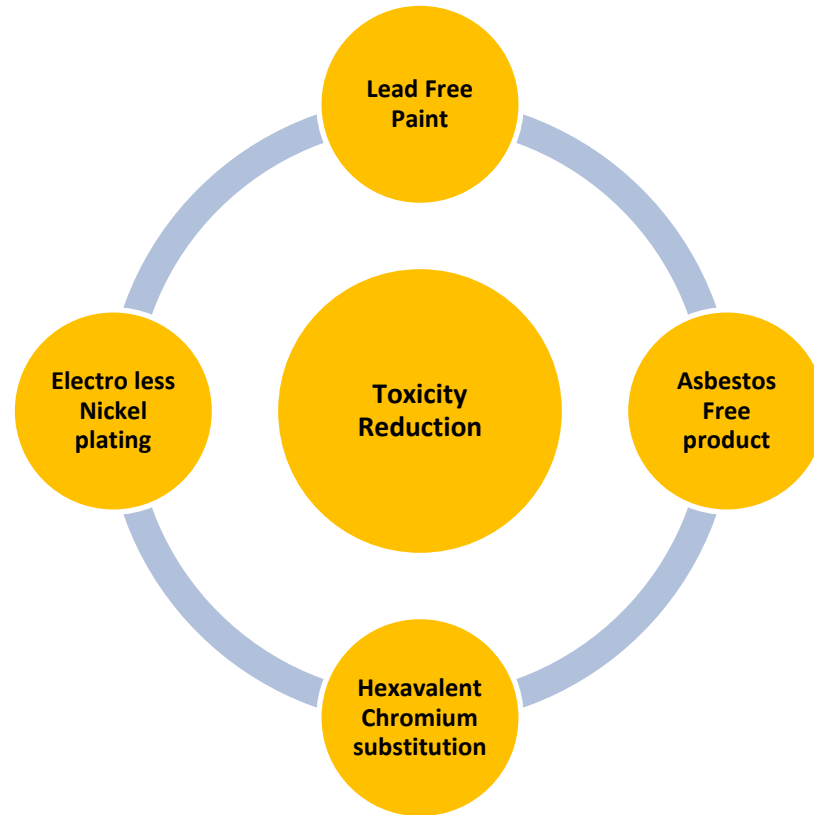
*2010 Fuel Consumption Vs 2015 Fuel Consumption

Sustainable Innovation : DFE

| OIL | ACTIVITY | | |
|----------------------------------|----------------|-----|---|
| Drain Period Extension: | | | |
| Hydraulic Oil VG46 - HVI VG46 | 1600-2000 hrs | 25% | ↑ Oil Qty at service reduced from 130L to 80L. |
| Rear Axle Oil 80W80 – 10W30 | 800-1000 hrs | 25% | ↑ |
| Engine Oil CF4 – CH4 | 400 – 500 hrs | 25% | ↑ |
| Transmission Oil ATF – TO4 | 500 – 1000 hrs | 50% | ↑ |



Reducing Toxicity of the Product



P589 Project and Conservation of Resources

3DX Backhoe upgraded and launched. Project P 589
Eco Excellence Backhoe

- **7% Increased Fuel Efficiency**
(Conservation of Resource)
- **Hydraulic oil Tank Size reduced** from 135 Liters to 120 Liters
(Conservation of resource)
- **Hydraulic oil replacement** 46% in service
(Conservation of resource)
- **No Coolant change** during 2000 hrs. of service interval.(16.5 lts)





SERVICE
Livelink will notify you about the service requirement of your machine. It increases the efficiency of your machine and keeps it in perfect working conditions of work.

OPERATION
Livelink helps you maintain your machine health and manage your fleet better by alerting you of any variation in health indicators. It lets you know in real time if your machine is facing a problem or needs any quick check-up.

SECURITY
Livelink helps you keep track of your machine's location, protection and movement.



together we can make a difference

