

Green-Co Forum Meet



Abhay M Pendse
24th Sept 2016

Overview of Godrej Group Companies

Godrej & Boyce Mfg. Co. Ltd.

- Appliances
- Construction
- Interio
- Locking Solutions and Systems
- Precision Engineering
- Process Equipment
- Storage Solutions
- Vending
- AV Solutions
- Batteries
- Electricals & Electronics
- Material Handling
- Precision Systems
- Security Solutions
- Tooling
- Lawkim Motors
- Godrej Infotech

Godrej Efacec Automation & Robotics

Godrej (Malaysia) Sdn Bhd
Godrej (Singapore) Pte Ltd
Godrej (Vietnam) Company Ltd
Godrej & Khimji (Middle East) LLC
Godrej Americas Inc

Godrej Industries

Godrej Chemicals

Godrej Consumer Products
Godrej Household Products
Godrej Properties
Godrej Agrovet

Godrej Tyson Foods

Keyline Brands
Kinky Brands (Proprietary)
Rapidol Pty
Godrej Global Mid East FZE
PT. Megasari Makmur
Issue Group Co.
Argencos S.A.

Holding Companies
Businesses Divisions
Corporate Entities
Joint Ventures
International Entities

GROUP Combined Turnover 2015-16 - Rs 25000 Cr.

Godrej & Boyce Mfg. Co. Ltd.- Product Range

APPLIANCES



interio



SECURITY SOLUTIONS



PRECISION ENGINEERING



TOOLING



MATERIAL HANDLING



Custom Motor Range



PROCESS EQUIPMENT



ELECTRICALS & ELECTRONICS



PRECISION SYSTEMS



STORAGE SOLUTIONS



CONSTRUCTION



LOCKS

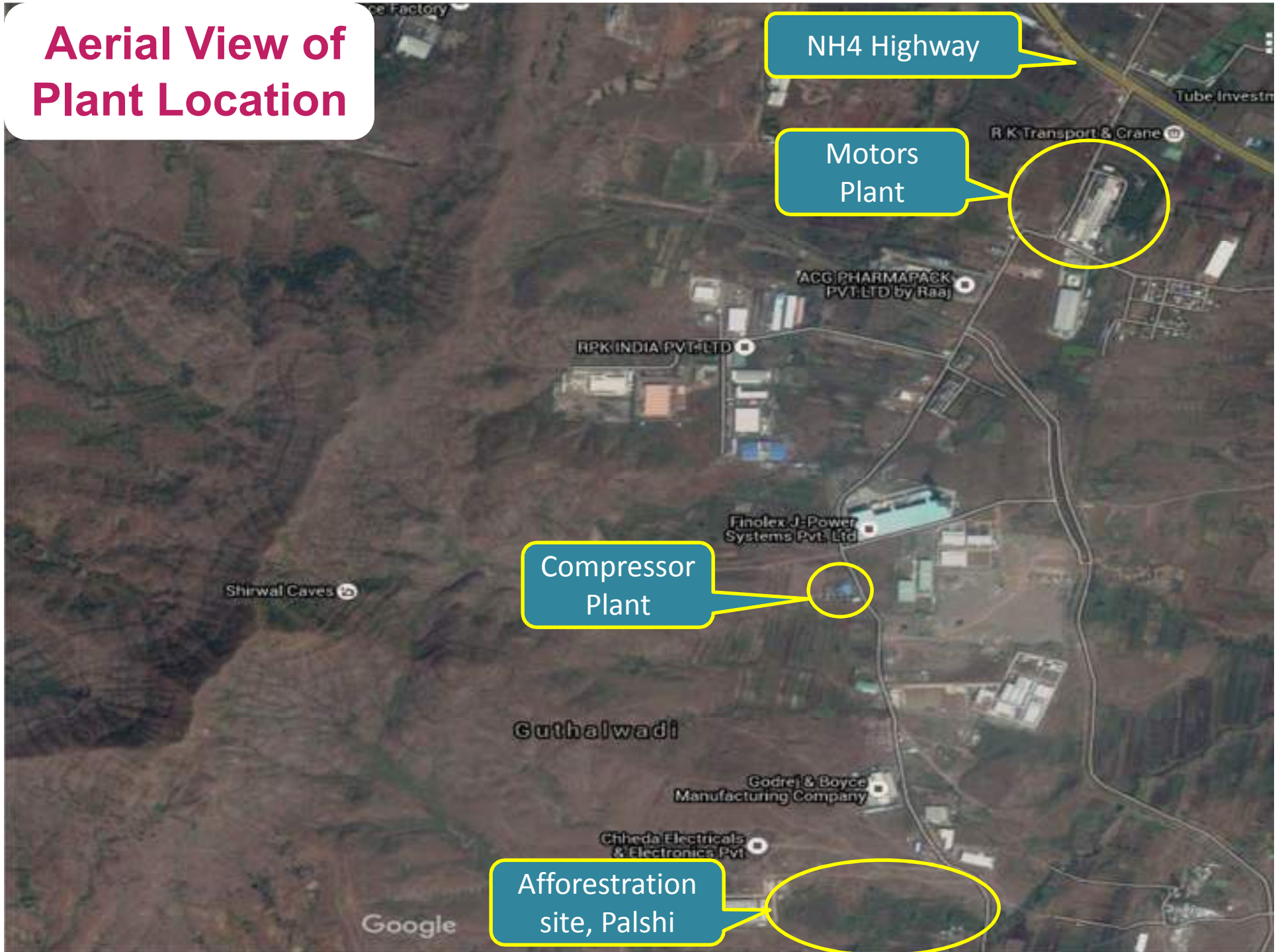


PRIMA



From Locks to Rocket Launchers

Aerial View of Plant Location



Context :-



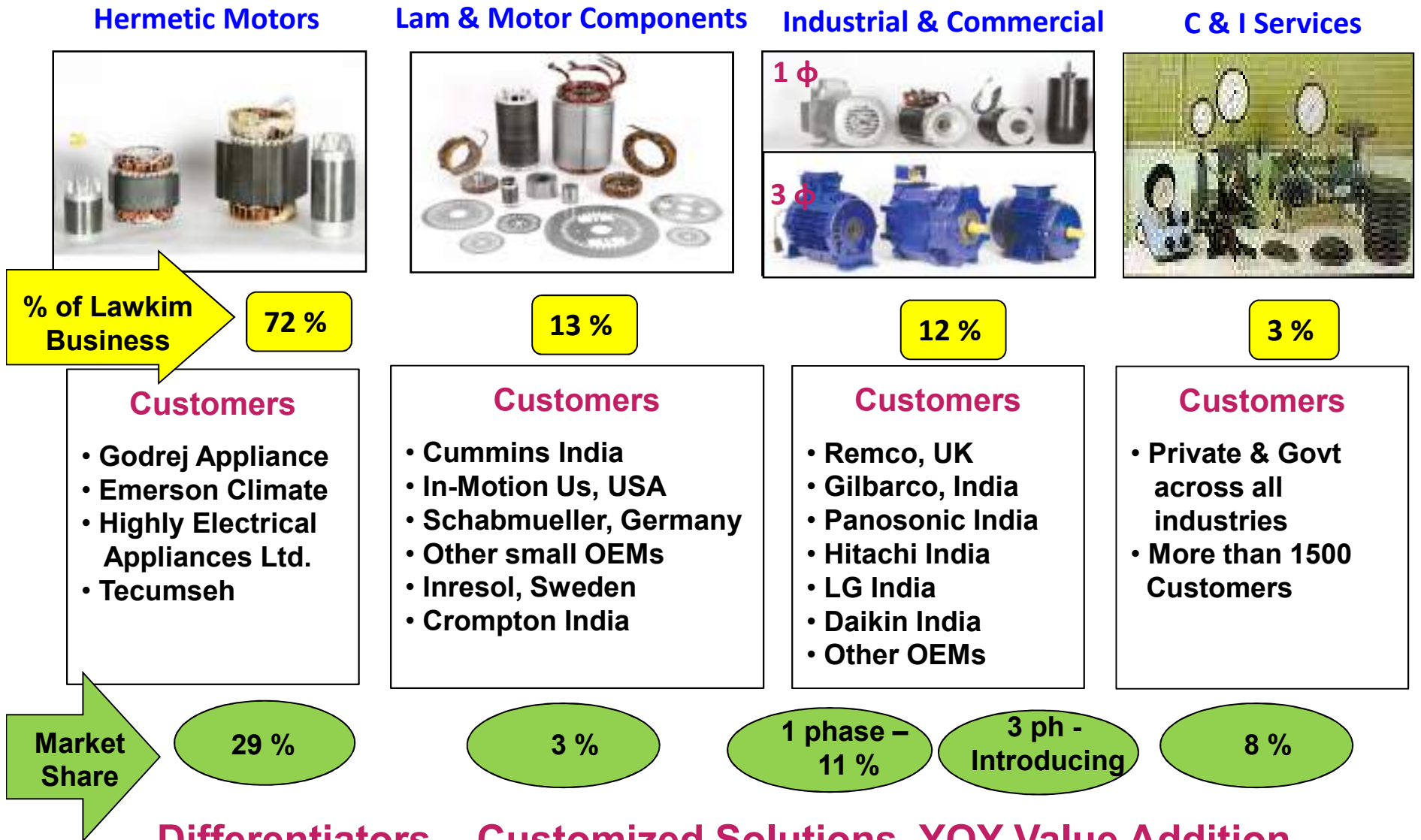
**Photographs of the location at the time of setting up Plant
in Year - 1992**

Aerial View of Factory



45 % Green
Cover

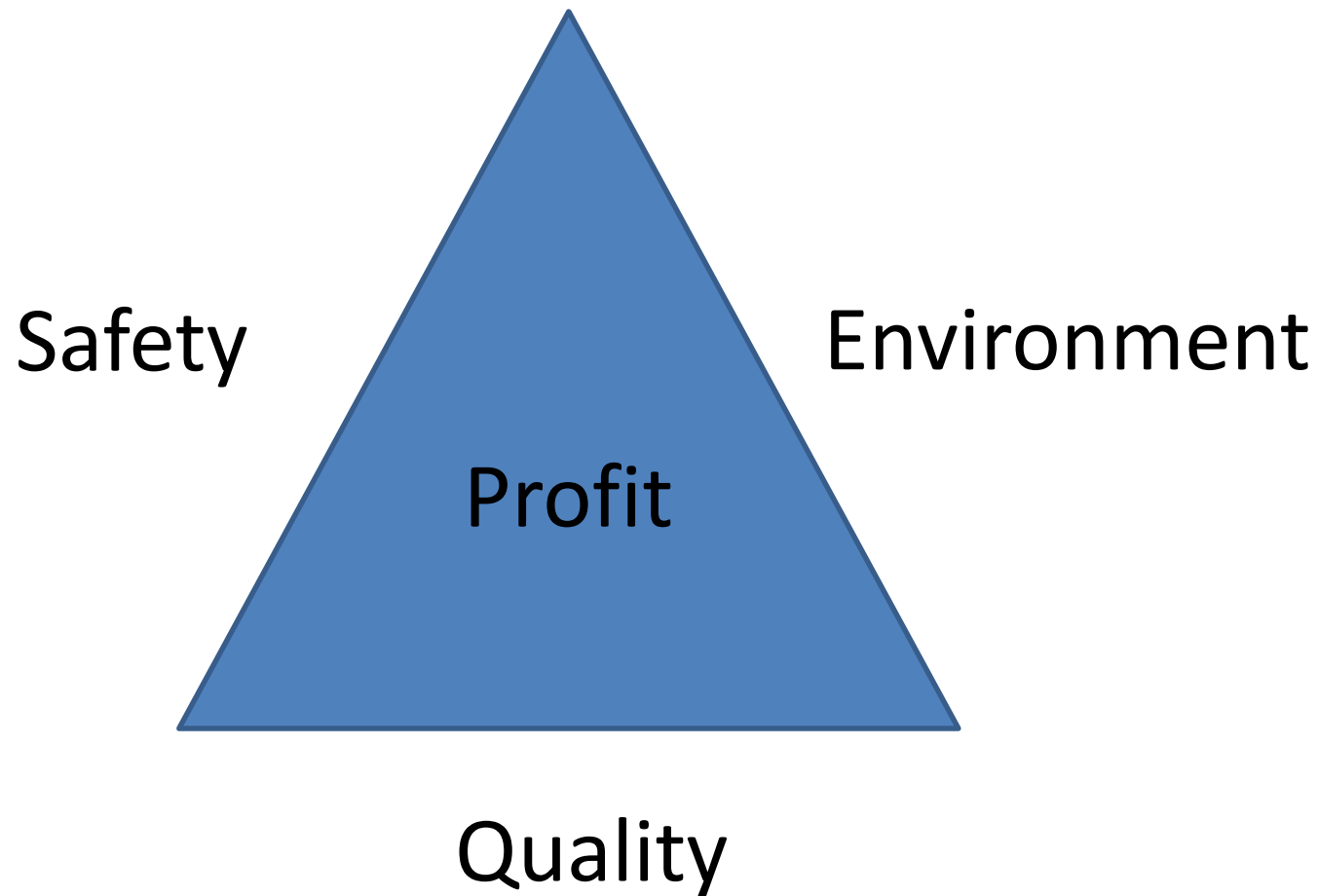
Our Product Segments



Differentiators - Customized Solutions, YOY Value Addition, Consistent Quality & Delivery

Our Approach towards Operational Excellence.

– Recognize challenge of Dynamic Business Environment



Need Commitment, Patience, Perseverance

Our Approach – Adopted EFQM Business Excellence Model

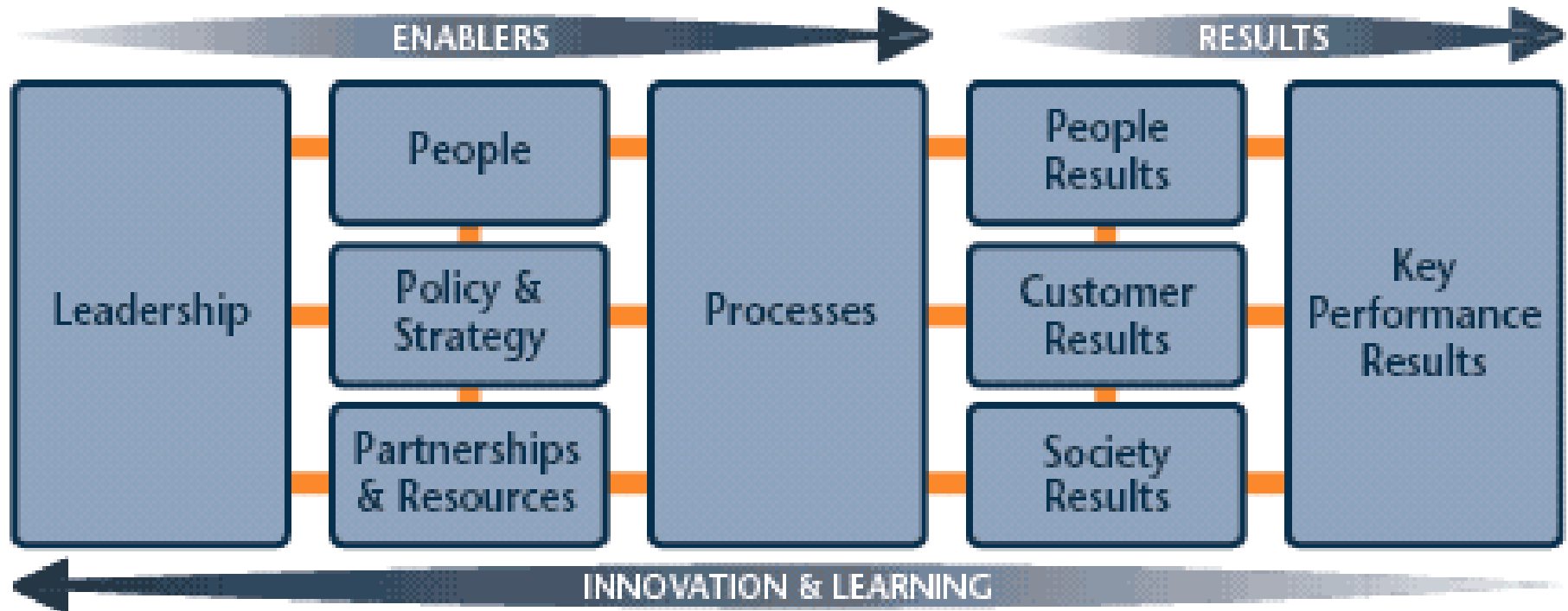


Figure 1 – The EFQM Excellence Model (©EFQM 1999).

Benchmarking used for setting targets.

Work on Enablers → Results Shall Follow

Top Management Commitment – “Godrej Good & Green”

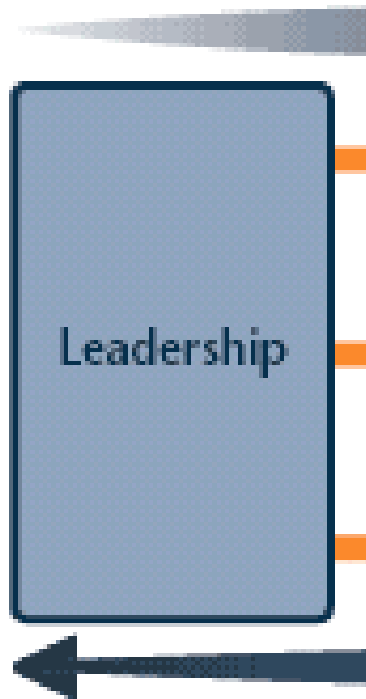


Figure 1 – The EFQM Exc



By 2020 Godrej aims to be

Creating a Greener India

Ensuring Employability

Innovating for Good and Green Products

Reduction in Energy Consumption, Achieve Zero Waste, Carbon Neutrality, Positive Water Balance & 30% Renewable Energy Use

Train 1 million rural and urban youth in skilled employment

Have a third of its portfolio revenues comprising Good and/or Green Products and Services

**Godrej is Synonymous with Caring for the Environment
Our strong Corporate culture drives divisional goals & actions**

Top Management Commitment – Policy & Strategy

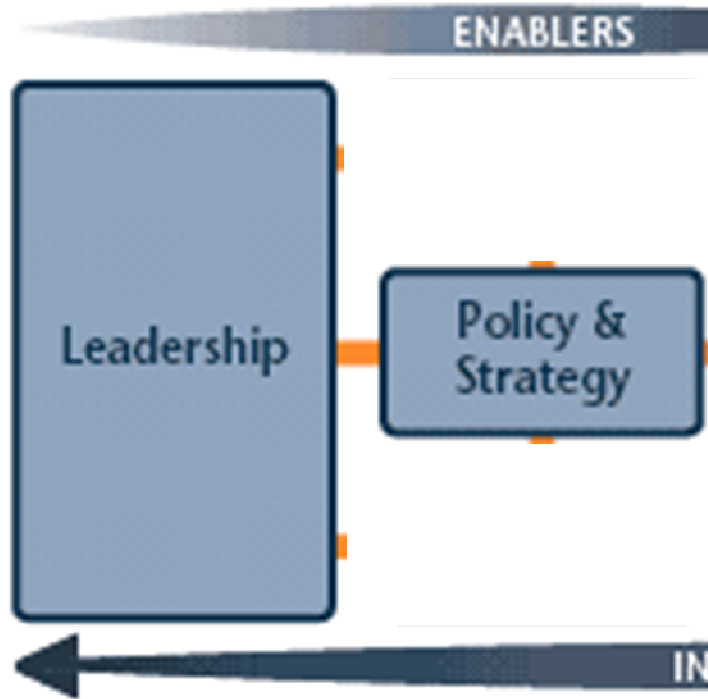


Figure 1 – The EFQM Excellence Model (DEFQM)

Road Map for Competitiveness Godrej group of companies																												
Rev 1 : July 2011																												
Time in Months	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Deliverables		
1. Re-Training 2. Training Modules 3. SOP for Sustenance																										Sustenance Management	Knowledge Mgt Holding Gains	
1. Cellular Manufacturing 2. Low Cost automation 3. Line Balancing																											Flow Manufacturing	Through put time reduction Stress / fatigue reduction Consistency in Qty & Quality
1. QC / QA 2. SOP Creation & Adherence 3. Corrective actions & Preventive Action 4. Poka-Yoke 5. Calibration																											Quality Management	Online Inspection Zero Defects at each stage Reduction in In-process rejection Zero Defects at Customer end Cost of Poor Quality Reduction
1. Mapping of Inventory 2. Receipt, Storage, Handling & Control 3. RACK reduction 4. FIFO (First Produced First Out) 5. SMED																											Inventory Management , Material handling & Control	ZERO Non moving Container reduction and standardization Forklift reduction / Elimination WIP reduction Change-over time reduction
1. Step 1 , 2 ,3 2. Greening The Production System																											TPM	OEE Improvement Improved Environemnet Performance
1. Kaizen 2. QCC + QC story 3. 7 QC tools																											TEI	Employee Involvement Employee Satisfaction Score Participation Kaizen / QCC / CFT/SIT
1. Basic 5 S 2. Red Tag Campaign 3. Safety 4. Waste Elimination																											5 S	5 S Score Zero red tag items Safety Frequency / Severity , No. of Accident free days Cost reduction
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Decided to work on “CII-Cluster Program”
for Operational Excellence

CII-Cluster Program for “Operational Excellence”

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5S Implementation

5S – Theme – “Hospital Clean Inside – Garden Green Outside”



Released 20K Sq. Feet Area

5S Implementation

5S – Theme – “Hospital Clean Inside – Garden Green Outside”



Complete transformation of the Factory

People Initiatives – TEI - Total Employee Involvement

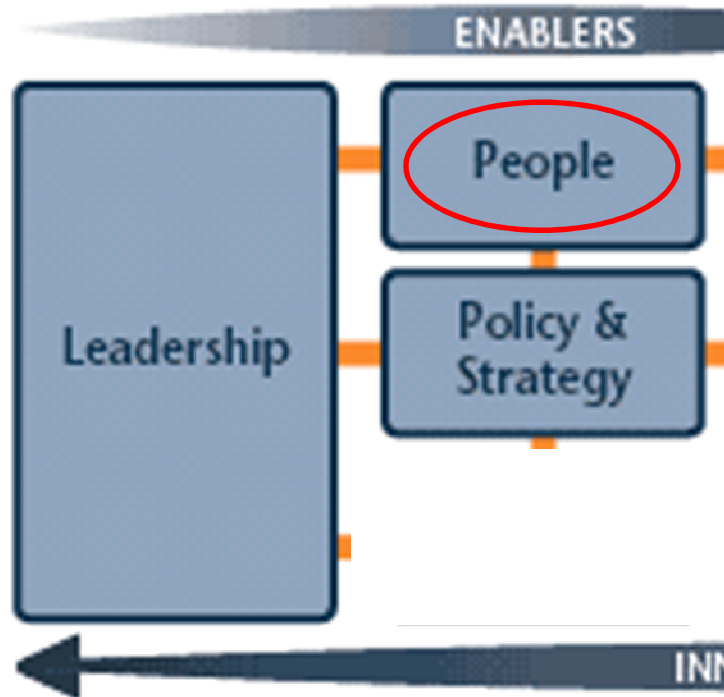


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**Implement Enablers to make work enjoyable –
Stress Free, Worry Free, Fear Free Environment**

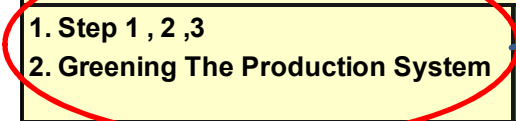
CII-Cluster Program for Operational Excellence

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Adopted "GreenCo Rating System"



Adopted “GreenCo Rating System”

- **Energy Efficiency**
- **Water Conservation**
- **Renewable Energy**
- **Green House Emission**
- **Waste Management**
- **Material Conservation**
- **Green Supply Chain**
- **Product Stewardship**
- **Life Cycle Assessment**
- **Other Areas**



**Green Company
Rating System**

Anything which is measured gets improved.

Energy Efficiency



Detailed Data Collection....

Periodically Load mangers installed to measure, variation in power consumption, w. r. t.,

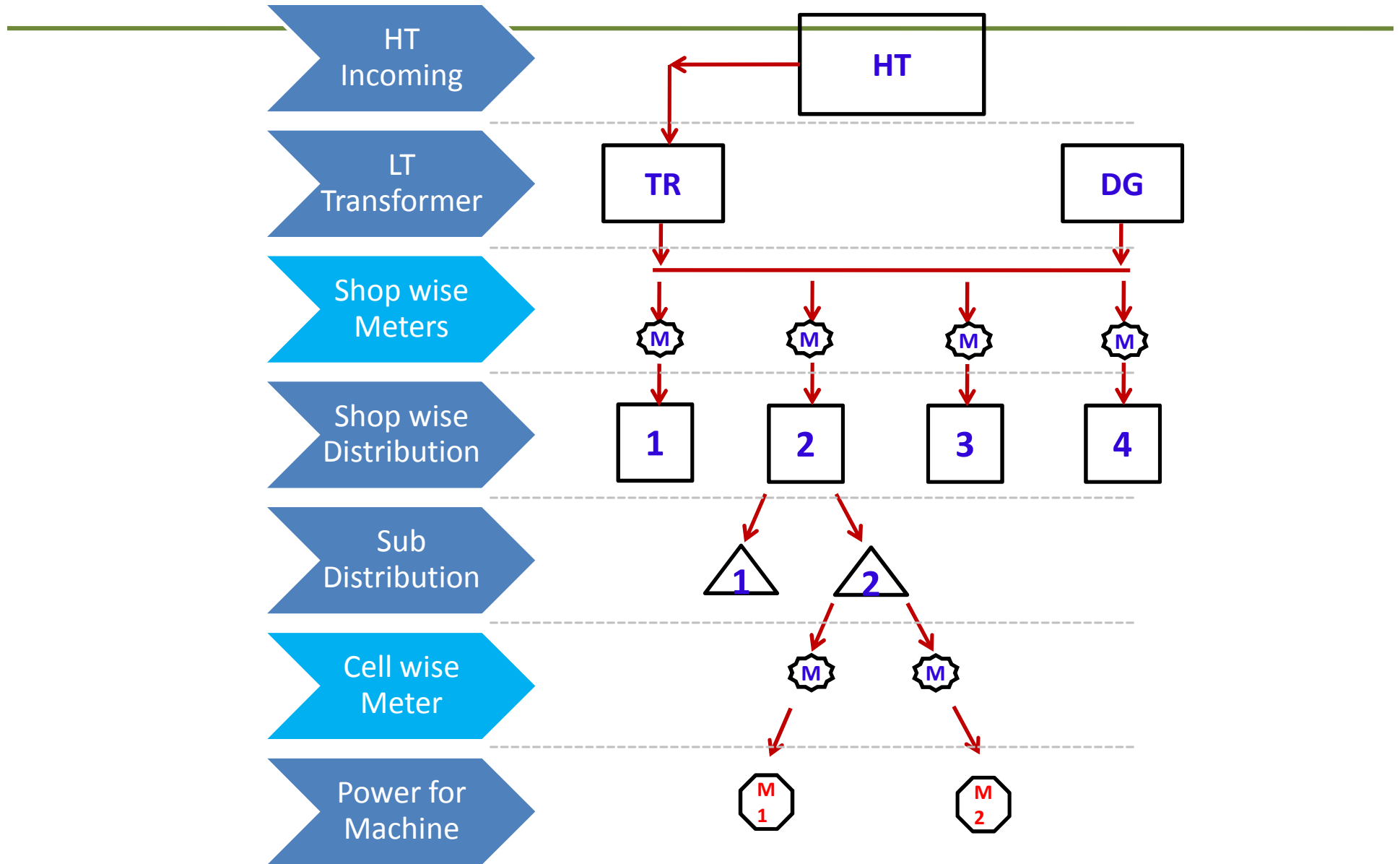
- a) Across time,
- b) Cycle to cycle,
- c) During changeover's.
- d) During start up & shut down, etc.

Also Measure,

- # Volumetric efficiency of air compressor,
- # Air leakages in the system.
- # HSD consumed per kw-hr of power generated.

Periodic variance analysis and corrective action taken

Representative Electricity Distribution / Measurement System



This data gave us readings between two measurement Intervals

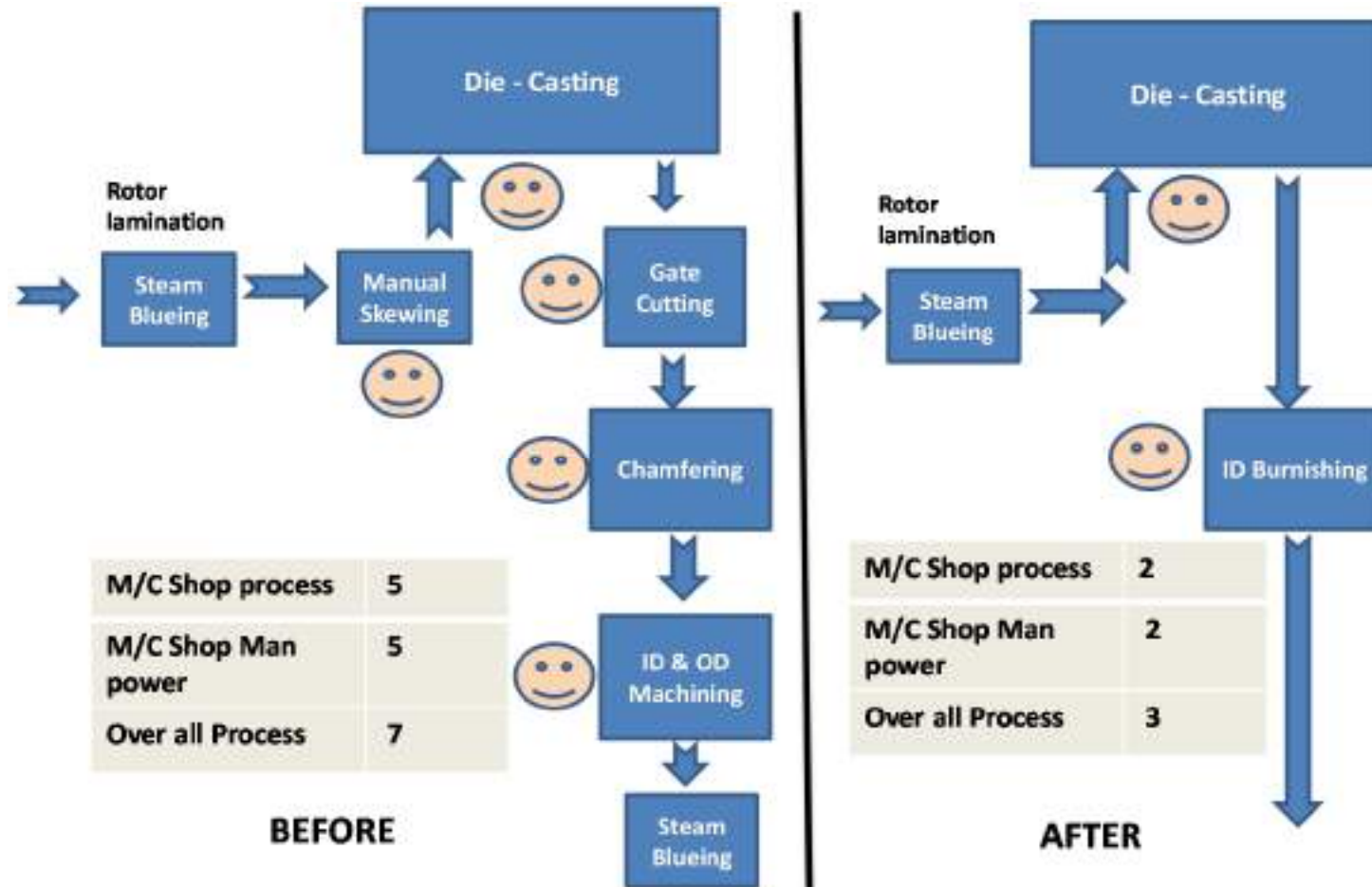
Development of solution – “Opportunity Matrix”

Source of consumption	Levers Used							
	Can this be eliminated	Alternate process ?	Reduce consumption	Increase efficiency	New technology	Use of renewable energy	Reduce Variation	Use of Exhaust Energy
Presses			★					
Air Compressor			★	★			★	
Heating Furnaces			★	★				★
Al. Melting Furnaces			★	★	★			
Welding Machines				★	★			
Water Heating		★	★			★		★
Air Conditioning	★	★				★		
Hydraulic Power Pack	★	★						
Machines							★	
Plant Lighting			★		★	★		
Our Products				★	★			

Appropriate levers applied to develop the solution

Elimination - Processes

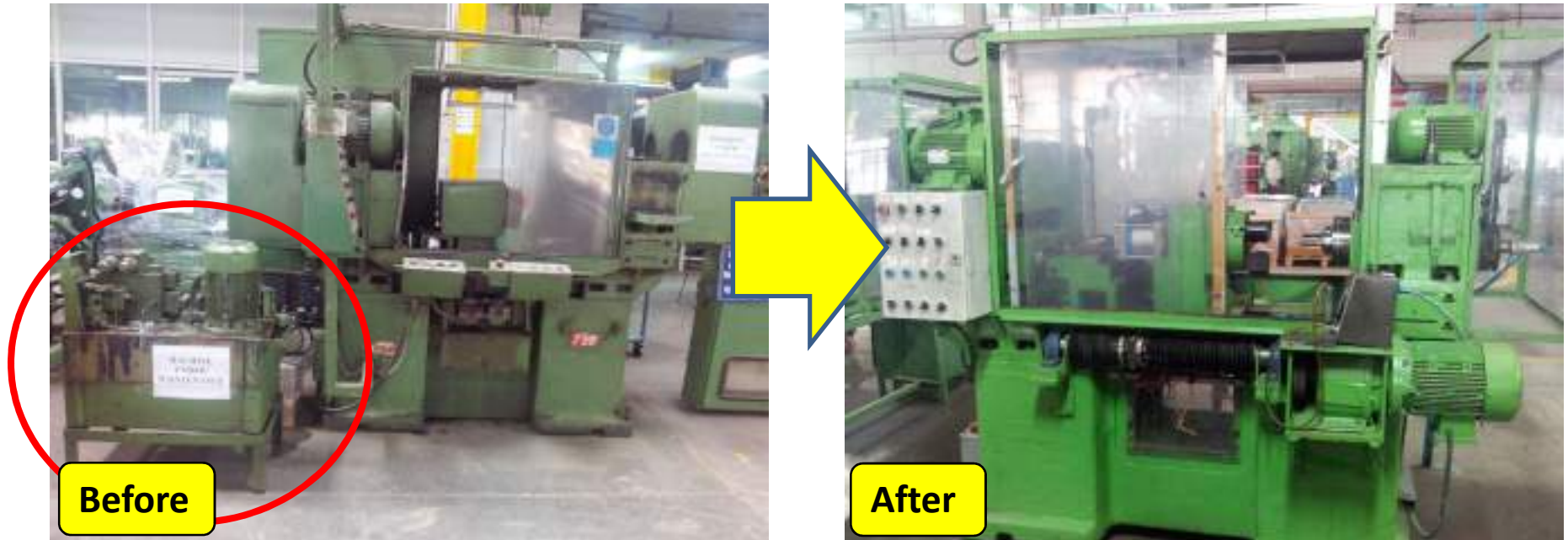
“1S” of Processes



Enabled Improve – Standard Time & Reduce Lead-Time

Eliminate – Hydraulic Power Packs

“1S” of Machine Parts



Machine with Hydraulic power pack

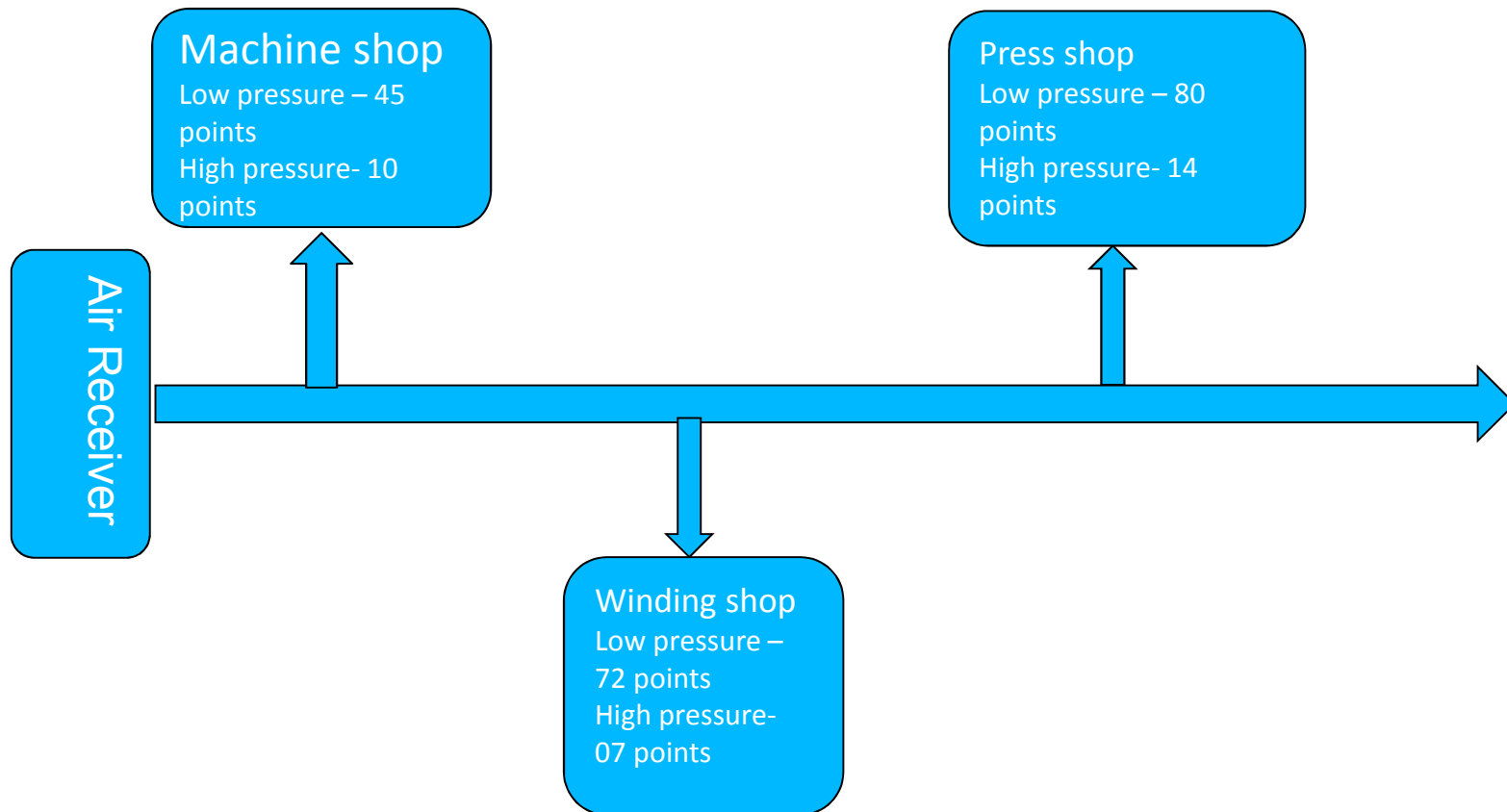
Machine with ball screw & motor

**Electrical consumption reduced up to 45 % per piece.
Pay back period < 7 months**

**Total Machines modified in 2013 – 14 = 13 nos.
Total Machined modified in 2014 – 15 = 11 nos.**

Reduce Consumption, Increase Efficiency – Compressed Air

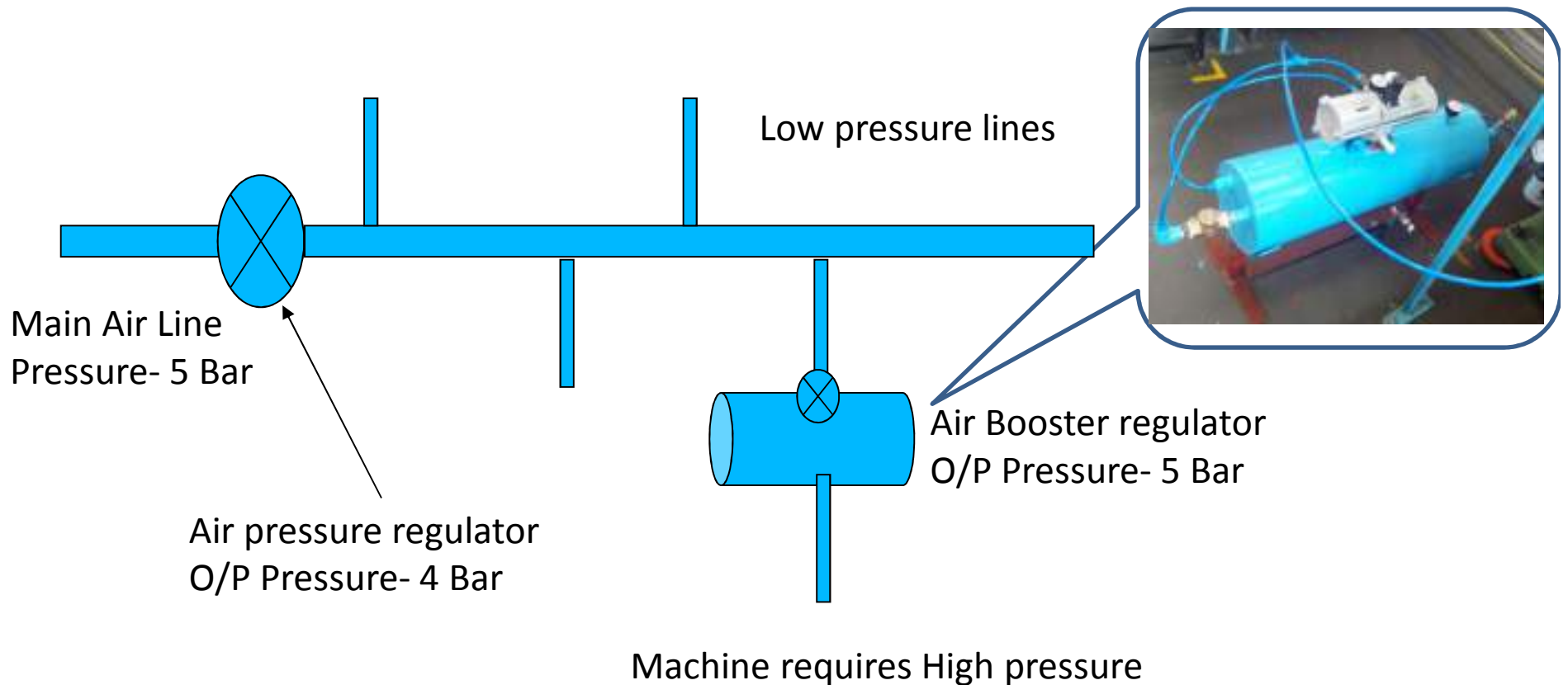
Pressure Line Mapping & Isolation



- **Mapping of all machines , lines for pressure requirement done.**

Reduce Consumption, Increase Efficiency – Compressed Air

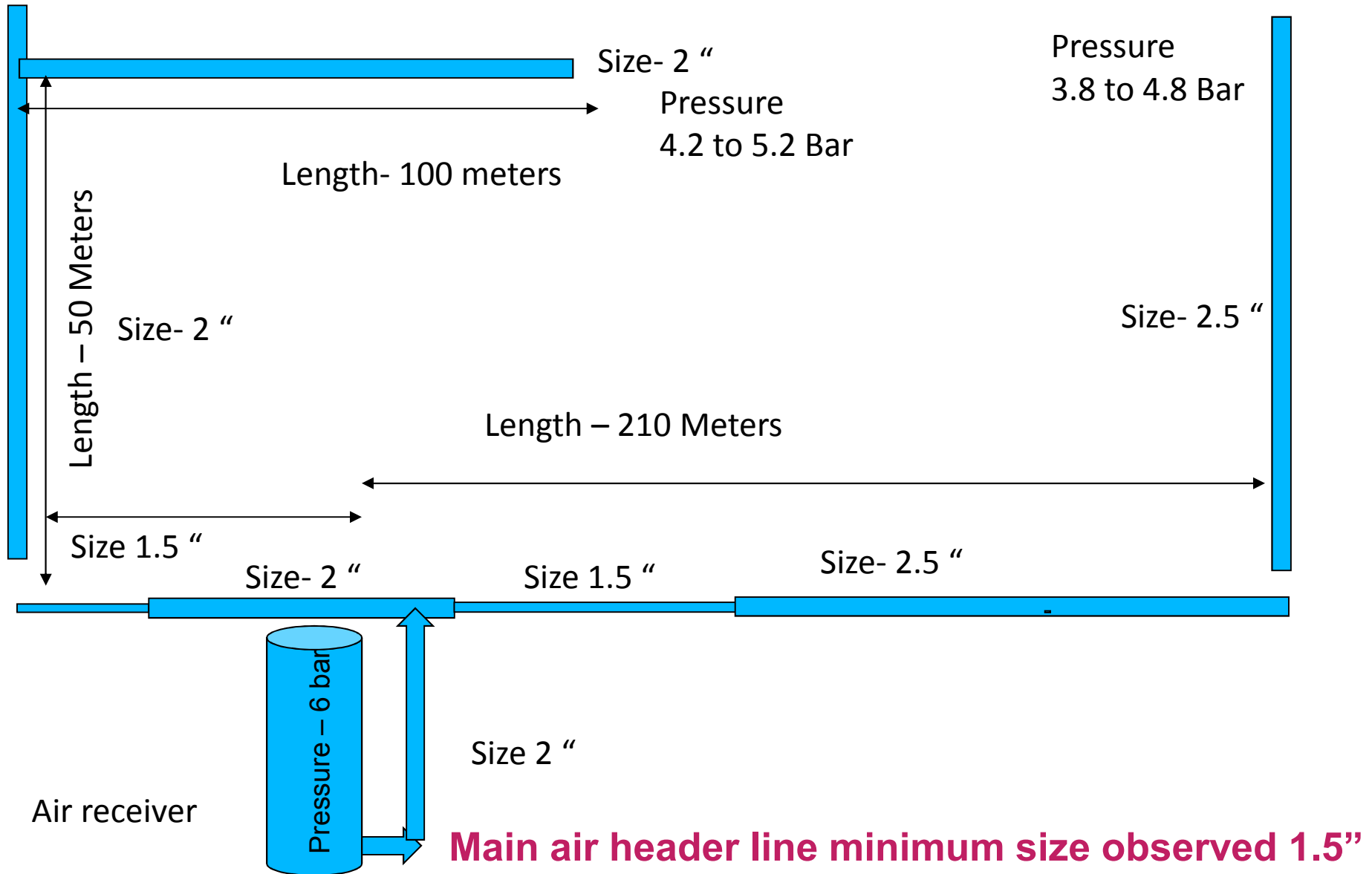
Pressure Line Mapping & Isolation



- Consumption reduced by 170 units per day.
Consumption reduced by 6.5 % of total compressed air consumption.

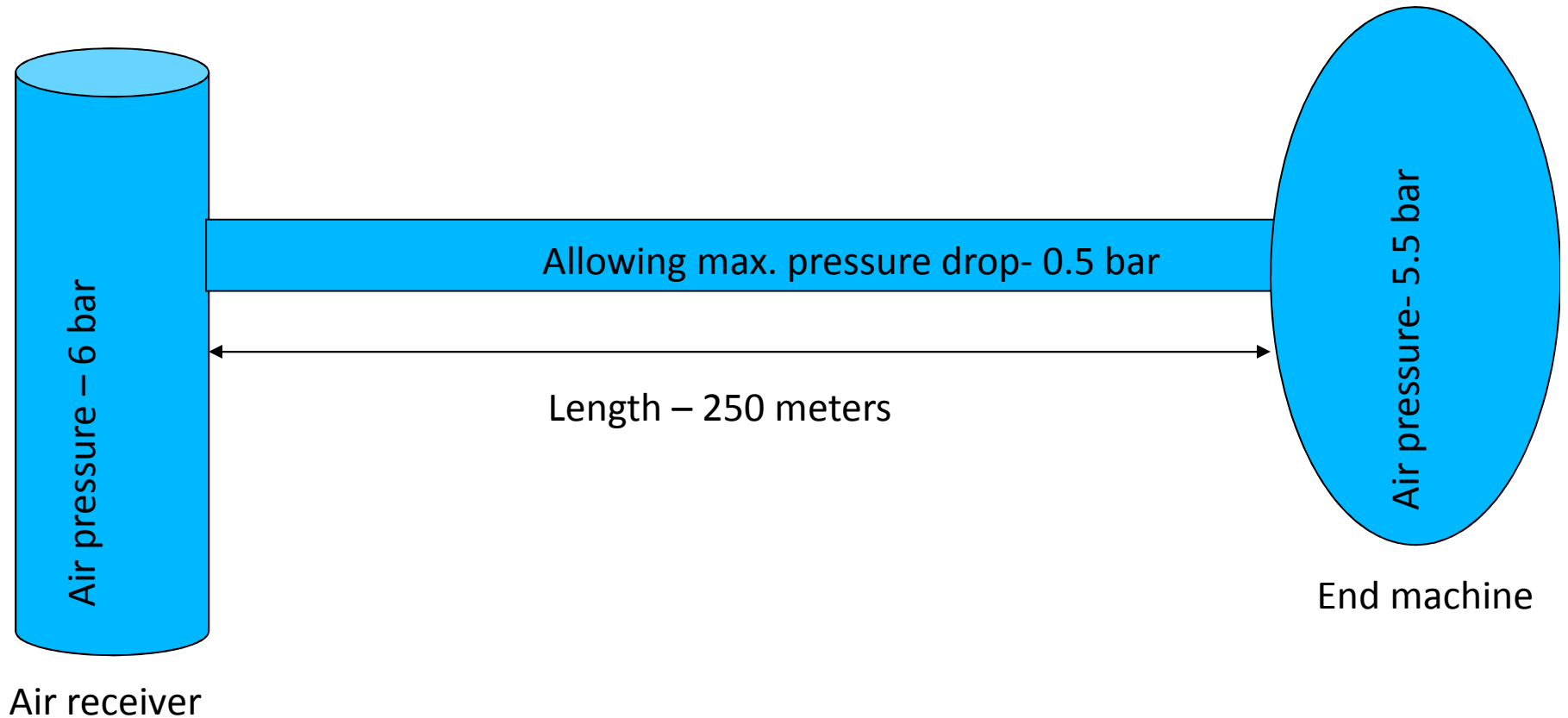
Reduce Consumption, Increase Efficiency – Compressed Air

Air line Header size revalidation / re-designing



Reduce Consumption, Increase Efficiency – Compressed Air

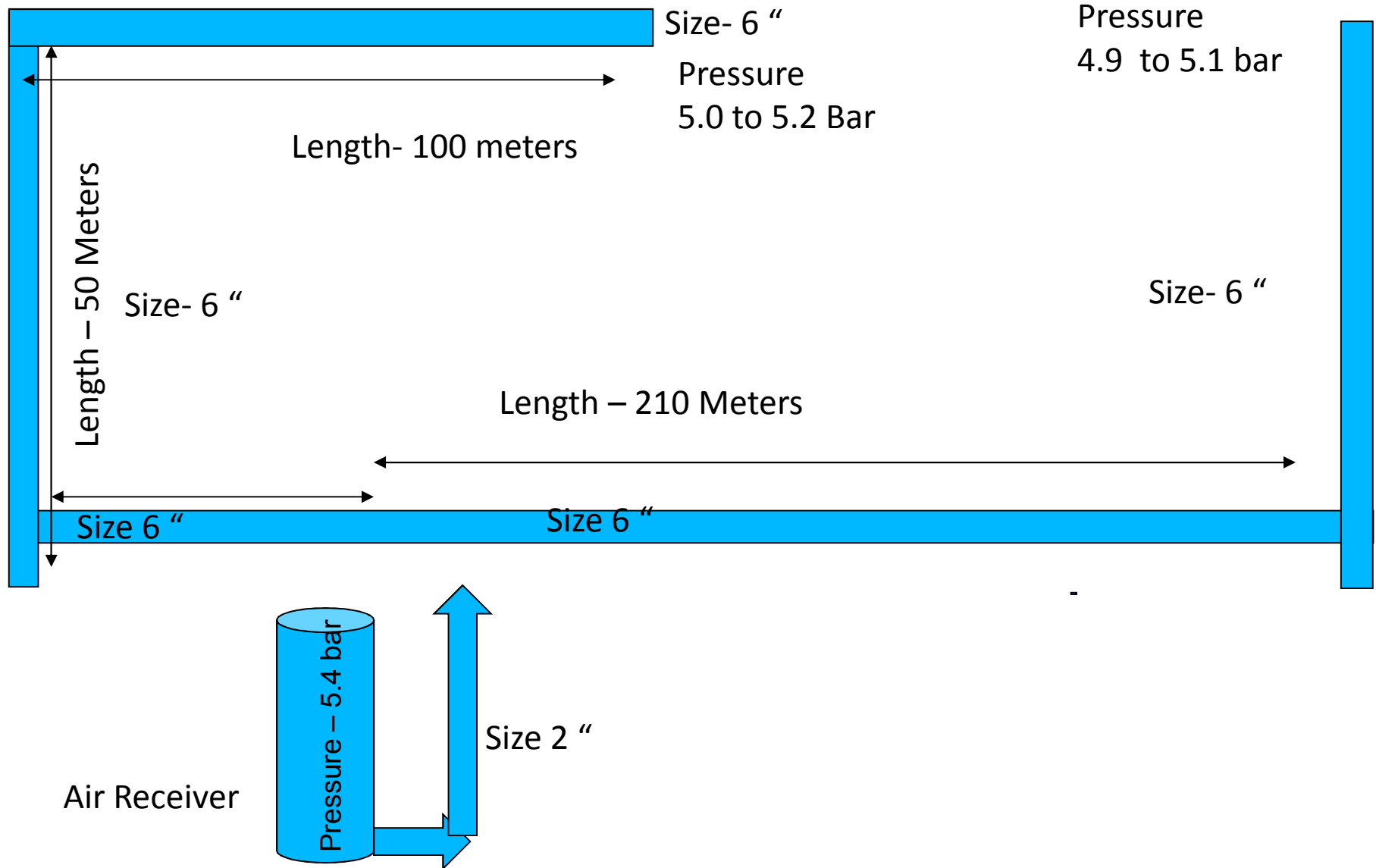
Air line Header size revalidation / re-designing



**For maintaining drop of 0.5 bar & for distance of 250 meters
We require header line size of 4 “ size minimum.**

Reduce Consumption, Increase Efficiency – Compressed Air

Air line Header size revalidation / re-designing



Reduce Consumption, Increase Efficiency – Compressed Air

Air line Header size revalidation / re-designing



Main air header line size changed to 6 “

**Savings achieved up to 300 units per day.
Savings achieved by 11.3 % to that of total compressed air consumption**

Reduce Consumption, Increase Efficiency – Compressed Air

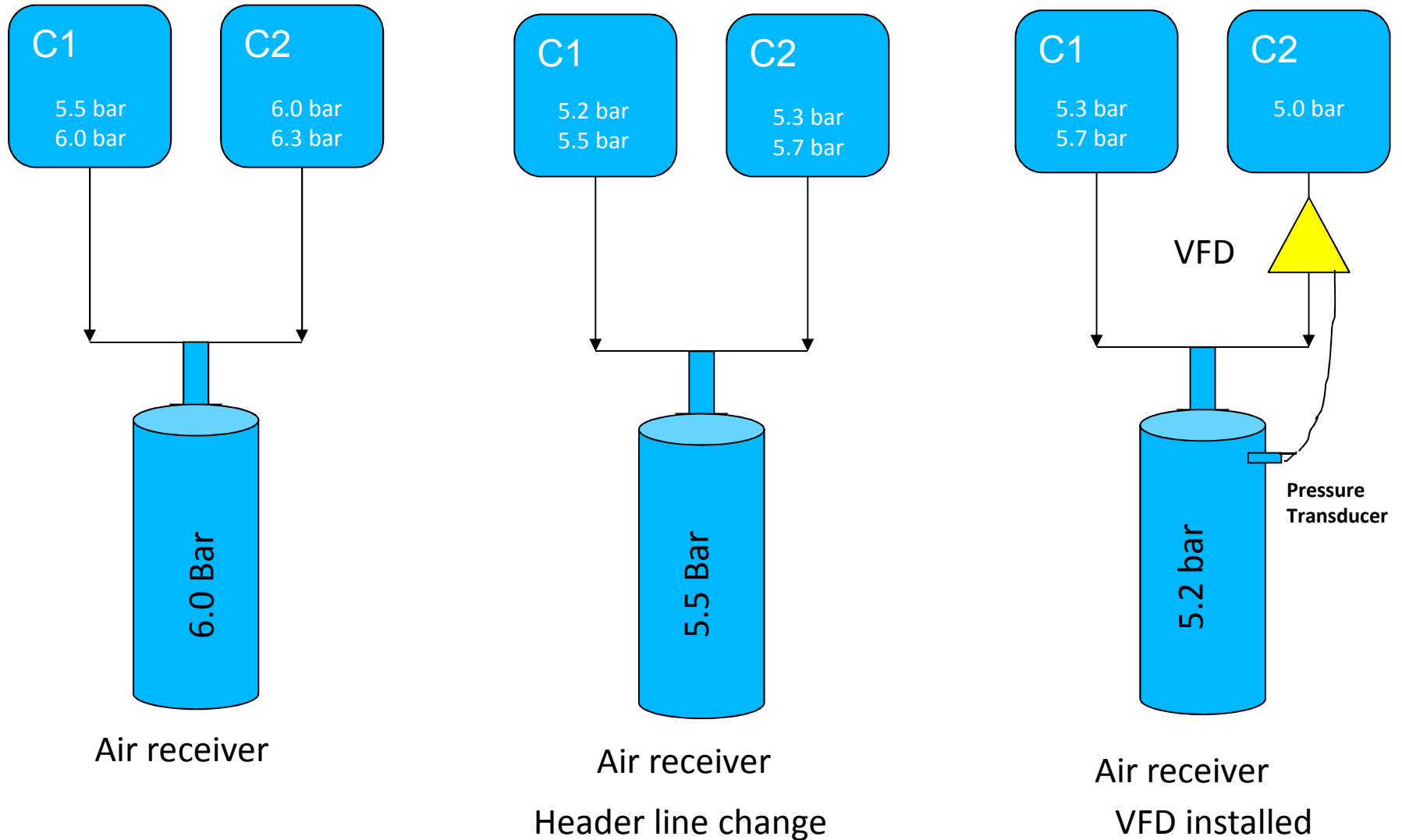
VFD Installation to Air-Compressors



Savings achieved up to 250 units per day.

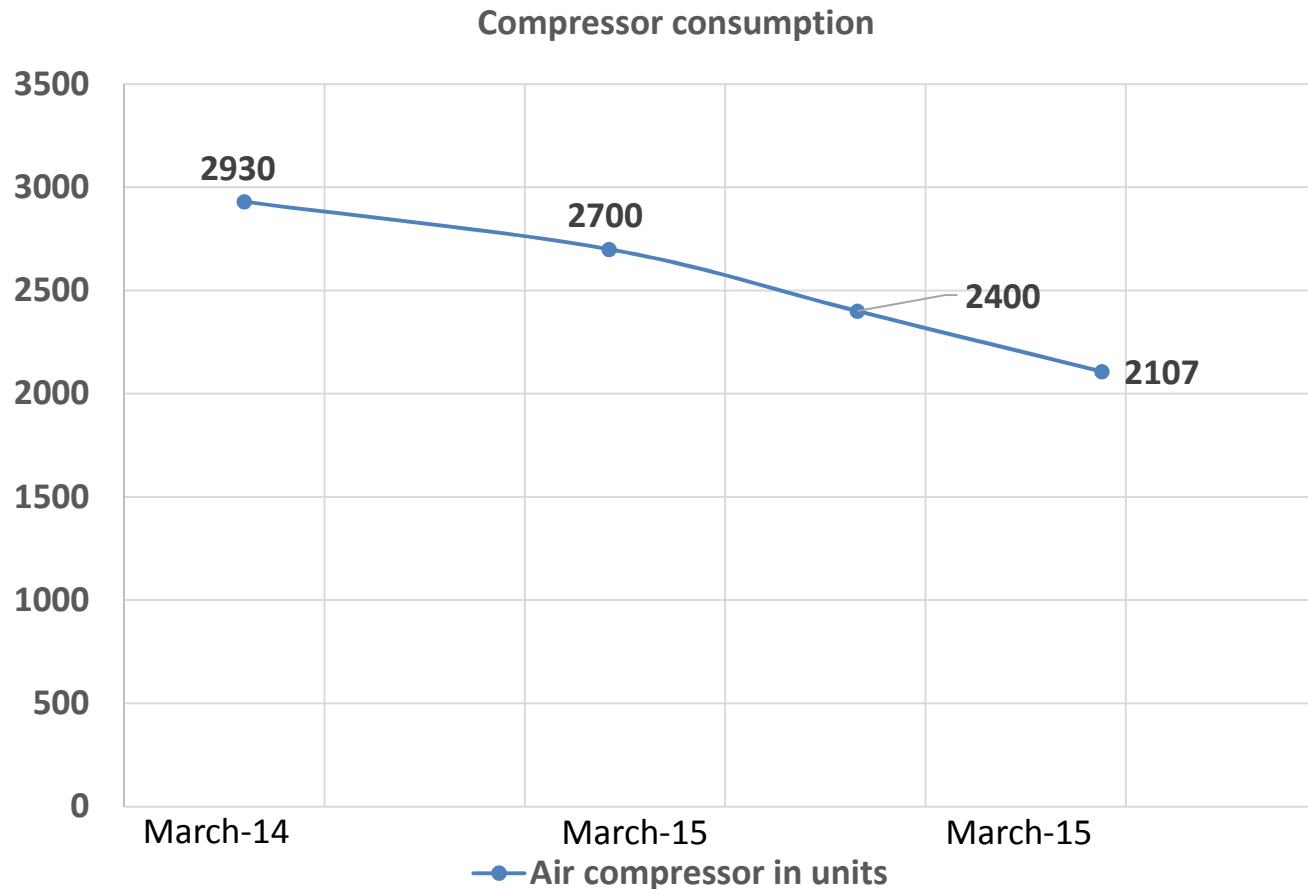
Reduce Consumption, Increase Efficiency – Compressed Air

Overall Air compressor Utilization



Reduce Consumption, Increase Efficiency – Compressed Air

Result – Compressed Air Conservation



Over all achievement- compressor consumption reduced from 11.7 % to 6.9 % to that of total electricity consumption.

Increase Efficiency – Annealing Furnace

Various idea generation -

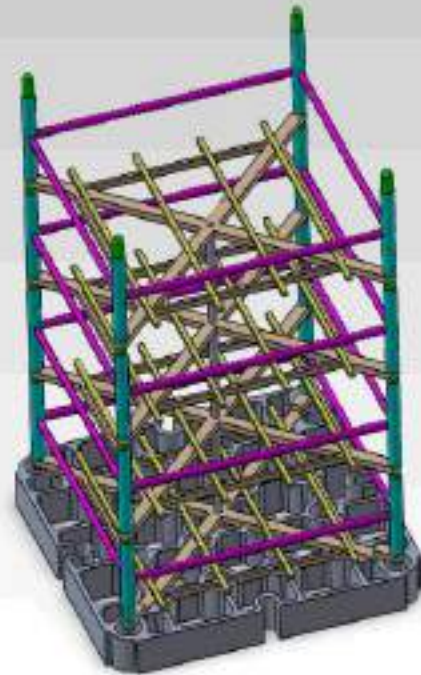


Existing Design



Idea Generation

Increase Efficiency – Annealing Furnace



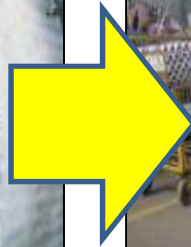
Tray Weight is 50 Kg Instead of 130 Kg.

Per Furnace capacity improvement = 4.55 MT / Day (19 %)
Per furnace annual cost savings ~ Rs. 15 Lacs

Increase Efficiency – Aluminium Melting Furnace



**LDO fired furnace
2010 – 11**



**Electrical furnace
with insulation
2013 – 14**



**Door Interlocked with M/c Cycle
2014- 15**

**Savings achieved up to 600 units per day in 4 furnaces
Total Al melting consumption reduction by 20 %**

Renewable Energy



Renewable Energy – Solar Roof Top Project



Solar Roof Top System- 250 KWp Capacity

Additional 500KW Capacity Solar Roof-Top Project is sanctioned and is in Installation stage. (32% of Consumption)

Renewable Energy – Biomass Fired Hot-Air System



Implemented for
→ Varnishing Process,
→ Powder Coating process
Annual potential savings of Rs. 14.7 Lacs.
Replaced 200KW Ovens

Renewable Energy – Solar Concentrator



Solar Concentrator 5KW Capacity

→ Power is fed to the Grid.

→ Hot water is fed to the Boiler as preheated water

Water Conservation



Rain Water Harvesting



**Main pond
capacity -
55 Lac litres**



Total capacity of all ponds = 90 Lac litres

Rain Water Harvesting - Beyond Fence



Created trench



Created check dams – 2 nos



Water Harvesting in Govt. Plot – Capacity- 25 Lac litre



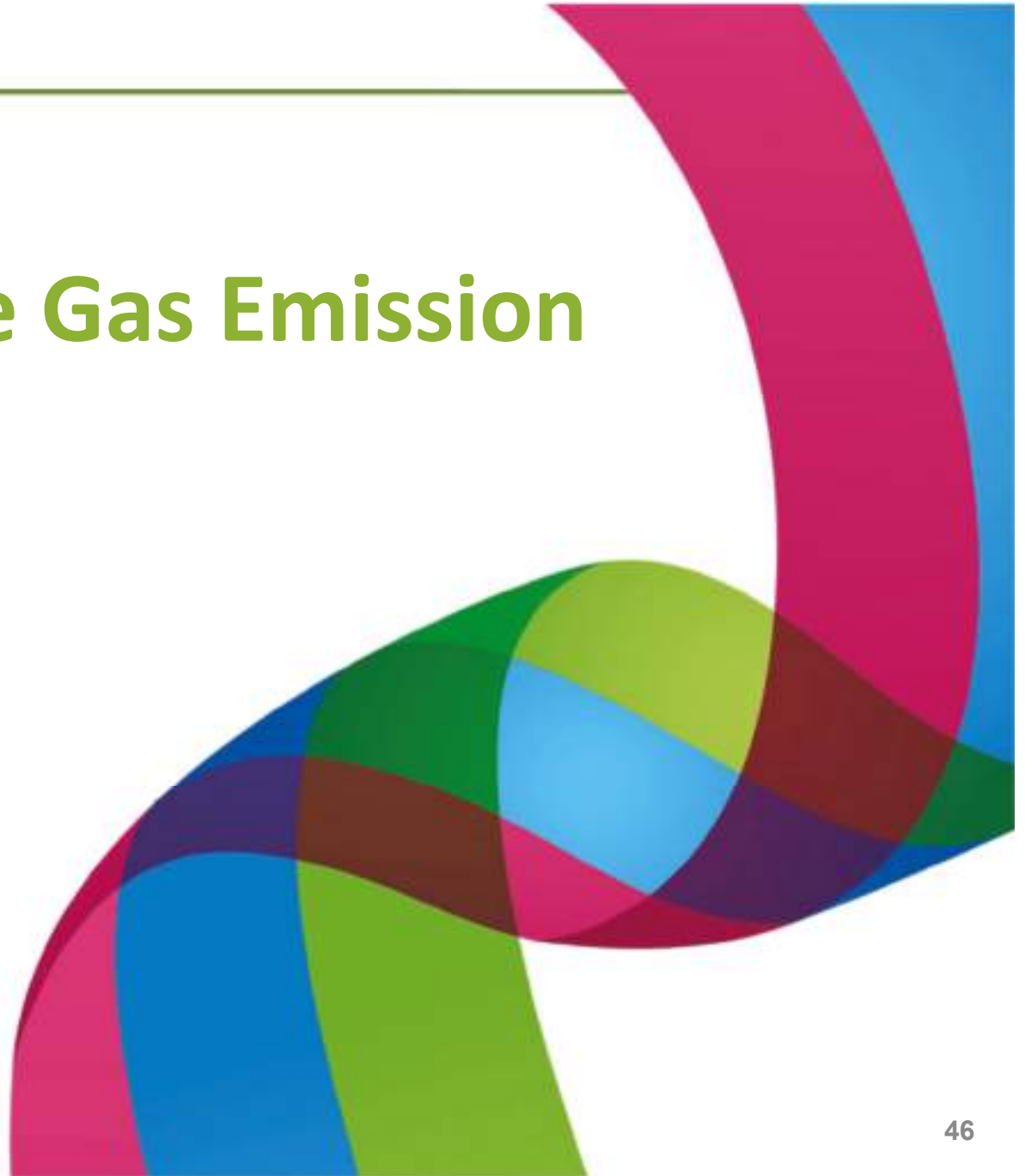
“Jalyukta Shivar Abhiyan” at Nearby Villages

Capacity Building – Technology absorption



One Village adopted by us for implementation of these concepts in Year 2016 – 17.

Green House Gas Emission



Scope 1 – Diesel consumption - Boiler

Replacement of low Efficiency boilers with high efficiency boiler.



Old Boiler



New Boiler

Old Boilers - Capacity 100 Kg / Hr , Efficiency – 31 – 35 % = 3 nos.
New Boiler – Capacity 300 Kg / Hr, Efficiency - 90 – 92 % = 1 nos.

Scope 1 – Replacement of LDO fired AL Melting Furnace



LDO Fired Baffco Furnace



Electrical Fired AL melting Furnace

Total 6 LDO fired Al melting furnaces converted into Electrical fired in last 3 years.

Carbon Neutral Approach

GOAL – Creating a microclimate to raise ground-water levels by planting 500000 hardy, drought-resistant trees native to the region by 2020.



AREA COVERED UNDER PLANTATION

- Planned : 80 Hectares
- Actual :72 hectares

In Lat 3 Years Total Plantation is 1,20,384 nos.

Waste Management



Implemented Concept – “Scrap On Wheel”

On line ‘Punching Scrap’ collection conveyor made in-house



Before

After

Even punching scrap is handled as single piece – Scrap on Wheel

Implemented Concept – “Scrap On Wheel”



Created simple visual codes to indicate when to call vehicle for disposal, Escalate the matter etc..

70 % of Waste Management area now converted to Car-Parking

Examples of Liquid waste Management

Treated water (As per MPCB Consent) further passed through Bio-Degradable Beds Before aeration:-



Worked with Pune Bremen Society (German Technology) for “Bio – filtration” of water

Examples of Liquid waste Management



Bamboo floats for waste water further treatment

Recognition for Liquid waste Management



External recognitions at State Level for the plant

**“Paryavran Gaurav Puraskar- Jun 2013”
By
Maharashtra Pollution Control Board**



Material Conservation, Recycling & Recyclability



Tools Adopted for Inventory Reduction in-turn Material Conservation

<ul style="list-style-type: none">• Rack Free
<ul style="list-style-type: none">• Pallet Free
<ul style="list-style-type: none">• No Forklift for Material Shifting
<ul style="list-style-type: none">• Lean Containers
<ul style="list-style-type: none">• Zero Stock in Scrap Yard
<ul style="list-style-type: none">• Practice of SMED for Bottleneck Machines
<ul style="list-style-type: none">• No receipt Area

Container Mapping & Reduction



Variety of Containers Removed From Shops for Material Handling

Rack Mapping & Reduction



Minimum Transshipment, Transport & Storage Points



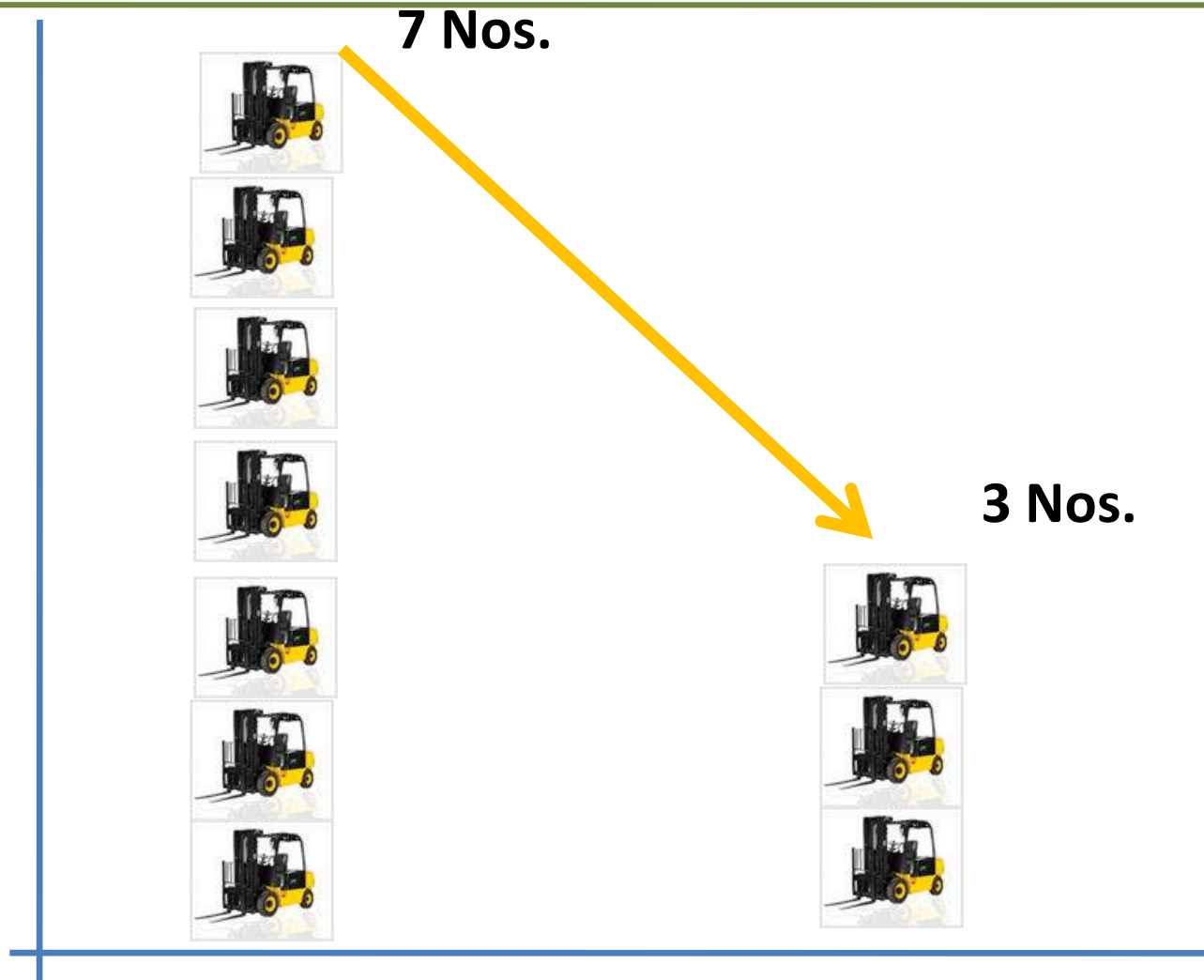
Elimination of central store concept & storage near usage point

BENEFITS :- Removed Buffer Equipment



Eliminated more than 300 Trolleys from the system & non moving items releasing cash worth Rs 2 Cr.

BENEFITS :- Removed Buffer Equipment



Eliminated 4 nos. forklifts Out of 7 nos.

Product Stewardship



Technological & Infrastructural Leadership – Design

**YOY we have improved hermetic motor efficiency from 70 % to 90 %
& Reduced the BOM Cost for customer up to 20%**

- Capability to handle efficiently various motor design software's enabling design prediction within +/- 3%.
- Indigenously developed motors with electronic commutation.

1995 to 2009
Efficiency 70%

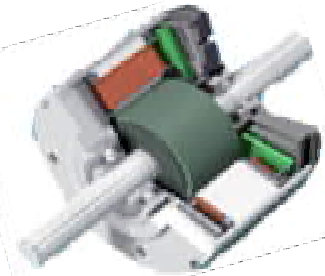
2010
Efficiency 80%

2012-13
Efficiency 85%

2013-14
Efficiency 86 %

2014-15
Efficiency 90% +

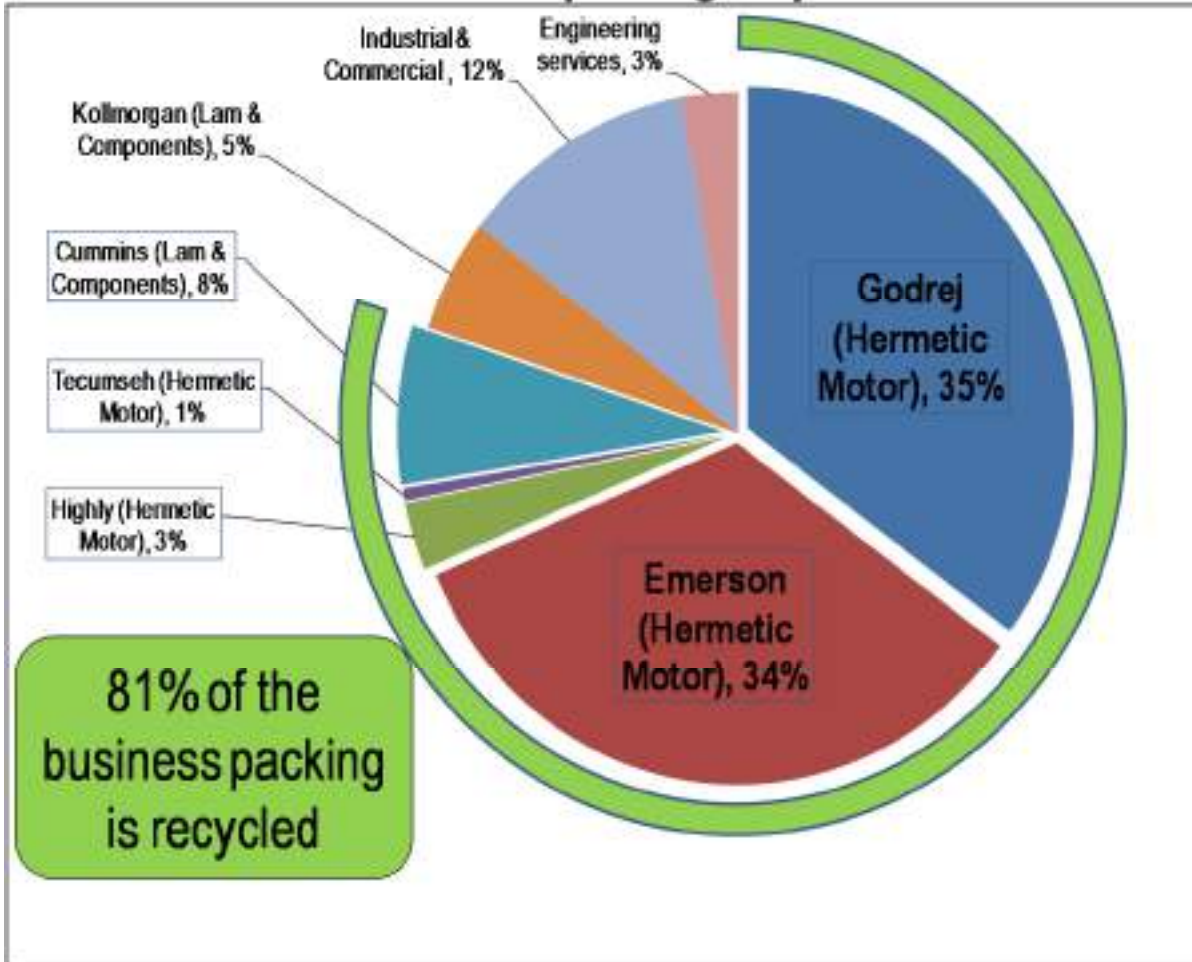
• In-house developed software for designing winding tools, as per given lamination profile. This capability enabled Lawkim to be considered as design partner in Statomat-Lawkim Joint Venture (1998 till 2008)



Design Capability at-par with those at GE / Emerson Design Centers.

Extended Producer Responsibility

Finished Goods packing recycled



Paper Recycling (In Kg)



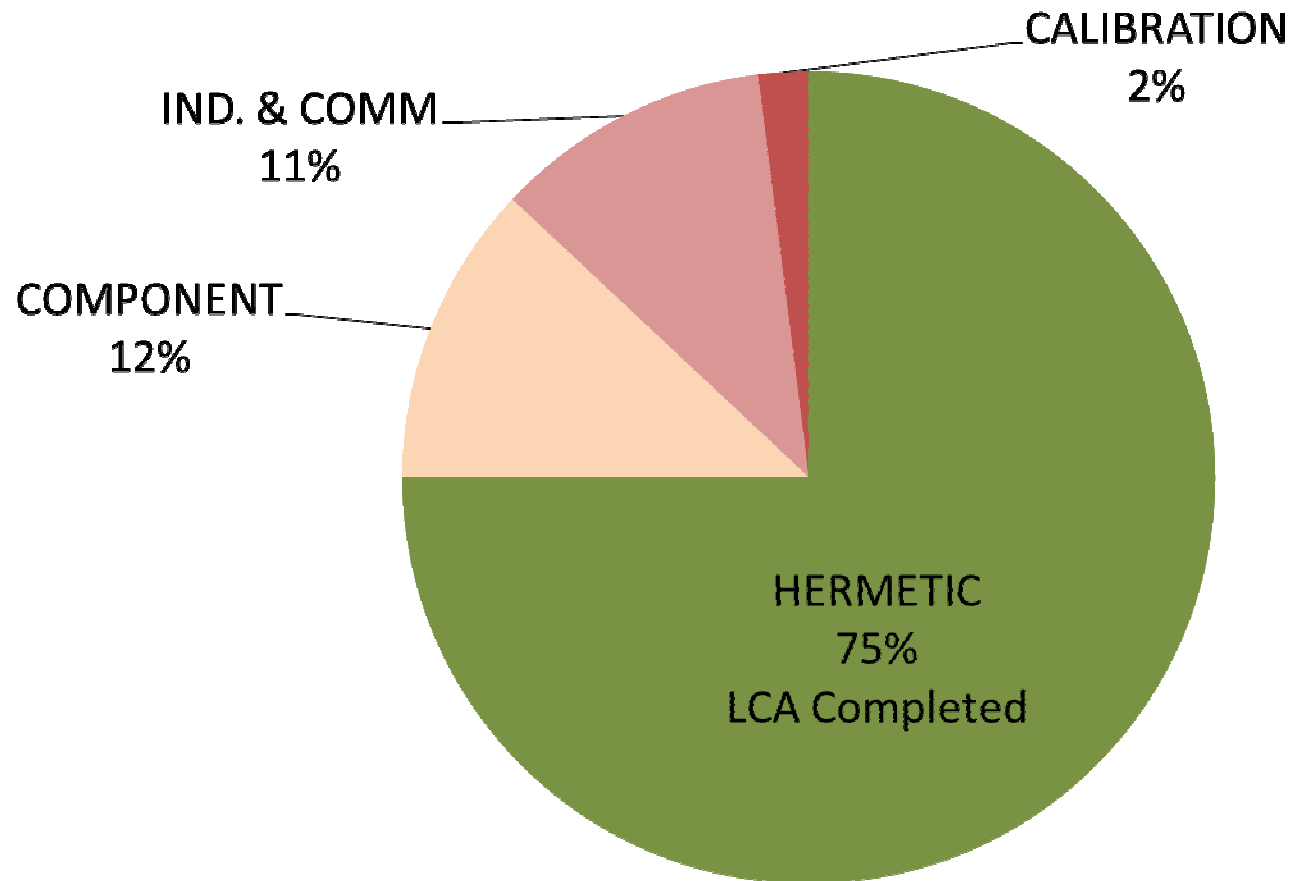
Steel coil packing – Wood eliminated

81% Packing is recycled

Life Cycle Assessment

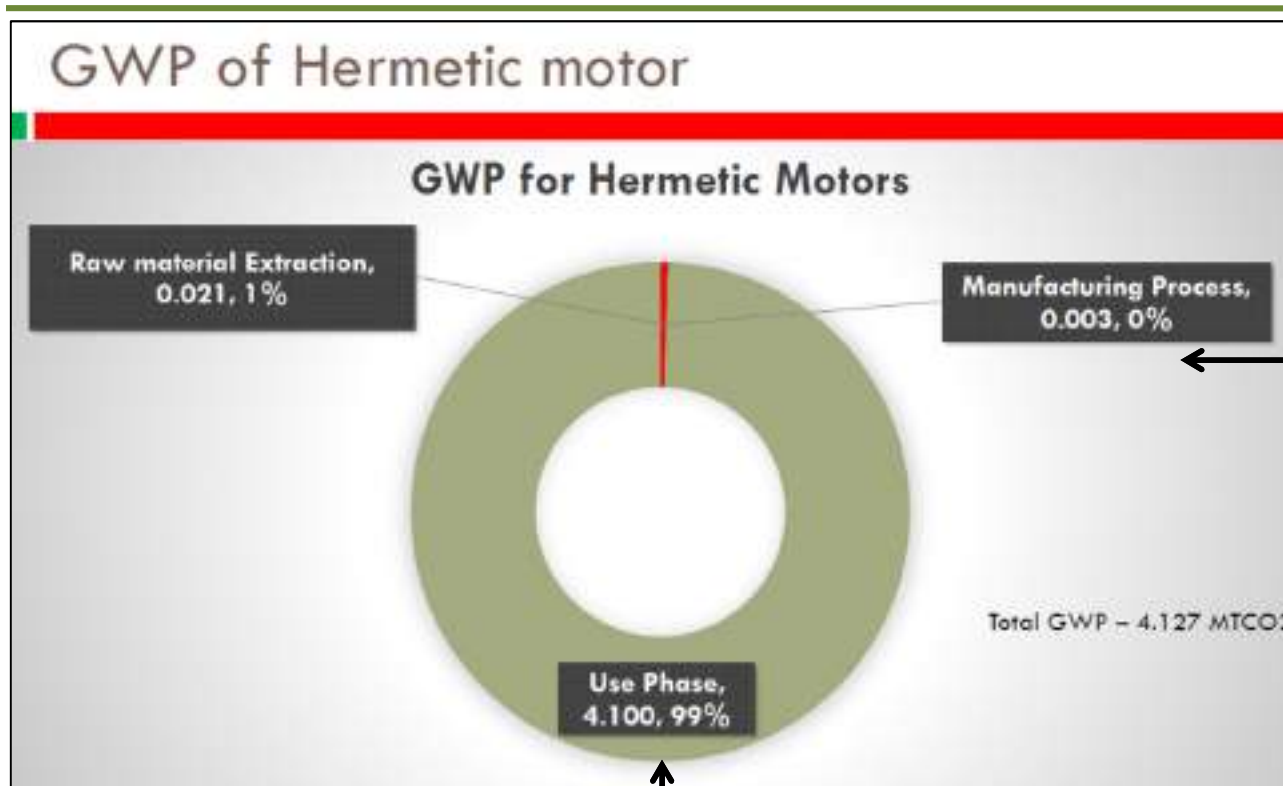


LCA for Product



75% Products (Hermetic) are covered.

Environment Impact Reduction Initiatives based on LCA



Projects to reduce energy impact during manufacturing stage.

1. Rotor steam bluing.
2. Casting process from LDO to electric.
3. Centrifugal die-casting in progress.
4. Evaporating punching oil.
5. Double row tool to reduce scrap.
6. Welding to stitching.
7. Logistics – Localization of steel + Copper & Aluminum.
8. Turning Eliminated
9. PCE Eliminated

Projects to reduce energy impact during use phase.

1. Efficiency of motor improved from 66% to 86% during 2010-2015
2. Efficiency of motor to be improved from 86% to 90%+. In progress since 2016.

Others



Piano type Roof Structure



Less heat load from roof & enhanced Natural Light in day time.

Innovation – “Flow Manufacturing”



Alternative to forklift- Automated Guided Vehicle

**Innovative use for In-house manufacturer of
Automated Guided Vehicle, Applied for Patent.**

Innovation - Bamboo Cycle



**Completed Expedition from
Kanyakumari to Khardung la**

**Use of Bamboo for structural material
to reduce carbon foot print
of making steel structure.**

Awareness creation about environment – Through Students



Other Unique Initiatives :-

Naoroji Godrej Centre for Plant Research



- ✦ Established in year 1992.
- ✦ Registered under Section 25 of The Companies Act, 1956.
- ✦ Approved by Department of Scientific and Industrial Research, India.



Unique industry academia partnership since 1992

Biodiversity at Premises at NGCPR :-



Recognition – GreenCo Rating



**Within first 5 Companies to
receive “GreenCo Gold”
Rating - 2014**



“GreenCo Platinum” Rating -2016

Way Forward :-

- Engage with Supply-Chain
- Continuous Capacity building programs
- Sustenance Management

Greening the
Production
System

Modern Plant
Practices

