

Rane Brake Lining Ltd – Plant 3 Puducherry

CII Energy Excellence

B.Shagul Hameed
Manager



M.Shenbaga vel
Dy.Manager



V.Senthil Kumar
Dy.Manager



Rane Brake Lining Ltd
Puducherry (Plant 3)

23rd to 25th Aug 2022

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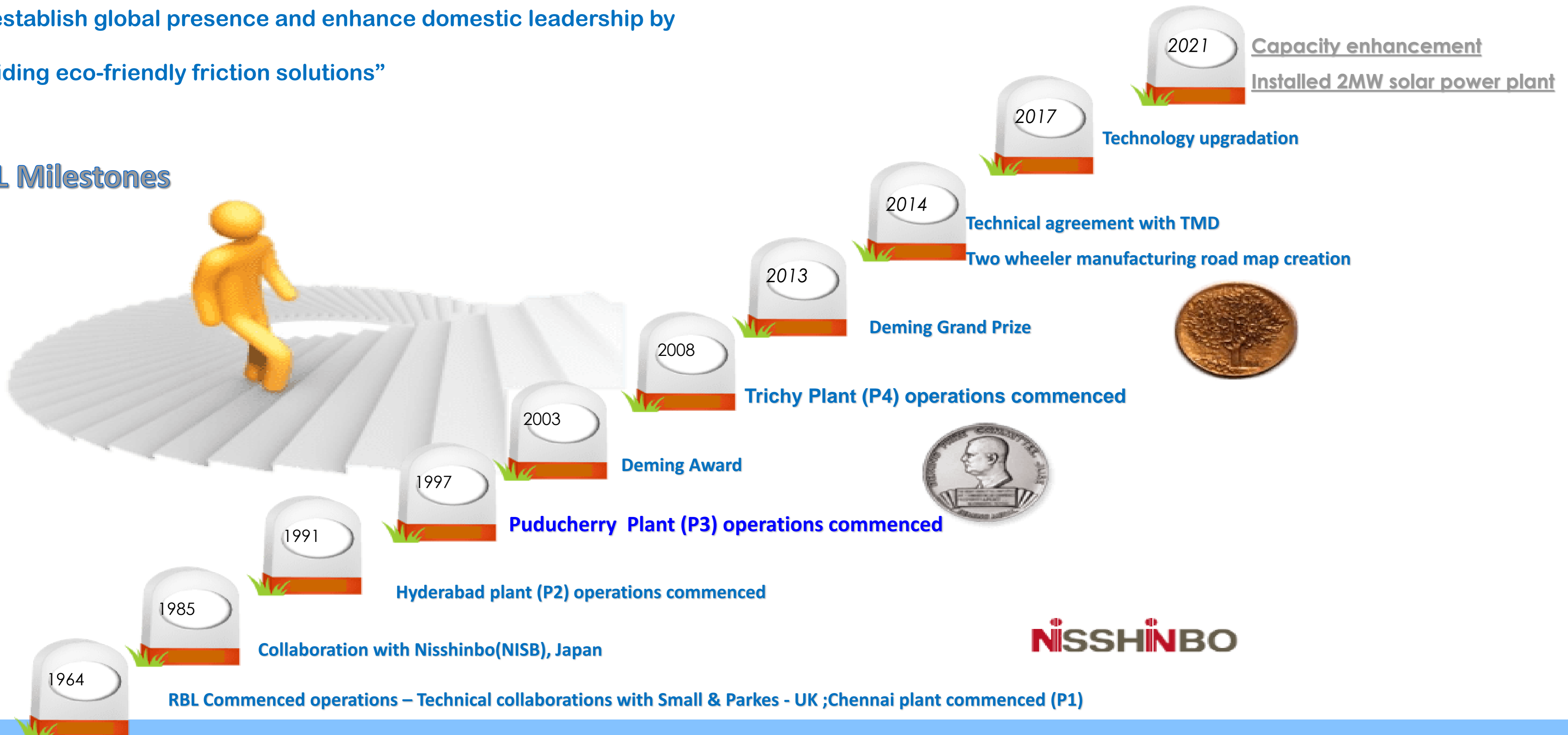
- 1. Brief introduction on company/units*
- 2. Specific Energy Consumption in last 3 years (FY 2019-22)*
- 3. Information on Competitors, National & Global benchmark*
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1. Company profile

RBL VISION

“To establish global presence and enhance domestic leadership by providing eco-friendly friction solutions”

RBL Milestones



1. Product segments & Customers

Product Segments

CVBL/CVDP



PCDP



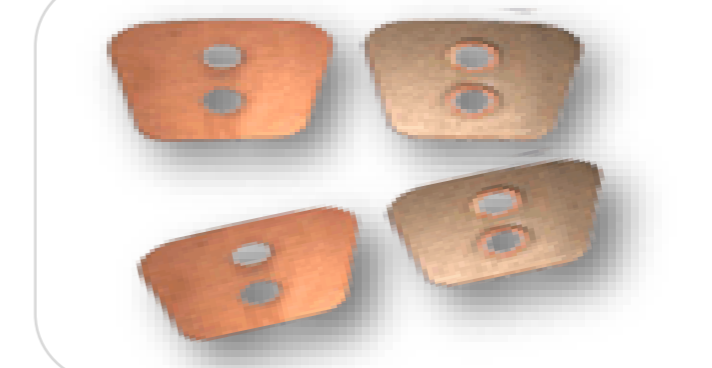
Two wheeler
Disc pad



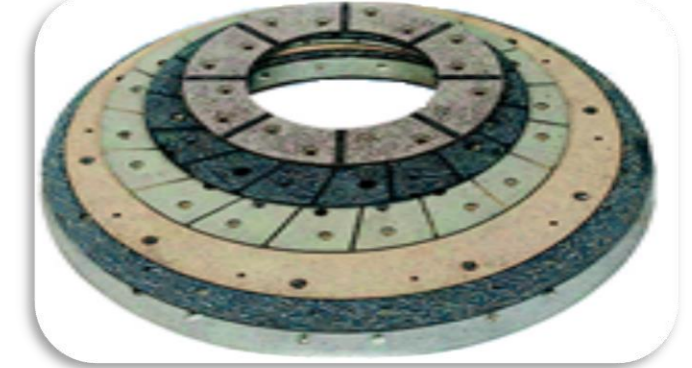
Rail Block



Sintered friction



Clutch Facing



OEM Customers

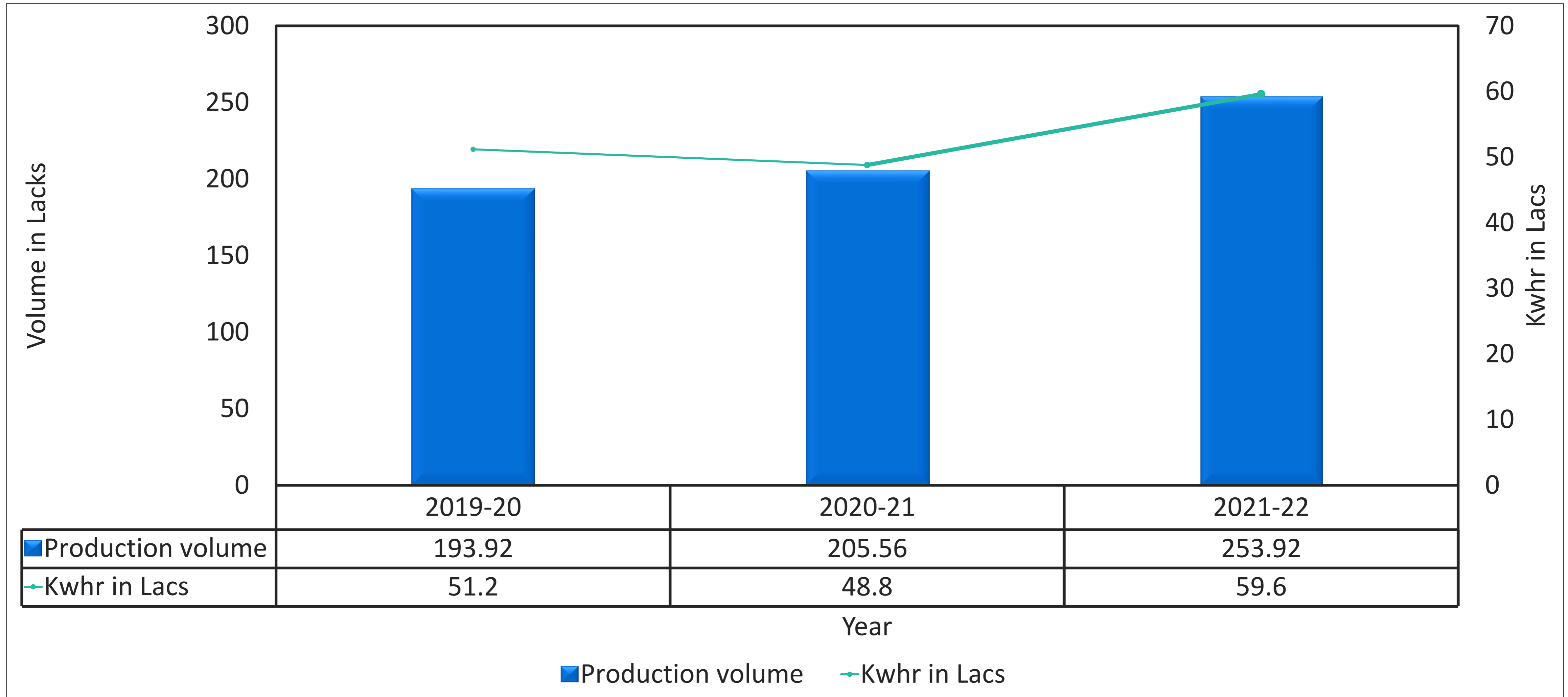


Tier 1 Customers



2. Specific Energy Consumption in last 3 years

Production vs energy consumption data for last 3 years



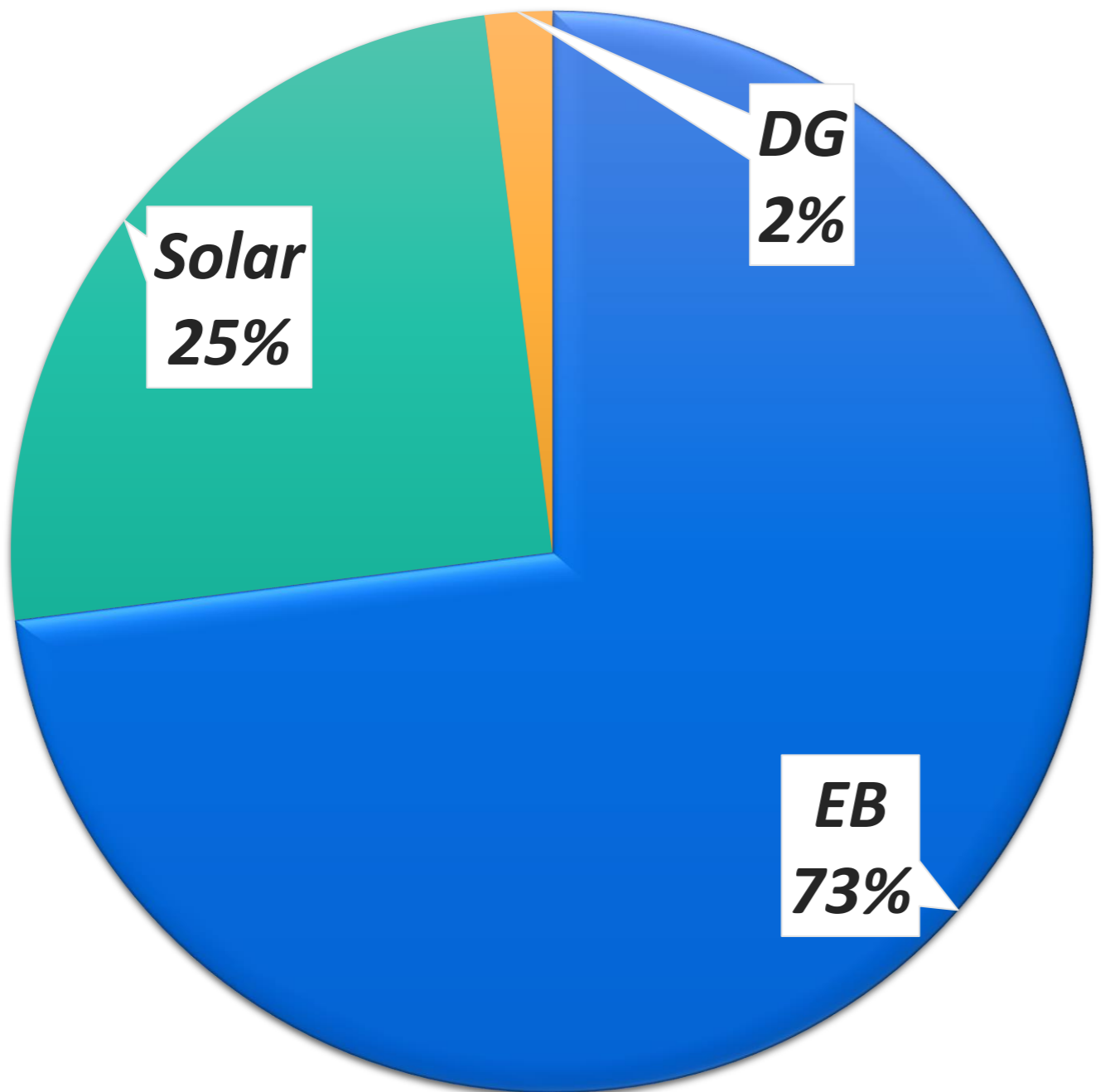
Production volume increased 29 % : Energy consumption reduced 10%

2. Specific Energy Consumption in last 3 years

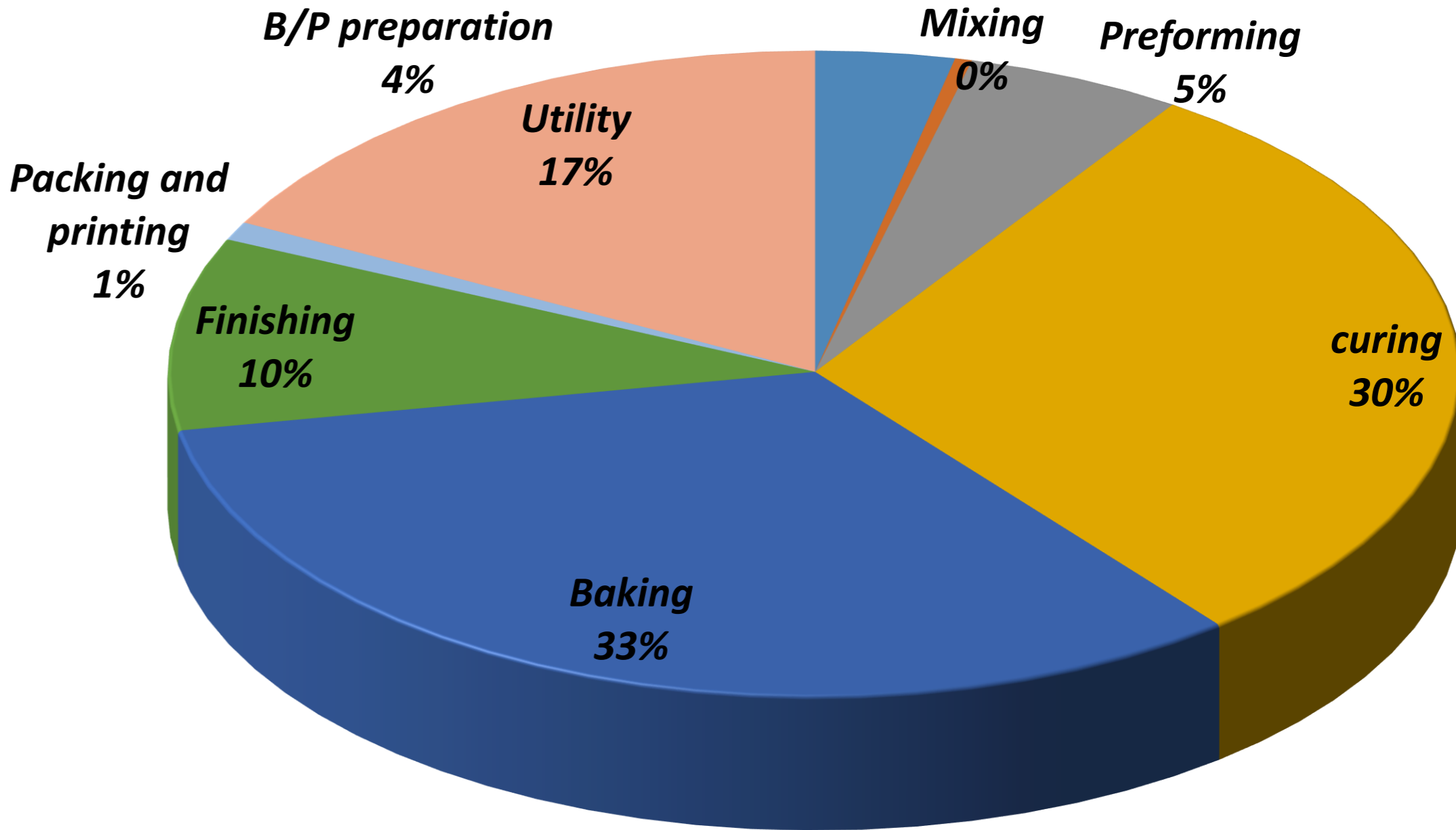
Source wise energy consumption data for last 3 years

Source	Consumption in kwh 2019-20	Consumption in kwh 2020-21	Consumption in kwh 2021-22
EB	46,47,140	29,92,300	40,14,000
DG	1,27,600	76,267	1,11,246
Solar	3,37,743	18,17,590	18,36,932
Total consumption	51,12,483	48,86,157	59,62,178

Source wise energy consumption



Plant Process wise power mapping



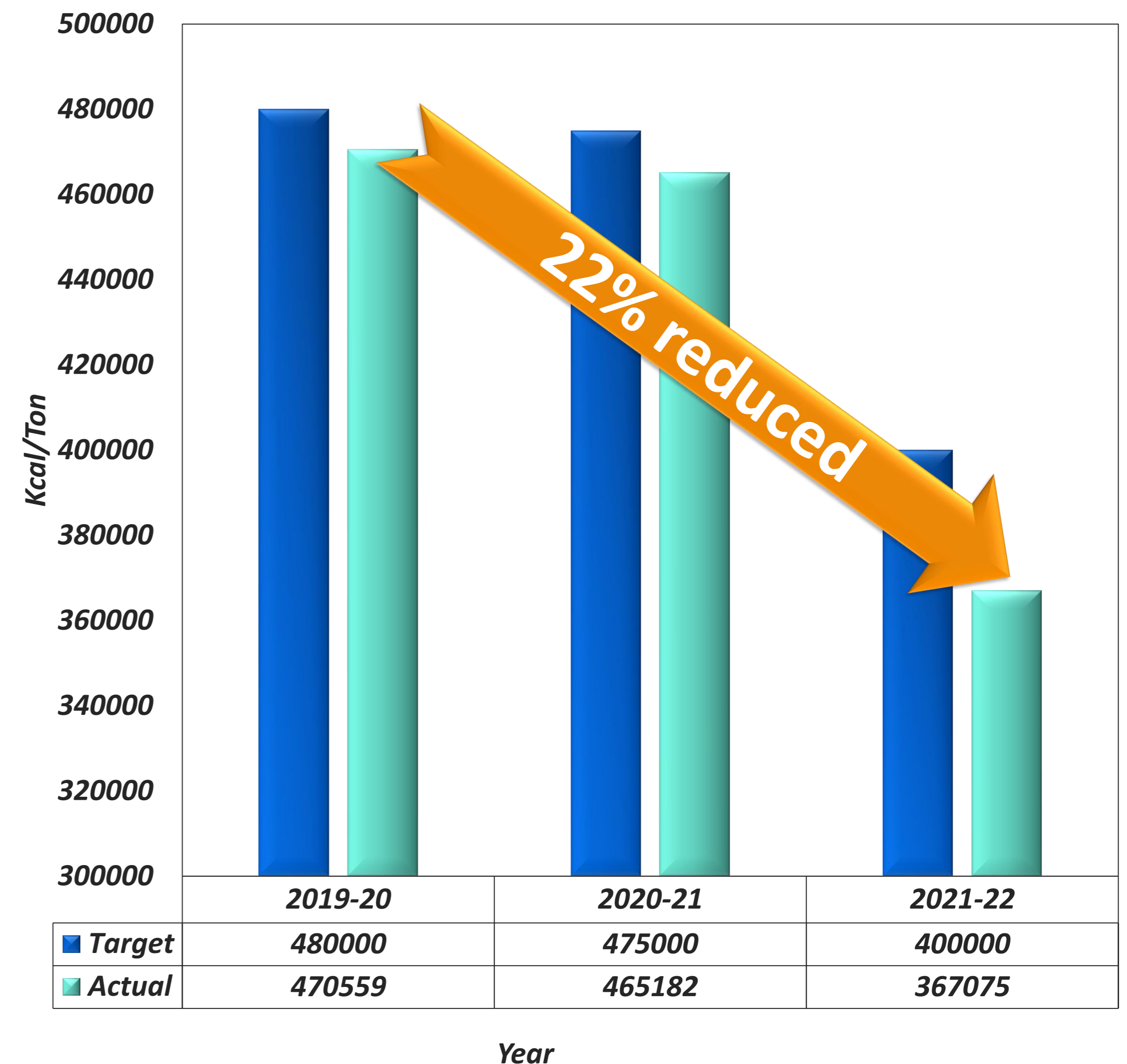
EB Power purchase dependency reduced from 98% to 73 %

2. Specific Energy Consumption in last 3 years

Specific energy consumption



Specific Thermal energy consumption

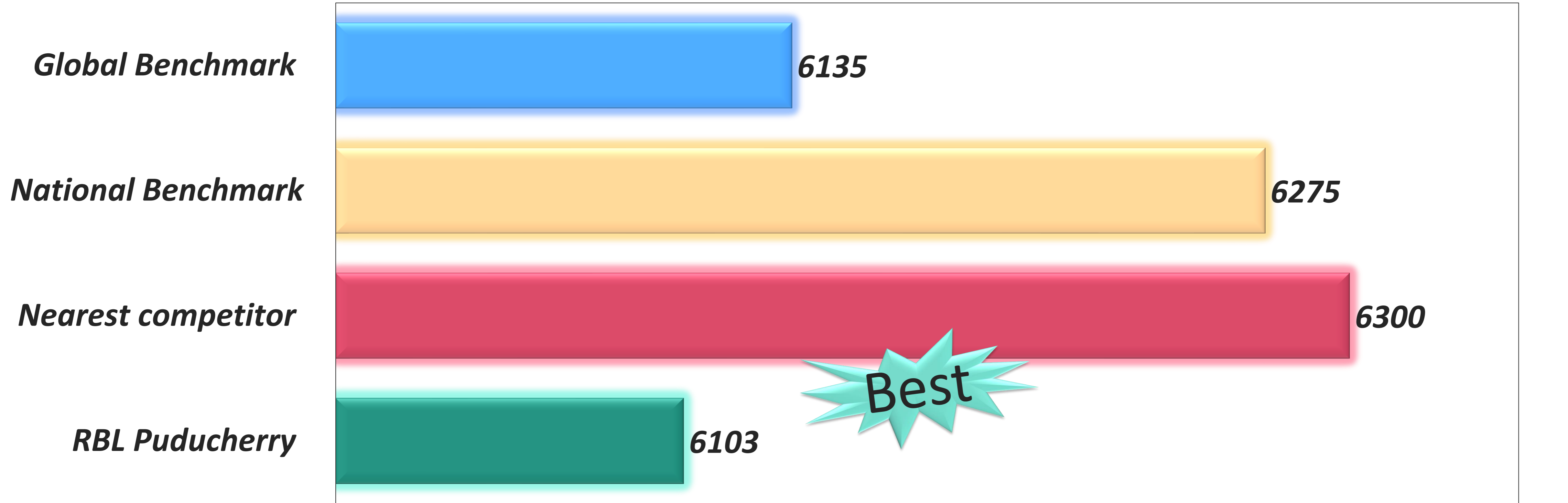


59 energy conservation projects implemented

6 Thermal energy conservation projects implemented

3. Information on Competitors, National & Global benchmark

SEC in kwh/ton



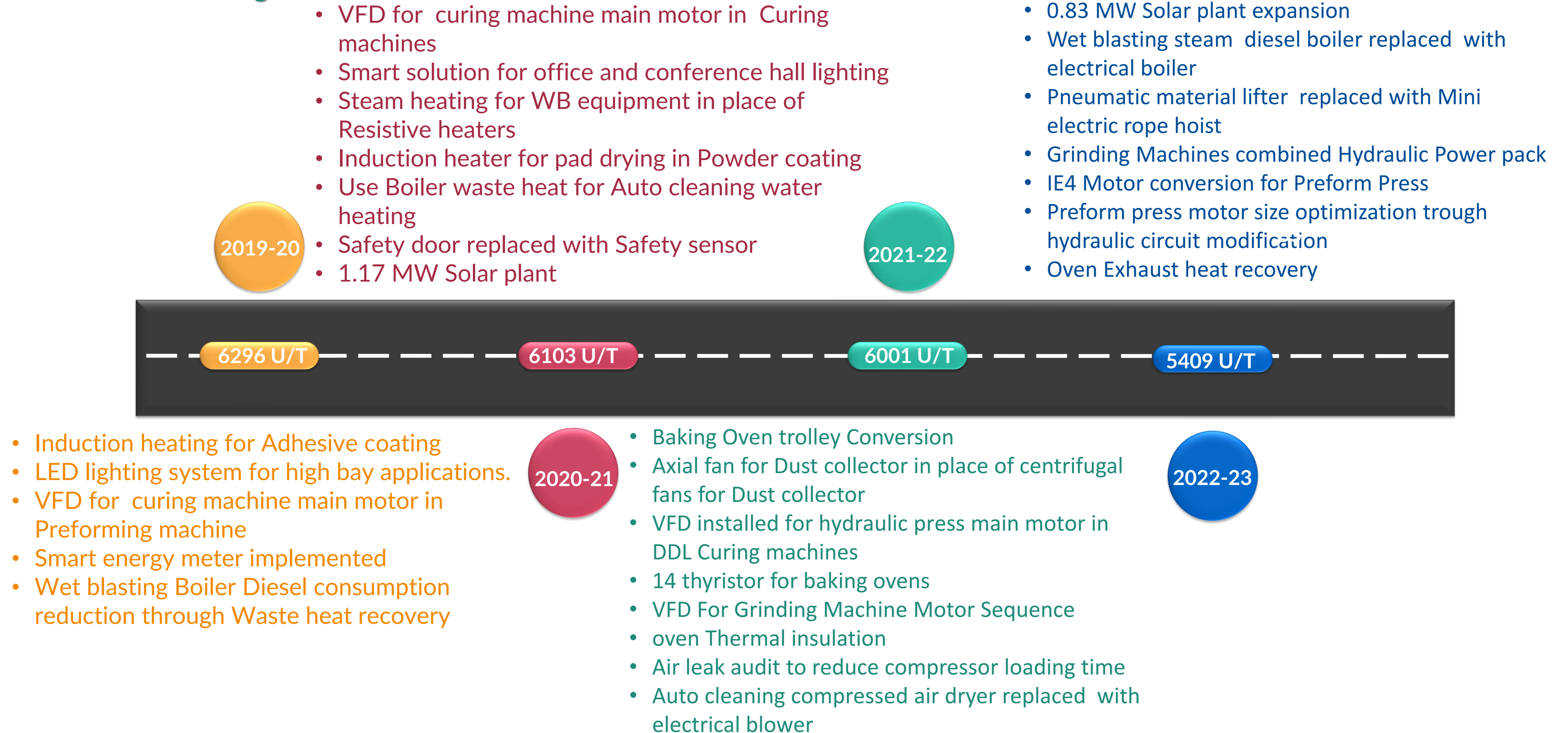
6000 6050 6100 6150 6200 6250 6300 6350

	<i>RBL Puducherry</i>	<i>Nearest competitor</i>	<i>National Benchmark</i>	<i>Global Benchmark</i>
■ <i>SEC in kwh/ton</i>	6103	6300	6275	6135

Target for 2022-23 is 5400 KWh/Ton

3.1 Road map to sustain benchmark

SEC in KWh / Tonnage



4. Energy Saving projects implemented in for last three years

Summary of the year 2019-20

No of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh	Thermal savings (Million Kcal/ MTOE)	Savings (INR Million)	Impact on SEC (Electrical, thermal)
22	0.9	0.21	0.4	1.4	48

Summary of the year 2020-21

No of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh	Thermal savings (Million Kcal/ MTOE)	Savings (INR Million)	Impact on SEC (Electrical, thermal)
19	1.1	0.29	0.2	1.8	193

Summary of the year 2021-22

No of Energy saving projects	Investments (INR Million)	Electrical savings (Million kWh	Thermal savings (Million Kcal/ MTOE)	Savings (INR Million)	Impact on SEC (Electrical, thermal)
18	0.5	0.23	0.3	1.9	102

2019-2022 : 59 Energy saving projects has been implemented with an investment of INR 1.69 Million

4. Energy Saving projects implemented in last three years

The following 3 projects will be explained in detail



Grinding machine motor on/off optimization through VFD



Baking oven Heater soft start through Thyristor



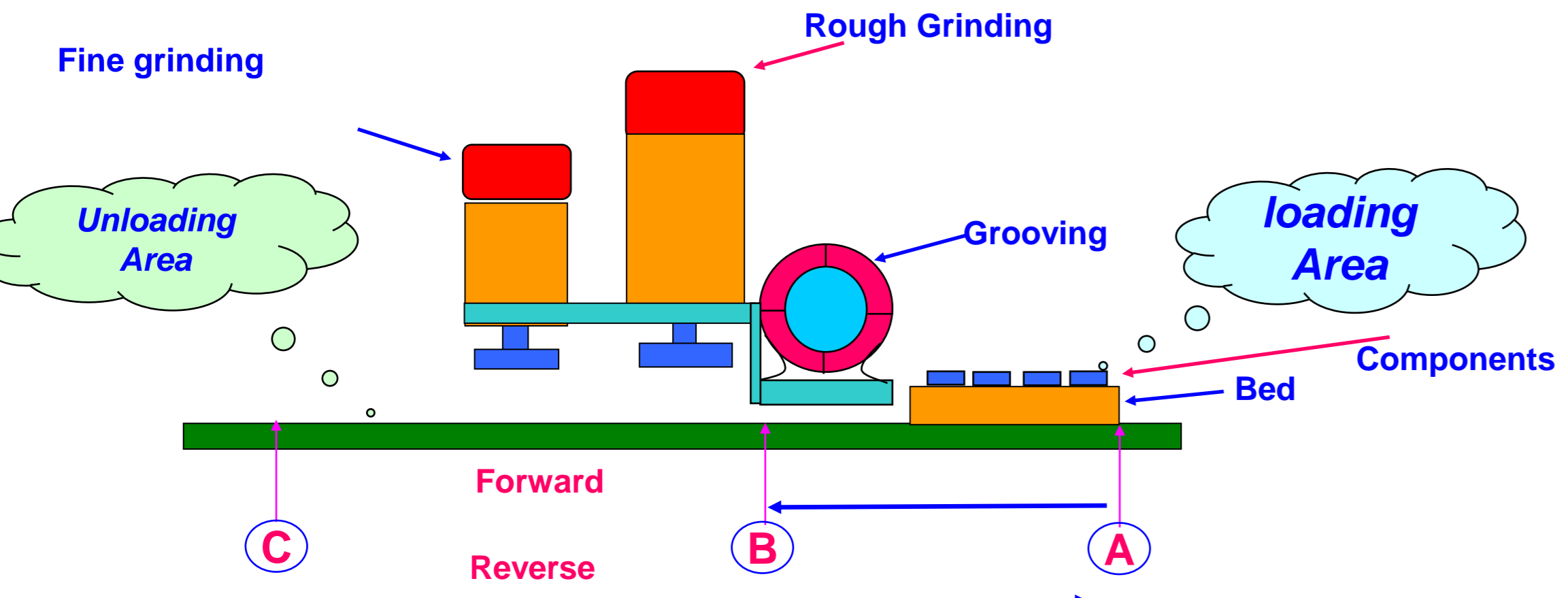
Compressor air consumption reduction

4.1 Grinding machine motor on/off optimization through

MED Machine:- Grinding machine DPO 714

- **Problem:-** Grinding machine energy consumption is high resulting of increasing of the power cost

Observations:-



- Grooving motor essential on time only A to B - 75 Sec
- Grinding Rough & Fine motor essential on time only B to C - 80 sec
- Grooving motor operation idle time from B to C in forward -130 sec
- Grinding Rough & Fine motor operation idle time from A to B in forward – 98 sec
- Grooving , Grinding Rough & Fine motor operational idle time from C to A in reverse – 32 sec
- There is no need of motor rotation in operational idle time - 130 sec

Root Cause:-

No provision to switch off the grooving motor in each cycle

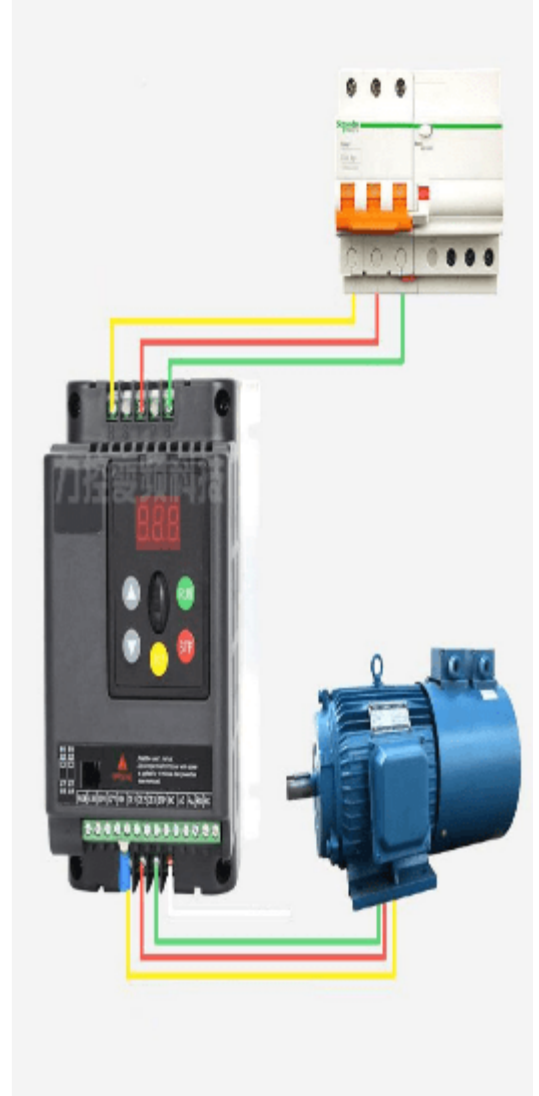
Action:-

VFD provided to switch of the All 3 grooving & grinding motors and interlinked with PLC

Before



After



Benefits:

- Energy consumption reduced 2859 to 1509 kw hr / month & Cost saved INR 8988/Month /machine
- HD Planned to 3 Grinding machine in Q3 (DPO713, DPO715 and DPO718) – Potential annual saving 4.3 lacs

4.2 Baking oven Heater soft start through Thyristor

Machine:- Baking Oven

Problem:- Energy cost is increase due to unit price increased and demand raised up

Observations:-

- Energy excess consumption in baking ovens
- Heater consume more energy
- Oven contains 2kw -16 heaters

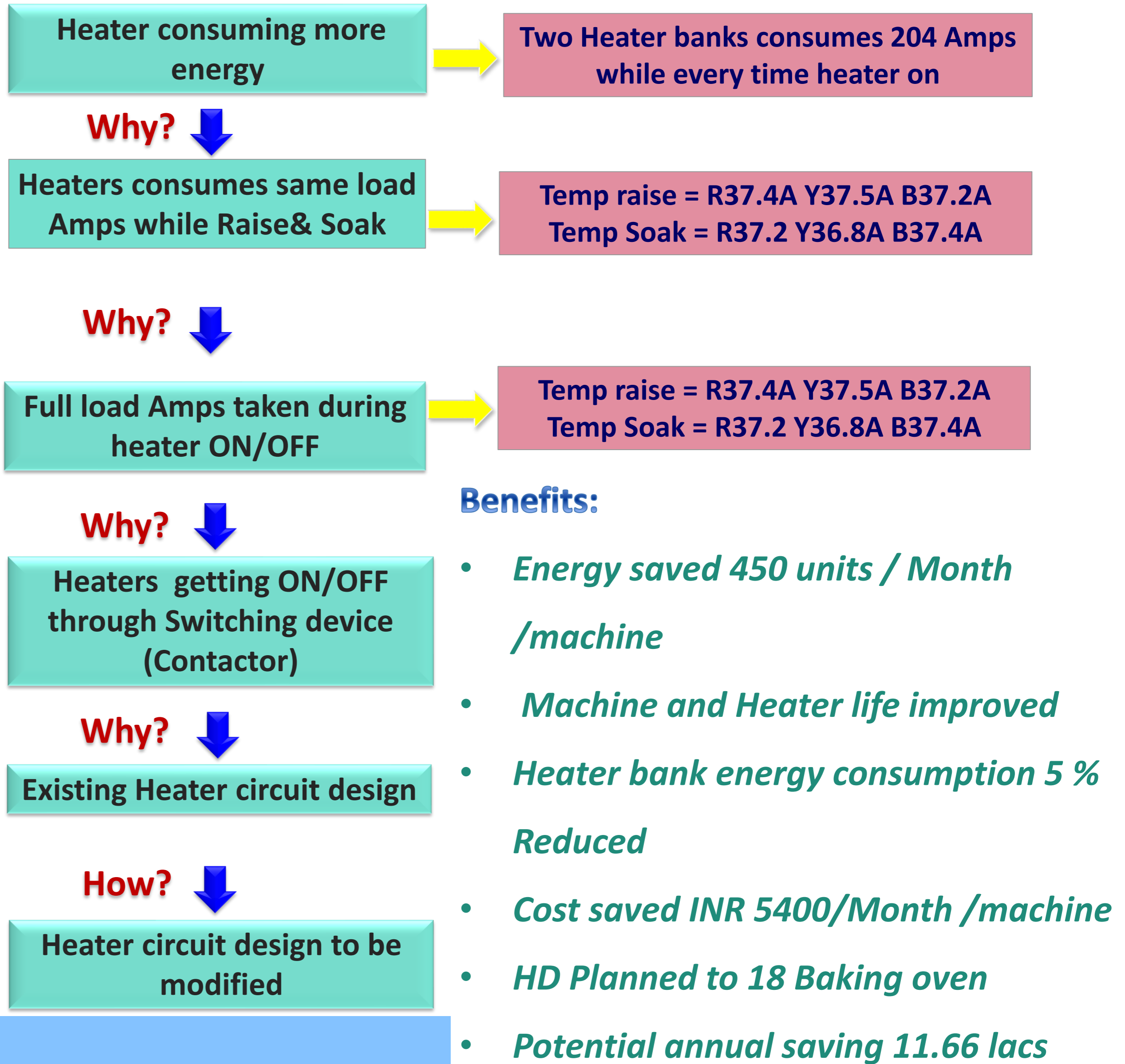
Root Cause:-

Heater on time is high due to Heaters getting ON/OFF through Switching device (Contactor)

Action:-

Thyristor controller is provided to soft start

Root cause and Counter measure analysis :

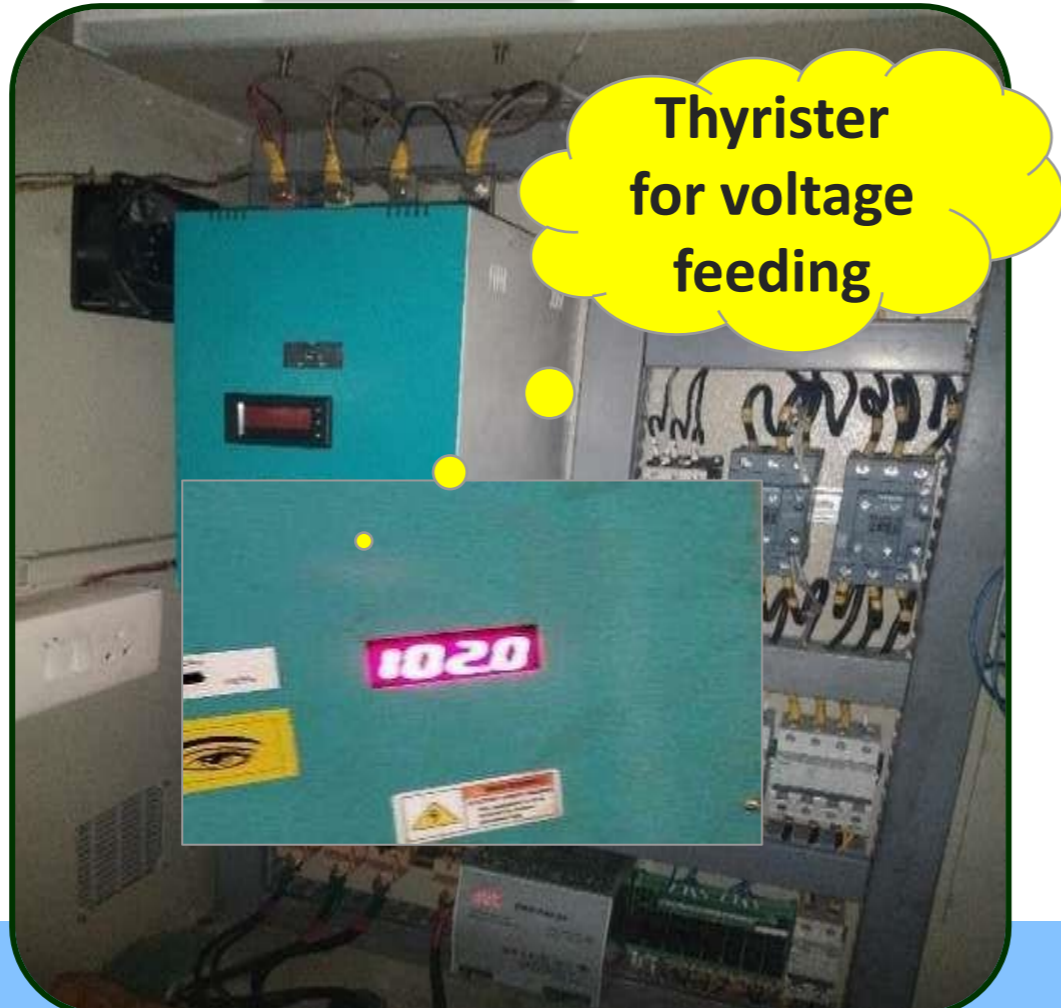
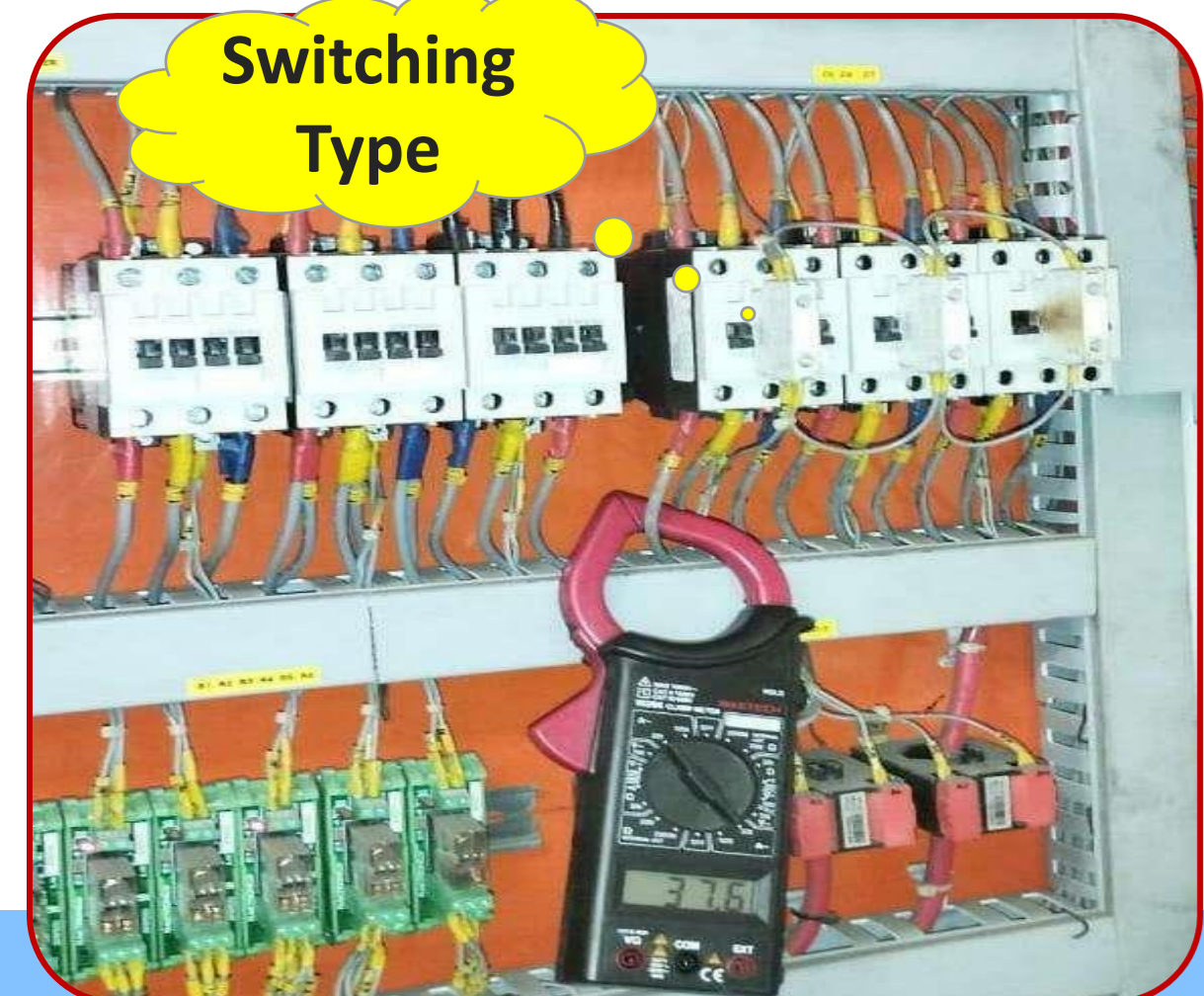


Before

After

Switching Type

Thyristor for voltage feeding



4.3 Energy consumption reduction - Utility

Machine:- Compressor

Problem:- Power consumption high in compressed air

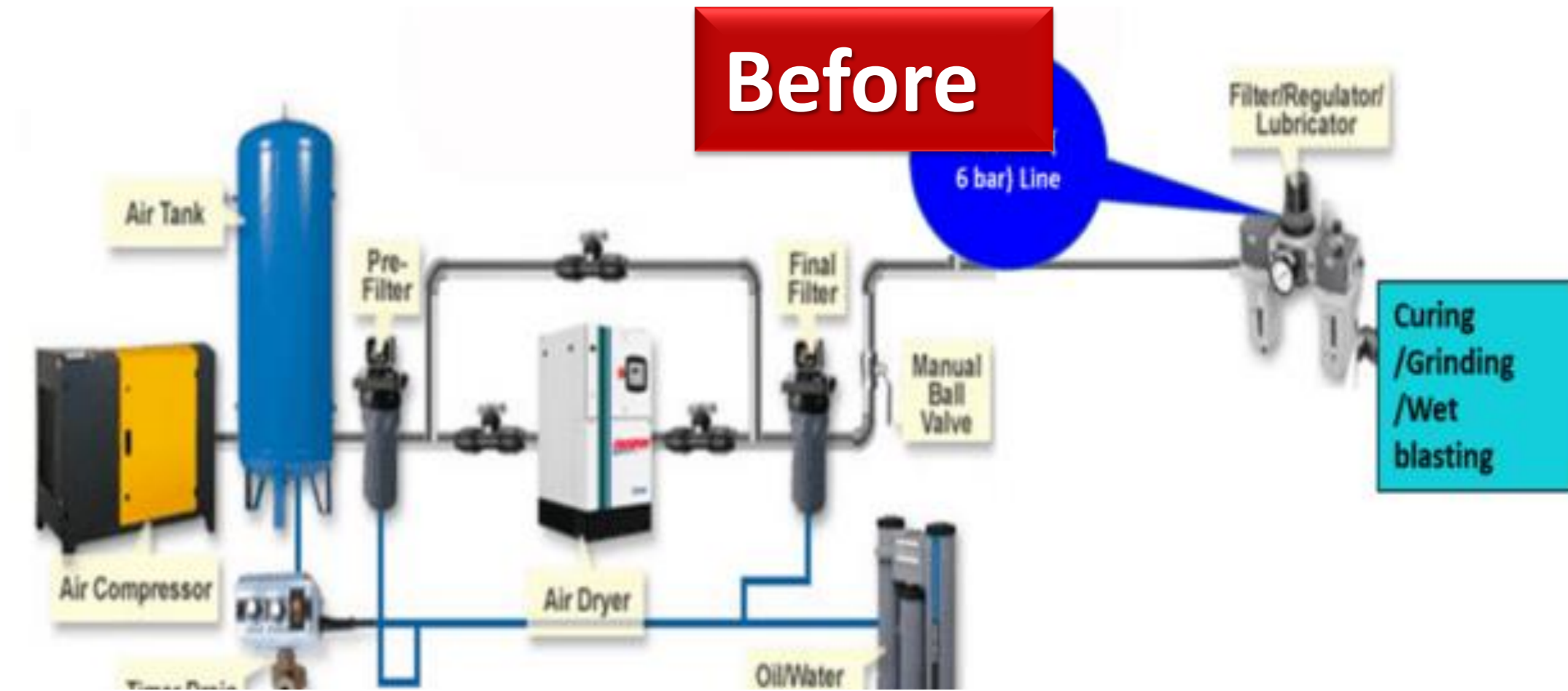
Observations:-

- Compressor consumes 40,950 Kwh / month
- In the total energy of plant 9% consumed by utility
- Compressor running continuously in load due to air consumption high
- 5 bar pressure for Wet blasting ,powder coating and finishing
- Paranol and adhesive ,paint spray and cleaning require 4 bar pressure
- To meet the above requirement, we use to run 2 compressors: 240 & 500 CFM
- Under utilization of both compressor causing energy loss

Root Cause:-

- Energy wastage in Mixing machine by usage of air for cooling the cutter un
- Energy wastage in grinding machine by usage of air by dust cleaning
- Energy waste in wet blasting machine by usage of high pressure in wet b.
- Waste of paint while painting due to more spread due to high pressure

Action:-



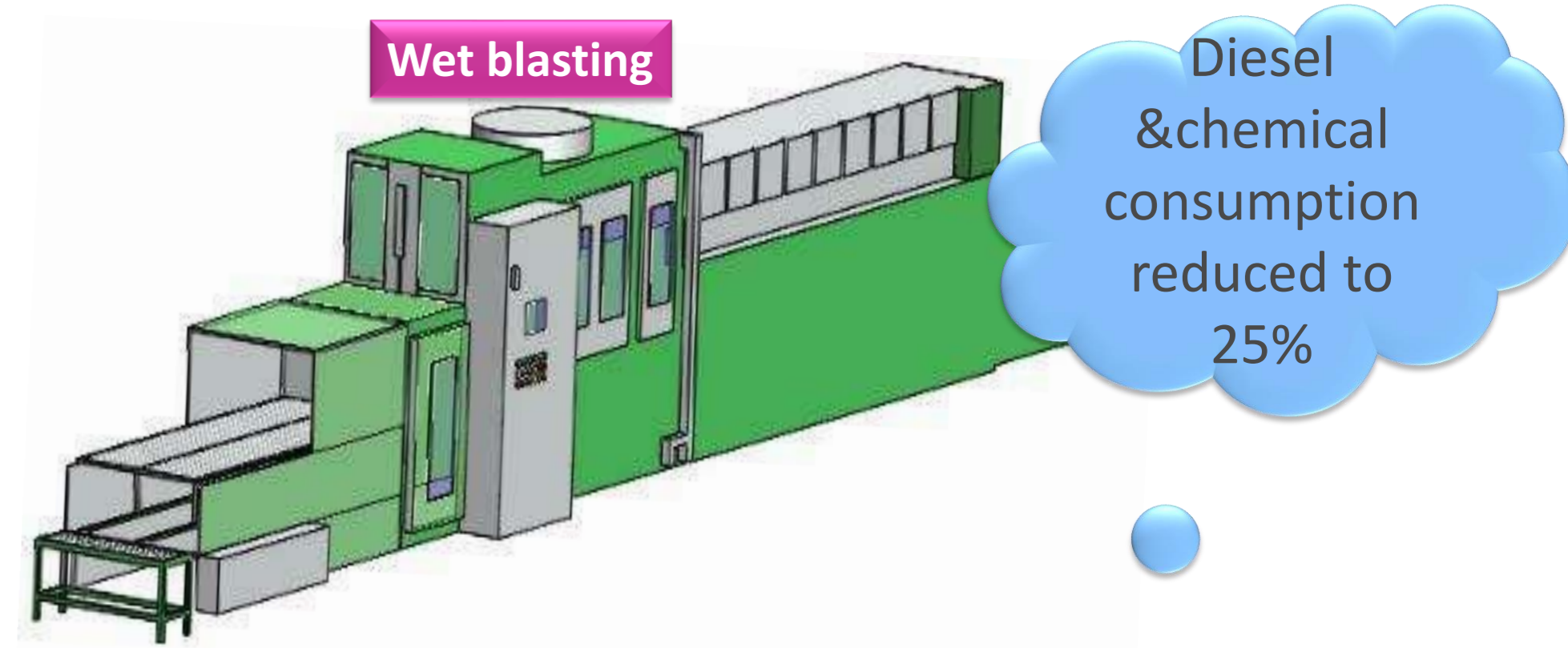
Benefits:

- **Paint consumption reduced from 1.8 ml to 1.55 ml/pad**
- **Paint cost reduced from 5.8 Lacs to 4.5 Lacs/month**
- **Paint per pad cost reduced ₹2.95 to ₹ 2.45**
- **Annual saving 15 Lacs (50 paise /pad)**
- **Air consumption reduced from 6 bar to 4 bar**
- **Energy consumption reduced from 40950 to 31785 Kwh / month - 25% saving**
- **Potential annual saving 7.5 lacs/year**

Diesel & reduction Through Capacity utilization in back plate preparation

Machine:- Wet blasting machine

Problem:- High Diesel consumption in Wet blasting machine (2800 to 4600 lts/month average 3553 lts/month)



Observations:-

- High Diesel consumption in Wet blasting operation ₹ 3.17 Lacs
- Steep increase in fuel price
- Directly impacts the company profit
- Wet blasting machine being operated in all three shifts(A,B,C)

Root Cause:-

- Wet blasting machine run with 88% of utilization

Action:-

- AM-PCDP-moved from wet blasting to grit blasting Wet blasting and online adhesive machine operating only in 2(A&B)shifts and C-Shift complete shutdown

Process	Total capacity	Utilization in %	Chemical consumption	Diesel consumption
Wet blasting	123750	88%	₹ 3.17 lacs/month	4600 lts/month
Grit Blasting	81000	30%		

After				
Process	Total capacity	Utilization in %	Chemical consumption	Diesel consumption
Wet blasting	123750	58%	₹ 2.23 Lacs/month	2600 lts/Month
Grit Blasting	81000	91%		

Benefits:

- Total cost saved 10.63 lacs/Annum
- Diesel consumption reduced 3552 to 2600 ltrs/ hrs
- Chemical cost saved 6.26 lacs/Annum (₹ 3.17 to 2.23 Lacs)



5. Innovative Projects implemented

11 innovation projects implemented in 2019-22

The following projects will be explained in detail



5.1 Specific energy consumption reduction in Baking oven

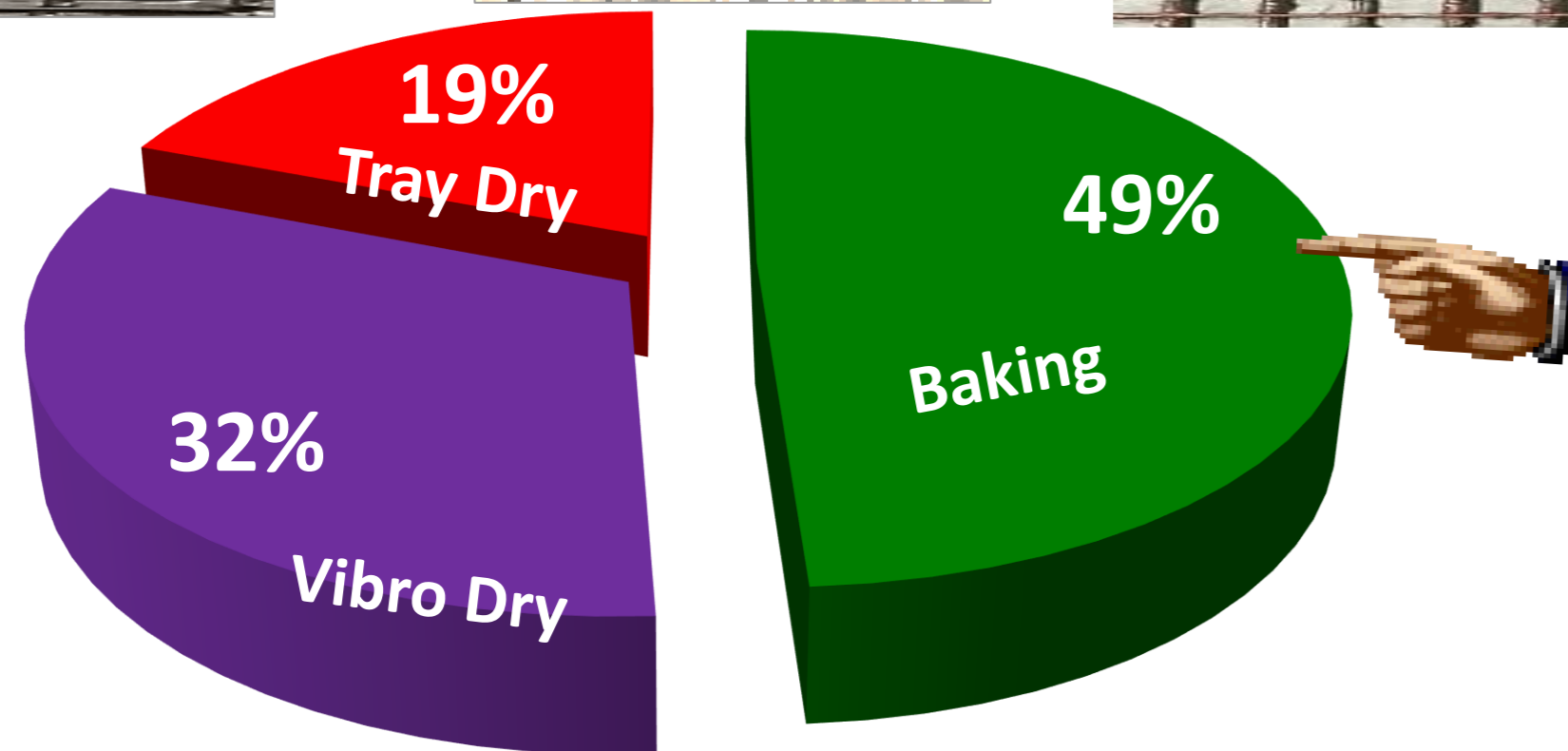
Root cause and Counter measure analysis :

Machine:- Baking oven

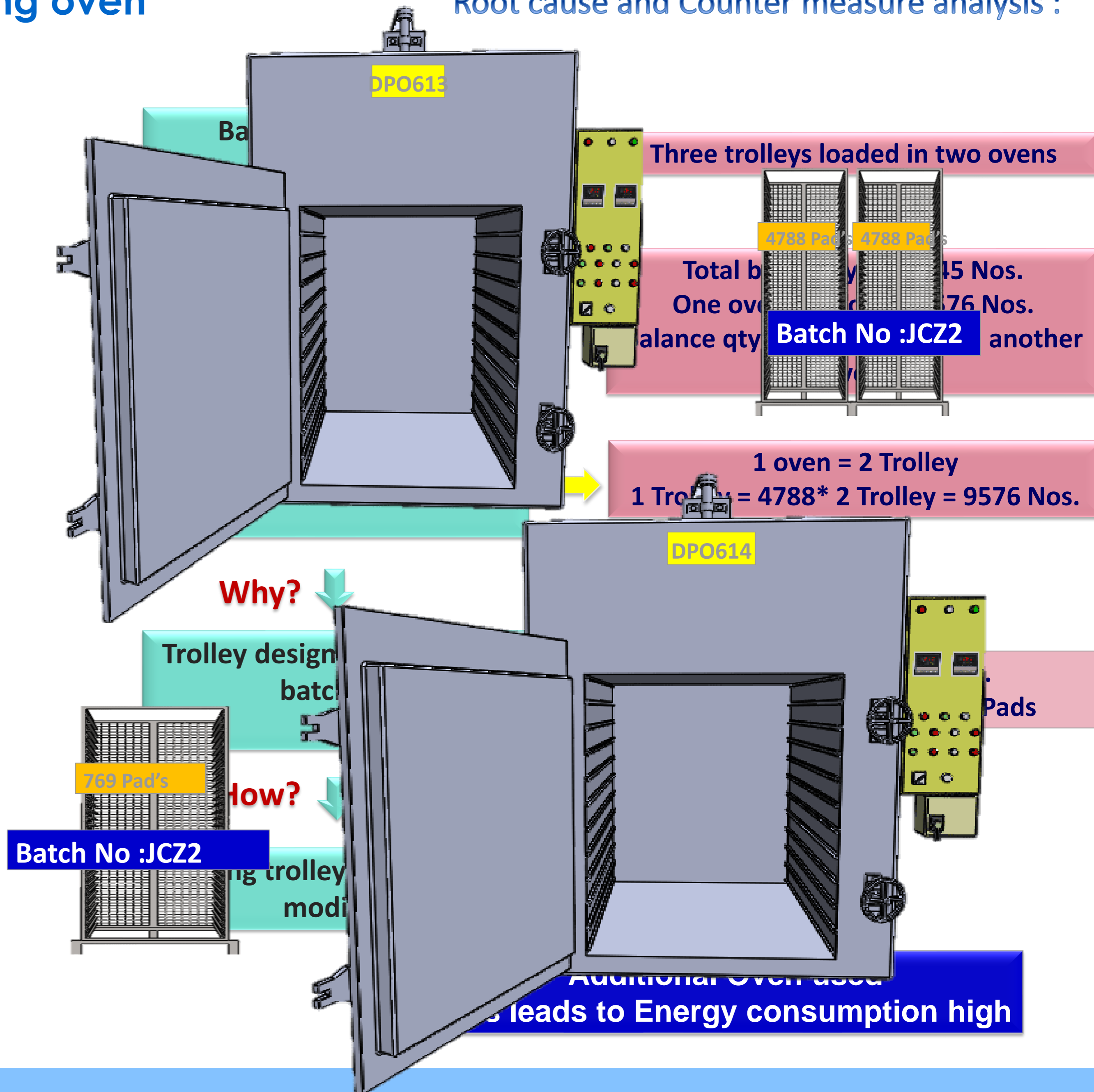
Problem:- Two Wheeler Disc pad Specific Energy consumption high

Observations:-

We use Oven for 3 Operations

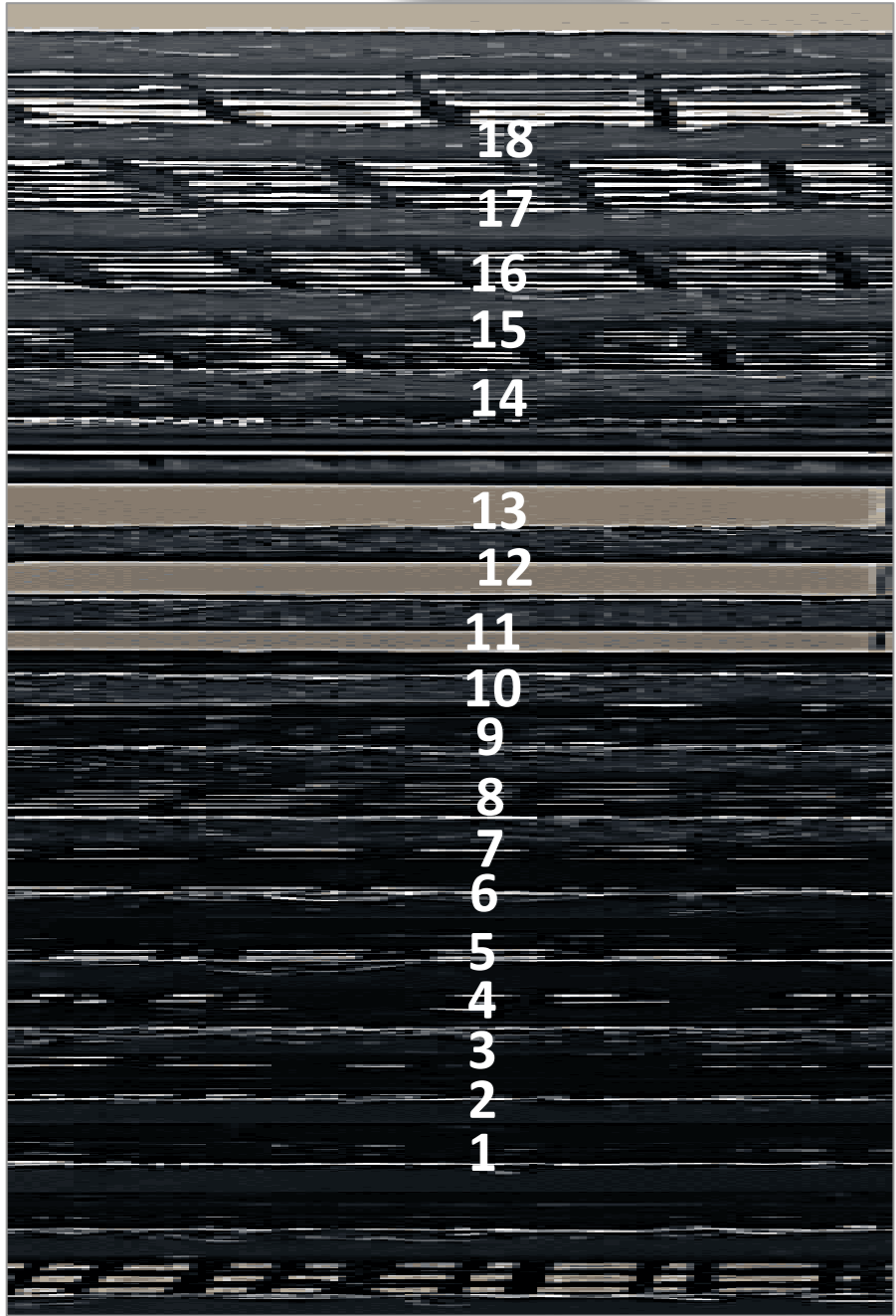


Hence We decided to take Baking operation for further observation



Action:

Before



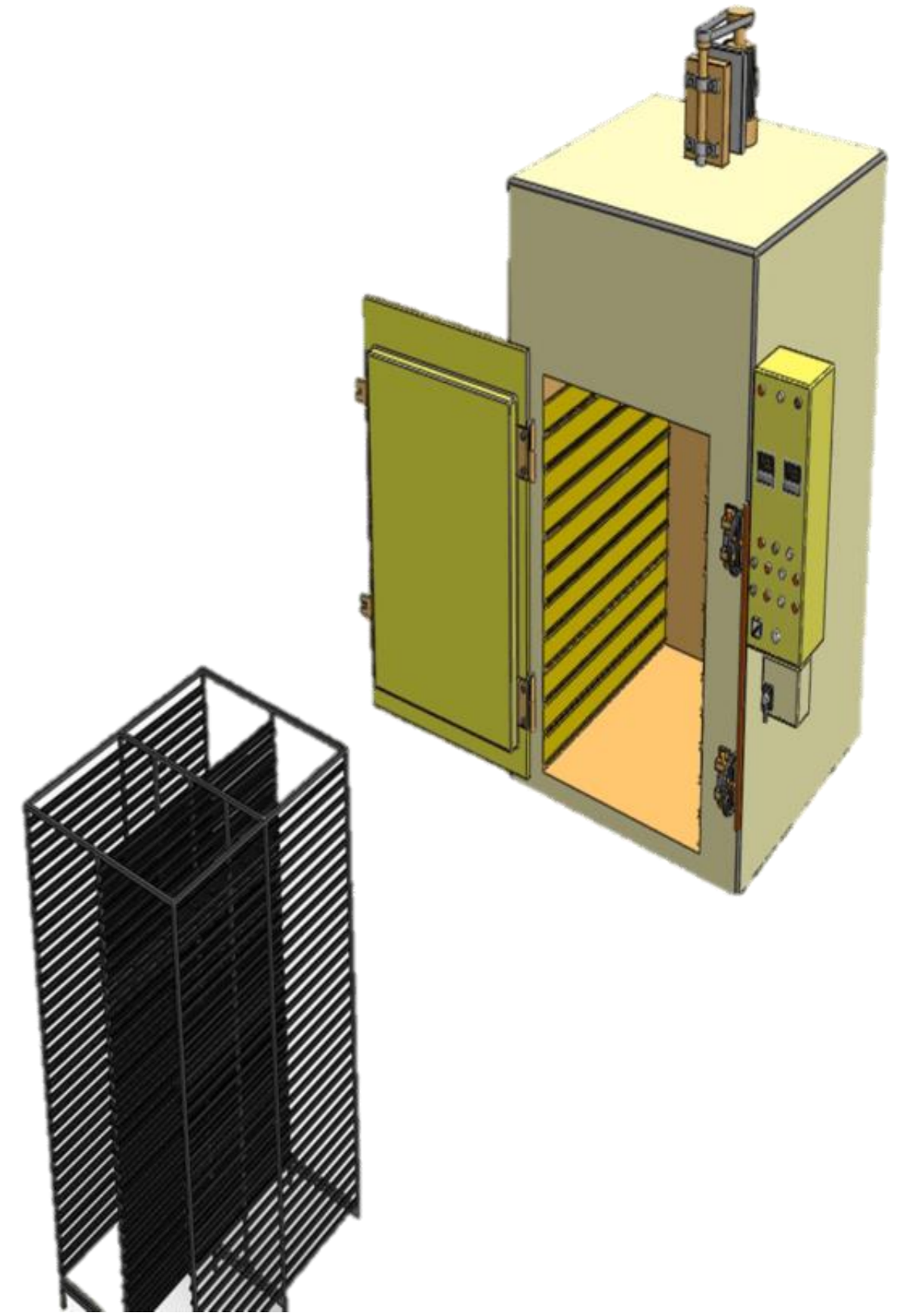
27 Tray Trolley



After



27 Tray , 4 Chamber Trolley



Benefits:

- *Oven capacity 100% utilized*
- *6912 Pads/cycle increased(3456to10345)*
- *Vibro dry Energy reduced from 620 to 350 Units / Ton*
- *Overall energy reduced from 2154 to 1779 Units / Ton*
- *22 Cycles to 7 cycles / Day reduced*
- *Baking per pad cost reduced ₹ 0.17 / Pad to ₹0.08 /Pad Energy consumption reduced 260 units/batch to 130units/batch*
- *Potential saving 1.0 Lac /month which is > 0.2 % of energy cost*
- *Horizontally deployed all ovens (Baking ,Vibro, Paint and adhesive drying ovens)*

5.2 Diesel consumption reduction Through replace Diesel boiler with an electric boiler

Diesel boiler

Machine:- Wet blasting machine

Problem:- High Diesel consumption in Wet blasting machine (average 2600 lts/month)

Observations:-

- High Diesel consumption in Wet blasting operation
- Steep increase in fuel price
- Directly impacts the company profit
- Wet blasting machine being operated in 2 shifts
- Diesel boilers are very energy-intensive

Root Cause:-

- *Wet blasting machine run with Diesel boiler*

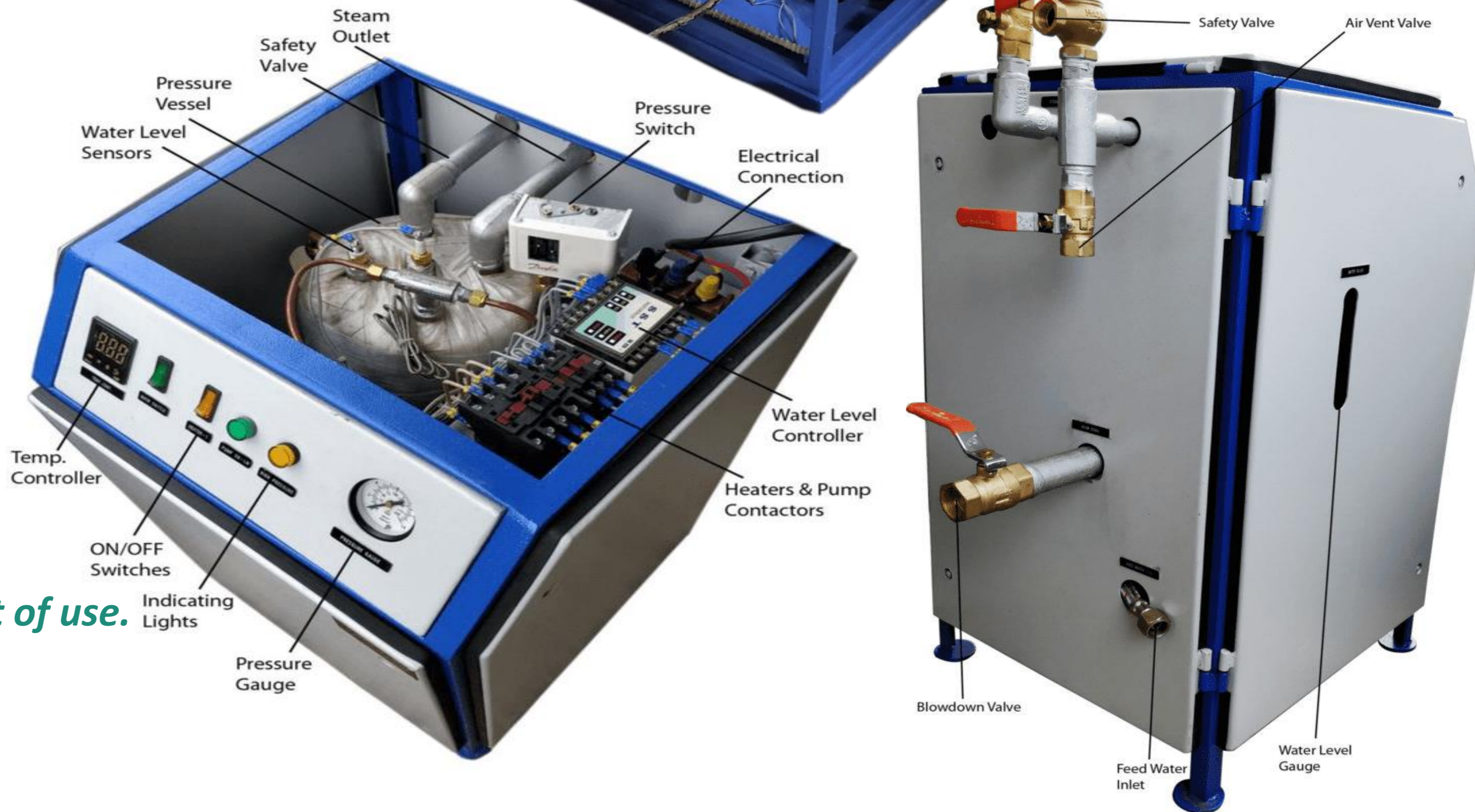
Action:-

- *Diesel Boiler converted in to electric boiler*

Benefits:

- *Total cost to be saved 29.63 lacs/Annum*
- *Eliminate Diesel consumption*
- *Environmentally friendly and pollution free at the point of use.*
- *No fuel Storage requirement.*
- *No special fire or health and safety precautions.*

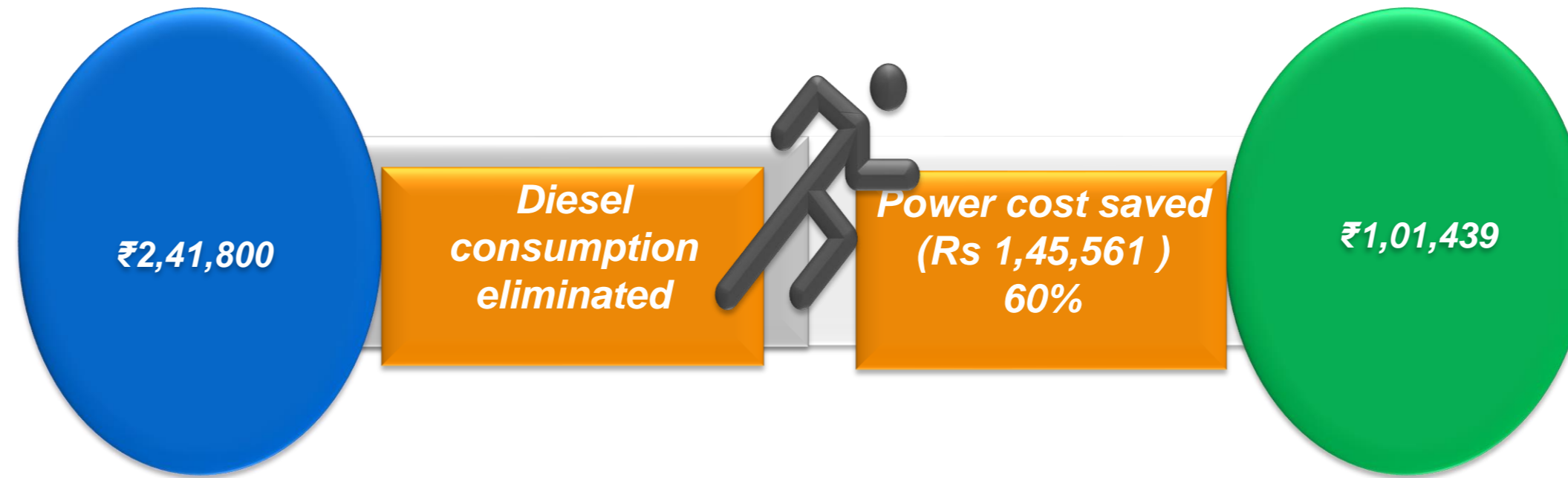
Electric boiler



Diesel consumption reduction Through replace Diesel boiler with an electric boiler



Steam Diesel Boiler



Steam Electric Boiler

Steam boiler

Dynamic load condition:

Total Diesel consumption per hr : 12lts/hr

Fuel (Diesel) consumption per day : 104 liters

(12 hrs Boiler firing time 8.67 hrs)

1 liter Diesel Cost: Rs 93.0

Fuel consumption cost per month

= 25 days X 104 liters per day X 93(diesel cost per lt)

= Rs 2,41,800

Electrical heater

Dynamic Load condition

Total electrical unit consumption per hr : 72 kWh (12 kw– 6 heater)

For Blasting , phosphate tank & dryer = 624 kWh

(12 hrs Heater on time 8.67 hrs)

1 unit power cost : Rs 6.50

Energy cost per month

= 25 days X 624 kWh per day X 6.5 (unit power cost)

= Rs 1,01,439

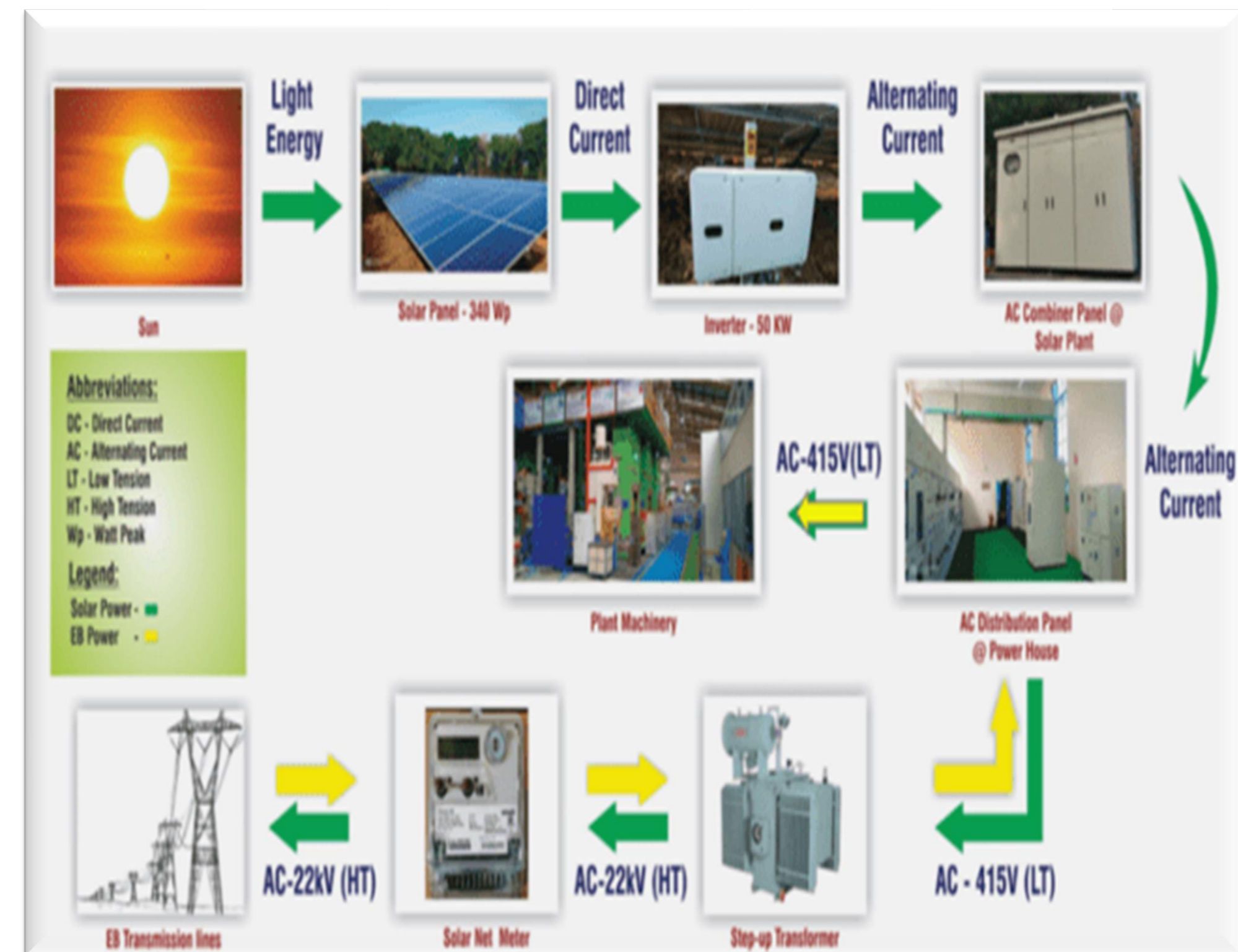
Potential Cost Saving - ₹ 29 lacs per year

6.Utilisation of Renewable Energy sources

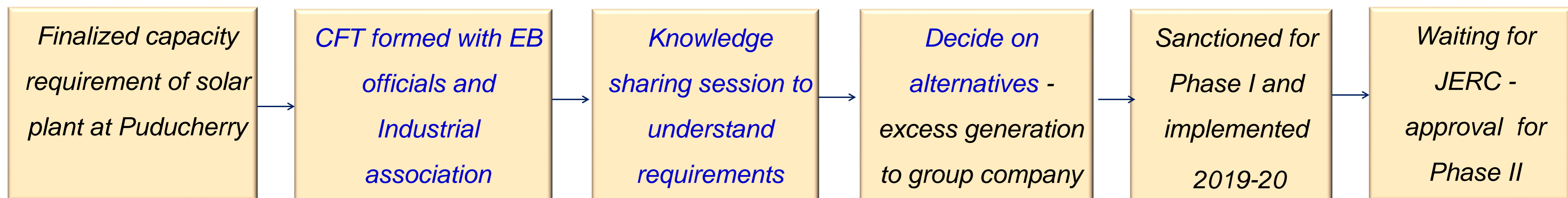
Renewable Energy usage – Solar power for Puducherry :

- RBL experienced the benefit of Solar power usage since 2017-18 at Tamilnadu and Telangana plants.
- Puducherry RBL- 1.17 MW solar power plant Commissioned on 5th Feb 2020
- We are the first plant in Puducherry state to install 1.17 MW solar plant
- We intended to tap the opportunity in a TQM way to enhance use of Renewable Energy at RBL...

On site solar net metering Flow chart

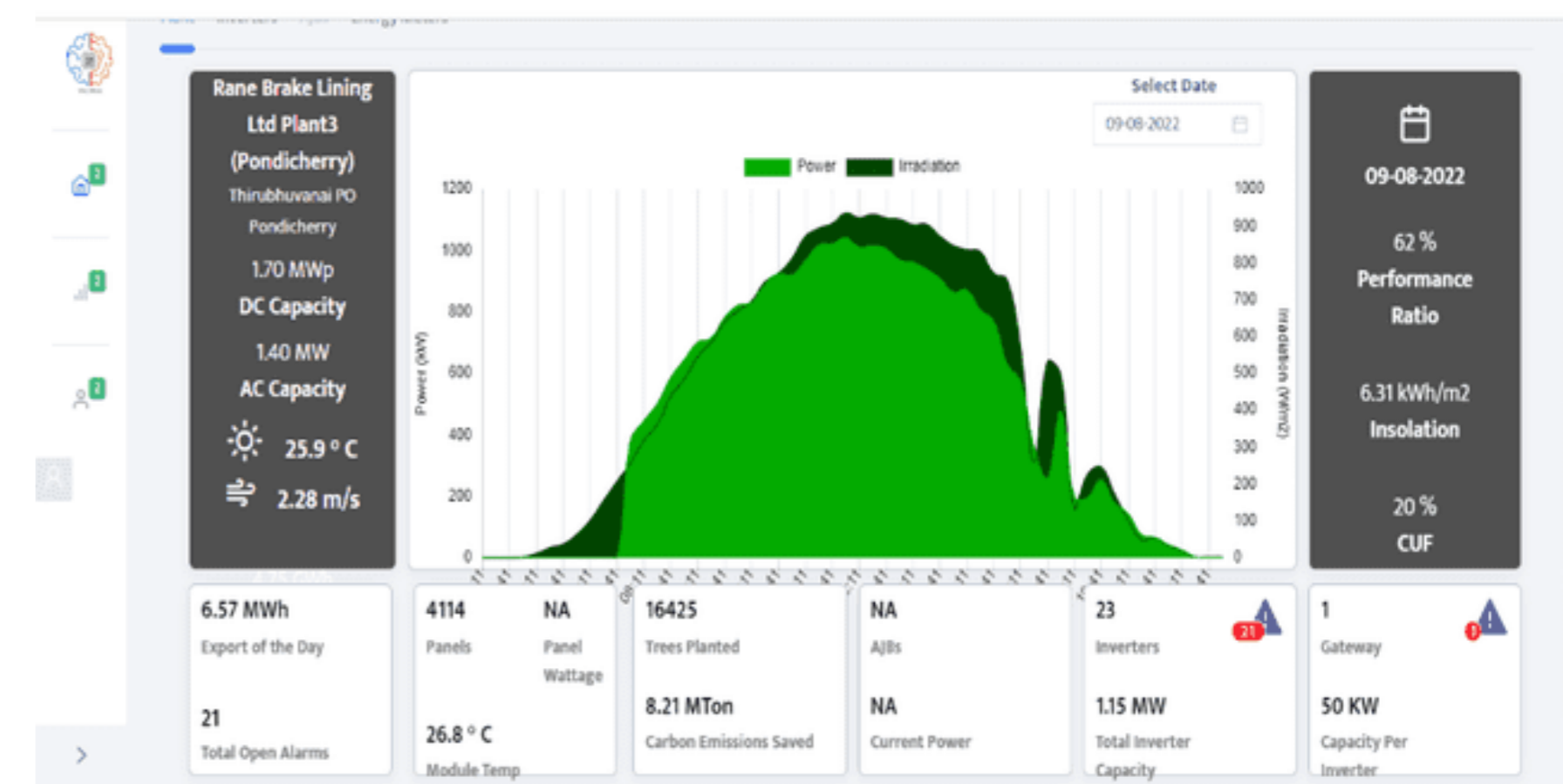


Approach for Solar at Puducherry:



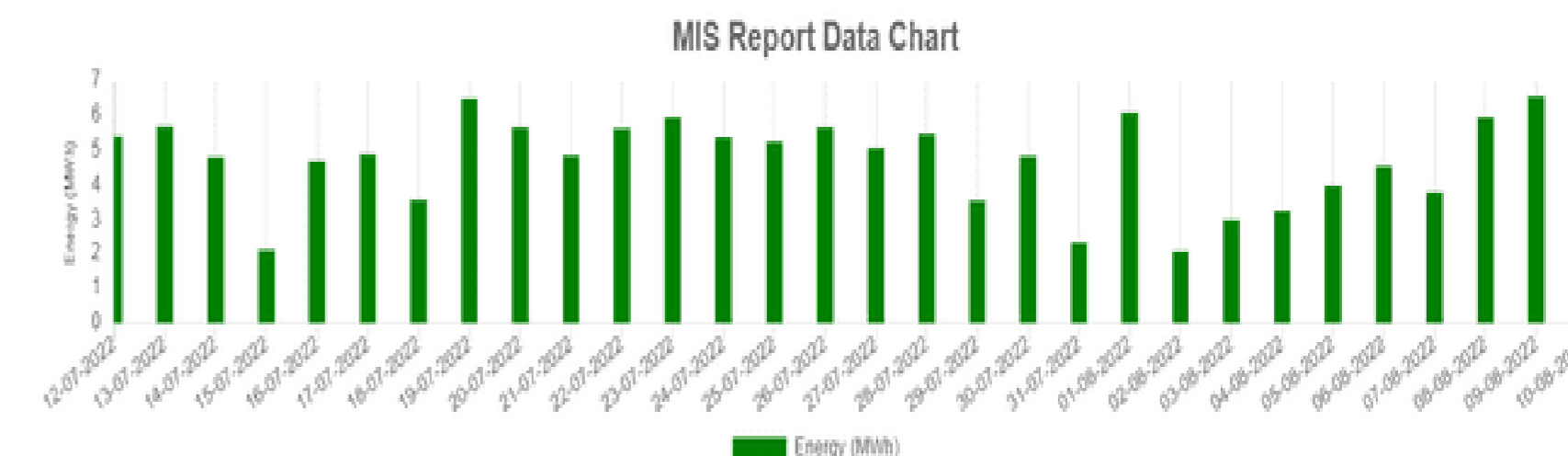
6.Utilisation of Renewable Energy sources

1.17 MW solar power plant Commissioned on 5'th Feb 2020.



Solar Power - Captive

Year	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (Million KWh)	% of overall electrical energy
2019-20	Electrical	Onsite	1.17	0.3	7%
2020-21	Electrical	Onsite	-	1.82	37%
2021-22	Electrical	Onsite	-	1.84	31%



- Dependency on Electricity board reduced from 98 % to 70 %
- 31% of energy used is generated through renewable energy
- Solar generation saving for the year 2021-22 18.4 Lacs units (INR 1Cr saving)
- Cut down CO2 emission almost 1,311 M ton
- Solar system will generate 1.84 GWh annually which is equivalent to planting 50,000 + Teak trees and total savings of ₹ 59 cr over the lifetime.

Total last 3 years Green Energy Generation 4.75 Gwh

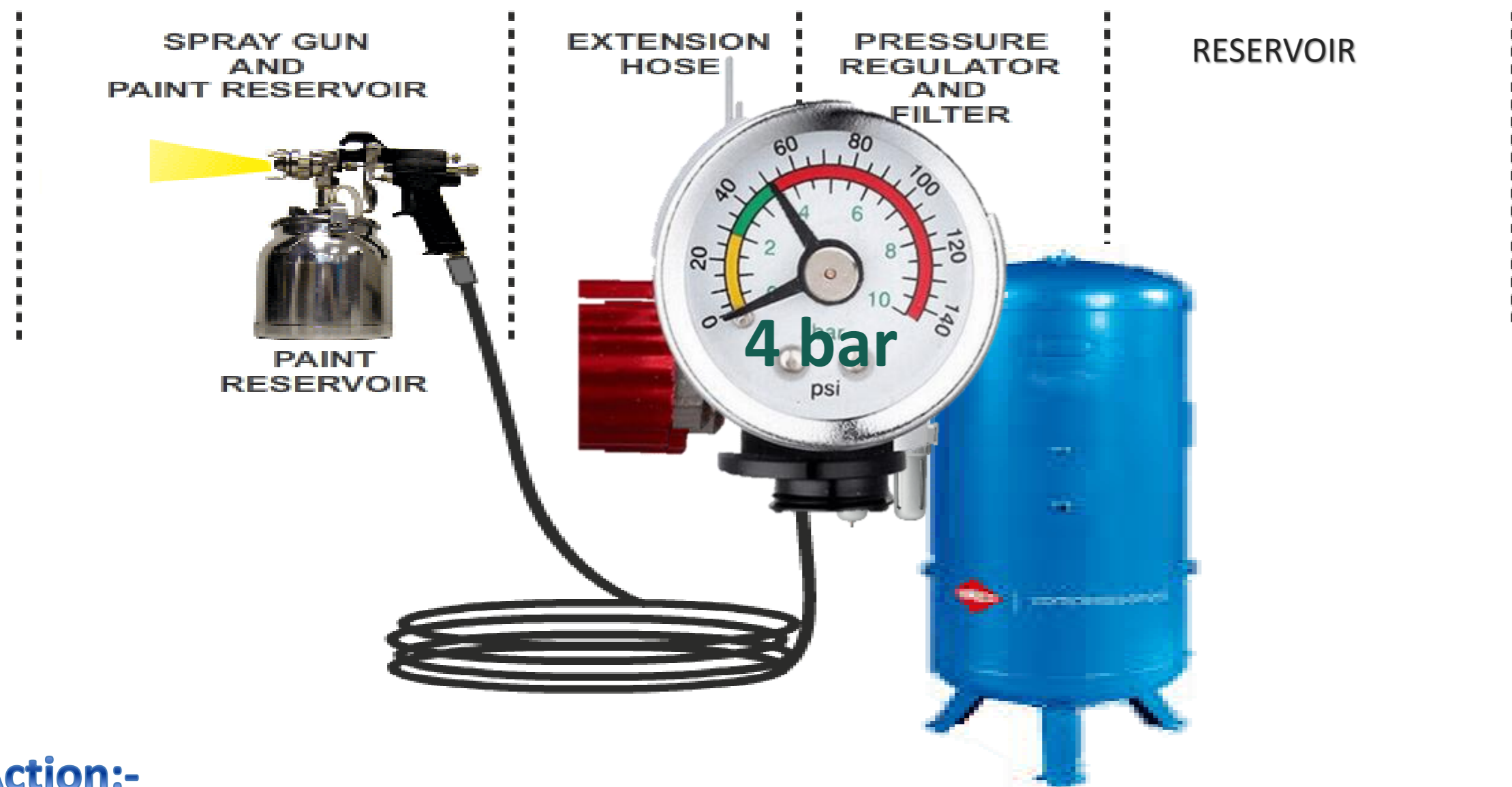
7. Waste utilization and management

Observations:-

- High contribution in manufacturing cost
- High energy consumption
- High compressed air usage
- Paint and thinner consumption high – Avg 1.8 ml/pad
- Paint coating thickness (20~ 40 microns)

Root Cause:-

- Waste of paint while painting due to more spread due to high pressure



Action:-

- Air pressure to be reduced from 6 to 4 bar
- Viscosity specification is stretched to 18 ~20 sec (Spec -18~25sec)

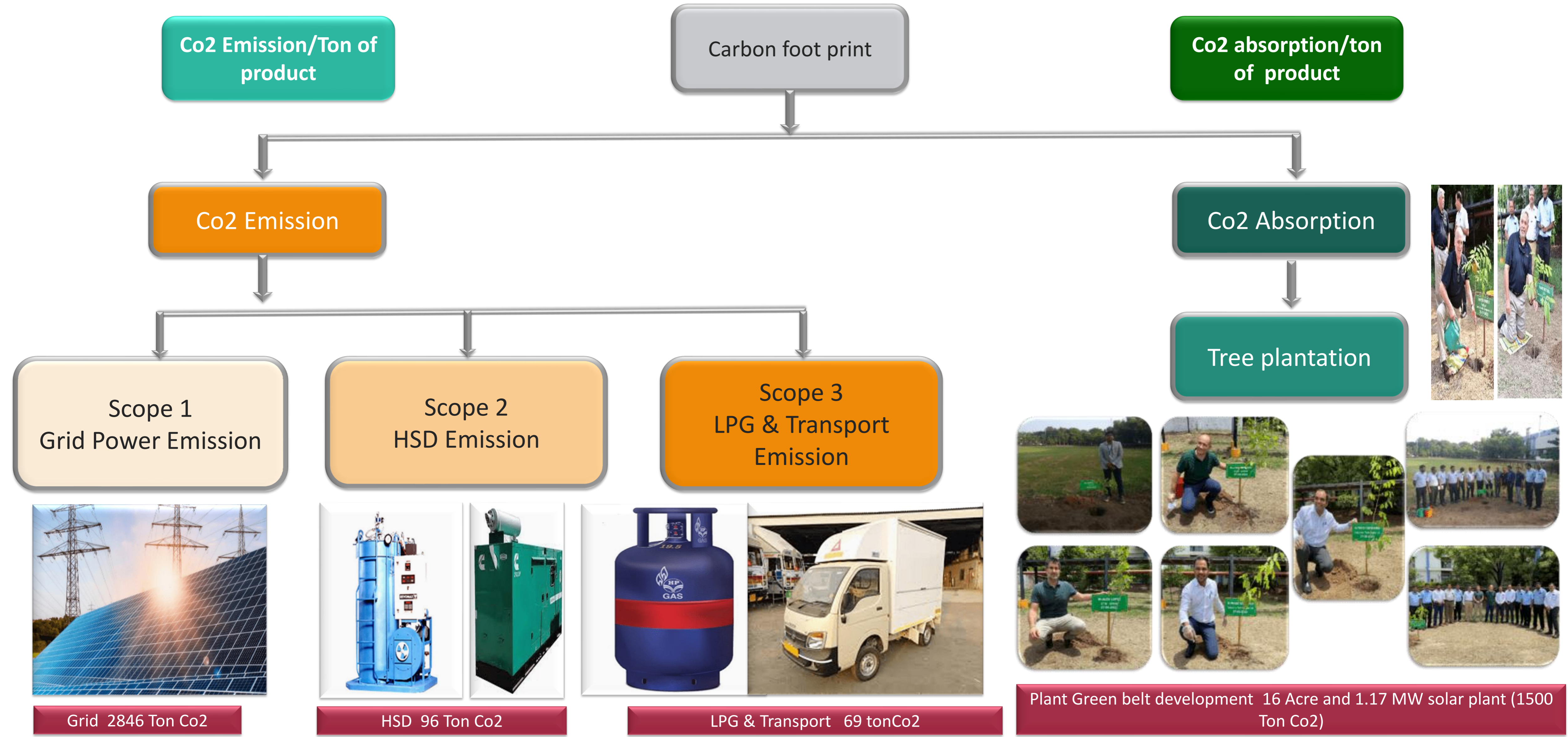
Benefits:

- Paint consumption reduced from 1.8 ml to 1.55 ml/pad
- Paint cost reduced from 5.8 Lacs to 4.5 Lacs/month
- Paint per pad cost reduced ₹2.95 to ₹ 2.45
- Annual saving 15 Lacs (50 praise /pad)
- Air consumption reduced from 6 bar to 4 bar
- Paint sludge reduced 14 Ton to 12.21 Ton /year

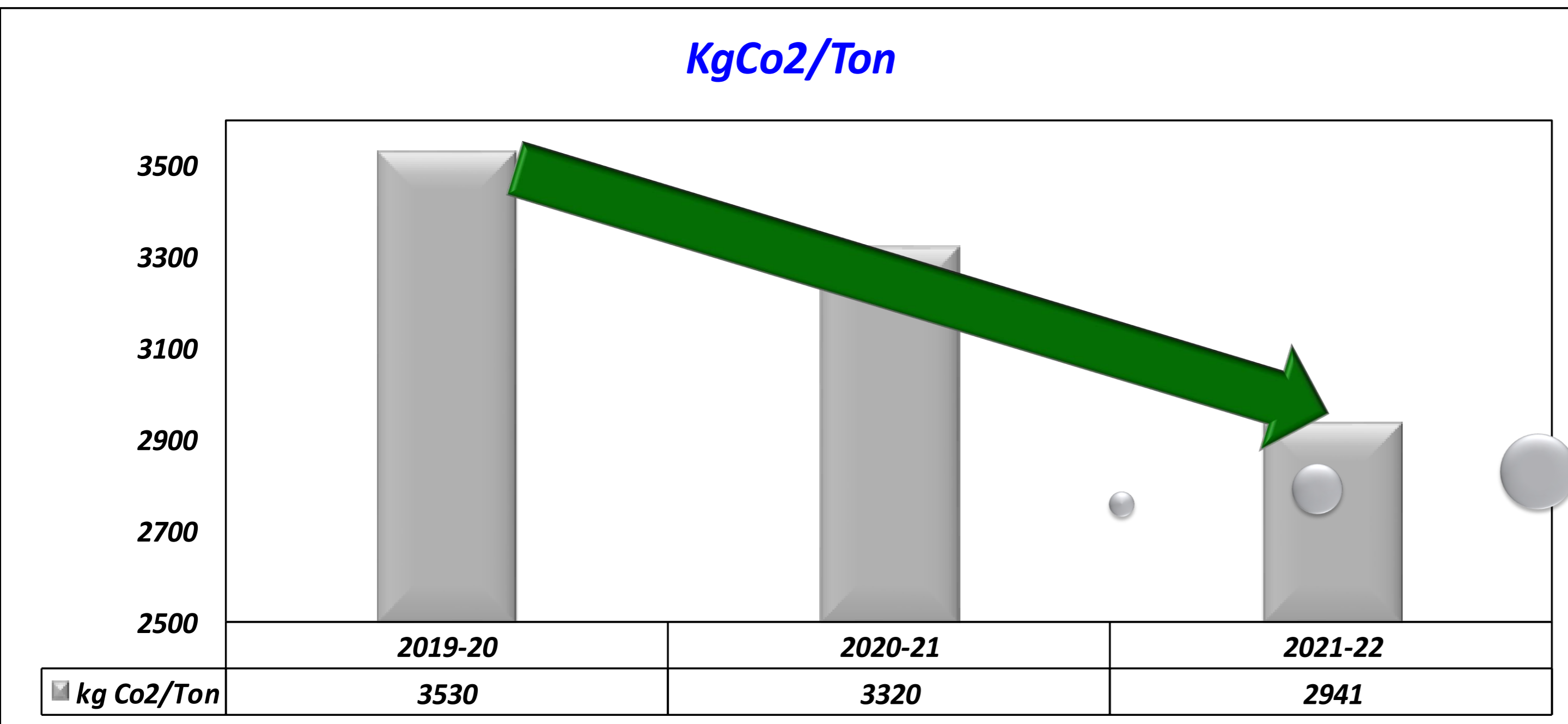
S.No	Type of waste Generated	Quantity of waste generated MT	Disposal method
1	Spent oil	1.68	Re cycle
2	Paint sludge	12.21	Co. Process
3	ETP sludge	10.9	Co. Process
4	Oil Soaked	3.5	Co. Process
5	Discard containers	51	Re use
6	Grinding Dust	201	Co. Process

58 Ton Grinding Waste utilization in last three years

8. GHG Inventorisation



8. GHG Inventorisation



1.17 MW solar plant installed to reduce CO2 emission

Short term actions:

- ✓ Implemented 59 projects to reduce GHG inventorisation

Long term action plan:

- ✓ Planned to install additional 0.83 MW solar plant to reduce emission

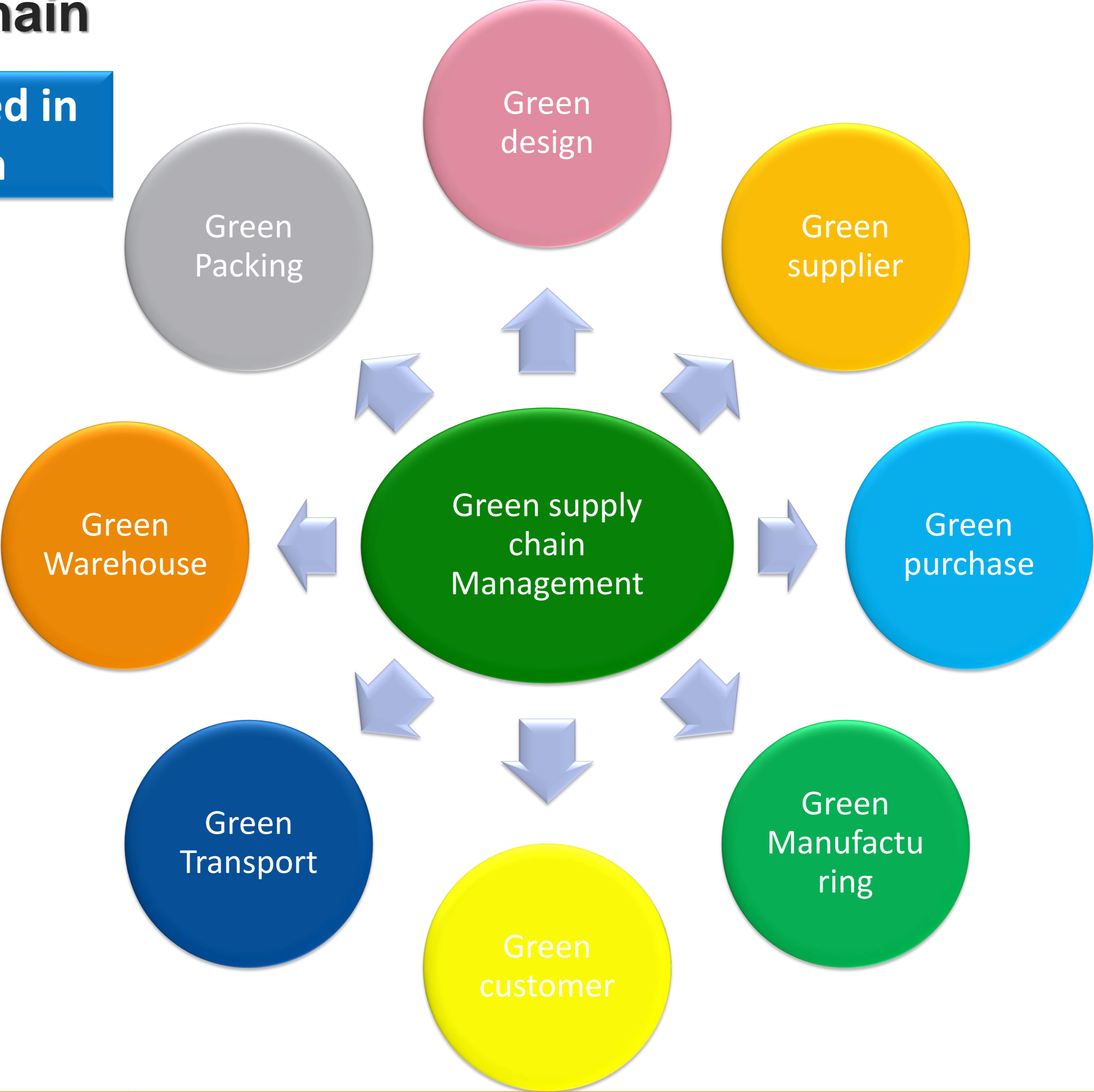


Benefits :

- Plant Green belt development 16 Acre and 1.17 MW solar plant implemented to reduce Co2 emission 1500 MT

9. Green Supply Chain

5 projects implemented in Green supply chain



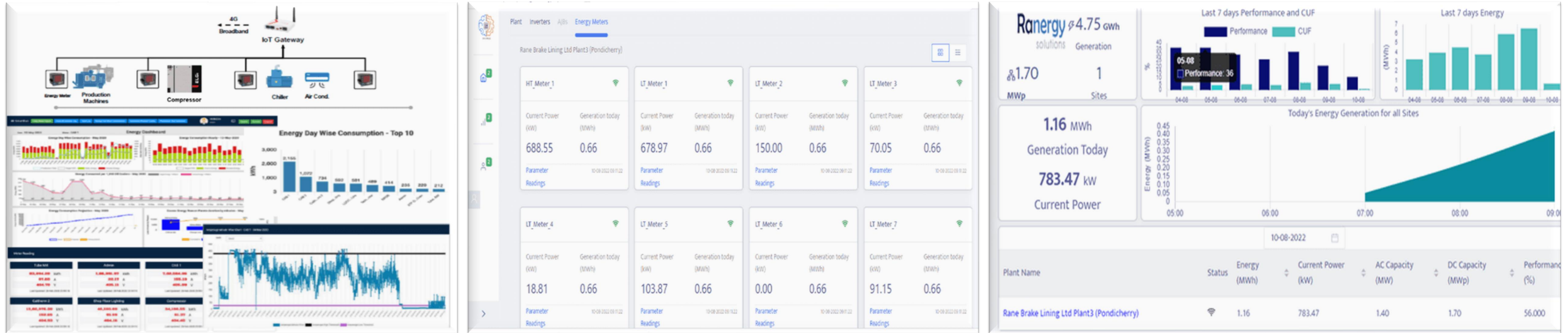
Digital supply chain management will be explained in detail

9. Green Supply Chain – Bench mark supplier visit



10. Team work, Employee Involvement & Monitoring

Energy monitoring system use of IoT



Review system:

<i>Reviewee</i>	<i>Reviewer</i>	<i>Frequency</i>
<i>Technician</i>	<i>Supervisor</i>	<i>Shift wise</i>
<i>Supervisor</i>	<i>Energy manager</i>	<i>Daily</i>
<i>Energy manager</i>	<i>Manufacturing Head</i>	<i>Weekly</i>
<i>Manufacturing Head</i>	<i>Plant head</i>	<i>Monthly</i>
<i>Plant head</i>	<i>President</i>	<i>Monthly</i>
<i>President</i>	<i>Chairman</i>	<i>Quarterly</i>

Benefits :

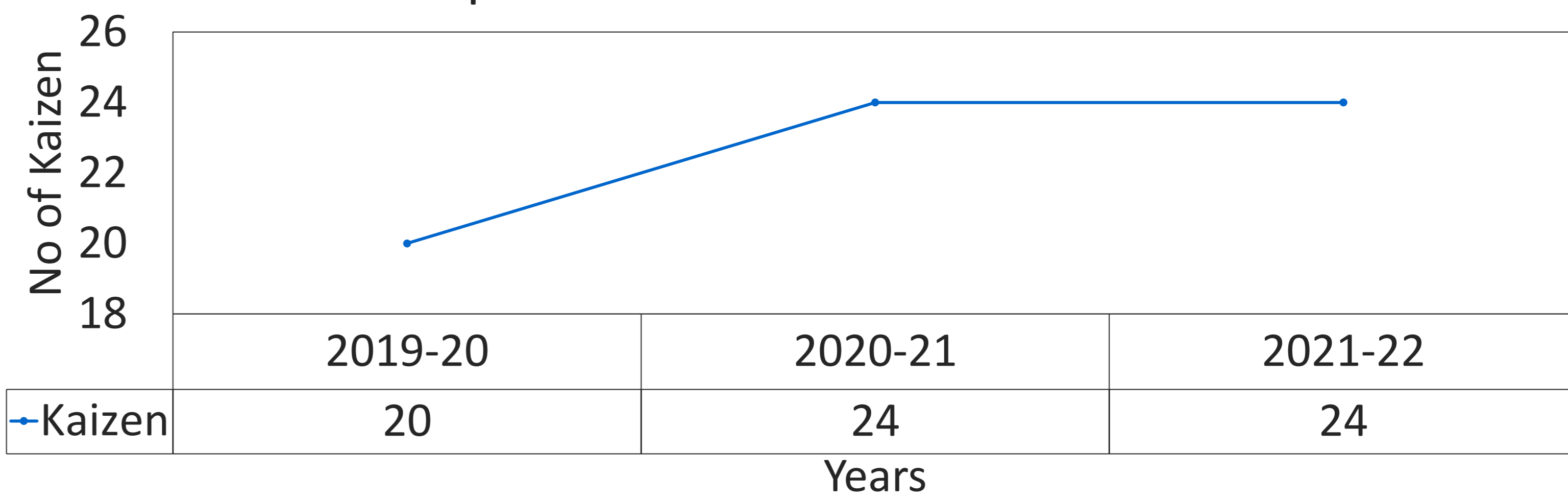
- Easy to view the Continuous monitoring of consumption of energy for the plant & machinery
- Easy retrieval of records.
- Easy to compare with past data.
- No need to maintain hard copy

10. Team work, Employee Involvement & Monitoring

Energy awareness program conducted



Operator Involvement kaizen



CII Puducherry Kaizen Competition

RBL Puducherry – "Glitters Team" Won 3rd Prize in "Supervisor Category" in Second Edition of CII Puducherry Kaizen Competition 2022 on Continuous Improvement Practices Manufacturing, Process & Service Sectors held on May 11, 2022.

Description	Team Photo
RBL – P3, "Glitters Team" Won 3 rd Prize in "Supervisor Category" in Second Edition of CII Puducherry Kaizen Competition 2022 on Continuous Improvement Practices Manufacturing, Process & Service Sectors held on May 11, 2022.	
Project details	Team Members
❖ Energy Consumption Reduction	Mr. V. Senthil Kumar - PED Mr. A. Karthikeyan – MFG

Energy awareness video



Spot quiz - Weekly



11. Implementation of ISO 50001/Green Co / IGBC rating

<i>S.no</i>	<i>Description</i>	<i>Certification</i>	<i>Planned on</i>	<i>Status</i>
1	ISO 50001	Nil	2022-23	Study completed . Work under progress.
2	Green co	Nil	2022-23	----
3	IGBC rating	Nil	2022-23	-----

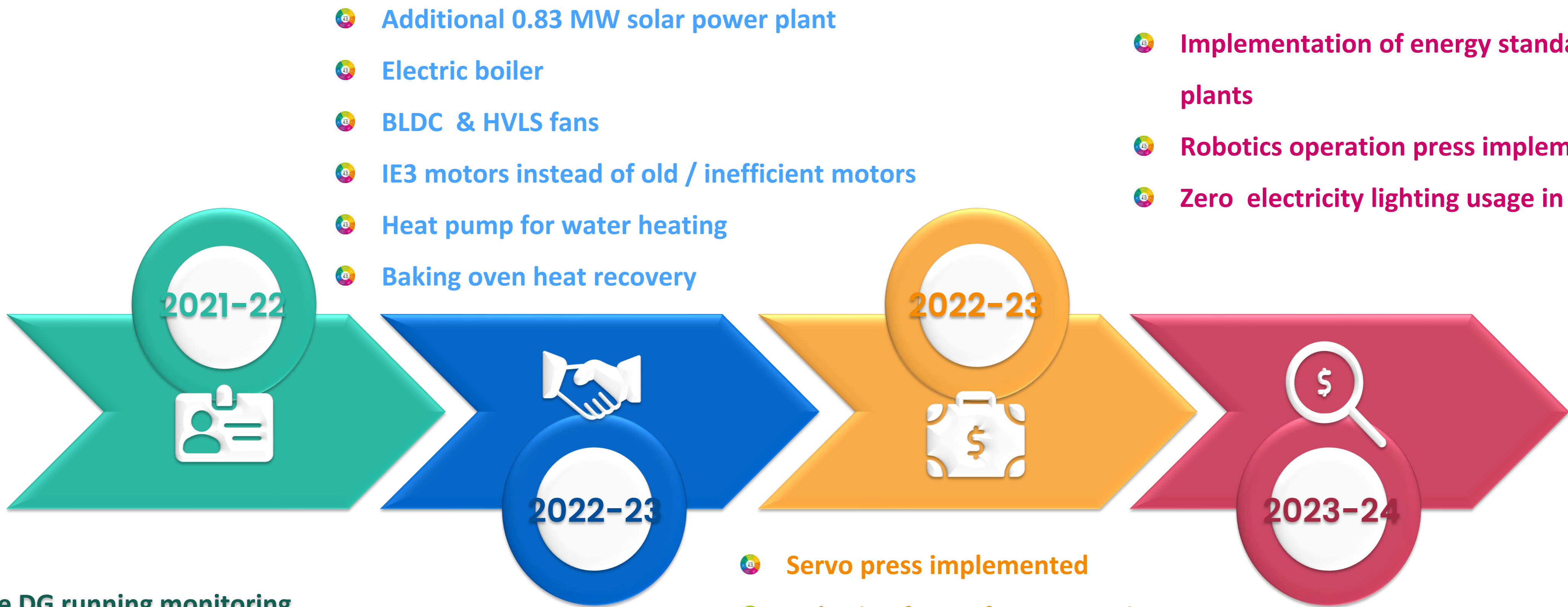
% Investment of energy saving projects

<i>S.no</i>	<i>Year</i>	<i>Total turnover in Million</i>	<i>Amount invested in Million</i>	<i>Investment %</i>
1	2021-22	927	0.92	0.10%
2	2020-21	735	0.71	0.10%
3	2019-20	734	0.80	0.11%

Invested 0.1% of our turnover in Energy saving projects

12. learning from CII Energy Award 2021 or any other award program

Long Term Vision on EE



- Additional 0.83 MW solar power plant
- Electric boiler
- BLDC & HVLS fans
- IE3 motors instead of old / inefficient motors
- Heat pump for water heating
- Baking oven heat recovery

- Implementation of energy standard across all plants
- Robotics operation press implementation
- Zero electricity lighting usage in shop floor

- Online DG running monitoring
- Online energy control system implantation
- IE3 motors instead of old / inefficient motors
- Axial dust collector

- Servo press implemented
- Robotics for Preform operation
- Servo press instead of mechanical press

13. Awards & acknowledgement

Awards

CII Solid waste management 1st Prize

RBL Puducherry - Won Best - Winners award in CII- Southern Region Industrial Waste Management Competition July-2021

Description	Team Photo
RBL-P3 won Best Winner award in CII- Southern Region Category - Solid Waste Management held on 09-July-2021	
Project details	Team Members
Zero Disposal of Waste to Environment	R.SANKAR S.UDAYA KUMAR

QCC 1st prize : ACMA National level 2021-22



QCC 1st prize : ACMA Southern level 2022-23



QCC 1st prize 2021-22



Rane Brake Lining Ltd – Plant 3 Puducherry

E mail : b.shagulhamed@ranegroup.com, v.senthilkumar@ranegroup.com, m.shenbagvel@ranegroup.com
Phone num : 9894270187, 8508449523, 9944996674



Thank you...