



Unilever

UNILEVER INDIA EXPORT LIMITED, KANDLA

Team:

- **Vineet Tiwari- Factory Engineer**
- **Sakshi Paswan-Process Engineer**



UIEL KANDLA SITE DEMOGRAPHICS



Site Facts

- Operation: 6-Day X 3-shifts
- Plot area: 20 acres, (27% built up area)
- Asset Base: GBV: 1209.3 million INR; NBV: 870.0 million INR
- TO: 3219 million INR

B&W



Category, Formats

- BPC (Skin)
 - Jars: Cream, 2 lines
 - Bottles: Lotions, BW, HW, (3 lines)
 - Gallon pack: 2L to 5L Line
- BPC (Hair)
 - Bottles: Shampoo, Cond
 - Gallon: Shampoo, Cond



Logistics

- FG SKUs: 300 +
- Suppliers: 100+
- Raw Materials: 250+
- Packaging Materials: 750+
- Vehicles per day: ~33
 - FG: 17+
 - RPM/SFG: 16+



People

- Workforce
 - 27 WC(white collar) (8.44%)
 - 289 BCE(Blue collar employee) (90.31%)
 - 4 OAS(office administrative staff) (1.25%)
- Gender Ratio: 7.5% (Inc CL+ App)
- Avg. Age: 48 Years



Site Product Portfolio

•FG product :SKU'S : > 250

•SIZE : 30 ml To 5 LTR

•COUNTRIES : > 80



Our Wide Portfolio



Shampoo

Bodywash

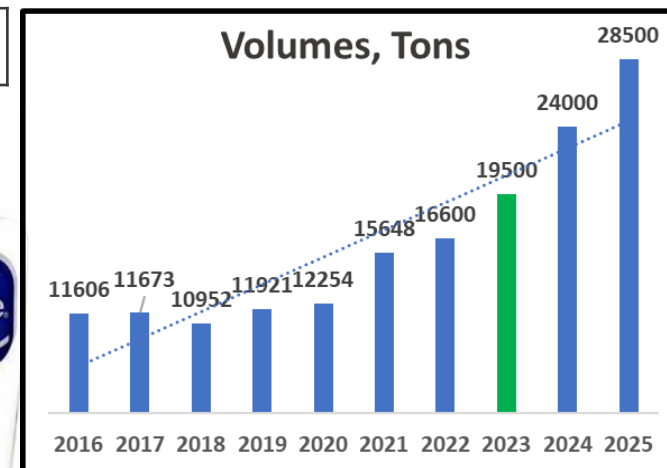
Handwash

Lotions

Conditioner

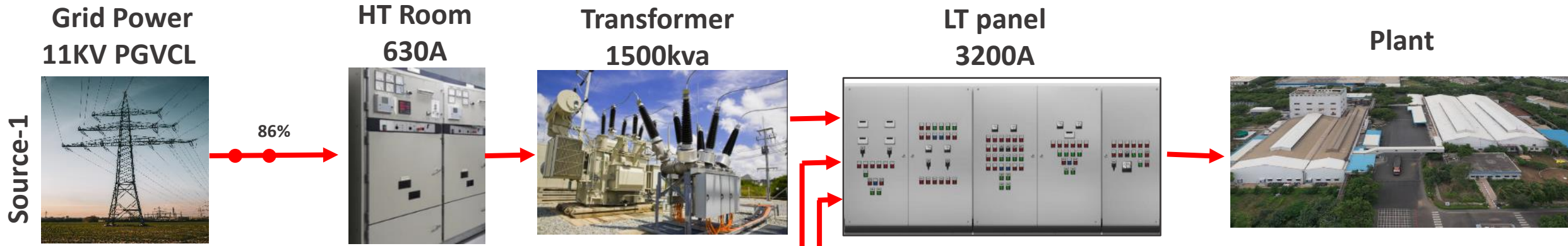
Creams

Oils

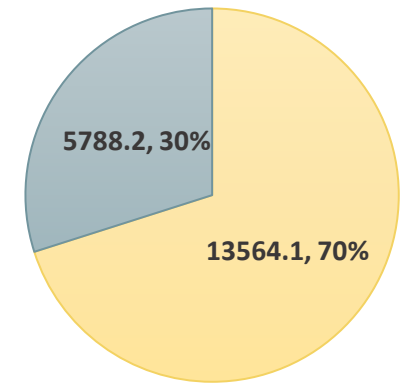


Dedicated site for UI with 100% contribution from 2022

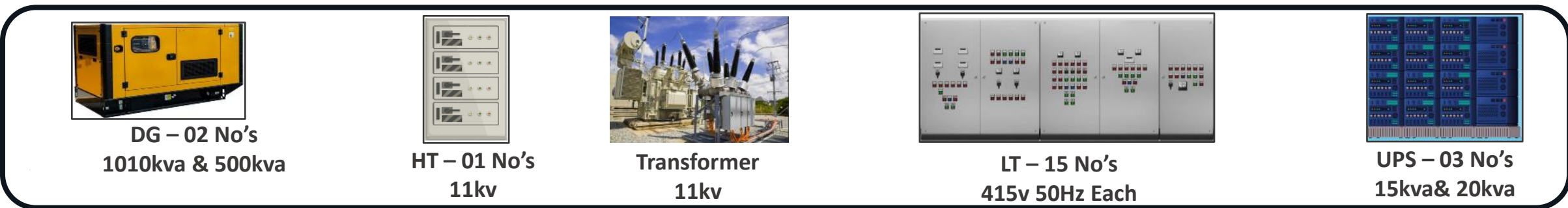
KANDLA Energy Mix Flow Diagram








TOTAL ENERGY (GJ)

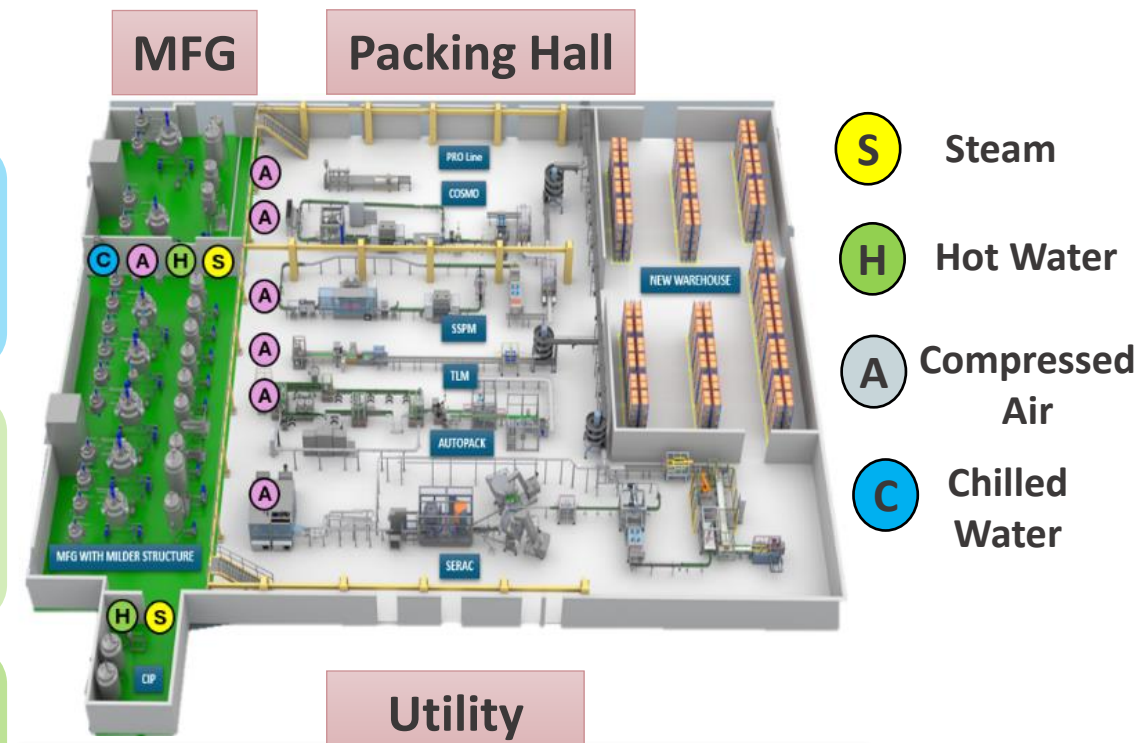


Renewable Non Renewable

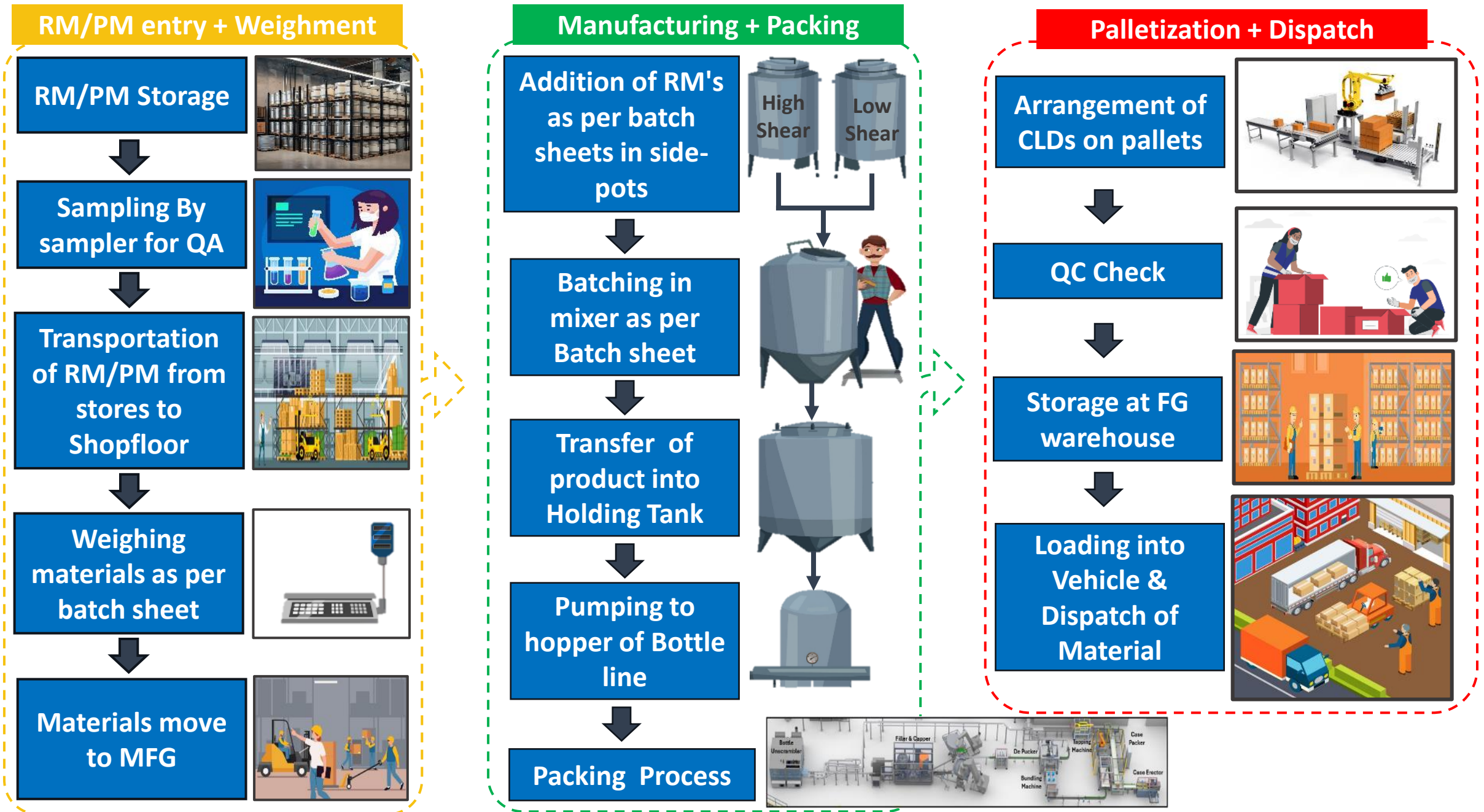


KANDLA Energy Mapping

External Supply	Type	Transmission	Location
 Grid	Electrical Energy 38.1%	Electrical Energy – 26% Total Hot water – 13.5% Steam – 22.3%	Plant
 Onsite+Offsite Solar	Solar Electrical 20%	Electrical Energy – 7%	ETP
 Onsite Solar Thermal	Electrical Hot Water 8.3% Solar Hot Water 5.2%	Electrical Energy – 64.7% Diesel – 22.3%	Utility
 Bio-Diesel Tanker	Steam 22.3%	Electrical Energy – 1.3%	Welfare Block
 Diesel Tanker	DG Diesel 6.1%	Electrical Energy – 0.2%	Fire Hydrant

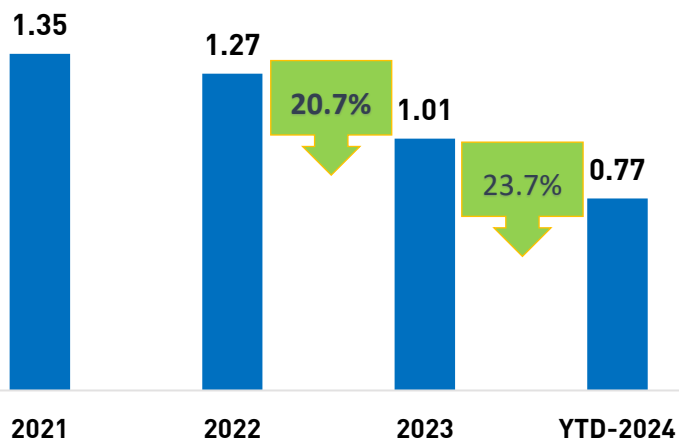


MANUFACTURING PROCESS FLOW

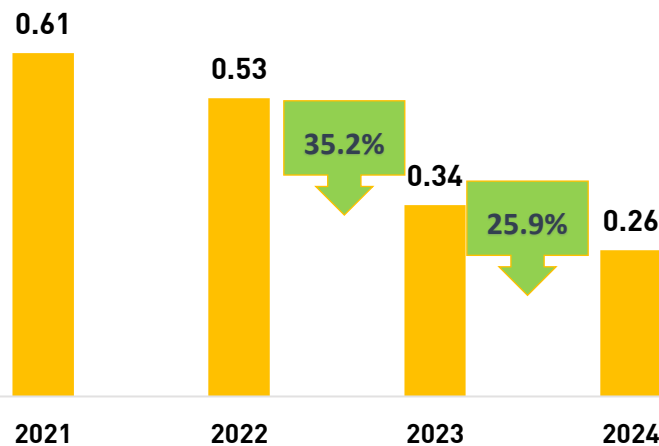


ENERGY WITH SPECIFIC CONSUMPTION & PRODUCTION-LAST 3 YEARS

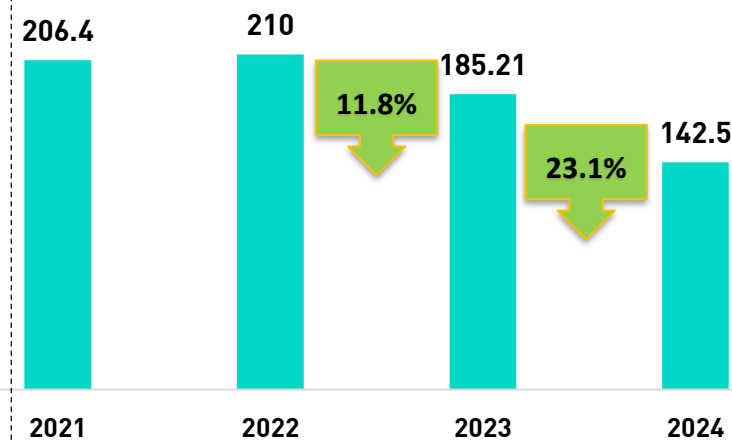
Total Energy (GJ/Ton)



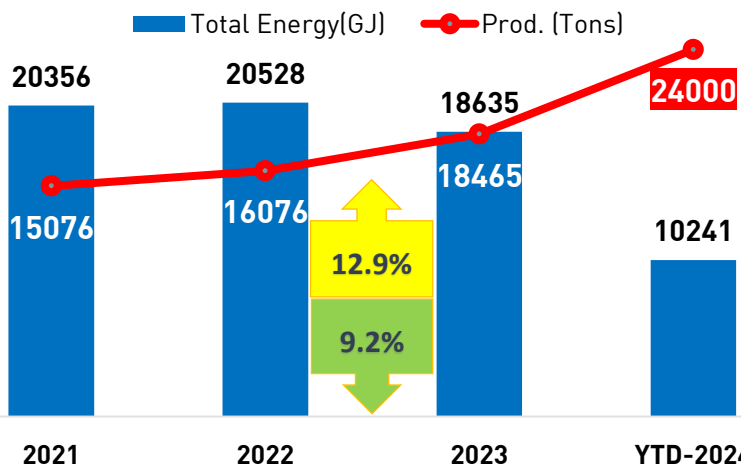
Specific Thermal Energy(GJ/Ton)



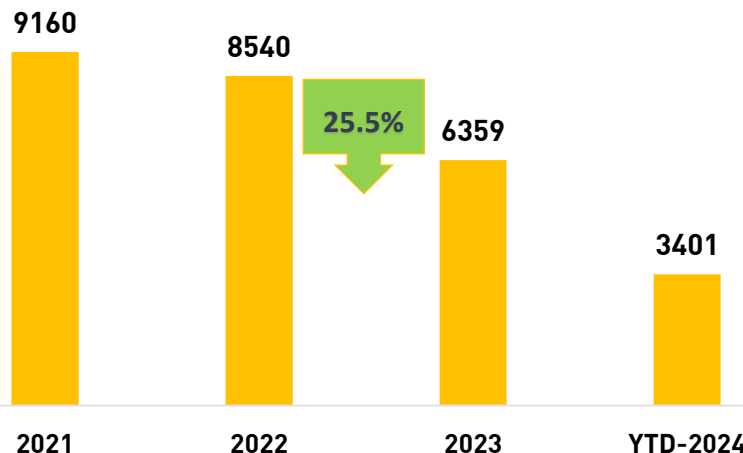
Sp.Electrical Consumption(KWH/Ton)



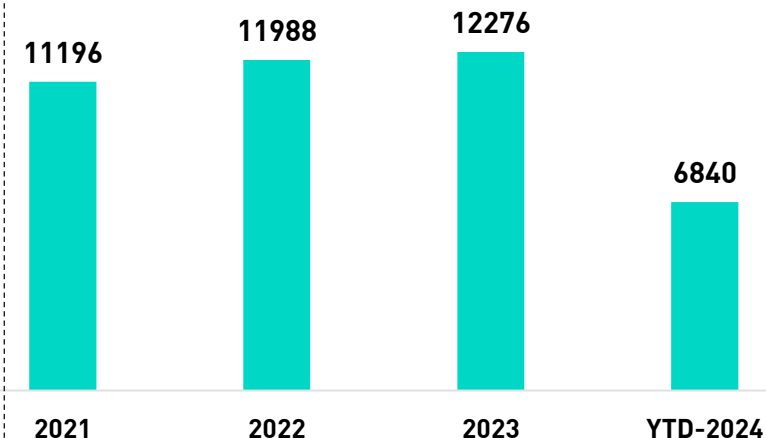
Total Energy(GJ) & Production(Ton)



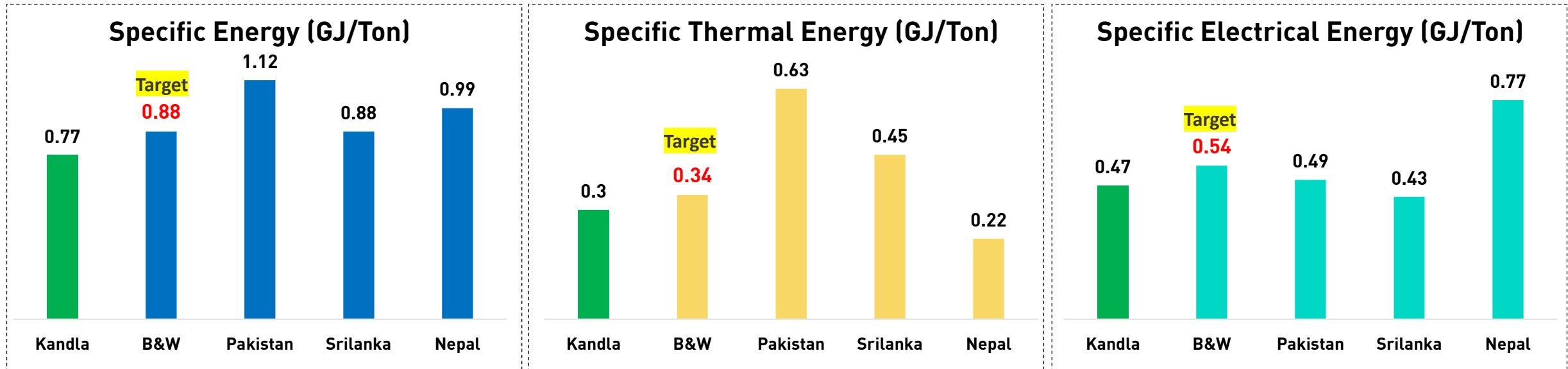
Total Thermal Unit(GJ)



Total Electrical Unit(GJ)



ENERGY BENCHMARKING-B&W India & Other SA Sites



SUMMARY OF THE PROJECTS

YEAR	No of Energy saving projects	Investment (INR Million)	Electrical savings (Million kWh)	Thermal Savings (Million Kcal)	Total Savings (INR Million)	Payback period (in months)
FY 2021-22	5	.225	.2	86.7	3.02	7
FY 2022-23	4	.22	.45	102.8	3.19	10.2
FY 2023-24	6	27.45	1.03	1530	14.8	28

KANDLA ENERGY ROADMAP

LED FACTORY LIGHTING



HVLS FAN IN PACKING HALL



VFD based HE CT



HRS IN COMPRESSOR



TURBOCOR MAGLEV CHILLER

- Oil free, magnetic bearing compressor
- 300 TR Kw cap., 8.5 COP

ELECTRIC BOILER

- 1 TPH capacity, 99% Eff.
- 99.5% Dryness fraction

DIGITALISATION



- EMS
- Control tower
- Dark cascade

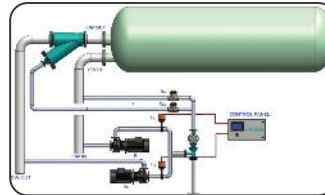
BIO-DIESEL IN BOILER & HWG



AIR SOURCE HEAT PUMP



ATCS IN CHILLER



EC+ AXIAL FAN RETROFIT

- 1.35 Lakh units saving/Annum



IE5 MOTOR SMART PUMPS



OFFSITE/ONSITE SOLAR PV PLANT

- 165 Kw onsite plant
- 12.85 Mw offsite Brookfield project



SOLAR WATER HEATER PLANT

- 20 KI Per day capacity
- 150 Kw capacity



VFD BASED AIR COMPRESSOR



- 100 KI Per day capacity
- 350 Kw capacity, 2.5 COP



MAJOR ENCON PROJECT PLANNED IN FY-2024-25

ENERGY + SUSTAINABILITY



- Brookfield offsite interstate Solar Project **12.85 MW** with peak 4 hours
- Proposed savings for Kandla-**11.3 lakhs Unit/Annum** Total savings **3.5 Million INR**
- Introduction of Wind PPA with total savings of- **5.5 Million INR**

EFFICIENCY IMPROVEMENT



- EEM-2.0, IE4,5 motors in Mfg- **1.2 Million INR**
- **E-FRP** fan in cooling tower- **.25 Million INR**
- **EMS-2.0**- with real time data and alarming for over energy consumption

TECHNOLOGY INTERVENTIONS



- **1 TPH** Electric boiler instead of diesel fired - **775 Ton CO2/Year, 8.8 Million INR**
- Solar water heater expansion- **5.04 Million INR**
- **Hydromix-Nano technology** fluid in Heat pump condenser circuit- **.9 Million INR**

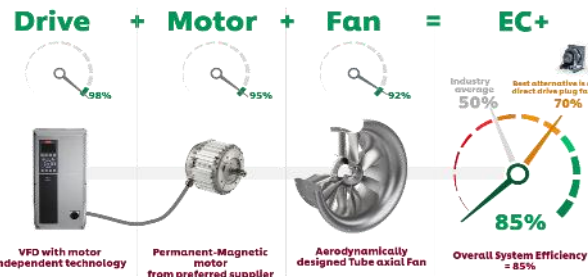
INNOVATIVE AND WASTE REDUCTION



- Using cold water in shampoo instead of hot water-BCT reduction + Power saving- **2.02 Million INR**
- Heat recovery from Dry Vacuum pumps- **.8 Million INR**
- Centralized vacuum pump for packing and mfg. by removing individual pumps- **.6 Million INR**

ENERGY SAVING PROJECTS IMPLEMENTED IN LAST 3 YEARS-2023-24

RETROFITTING EC+ FAN IN AHUs



Efficiency Gains over Centrifugal & Plug Fans:

- 15-35% efficiency gain in the fan
- 5-10% gain by eliminating belt losses.
- 2-4% gain by switching from IE2 to IE4 / IE5 motors



▪ Saving-452 GJ/1.11 Million INR

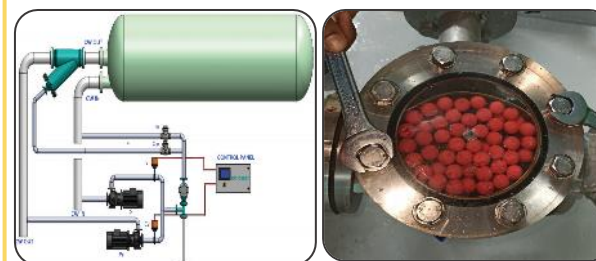
Replicable in all AHUs, already replicated at 12 sites in HUL

IE5 MOTOR SMART PUMP



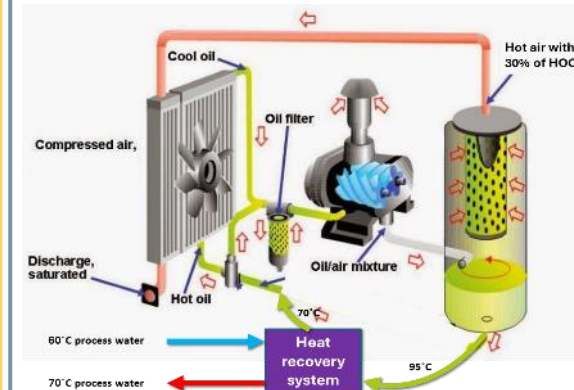
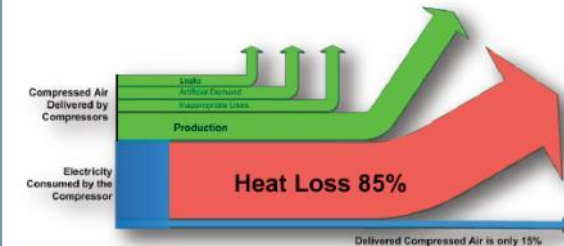
- Inbuilt VFD controlled
- Can monitored and controlled the required parameters like temp and pressure diff.
- Installed at cooling tower, hot well and cold well
- Saving-1206 GJ/3.01 Million INR
- Easily replicable

ATCS IN CHILLER



- Used for cleaning condenser tube in auto mode
- COP IMPROVEMENT BY 0.5
- Saving-216 GJ/.43 Million INR
- Easily replicable at all chillers anywhere with low cost

HRS IN COMPRESSOR



- Saving-266 GJ/.66 Million INR
- Can be done in any compressor

ENERGY SAVING PROJECTS IMPLEMENTED IN LAST 3 YEARS-2022-23

VFD BASED HE AIR COMPRESSOR



Compressed Air cons @100KW motor for 1hr

Capacity	500	CFM
Requirement time	250	CFM/hr
Motor capacity	55	KW
	Before	After
Loading Time	1	2
Unloading Time	1	0
Energy cons during loading (KWH)	55	27
Energy cons during Unloading (KWH)	18	0
Total	73	27

- Saving-324 GJ/.08 Million INR
- VFD can be installed at old compressor

HVLS FANS IN PACKING HALL



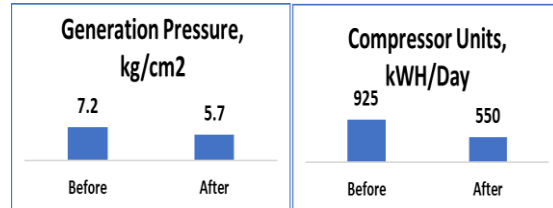
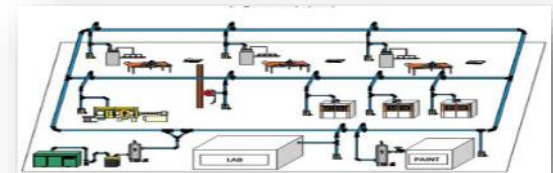
- Old wall mounted 35 industrial fans replaced by 1 high volume low speed(HVLS) fan
- Saving-648 GJ/1.6 Million INR
- Easily replicable to anywhere

VFD based HE CT WITH FRP FAN



- High efficient fan with VFD controlled interlocking with WBT
- Saving-432 GJ/1.08 Million INR
- FRP fans can be easily retrofit to any cooling tower

RING MAIN HEADER IN PACKING HALL



- Saving-216 GJ/.43 Million INR
- Easily replicable to anywhere

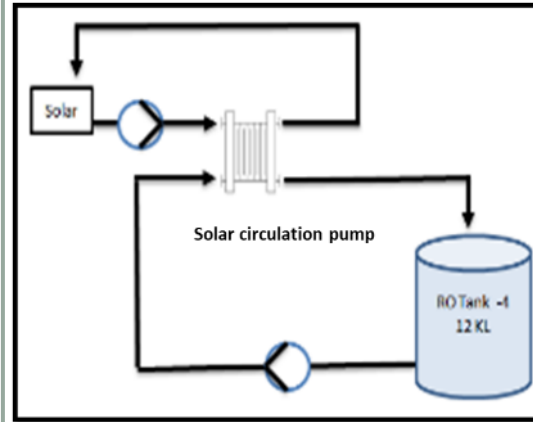
ENERGY SAVING PROJECTS IMPLEMENTED IN LAST 3 YEARS-2021-22

EC BLOWERS IN ETP



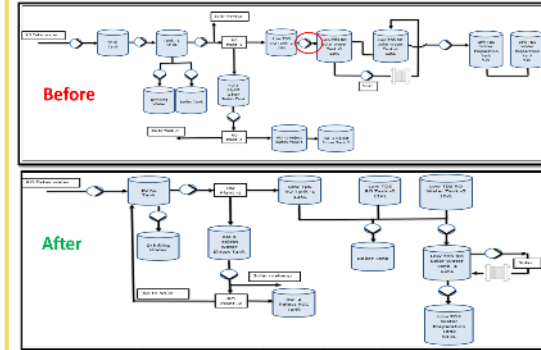
- Using high efficient EC blowers in ETP for aeration tank by replacing old conventional blower
- **Saving-216 GJ/.54 Million INR**
- **Easily replicable to anywhere**

SOLAR THERMAL OPTIMIZATION



- Automation of pump on and off to optimize running hours of solar heater pump
- **Saving-270 GJ/.67 Million INR**
- **Replicable as per design of the system**

ECRS IN RO PLANT



- Elimination of one pump by combination of tanks and making common header and using gravity for flow
- **Saving-216 GJ/.54 Million INR**
- **Replicable as per design of the system**

CONVEYORS INTEGRATION

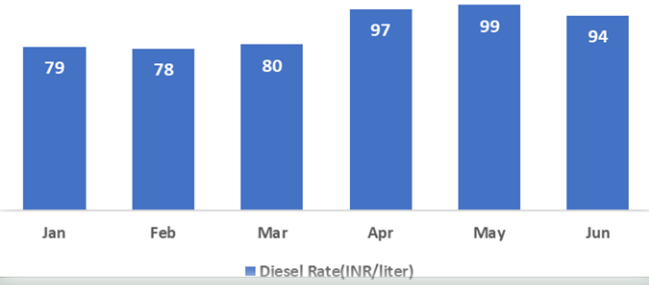


- Integration of all the conveyors with respective machine/equipment to eliminate idle running when machine is not running
- **Saving-108 GJ/.27 Million INR**
- **Easily replicable to anywhere**

HSD saving project by HWG optimization-2022-23

Hot water is the major source of Diesel consumption 70%

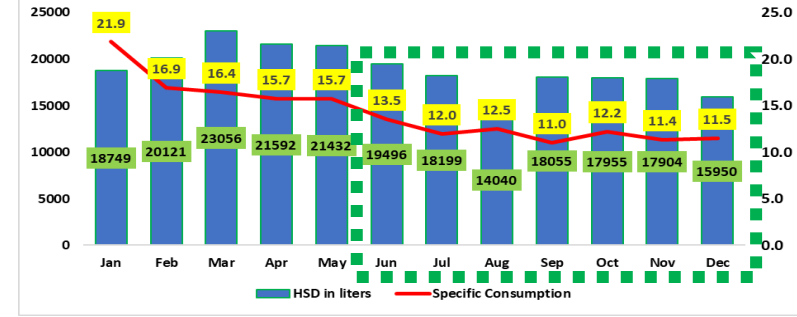
Diesel Cost Trend



Boiler and HWG running hours



HSD Consumption Analysis

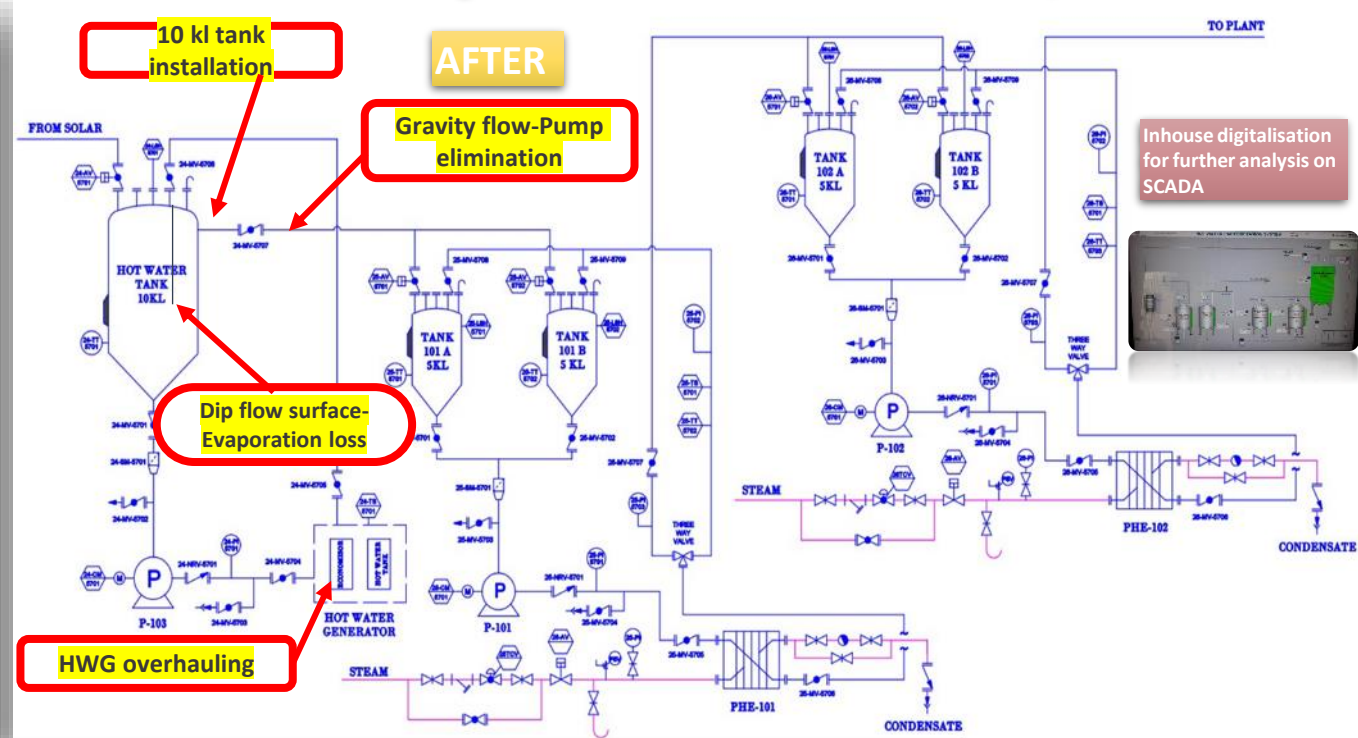
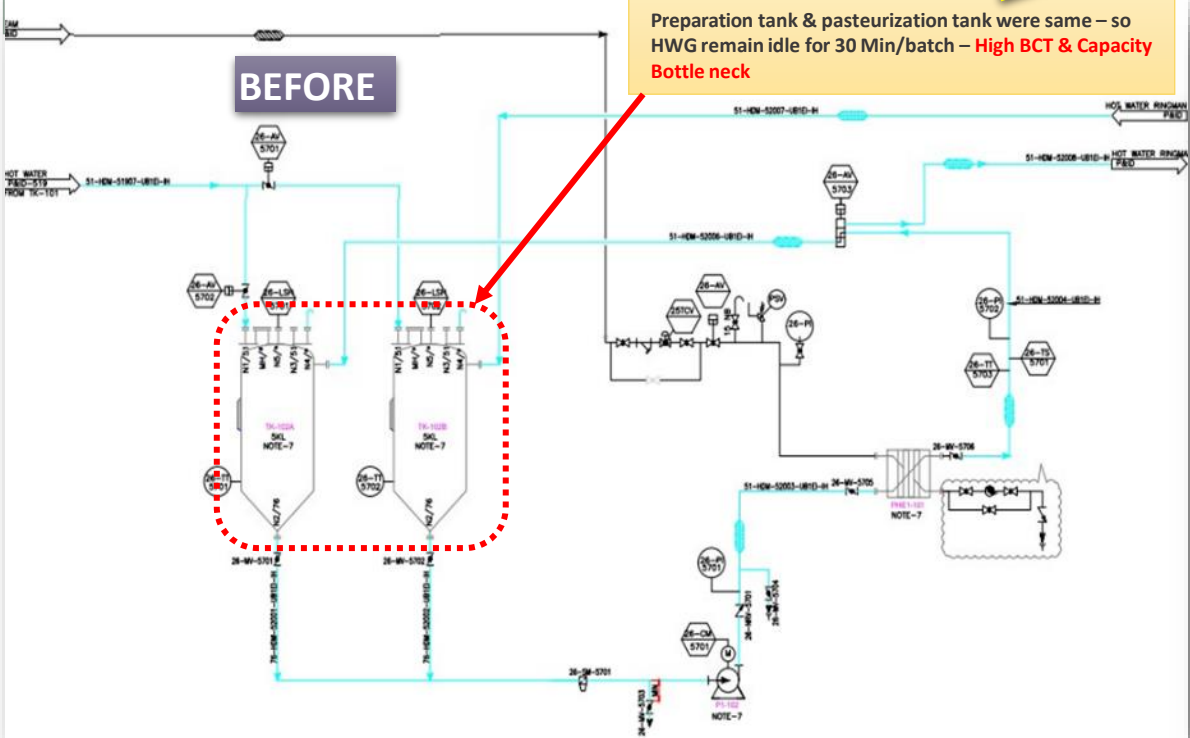


Hot water Generating source were Boiler & HWG
 Cost/KL of Heating Hot water **Boiler - 629 INR/KL** HWG -389 INR/KL
 HWG idle time was high
Generating Capacity was Bottle Neck
 To Full fill peak demand Boiler is being used for Heating water - **High Specific cost of Boiler**

7.3% reduction in Boiler+HWG running hrs.

Total cost saving-2.56 lakhs/month

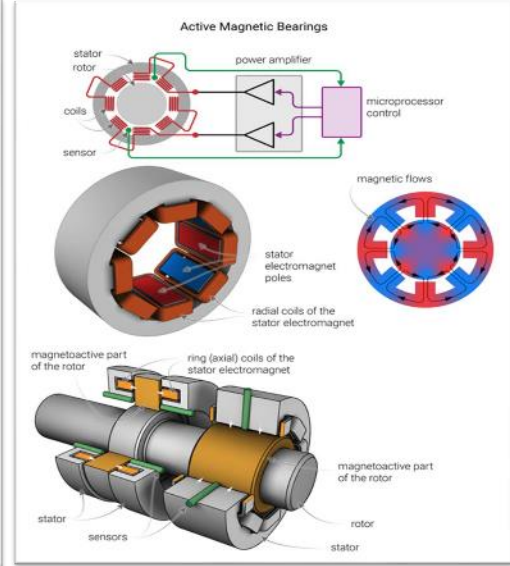
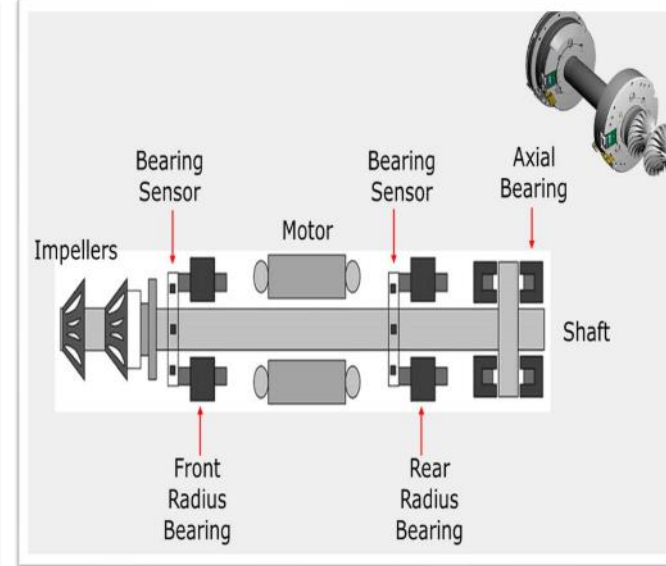
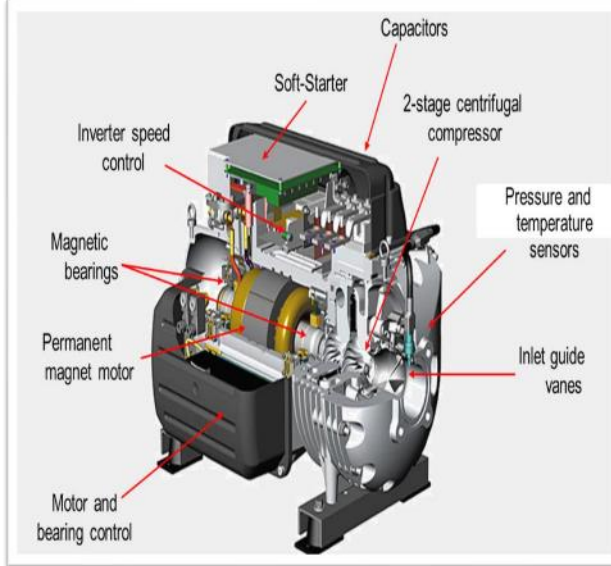
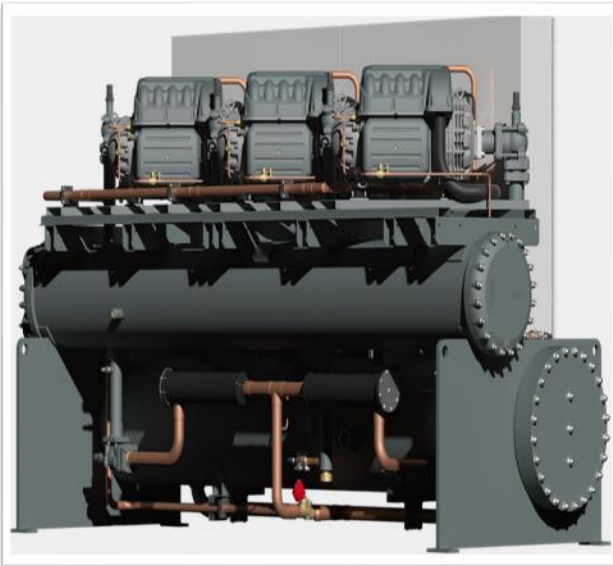
1312 GJ/YEAR



Inhouse digitalisation for further analysis on SCADA



INNOVATIVE PROJECT-1 – Magnetic Bearing Compressor Chiller (1st in HUL)



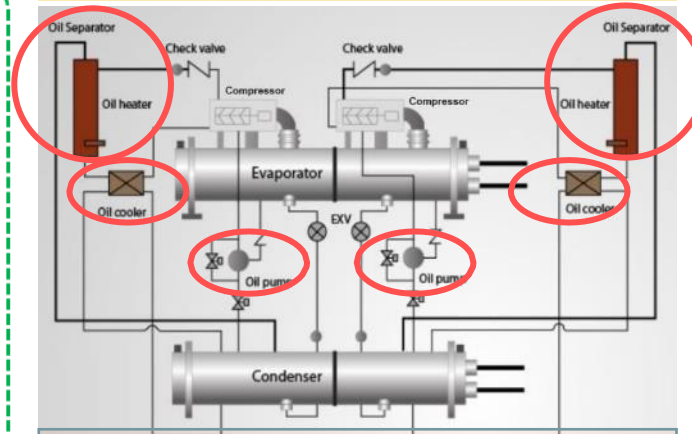
A magnetic-bearing centrifugal chiller utilizes magnetic levitation technology to achieve a frictionless and non-contact levitation state.

Advantages



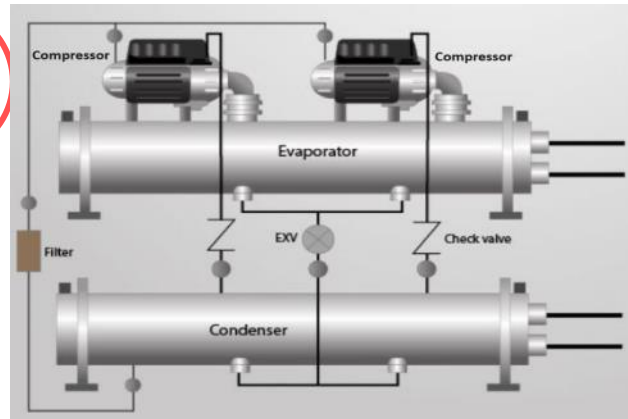
Energy Saving	20-40% Energy Saving
Compact and Light Weight	80 % Smaller
Low Noise	Friction Less Bearings
Low Vibration	Contact Free Compression
Minimized Start Up Current	Lowest starting current from 2 Amps. Reduction in Generator, Switchgear Sizing
Reduced Maintenance Efforts and Cost	Oil Free, Field Serviceable Compressors
Compatible with Ultra low GWP Refrigerants	Compatible with R-1234ze, R 1234zd etc.

Complex Design with Oil Handling Components



Oil is required to lubricate bearings which are used to support rotational and linear movement of the rotor

Simple Design without Oil Handling Components



Oil is not required since the motor shaft levitates in a magnetic field or uses refrigerant for lubrication

INNOVATIVE PROJECT-1 – Magnetic Bearing Compressor Chiller (1st in HUL)

Oiled Screw Compressor



Mechanical Wear typical maintenance needed in 5 years

20% Capacity loss over 10 years

Oil needed for bearing lubrication

Risk of refrigerant leakage is comparatively high

Annual replacement of oil and oil filter – 2L/annum.
Lifetime maintenance cost – 35 L

Oil Free, Magnetic Bearing Centrifugal Compressor



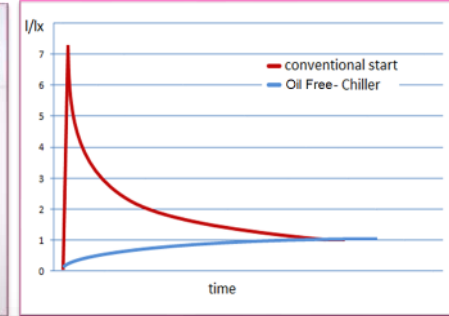
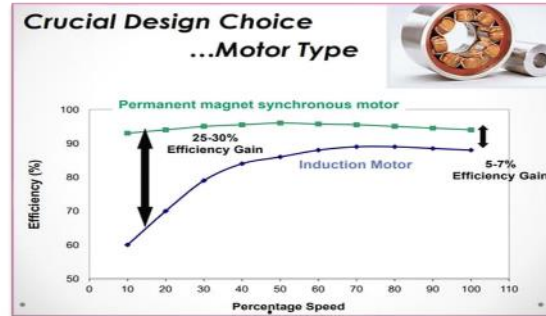
No mechanical wear over entire life

No capacity or efficiency degradation over life

Oil free magnetic bearing. No lubrication needed.

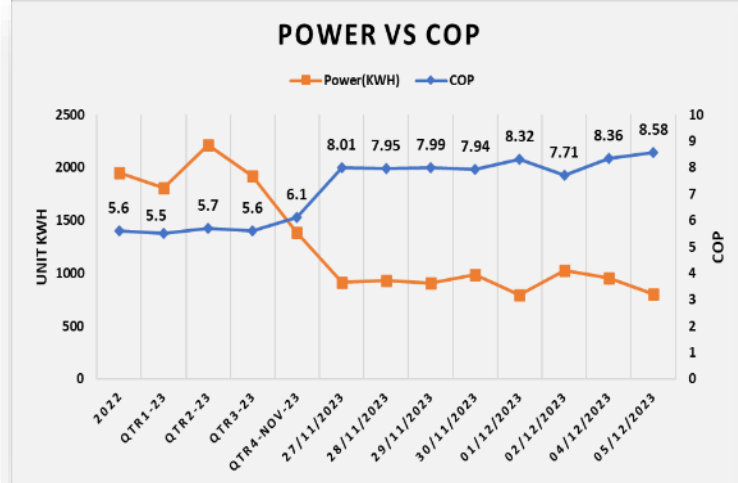
Minimal refrigerant leakage risk

Zero maintenance cost for compressor



Replicated at 5 sites with 8 sites in progress

2253 GJ saving/year



Parameter	Turbocor Maglev Chiller	Existing Oil Screw Chiller
Capacity, TR	300	330
IPLV (KW/TR)	0.45-.38	0.60
IPLV (COP)	7.5-9	5.9
Refrigerant	R1234ze	R134A
Sustainability	20 times lower GWP; ODP-0	GWP*-1300; ODP-0
Annual KWh Consumption	2,70,000	6,60,000
Savings	56.3 Lakhs/Annum	

Typical COP 4 to 6.1

*GWP is measured as a multiple of CO₂



INNOVATIVE PROJECT-2 – Air Source Heat Pump (1st in HUL)

Process Description: Pasteurized hot water > 80deg is required for CLS batch & CIP process. The hot water is generated by using HSD fired HWG. With avg hot water Req – 100 KI/day

Major Challenges :
 Avg Diesel Consumption -536 lit/day
 Annualized diesel cons – 160.8 KI
 GJ impact by HSD - 6401 GJ
 Annual CO2 impact – 480 Tons

Typical Unilever Applications	
Applications	Temperature Range
CIP System	< 80 - 85 °C
Process Water	< 80 - 85 °C
Domestic Hot Water	< 40 - 45 CC
Boiler Feed Water Preheat	Up to 95 °C
Steam Systems	150 °C to 200 °C

Ultra-High Temperature Lift

- Temperature raised from 15C ambient on evaporator to 86C hot water on condenser side
- 310 kW heat pump capacity
- Twin screw compressor model used for high lift**

Elimination of diesel

- Since operation of heat pump, diesel consumption in HWG is **completely eliminated**
- All ancillary costs like blower, maintenance, spares, fuel pumps etc shut down.

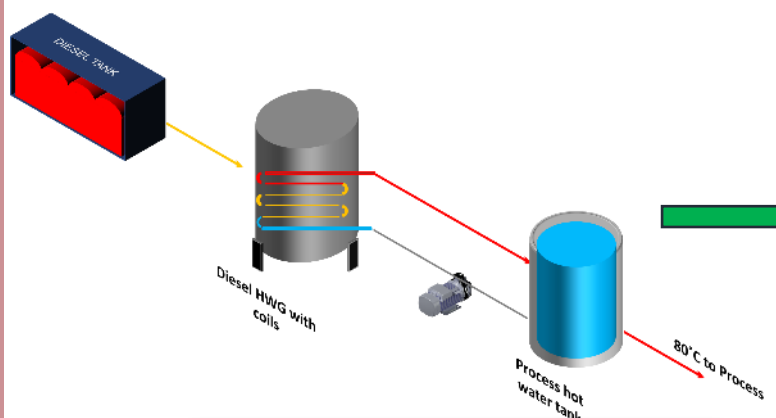
Why HEAT PUMP is more effective than direct electric heating?

Combined CoP (5.0) = 3 units of heat and 2 units of chilled water. Whereas 1 Unit of electricity is required to produce 1 unit of heat in direct heating.

CoP: Coefficient of Performance

- Zero gross emissions.** Electric heat pumps do not emit GHG
- High Efficiency** The coefficient of performance (COP) of electric industrial heat pumps can approach 4.0
- Reduce dependency on fossil fuels** There is no requirement of combustion fuel, combustion air and combustion management systems.
- No Risks associated with Combustion Fuels**
- Operational Cost Savings** Significant utility cost saving can be achieved
- Recyclability.** There is no recyclability risk since most of the parts are reusable..
- Age.** With optimum care it can be used upto 14 years.
- Diverse Applications** Heat pumps can be applied to Process Heating, Space Heating, Cooling etc.

Diesel fired Hot Water Generator



Cost per GJ – INR 3300, CO2 – 400-500 Ton CO2 per year

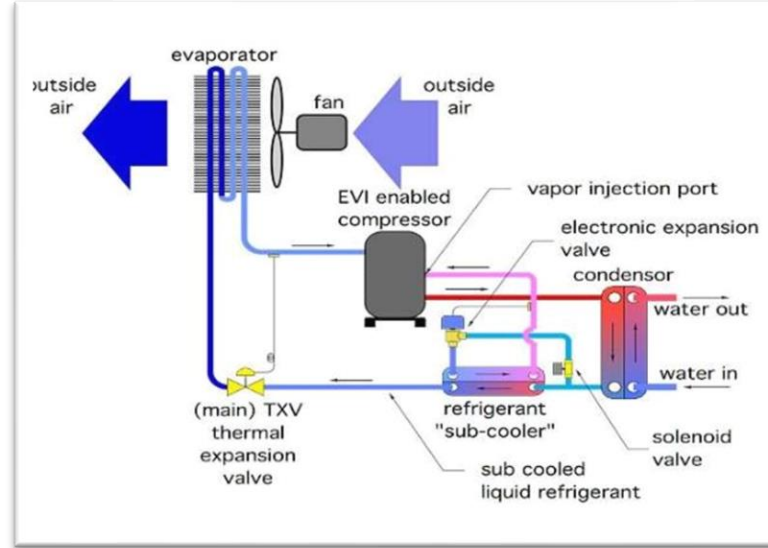
Air Source Heat Pump



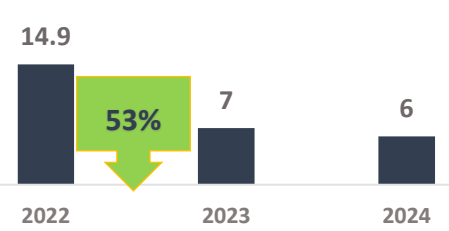
Cost per GJ – INR 1650; CO2 – Zero ; New age refrigerant R1234ze with GWP<5 and ODP of 0

450 Tons CO2 saving/annum

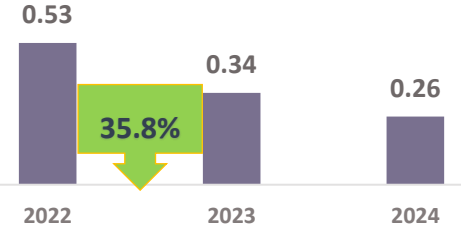
Basic Principle of ASHP



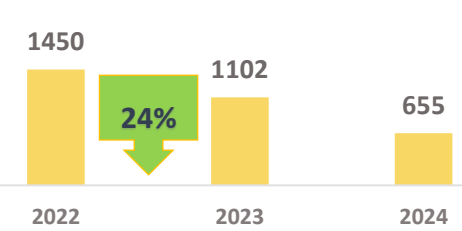
HSD/Ton(Litre/Ton)



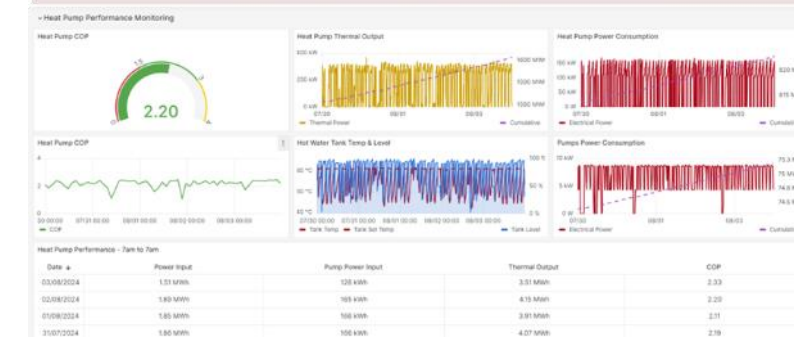
Thermal Energy(GJ/Ton)



HSD Cost/Ton(INR/Ton)



Real Time Cloud Based Dashboard



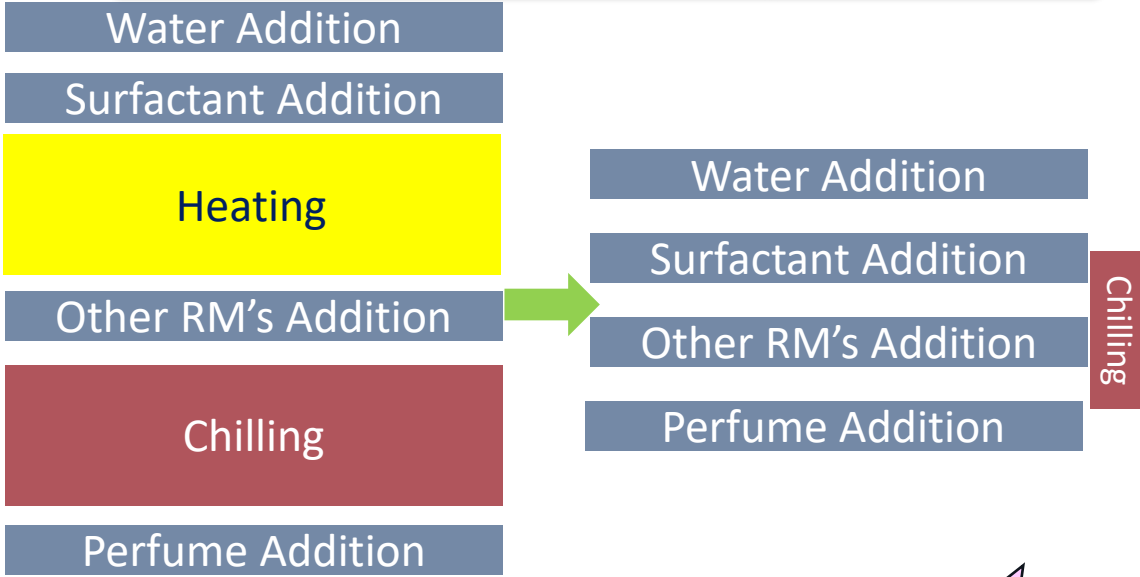
Replicated at 8 sites with 4 sites in progress



INNOVATIVE PROJECT-3 - Utility reduction in Process-2023-24

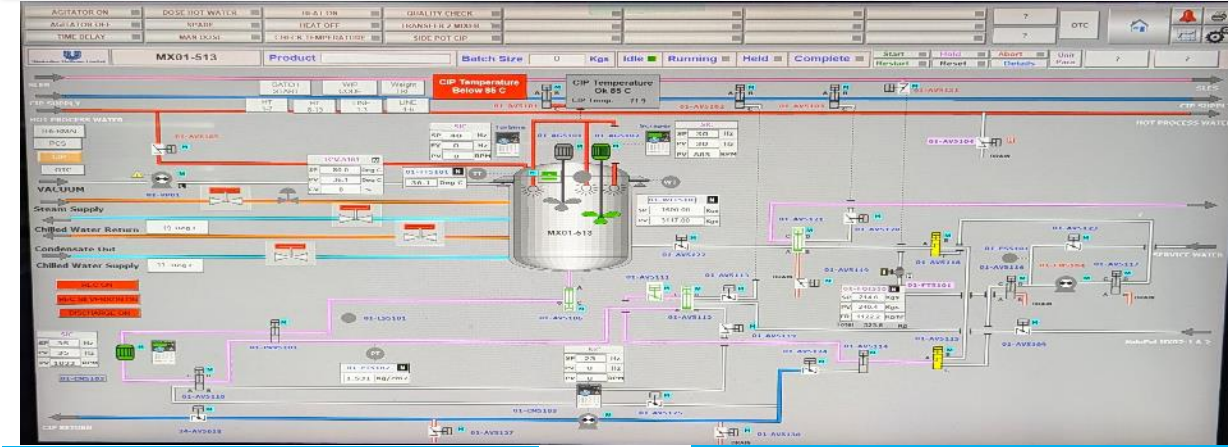
Batch Cycle Time Improvement

Steam Elimination from Process



One Touch CIP

Customised one touch SCADA system for CIP



Standardization of process Time

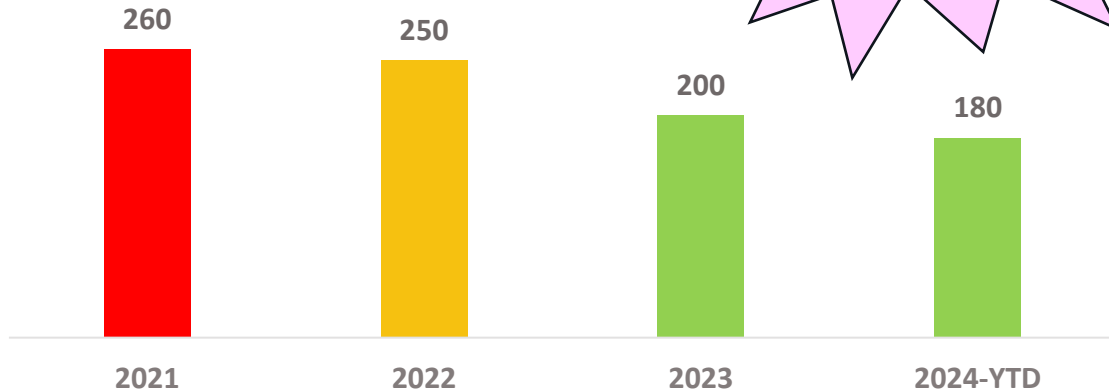
Elimination of Manual Dependency

Reduction in time and Hot Water Usage:
Steam & Power usage Reduction

CIP TIME REDUCED FROM 2 HRS TO 1 HR PER CIP

Steam(Kg/Ton)

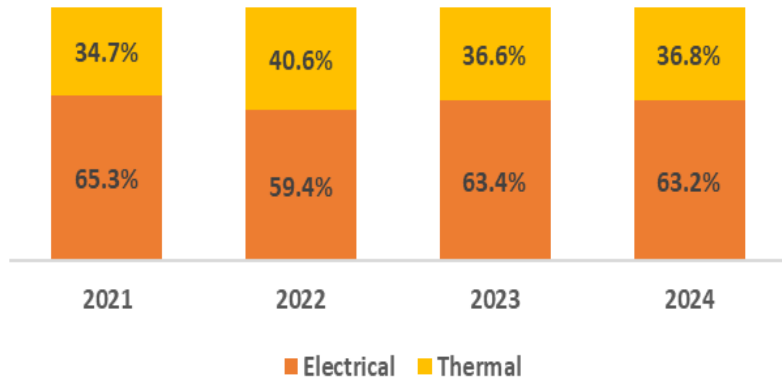
718 GJ/YEAR SAVED



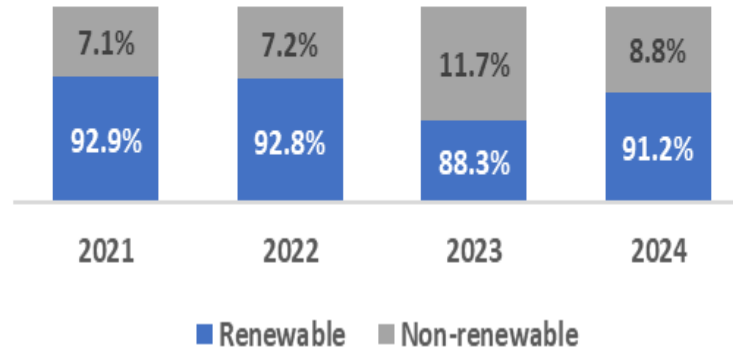
1728 GJ/YEAR SAVED

UTILISATION OF RENEWABLE ENERGY SOURCES

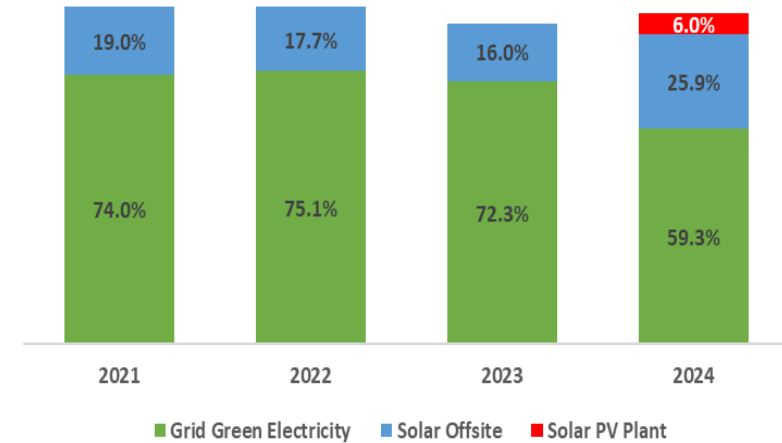
Electrical vs Thermal Share



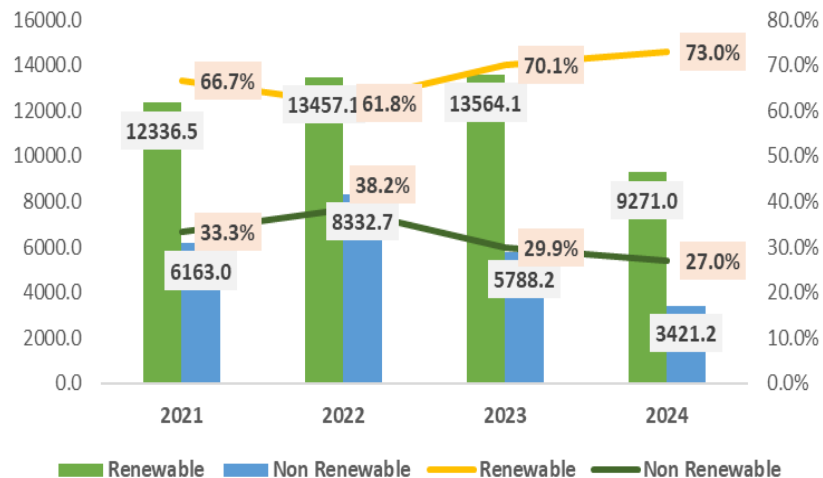
Electrical Energy GJ-RE vs NRE



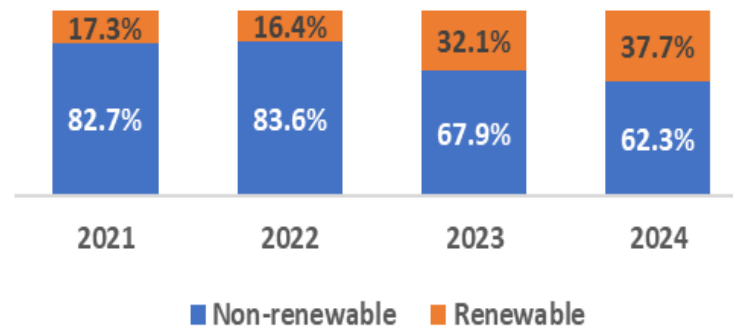
RE in Electrical



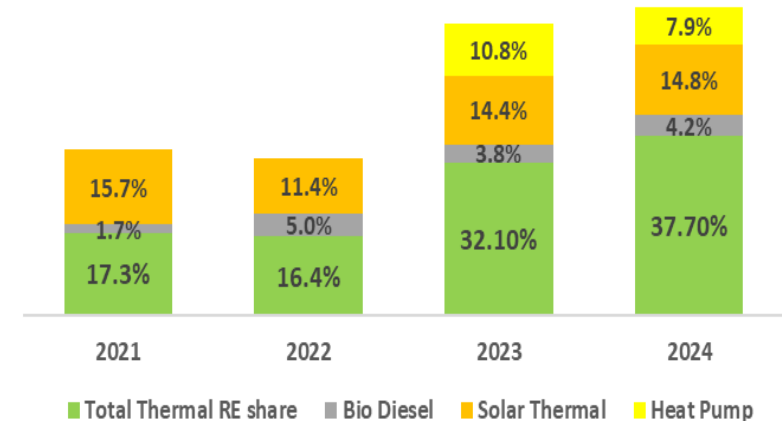
Total Energy(GJ)



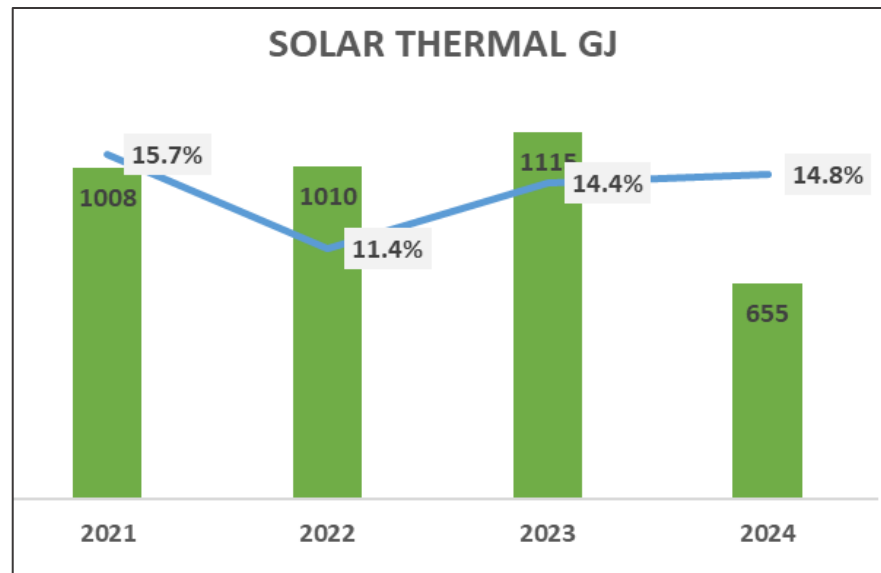
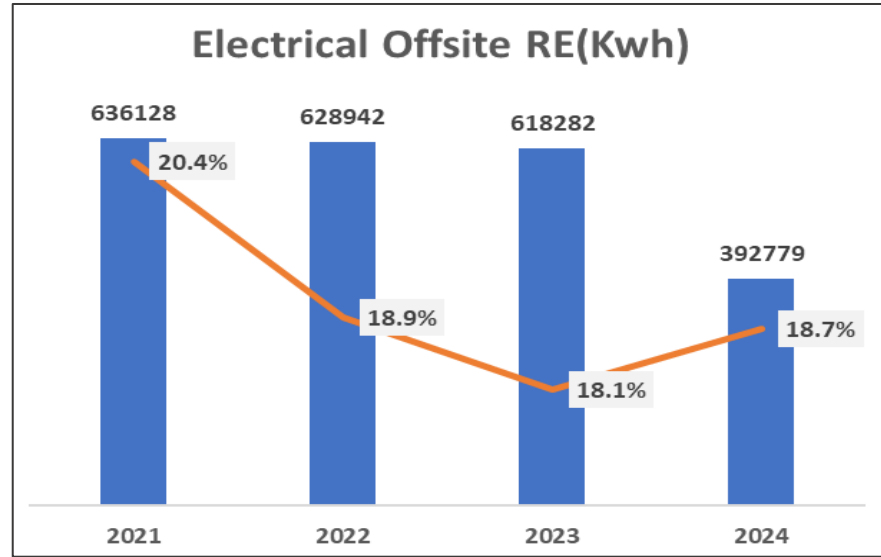
Thermal Energy GJ-RE vs NRE



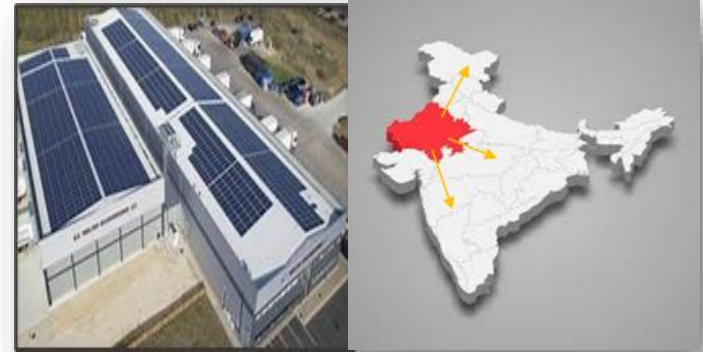
RE in Thermal



UTILISATION OF RENEWABLE ENERGY SOURCES & FUTURE PLAN



BROOKFIELD SOLAR MEGA PROJECT-12.85 MW



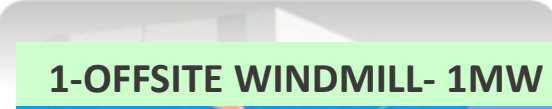
SOLAR WATER HEATER EXPANSION UPTO 2016 GJ



1 TPH ELECTRIC BOILER IN PLACE OF HSD FIRED BOILER



1-OFFSITE WINDMILL- 1MW



EMS SYSTEM

UIEL Kandla Monitoring System

Dashboard header featuring an illustration of a factory with a green leaf on its roof and several wind turbines against a blue sky. Below the illustration is a row of navigation buttons: Link Home, Open Data, Total Power Energy, Water Flow Data, Live KW Usage, Download Report, Air Compressor, Chiller, Diesel Generator, Air Flow, Steam Flow, ETP Water, Diesel Tank, Plant Water Meter, EMS STATUS, Data Compare, and Alert Page.



Live meter

Section Wise Energy

Live KW Usage



Air Compressor Status

Chiller Status



ETP Water

Data Comparison

and many more..

UNILEVER GHG TARGET & ACTION PLAN

Our Climate Targets

Unilever has three principal targets that guide our actions:*

- a **Short-term Emissions Reduction Target:** to reduce in absolute terms our operational (Scope 1 & 2) emissions by 70% by 2025 against a 2015 baseline;
- a **Medium-term Emissions Reduction Target:** to reduce in absolute terms our operational emissions (Scope 1 & 2) by 100% by 2030 against a 2015 baseline; and
- a **Long-term Net Zero Value Chain Target:** to achieve net zero emissions covering Scope 1, 2 and 3 emissions by 2039.[†]

Net Zero
by **2039**
across **Scope 1, 2 & Scope 3** emissions

Scope 1 & 2 emissions reduction against a 2015 baseline **100%** by **2030**

Scope 1 & 2 emissions reduction against a 2015 baseline **70%** by **2025**

Halve the footprint of our products by 2030 against a 2010 baseline

Integrated GHG roadmaps for all key materials and ingredients



Zero deforestation by **2023** in palm oil, tea, soy and cocoa



100% renewable grid electricity (achieved January 2020)



Eco-efficiency programmes to reduce energy demand

Estimated **40-50%** reduction in logistics emissions by 2030



At least **25%** Recycled plastic by **2025**



Transition to **100%** renewable heat by 2030

Align capital expenditure with our **1.5° pathway**



100% EVs or hybrids in our global car fleet by 2030



Reduce emissions from **aerosol propellants** in North America

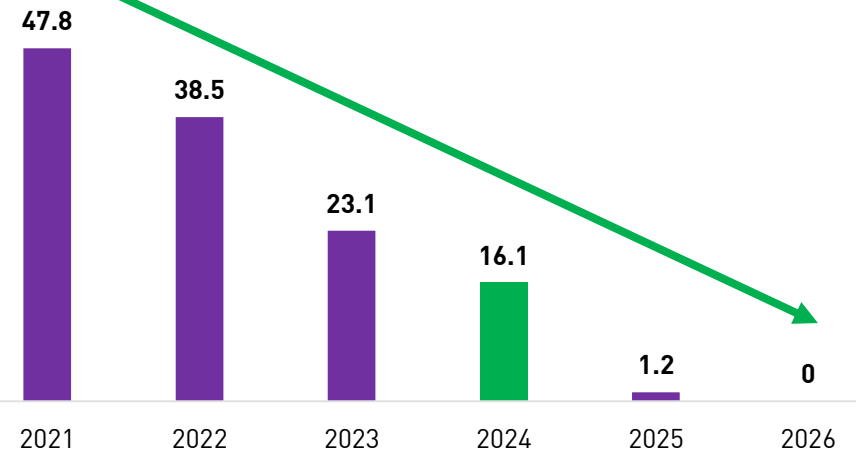


Phase out high-impact **HFC refrigerants** from cooling systems

Halve food waste in our operations by **2025**



KANDLA SCOPE-1&2 CO2 emission (Kg/Ton)



GHG INVENTORISATION & ACTION PLAN

STEP 1.1 : ASSESS WHICH OF THE 3 MAIN CONTRACTUAL OPTIONS TO DELIVER 100% RENEWABLE ELECTRICITY



GREEN POLICY

Option 1

RENEWABLE ELECTRICITY CERTIFICATES*

Option 2

ON SITE PPA

Option 3

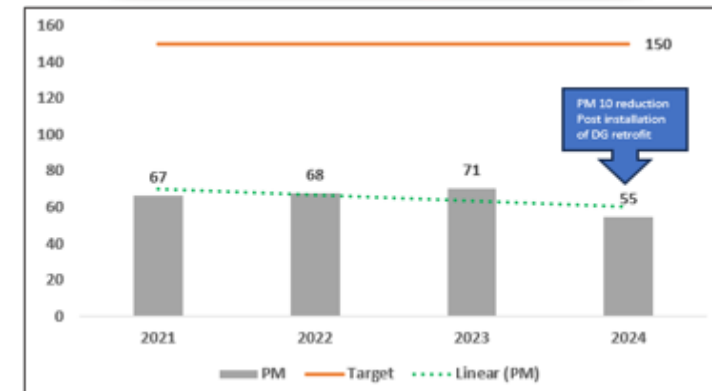
Bundled REC / OFF SITE PPA/ Green Tariff

Supply contract	Multi-customers	single customer	Multi-customers
Contract structure	regional/ national/site	site supply	national or site supply
Contract terms	1+ yrs	10-15 yrs	3-10 yrs
Covers % of consumption	up to 100%	~ 10-30%	up to 100%
Implementation complexity	low **	high	medium
Savings vs. On cost	On cost	Savings	Savings

* These have different names in different markets

** low if REC concept & system implemented in country

Options	Renewable Market & Legislation		
	CLOSED (Not supportive)	REFORMING (Partially supportive)	OPEN (Pro renewables)
1 RECs	Y	Y	Y
2 On/near site solar (Power Purchase Agreement -PPA- or Capex)	Y	Y	Y
3 Contract renewable electricity (e.g. green tariff or short-term PPA)		Y	Y
4 Long term renewable electricity PPA contracts (virtual or physical)			Y
5 CAPEX (to leverage corporate tax credit or subsidies)			Y



Particulate Matter reduction

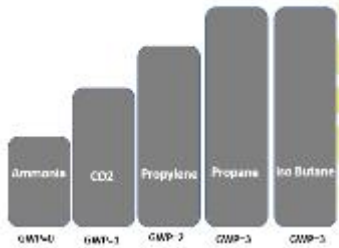
Compliance to NGT order dated 06.08.2019 in the matter of "Report filed in O.A. No. 681/2018. This is with the objective for PM reduction by using retrofitted emission control devices (RECD) for in-use diesel operated internal combustion engines up to 800 kW gross mechanical power for generator set (Genset) application.

INITIATIVES TAKEN AND FUTURE PLAN

- Usage of food waste for producing Bio-Gas to reduce no. of LPG cylinders in canteen for cooking
- Replacement of old refrigerant to natural one
- Retrofit emission control device in DG to reduce the PM
- Bio-diesel in DG set
- Electric boiler to eliminate HSD usage and zero flue gases in chimney
- Localisation of raw material supplier to reduce trucks Kms and reduction in GHG emissions by 60% in transportation
- Usage of EV vehicle for factory staff

Eco Friendly/ Green Refrigerants inventorisatio

Natural Refrigerants



Classification of Refrigerants

Natural Refrigerants

e.g. Water, Ammonia etc.

Zero ODP

Very low / Zero GWP



Synthetic Refrigerants

e.g. CFC, HCFC, HFC, HFO, etc.

Contributes to ODP**

Contributes to GWP**

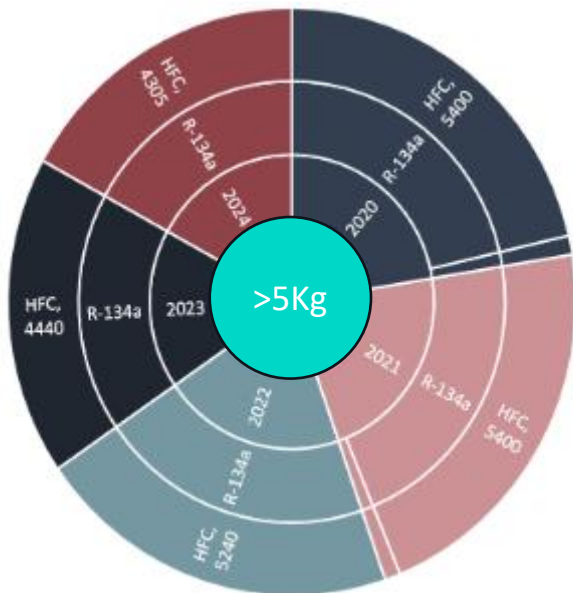


Unilever objective:

Phase out of high GWP refrigerants to achieve our carbon neutral commitment.

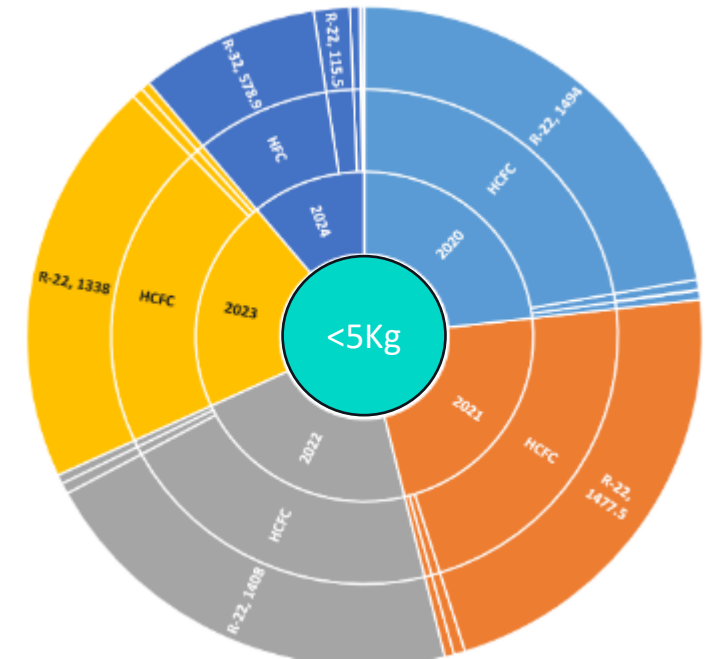
Unilever Policy Towards use of Eco-Friendly Refrigerants:

1. Use of natural refrigerants wherever possible
2. No refrigerants with ODP > 0
3. **For Existing Installations:** No refrigerants with GWP > 1500 by December 2021.
4. **For New installations:** No new CFCs or HCFCs in installations + Use of new ultralow GWP refrigerants with GWP < 150



Refrigerant Contained in Large Systems (> 5Kg) on Site (Kg)

Refrigerant Contained in Large Systems (< 5Kg) on Site (Kg)



GREEN SUPPLY CHAIN MANAGEMENT

INSOURCING RIGID SUPPLIER INSIDE SEZ



KASEZ

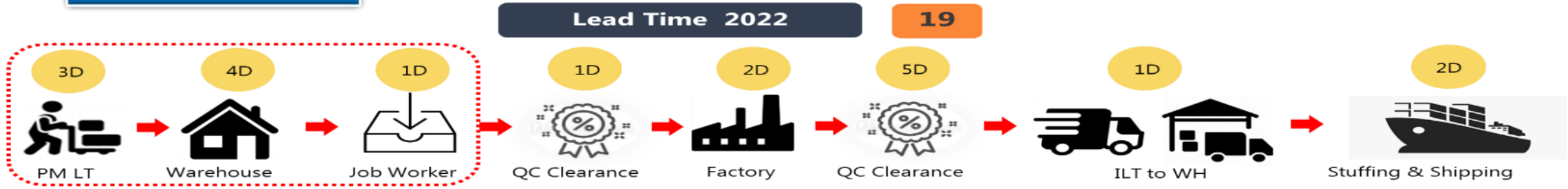


- LT reduction by **10 days**
- Import price parity of Resins/RM – **Duty savings**
- **660 Kms / 410 Miles** travel reduction

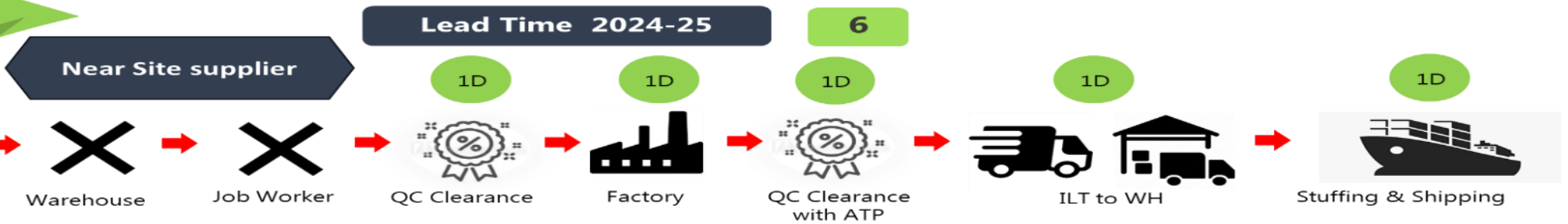
Savings – 500K+ Euro



53000 Kg Co2 emission reduction



68% Reduction In Truck Kms



Local Rigid Supplier

Warehouse
Job Worker

QC Clearance
Factory
QC Clearance with ATP

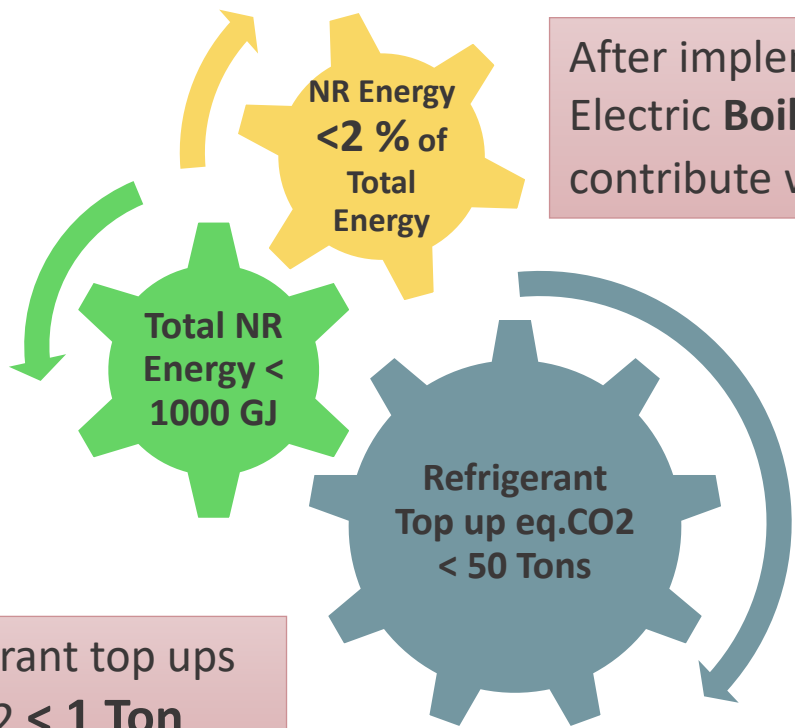
ILT to WH

Stuffing & Shipping

KANDLA NET ZERO COMMITMENT

VOLUNTARY INITIATIVE-EP 100

- Usage of Heat Pump across 8 sites
- Magnetic bearing compressor chiller across 5 sites



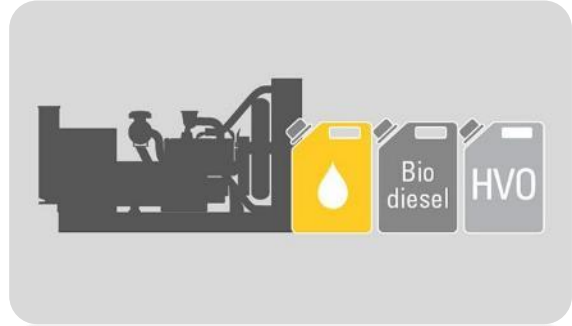
After implementation of Electric **Boiler**, only **DG** will contribute which is **< 1.5%**

DG HSD
Contribution will be
< 350 GJ

Refrigerant top ups
eq. CO2 **< 1 Ton**

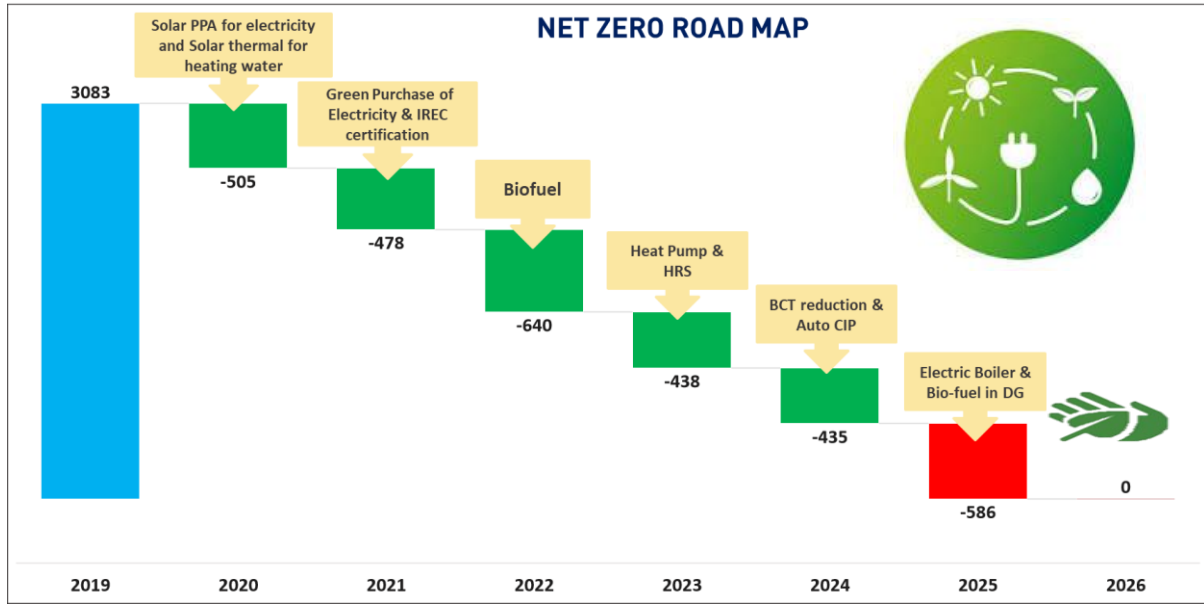


BIO-FUEL IN DG



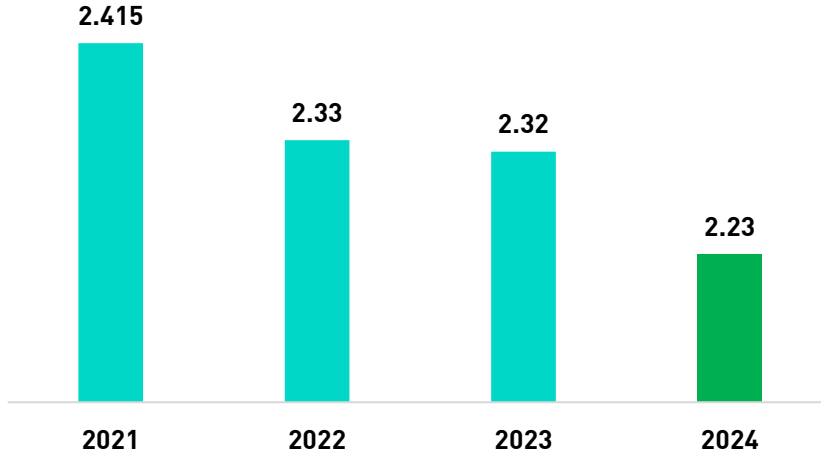
FUTURE INITIATIVE & PLAN-RE 100

Usage of DM cold water in place of pasteurize hot water for making Shampoo for export-Applied for approval-**1800 Ton** steam saving/Annum

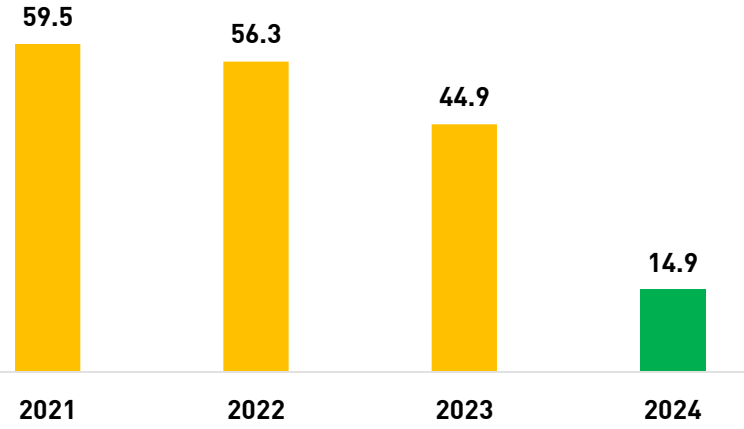


CARE FOR PLANET-WATER AND WASTE

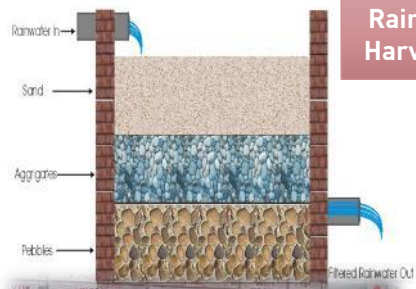
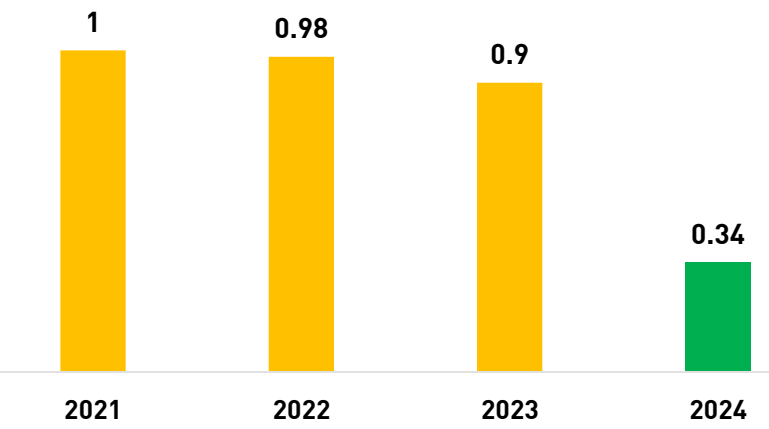
Water (M3/Ton)



Plastic and Paper Waste (Kg/Ton)



EFFLUENT(M3/Ton)



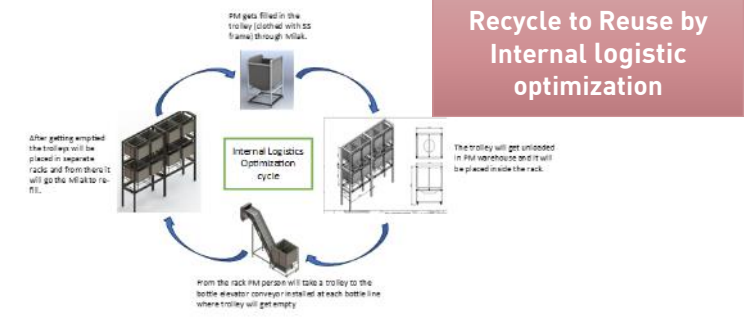
Rainwater Harvesting

ETP TREATED WATER USAGE IN WASHING, CANTEEN AND TOILETS

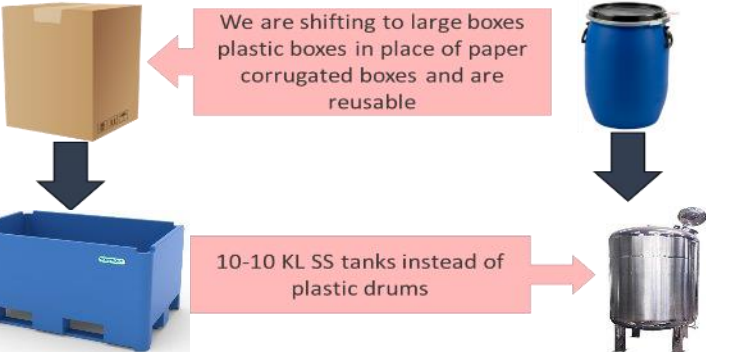
OPTIMIZATION OF RO PLANT TO REDUCE ITS REJECT



Auto CIP



Recycle to Reuse by Internal logistic optimization



We are shifting to large boxes plastic boxes in place of paper corrugated boxes and are reusable

10-10 KL SS tanks instead of plastic drums



Biogas Plant



PIGGING IN MFG

REWARDS AND RECOGNITION

Published WOW stories

KANDLA FACTORY INSTALLS AIR SOURCE HEAT PUMP - WITH 10 Deg Ambient Air Heat Source (1st in Unilever)

Process Description: Pasteurized hot water @ 80deg is required for CIG batch & CIP process. The hot water is generated by using diesel fired hot water generation. With ambient hot water @ 30-35 C/W.

Major Challenges:
 - Avg Diesel Consumption - 538 kwh/da
 - Annualized diesel cost - 150.8 M INR
 - GJ Impact by HSD - 5401 GJ
 - Annual CO2 impact - 480 Tons

Existing HWG system: Capacity 20000 LPH, Production of Water Requirement 10000 LPH, Annualized Diesel Cost 150.8 M INR, Annualized CO2 Impact 480 Tons, Annualized GJ Impact 5401 GJ.

ASHP system: High Temperature Heat Pump, Heat exchanger, Condenser, Evaporator, Compressor, Expansion Valve, Refrigerant, Control Panel, ASHP Unit, ASHP System, ASHP Installation, ASHP Commissioning, ASHP Operation, ASHP Maintenance, ASHP Troubleshooting, ASHP Safety, ASHP Training, ASHP Documentation, ASHP Reporting, ASHP Audit, ASHP Review, ASHP Improvement, ASHP Innovation, ASHP Leadership, ASHP Teamwork, ASHP Communication, ASHP Collaboration, ASHP Partnership, ASHP Alliance, ASHP Network, ASHP Community, ASHP Stakeholder, ASHP Supplier, ASHP Customer, ASHP Partner, ASHP Competitor, ASHP Industry, ASHP Market, ASHP Economy, ASHP Society, ASHP Environment, ASHP Future, ASHP Vision, ASHP Mission, ASHP Values, ASHP Culture, ASHP Identity, ASHP Reputation, ASHP Brand, ASHP Image, ASHP Perception, ASHP Awareness, ASHP Understanding, ASHP Knowledge, ASHP Skills, ASHP Competence, ASHP Performance, ASHP Results, ASHP Impact, ASHP Contribution, ASHP Legacy, ASHP Success, ASHP Failure, ASHP Risk, ASHP Opportunity, ASHP Challenge, ASHP Obstacle, ASHP Barrier, ASHP Constraint, ASHP Limitation, ASHP Weakness, ASHP Strength, ASHP Advantage, ASHP Disadvantage, ASHP Benefit, ASHP Drawback, ASHP Advantage, ASHP Disadvantage, ASHP Benefit, ASHP Drawback.

KUDOS TO TEAM Kandla FOR THEIR INCREDIBLE WORK!!

Team Members: Hassan Faraz, Vineet Tiwari, Manish Ram, Mahesh Patel, Akhshay Kumar, Bharat Parmar, Priyank Parmar.

KANDLA DELIVERS ABSOLUTE ENERGY REDUCTION WITH SMALL ACTIONS BIG DIFF.

Under the Umbrella of Unilever, team Kandla took an ambitious target to deliver Improvement in Environment Foot print, Utility Cost & capacity Unlock of Posturization plant. All these activities were done inhouse without any major CapEx with motto of **SMALL ACTION BIG DIFFERENCES.**

Some of the key actions taken were -

- Posturization Plant Full Automation with elimination of boiler for hot water generation
- Line Integration and elimination of Edging of canvases
- Ring Main Header and VE Dr. compressor in remote process from 7.8 to 6.1 kg/cm²
- Simplification of Water System - RG and Pasteurization Plant Elimination of 8 pumps
- Water system simplified from 2cm to 2 cm.
- Boiler Optimization

Annual Saving 1.15 Cr

Top Results delivered -

- Reduction in 3750 GJ of energy & 8% of absolute Diesel consumption with 6% of Volume increase
- Total CO2 Reduction 263 Tn
- Improvement in Total Energy Consumption from 1.18 GJ/Tn to 1.26 GJ/Tn
- Annual Saving of 45 Lakhs and Capex Avoidance of 70 lakhs

Kudos to team Kandla on Successful delivering Energy & Co2 Reduction with agility and resilience cost saving of 1.15 Cr. Thanks all Stake holders for support

WOW TEAM: Vineet Tiwari, Akhshay Kumar, Mahesh Patel, Bharat Parmar, Priyank Parmar.

ManEx Edge: Productivity Bulletin

Factory: KANDLA **Project title: UTILITY COST SAVINGS** **Cost savings: .287 INR Cr**

Project description: At Kandla exports plant, team has reduced utility cost/ ton by 18% and GJ/ton by 14% b/w 2023 and 2024. The team have always tried to keep the utility cost under control and have worked around various solution. Some of the recent continuous Improvement projects are -

- Implementation of FC+ fans with VFD in AHU by replacing old conventional fan **452 GJ./11 INR Cr**
- Implementation of Auto tube cleaning system(ATCS) in Chiller for condenser tube cleaning in auto mode **468 GJ./043 INR Cr**
- Implementation of High energy efficient, High strength, E-glass epoxy FRP Fan in Cooling tower. Savings delivered **216 GJ./054 INR Cr**
- Reduction in compressed air consumption by optimizing compressed air at distribution by analysing through EMS- **324 GJ./08 INR Cr**

Benefits:

- Total Savings (INR CR) : .287
- Direct (INR Cr) : .287
- Indirect (INR Cr) : 1460
- Energy(GJ) : 1460

Replication potential: Across all the sites where Cooling tower, Chiller, AHU and compressed air is used.

Utility cost(INR/Ton) & GJ/Ton:

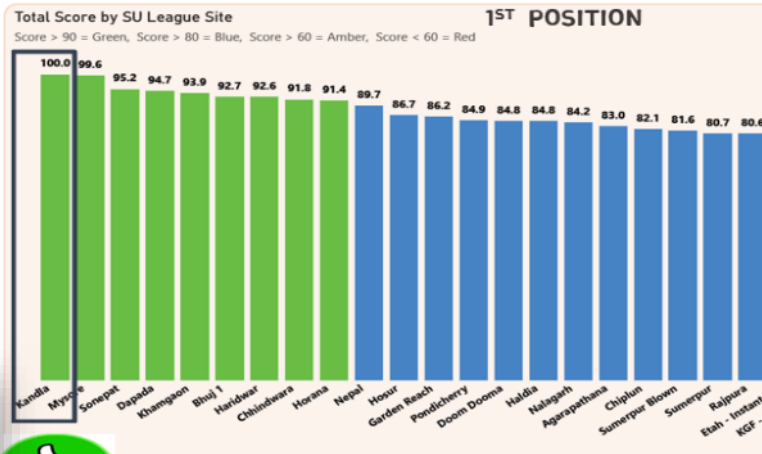
1983: Utility cost 1.185, GJ/Ton 1.26

2024: Utility cost 0.898, GJ/Ton 1.09

Kandla – AMONGST TOP SITES – SA Factory League YTD June

Comprising of Holistic manufacturing performance metrics converted into one comparative table

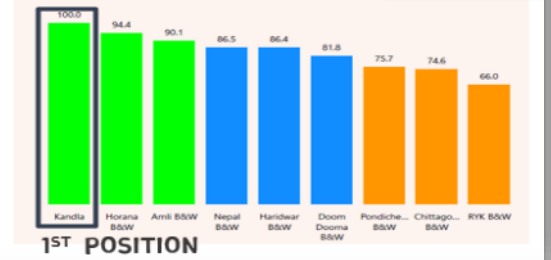
South Asia – Overall League



South Asia – Cost League



Total Score – Beauty & Wellbeing



Agile Site With Evolving Portfolio

2 new automated lines installed for the first time, capacity to 23K

2023: Winner-SMED 2.0, Best Digital Kaizen - BGKC '23, GOLD AWARD-FICCI, Apex Award- IMEXI

2022: GOLD Award in Environment MGT By Grow-care India, Green Tech Gold award in exports

2021: SA SC AWARD for BEST FACTORY

2020: Project Phoenix

2018: Oral Portfolio Discontinued, 3 plants consolidated into FICCI Quality Excellence Gold Award

2013: FICCI Quality Excellence Gold Award

2013: Liquid detergents for Malaysia

2013: Earthquake hit the region and rice unit stopped

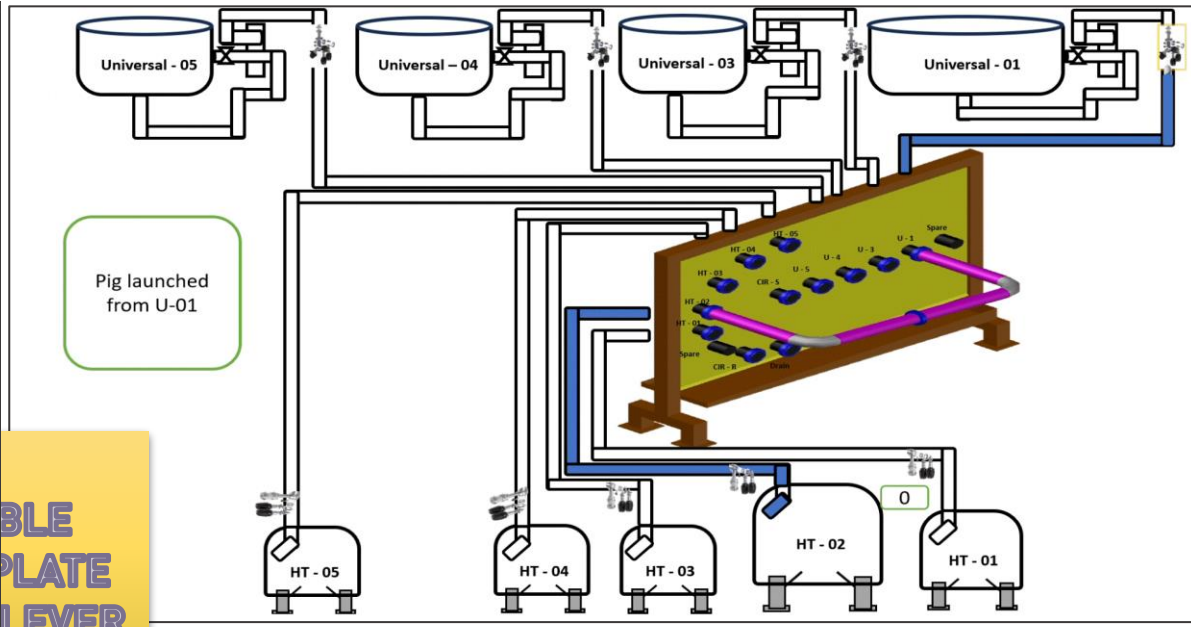
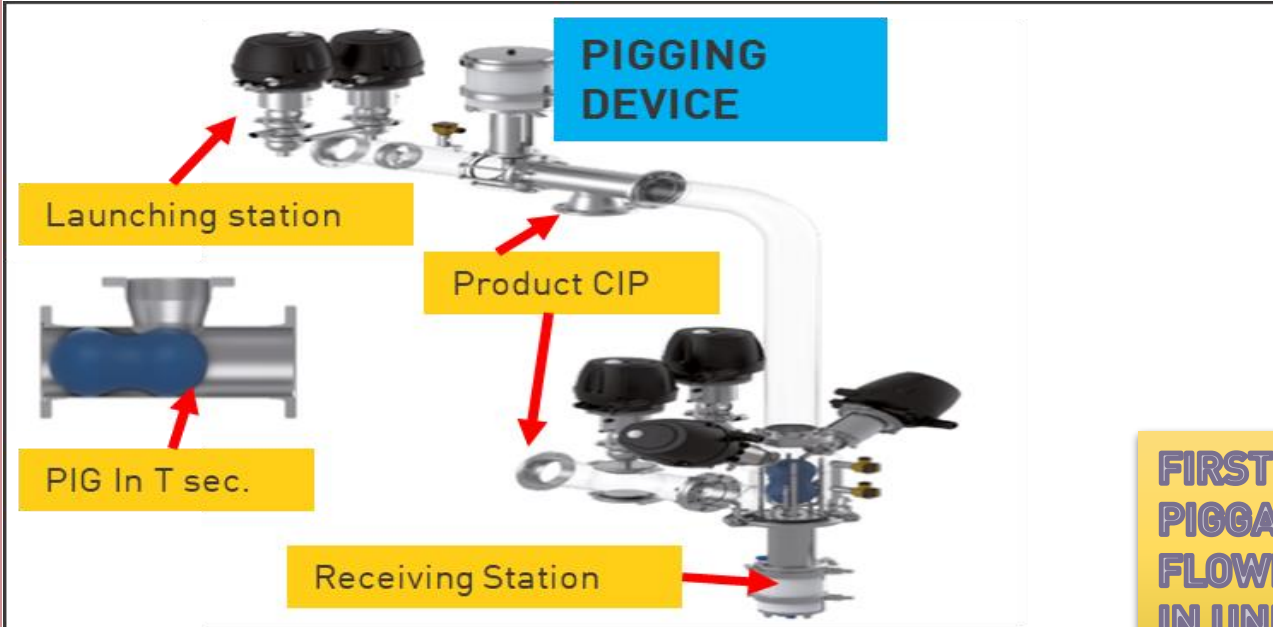
2002: Voluntary retirement of 180 FTCs and remaining 300 made permanent

1995: Manufacturing of Hair OIL, Sunsilk Hair Cream, VPJ

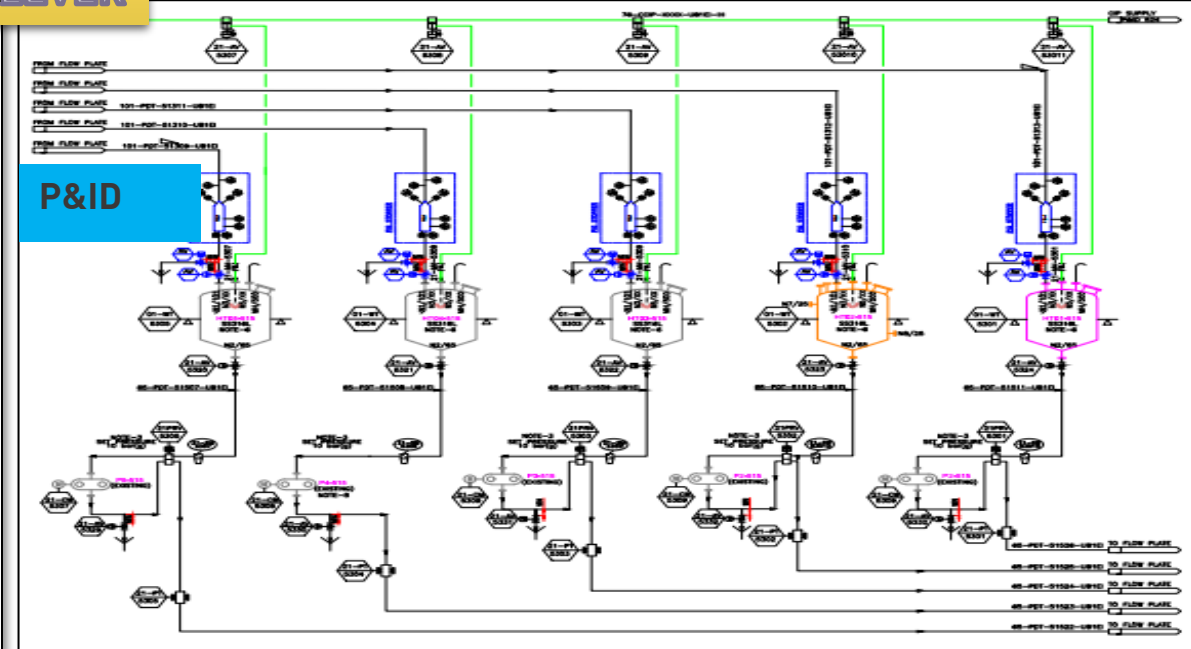
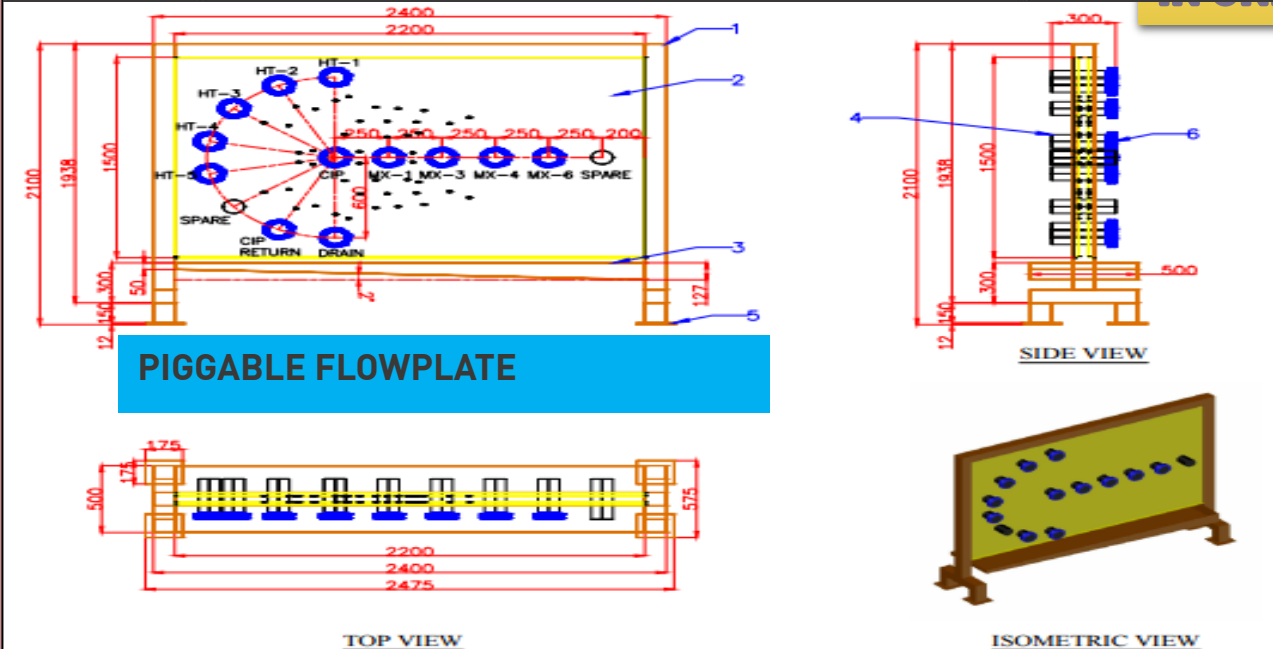
1988: Transformed to making lipsticks, perfumes, eye liners and Daida Ghee

1983: Factory Started with production of Oral and FAL portfolio

PIGGING THROUGH CUSTOMIZE PIGGABLE FLOW PLATE



FIRST PIGGABLE FLOWPLATE IN UNILEVER

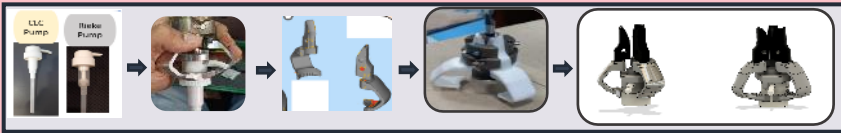


3D MODELLING PRINTING IN MANUFACTURING SPACE: INDUSTRY 4.0

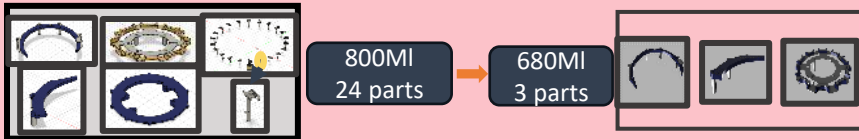


3D printing and reverse Engg. to create Universal Change Parts

- Universal Jaw Claw Design Standardization for all 90% pumps.



- Harmonization of Common change parts by 60%.



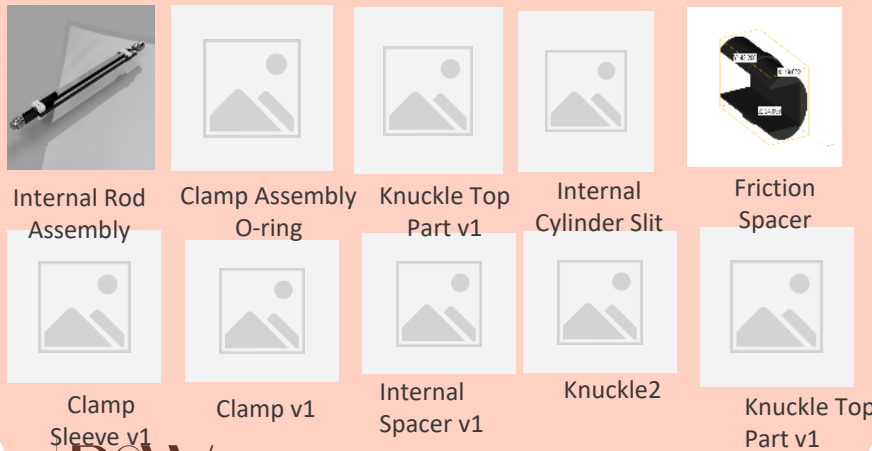
- Height adjustable Jaw design for all pumps/caps.



Savings: 33K Euro per innovation

Spare Part Redesign

- Critical part Redesigning using 3D modelling resulting Spare part cost reduction and lead time reduction

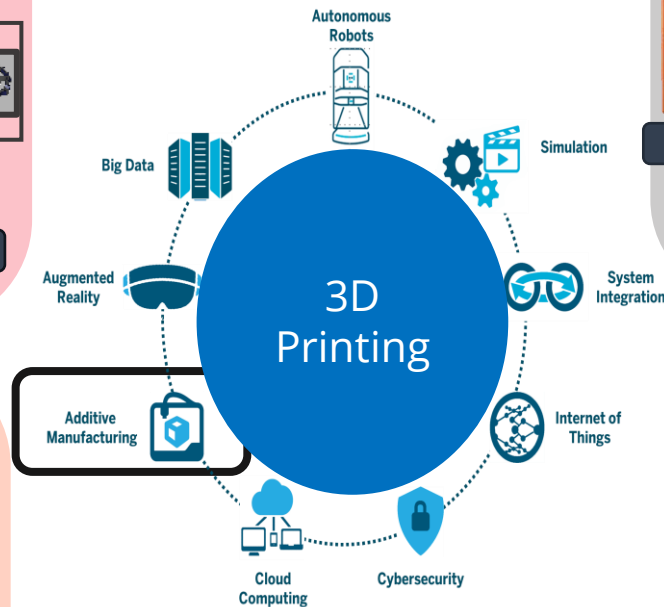


Savings: 21K Euro

SMED



Innovation



Spare Part Redesign

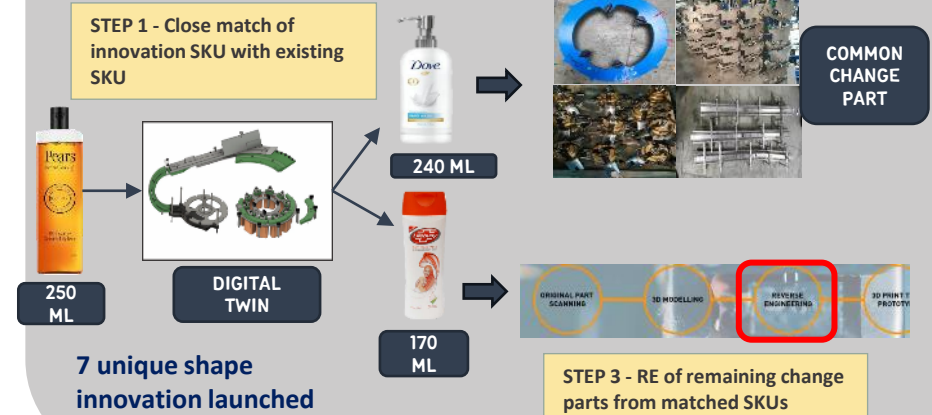


Multiformat Flexibility



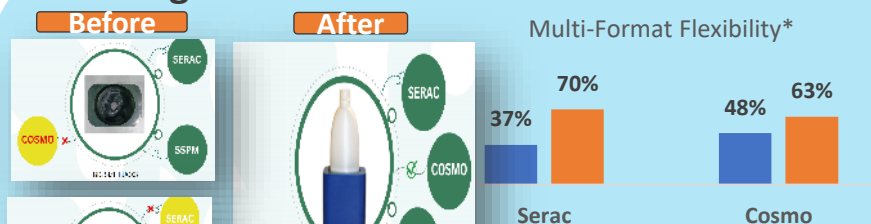
Faster Innovation in Bottle Line

STEP 2 - Max common change parts can be used from matched existing SKU)



Savings: 80 K Euro, 50% LTFN Reduction

Providing MFF to all bottle lines to run all SKU's



- Multiformat flexibility through puck standardization by 3D modeling and RE.
- Elimination of skill dependency on line specific operator..



Savings: Depn. cost avoidance 50K Euro

*Multiformat Flexibility is measured as a ratio of packs which can be produced and total formats that exists



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THANK



Unilever