Welcome

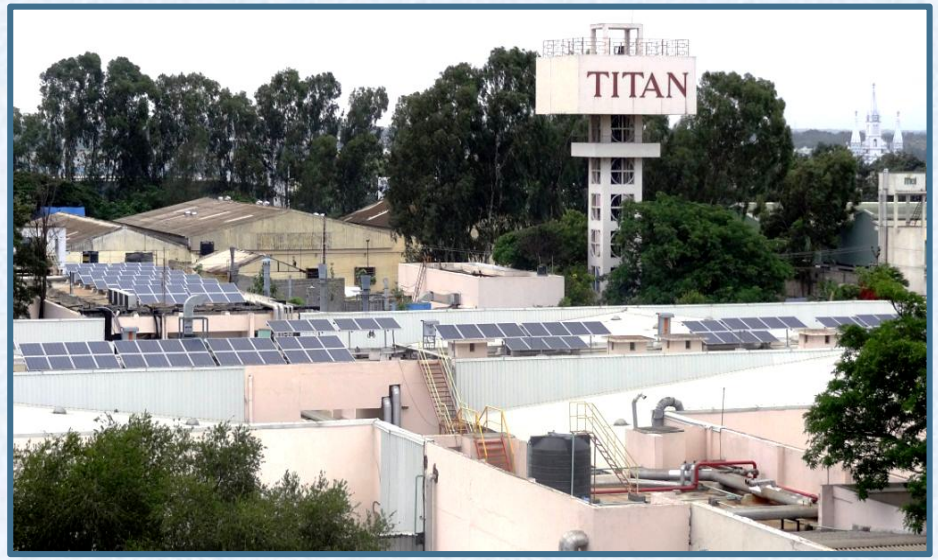
CII National Award for

Excellence in Energy Management 2022

Titan Company Limited

(Watches & Wearable division)

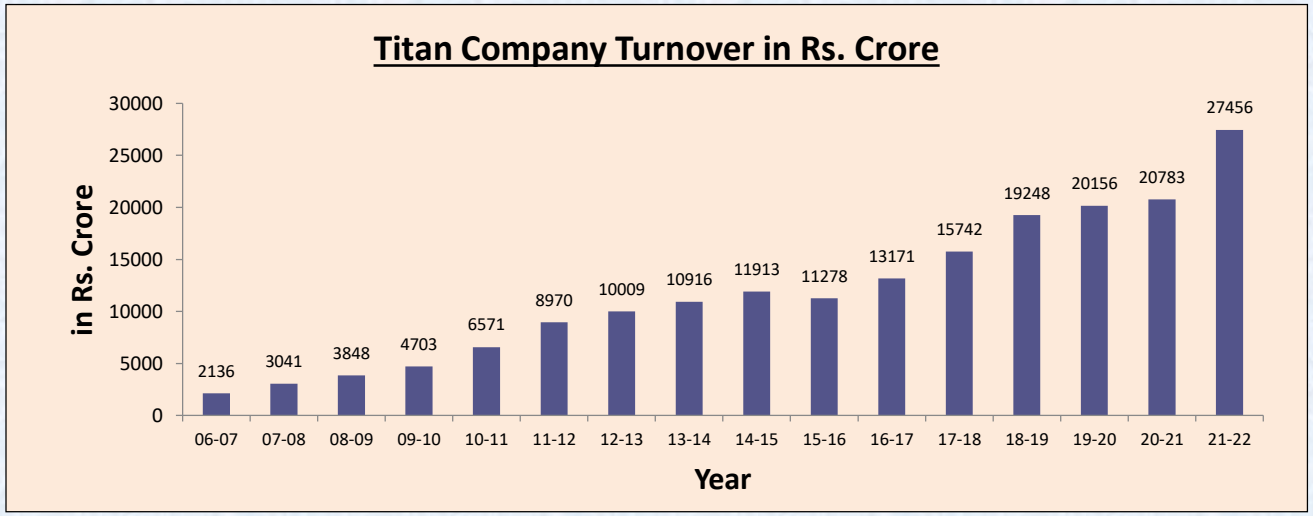
Hosur, Tamilnadu



Company Profile

Corporate office located at Electronic city, Bangalore
Watch Manufacturing located at Hosur, Tamil Nadu

- Joint venture between TATAs and TIDCO (Tamil Nadu Industrial development corporation) – started during 1984.
- Sold 150 Million watches world over and Producing 15 million watches / annum, holding 60% of organized market share in India.
- Titan is the 5th largest Integrated Own Brand watch manufacturer brand in the world.
- Exporting watches to 32 countries.
- 2 Billion Dollar company having 1,200 exclusive retail outlets covering over 220 Towns.
- 2 Exclusive Design studios, 12 Manufacturing units and 6500 + employees.



Our Products

Watches & Accessories

Jewellery

Precision Engg.

Eye Wear

Sarees

xylys SWISS MADE Brought HOME by TITAN | TITAN

fastrack | TITAN EDGE THE SLIMMEST WATCH IN THE UNIVERSE MASTER CRAFTED

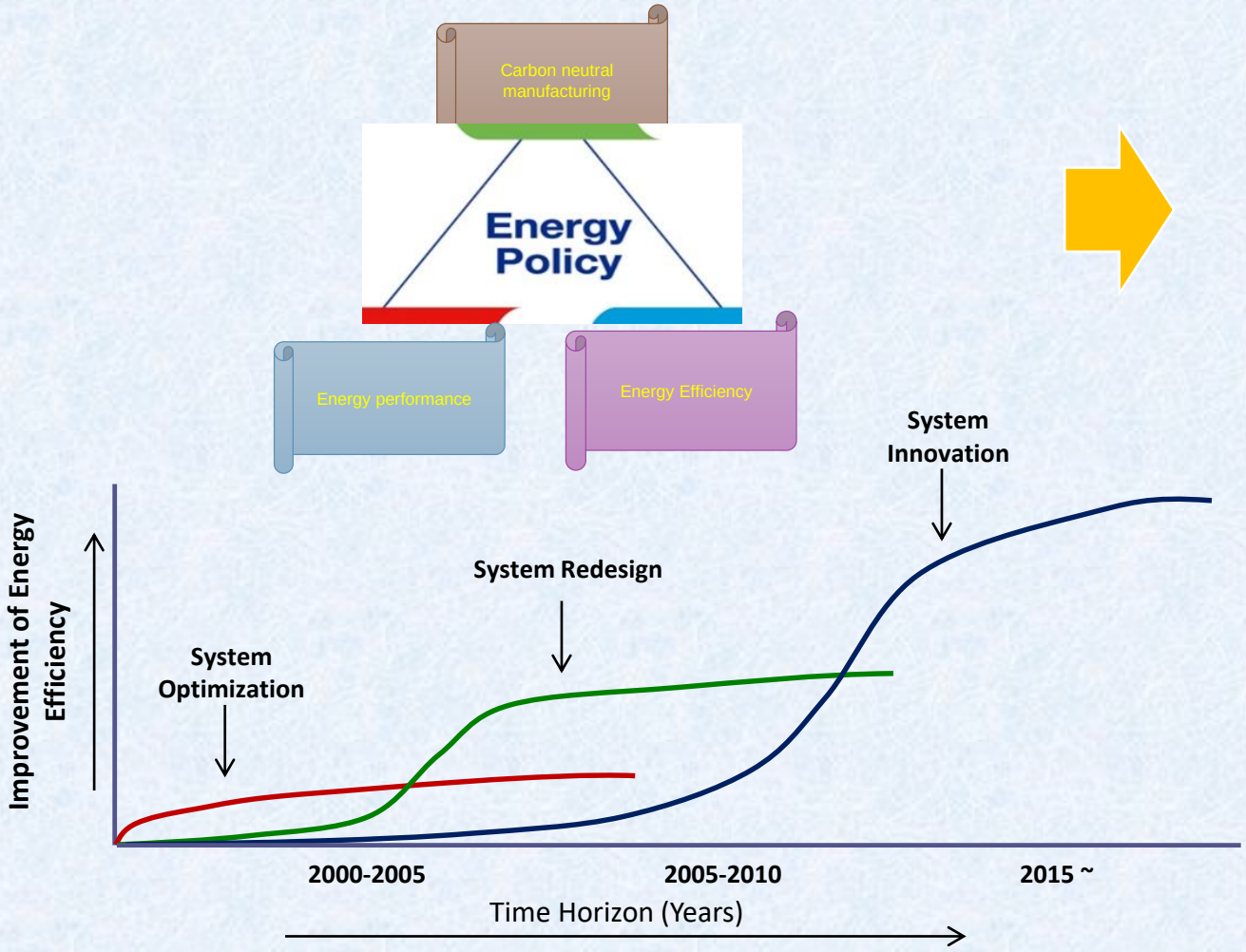
TANISHQ

TEAL TITAN ENGINEERING & AUTOMATION LIMITED

TITAN eyeplus

TANEIRA A TATA PRODUCT

Energy Management - Policy



TITAN COMPANY LIMITED

WATCHES & WEARABLES DIVISION

ENERGY POLICY

We, at TITAN – Watch manufacturing, Hosur are committed to continually improve our energy performance at in-house manufacturing activities so as to make it environmentally sustainable for the future generations.

TITAN will demonstrate the above by:

- Ensuring evaluation & review of the energy requirements and performance at the highest level.
- Providing appropriate resources to enhance the energy performance of manufacturing activities including utility services.
- Incorporating the energy performance requirements, while designing the manufacturing processes and procurement of energy products & services.
- Complying with applicable legal & other requirements.
- Harnessing Renewable Energy Resources wherever feasible, to reduce Carbon / Green House Gas emissions.
- Communicating the policy and importance of energy management to all personnel in watch manufacturing, Hosur, and to the interested parties as appropriate.

..sd..
Chief Manufacturing Officer
Watches & Wearables Division
January' 2021

Energy Management Team

Group Manager - Projects, Civil & Engineering services

Senior Manager - Engineering services

Asst. Manager - Engineering services

Senior Engineers & Engineers

Operating team

Energy Management - Approach

Pursue energy conservation initiatives
- In-house experience
- External expertise

Maximize the renewable energy substitution
- Wind energy
- Solar energy

Minimize the impact on Environment – CO2 emission reduction

Systems and procedures to sustain – EnMS ISO 50001

GreenCO Certified - Silver
IGBC certification – In progress

Energy efficiency

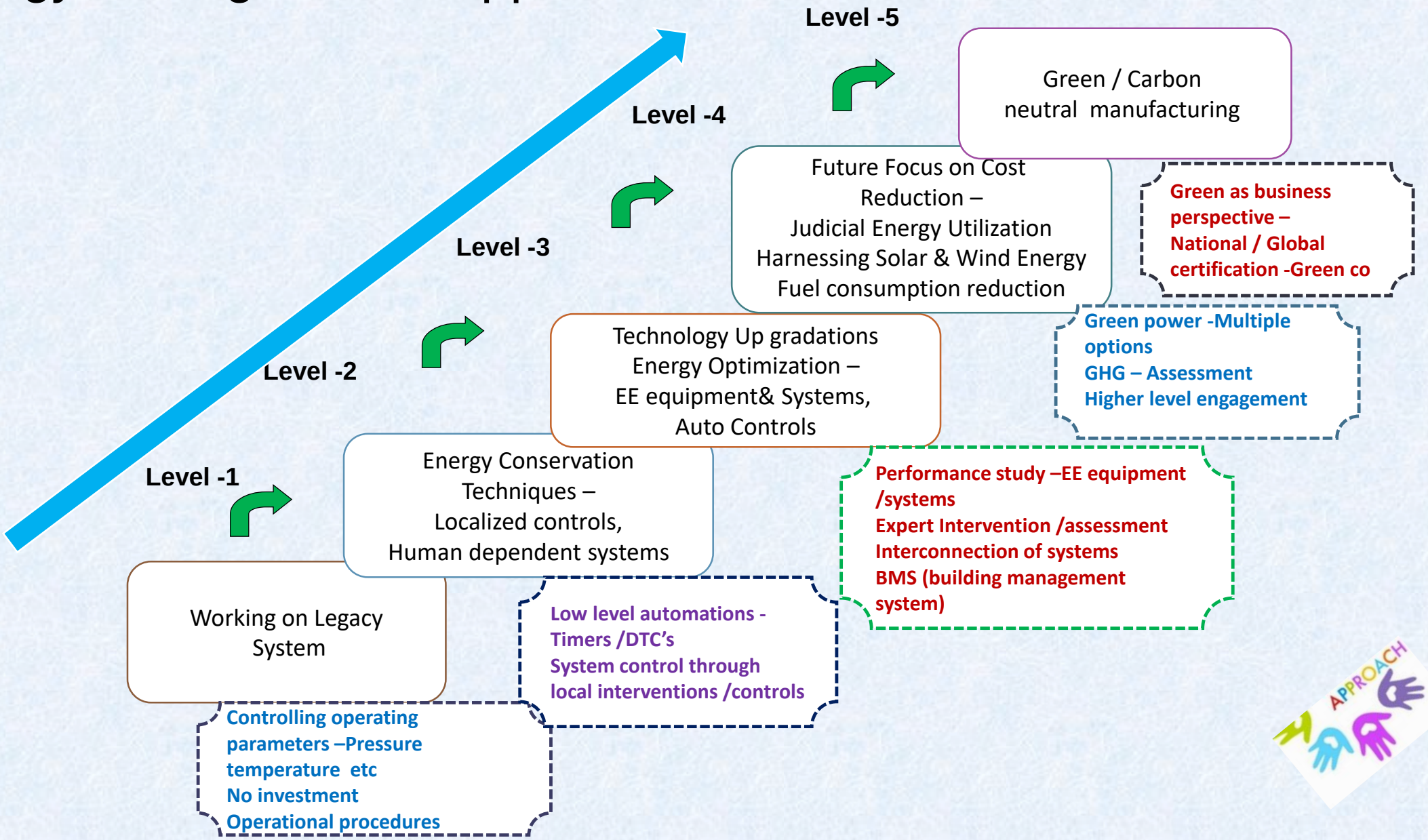
Technology scanning

Continuous assements – In-house / External

Evaluations & Pilot / Trials

Training / Rewards & Recognition

Energy Management - Approach Ladder



Energy Management - Reviews

Mid course correction based on the review outcome

Initiative review	Monthly - With the SMT
	Review of the projects / Outcomes of internal audits on EnMS
Monthly reports	Monthly - Unit head and to Plant head
	Reports covering all aspects of energy consumption / conservation
Weekly production meeting	Monthly - Sharing to plant head / unit heads
	New projects progress
Daily review	Department meeting
	Project progress / Energy consumption

EnMS – Internal audits / review

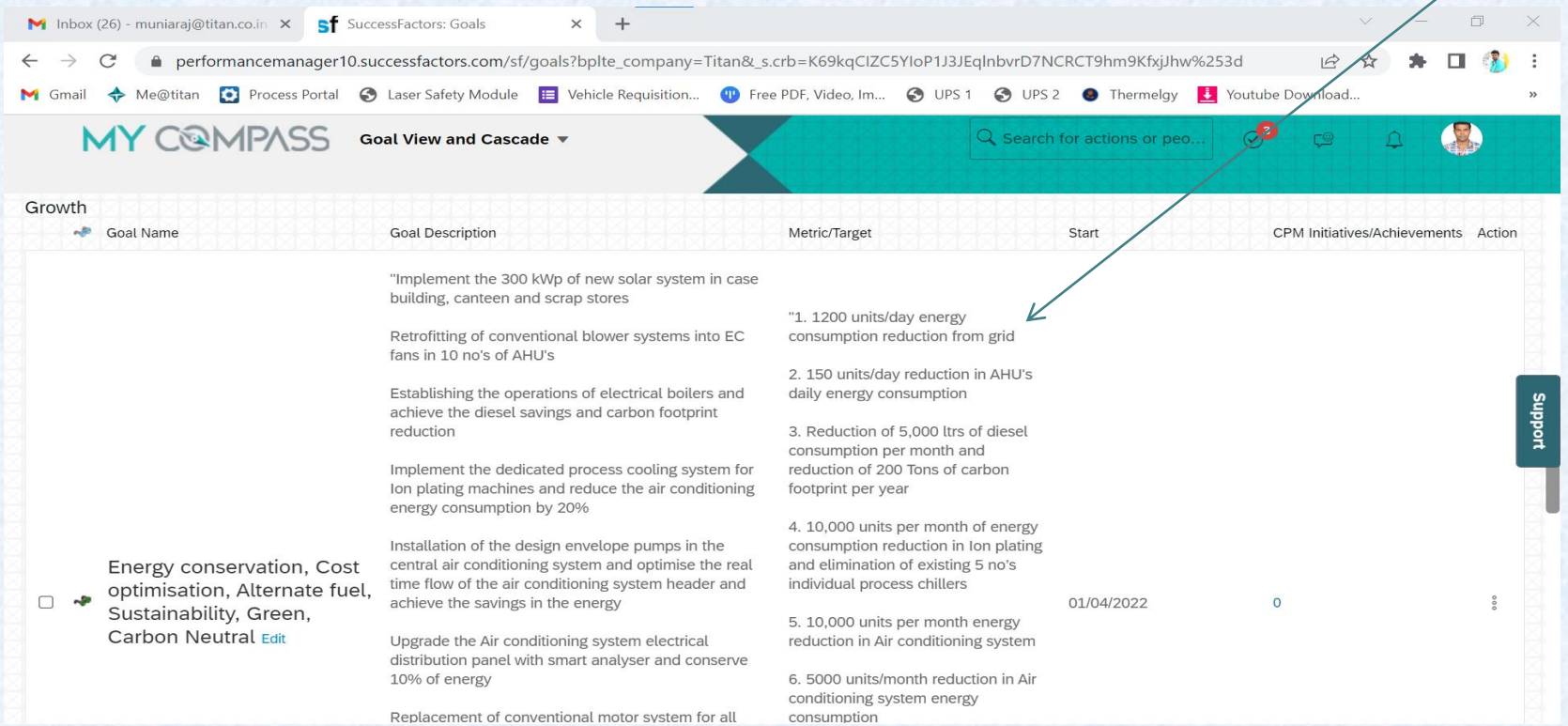
Sharing of information to operating team

Energy Management – KRA linkage

Energy conservation / Improvement is part of KRA and specific weightage is allocated

Results / Savings through the projects are captured under the head of ASPIRE

Department level KRA - ABIP & Individual KRA is linked with this ABIP



Energy Management – Employee Involvement

Employee Involvement & Capacity building

- Employee participation
- Training programmes
- Rewards and recognition
- Employee suggestion

- Energy conservation techniques - Programme by external agencies for our employees
- Participation in external seminars on Energy efficiency / ENCON conducted by M/s CII
- Energy conservation programmes – Organized by Hosur Industries association

Idea + , Inviting suggestions / SGA 's and Emails from individuals

Awareness messages to employees from SMT / Display of energy efficient gadgets through vendors

Energy Monitoring

ON line monitoring system connected across load centres - 100 + Multi function energy meters

Real time monitoring

Demand management

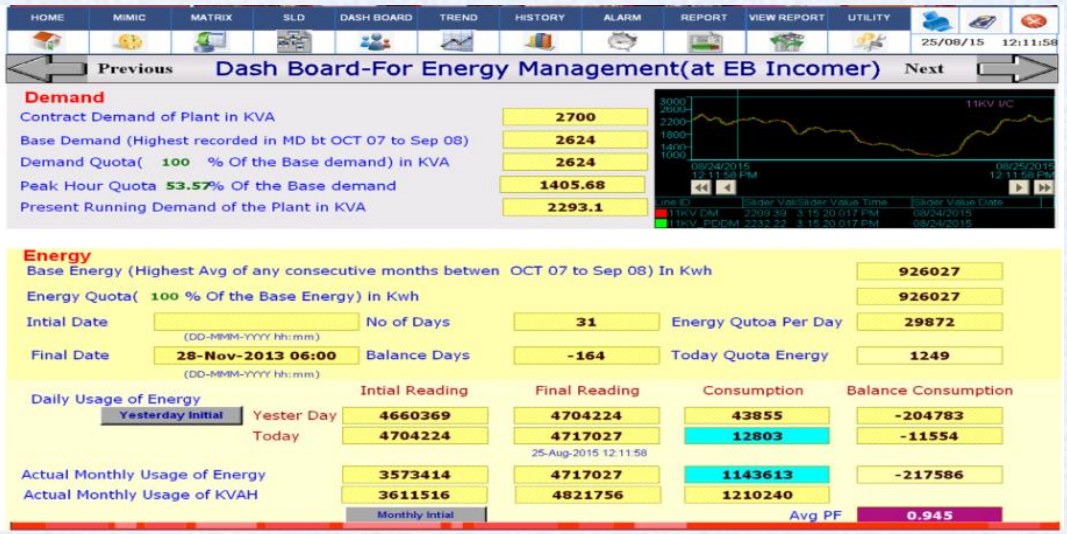
Energy consumption reports – Customized

Data analysis / history

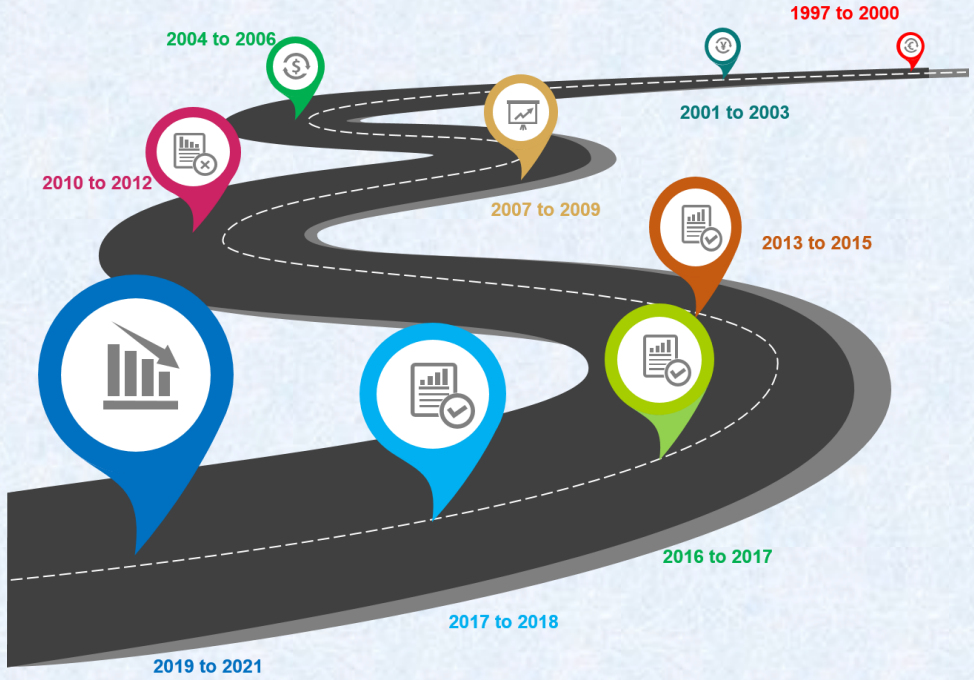
ENERGY INTENSIVE

Energy monitoring for top energy consuming equipment – Chillers / Air compressors / presses and PVD Equipment

SLD
Daily reporting
ON line trend
History



Energy Conservation - Initiatives Summary



Timer based operation control installed in AHU's - Phase 1	1996
Ceiling lamps copper chokes converted into electronic ballasts - Phase 1 (200 lamps)	1997
Lower head pumps installed for AC chilled water circulation pumps	1997
Timer based operation control installed in AHU's - Phase 2	1997
Star delta star converters installed for lightly loaded motors in shop floors and utilities	1997
Ceiling lamps replaced from HPMV to Metal halide lamps @ case press shop	1998
Ceiling lamps copper chokes are converted into electronic ballasts - Phase 2 (1000 lamps)	1998
Centralized AC system automated by introduced temperature controllers - Phase 1 (AHU's)	1998
AHUs automation in BMS installed by Tata Honeywell System - Phase 1	1998
Centralized AC system automated by introduced temperature controllers in service building (3 no's of 95 TR plants)	1998
Servo Stabilizer installed in Euro watch lighting system	1999
Ceiling lamps copper chokes are converted into electronic ballasts - Phase 3 (1450 lamps)	1999
Ceiling lamps copper chokes are converted into electronic ballasts - Phase 4 (250 lamps)	1999
Refrigerated air drier replaced with conventional desiccant air drier - Phase 1 (Module)	1999
Flat belt replaced in place of " V "belt in Air compressors	1999
Optimized the pump capacity for Air compressor cooling system	1999
Process water pumps capacity analyzed and replaced with optimum capacity pumps	1999
Steafa three way controller valve installed in AHU chilled water line to control the room temperature - Phase 1 (Module)	1999
Capacitors upgraded in Automatic capacitor panels in LT room & Euro basement	1999

400+ Significant projects implemented

65 Sub system categories

Screw air compressors installed at Module building	2007
Boosters installed at shop floors for machine's operating at 6.0 bar	2007
Wind Energy procurement - Phase 1 (3 x 250 kW)	2007
Reciprocating pumps replaced with rotary vacuum pumps - Phase 4	2007
Reciprocating pumps replaced with rotary vacuum pumps - Phase 5	2007
Replacement of Energy efficient transformer - Phase 1	2007
Overall plant power factor improved from 0.97 to 0.99	2008
Reverse Osmosis system III installed	2008
SCADA system installed for compressors operation	2009
Wind Energy procurement - Phase 2 (2 x 1.5 MW)	2009
Used ISOPAR-H mixed with diesel and utilized as Boiler fuel	2009

Street light fittings replaced with EGP mirror optic fittings	2010
PHE system upgraded in central air conditioning system	2010
Conventional pumps replaced with energy efficient pumps	2010
Waste heat recovery system installed	2010
Installed Thermal Energy Storage system - Phase 1	2011
Free cooling system installed - Phase 1 (Admin)	2011
Solar steam generation system installed in Canteen	2011
De-Super heating system installed	2011
LED lightings replaced in place of fluorescent lamps - Phase 1	2012
LED lightings replaced in place of fluorescent lamps - Phase 2	2012
VFD installed for primary chilled water pumps	2012
VFD installed for primary cooling tower pumps	2012
Fresh air fan blades replaced from aluminum to FRP material	2012
Thermal Energy Storage system installed - Phase 2	2012
Solar light pipes installed - Phase 1 (Module)	2012
Reverse Osmosis System IV upgraded	2012
Resonator installed in DG fuel lines	2012
Centrifuge system installed at MES in ETP	2012

40W ceiling lamps replaced with 11W CFL lamps	2000
Single tube silver shield reflector fittings	2000
Lighting energy saver- 330 KVA energy efficient transformer	2000
electronic ballasts - Phase 5 (500 lamps)	2000
Zero air loss auto drain valves	2000
Steafa three way controller valve installed	2000
Temperature controller based automation	2000
ECOMESH cooling system installed for Dx plants	2000
Ion plating Dx plant system automated with temperature control	2000
AHUs automation in BMS installed	2000
Lighting energy saver- 105 KVA energy efficient transformer	2001
Single tube silver shield reflector fittings	2001
Refrigerated air drier - Phase 2 (Euro)	2001
Refrigerated air drier - Phase 3 (shop floors)	2001
Energy efficient motor 45 KW installed i	2001
Quick star push- in-fittings with polyurethane hoses	2001
Energy efficient motor 45 KW was installed Phase 2	2001
Intermediate controller installed compressed air system	2001
Installed Transvector nozzles for Air guns - Phase 1	2001
PLC based automation done in Jig boring section air conditioning	2001
Operation automation done in service building A/C plant 3	2001
Kitchen exhaust blowers V belt converted into flat belt	2001
Single tube silver shield reflector fittings - Phase 3 (250 no's)	2002
Auto temperature cut off system installed in AHU's - Phase 1	2002
Auto temperature cut off system installed in AHU's - Phase 2	2002
Temperature controller installed for air compressors cooling tower	2002
Single tube silver shield reflector fittings - Phase 4 (500 no's)	2003
Air condition leakage eliminated in corridor areas	2003
Canteen boiler combustion efficiency increased	2003
Vermicomposting system installed	2003

T8 light fittings into T5 light fittings in case press shop	2004
Operation automation done in service building A/C plant 1	2004
Chilled water cooling system replaced for hydraulic press	2004
Three way controller valve installed in PWS - Phase 1	2004
Raw water pump capacity optimized	2004
Sewage Treated water utilized for cooling tower make up purpose	2004
Dew point temperature settings optimized in compressed air dryer	2005
Screw air compressors installed at Euro building	2005
Installed Transvector nozzles for Air guns - Phase 2	2005
Energy efficient multistage pump installed for air compressors	2005
Star/Delta/Star converter installed for AHU's - Phase 1	2005
Auto Room temperature control system installed for Extn. Area.	2005
Star/Delta/Star converter installed for AHU's - Phase 2	2005
Reciprocating chillers replaced with Screw chillers - Phase 1	2005
Reciprocating chillers replaced with Screw chillers - Phase 2	2005
Three way controller valve installed in PWS - Phase 2	2005
Reciprocating pumps replaced with rotary vacuum pumps - Phase 1	2005
Reciprocating pumps replaced with rotary vacuum pumps - Phase 2	2005
Canteen kitchen exhaust blowers V belt converted into flat belt	2005
Polishing blower system 'A" capacity optimized	2005
Vertical multistage pump installed for OHT raw water pumping	2005
Solenoid valves installed for compressed air lines of bar feeders	2006
Reciprocating chillers replaced with Screw chillers - Phase 3	2006
Reciprocating pumps replaced with rotary vacuum pumps - Phase 2	2006
Energy efficient blower fans installed for AHU's in Module	2006
Float based auto water pumping system installed	2006
Zero Discharge plant installed at ETP	2006
TCE usage eliminated from all shop floor	2006

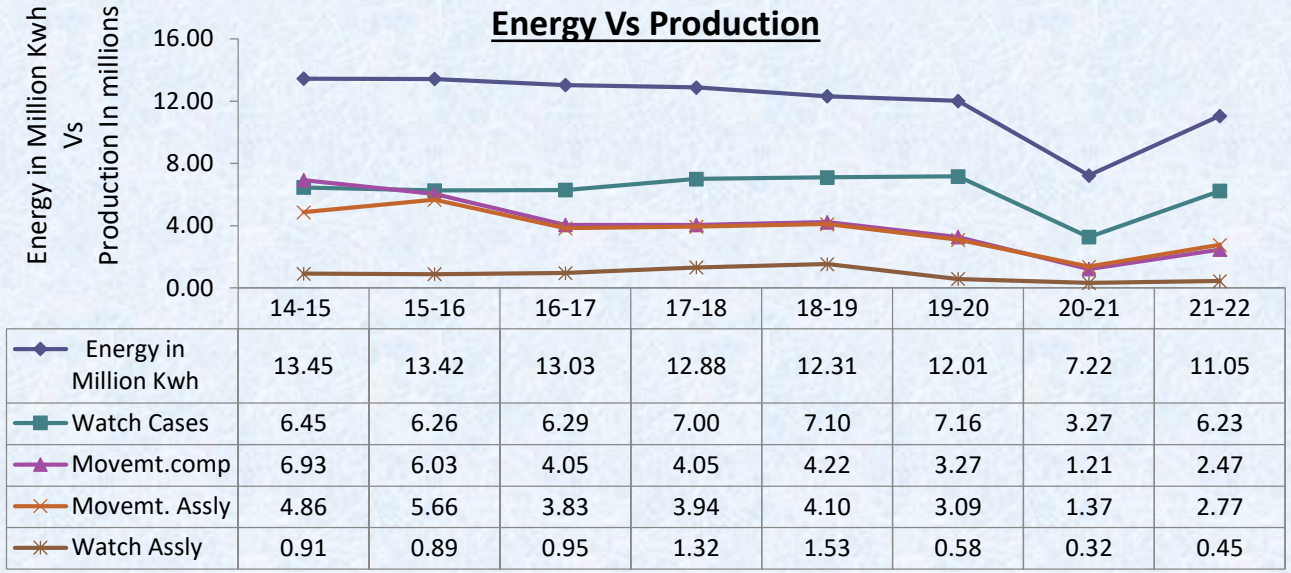
Designer light fittings & path way light fittings replaced with LED	2017
Induction lightings replaced in place of fluorescent lamps - Phase 1	2017
Installed Automatic shut off valves for compressed air system	2017
Euro & Case side AHU motors converted into IE3 motors	2017
Process improvements done in Air conditioning system	2017
Flow meters installed for screw chillers	2017
Flow meters installed for cooling towers & brine chillers	2017
Process water system integrated with BMS - Phase 1	2017
ATCS - Installed Automatic Tube cleaning system for chiller 2&3	2017
Transformer loss eliminated during Holidays	2017
New fuel efficiency boiler installed for MVR operation	2017
Production shop floors energy tracking system introduced	2017
Foodie machine installed for converting the food wastes into manure	2017
Cyanide consumption mitigated in recovery process	2017
Acid consumption reduced in case press shop department	2017
Canteen tumbler / utensil wash sink revamped	2017
20 watts task lamps replaced with LED	2018
Energy efficient air guns replaced to conventional air guns - Phase 1	2018
Automatic shut off valves integrated with BMS	2018
Flow meters installed for compressed air lines - Phase 1	2018
Separate air compressor installed for case assembly	2018
Installed Energy valves @ Main assembly AHUs chilled water lines	2018
Installed Energy efficient chiller at plant room	2018
Chilled water pumps VFD frequency optimized	2018
Performance study conducted in central air conditioning system	2018
Screw chillers performance monitoring system implemented to BMS	2018
Process water system integrated with BMS - Phase 2	2018
Conventional RH control system into thyristor based RH system	2018
Toolroom conventional Dx plant system upgraded	2018
EC fans are installed to reduce the AHU's energy consumption	2018
Case polishing exhaust system motors converted into IE3 motors	2018
Case RO plant replaced and capacity reduced	2018
LPG system re-modified in canteen for reduction of LPG consumption	2018
Foodie machine installed for converting the food wastes into manur	2018
High pressure pump installed at Canteen plate wash area	2018

Energy efficient air guns replaced with conventional air guns - Phase 2	2019
Energy efficient air guns replaced with conventional air guns - Phase 3	2019
Flow meters installed for compressed air lines - Phase 2	2019
Brushless DC Motor installed for Case assembly AHU	2019
Balancing valves installed for chilled water header lines @ Module	2019
Cooling tower TR Online monitoring integrated with BMS	2019
Energy valves installed @ Module AHU's	2019
Installed Scale Bio Remover system (SBR) for AC system Cooling tower	2019
Process water system integrated with BMS online monitoring - Phase 3	2019
Energy efficient stove installed in canteen	2019
Dishwasher unit installed for canteen plate washing	2019
Screw chiller 1 replaced with energy efficient chiller	2020
Online performance monitoring (ikW/TR) establishment	2020
Compressed air flow meters are installed for significant energy users	2020
Air conditioning system study has carried out	2020
Vendor energy audit 2 no's has been completed	2020
15 no's improvements in the process of A/C & compressed air system	2020
IE 3 phase 2 activity has been carried out	2020
Balancing valves installed in headers and frequency mofied	2020
AHU optimization and chiller operation optimization has been done	2021
Stepper motor AHU EC fan retrofit has been done and 22% of savings achieved	2021
ATFD system installed in CETP	2021
HVLS fans installed at case press shop	2021
Automatic doors installed at back cover press shop	2021
EnMS version upgradtion to 2018 and assessment done	2021
Process water systems, Automatic shut off valves are integrated	2021
Level controllers system are installed for thestorage tanks	2021
Live energy load display system installed in departments	2021

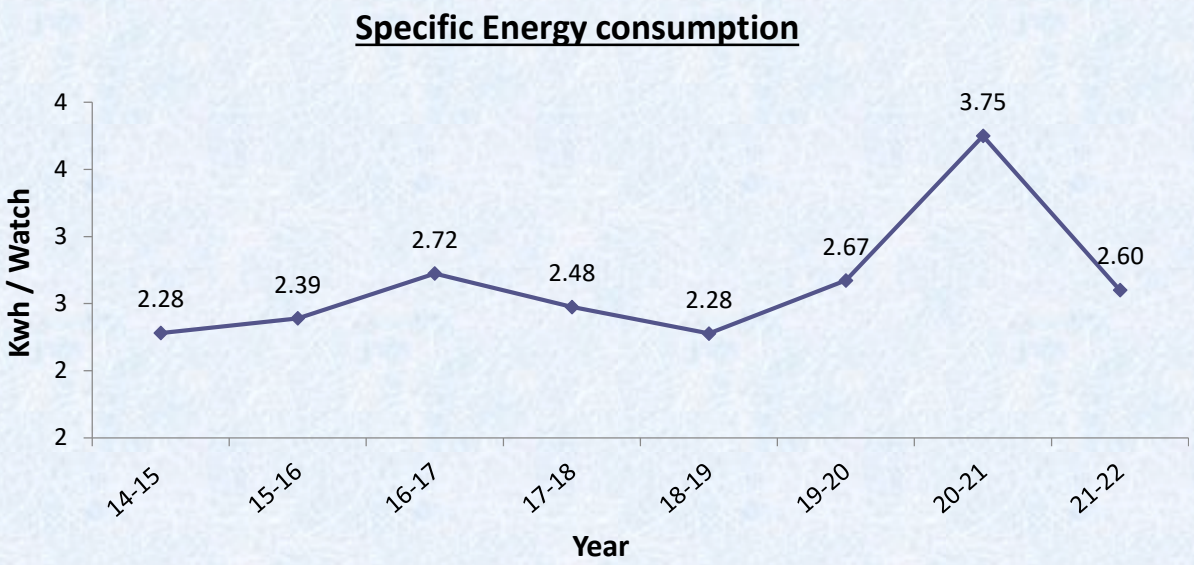
LED lightings replaced in place of fluorescent lamps - Phase 3	2013
VFD installed for primary condenser water pumps	2013
Optimization of process cooling system @ Torvac PWS	2013
Installed VFD drives for Module AHU's - Phase 1	2013
Installed Aircosaver for smaller capacity Split A/C units	2013
Installed Free cooling system in AHU - Phase 2 (Module)	2013
Solar light pipes installed - Phase 2 (Stores)	2013
4kW solar hybrid lighting installed at Admin	2013
Replacement of Energy efficient transformer - Phase 2	2013
Harmonic distortion avoided in the incoming panel	2013
Utilization of Third party power	2013
WHRS installed for CSD 122 screw air compressor	2013
LED lightings replaced in place of fluorescent lamps - Phase 4	2014
Induction lightings replaced in place of fluorescent lamps - Phase 1	2014
External air leakage audit conducted and leakages arrested	2014
Installed VFD drive system for AHU's - Phase 2 (Assembly)	2014
Installed VFD drives for AHU's - Phase 3 (Euro)	2014
Installation of Free cooling system - Phase 3 (Euro)	2014
VFD installed vacuum pumps at Stepper motor & Gears sub assy.	2014
Dedicated feeder system installed for TNEB incoming	2014
Pressure rating of scrubber water pump optimized	2014
RO system installed for oil & grease effluent treatment	2014
Fuel additive introduced for canteen boiler fuel	2014
Mechanical Vapor Recompression system installed	2014
LED lightings replaced of fluorescent lamps for street lights	2015
LED lightings replaced in place of fluorescent lamps - Phase 5	2015
Automatic lux level based lighting operation installed in Toolroom	2015
216 kW roof top solar system installed at Case p/s, Module, Admin	2015
Low level automation done in Vacuum system - Phase 1	2015
Low level automation done in Vacuum system - Phase 2	2015
MVR boiler operation optimized for fuel energy savings	2015
RO system for oil & grease effluent treatment expanded	2015
Secure land filling facility eliminated	2015

installed Occupancy sensor based lighting operation - Phase 1	2016
Centralized pressure optimized in compressed air system	2016
Process improvements implemented in compressed air system	2016
Shift based compressed air system operation introduced	2016
Efficiency based compressed air system operation introduced	2016
Module AHU motors converted into IE3 motors	2016
Air conditioning system cooling tower performance improved	2016
Installed automatic control valves in Process water systems	2016
BLDC (Brush less) motors installed for AHU @ Auto Turing	2016
Water pumping flow enhanced in cooling tower circuits	2016
Cooling tower MS lines replaced with PVC lines & SS lines	2016
Cooling tower nozzles replaced from flash type to flower type	2016
Replacement of Low energy efficient split A/C units converted	2016
ATCS - Installed Automatic Tube cleaning system @ chiller 1	2016
1.5 kW wind mill installed in Admin building	2016
Low level automation done in Vacuum - Phase 3	2016
Up flow anaerobic sludge blanket reactor installed	2016
Energy management system implemented	2016
Aerator taps installed for hand wash purpose	2016
Calendria-1 converted from Falling film to Forced circulation	2016
B22 base incandescent lamps replaced into LED lamps	2017
Installed Occupancy sensor based lighting operation - Phase 2	2017

Production & Specific Energy Consumption



	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22
Energy in Million Kwh	13.45	13.42	13.03	12.88	12.31	12.01	7.22	11.05
Watch Cases	6.45	6.26	6.29	7.00	7.10	7.16	3.27	6.23
Movemt.comp	6.93	6.03	4.05	4.05	4.22	3.27	1.21	2.47
Movemt. Assly	4.86	5.66	3.83	3.94	4.10	3.09	1.37	2.77
Watch Assly	0.91	0.89	0.95	1.32	1.53	0.58	0.32	0.45



Since the facility has 50 ~ 60% are the fixed energy, the decrease in the production will affect the specific energy consumption performance

But even 5% reduction in utility specific energy consumption even in 10% of decrease in the production, due to energy conservation activities

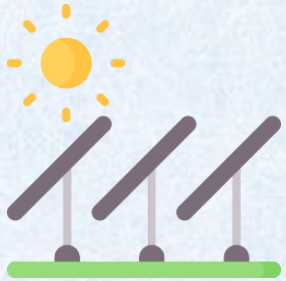
Because of the Covid pandemic, the production has been affected during 20-21 and its affected the specific energy consumption performance

Due to unavailability of similar kind of organized comparison there is no national benchmark

Green power substitution

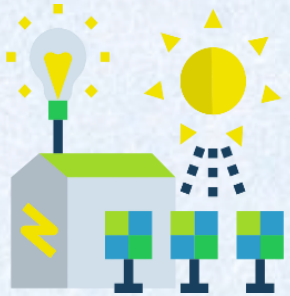
Wind Power Enhancement

- Capacity - 5.5 MW
- Annual generation 120 L kWH / annum
- Green power substitution - 83 %



Roof Top Solar System - 216 kW

- Capacity - 216 kW @ watches division , Hosur
- Annual generation – 2.5 LkWH to 3.0 LkWH
- Green power substitution of 2 %

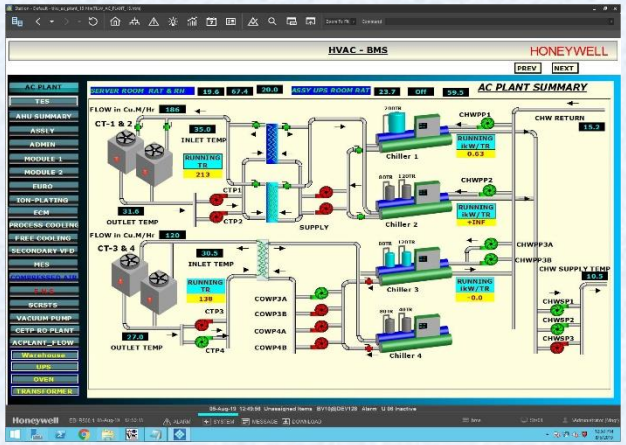


Solar Light Pipes

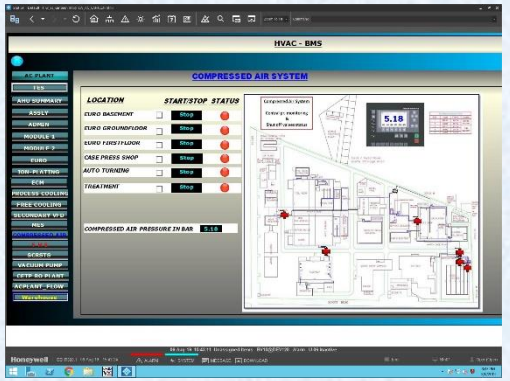
- Installed solar light pipes to harvest sun light
- Total area covered – 45000 Sq.ft –Day time lighting
- Energy saving / annum – 0.20 LkWH

Key Energy Conservation Projects 2019

- Performance monitoring & optimization of A/C system screw chillers
  - Real time performance of the chillers (iKW/ TR) can be seen & based on that it will be operated
  - Triggers immediate corrective action on parameters affecting performance –
  - Chilled water flow , Delta T , Comparison of chillers – Trend and history
  - Specific energy consumption of chiller (IkW /TR) is reduced from 0.85 to 0.67
  - Impact - Energy saving 3 LkWH /annum



- Compressed air system optimization with automatic valve control
  - Automatic shut off valves for the isolation of air supply during non working hours – 07 Nos
  - Integrated with BMS and programmed based on shift cycle – eliminates air leak and
  - Results in reduction on compressor loading



- Energy (BELIMO) valves for AHU's
  - Based on return air temperature, it restricts water flow across AHU's
  - Required flow across AHU maintains constant Delta "T "
  - Load on centralized chiller is optimized
  - Energy saving of 7 % is achieved – 0.25 L kWH

- Balancing valves for chilled water pumping system
  - Mechanical valve installed in chilled water line (headers) - 7 locations
  - One time set according to capacity of the AHU design
  - Adjusts the flow against the total A/c load on the block
  - Optimized chilled water flow -Reduction in load on chillers
  - Energy saving – 2.25 L KWH

- Scale Bio Removal (SBR) system for A/c system cooling towers
  - Removes the scale deposition
  - Avoid biological growths & Inhibits corrosion

Key Energy Conservation Projects 2020 & 2021

Energy Efficient Chillers

- Water cooled screw chillers in place of conventional chillers
- Annual energy reduction – 1.50 LkWH

IE3 Motors

- Retrofitting of energy efficient motors for AHU & Dust extraction system – 10 Nos.
- Annual energy reduction – 1.0 LkWH

VFD's (Variable frequency drive)

- Variable Frequency Drives for Air handling Units – Optime the speed
- Annual energy reduction – 0.80 LkWH

Key Energy Conservation Projects 2020 & 2021

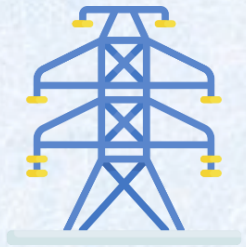
LED’s for lighting

Retrofitting of LED for shop floors & Street lighting

- No. of fittings converted - 3000 +
- Energy saving / annum – 1.80 LkWH

Energy valves for AHU’s

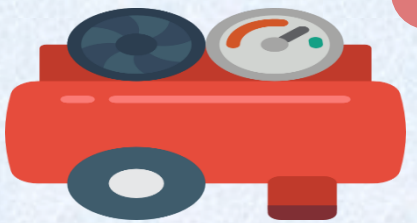
- Introduction of Energy valves & Balancing valves for A/c system
- Energy saving - 1.0 LkWH



Dedicated Power Feeder

- HT (high tension) power supply feeder to Titan
- Improved Grid power availability - 65% to 95%
- DG sets operation reduced - Reduction of diesel 1.0 lakh Litres

Key Energy Conservation Projects 2020 & 2021



Mechanical Vapor Recompressor

- System capacity - 25 KLD
- Effluent evaporation @ ETP – Improved evaporation
- Reduction of diesel consumption – 60 KL / Year

Energy efficient stoves for cooking

- Energy efficient stoves for Canteen - 04 Nos
- LPG reduction – 350 Cylinders / Year (6600 Kgs)

EC fan retrofit for AHU's

- Conventional blowers converted in to EC fans – 3 No's
- Energy saving / annum – 0.40 LkWH

Waste Management Projects

Sludge Volute Press

Waste effectively treated and converted as organic manure and given to local farmers for the agricultural purpose

- 65 Tons per month manure generation

Aerated digested sludge slurry transferred to feed chamber & entered into the flocculation zone and then thoroughly mixed with flocculation poly , sludge fully mixed with small stirrer forming bigger floc is travels by gravity to the screw body

The flow by gravity started to move from the de – watering zone to the concentration zone to get the dewatered sludge with moisture content as specified through the sludge chute. The space between movable annular plate and the fixed annular plate in the dewatering part narrower and narrower .Further pressure is exerted by the plate located on the exit of output sludge cake

Local Landlord Usage - Process

Digested Sludge From Aeration Tank

↓

Sludge Volute Press

↓

Stored in Barrel

↓

Sludge – NABL Lab Analyze

↓

Landlord Acceptance Letter/Land Documents Verification

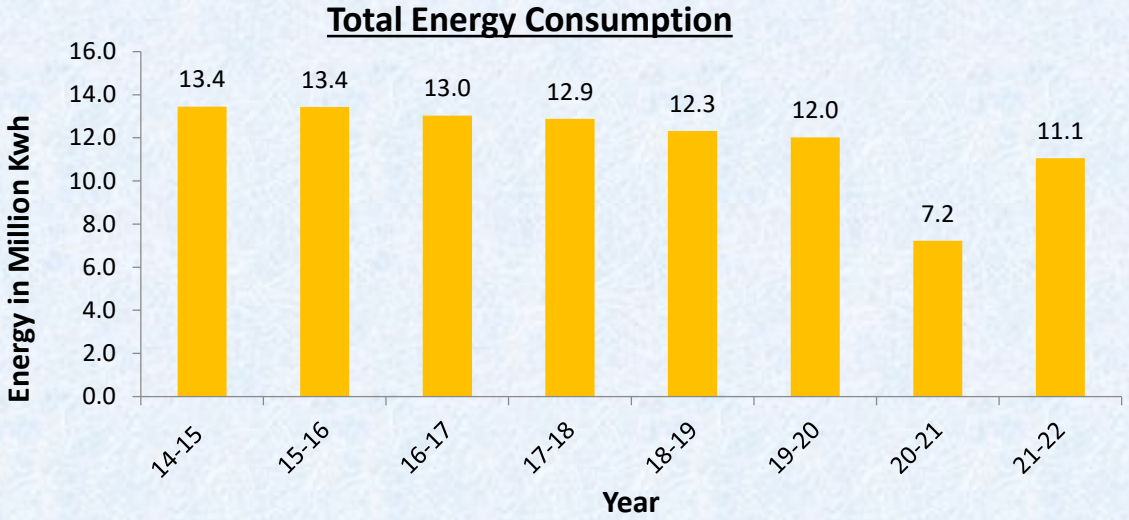
↓

Sludge Disposed to Landlord For Agriculture Purpose

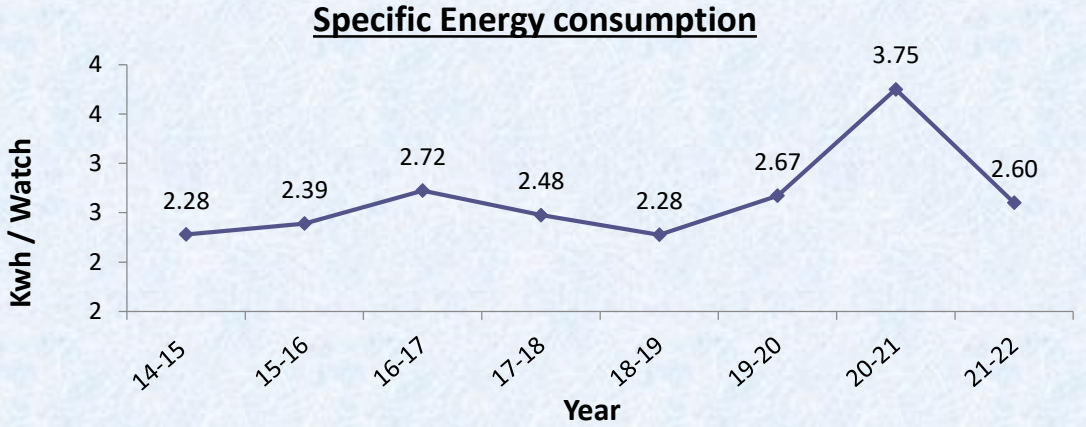
Uniqueness:

- Removal of moisture - To an extent of 80 %
- Fully automatic - continuous operation
- Quick drying
- Improved hygiene (Handling of sludge)
- Minimum water consumption – for flushing
- Very Less Power load – 0.5 KW for 3m3/Hr Capacity
- Avoid manual intervention

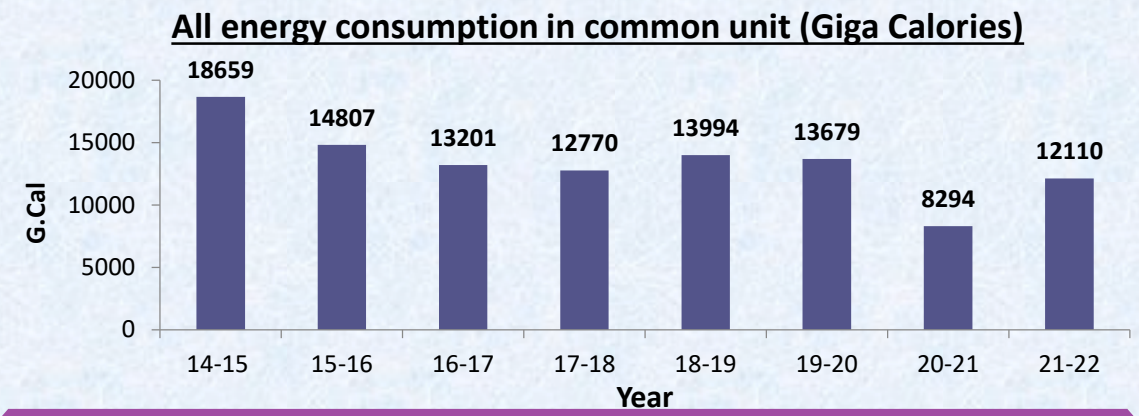
Results & Impacts



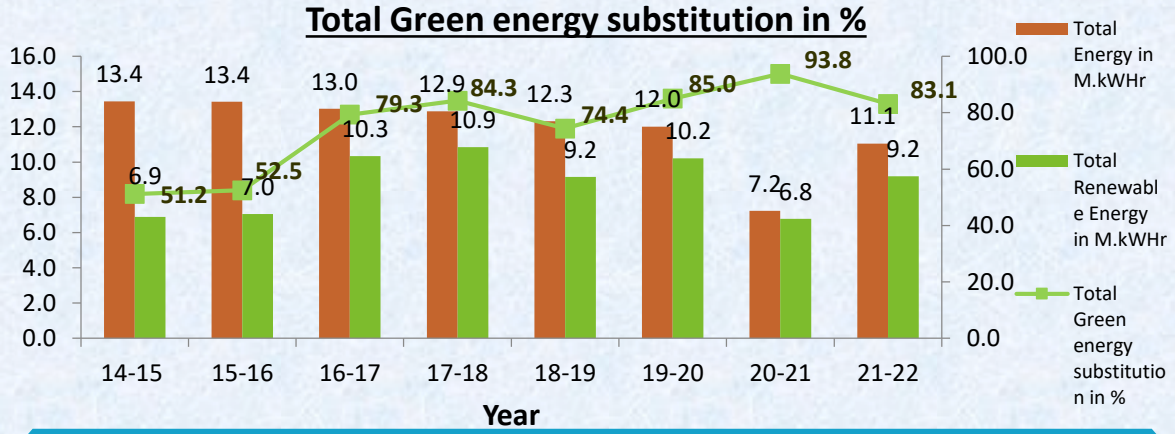
10% reduction in overall energy consumption even in spite of 20% increase in production



5% reduction in utility specific energy consumption

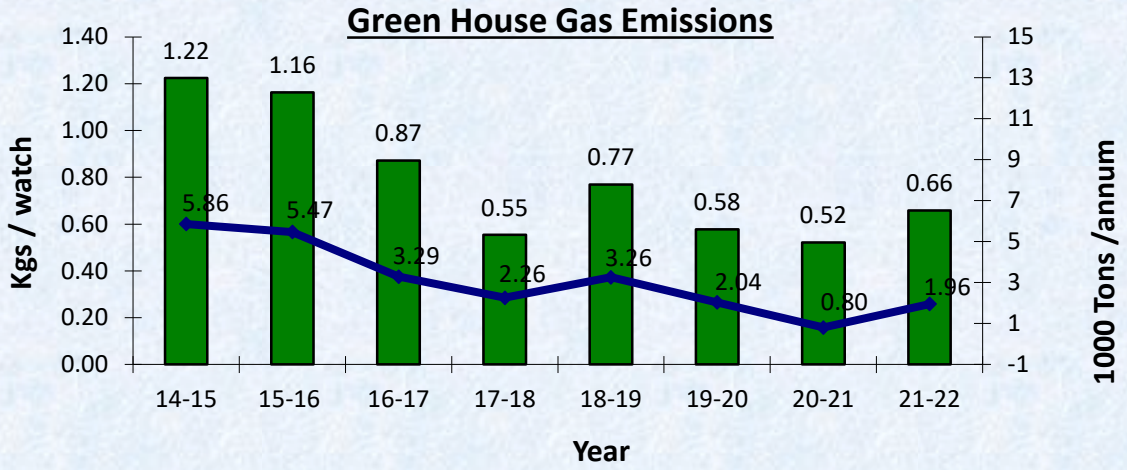


10% reduction in overall energy consumption even in spite of 20% increase in production

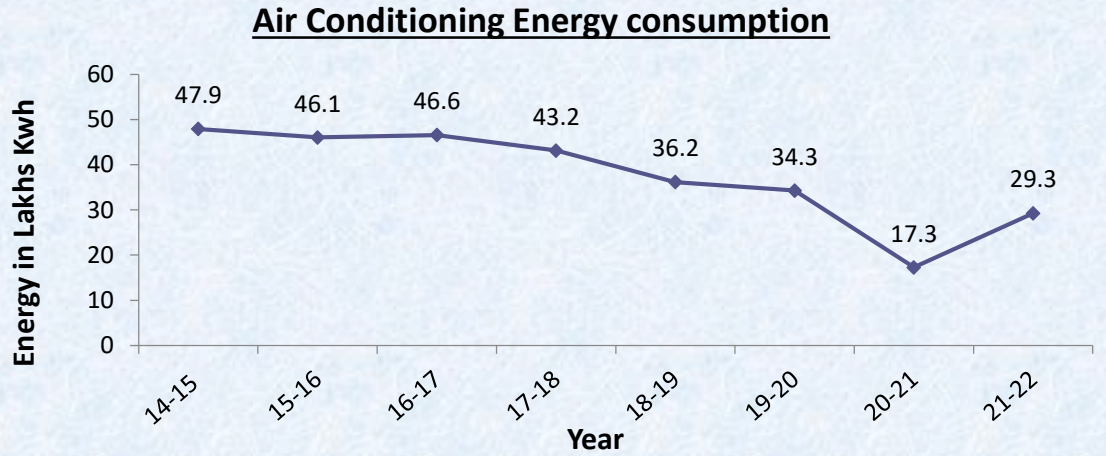


Green energy substitution from 50% to 83%, moving towards 100%

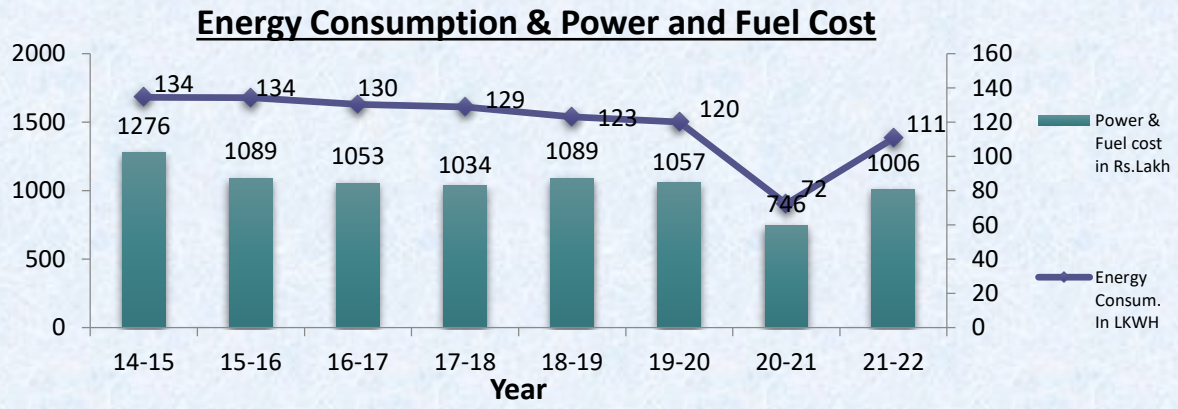
Results & Impacts



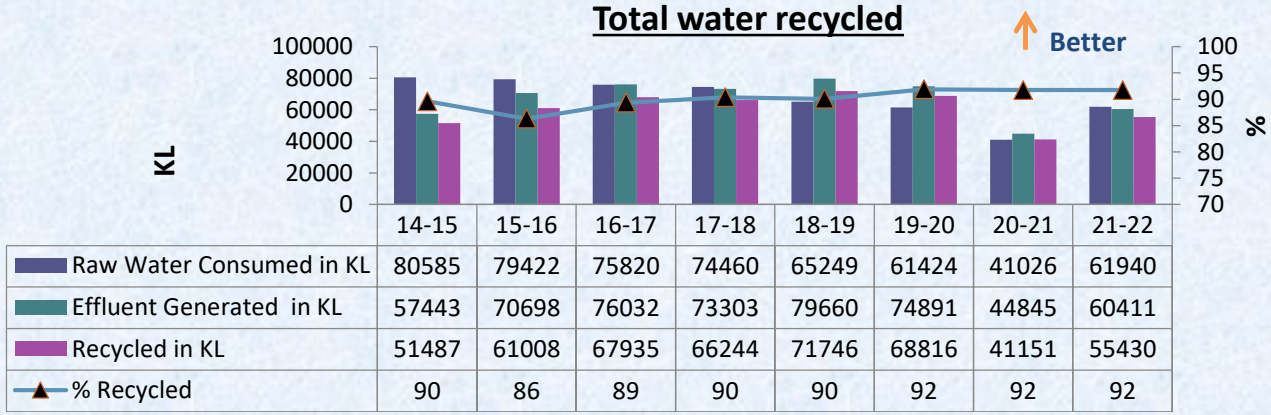
60% reduction in carbon emission
55% reduction in specific carbon emission per product



Significant improvement of Air conditioning system energy performance – 30% reduction in energy consumption



21% reduction in Fire & Fuel cost in spite of continuous tariff increase of grid power supply & Increase of diesel price



	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22
Raw Water Consumed in KL	80585	79422	75820	74460	65249	61424	41026	61940
Effluent Generated in KL	57443	70698	76032	73303	79660	74891	44845	60411
Recycled in KL	51487	61008	67935	66244	71746	68816	41151	55430
% Recycled	90	86	89	90	90	92	92	92

23% reduction in raw water consumption
More than 90% of waste water recycling

Energy Conservation Projects - 2022 (Innovative Project 1)

Electrical boilers - Green power substitution

Capex Investment	• 9.5 Lakhs
Expected Returns	• 10 lakhs/ annum
Expected IRR	• 83%
Expected Payback	• 1.2 Year

Description	UOM	Diesel fired	Electrical fired
Working hours per year		6000	6000
Diesel consumption per hour	Ltrs	13.5	0
Diesel consumption per year	Ltrs	81000	0
Connected electrical load in kW	kW	2	130
Electrical consumption per year in kWHr	kWHr	12000	780000
Diesel price per ltr	Rs.	80.0	
Energy cost per kWHr	Rs.	7	
Total running cost / year	Lakh Rs.	65.6	54.6
Expected savings / year	Lakh Rs.	11.0	
Investment of Electrical boiler	Lakh Rs.	9.0	
Expected ROI	Months	9.8	
Expected carbon emission abatement / year	Tonns of CO2	214	

Diesel reduction

- 81000 Liters / annum

Reduction in carbon foot print

- 200Tons / Annum

Increase in Energy consumption

- 7.8 Lakhs units / annum

Why innovative

The grid energy consumption has been purposefully increased by installed electrical boilers and therefore eliminated the complete fuel consumption of the existing fuel fired boilers and the increased energy consumption offset by the offsite wind energy. Therefore it's completely cost effective and green solution

Project Trigger

Moving towards the group level target of carbon neutral manufacturing, to eliminates the fuel consumption became essential and also increasing the price of the fuel also the trigger

Existing boiler
Diesel fired

New Proposed boiler
Electrical operated

Fuel tank

Energy Conservation Projects - 2022 (Innovative Project 2)

Power optimization panel upgradation - Machine learning solution

Capex Investment	• 28 Lakhs
Expected Returns	• 8 lakhs/ annum
Expected IRR	• 23%
Expected Payback	• 4.3 Years

Energy Conservation

- 85,000 units / annum

The normal replacement cost of the panel – 15 Lakhs

Additional cost to go with the SmartPO panel – 10 Lakhs only

Why innovative

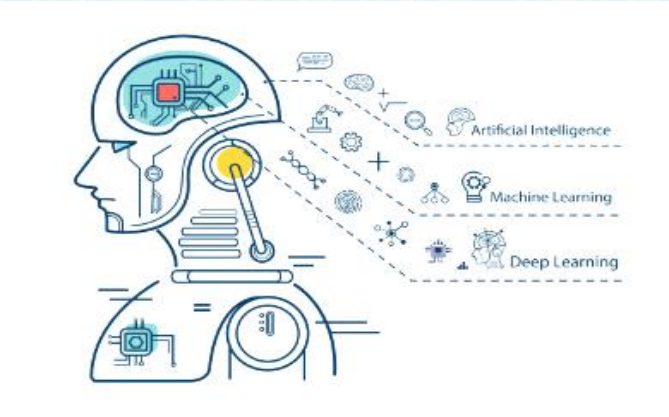
The machine learning is the latest technology improvement everywhere is emerging but using the machine learning solution for the electrical distribution panels is the unique and most efficient energy conservation activity

Project Trigger

More than act in individual equipment for the energy optimization and energy conservation thought to act in the distribution level conservation opportunities are the trigger

• AI based SmartPO with Advanced Machine learning strategy

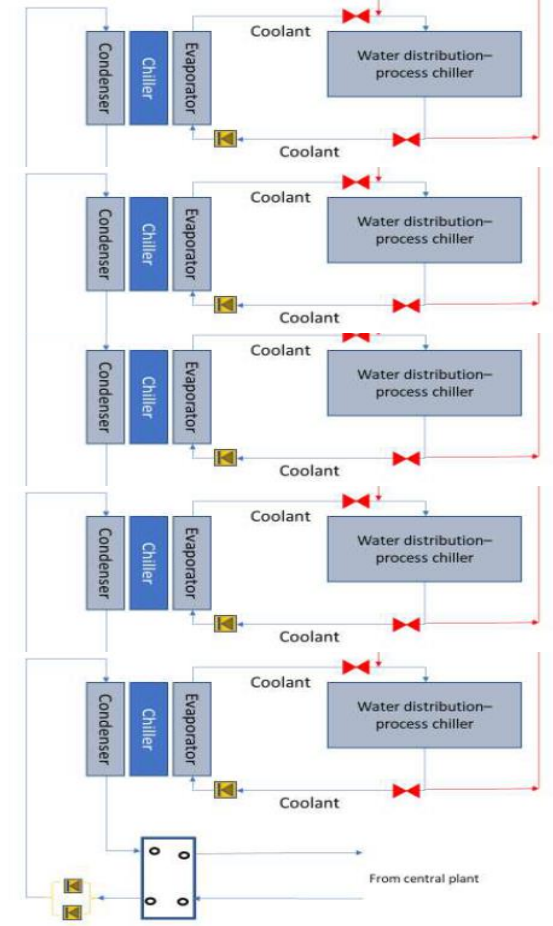
• Aimed at delivering a optimal output at the distribution point varying the voltage and current to an optimal level closer to Rated parameters of equipment



Energy Conservation Projects - 2022 (Innovative Project 3)

Dedicated process cooling system for plating machines

Existing system



Energy Conservation

- 3.0 Lakh units / annum

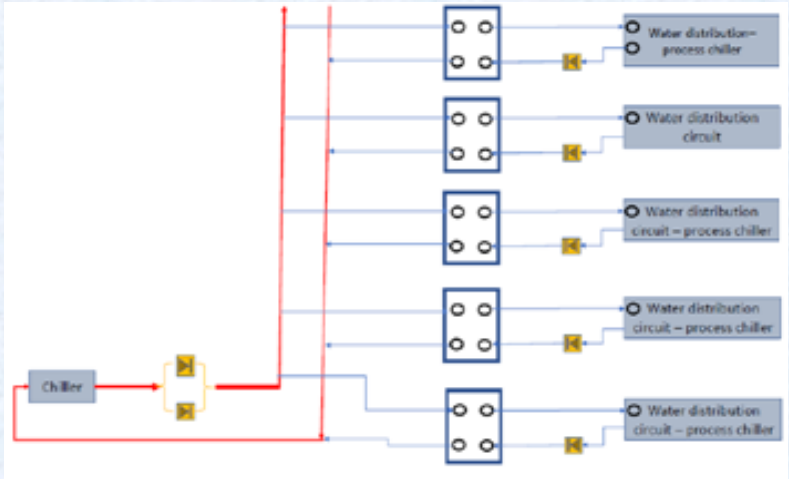
Why innovative

Since the part of the machine has been eliminated and its substitute with home grown expertise solution and one solution combines many machine's requirement it is innovative

Project Trigger

Individual process cooling systems for individual machines accompying more space, generates noise and adding much heat load and these are triggers to go with the centralized common system

Proposed system



Capex Investment	• 96 Lakhs
Expected Returns	• 29 lakhs/ annum
Expected IRR	• 23%
Expected Payback	• 4.4 Years

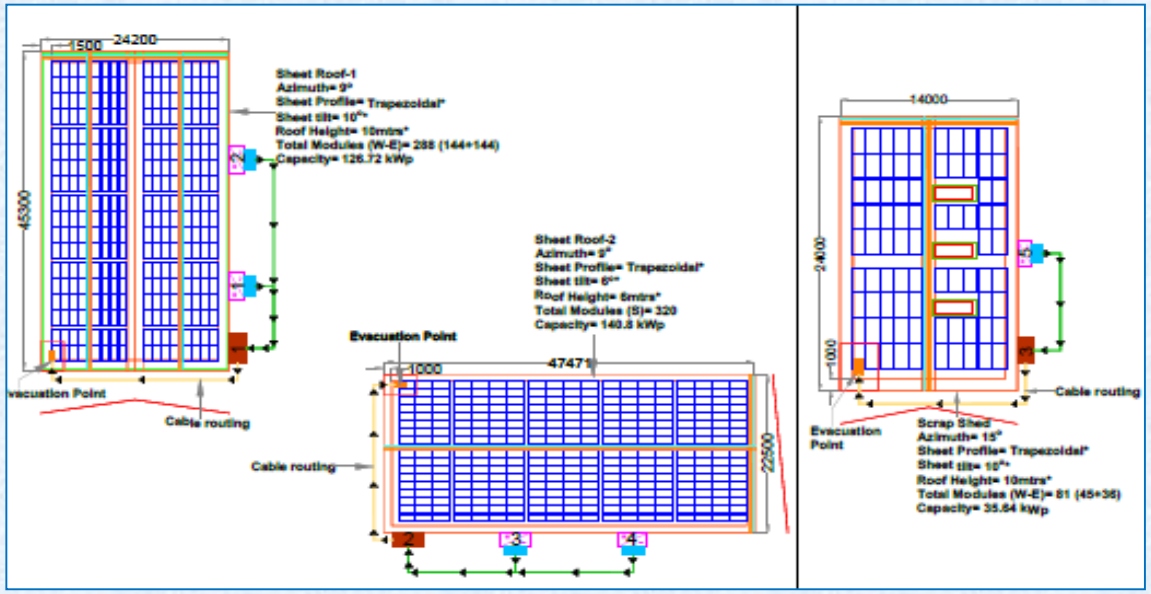
Energy Conservation Projects - 2022

Rooftop solar system – 303kWp

Capex Investment	• 139 Lakhs
Expected Returns	• 30 lakhs/ annum
Expected IRR	• 21%
Expected Payback	• 4.5 Years

Total – 303.16 kWp

Canteen roof – 126.72 kWp
New Case building roof – 140.8 kWp
Scrap yard roof – 35.64 kWp



Energy generation

- 4.0 LkWHr / Annum

Reduction in carbon foot print

- 300Tons / Annum

Renewable energy contribution

- 4% increase (85% to 89%

Energy Conservation Projects - 2022

Energy efficient chiller system

Capex Investment	• 37 Lakhs
Expected Returns	• 23 lakhs/ annum
Expected IRR	• 66%
Expected Payback	• 1.5 Years

Month	TRh	Hrs.	Avg. kW/TR	kWh
Old operation				
Chiller 1	1,034,541	4,463	0.50	517,270
Chiller 2 (80 tr + 120 tr)	26,811	123	0.85	22,790
Chiller 3 (80 tr + 120 tr)	81,882	703	0.85	69,600
AC Chiller-120	347,302	4,324	1.10	382,032
Old total	1,490,536			991,692
New operation				
New 200TR	1,034,541		0.45	465,543
Chiller-1	455,995		0.50	227,998
New total	1,490,536			693,541
Savings, kWh				298,151

Existing chiller
R22 refrigerant

New Proposed chiller
R-134a refrigerant

Energy Conservation

- 2.5 Lakh units / annum

Energy Conservation Projects - 2022

EC fan retrofit for AHU's

Capex Investment	• 31 Lakhs
Expected Returns	• 7.5 lakhs/annum
Expected IRR	• 21%
Expected Payback	• 4.8 Years

Pilot activity completed in Stepper motor AHU during Sep'2020

- 25% savings achieved
- Payback arrived 3.3 years
- Good performance & less maintenance

Present Air handling Unit Fan

- The AHU fan is DIDW Centrifugal Type Belt Driven Fans
- Due to belt arrangement transmission losses are more
- Medium efficient Fans
- Less power factor
- More heat dissipation from motor
- High noise and higher vibrations

Proposed Air handling Unit - Fan

- The AHU fan is new technology EC Fans
- Direct driven motor, no transmission losses
- Prime efficient Fans
- Power factor close to unity.
- Inbuilt VFD fans., can be controlled through field input.
- Less heat dissipation from motor
- Extremely low noise and no vibrations

Energy Conservation

- 70,000 units / annum

10 AHU's Proposed

Best Practices

Benchmark Practice → **IoT driven Energy Management System**

TECHNOLOGY

- Integrated equipments operations & performance online monitoring and control SYSTEM
- Fully automated operations for AHU systems controls based on the temperature requirement
- Fully automated compressed air system operation & auto shut off valve system
- 100% elimination of conventional lighting systems inside the facility
- Process cooling system integration – Temperature / valve control
- Utilization of wastes – Installation of Waste heat recovery system

PROCESS

- Coming out of manual interventions and stand alone systems
- Continuous optimization of process for improve the energy performance in certain intervals
- Utility systems / equipments upgradation with latest energy efficient class
- Energy audits and horizontal deployment of energy conservation projects to the vendors
- Systematic energy review / Specific energy monitoring and control at shop level
- Make use of the BMS as base and to integrate with multiple systems through different protocols

SYSTEMS

- ISO 50001:2018 Energy Management System certified facility
- GreenCo Silver rated certified facility
- Purchasing policy for Energy efficient equipment procurement
- Affiliation with professional bodies for the latest updates on Energy conservation
- Utilization of natural resources – Installation of Light pipe system, Roof top solar system, Pilot wind mills
- Working towards 100% Green substitution & Carbon neutral manufacturing facility target

Internet of Things – IoT

What we Integrated

Utility System

- Air conditioning
- Compressed air system
- Power distribution
- Chilled water system
- Fire hydrant system

Equipment

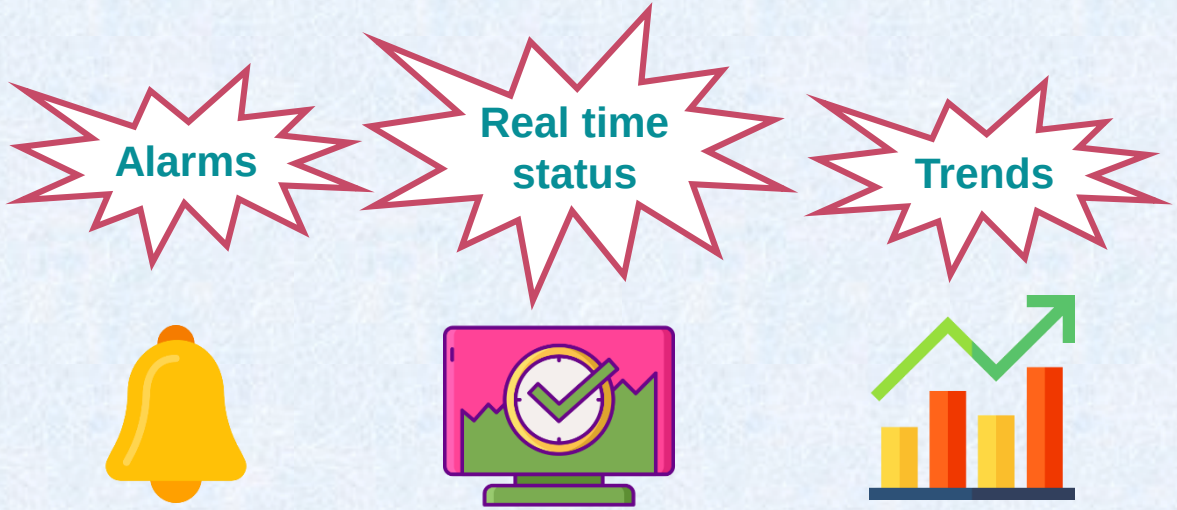
- Assembly thermostatic ovens
- Boilers
- Vacuum pumps
- Scrubbers

Remote Monitoring Stations

- Ware house
- WOT – Bangalore
- Satellite assembly units

Live – EnMS & BMS

What can be Seen / Monitored



Reports / Performance

- Chiller performance –iKW / TR
- Compressors performance - Kw / CFM
- AHU performance - TR delivery
- Reports - Energy consumption , running hours , temperature & RH , flow rate , TR delivery , Pressure

Recent Rewards & Recognition

Excellence in Energy Management (3 times consecutively)

- Confederation of Indian Industry
- 2017, 2018, 2019

Green tech environment award (4 times consecutively)

- Green tech foundation
- 2017, 2018,2019,2020

Environmental Best Practices Award

- Confederation of Indian Industry
- 2020

National Competition on DRA & Industry 4.0

- Confederation of Indian Industry
- 2021

THANKS

QUESTIONS PLEASE