# 24th National Energy Award for Excellence in Energy Management - 2023


## Zonal Railway Training Institute (ZRTI)

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Senior Divisional Electrical Engineer,
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# Brief introduction of ZRTI

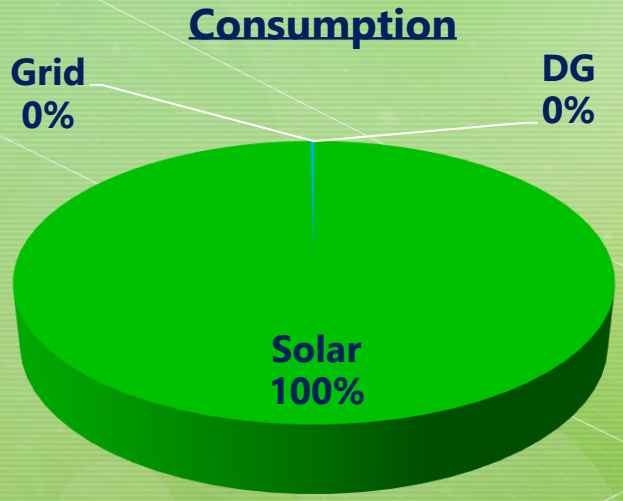
- Zonal Railway Training Institute (ZRTI/MLY) is one of the most important training centre over South Central Railway located in Moula-Ali.

# Brief introduction of ZRTI

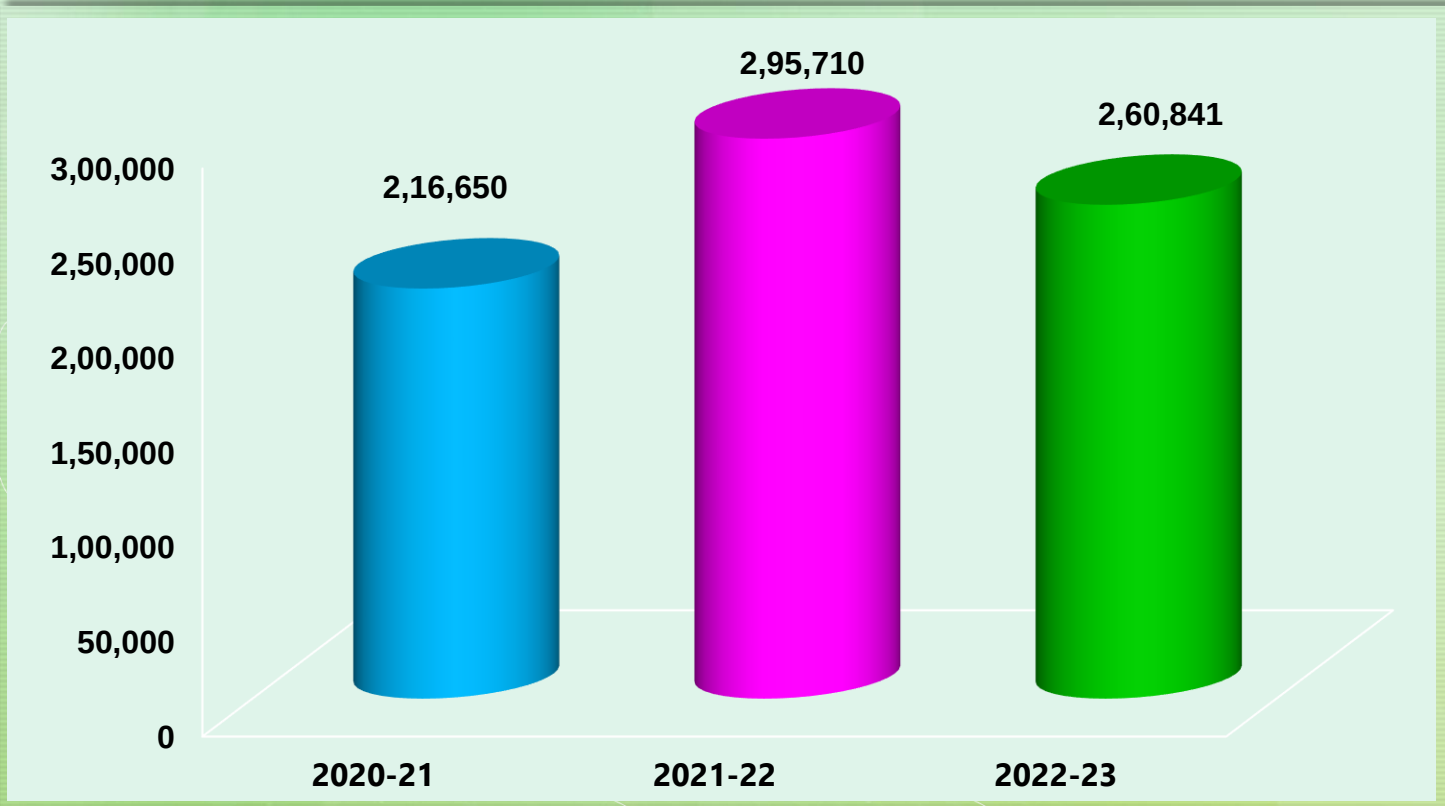
- Zonal Railway Training Institute was established on 7th December 1972 at Moula Ali at a distance of about 6 Kms from Secunderabad Station.
- Zonal Railway Training Institute is to impart training to various frontline and safety categories staff for high value rail transportation technology development, Testing, Standards and Training Make them adopt in theoretical, Knowledge, updating rules and practical working.
- Impart training to the staff of Operating, Commercial, Loco, Civil Engineering / Electrical and Signal departments with a vast array of specialized training for all categories of freight and passenger trains and traffic safety devices.
- Campus is located in the backdrop of Hillock, amidst lush green landscape in an area of 19.73 acres.
- The entire building is surrounded by lush green patch to provide serene ambience which will also add to the energy conservation measures. The building has been provided with LED garden lights.
- This building comes in the **COMPOSITE** Climatic Zone.

# Energy Consumption Overview

| Description | 2020-21 | 2021-22 | 2022-23 |
|---|---|---|---|
| Purchased from Grid (kWh) | 0 | 53015 | 0 |
| Consumption through DG set (kWh) | 321 | 263 | 242 |
| Consumption through Solar Plant (kWh) | 216329 | 242432 | 260599 |
| Total Consumption (kWh) | 216650 | 295710 | 260841 |
| Total Built-up area (sq.mt) | 9810 | 9810 | 9810 |
| Specific Energy Consumption (kWh/sq.mt) | 22.05 | 30.12 | 26.56 |

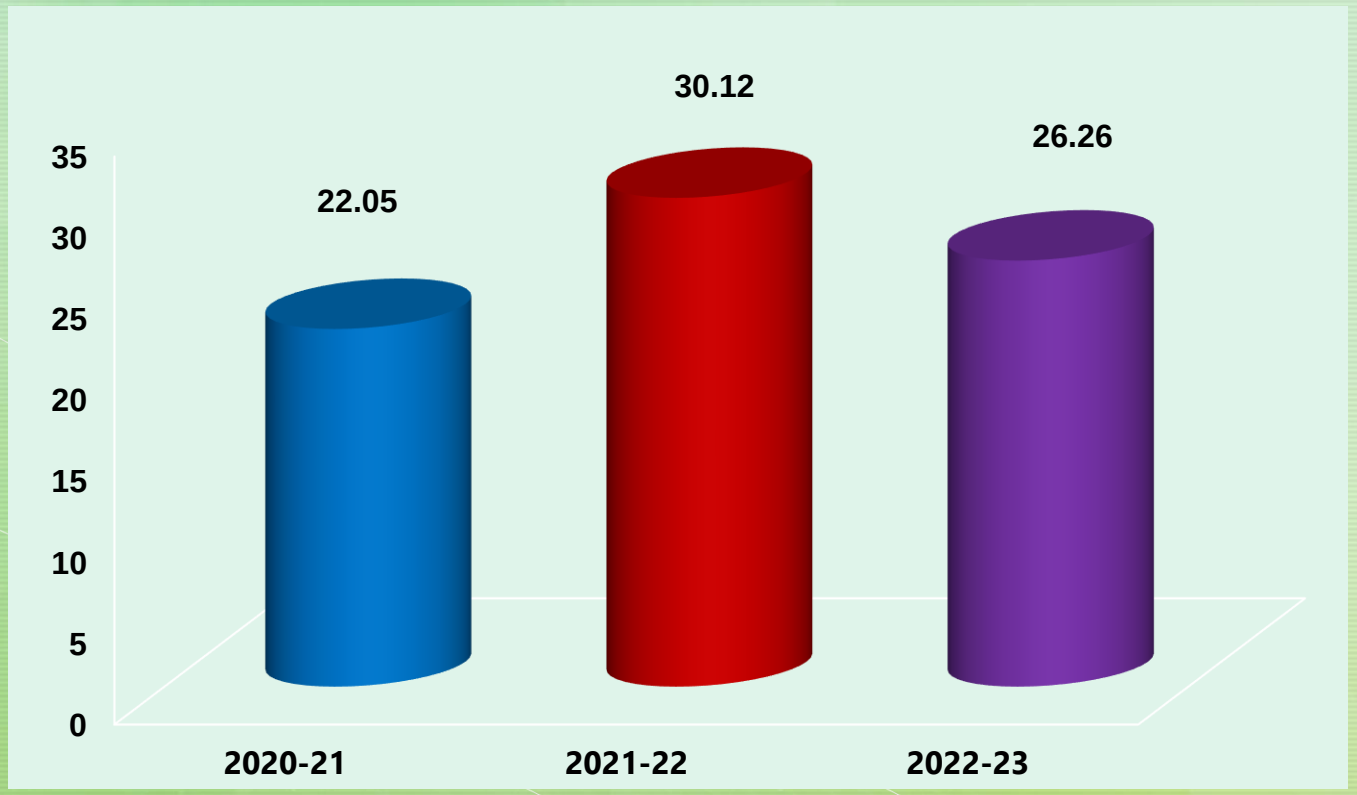


# Comparison of Consumption for the last 3 years




Consumption was decreased by 11.79% during 2022-23 compared to 2021-22

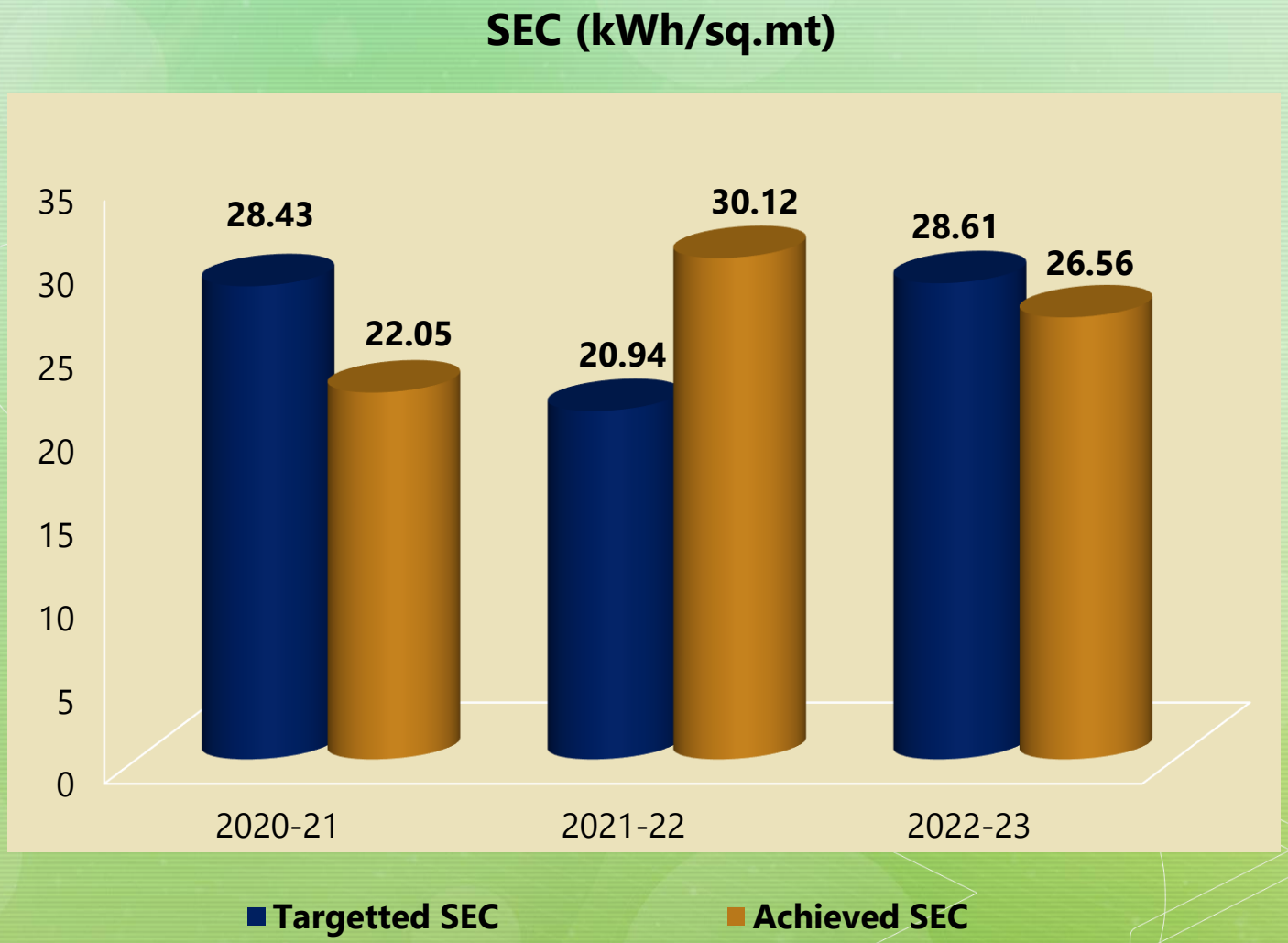
# Comparison of SEC for the last 3 years




SEC was decreased by 11% during 2022-23 compared to 2021-22

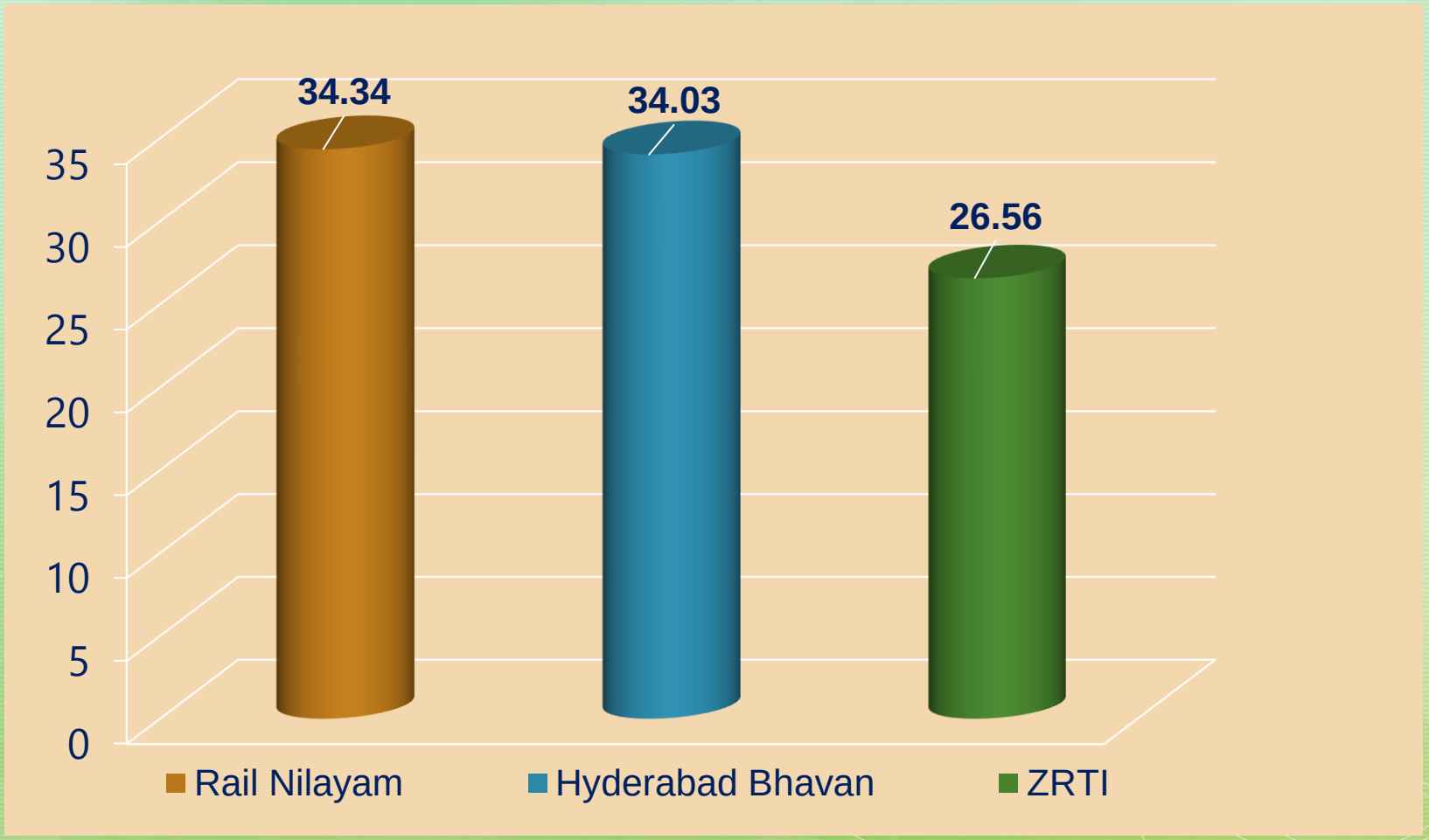
# Internal Benchmarking (SEC)

**Target: 5% reduction in preceding year's SEC as assigned by Railway Board.**



# Information on Competitors, National & Global Benchmark

## Direct Competitors and National Benchmarking




☑ Data obtained from earlier CII Energy Awards presentations.

# Road map to achieve Global Bench Marking

# EnCon Projects planned in 2023-24

- ✓ IOT based Energy Monitoring System
- ✓ Web based Intelligent Water Management System.
- ✓ Low carbon cooling system
- ✓ Automation of Pumps
- ✓ Power Quality Restorers
- ✓ Water conservation by implementing the water saving adaptors.
- ✓ Introduction of E-Vehicle and increase in existing fleets.

# EnCON Projects Implemented from 2020-21 to 2022-23

# Energy Conservation Projects implemented in 2020-21

## Major EnCon Projects implemented are:

| Sl. No. | Description | Savings in Lakh Rs. | Investment in Lakh Rs. | Payback Period |
|---|---|---|---|---|
| 1 | 100% LED Lighting | 6.39 | 2.18 | 0.4 |
| 2 | BLDC Fans | 0.93 | 2.24 | 2.7 |
| 3 | Energy Efficient Inverter AC units | 1.50 | 5.40 | 3.7 |
| 4 | Natural Day light pipes | 1.58 | 0.72 | 0.5 |

# Energy Conservation Projects implemented in 2021-22

## Major EnCon Projects implemented are:

| Sl. No | Name of the Item | Savings in Lakh Rs. | Investment in Lakh Rs. | Payback Period |
|---|---|---|---|---|
| 1 | Timers for water coolers | 0.36 | 0.06 | 0.16 |
| 2 | Energy Efficient Pumps | 1.36 | 0.70 | 0.5 |
| 3 | Occupancy sensors for lights | 0.88 | 0.30 | 0.4 |
| 4 | Occupancy sensors for ACs | 1.57 | 0.25 | 0.2 |

# Energy Conservation Projects implemented in 2022-23

## Major EnCon Projects implemented are:

| Sl. No | Name of the Item | Savings in Lakh Rs. | Investment in Lakh Rs. | Payback Period |
|---|---|---|---|---|
| 1 | BLDC Fans | 0.58 | 1.40 | 2.4 |
| 2 | Energy Efficient Pumps | 0.82 | 0.70 | 0.9 |
| 3 | Occupancy sensors for Acs | 3.98 | 0.40 | 0.1 |
| 4 | Temperature setting of 22 deg C to 26 deg C in AC | 1.84 | 0 | 0 |
| 5 | Energy Efficient Inverter AC Units | 3.0 | 10.8 | 3.6 |

# INNOVATIVE PROJECTS IMPLEMENTED

# Innovative Projects implemented

| Sl. No. | Name of the Project | Year of Implementation | Savings in Lakh Rs. | Investment in Lakh Rs. |
|---|---|---|---|---|
| 1 | Provision of Energy efficient BLDC fans i.e., adopting of super energy efficient fans | 2020-21 | 0.93 | 2.24 |
| 2 | Provision of 5 star rated energy efficient Inverter type AC units which uses eco friendly refrigerant (R-410A) | 2020-21 | 1.50 | 5.40 |
| 3 | Energy Efficient Pumps | 2021-22 | 1.36 | 0.70 |
| 4 | Occupancy sensors for lights | 2021-22 | 0.88 | 0.30 |
| 5 | Occupancy sensors for ACs | 2022-23 | 3.98 | 0.40 |
| 6 | Temperature setting of 22 deg C to 26 deg C in AC | 2022-23 | 1.84 | - |

# Utilization of Renewable Energy Sources

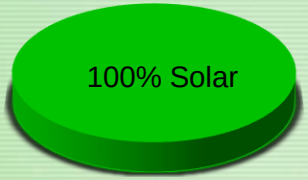
## 200 kWp On Grid Solar Power Plant

| Year | Technology (Electrical) | Type of Energy | Onsite/ Offsite | Installed Capacity (kWp) | Total Consumption in kWh | Generation in kWh | % of Generation over Consumption |
|---|---|---|---|---|---|---|---|
| 2020-21 | Renewable Energy | SPV | Onsite | 200 | 216650 | 263469 | 121 % |
| 2021-22 | | | | | 295710 | 242432 | 82 % |
| 2022-23 | | | | | 260841 | 263321 | 100 % |

# Utilization of Renewable Energy Sources

| Energy Consumption analysis for the year 2022-23 (in Units) | | | | |
|---|---|---|---|---|
| Description | Utility (SEB) Consumption | DG Generated | Solar Generation | Total Consumption |
| Units | 0 | 100 | 263321 | 260841 |
| % of Total Consumption | 0 | 0 | 100% | -- |

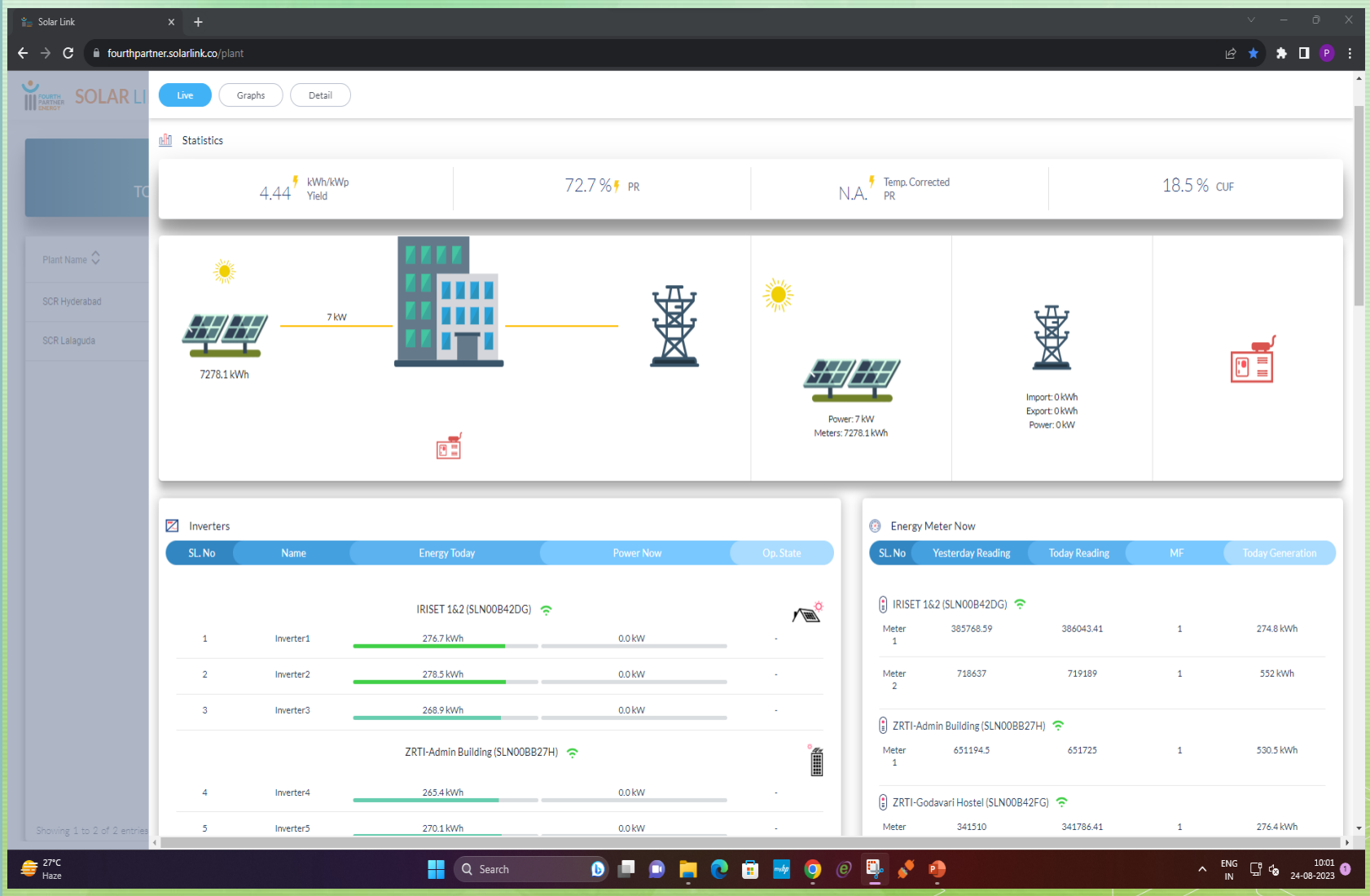
Energy Consumption Pattern



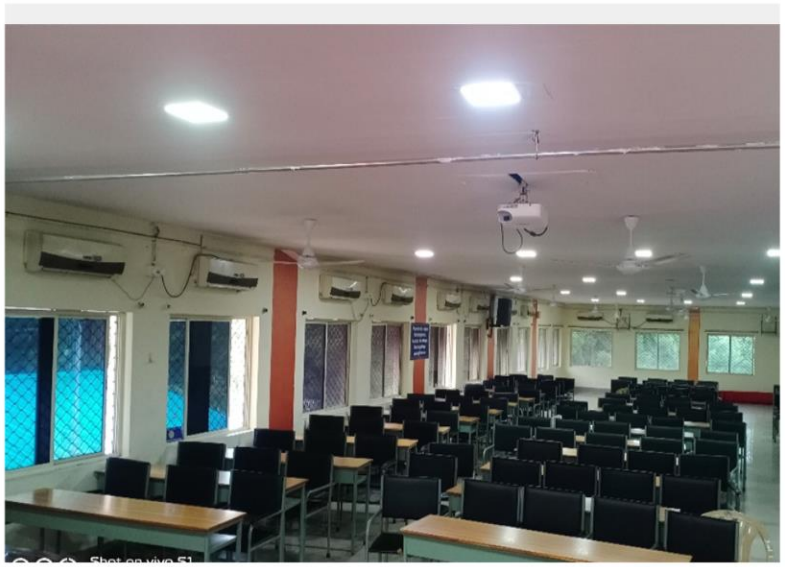

- **100% of the ZRTI building consumption is met by renewable energy sources i.e., 200kWp SPV Plant.**
- **First Energy Neutral Training Centre over South Central Railway**

# Renewable Energy Utilization


# On line Energy Monitoring



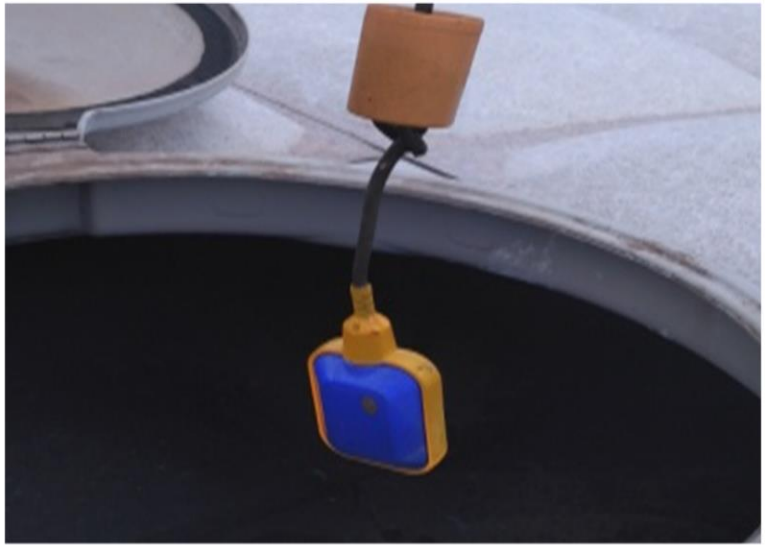
# 100% LED Lighting



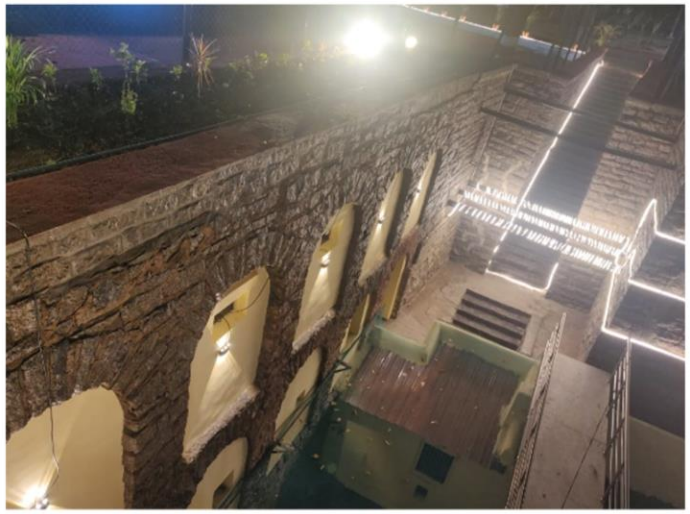

# Energy Efficient BLDC fans & Inverter type AC units

# Sensors and Timers





# Renovation of 200-year old heritage well



Narendra Modi
@narendramodi · Follow

This is a laudatory effort.

Ministry of Railways @RailMinIndia

Heritage Well revived!

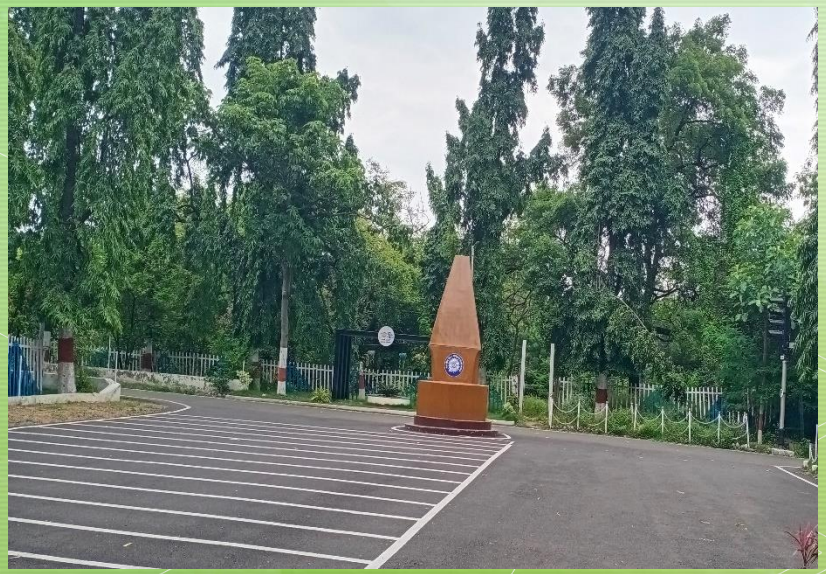
Promoting sustainable & green initiatives Zonal Railway Training Institute, Secunderabad, revived a 200-year-old heritage well on its premises & further built Rainwater Harvesting Pits around it to facilitate water conservation.


9:54 AM · Feb 26, 2023

**Promoting sustainable & green initiatives, revived a 200-year-old heritage well & further built Rainwater Harvesting Pits around it to facilitate water conservation.**

# Green Initiatives in ZRTI





# Green Supply Chain

- Use of Renewable Energy Sources
- Use of Energy Efficient Air Conditioners with eco-friendly refrigerants
- Use of Energy Efficient LED Fittings
- Use of Super Energy Efficient BLDC fans
- Use of Energy efficient pumps

# Green Supply Chain

Projects implemented

| S. No | Description | Capacity installed | Cost Gain (Lakh Rs.) | Investment (Lakh Rs.) |
|---|---|---|---|---|
| 1 | Solar Plant | 200 kWp | 12.00 | PPA |
| 2 | Day light pipe | 5 Nos. | 0.20 | 0.6 |
| 3 | Solar Street lights | 20 Nos. | 0.55 | 4.0 |

**Action Plan to expanding the "Green Supply Chain" activities.**

- Provision of more SPV panels on the available vacant land building under PPA.
- Provision of additional 10 No.s solar street lights.
- Commissioning of additional 5 No.s Day light pipe systems.

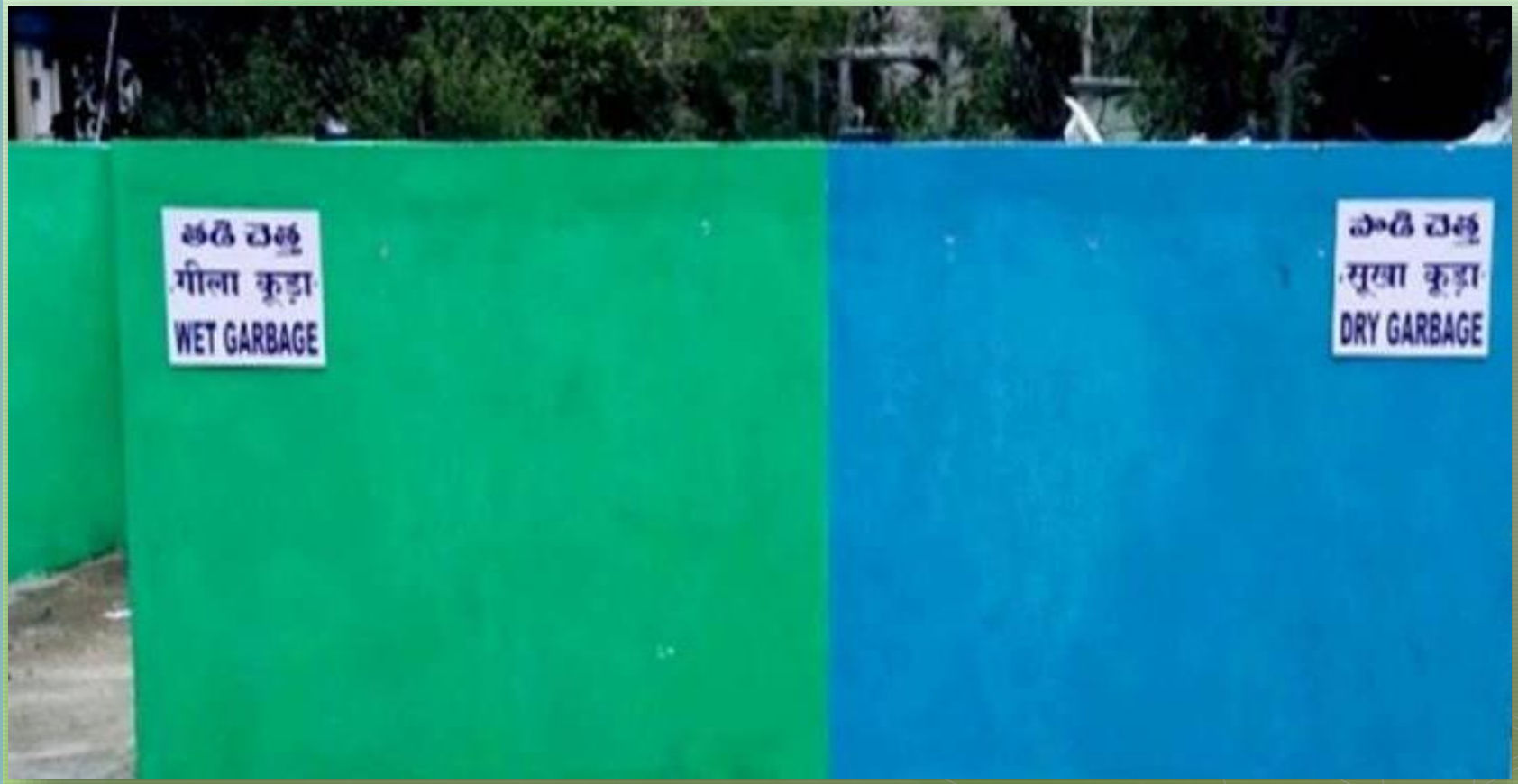
# Green Supply Chain Management

- Green Purchase Policy.
  - E-Tendering
  - E-Pass/PTO to staff/employees
  - E-Procurement
  - 100% - E-Office working
  - E-Payment to firms/contractors
  - E-Auction of scrap
  - E-Awareness towards energy conservation through messages in WhatsApp groups.

# Solid Waste Management

- This Building is installed with one De-composting machine and it is producing 100 kg to 120 kg high quality organic manure per week.
- This generated manure is used for the gardens at office premises and colonies.

# Separation of Dry Waste & Wet Waste



# Rain Water Harvesting

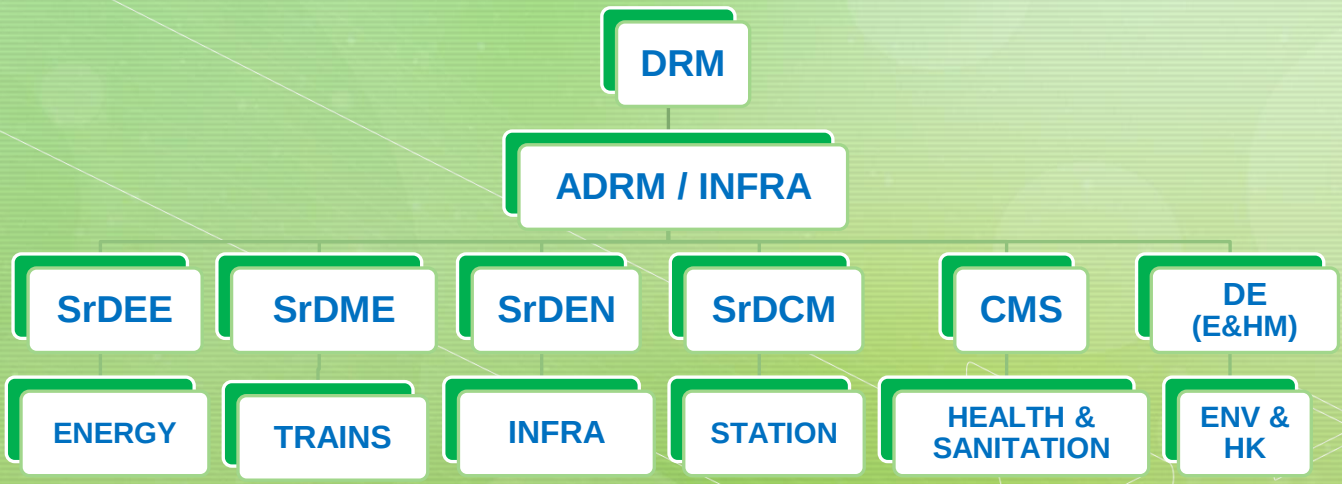
- Provided with 8 Nos. of Rain Water Harvesting pits for conservation rain water.

| Water Consumption | | |
|---|---|---|
| Year | Water Consumed | % Improvement |
| 2020-21 | 10950 KL | 20.32 |
| 2021-22 | 7191 KL | 34.32 |
| 2022-23 | 4578 KL | 36.33 |

**Rain Water Harvesting Pit**

# Green Mission Steering Team

- ✓ Committee of 'Service Improvement Group' is in place for regular monitoring of implementation, Operation & Maintenance of existing green features at station, consisting of ADRM(I) & Branch level officers who inspect the ZRTI/MLY on regular basis.



# Team work, Employee Involvement & Monitoring


# Teamwork, Employee Involvement & Monitoring

- Daily Energy monitoring at Supervisor of Electrical level Department.
- Monthly consumption report of each building for comparison with last month and last year same period consumption.
- Energy Conservation Week Celebrations every year – Conducting Awareness programs like seminars, oath and painting competitions.
- Formation of Energy Management Cell.
- Awareness campaign against Man-Made Wastages.
- Counselling at shop/floor levels by Energy Management Cell Team.
- Conducting mass tree plantation drives to improve greenery.

# Energy Conservation and GHG Policy

## Energy Conservation Policy of Hyderabad Division

1. Daily monitoring the Energy consumption through specially designed software.
2. Creating awareness among the users through various activities such as brochures / seminars.
3. To minimize the specific energy consumption w.r.t previous years.
4. Conducting of regular inter departmental energy audits aimed to minimize the energy losses.
5. Implemented the action plan of energy conservation items to reduce the Energy Consumption at least by 10% every year w.r.t. previous years targets.
6. Promote use of the renewable sources of energy.
7. Use of latest BEE 5 star rated Electrical Fittings and Equipments.

**K. Kiran Kumar**
**Senior Divisional Electrical Engineer,**
**Hyderabad Division, South Central Railway.**

## GHG Policy of Hyderabad Division

1. We committed to use products which reduce the GHG emission.
2. Using of eco-friendly refrigerants in HVACs, Refrigerators, Water Coolers etc.
3. Converting Existing Office Buildings into Green Buildings.
4. Use of Solar and Wind Energy.
5. Ensuring availability of resources for continual reduction of GHG emissions intensity.

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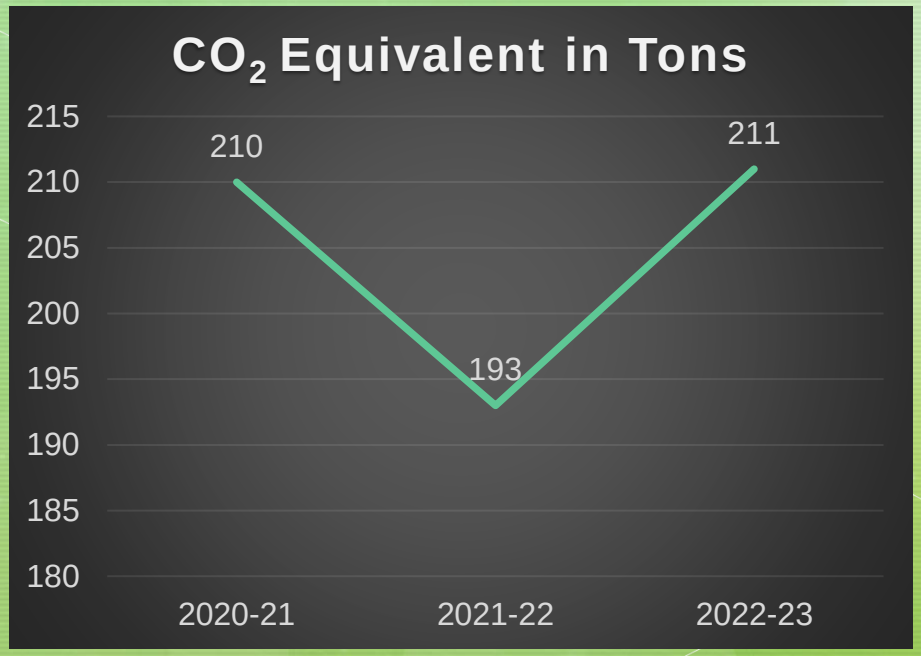
# GHG Inventorisation

| S.No. | Year | Reduction of $CO_2$ Emissions in Tons |
|---|---|---|
| 1 | 2020-21 | 210 |
| 2 | 2021-22 | 193 |
| 3 | 2022-23 | 211 |



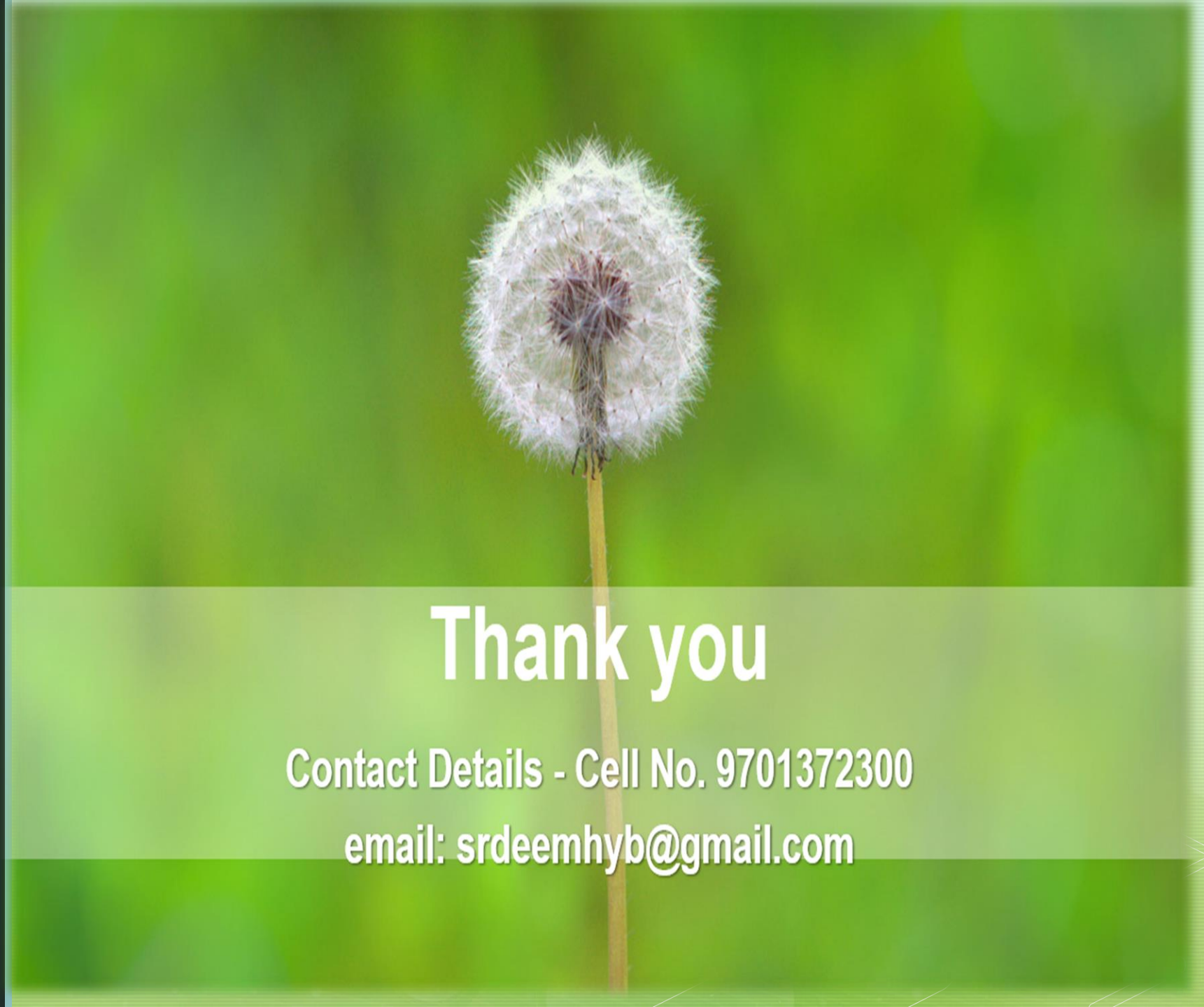
# Net Zero Action Plan

- **ZRTI Building has become Energy Neutral and processed for awarding “Shunya + ” by Bureau of Energy Efficiency.**

- **To maintain Net Positive Energy on future expansion of loads the following action plan was made.**
- Implementation of SMART Energy Management System.
- Provision of more number solar street lighting.
- Provision of Energy efficient Pumps
- Use of IoT Technology for Electrical Energy Monitoring and Controlling.
- Water conservation by implementing the water saving adaptors.
- Introduction of E-Vehicle and increase in existing fleets.
- EV charging station for employees at office.

# Learning from Previous Years CII Energy Awards

- Interaction with professional peers of other buildings & implemented new ideas.
- R&D buildings and IT buildings are different with regard to energy usage.
- GHG emission classification under Scope 01, Scope 02 & Scope 03.
- Clarity on EPI/SEC & Contribution to Nation Building.
- BMS system.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Q&A