



Indian Railways

Mission Net Zero Carbon Emission 2030

South Asia Regional Energy Partnership (SAREP)

April 30, 2024



Vision Net Zero Carbon Emission 2030

- **Hon'ble Prime Minister during his address to the nation on 15th August 2021 announced:**

*Indian Railways has set a target of becoming “**Net Zero Carbon Emitter by 2030**”*

- **Statement made during COP26 Summit**

*Every year more passengers travel by Indian Railways than the population of the world. This huge railway system has set a target of making itself 'Net Zero' by 2030. This initiative alone will lead to **a reduction of emissions by 60 million tonnes annually.***



MoU Signed between Indian Railways and USAID/India

MoU signed on June 14, 2023 for supporting Indian Railways to achieve Mission Net Zero Carbon Emission by 2030.



USAID - Indian Railways Collaboration

Energy Efficiency

- Energy Efficiency Policy & Action Plan
- Investment Grade Audit of Existing Buildings - EE retrofits of IR pilot buildings
- BEE Shunya/Shunya+ label for existing building.
- Super ECBC Compliance in new station development
- 5-star and super efficient appliances
- Net Zero campaigns

Renewable Energy

- Procurement of Round the clock renewable energy power for traction load
- Innovative models for rooftop solar deployment in IR buildings
- Generation data monitoring and institutionalizing of rooftop solar plants' monitoring to improve efficiency
- Technical assistance in deployment of energy storage

E-mobility

- Adoption of EVs across Indian Railways
 - Cost benefit analysis
 - Quantitative, qualitative, and environmental benefits of shifting to EVs
- EV charging infrastructure at IR stations and office complexes

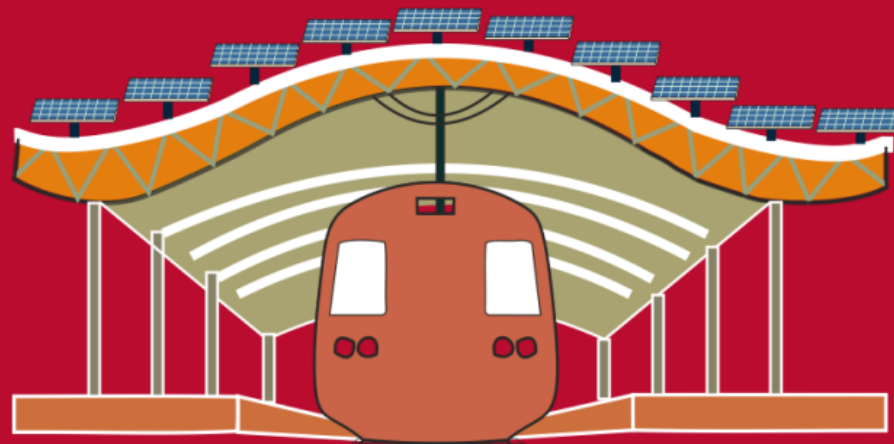
Key achievements

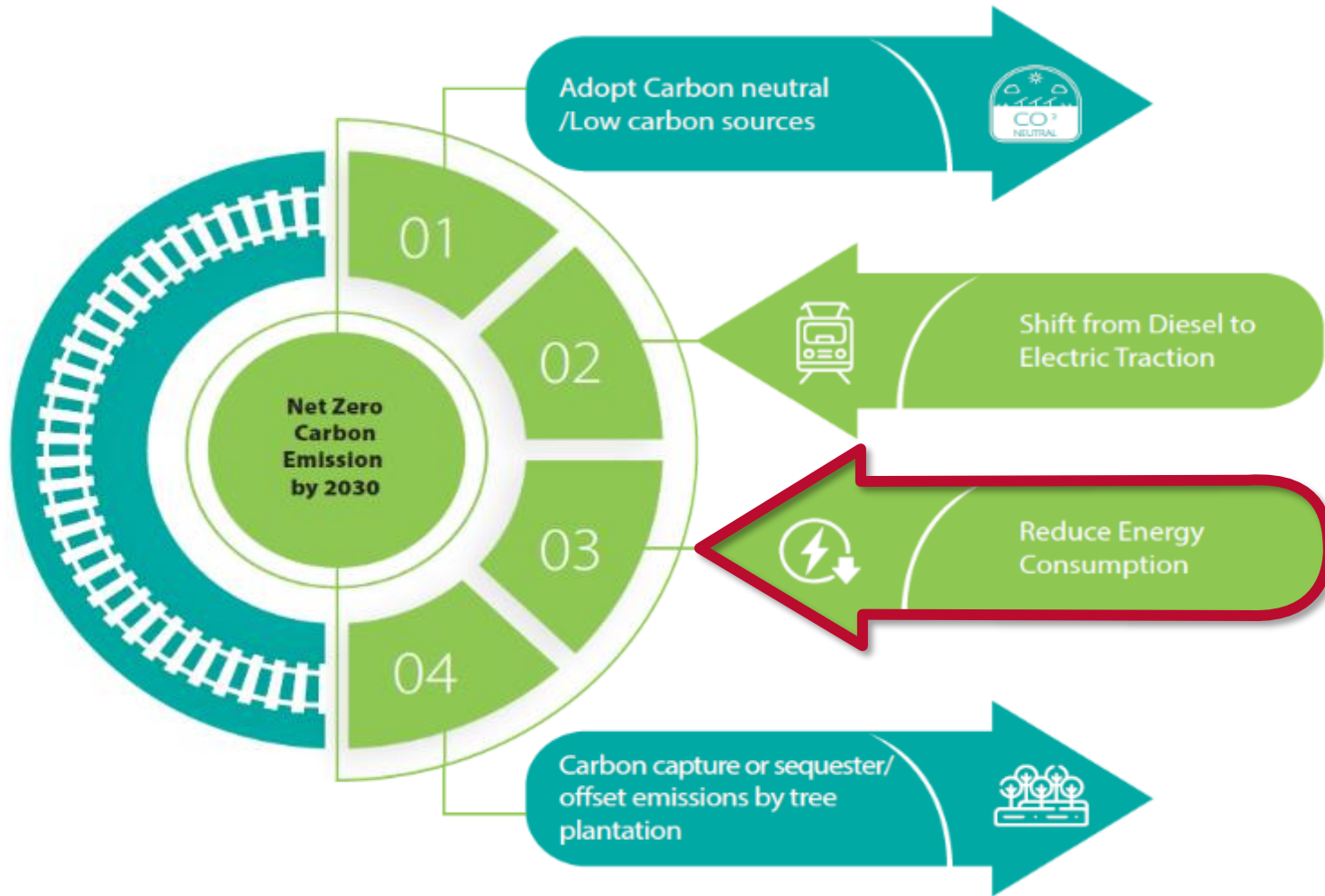
- **IGEA tenders** released for more than 1100 buildings
- **Super ECBC** integrated in 5 new stations – New Delhi, Ahmedabad, CSMT, Nagpur, Gurugram
- 24 buildings labelled **BEE Shunya/Shunya+**
- **1,650 MW** Round-the-clock RE bid awarded
- **3% Increase in generation** from rooftop solar projects in 1 year
- More than **800 participants trained**



India Railways

Energy Efficiency Policy and Action Plan





IR Energy
Efficiency
Action Plan and
Policy

Energy Efficiency Action Plan

- 5 point action plan
- For non-traction loads
- For all personnel at all levels



The diagram features a central blue box with the title 'IR Energy Efficiency Action Plan'. A red line descends from this box and branches into five horizontal red lines, each leading to a red box containing an action plan item. The background is a night-time photograph of a city street with streetlights and a bridge railing on the left.

IR Energy Efficiency Action Plan

API - Sustainable
Buildings

AP2 - Online energy
use monitoring

AP3 – Energy Efficiency
in Equipment &
Appliances

AP4 – Power
Quality
Restoration

AP5 – Capacity
Building & Awareness

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Action Point I- Sustainable Buildings

1. Compliance of **all existing buildings** (having connected load of 30 kW or more) to **BEE Shunya/Shunya+** label.
2. Compliance of all upcoming **non-residential buildings** to **SuperECBC**
3. All **new residential buildings** to be **Eco-Niwas Samhita** compliant
4. Adoption of **ESCO model** to implement EE initiatives.

First three buildings of Indian Railways to achieve Shunya+ label



Kendriya Vidyalaya, Rail Wheel Factory



ICF Administrative Complex



Lekha Bhawan, South Central Railways

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ECBC

Energy
Conservation
Building
Code 2017



ECBC 2017 – A Unique Tiered Structure

Toward Near Zero Energy Buildings

ECBC+

High performance

35%

SuperECBC

Best tech available

50%

ECBC

Lifecycle cost effective

25%

better than Typical



GOVERNMENT OF INDIA
MINISTRY OF POWER



Bureau of Energy Efficiency
Ministry of Power, Government of India



Mandatory Minimum standards for Commercial Buildings

Action Point I- Sustainable Buildings

1. Compliance of all existing buildings (having connected load of 30 kW or more) to BEE Shunya/Shunya+ label.
2. Compliance of all upcoming non-residential buildings to SuperECBC
3. All new residential buildings to be Eco-Niwas Samhita compliant
4. Adoption of **ESCO model** to implement EE initiatives.

API – Point 3 (Eco-Niwas Samhita Compliance for upcoming residential buildings)

Eco-Niwasl Samhita – Part 1 Compliance

Eco-Niwasl Samhita – Part 2 Compliance

Window
-to-Floor
Area
Ratio
(WFR_{op})

Thermal
Transmi
ttance of
Roof
(U_{roof})

RETV
value
(except
roof)

Thermal
Transmi
ttance of
building
envelope
(except
roof) for
cold
climate

Visible
Light
Transmi
ttance
(VLT)

Window
-to-wall
ratio
(WWR)

Power
Factor

Energy
Monitoring

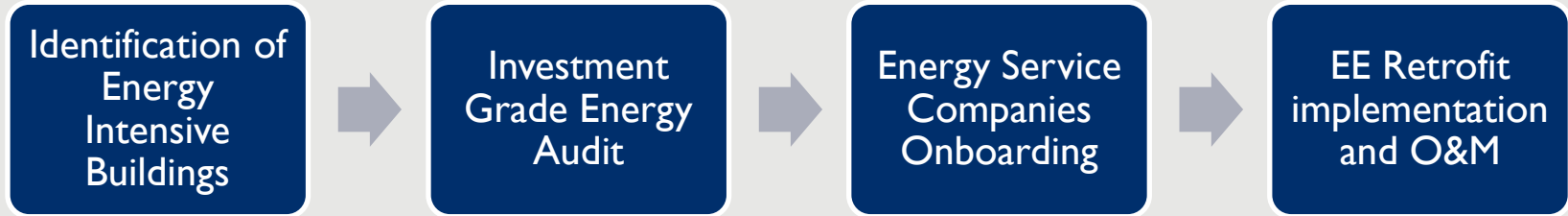
Electrical
Systems

Electric
Vehicle
Charging
System

Action Point I- Sustainable Buildings

1. Compliance of all existing buildings (having connected load of 30 kW or more) to BEE Shunya/Shunya+ label.
2. Compliance of all upcoming non-residential buildings to SuperECBC
3. All new residential buildings to be Eco-Niwas Samhita compliant
- 4. Adoption of ESCO model to implement EE initiatives.**

API-Point 4: Adoption of ESCO Model for EE Retrofits



Energy Efficiency Retrofit Approach: Guaranteed Performance Model



Investment by Indian
Railways



Performance Guarantee
by ESCO

The diagram is set against a background of a city street at night, illuminated by streetlights that create a starburst effect. A central blue box at the top contains the title 'IR Energy Efficiency Action Plan'. A red line descends from this box and branches out to five red boxes below. The first two boxes, 'API - Sustainable Buildings' and 'AP2 - Online energy use monitoring', are enclosed in a dashed white border. The other three boxes, 'AP3 - Energy Efficiency in Equipment & Appliances', 'AP4 - Power Quality Restoration', and 'AP5 - Capacity Building & Awareness', are not enclosed in a border.

IR Energy Efficiency Action Plan

API - Sustainable Buildings

AP2 - Online energy use monitoring

AP3 - Energy Efficiency in Equipment & Appliances

AP4 - Power Quality Restoration

AP5 - Capacity Building & Awareness

What is IR-NIYANTRAC?



Centralized collation of data from IoT devices at different hierarchical levels - Railway & vendor agnostic, perpetual



Data analysis - predictive maintenance, health monitoring, optimal utilization of assets



Remote automatic/manual controlling - manpower saving, energy saving



Alerts for greater asset uptime

Applications of IR-NIYANTRAC



Lift/Escalator
Monitoring



Water Pump
Management



Outdoor Lighting
Management



30%-70% platform
lighting



Energy Sub-metering



The diagram is set against a background of a city street at night, featuring a bridge with purple lighting on the left and streetlights with starburst effects. A central blue box with a white border contains the title 'IR Energy Efficiency Action Plan'. A red line descends from this box and branches into five red boxes with white borders, each containing an action plan item. A dashed white box encloses the three middle items (AP2, AP3, and AP4).

IR Energy Efficiency Action Plan

API - Sustainable Buildings

AP2 - Online energy use monitoring

AP3 – Energy Efficiency in Equipment & Appliances

AP4 – Power Quality Restoration

AP5 – Capacity Building & Awareness



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Action Plan 3

Energy Efficiency & Appliance

1.
Lighting,
Fan & AC
Controllers

2.
Procurement
of BEE 5 star
rated

3.
30%-70%
platform
lighting
circuit
segregation

4.
Replaceme
nt of
convention
al fans with
BLDC Fans

5.
EE in
Workshop,
Production
units &
Loco sheds

6.
Low
carbon
cooling
systems

7.
Other
Energy
Efficiency
retrofits

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Action Plan 4

Power Quality Restoration

1.

Ensuring provision of APFCs

2.

Power Quality Restorers should be used as needed

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IR Energy Efficiency Action Plan

API - Sustainable Buildings

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AP4 – Power Quality Restoration

AP5 – Capacity Building & Awareness



Action Plan 5 - Capacity Building & Awareness

1. Periodic Training of IR Staff
2. Printed/ Digital awareness campaign and energy efficiency awards
3. Reporting of EE & Net zero actions

Training Program : Implementation of Energy Efficiency Policy & Action Plan Northern Railways Headquarters, Baroda House, Delhi



Site visits to Net Zero Energy Buildings

Institute of Rural and Research Development (IRRAD), Gurgaon





Increasing Renewable Energy

Increasing Renewable Energy Generation

- Procurement of Round the clock renewable energy power for traction load.
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E-Mobility

E-Mobility

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Electrification

Broad Gauge Electrification

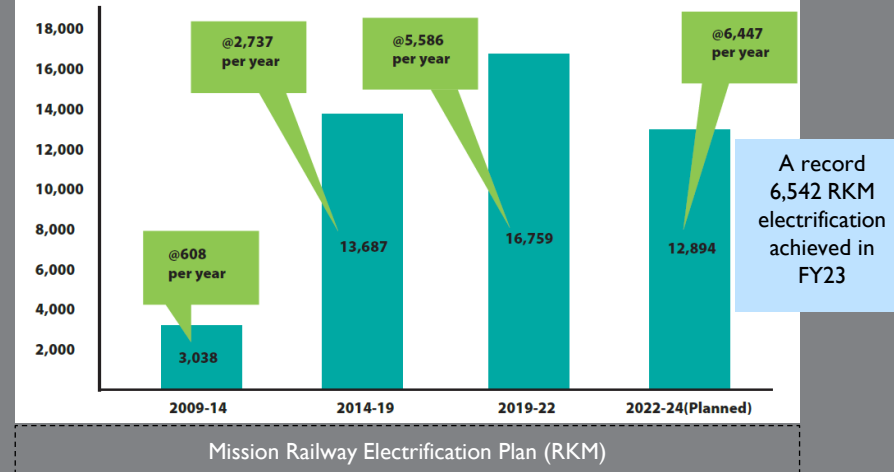
As on March 2024, ~96.00% (63,456 RKM out of 65,141 RKM) electrification completed.



Mission Railway Electrification:

2,405 RKM BG Routes on which electrification works are in progress

Total route kilometres electrified (RKM)		
2013-14	2022-23	% Growth
610	6,542	More than 1000%





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Thank You
