**IGBC Green Railway Stations**

Pilot Version

Abridged Reference Guide

**October 2016**

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**Indian Green Building Council**

C/o Confederation of Indian Industry

CII – Sohrabji Godrej Green Business Centre

Survey No. 64, Near HITEC City Kothaguda Post, Ranga Reddy District Hyderabad – 500 084, India

**2** IGBC Green Railway Stations

**Acknowledgements**

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System (Pilot Version)

IGBC would like to specially thank the Environment Management Directorate of Indian Railways for their encouragement and outstanding support in development of the pilot version of the rating system. IGBC expresses its deepest gratitude to Indian Railway team.

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IGBC would like to thank the following Technical Core Committee members for their participation and contribution in developing the rating programme. We also thank members for agreeing to participate in future development of the rating programme.

™ Ar Hiten Sethi, Chair, IGBC Green Railway Stations and CEO, Hiten Sethi Associates

™ Mr Swaminathan, Adviser (EnHM), Environment Management Directorate, Railway Board, Ministry of Railways

™ Mr. V Suresh, Chair, IGBC Green Villages, Chair- IGBC Green Cities, Chair- IGBC Policy & Advocacy Committee, Vice Chair- National Building Code, BIS and Former CMD-HUDCO

™ Technical Committee members (Technical Committee Meeting to convened post the release of the Draft Version)

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**6** IGBC Green Railway Stations

**Introduction**

Indian Railways, with 115,000 kms (71,000 miles) of track and 7,112 stations is one of the world’s largest railway networks. Indian Railway carries more than 23 million passengers a day, roughly half of whom were suburban passengers. Its operations cover twenty-nine states and seven union territories and also provide limited international services to neighboring countries. The stations of Indian Railways have a wide coverage across various small towns & villages, touching lives of millions of commuters every day.

The operation of trains and the railway stations leads to significant impact on the environment. Apart from the environmental impact, some of the key issues to be addressed include Health, Hygiene, sanitation, energy and waste management in the stations. The rating is designed & developed to address the above issues and enhance the commuter experience.

At present, Indian Railway have taken many policy initiatives to sustainably manage environmental resources. Few such policies include provision for Environment related works in the Estimates for Works, Policy on formation of Environmental Management wing in Zonal Railways, Plantation of trees alongside track and vacant land areas in Indian Railways.

Adoption of Green concepts in Railway stations can significantly contribute for reduction in environmental impacts and enhance the passengers experience. To implement the Green Concepts seamlessly across all the railway stations and monitor on a continuous basis there is a need for a comprehensive framework.

Against this background, the Indian Green Building Council (IGBC) has launched ‘IGBC Green Railway Stations rating system® to address the national priorities. This rating programme is a tool which enables the railway authorities to apply green concepts on existing railway stations and reduce environmental impacts. The overarching objective of IGBC Green Railway Stations Rating is to ensure environmental sustainability, while enhancing commuter experience. It will also help to understand the need for relevant policies for existing and proposed setups with regards to its responsibility towards environment.

Contact:

**Indian Green Building Council**

C/o Confederation of Indian Industry

CII – Sohrabji Godrej Green Business Centre

Survey No. 64, Near HITEC City Kothaguda Post, Ranga Reddy District Hyderabad – 500 084, India

Ph: +91 40 4418 5114

Fax : +91 40 44185139

Email: igbc@cii.in

[Web: www.igbc.in](http://www.igbc.in)

**Benefits of Green Approach in Railway Stations**

* Reduced water demand
* Reduced power demand
* Effective waste management
* Enhanced Comfort, Health and well-being of the passengers

Green railway stations can have tremendous benefits, both tangible and intangible. The most tangible benefits are the reduction in water and energy consumption. The energy savings could range from 20 -

30 % and water savings around 30 - 50%.

The intangible benefits of green railway stations include enhanced air quality, excellent daylighting, health

& well-being of the passengers. Adoption of Smart and Green concepts will enhance the convenience and comfort of the passengers.

**National Priorities Addressed in Rating System**

The IGBC Green Railway Station Rating System addresses the most important national priorities which include water conservation, handling waste, energy efficiency, reduced use of fossil fuels, lesser dependence on usage of virgin materials and health & well-being of occupants.

The rating system requires the application of National standards and codes such as the NBC, ECBC, MoEF guidelines, CPCB guidelines, and several others. The overarching objective is to be better than the national standards so as to create new benchmarks.

**IGBC Green Railway Stations Rating System®**

IGBC has set up the Green Railway Stations Core Committee to develop the rating programme. This committee comprised of key stakeholders, including architects, representative from Indian Railways, Builders, Consultants, Institutions, manufacturers and industry representatives. The committee, with a diverse background and knowledge has enriched the rating system, both in its content and process.

**A. Features**

IGBC Green Railway Stations rating system® is a voluntary and consensus based programme. The rating system has been developed in line with the recommendations of Indian Railways. Also, the researchers and practitioners have been consulted to develop the framework for the rating system. The key learning from best sustainable practices in green transit stations across the world has been incorporated in the rating.

The rating system evaluates certain mandatory requirements & credit points using a prescriptive approach and others on a performance based approach. The rating system is evolved so as to be comprehensive and at the same time user-friendly. The programme is fundamentally designed to address national priorities and enhance the convenience and comfort of the passengers.

**B. The Future of IGBC Green Railway Stations Rating System**

Many new green building materials, equipment and technologies are being introduced in the market. With continuous up-gradation and introduction of new green technologies and products, it is important that the rating programme also keeps pace with current standards, design trends and technologies.

Therefore, the rating programme will undergo periodic revisions to incorporate the latest advancement and changes. It is important to note that zonal railways applying for IGBC Green Railway Stations rating system® should register their stations with the latest version of the rating system.

[IGBC will highlight new developments on its website (www.igbc.in)](http://www.igbc.in)

**C. Overview and Process**

IGBC Green Railway Stations rating system® addresses green features under the following categories:

* **Sustainable Station Facility**
* **Health Hygiene & Sanitation**
* **Energy Efficiency**
* **Water Efficiency**
* **Smart & Green Initiatives**
* **Innovation and Development**

The guidelines detailed under each mandatory requirement & credit enables the implementation of green features in existing stations (as defined in scope). Different levels of green certification are awarded based on the total credits earned. However, every green railway station should meet certain mandatory requirements, which are non-negotiable.

**D. When to use IGBC Green Railway Station Rating System®**

IGBC Green Railway Station rating system® is designed primarily for existing stations of commuter rail or inter-city rail. Major Up gradation projects of railways can also apply for the rating.

The railway station project can apply for IGBC Green Railway Station rating system® certification, if the station can meet all mandatory requirements.

**E. Registration**

Railway station projects interested in IGBC Green Railway Station Certification can register with the [Council. Projects can be registered on IGBC website (www.igbc.in) under ‘IGBC Green Railway Stations Rating’. The registration is the initial step which will help in establishing contact with IGBC and provide access to several resources like abridged reference guide and templates.](http://www.igbc.in)

**F. Certification**

To achieve the IGBC Green Railway Stations Rating, the project must satisfy all the mandatory requirements and the minimum number of credit points. The project team is expected to provide supporting documents at preliminary and final stage of submission for all the mandatory requirements and the credits attempted.

The project needs to submit the following:

1. General information of project including

a. Project brief including station details, daily ridership, number of floors, number of platforms, area statement of project, details of utility services, details of green features etc., b. General drawings (in PDF format only):

i. Railway Network Plan ii. Station Site Plan

iii. Station Landscape Plan iv. Floor Plans

v. Elevations vi. Sections

vii. Parking Plan

viii. Photographs / Rendered views

2. Narratives and supporting documentation such as drawings, calculations (in excel sheets), declarations / contract documents, purchase invoices, manufacturer cut-sheets / letters / material test reports, etc., for each mandatory requirement / credit.

The necessary details are mentioned in this guide, under each mandatory requirement and credit. Documentation is submitted in two phases – preliminary submission and final submission:

* The preliminary submission involves all those possible credits which are aspired by the project

team. After the preliminary submission, review is done by third party assessors and review comments would be provided by IGBC within 30 working days.

* The next phase involves submission of clarifications to preliminary review queries and final submission. This review will also be provided by IGBC within 30 working days, after which the rating is awarded.

It is important to note that the mandatory requirements and credits earned at the preliminary review are only considered as expected. These mandatory requirements and credits are not awarded until the final documents are submitted, along with additional documents showing implementation of design features. If there are changes in any ‘expected credits’ after preliminary review, these changes need to be documented and resubmitted during the final submission.

**Threshold criteria for Certification Levels**

|  |  |  |
| --- | --- | --- |
| Certification Level | Green RailwayStation | Recognition |
| Certified | 40 – 49 | Best Practices |
| Silver | 50 – 59 | Outstanding Performance |
| Gold | 60 – 79 | National Excellence |
| Platinum | 80 – 100 | Global Leadership |

IGBC will recognise Green Railway Station that achieve one of the rating levels with a

formal letter of certification and a mountable plaque.

**Certification Process**

Online Project Registration at www.igbc.in

30 days

|  |  |
| --- | --- |
| Project team submits preliminary documentation for review to IGBC |  |
|  |
|  |
| Review by IGBC 3rd party Assessors |  |
|  |

Submission of Final documentation by Project team

Site visit by IGBC

30 days

Final review & award of rating

Acceptance of rating by project

Project team appeals within 30 days of announcement

IGBC present Plaque & Certificates indicating Certification level

**H. Credit Interpretation Ruling (CIR)**

In some instances, there is a possibility that the design team may encounter certain challenges

in applying or interpreting a mandatory requirement or a credit. It can also happen in cases where the project can opt to achieve the same intent through a different compliance route. To address this, IGBC uses the process of Credit Interpretation Ruling (CIR) to ensure that interpretations are consistent and applicable to other projects as well.

The following are the steps to be followed in case the project team encounters any difficulty:

™ Refer the Abridged Reference Guide for description of the credit intent and compliance options.

™ Review the intent of the mandatory requirement / credit and self-evaluate whether the project satisfies the intent.

™ Review the Credit Interpretation Ruling web page for previous CIRs on the relevant mandatory requirement or credit. All projects registered under IGBC Green Railway Station rating system will have access to this page.

™ If a similar CIR has not been addressed or does not answer the question sufficiently, submit a credit interpretation request. Only registered projects are eligible to post credit interpretation request. Two CIRs are answered without levying any fee, and for any CIR beyond the first two CIRs, a fee is levied.

**I. Appeal**

To be developed

**J. Fee**

[Registration, Certification and CIR fee details are available on the IGBC website (www.igbc.in) or](http://www.igbc.in)

can be obtained from IGBC (igbc@cii.in).

**K. Updates and Addenda**

As the rating system continues to improve and evolve, updates, addenda and errata to the abridged reference guide will be made available through IGBC website. The addition thereof will be suitably incorporated in the next version of the rating system.

|  |  |
| --- | --- |
| **IGBC Green Railway Stations Rating System****Checklist** | **Points****Available** |
| **Modules** | **100** |
| **Sustainable Station Facility (SSF)** | **24** |
| SSF Mandatory Requirement 1 | Environmental Regulations |  |
| SSF Credit 1 | Passenger Amenities at Railway Station | 6 |
| SSF Credit 2 | Universal Access | 4 |
| SSF Credit 3 | Integrated Transport Network | 4 |
| SSF Credit 4 | Green Cover at Station | 2 |
| SSF Credit 5 | Heat Island Reduction – Roof & Non Roof | 4 |
| SSF Credit 6 | Outdoor Light Pollution Reduction | 2 |
| SSF Credit 7 | Station - Operations & Maintenance | 2 |
| **Health, Hygiene & Sanitation (HHS)** | **20** |
| HHS Mandatory Requirement 1 | Tobacco Smoke Control |  |
| HHS Mandatory Requirement 2 | Safe Drinking Water Facility |  |
| HHS Credit 1 | Fresh Air Ventilation | 4 |
| HHS Credit 2 | Solid Waste Management Plan | 6 |
| HHS Credit 3 | Plastic-free Environment | 2 |
| HHS Credit 4 | Air Quality Monitoring | 4 |
| HHS Credit 5 | Station Housekeeping Plan | 4 |
| **Energy Efficiency (EE)** | **22** |
| EE Credit 1 | Enhanced Energy Performance – Non Traction | 10 |
| EE Credit 2 | On site Renewable Energy | 6 |
| EE Credit 3 | Energy Monitoring | 4 |
| EE Credit 4 | Solar Water Heating | 2 |
| **Water Efficiency (WE)** | **16** |
| WE Credit 1 | Water Conservation Measures | 4 |
| WE Credit 2 | Rain Water Harvesting, 25%, 50% | 4 |
| WE Credit 3 | Waste Water Treatment, 100% | 4 |
| WE Credit 4 | Waste Water Reuse, 75%, 100% | 2 |
| WE Credit 5 | Water Monitoring | 2 |
| **Smart & Green Initiatives (SGI)** | **12** |
| SGI Credit 1 | Smart Passenger Services | 8 |
| SGI Credit 2 | Green Outreach & Awareness | 2 |
| SGI Credit 3 | Green Railway Station Committee | 2 |
| **Innovation & Development (ID)** | **6** |
| ID Credit 1 | Innovation | 5 |
| ID Credit 2 | IGBC Accredited Professional | 1 |

**Sustainable Station Facility**

**Environmental Regulations**

**SSF Mandatory Requirement 1**

**Intent:**

Ensure that the building complies with necessary statutory and regulatory codes.

**Compliance Options:**

The project shall comply with following statutory approvals from the Government of India or State Government authorities, as applicable:

* Approved site plan (and/ or) building plans for construction, as applicable
* Completion certificate signed by Architect/Engineer/Owner or Third party Commissioning
* Authority (OR) Occupancy certificate from Local Authority

(AND)

The project shall adhere to the requirements of **Ministry of Railways (Railway Board) - Works Directorate,** as per latest version of ‘Indian Railways Works Manual’ and ‘Manual For Standards and Specifications for Railway Stations’.

**Passenger Amenities at Railway Station**

**SSF Credit 1 Points: 6**

**Intent:**

Provide access to facilities which will enhance the comfort for the passengers and visitors during their stay at station.

**Compliance Options:**

Demonstrate implementation of at least 6 passenger amenities at the station premise.

1. Platforms with adequate lighting fixtures and level of illumination (lux level)

2. Firmly fixed waiting chairs/ benches on each platform

3. Waiting Rooms/ Halls with lighting fixtures, ventilation & well maintained facilities

4. Cloak Room with adequate storage space

5. Booking Office with seating & adequate lighting.

6. Toilets (for Male & Female) atleast at main platforms (1st and last platform) with daily maintenance plan

7. Water vending machines on each platform (Adequate nos.)

8. Emergency medical care facilities.

9. Foot-Over-Bridges or Sub-ways (If required)

10. Adequate Elevators & Escalators (If required)

11. Adequate Mobile charging points on every platform

12. Adequate pickup and drop-off points.

13. Ease to reach Station office from public transport drop off points

14. Provide convenience shops, Drinking water points, Freight pickup and drop zones, etc.

*All the passenger facilities should be functional.*

**Universal Access**

**SSF Credit 2 Points: 4**

**Intent:**

Ensure that station is designed to be commuter friendly for differently abled and senior citizens.

**Compliance Options:**

Demonstrate implementation of at least 4 of the following facilities: (1 point for each measure)

1. Electric/ battery operated vehicles to ferry physically challenged and senior citizens at the railway station
2. Trolly Based System for Luggage Assistants
3. Entrance with non-slippery ramps, handrails on at least one side (as applicable)
4. At least One Toilet designed for differently abled people at the main platform and waiting rooms
5. Adequate Signage system for guiding the person up to the lift / elevators and various other passenger
6. amenities at station
7. Braille along circulators to be incorporated on walkways and walls.

**Integrated Transport Network**

**SSF Credit 3 Points: 4**

**Intent:**

Improve the connectivity between the railway station and other parts of the city through public transport.

**Compliance Options:**

**Connectivity with City Transport System : (2 Points)**

Demonstrate that the station has atleast one of the following public transport modes to connect to the city within 1 km radius of the station.

* Suburban Railway Station (intra city)
* Metro Station
* Bus Stop

(AND)

**Feeder System for Railway Station : (2 Points - 1 point for each measure)**

Provide the following to enhance accessibility to station:

* Bus stop/ Feeder bus facility within 100m walkable distance from all entrance/exit points of station
* Dedicated Drop-off zones for Intermediate Public Transport (e-Rickshaw, Auto Rickshaw, Cycle

Rickshaw etc.) within 100m walkable distance from all entrance/ exit points of station

* Parking facility for Feeder bus and Intermediate Public Transport

 2 and 4 wheeler parking facility

* Provide electric points to encourage electric cars in parking lots

**Green Cover at Station**

**SSF Credit 4 Points: 2**

**Intent:**

Preserve / restore existing trees and plant new saplings to protect habitat and promote biodiversity.

**Compliance Options:**

Demonstrate atleast two of the following measures at the station site:

1. Preserve all existing trees at station premise
2. Provide vegetation (with native/ naturalised species) for atleast 30% of the station site
3. Plantation of at least 10 native tree saplings at station premise every year
4. Development of organic garden (or) vertical gardens within station premise

4.1 Reduce noise pollution by adding green buffers

4.2 Avoid use of pesticides for gardening

**Heat Island Reduction – Roof & Non Roof**

**SSF Credit 5 Points: 4**

**Intent:**

Minimise heat island effect so as to reduce impact on microclimate

**Compliance Options:**

**Non Roof Areas: (2 points)**

For atleast 75% of exposed non-roof impervious areas within the project site, implement atleast one or combination of the following :

1. Shade from tree cover

2. Open grid pavers, grass pavers

3. Hardscape materials (SRI)

**Roof Areas: (2 points)**

Use material with high solar reflective index (SRI) value (or) vegetation (or) a combination, to cover

atleast 50% of the exposed roof areas:

1. Minimum SRI value of 78 for Low-sloped roof (Slope: < 2:12)

2. Minimum SRI value of 29 for Steep-sloped roof (Slope: > 2:12) and Maximum SRI of 64. (OR)

Develop vegetation/ green roof/ solar PVs to cover atleast 50% on the Exposed Station Roof Areas.

(OR)

Any other innovative methodology for reduction of heat island effect.

**Outdoor Light Pollution Reduction**

**SSF Credit 6 Points: 2**

**Intent:**

Reduce light pollution from exterior and façade lighting to increase night sky access and enhance nocturnal environment.

**Compliance Options:**

Design exterior lighting such that no external light fixture emits more than 5% of the total initial designed fixture Lumens, at an angle of 90 degrees or higher from nadir (straight down).

(AND)

The lighting power density should be reduced by 30% for building facades and exterior areas vis-à-vis the ASHRAE Standard 90.1-2010 baselines, Section 9.4.3 - Exterior Building Lighting Power (tradable

& non-tradable surfaces).

**Station - Operations & Maintenance**

**SSF Credit 7 Points: 2**

**Intent:**

Ensure sustained performance of the station facilities, so as to achieve benefits during the lifetime of the station operations.

**Compliance Options:**

The railway station authority shall have an in-house team to handle the operation & maintenance for the following, as applicable :

* Housekeeping
* Water supply & Maintenance of Plumbing Systems
* Electrical Systems
* Mechanical Equipment
* Solid waste management

For the in-house maintenance, submit a narrative on preventive and corrective actions in the preceding

1 year. (OR)

The railway station authority shall have an annual maintenance contract with external agency for all building systems and housekeeping. A copy of the contract shall be submitted with detailed scope of work.

**Health Hygiene & Sanitation**

**Tobacco Smoke Control**

**HHS Mandatory Requirement 1**

**Intent:**

Minimise exposure of non-smokers to the adverse health impacts arising due to passive smoking at the station

**Compliance Options:**

Demonstrate implementation of the following measures at the station premise:

* Smoking shall be prohibited in the station in accordance with Govt. of India regulations (OR)
* Designated Smoking rooms with proper exhaust systems
* Prohibit sale of tobacco products in the station premise

**Safe Drinking Water Facility**

**HHS Mandatory Requirement 2**

**Intent:**

Ensure adequate quantity of clean and safe drinking water for all passengers to eliminate spread of

water borne diseases.

**Compliance Options:**

Demonstrate implementation of following measures at station.

1. Safe drinking water unit/ storage facility at Station
2. Adequate drinking water availability as per IR code (or) 0.5 litres per station FTE.
3. Quality of water to meet CWC & CGWB standards

*CWC : Central Water Commission, CGWB : Central Ground Water Board*

**Fresh Air Ventilation**

**HHS Credit 1 Points: 4**

**Intent:**

Provide adequate fresh air ventilation so as to avoid pollutants affecting indoor air quality

**Compliance Options:**

**Naturally Ventilated Station:**

All multi occupied spaces in the station shall have open / openable area (windows, doors, ventilators)

equal to or greater than 8% of the total carpet area.

**Mechanically Ventilated Rooms:**

Demonstrate that the fresh air ventilation in all multi occupied areas shall meet the minimum ventilation

rate of 0.12 cfm/ sq.ft.

***Note:***

● *Multi occupied spaces include waiting rooms, cloak rooms, booking office, etc.*

● *Doors, windows & ventilators can be considered as openings and should be kept open during occupancy.*

**Solid Waste Management Plan**

**HHS Credit 2 Points: 6**

**Intent:**

Segregate station waste at source and facilitate recycling (Or) environment friendly disposal, thereby

maintain a hygienic environment at station and avoid such waste being sent to land-fills

**Compliance Options:**

Demonstrate an ongoing solid waste collection and disposal system at station to include organic and recyclable waste: (1 point for each measure)

1. Provide 2 separate bins for collection of food waste (organic) and recyclable waste (plastic & paper) at every platform at an interval of 100m.
2. Have provision of a central waste collection area in station premise with separate bins for dry waste (paper, plastic, cardboard, metal, glass), wet waste (garden & food waste) and e-waste.
3. Station shall have a contract in place with recyclers for diverting paper & plastic waste.
4. Have a organic waste management system in place within the station premise
5. Adequate disposal discipline to a nearby landfill site from centralised waste collection area after

diverting the recyclable waste for reuse/ recycling.

1. Maintenance Plan for keeping the centralised waste collection area free from insects and mosquitos.

**Plastic-free Environment**

**HHS Credit 3 Points: 2**

**Intent:**

Ban use of plastic bags within the station premises to reduce environmental impacts of handling such waste.

**Compliance Options:**

Demonstrate the following measures at station premise:

* Signage at all the railway platforms for awareness
* Periodic supervision to keep check on plastic litter at station premise
* Organise awareness programme about adverse effects of ‘plastic use’ periodically

**Air Quality Monitoring**

**HHS Credit 4 Points: 4**

**Intent:**

Avoid exposure to airborne contaminants while occupying the station premises, so as to reduce the adverse health impacts on passengers & station staff

**Compliance Options:**

* Conduct Air Quality testing using testing protocols consistent with National Ambient Air Quality Standards (MoEF notification G.S.R 826(E), dated 16.11.2009), Environment (Protection) Rules 1986

 (AND)

Demonstrate that maximum concentration levels of contaminants are not exceeded

* Install Air Quality Monitoring System for public awareness

Maximum Concentration Levels of Contaminants

|  |  |  |  |
| --- | --- | --- | --- |
| Contaminant | Time weightedAverage | Concentration inAmbient Air | Method of measurement |
| Sulphur Dioxide(SO2) | AnnualAverage | 50.0 µg/ m3 | 20.0 µg/ m3 | - Improved West & Gaeke method- Ultraviolet fluorescence |
| 24 Hours | 80.0 µg/ m3 | 80.0 µg/ m3 |
| Oxides ofNitrogen as NO2 | AnnualAverage | 40.0 µg/ m3 | 30.0 µg/ m3 | - Modified Jocob and Hochheise(Sodium Arsenite )- Chemiluminescence |
| 24 Hours | 80.0 µg/ m3 | 80.0 µg/ m3 |
| Particulate matter (size less than 10µm) | AnnualAverage | 60.0 µg/ m3 | 60.0 µg/ m3 | - Gravimetric- TOEM- Beta attenuation |
| 24 Hours | 10.0 µg/ m3 | 10.0 µg/ m3 |
| Particulate matter (size less than 2.5µm) | AnnualAverage | 40.0 µg/ m3 | 40.0 µg/ m3 | - Gravimetric- TOEM- Beta attenuation |
| 24 Hours | 60.0 µg/ m3 | 60.0 µg/ m3 |

**Station Housekeeping Plan**

**HHS Credit 5 Points: 4**

**Intent:**

Encourage use of eco-friendly housekeeping chemicals so as to reduce adverse health impacts for passengers

**Compliance Options:**

Demonstrate that station facility management team (or) external housekeeping agency is using housekeeping chemicals that meet GreenPro – Green Product Certification standard, green seal standard (GS-37) or other internationally recognised equivalent standards, for all station applications.

(AND)

Implement measures as per Environment and Housekeeping Management Directorate of Indian Railways

* Mechanised Cleaning
* Pest & Rodent Control
* Linen Management at station
* Repairs to Amenities
* Support Station for on board house-keeping services on platform

**Energy Efficiency**

**Enhanced Energy Performance – Non Traction**

**EE Credit 1 Points: 10**

**Intent:**

Enhance energy efficiency of the station to reduce environmental impacts from excessive energy use

**Compliance Options:**

Energy Efficient Lighting Fixtures (2 points)

Demonstrate 25% improvement over the base case in energy consumption by using LED for interior

lighting fixtures

The wattage (W) to be considered in base case for interior lighting is 55W

**Energy Efficient Fans (2 points)**

Use or replace atleast 30% of fans in stations with minimum BEE 3-star rated or equivalent fans.

**Energy Efficiency in Appliances & Equipment (2 points)**

Provide atleast 50% of computers/ monitors/ printers used in station office area and booking office which are rated under Energy Star or equivalent program with high efficiency UPS.

(AND)

Provide all unitary air-conditioners with minimum BEE 3-star rating or equivalent (2 points)

(AND)

BEE rated transformers in substation for better performance. (2 points)

**On site Renewable Energy, 2.5%, 5%, 10%**

**EE Credit 2 Points: 6**

**Intent:**

Encourage the use of on-site renewable energy systems, to minimise the environmental impacts associated with use of fossil fuels

**Compliance Options:**

Demonstrate onsite renewable energy generation for atleast 2.5% of total energy consumption of the station.

Implement any of the following RE systems at station premise:

* Solar PV systems at station rooftop
* Bio-energy technologies
* Small wind turbines
* Bio Diesel based DG sets
* Biogas from food waste to be used as cooking gas
* Mini wind turbines

The list is illustrative and does not include all renewable energy systems.

**Energy Monitoring**

**EE Credit 3 Points: 4**

**Intent:**

Encourage continuous monitoring to identify improvement opportunities to improve energy efficiency.

**Compliance Options:**

Demonstrate sub-metering and identify trends (energy monitoring) for the following energy use applications in stations:

* Lighting
* Onsite renewable energy systems
* Power back-up systems (Generator sets, gas turbines etc)

(AND)

Carry out comprehensive energy audits once in three years and explore opportunities for Improvement

Carry out Energy Safety Audit

**Solar Water Heating**

**EE Credit 4 Points: 2**

**Intent:**

Encourage use of solar assisted water heating applications, to minimise the environmental impacts associated with use of fossil fuels

**Compliance Options:**

Install Solar water heating system for station to meet at least 25% of hot water requirement of canteen

and restaurants within the station premise.

**Water Efficiency**

**Water Conservation Measures**

**WE Credit 1 Points: 4**

**Intent:**

Reduce potable water consumption in the station by implementing water conservation measures.

**Compliance Options:**

**Water Efficient Fixtures**

Demonstrate at least 10% reduction in potable water requirement by using water efficient plumbing fixtures whose flow rates are less than the baseline criteria of uniform plumbing code, as mentioned below:

|  |  |
| --- | --- |
| Fixture type | Baseline |
| Water Closets (LPF) | 6.0/3.0 |
| Urinals (LPF) | 4.0 |
| Faucets / Taps (LPM)\* | 6.0 |
| Health Faucets (LPM)\* | 6.0 |

**Water Use Reduction for Coach Washing**

Demonstrate reduction in potable water demand for coach washing by implementing any of the following measures:

* Automatic coach washing plants
* Rainwater Harvesting (Use of harvested water)
* Any other source

**Rain Water Harvesting, 25%, 50%**

**WE Credit 2 Points: 4**

**Intent:**

Recharge the local aquifer or capture rain water to reduce potable water consumption.

**Compliance Options:**

Capture atleast 25% of run-off volumes from roof and non-roof areas of station. The harvesting system designed shall cater to atleast 1day average rainfall occurred in the last 5 years

In areas where the central/ state ground water board does not recommend artificial rain water recharge

(or) if the groundwater table is less than 4 m, such projects need not comply to the credit requirement.

**Waste Water Treatment, 100%**

**WE Credit 3 Points: 4**

**Intent:**

Treat waste water generated at station so as to make it available for reuse or safe disposal and hence avoid polluting the receiving streams

**Compliance Options:**

Have on-site treatment systems OR community wastewater treatment system to treat 100% of waste

water generated at the station, to the quality standards (CPCB)

* O&M Plan for monitoring the treatment plant periodically
* Discharge system to be defined

*Effluent Treatment Plant/ Sewage Treatment plant under construction and to be completed within 3*

*years can comply.*

**Waste Water Reuse, 75%, 100%**

**WE Credit 4 Points: 2**

**Intent:**

Use treated waste water thereby reducing dependence on potable water.

**Compliance Options:**

Use treated waste water for following applications within the station premise, thereby reducing dependence on potable water.

* Flushing
* Landscaping
* Cleaning of station

**Water Metering**

**WE Credit 5 Points: 2**

**Intent:**

Encourage water metering to identify improvement opportunities and thereby reducing the usage of potable water

**Compliance Options:**

Demonstrate sub-metering for at least 75% of the total water consumption in the station. This may cover the following major water supply and users.

* Municipal water supply
* Water supply from bore wells
* Treated waste water supply
* Major sources of water consumption
* Coach washing
* Toilets
* Land scaping
* Drinking water
* Cleaning of stations i.e roofs, floors, platforms, columns, walls, ramps, steps, etc.

**Smart & Green Initiatives**

**Smart Passenger Services**

**SGI Credit 1 Points: 8**

**Intent:**

Encourage smart passenger information systems & services at the station for convenient and comfortable commuting experience.

**Compliance Options:**

Implement unique smart technologies at station: (1 point for each technology)

* Wi-fi facility at station
* Multi lingual e-Ticketing portal
* Automatic ticket vending machine
* CCTV surveillance for safety
* Portable structures with biotoilets for senior citizens at platforms
* Vacuum Bio-toilet at station.
* Request through SMS for cleaning of toilets
* Built-in Dustbins at station
* Water vending machine exceeding IR requirement by 20%
* Automatic Vehicle Location & Tracking
* Air Quality Monitoring Station
* Smart Card Ticketing
* Digital Information Signage

**SMART & GREEN INITIATIVES**

**Green Outreach & Awareness**

**SGI Credit 2 Points: 2**

**Intent:**

Adopt measures to spread awareness on Green Railway Station amongst all the users of rail way services.

**Compliance Options:**

* Green Information Signage installed at station entrance(s) highlighting the key green features implemented in the station
* Green Awareness campaigns on Environment Day, Earth Day, Green Building Week, etc.,
* Green Safety Campaign to be done periodically
* Signage indicating the quantification of impacts (in terms of energy & water savings) after

implementation of green measures at station

**52** IGBC Green Railway Stations

**Green Railway Station Committee**

**SGI Credit 3 Points: 2**

**Intent:**

To sustain & enhance the green measures implemented at the station on a continuous basis, thereby

reaping the environmental benefits

**Compliance Options:**

* Formation of Green Railway Station Committee for regular monitoring of implemented green features at station
* The committee shall convene a meeting every two months to discuss on existing green features at station and new green initiatives proposed for the Green Railway Station.

**Innovation & Development**

**Innovation**

**ID Credit 1 Points: 5**

**Intent:**

Provide design teams and projects an opportunity to be awarded points for innovative performance in green building categories not specifically addressed by the IGBC Green Railway Stations rating system and / or exemplary performance above the requirements set by the IGBC Green Railway Stations rating system.

**Compliance Options:**

 **Innovation**

Identify the intent of proposed innovation credit, proposed requirement for compliance, and proposed documentation to demonstrate compliance, and the design approach used to meet the required measures.

(Or)

**Exemplary performance**

The project is eligible for exemplary performance, if the implemented measures greatly exceed the

credit requirements of the IGBC Green Railway Station rating system.

***Notes:***

● *As a general rule, points for exemplary performance are awarded for achieving the next incremental percentage threshold.*

● *Eligibility criteria for various credits in the IGBC Green Railway Station rating system are defined in respective credits and Exhibit - B.*

***General Notes:***

The project shall also meet the following criteria for achieving an Innovation point:

● *Quantitative performance improvements (comparing a baseline and design case).*

● *Strategy must be significantly better than standard sustainable design practices.*

● *Measures must be voluntary. Measures that are mandated by the Indian Railways and not addressed in the rating system are not eligible for Innovation.*

**Suggested Innovations :**

**1. Enhanced Energy Efficiency – Traction**

Reduce power demand for traction, thereby reducing environmental impacts from excessive energy use

**2. Smart Freight Management**

Encourage information technology in freight operations, thereby reducing the environmental impacts

**58** IGBC Green Railway Stations

**IGBC Accredited Professional**

**ID Credit 2 Point: 1**

**Intent:**

Support and encourage involvement of IGBC Accredited Professional in green building projects, so as

to integrate appropriate design measures and streamline the certification process.

**Compliance Options:**

At least one principal participant of the project team shall be an IGBC Accredited Professional.

**60** IGBC Green Railway Stations