IGBC

Confederation of Indian Industry

Green Data Center Certification

VERSION 1

ABRIDGED REFERENCE GUIDE
AUGUST 2024

IGBC Green Data Centers

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Abridged Reference Guide

August 2024

Confederation of Indian Industry

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Foreword

Data centers have experienced exponential growth over the past decade owing to advancement in businesses, technologies and governance.. They play a crucial role in driving various benefits, including:

- **Efficiency and Productivity**: Data centers support IT-enabled services and streamlined communication, leading to increased efficiency and man-day savings.
- **Economic Growth**: Data centers power e-commerce, digital payments, and cloud-based services, fostering business innovation and economic development.
- **Job Creation**: The data center industry generates significant employment opportunities across construction, Operational, and IT sectors.
- **Environmental Sustainability**: By enabling remote work and online transactions, data centers reduce carbon emissions associated with travel and commuting.

Today, data centers have become critical enablers in IT infrastructure leading to digital transformation.

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Thanks to all the organizations for their participation and contribution in developing the Certification Program, as mentioned in the table.

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Green Data Center Certification Program:

1. Introduction:

The Data Center sector is growing significantly and it is expected to witness the growth several folds in the years to come. Considering the growth in the Data Center Sector, there is a need to address sustainability in a holistic way and define solutions which can enable the sector to adopt green principles for better resource utilization and reduce dependency on conventional design/operational practices. Introducing the principles of green in data centers can help address concerns like energy efficiency, water management, safe disposal of waste and high embodied energy materials uses in their new construction/expansion.

Against this background, Green Data Center Certification Program which was launched in 2016, has now been upgraded to addresses todays' sustainability requirements.

2. Benefits of Green Data Center Certification:

The Green Data Center Certification presents a comprehensive framework for evaluating and enhancing the sustainability of data centers. It encompasses various aspects of data center design, construction, and operation, including site selection, energy efficiency, water conservation, material usage, and indoor environmental quality. The certification also includes a unique Operational Stability Framework that focuses on risk assessment, change management, and preventive maintenance to ensure the continuous and efficient operation of data centers.

The certification employs a Credit-based approach, awarding credits for meeting specific criteria and prerequisites. By achieving higher credit scores, data centers can attain certifications ranging from "Certified", "Silver", "Gold" to "Platinum," signifying their commitment to environmental responsibility and resource efficiency. The certification not only encourages the adoption of green technologies and practices but also promotes innovation and continuous improvement in data center sustainability.

3. Sustainability Measures Addressed in the Certification Program:

The Green Data Center Certification addresses the most important priorities which include reduction in energy demand & related infrastructure, savings in water & increased availability. It also promotes increased share of renewable energy use and proper Waste segregation & proper disposal.

The certification is fully aligned with the National/International Codes and Standards. It sets criteria that meet or exceed those established by organizations like ASHRAE and ISOs, showcasing its commitment to global best practices. NBC-2016, ECBC 2017, MoEF and CPCB guidelines, are referred, also demonstrates its global relevance by incorporating and referencing various Standards and Guidelines such as ASHRAE 90.4-2022, Equipment Thermal Guidelines for Data Processing Environments 2021 (ASHRAE TC 9.9 Reference) and ISO 14644-8:2022, ANSI/ISA-71.04-2013. The certification's overarching objective is to not only comply with the National/International Standards however, to push beyond the baseline, fostering innovation and setting new benchmarks for sustainable Data Center practices, thereby contributing to a global movement towards greener and more efficient data centers.

- In the realm of **Energy Efficiency**, the certification mandates the use of refrigerants that adhere stringent requirements limiting Global Warming Potential (GWP). It also sets a minimum energy performance threshold by requiring data centers to achieve a Power Usage Effectiveness (PUE) that doesn't exceed a defined limit. The certification further encourages the adoption of advanced energy management systems and the integration of renewable energy sources, with specific credit Credits allocated based on the percentage of renewable energy utilized.

- For **Water Conservation**, the certification mandates rainwater harvesting systems capable of capturing at least one day's rainfall runoff. It also promotes the use of water-efficient plumbing fixtures with flow rates lower than baseline standards. The use of alternative water sources is incentivized, with credits awarded based on the percentage of total water consumption met through such sources.

- The certification addresses **E-Waste Management** by requiring data centers to partner with certified e-waste recyclers and maintain detailed inventories of e-waste generated. Further DCs are encouraged to adopt e-waste reduction strategies like extending equipment lifespans, implementing sustainable procurement practices and following EPR (Extended Producers Responsibility) policies.

- The certification also references international standards like ASHRAE Standard 62.1-2022 for ventilation rates, ISO 14644-8 for gaseous contaminant testing, and ASTM standards for solar reflectance index values, showcasing its alignment with global best practices.

- **Sustainable Building Materials**: The Green Data Center Certification actively promotes the use of sustainable materials in data center construction. It encourages the incorporation of certified green products, both passive (like concrete, steel, insulation, and wood) and that meet stringent environmental performance criteria. The certification awards credits based on the percentage of certified green products used, incentivizing data centers to reduce their reliance on virgin materials and minimize the environmental impacts associated with resource extraction and processing.

- **Indoor Environment Quality:** The Green Data Center Certification recognizes the importance of occupant health and well-being, even in data centers with low human occupancy. The certification mandates measures to ensure a healthy and comfortable working environment for staff following ventilation requirements. It requires compliance with ASHRAE 62.1 for fresh air ventilation and mandates the implementation of tobacco smoke control policies. The certification also encourages the use of low-emitting materials, daylighting, and the provision of occupant well-being facilities, further enhancing the quality of the indoor environment and promoting the well-being of data center personnel.

4. Green Data Center Certification:

IGBC has set up the Green Data Center technical Committee to develop the certification program. The committee comprised of key stakeholders, including Data Center owners, operators, technology suppliers, HVAC&R technology suppliers and referred DC Consultants. The committee, with a diverse background and knowledge has enriched the certification system, both in its content and process.

Features

IGBC Green Data Center certification is a voluntary and consensus-based program. The certification has been developed based on solutions, technologies and materials that are presently available. The objective of IGBC Green Data Center Certification is to come out with a tool that would help designers and operating personnel to incorporate green elements.

The Certification has evolved so as to be comprehensive and at the same time user-friendly. The program is fundamentally designed to address sustainability holistically.

- **Focus on Data Center Equipment:** The certification places a strong emphasis on the efficiency and sustainability of the data center equipment itself, rather than solely focusing on the building's structural elements. This ensures that the core Operational of the data center are optimized for resource conservation.
- **Comprehensive Scope:** The certification addresses both the IT areas (server rooms, data halls) and the non-technical spaces (offices, common areas) within the data center, promoting sustainability in a holistic approach manner.
- **Emphasis on Management and Monitoring:** The certification recognizes the critical role of effective management and monitoring in achieving operational efficiency. It places a higher emphasis on management information systems, energy management, and real-time monitoring to enable data centers to track and optimize their performance.
- **Stringent Indoor Air Quality Standards:** The certification goes beyond basic indoor air quality requirements. It mandates the maintenance of ISO Class 8 cleanliness levels in IT spaces and sets specific limits for gaseous contaminants, ensuring a healthy and corrosion-free environment for sensitive electronic equipment.
- **On-Site Verification:** The certification process includes proposed site visits before awarding the rating, ensuring that the implemented green measures are effective and aligned with the certification's intent.

Scope:

IGBC Green Data Center Certification is designed primarily for

- Data Centers under Design/Construction Stage should apply for **Green Data Center, Design Certification**
- Commissioned Data Centers with less than year of Operation shall follow **Green Data Center, Design & Build Certification**
- Data Centers with more than 1 year of Operation: **Green Data Center**, **Operational Certification**

The Future of IGBC Green Data Center Certification

Many new green building materials, equipment and technologies are being introduced in the sector. With continuous upgradation and introduction of new green technologies and products,

it is important that the certification program also keeps pace with current Standards and Technologies.

Therefore, the certification program will undergo periodic revisions to incorporate the latest advancement and changes. It is important to note that project teams applying for IGBC Green Data Center certification should register their projects with the latest version of the certification. During the course of implementation, projects have an option to transit to the latest version of the certification program. IGBC will highlight new developments on its website (https://dcs.greenbusinesscentre.com/dcs2024.php).

5. Overview and Process

IGBC Green Data Center certification addresses green features under the following categories:

- **Site Selection & Planning**
- **Energy Efficiency**
- **Operation Stability Framework**
- **Water Conservation**
- **Building Material and Resources**
- **Indoor Environmental Quality**
- **Innovation**

The guidelines detailed under each requirement & credit enable the Design & Operation of Data Center projects of all sizes and types. Different levels of Green Data Center certification are awarded based on the total credits earned. However, every Green Data Center should meet certain mandatory requirements, which are non-negotiable.

The various levels of rating awarded are as below:

Certification Level	Recognition
Certified	Good Practices
Silver	Best Practices
Gold	National Excellence
Platinum	Global Leadership

A. Registration

Organizations interested in registering their projects under Green Data Center Certification are advised to first register at (www.igbc.in). The website includes information on registration fee for several categories including member and non-member companies.

Registration is the first step which helps establish initial contact with the certification agency and provides access to the required documents, templates, important communications and along with other necessary information.

The website provides all important details on Green Data Center Certification registration &

certification - process, schedule and fee.

B. Certification

To achieve the Green Data Center Certification, the Data Center must satisfy all the mandatory requirements and the minimum number of credit Credits. The project team is expected to provide supporting documents at the preliminary and final stage of submission, for all the mandatory requirements and the credits attempted.

The Certification is valid for 3 years from the date of award, after which the project is required to apply for the recertification. In case of certification upgradation, a project can reapply within 90 days after the certification for additional Credits only paying Rs. 20,000/ per credit for upgradation and later to this (beyond 90 days), the project would be treated under recertification, following the process defined under recertification.

Narratives and supporting documentation such as drawings, calculations (in excel sheets), declarations / contract documents, purchase invoices, manufacturer cut sheets / letters / material test reports, etc., shall be submitted for each mandatory requirement and credit. The project documentation is submitted in two phases - Preliminary submittal and Final submittal:

The preliminary phase involves submission of all documents, which shall include the mandatory requirements and the minimum number of credits. After the preliminary submission, review is done by third party assessors and review comments will be provided within 30 calendar days.

The next phase involves submission of clarifications to preliminary review queries and final submittal. This review will also be provided within calendar days, after which the Certification is awarded.

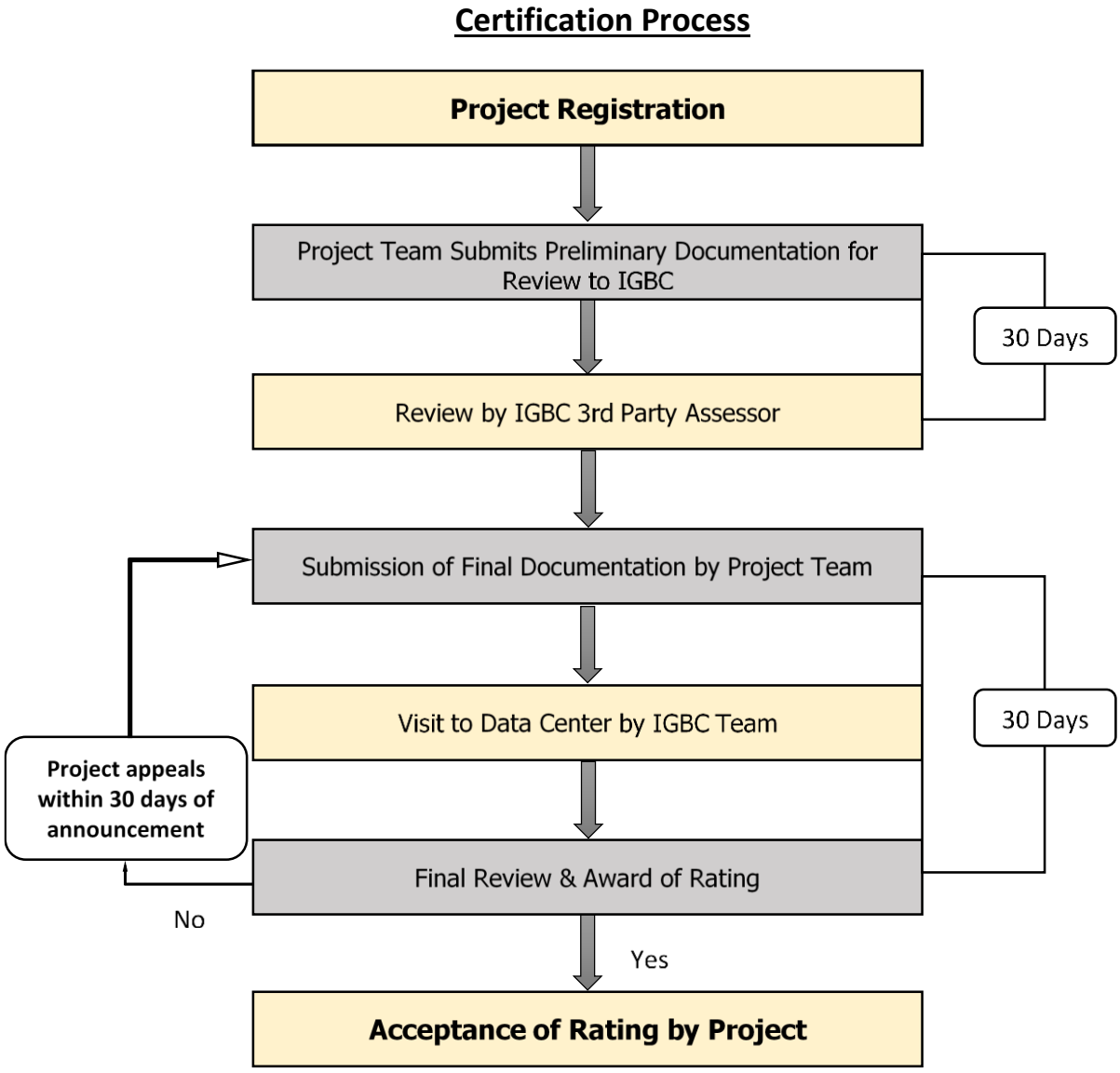
It is important to note that the mandatory requirements and credits earned at the preliminary review are considered as almost achieved and indicated as 'Expected'. These mandatory requirements and credits are awarded after the final documents are submitted. If there are changes in any 'Expected' credits after preliminary review, these changes need to be documented and resubmitted during the final review.

The threshold criteria for certification levels are as under:

Certification Level	Credit Credits		Recognition
	New Data Center	Existing Data Center	
Certified	40 – 49	40 – 49	Good Practices
Silver	50 – 64	50 – 64	Best Practices
Gold	65 - 79	65 - 79	National Excellence
Platinum	$\geq$80	$\geq$80	Global Leadership

Green Data Center is recognized that achieve one of the rating levels with a formal letter of

Certification and a Mountable Plaque.



C. Credit Interpretation Ruling (CIR)

In some instances, there is a possibility that the 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, Credit Interpretation Ruling (CIR) may be utilized 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 (CIR) web page for previous CIRs on the relevant mandatory requirement or credit. All projects registered under IGBC Green Data Center Rating System or similar 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.

D. Appeal

In rare cases, mandatory requirements / credits get denied due to misinterpretation of the intent. On receipt of the final review and if the project team feels that sufficient grounds exist to appeal a credit denied in the final review, the project has an option to appeal to IGBC for reassessment of denying mandatory requirements/ credits. The documentation of the mandatory requirements / credits seeking appeal may be resubmitted to IGBC along with necessary fees. IGBC will take 30 days to review such documentation. If an appeal is pursued, please note that a different review team will be assessing the appeal documentation.

E. Fee

Registration, Precertification / Provisional Certification, Certification and CIR fee details are available on the IGBC website (https://igbc.in/igbcgreendatacenter) or can be obtained from IGBC (igbc@cii.in)

F. Updates and Addenda

The Certification system continues to improve and evolve, updates, addenda and errata to the abridged reference guide will be made available through IGBC website(https://igbc.in/igbcgreendatacenter). The additions thereof will be suitably incorporated in the next version of the Certification program.

Credit Checklist

IGBC Green Data Center Rating System		Credits	
		Design and Build	Operational
Modules		**100**	**100**
Site Selection and Planning		**7**	**7**
SSP Mandatory Requirement 1	Local Building Regulations	Required	Required
SSP Credit 1	Natural Topography	2	2
SSP Credit 2	Urban Heat Island Mitigation		
	Roof Area	2	2
	Non-Roof Area	2	2
SSP Credit 3	Reduction in Nocturnal Light Pollution	1	1
Energy Efficiency		**52**	**52**
EE Mandatory Requirement 1	Eco Friendly Refrigerants	Required	Required
EE Mandatory Requirement 2	Commissioning Plan	Required	NA
EE Mandatory Requirement 3	Minimum Energy Performance	Required	Required
EE Credit 1	Eco-Friendly Refrigerants	1	N/A
EE Credit 2	Integrated Building Management System	3	1
EE Credit 3	Enhanced Energy Efficiency	42	42
EE Credit 4	Renewable Energy	6	9
Operational Stability Framework		**10**	**14**
OSF Mandatory Requirement 1	Management Information System	Required	Required
OSF Credit 1	Preventive Maintenance Plan	3	4
OSF Credit 2	Energy Assessment		
	2.1 Integrated Systems Testing	4	N/A
	2.2 Periodic Energy Assessment	N/A	4
OSF Credit 3	Green Education		
	3.1 Energy Efficiency	1	2
	3.2 Sustainability Education	1	2
	3.3 Safety and Security	1	2

Water Conservation		**5**	**5**
WC Mandatory Requirement 1	Rainwater Harvesting, Roof & Non-roof	Required	Required
WC Credit 1	Water Efficient Plumbing Fixtures	1	1
WC Credit 2	Alternate Water Performance	2	2
WC Credit 3	Water Performance Monitoring	2	2
Building Material and Resources		**12**	**8**
BMR Mandatory Requirement 1	Policy on Waste Management	Required	Required
BMR Mandatory Requirement 2	Segregation of Wastes	Required	Required
BMR Credit 1	Use of Certified Green Products, Materials and Equipment	9	4
BMR Credit 2	E - Waste Management	2	3
BMR Credit 4	Hazardous waste & Operational	1	1
Indoor Environmental Quality		**8**	**8**
IEQ Mandatory Requirement 1	Tobacco Smoke Control	Required	Required
IEQ Mandatory Requirement 2	Minimum Fresh Air Ventilation	Required	Required
IEQ Credit 1	Indoor Air Quality Monitoring		
	Regularly Occupied Spaces	2	2
	IT Spaces	2	2
IEQ Credit 2	Day Lighting	1	1
IEQ Credit 3	Low-emitting Materials		
	Paints & Coatings	1	1
	Adhesive and Sealants	1	1
IEQ Credit 4	Occupant Well-being Facilities	1	1
Innovation and Development		**6**	**6**
ID Credit 1	Innovation in Design	5	5
ID Credit 2	IGBC Accredited Professional	1	1

Site Selection and Planning

Local Building Regulations

SSP Mandatory Requirement 1

Intent:

Ensure that the Data Center complies with necessary statutory regulatory codes.

Compliance Options:

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

- Approved site plan (and/ or) building plans for construction, as applicable
- Status of completion or Completion certificate signed by Owner or Third-Party Commissioning Authority (CxA)
- Implementation of Universal Design as applicable in local bylaws or NBC 2016

Note*:*

Project with 20,000 sq. m Build-up area or more shall submit 'Environmental Clearance Certificate', approved by Ministry of Environment & Forests (MoEF) or State Environment Impact Assessment Authority (SEIAA) to show compliance for certification.

Documentation Requirements

Design & Build, Operational

i. Approved Site Plan along with Environmental Clearance (EC) certificate

ii. Project completion certificate

iii. Implementation of Universal Design NBC 2016 or as per local bylaws

Natural Topography or Vegetation

SSP Credit 1 Credits: 1-2

Intent:

Minimize disturbances or restore the site to reduce long-term negative environmental impacts, thereby promoting habitat and biodiversity.

Compliance Options:

❖ **Option 1: Vegetation**

Avoid disturbance to the site by retaining natural topography and/ or design vegetated spaces on the ground, for at least 15% of the site area.

Credits are awarded as below:

Percentage of Site Area with Vegetation	Credits
≥ 15%	1
≥ 20%	2

❖ **Option 2: Vegetation over Build Structures**

Restore disturbed site area by designing vegetated spaces over Build structures and on the ground, for at least 30% of the site area (including development footprint).

Credits are awarded as below:

Percentage of Site Area with Vegetation over Built Structures and on the Ground	Credits
≥ 30%	1
≥ 40%	2

Notes:

- In case of DC located in a campus or within a building, the requirements will be estimated in proportion to the area of the Data Center.
- If a DC is part of a larger DC Park (more than a DC in a project area/site), assessment for a particular credit will be considered for the entire park's layout and the total number of data centers planned for the site, not just the individual DC.
- If a DC is located within a larger DC park that already has one or more buildings certified as green data centers, the new DC can reuse the existing certification for this specific credit if the overall site layout and design have not changed.
- Only native / adaptive vegetation which consumes less water shall be considered for this credit calculation.

- Retaining Vegetation in its broad sense means preserving the natural features of the terrain such as exposed natural rocks, water body, etc.,
- Vegetation/ Soft landscape shall not be designed with monoculture plant species, since such species would not promote habitat and biodiversity.
- Vegetation on the ground shall only be considered for this credit; vegetation over Build structures such as roofs, basement, podiums, etc., shall not be considered.
- Potted plants shall not be considered as vegetation.
- Artificial vegetation shall not be considered for this credit calculation.

Exemplary Performance:

The project is eligible for exemplary performance under Innovation in Design and O&M Process, if more than 25% of the site area is left undisturbed (i.e. retained with the natural topography and / or vegetated) based on final approved master plan

(Or)

More than 50% of the site area (including development footprint) is restored by designing vegetated spaces over Build structures and on the ground. Based on final approved master plan

Documentation Requirements:

Design & Build

i. Site plan showing natural topography and proposed area for vegetation highlighting areas for both along with calculation

ii. List of Trees/Plants species with numbers planted at site

Operational (additional)

iii. Actual photographs of site showing highlighted areas.

Urban Heat Island Mitigation, Roof

SSP Credit 2.1 Credits: 1-2

Intent:

Minimize heat island effect so as to reduce negative impact on micro-climate

Compliance Options:

❖ **Option 1: High Reflective Materials**

Use material with a high Solar Reflective Index (SRI) to cover at least 75% of the exposed roof area, including covered parking.

Notes:

Material with high Solar Reflectance Index (SRI) include white/light colored broken China mosaic tiles or white cement tiles or other high reflective materials / coatings. Minimum Solar Reflective Index (SRI) values for different roof types are provided below:

Solar Reflective Index (SRI) values for different roof types

Roof Type	Slope	Minimum SRI Value	Maximum SRI Value
Low-sloped roof	≤ 2:12	78	-
Steep-sloped roof	> 2:12	29	64

Credits are awarded as below:

Percentage of roof area covered with High Reflective Material	Credits
>= 75%	1
>= 95%	2

(OR)

❖ **Option 2: Vegetation**

Provide vegetation to cover at least 50% of the exposed roof area, including covered parking.

Credits are awarded as below:

Percentage of roof area covered with Vegetation	Credits
>/= 50%	1
>/= 75%	2

(OR)

❖ **Option 3: Combination of High Reflective Materials and Vegetation**

Install combination of materials with high solar reflective index and vegetation to cover at least 75% of the exposed roof area, including covered parking.

Credits are awarded as below:

Percentage of roof area covered with High Reflective Materials and Vegetation	Credits
>/= 75%	1
>/= 95%	2

Notes:

- In case of Data Centers located in large campus/building the requirements will be estimated in proportion to the area of the Data centers.
- If the data center is part of a larger data center park (a collection of data centers in one area), the assessment for this credit will consider the entire park's layout and the total number of data centers planned for the site, not just the individual data center.
- If the data center is located within a larger data center park that already has one or more buildings certified as green data centers by IGBC, the new data center can reuse the existing certification for this specific credit if the overall site layout and design have not changed.
- All roof areas, including podium, covered surface parking and utility blocks, which are exposed to the sky (at and above ground level) shall be considered for this credit calculation. Artificial vegetation shall not be considered.
- SRI values of high reflectance materials shall be as per ASTM Standards. Broken China mosaic tiles are exempted from showing SRI value.
- SRI materials that are certified by 'GreenPro' – Green Product Certification programme with the support of IGBC or having any other internationally accepted Eco Label, can be used by the project to show compliance.
- Pavers installed over basement shall have SRI of at least 29 (and not higher than 64).

Exemplary Performance:

The project is eligible for exemplary performance under Innovation in Design and operation, if more than 95% of the exposed roof area is covered with high reflective materials and (or) vegetation.

Documentation Requirements:

Design & Build , Operational

i. Site plan and calculations showing total roof areas highlighting area covered by equipment, solar PV and the area considered under UHI mitigation measures.

ii. In the case of SRI coated roof, provide test certificate of high reflective material indicating SRI value as per ASTM standard.

iii. Photographs of highlighted areas

Urban Heat Island Mitigation, Non-roof

SSP Credit 2.2 Credits: 1-2

Intent:

Minimize urban heat island effect to reduce negative impact on micro-climate

Compliance Options:

❖ **Option 1: Non-roof Impervious Areas**

Provide one or combination of the following, for at least 50% of exposed non-roof impervious areas within the project site:

- Shade from existing tree cover/ newly planted saplings within 5 to 8 years of planting
- Open grid pavers or grass pavers
- Hardscape materials (including pavers) with SRI of at least 29 (and not higher than 64).

Credits are awarded as below:

Non-roof Impervious Area as a Percentage of Total Non-Roof Area	Credits
≥ 50%	1
≥ 75%	2

Notes:

- In the case of Data Centers located in a campus /inside building the requirements will be estimated in non-roof areas in proportion to the area of the Data centers.
- If the data center is part of a larger data center park (more than a DC in an area/premise), the assessment for this credit will consider the entire park's layout and the total number of data centers planned for the site, not just the individual data center.
- If the data center is located within a larger data center park that already has one or more buildings certified as green data centers, the new DC can reuse the existing certification for this specific credit if the overall site layout and design have not changed.
- Non-roof impervious areas include, but not limited to, footpaths, pathways, roads, driveways, uncovered surface parking, and other impervious areas.
- Trees / Saplings shall be in place at the time of the site visit.
- SRI values of reflectance materials shall be as per ASTM Standards. SRI materials that are certified by 'GreenPro' – Green Product Certification programme with the support of IGBC or having any other internationally accepted Eco Label, can be used by the project to show compliance.

❖ **Option 2: Covered Parking**

Provide at least 50% of the parking spaces under cover.

Credits are awarded as below:

Percentage of Parking spaces under Cover	Credits
≥ 50%	1
≥ 75%	2

Notes:

- In case of Data Centers located in large campus/building the requirements will be estimated based on the available car parking for the Data centers under cover vis-à-vis total number of car parking required for data center operator and maintenance personnel.
- 'Parking spaces under cover' here refers to structured covered parking/Tree Shade.
- The exposed roof of the parking shall meet 'Heat Island Effect - Roof' criteria.
- If the data center is part of a larger data center park (a collection of data centers in one area), the assessment for this credit will consider the entire park's layout and the total number of data centers planned for the site, not just the individual data center.
- If the data center is located within a larger data center park that already has one or more buildings certified as green data centers by IGBC, the new data center can reuse the existing certification for this specific credit if the overall site layout and design have not changed.

Exemplary Performance:

This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process:

❖ **Option 1:**

If more than 95% of exposed non-roof impervious areas are under tree cover (and/or) with open grid pavers/grass pavers (and/or) hardscape materials with an SRI of at least 29 (and not higher than 64).

❖ **Option 2:**

If more than 95% of the parking spaces are under cover.

Documentation Requirements:

Design & Build, Operational

i. Site plan and calculations showing total non-roof areas, exposed areas under roof and non-roof, highlighting area covered by equipment platform, Solar PV and the area considered under UHI mitigation measures.

ii. Photographs of hardscape areas (non-roof) covered with existing tree canopy/ open grid pavers / structured surface parking / solar panels

iii. In the case of SRI coated roof and non-roof areas, provide test certificate of high reflective material indicating SRI value as per ASTM standard.

Reduction in Nocturnal Light Pollution

SSP Credit 3 Credits: 1

Intent:

Reduce light pollution to increase night sky access and enhance the nocturnal environment.

Compliance Options:

- **Downward Lighting**

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).

Exemplary Performance:

This credit is not eligible for exemplary performance.

Documentation Requirements:

Design & Build , Operational

i. Site plans showing exterior lighting layout highlighting all exterior lighting fixtures.

ii. Luminance profile of the chosen lighting fixtures.

iii. Nighttime photographs of Lighting Fixtures.

Energy Efficiency

Eco Friendly Refrigerants

EE Mandatory Requirement 1

Intent:

Encourage use of eco-friendly refrigerants and fire-suppression system, thereby minimizing negative impact on the environment.

Compliance Options:

Demonstrate that refrigerants used in the data Center and building Heating, Ventilation & Air-conditioning (HVAC) equipment are eco-friendly and have Global Warming Potential (GWP).

The projects HVAC equipment must comply with the following formula, which sets a maximum threshold for the combined contributions to ozone depletion and global warming potential:

$LCGWP + LCODP \times 10^5 \leq 13$

LCODP = [ODPr x (Lr x Life +Mr) x Rc]/Life

LCGWP = [GWPr x (Lr x Life +Mr) x Rc]/Life

LCODP: Lifecycle Ozone Depletion Potential (kg CFC 11 / kW-Year)

LCGWP: Lifecycle Direct Global Warming Potential (kg CO_2 / kW-Year)

GWPr: Global Warming Potential of Refrigerant (0 to 12,000 kg CO_2 / kg r)

ODPr: Ozone Depletion Potential of Refrigerant (0 to 0.2 kg CFC 11 / kg r)

Lr: Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)

Mr: End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)

Rc: Refrigerant Charge (0.065 to 0.65 kg of refrigerant per kW of gross AHRI rated cooling capacity or Eurovent Certified cooling capacity)

Life: Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)

Notes:

- For multiple types of equipment, a weighted average of all base building HVAC&R equipment must be calculated using the following formula:

$$\frac{(LCGWP + LCODP \times 10^5) \times Q_{unit}}{Q_{total}} \leq 13$$

Q_{unit} = Eurovent Certified cooling capacity of an individual HVAC or refrigeration unit (kW) (or) Gross AHRI rated cooling capacity of an individual HVAC or refrigeration unit (kW)

Q_{total} = Total Eurovent Certified cooling capacity of all HVAC or refrigeration (kW) (or) Total gross AHRI rated cooling capacity of all HVAC or refrigeration

Small HVAC units (containing less than 0.25 kg of refrigerant) need not be considered in calculation.

Note:

Existing Data Centers those are installed HVAC equipment recharged with refrigerant whose LCGWP and or LCODP is more than the limit prescribed, shall strongly submit a letter of commitment describing "Phase Out Plan" within the period of certification. Such data centers, during recertification would not be accepted without phase-out of HCFC refrigerant.

Documentation Requirements:

Design & Build, Operational

i. Documentation for the type of refrigerant along with the global warming potential for all refrigerant based units

ii. Calculation in line with the compliance options in excel format as per annexure-1

Commissioning Plan

EE Mandatory Requirement 2

Intent:

Verify and ensure that the data centre's equipment & system are commissioned to achieve the energy performance as envisaged during the design stage through a comprehensive commissioning process

Compliance Options:

The project shall comply with the following requirements:

❖ **Project Definition**

Submit the Owner's Project Requirements (OPR) and Basis of Design (BOD) report. These documents outline the project goals, performance expectations, and design criteria.

❖ **Equipment Verification**

Provide documentation of Factory Acceptance Testing (FAT) plan & report performed by the equipment manufacturers. This demonstrates that the major equipment components meet the specified requirements before installation.

❖ **On-Site Testing**

Submit the Site Acceptance Testing (SAT) plan and the corresponding SAT report. The plan details the testing procedures, while the report documents the test results, observations, and any corrective actions taken to address discrepancies.

❖ **Integrated Systems Testing Plan**

Provide the Integrated Systems Testing (IST) plan and the relevant standard protocols to be followed during testing. This ensures a comprehensive evaluation of the interconnected systems' performance. (*Enterprise Data Center less than 2 MW design IT load is exempted*).

❖ **Approvals**

Submit a review report and signed approvals for the OPR, BOD, FAT, IST, and SAT documents. These approvals should be obtained from the Project Design Team, Project Owner, and Design Consultant, signifying their acceptance of the project's design, equipment performance, and on-site testing results.

Note:
Data Centers under "Operational " are exempted to comply with this requirement.

Documentation Requirements:

Design & Build

i. Submit Owner Project Requirement (OPR), Basis of Design (BOD) report and IST Plan.

ii. Documentation of FAT conducted by the equipment manufacturers for major equipment

iii. SAT plan and SAT report detailing test procedures, results, observations, and corrective actions

iv. Review report and signed approvals of OPR, BOD, FAT and SAT by Project Design Team, Project Owner and Design Consultant.

Minimum Energy Performance

EE Mandatory Requirement 3

Intent:

Optimize energy consumption to reduce negative environmental impacts from excessive energy use

Compliance Options:

❖ **Power Usage Effectiveness (PUE)**

Minimize the Power Usage Effectiveness (PUE) of the data center by reducing the total facility energy consumption.

PUE is defined as

$$\textbf{Power Usage Effectiveness} = \frac{\textbf{Total Facility Energy (kWh)}}{\textbf{IT Equipment Energy (kWh)}}$$

❖ **Total Facility Energy**

This includes all IT equipment, energy which is used to manage, process, store, or route data within the compute space and everything that support the IT equipment using energy such as:

- Power delivery component, including UPS system, switch gear, generator, power distribution Unit (PDU), batteries and distribution losses external to the IT equipment
- Cooling system component such as chiller, cooling tower, pump, computer room air handling unit (CRAHs), computer room air-conditioning units (CRACs) and direct expansion air handler units
- Other miscellaneous loads such as data center lighting.

❖ **IT Equipment Energy**

This includes, energy associated with all the IT Equipment (e.g. compute, storage and network equipment) along with supplemental equipment (e.g. switches, monitors, and workstations or laptops, used to monitor or otherwise control the data center).

Total facility energy and IT equipment energy need to be measured as below:

- Total facility energy at utility-input
- IT Equipment at floor PDU output (kWh measurement either at PDU display or by an energy meter on the secondary side of PDU transformer)
- The IT equipment, energy and total facility energy need to be measured on daily basis

Establish the Power Usage Effectiveness of Data Center as per the above procedure and demonstrate that the PUE does not exceed threshold limit part loading of the data center.

The Power Usage Effectiveness (PUE) of Data Center (Design/Build/Operational) shall not be more than 1.8 as per annexure-1 during Green Data Center Certification.

Documentation Requirements:

Design & Build

i. Provide design PUE calculations in excel format as per annexure-1.

Operational

i. Energy consumption details including total facility energy (kWh) and IT equipment energy (kWh) measured on a daily basis for the past one year.

ii. PUE calculations along with the percentage loading of data center.

Eco-Friendly Refrigerants

EE Credit 1 Credit: 1

Intent:

Encourage use of eco-friendly refrigerants in the facility, thereby minimizing their environmental impact.

Compliance Options:

- **Low GWP Refrigerants**

  Demonstrate that refrigerants used in the Data center and the associated buildings' Heating, Ventilation & Air-conditioning (HVAC) equipment are low GWP (750) and zero ODP

- **Halon-free Fire Suppression Systems**

  Demonstrate that the fire suppression systems installed for IT space have GWP<5

- **End-of-Life Management Plan**

  Submit a plan for the end-of-life management of the refrigerants and suppression agent, including recovery, recycling, reclaim and disposal procedures.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Documentation Requirements:

Design & Build, Operational

i. Documents indicating the details of the refrigerant used in building HVAC.

ii. Documents indicating the details of the chemicals / gases / agents used in the fire suppression systems.

iii. End of Life management plan of fire-suppression agents and refrigerants.

iv. In case the primary fire suppression agent has higher GWP (>5), submit plan to replace existing fire-suppression agent.

Integrated Building Management System

EE Credit 2 Credits: 1-3

Intent:

Foster the implementation of a smart, efficient, and integrated BMS for optimal data center performance and management.

Compliance Options:

❖ **Design & Build**

- Deploy fully functional BMS that monitors critical building systems including HVAC, electrical, lighting, and security. **Credit: 1**
- The BMS shall incorporate advanced features such as (Any 3): **Credit:1**
  - Real-time data collection and analysis
  - Fault detection and diagnostics
  - Availability Metrics, Cooling Capacity Factor (CCF), Space Capacity and Utilization Metrics etc
  - Compliance metrics, RCI or RTI
  - Sustainability metrics, CUE or WUE
- Integrate BMS with the IT infrastructure management through **Credit:1**
  - A dedicated DCIM system that communicates with the BMS to provide comprehensive visibility and control over both building and IT systems or an integrated BMS solution that incorporates DCIM functionalities within its platform

  or

  - Ability to view and monitor IT equipment status and performance at rack or server level.

Note: Enterprise Data Center of less than 2 MW is excluded

❖ **Operational**

1. Deploy fully functional BMS that monitors critical building systems including HVAC, electrical, lighting, and security **Credit:1**

Documentation Requirements:

Design & Build

i. Functional specifications, system diagrams, and commission reports that demonstrate the BMS's ability to monitor and control critical building systems

ii. User manuals, configuration settings, or screenshots showcasing the presence and functionality of the following advanced features within the BMS like Real-time data collection and analysis, Fault detection and diagnostics, Energy optimization algorithms, Occupant comfort control.

iii. Screenshots or other evidence demonstrate the ability to view and monitor IT equipment status and performance at the rack or server level within the DCIM interface or Documentation showcasing the Build-in DCIM capabilities and its integration with building systems.

Operational

i. Functional specifications, system diagrams, system generated reports that demonstrate the BMS's ability to monitor and control critical building systems

Enhanced Energy Efficiency
EE Credit 3 Credits: 42

Intent:

Optimize energy consumption to reduce negative environmental impacts arising from excessive energy use.

Compliance Options:

❖ **Design and Build**

- Demonstrate detailed calculations that the Power Usage Effectiveness (PUE) as per Annexure-1.

❖ **Operational**

- The details of monthly energy consumption for the preceding year at PDU and the utility dedicated for the facility (DC) along with the power distribution layout highlighting metering locations.

- Utility (Electricity) Bills for the preceding year

S. No.	PUE Range	Credit Credits	
		Design & Build	Operational
1	1.80 - 1.75	16	20
2	1.75 - 1.70	18	22
3	1.70 - 1.65	20	24
4	1.65 - 1.60	23	26
5	1.60 - 1.55	26	28
6	1.55 - 1.50	29	30
7	1.50 - 1.45	32	33
8	1.45 - 1.40	35	36
9	1.40 - 1.35	38	39
10	1.35 - 1.30	42	42

Exemplary Performance:

This credit is eligible for exemplary performance under innovation category if Design PUE is less than 1.3 at 100% IT load.

Documentation Requirements:

Design & Build

i. Submit Design PUE calculation as per Annexure-1.

Operational

i. Energy consumption details including total facility energy (kWh) and IT equipment energy (kWh) measured at PDU on daily basis for the preceding year.

ii. PUE calculations along with the percentage loading of Data Center

Renewable Energy

EE Credit 5 Credits: 1-9

Intent:

Encourage use of renewable energy sources, to minimize the environmental impacts associated with the use of fossil fuel energy.

Compliance Options:

❖ **Design & Build**

- Demonstrate that the organization has plan to invest in renewable energy sources (procurement / captive power generation).
- Submit declaration to share signed PPA within 1 year of certification.
- Update the Council about any change in commitment (investment in RE)

Note:

Any variation in RE investment must have a significantly strong reason and will be subject to evaluation by the Green Data Center Committee. Project team shall share a 6 monthly update.

❖ **Operational**

- Demonstrate that the project has invested in renewable energy and wheeling the power for meeting the energy consumption of the Data Center and have in place a power purchasing agreement with the renewable energy agency for a minimum of 3 years.
- Type of renewable energy source has to be in line with the definition as recommended by MNRE, Govt of India and respective state regulatory commission.

Credits are awarded as below:

Renewable energy as % of total Facility Energy Consumption	Design and Build	Operational
20	1	4
30	2	5
40	3	6
50	4	7
60	5	8
70	6	9

Exemplary Performance:

The credit is eligible for exemplary performance under innovation category if total renewable energy consumption is more than 80% of facility energy consumption.

Documentation Requirements:

Design & Build

i. Submit any of the following along with renewable energy sources indicating the capacity and power generation potential in line with the requirements.

- Investment plan for offsite renewable sources.
- Letter of intent or power purchase agreement with the RE producer.

Operational

i. Submit the details of installation of renewable energy sources along with the photographs.

ii. Details of annual renewable energy generated from onsite renewable sources.

iii. For offsite, submit a copy of power purchase agreement or contract for wheeling of renewable energy and details of annual renewable power purchased.

Operational Stability Framework

Management Information System (MIS)

OSF Mandatory Requirement 1

Intent:

Establish a robust Management Information System (MIS) within the data center to ensure operational stability, minimize risk, and maintain data integrity.

Compliance Options:

Design and Build, Operational

Submit a detailed narrative that describes their Management Information System practices, addressing the details of all the following documents and processes.

- Clearly defined roles and responsibilities for all parties involved.
- A detailed list of all components highlighting make and model, and installation dates
- Escalation procedures for critical incidents.
- **Standard Operating Procedure Document (SOP) covering**
  - Access control (physical & logical), Incident response, Backup and recovery,
  - Environmental monitoring, Equipment maintenance
  - Security protocols (network & physical)
  - Safety protocols, Energy efficiency, Documentation and reporting
- **Risk Assessment and Mitigation**
  - Formal risk assessment procedure for evaluating potential impacts.
  - Risks categorized and prioritized.
  - Mitigation plans developed for all identified risks.
- **Change Management**
  - Structured approval process with defined criteria, stakeholder/expert involvement, and pre-approved implementation plans.
  - Proactive communication to affected parties.
  - Robust change tracking system with status updates, timelines, and impact assessments.
  - Regular reporting on change activity and KPIs to drive continuous improvement.
  - Process of approvals and information adopted by data center for implementation and deviations of activities.

Documentation Requirements:

***Design & Build,* Operational**

i. Submit a detailed narrative that describes their Management Information System practices

ii. Demonstrate following documents during physical site assessment

Roles and Responsibilities Matrix along with Data Center Asset List, Escalation Procedures Document, Standard Operating Procedure (SOP) Document, Risk Assessment Report, Mitigation Plans, Change Management Plan, Change Tracking System Records.

Preventive Maintenance

OSF Credit-1 Credits: 1-4

Intent:

Proactively maintain data center assets to maximize their lifespan, reduce unplanned downtime, and minimize resource waste, contributing to overall operational sustainability.

Compliance Options:

❖ **Design & Build**

The data center to have a comprehensive, documented PMP that covers all critical infrastructure components. This includes but not limited to:

Maintenance Schedule:
Credit:1
A calendar of planned maintenance activities, including frequency (e.g., monthly, quarterly, annually), tasks to be performed, and responsible personnel

Computerized Maintenance Management System (CMMS): Credits: 2
CMMS for record & tracking the maintenance and operational history of each equipment within the data center.

Note: Key feature of CMMS.

- Equipment Identification: Unique identifiers (e.g., asset tag, serial number) for each piece of equipment.
- PM History: Dates and details of preventive maintenance activities performed (e.g., cleaning, inspection, calibration).
- Fault/Incident History: Records of any malfunctions, failures, or incidents that occurred, including dates, descriptions, root causes, and resolutions.
- Repair History: Details of any repairs performed, including dates, parts replaced
- Spare Parts Inventory: Information on spare parts used or replaced during maintenance or repairs.
- Vendor Information: Contact details for equipment manufacturers or service providers.

❖ **Operational**

- **Preventive Maintenance Consistency (PM Schedule Adherence):**

Level 1: Data center maintains 90% or greater adherence to the scheduled preventive maintenance plan over a 12-month period.

Level 2: Data center maintains 100% adherence to the scheduled preventive maintenance plan over a 12-month period.

Level -1	Credit : 1
Level 2	Credits : 2

Equipment History Log:
Narrative along with mentioning details as mentioned below of a centralized record for tracking the maintenance and operational history of each equipment within the data center.
Credits:2

Note: Equipment History Logs shall include data for a minimum of last 3 years or Go-Live date (whichever is earlier)

- PM History: Dates and details of preventive maintenance activities performed (e.g., cleaning, inspection, calibration).
- Fault/Incident History: Records of any malfunctions, failures, or incidents that occurred, including dates, descriptions, root causes, and resolutions.
- Repair History: Details of any repairs performed, including dates, parts replaced
- Spare Parts Inventory: Information on spare parts used or replaced during maintenance or repairs.
- Vendor Information: Contact details for equipment manufacturers or service providers.

Documentation Requirements:

Design & Build

i. Preventive Maintenance Calendar

ii. Submit details of CMMS installed

Operational

i. Updated PM Calendar along with PM reports signed by authorized signatory

ii. Narrative on Equipment History Logs including all the details mentioned above (actual documents to be demonstrated during site visit)

Integrated Systems Testing

OSF Credit-2.1 Credits:1-4

Intent:

Ensure comprehensive testing and verification of integrated systems under actual operating conditions to optimize energy performance and identify issues, and further to validate compliance to meet design intent and energy efficiency goals

Compliance Options :

Design and Build

❖ **IST Report** **Credits: 3**

- Engage a qualified 3rd Party Commissioning Authority (CxA) to develop and execute a comprehensive IST.
- The IST report should include:
  - Detailed test procedures for all major systems, including HVAC, electrical, lighting, controls, and any integrated IT infrastructure management systems.
  - Test scenarios simulating various operating conditions, including full IT load, partial load, and failure modes.
  - Clear acceptance criteria for each system and the integrated data center performance.
  - Roles and responsibilities of the commissioning team and contractors.
- Implement a robust Measurement & Verification (M&V) to collect and analyse data during IST.
- Measure and verify key performance indicators but not limited to:
  - Power Usage Effectiveness (PUE), Energy consumption of individual systems, Cooling efficiency, Airflow and temperature distribution, RCI & RTI and Water consumption (if applicable)

❖ **IST System Performance Resolution** **Credit: 1**

- Identify and document any performance issues or discrepancies observed during IST.
- Implement corrective actions to address any identified issues.
- Optimize system performance and controls based on IST results to maximize energy efficiency and performance.

Operational

Comprehensive Energy Assessment **Credit: 4**

Data center to have a comprehensive energy assessment performed by a third-party assessor within the past 36 months. The energy assessment shall include a thorough assessment of all the following areas:

- **Cooling System Efficiency Evaluation:**
    - Assess the performance of CRAC/CRAH units, chillers, cooling towers, and other cooling infrastructure.
    - Calculate Power Usage Effectiveness (PUE) and metrics.
    - Recommend improvements to airflow management and cooling strategies.
- **Power Distribution and Losses Assessment:**
    - Evaluate the efficiency of transformers, switchgear, PDUs, and UPS systems.
    - Identify sources of energy loss (and %) in the electrical distribution system.
- **Airflow Management and Optimization:**
    - Analyze airflow patterns within the data center using tools like Computational Fluid Dynamics (CFD), compliance metrics like RCI & RTI
    - Recommend changes to rack layout, containment strategies, and blanking panels to improve cooling efficiency (if applicable)
- **Renewable Energy Integration Potential:**
    - Assess the feasibility of incorporating renewable energy sources to power the data center.
    - Evaluate potential energy savings and environmental benefits.
- **Recommendations for Improvement:**
    - Provide a prioritized list of actionable recommendations to improve energy efficiency, reduce costs, and lower the environmental impact.

Documentation Requirements:

Design & Build

i. IST Commissioning report documenting the scope, schedule, and responsibilities , test results, deviations, and corrective actions taken for minimum of 1 complete independent floor.

Operational

i. Final energy & health audit report from the third-party auditor.

ii. Gap analysis with closed gaps and action plan for open Credits.

Green Education

OSF Credit-3 Credits: 1-6

Intent:

Empower staff with knowledge and skills to optimize data center Operational for efficiency, security, safety, and sustainability.

Compliance Options:

❖ **Energy Efficiency Training** **Points: 2**

Capacity Building and Skill Development:

- Data Center Energy Consumption: Identifying major energy consumers, analyzing usage data, understanding PUE.
- Power Usage Effectiveness (PUE): Measuring and improving PUE, best practices for reducing energy waste.
- Airflow Management: Hot/cold aisle containment, raised floor optimization, best practices.
- Cooling Technologies: Air cooling, liquid cooling, free cooling, evaporative cooling, efficiency optimization.
- Power Management: Efficient power distribution, UPS systems, power factor correction, voltage optimization, demand response, peak shaving.
- Server and IT Equipment Efficiency: Energy-efficient hardware, virtualization, consolidation, power management settings.

❖ **Sustainability Education** **Credits: 2**

- Non-Hazardous and Hazardous Waste Reduction and Recycling
- EPR, E-waste management, recycling programs for IT equipment, packaging, and other materials.
- Water Conservation: Water-efficient cooling, rainwater harvesting, greywater recycling.
- Sustainable Procurement: Environmentally friendly products and services, supplier sustainability requirements.

❖ **Safety and Security Training** **Credits: 2**

- Electrical Safety: Arc flash awareness, lockout/tagout procedures, working with high voltage.
- Fire Safety: Prevention, suppression systems, evacuation procedures, emergency response, fire extinguisher training.

- Chemical Safety: Handling hazardous materials (batteries, cleaning agents), PPE use, spill response.
- Physical Safety: Proper lifting techniques, ergonomics, fall prevention, working at heights, confined space entry.
- Cybersecurity: Data security basics, common threats, and preventive measures.

Documentation Requirements:

Design & Build , Operational

i. Training Calendar, course material with photographs and list of participants and training assessment report and key learnings. (a minimum of 4 topics to be covered from each module)

Water Conservation

Rainwater Harvesting, Roof & Non-roof

WC Mandatory Requirement 1

Intent:

Enhance ground water table or utilize harvested rainwater and reduce potable waster consumption

Compliance Options:

- ❖ Design rainwater harvesting system to capture at least 'one-day rainfall'* runoff volume from roof and non-roof areas.

* One-day rainfall can be derived from 'percentage of average peak month rainfall' given in the Table. To arrive at average peak month rainfall, consider an average of at least last 5 years peak month rainfall (of the respective year).

Criteria to arrive at 'One-day Rainfall'

S No	Average Peak Month Rainfall (in mm)	One-day Rainfall (% of Average Peak Month Rainfall)
1	Upto 250	9%
2	251 – 350	7.5%
3	351 – 500	6%
4	501 – 700	4.5%
5	701 & above	3%

- ❖ In areas where the Central / State Ground Water Board does not recommend artificial rainwater recharge (or) if the groundwater table is less than 4 meters, the project is required to provide justification for not implementing rainwater harvesting system.

Notes:

- For rainfall information, refer Indian Meteorological Department data at http://www.imd.gov.in
- Runoff volume = Surface area x Runoff Coefficient x Rainfall.
- Consider Rainwater Harvesting Guidelines (as and when available) from the National Building Code (NBC) 2016 of India, Part 11 - Approach to Sustainability, Section 7.2 - Rainwater Harvesting-Surface Runoff.
- In areas where the water percolation is limited, collection tanks / water bodies may be provided to meet the above requirement.
- Filtering of suspended solids shall be ensured by providing suitable filtering media before letting the water into the collection tanks, water bodies, municipal storm water drains.

Runoff Coefficients for Typical Surface Types

S No	Surface Type	Runoff Coefficient
1	Cemented / Tiled Roof	0.95
2	Roof Garden (<100 mm thickness)	0.5
3	Roof Garden (100 – 200 mm thickness)	0.3
4	Roof Garden (201 – 500 mm thickness)	0.2
5	Roof Garden (> 500 mm thickness)	0.1
6	Turf, Flat (0 - 1% slope)	0.25
7	Turf, Average (1 – 3% slope)	0.35
8	Turf, Hilly (3 - 10% slope)	0.4
9	Turf, Steep (> 10% slope)	0.45
10	Vegetation, Flat (0 - 1% slope)	0.1
11	Vegetation, Average (1 - 3% slope)	0.2
12	Vegetation, Hilly (1 - 3% slope)	0.25
13	Vegetation, Steep (> 10% slope)	0.3
14	Concrete Pavement	0.95
15	Gravel Pavement	0.75
16	Open-grid Concrete Pavement	0.75
17	Open-grid Grass Pavement	0.5
18	Water Bodies (lined) Ex: Swimming Pool	0.95

Documentation Requirements:

Design & Build/Operational

i. Site Plan showing the location of rainwater harvesting systems including capacity of rainwater harvesting structures (number of pits and their harvesting volumes) and calculation for rainwater harvesting system based on one day rainfall

ii. Additionally, submit photographs of rainwater harvesting system/ percolation pit for existing data center project.

Water Efficient Plumbing Fixtures

WC Credit 1 Credit : 1

Intent:

Enhance efficiency of plumbing fixtures, thereby minimizing potable water use.

Compliance Options:

Use water efficient plumbing fixtures (as applicable) whose flow rates are at least 15% less than the baseline criteria given Table - 4, in aggregate.

Note:

- *Use of treated wastewater/ captured rainwater shall not be considered to show water savings.*

The baseline criteria is as below:

Table 2 - Baseline Flow Rates / Consumption for Plumbing Fixtures

Fixture Type	Maximum Flow Rate / Consumption	Duration	Estimated Daily Uses per FTE ***
Water Closets (Full-flush)	5 LPF	1 flush	1 for male; 1 for female
Water Closets (Half-flush)	3 LPF	1 flush	2 for female
Urinals	2 LPF	1 flush	2 for male
Faucets / Taps*	2 LPM	15 seconds	4
Health Faucet*	5 LPM	15 seconds	1
Kitchen Faucet*	6.5 LPM	15 seconds	1
Showerhead / Handheld Spray**	7.5 LPM	8 minutes	0.1

Source: Uniform Plumbing Code – India 2021

* *Reporting pressure for these fixtures shall be at 4 bar.*

*** Reporting pressure for these fixtures shall be at 5.5 bar.*

**** Full Time Equivalent (FTE) represents a regular building occupant who spends 8 hrs per day in the building. Part-time or overtime occupants have FTE values based on their hrs per day divided by 8.*

Credits are awarded as below:

Water Efficient Plumbing Fixtures (Individually or in aggregate)	Credits
4% less than baseline criteria	1

Notes:

- *Water fixtures do not include irrigation systems.*
- *Faucets / Taps installed for hand wash in rest rooms and canteen shall be considered; whereas, faucets / taps installed for dish washing and washing clothes need not be considered.*
- *Rain showers (if any) need to be considered in the calculations under Showerhead.*
- *If the project is a mixed-use building and has residential space with showerheads, in such case the daily use per occupant shall be considered as 1.*
- *The baseline flows can be demonstrated at a flowing water pressure of 4.13 bar. Flowing water pressure of 3 bar does not mean that the water supply in the building is at 4.13 bar. The building fixtures can operate at lower pressures; however, to show compliance under this credit, the design flow rates are to be submitted at 4.13 bar.*
- *Default occupancy shall be considered as 50% for male and female.*
- *FTE occupancy shall be considered in calculation, including visitors.*
- *Plumbing fixtures that are certified by CII under Green Product Certification Programme (GreenPro) or by a third-party agency approved by IGBC can be used by the project to show compliance.*

Documentation Requirements:

Design & Build/ Operational

i. Overall annual water balance chart indicating the water use for all type of activities (such as HVAC, flushing, irrigation, etc.)

ii. Details indicating the flow rates and flush rates of all the fixture types.

iii. Filled in templates and calculations as per the Annexure-1.

Alternate Water Performance

WC Credit 2 Credits: 1-2

Intent:

To use alternate water for various water end use, to reduce raw water demand

Compliance Options:

Demonstrate alternate water use at least 30% of the total water consumption in the project for various applications including flushing, irrigation, domestic use, cooling tower make-up water etc.

$$\%\ Use\ of\ Alternate\ water\ (Water\ Performance\ Ratio) = \frac{Alternate\ Water\ Consumption}{Total\ Water\ Consumption}$$

Credits awarded are as follows:

Water Performance Ratio (% Alternate Water to the Total Water Consumption)	Credits
40	1
60	2

Notes:

- Use of alternate water includes rainwater (captive use), treated wastewater, condensate water or any purchased treated wastewater.
- Treated wastewater sourced from other sites/local authorities through permanent piped connections or other means can be considered to show compliance for 'alternate water'.
- The water requirement and average number of watering days for landscaping shall be considered as 6 liters per sq.m. per day (i.e. 6 litres/sqm/day) for turf and 2 litres/ sqm/day for a minimum of 300 days, (or) justify if the water requirement and the average number of watering days for landscaping is less than the above requirement.

Documentation Requirements:

Design & Build/ Operational

i. Overall annual water balance chart indicating the water use for all type of activities (such as HVAC, flushing, irrigation, etc.)

ii. Calculation indicating the percentage of alternative water used in the project to the total water consumption of the project.

iii. Capacity and type of wastewater treatment plant installed.

Water Performance Monitoring

WC Credit 3 Credits: 1-2

Intent:

To encourage sub-metering and water monitoring to improve overall water performance, thereby reducing potable water demand.

Compliance Options:

❖ **Realtime Water Monitoring** **Credit: 1**

Install sub-metering as applicable to measure water use of minimum of 3 headers/locations mentioned below:

- Provides water metering to measure total potable water quantity (Municipal, Borewell and tankers) on daily/monthly basis.
- Total potable water usage through water fixtures (kitchen, handwash etc.)
- Install water meter to measure treated wastewater
- Provide water metering to consider total water usage in irrigation (potable and non-potable)
- Install water meter to measure total water usage in flushing (or cooling tower make-up water)
- Provide water metering to measure the quantity of rainwater reused for process or non-process application.

❖ **Water Dashboard** **Credit: 1**

Demonstrate an online water monitoring system to ensure continuous water performance on a daily or monthly basis (project may share water performance data with IGBC for feedback). The water dashboard would enable the project to understand water balance.

Documentation Requirements:

Design & Build

i. Submit details of water meter installations and water balance chart covering entire facility

ii. Screenshots of online water dashboard and monthly waste usage report

Operational

iii. Water consumption (borewell, municipal and water tankers)

Building Materials and Waste Management

Policy on waste management

BMR Mandatory Requirement 1

Intent:

Have a waste management policy that would guide the organization to dispose of the waste in an environmentally friendly manner.

Compliance Options:

- ❖ Submit waste management policy including e-waste, wet and dry wastes signed by the highest authority in the organization or authorized signatory.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Documentation Requirements:

Design & Build/ Operational

i. Submit a policy document signed by the head of the organization / authorized signatory highlighting waste management within the organization.

Segregation of Waste

BMR Mandatory Requirement 2

Intent:

Segregate waste at source to encourage reuse or recycling of materials thereby avoiding waste being sent to landfills.

Compliance Options:

- **Non-Hazardous waste**

Provide separate bins to collect non-hazardous dry solid wastes such as paper, plastics, metals, glass etc. and wet wastes in the common areas as required. Divert the collected waste to a centralized facility which is easily accessible for hauling.

- **Hazardous waste**

Provide a separate collection system for safe disposal of hazardous wastes such as Batteries, E-wastes, Lamps etc following regulation of State/Central Pollution Control Board.

Follow hazardous waste management guidelines as prescribed by the Ministry of Environment and Forest (MOEF), Government of India.

Documentation Requirements:

Design & Build

i. Submit plan for segregating waste including hazardous and non-hazardous.

Operational

ii. The details of waste management practices adopted at data center.

iii. Quantification of each type of waste including hazardous and non-hazardous waste along with certificate/ letter from designated recyclers for disposal or recycling of waste.

Use of Certified Green products

BMR Credit 1.1 Credits: 1-9

Intent:

Encourage the use of environmentally preferable products in the data center construction to reduce the environmental impact and promote sustainable practices throughout the building's life cycle.

Compliance Options:

Incorporating green certified products from the list below, with each product type representing at least 75% of the total quantity used for that product category in the project as per approved Bill of Quantities.

- **Cement/Concrete/Construction Blocks:** Products with recognized eco-labels demonstrating reduced environmental impact in terms of embodied carbon, resource use, and emissions (as applicable).
- **Steel:** Products with recognized eco-labels demonstrating sustainable sourcing, recycling content, and reduced emissions during production.
- **Insulation/Boards/Panel:** Products with recognized eco-labels demonstrating low VOC emissions, recycled content, and thermal performance.
- **Wood:** Use products those are GreenPro or Forest Stewardship Council (FSC) certified, ensuring they come from responsibly managed forests that provide environmental, social, and economic benefits.
- **Other Products:** Other building materials or components with recognized eco-labels that demonstrate significant environmental benefits (e.g., flooring, ceiling tiles, doors, windows).

Credits are awarded as below:

Design & Build	
Number of Certified Green Products used	**Credits**
Cement/Concrete/Construction Block	3
Steel	3
Insulation	1
Wood	1
Others*	1

Operational	
Number of Certified Green Products used	**Credits**
Cement/Concrete/ Construction Block/Steel	2
Insulation/Boards/Panel/ Wood/Other*	2

Notes:

*Other refers to passive products & materials include glazing, adhesives & sealants, false ceiling materials, flooring materials, gypsum-based products, high reflective materials & coatings, etc.,

Exemplary Performance:

This credit is not eligible for exemplary performance.

Documentation Requirements:

Design & Build/Operational

i. Submit a project specific invoice, purchase order for the procurement of certified green building materials, products and equipment (certificate must be valid for the specified products).

ii. Detailed calculation showing % of green material to total material of that category used at site by quantity

iii. Copies of relevant certifications or labels for each product listed, verifying compliance with the specified eco-label requirements

E-Waste Management

BMR Credit 2 Credits: 1-2

Intent:

Encourage proactive measures to minimize the generation of electronic waste (e-waste) during the data center's construction and operation phases, promoting resource conservation and reducing environmental impact.

Compliance Options:

The project shall implement at least two of the following e-waste reduction strategies:

Design and Build:

❖ **Extended Annual Maintenance Contract** **Credit: 1**

- Secure Annual Maintenance Contracts (AMCs) for a minimum of 3 years for any 4 of non-IT infrastructure components from UPS, Chiller, Batteries, Transformers, Diesel Generators.
- The AMC should include preventive maintenance, repairs, and upgrades to extend the components' lifespan and reduce the need for premature replacements.
- Provide documentation of the AMC agreements, including terms and duration.

❖ **Extended Producer Responsibility**
Credit:1

- Formal commitment by a manufacturer or vendor to any 4 of non-IT infrastructure components from UPS, Chiller, Batteries, Transformers, Diesel Generators from manufacturers or vendors offering a certified take-back program or EPR.
- The take-back program must include provisions for responsible collection, recycling, or refurbishment of components at the end of their useful life.

Operational

❖ **Extended Annual Maintenance Contract** **Credit: 1**

- Secure Annual Maintenance Contracts (AMCs) for a minimum of 3 years for any 4 of non-IT infrastructure components from UPS, Chiller, Batteries, Transformers, Diesel Generators.
- The AMC should include preventive maintenance, repairs, and upgrades to extend the components' lifespan and reduce the need for premature replacements.
- Provide documentation of the AMC agreements, including terms and duration.

❖ **Disposal through an authorized E-Waste Recycler** **Credits: 2**

- E-wastes to collect, store in a designated place and handover to an authorized recycler only for recycling of e-wastes.

- Maintain an inventory of all the e-waste generated with their total weight in a year

Documentation Requirements:

Design & Build

i. AMCs for a minimum of 3 years for any 4 of non-IT infrastructure components from UPS, Chiller, Batteries, Transformers, Diesel Generators.

ii. Provide formal commitment from manufacturer for take back program including provisions for responsible collection, recycling, or refurbishment of components at the end of their useful life

Operational

iii. Letter to dispose of the e-waste only through authorized recycler along with contract

iv. Submit the total quantity of e-waste disposed in the preceding year to the authorized e-waste recycler along with the certificate.

Hazardous waste & Operational

BMR Credit 3 Credit: 1

Intent:

To promote the safe handling, storage, and disposal of hazardous materials and waste generated during the data center's construction and operation, minimizing risks to human health and the environment.

Compliance options:

The project to implement a comprehensive hazardous materials management plan that addresses the following aspects:

- **Hazardous Materials Inventory and Risk Assessment:**

Develop a detailed inventory of all hazardous materials used or stored at the data center, including batteries (lead-acid, lithium-ion, etc.) used in UPS systems and backup power, cleaning chemicals and solvents, fire suppression agents, fuels for backup generators and refrigerants.

Conduct a risk assessment to identify potential hazards associated with the handling, storage, and use of these materials.

Note: *Implement appropriate control measures to mitigate identified risks, such as proper labelling and signage, secure and ventilated storage areas, spill containment measures, personal protective equipment (PPE) for handling and regular inspections and maintenance of storage areas and equipment*

- **Spill Prevention and Emergency Response:**

Develop and implement spill prevention and containment procedures, especially in areas with high risk (e.g., battery rooms, fuel storage areas). Establish an emergency response plan for handling spills and other hazardous incidents, including clear communication protocols and designated emergency contacts and evacuation procedures.

Documentation Requirements:

Design & Build, Operational

i. A detailed list of all hazardous materials, their quantities, locations, and associated risks.

ii. A documented plan outlines procedures for preventing and responding to spills and other hazardous incidents.

Indoor Environmental Quality

Tobacco Smoke Control

IEQ Mandatory Requirement 1

Intent:

Minimize exposure of non-smokers to the adverse health impacts arising due to passive smoking in the building.

Compliance Options:

- **Case-A: No Smoking**

Demonstrate that smoking is prohibited in the building and is in accordance with the regulations of Ministry of Health & Family Welfare, Government of India.

(And / Or)

- **Case-B: Outdoor Smoking Areas**

In case the Data Center has assigned outdoor smoking areas, locate such areas at a minimum of 7.6 meters from all outdoor air intakes (entrance doors, window openings etc.)

(And / Or)

- **Case-C: Designated Smoking Rooms**

Alternately, compliance can be shown through designated smoking rooms which capture and remove tobacco smoke from the building.

Notes:

- *The smoking room shall be completely sealed. The conditioned air entry into the smoking zone shall not return back or be transferred to the air-handling units. This air shall be completely exhausted.*
- *The exhaust air louver / duct should be located at least 7.6 meters away from building entry or fresh air intakes.*
- *The smoking room shall be maintained at a negative pressure of 5 Pascals (0.00005 bar).*

Documentation Requirements:

Design & Build

i. Copy of HR policy indicating that smoking is prohibited in the facility/ premises.

ii. For existing data center project, submit photographs of 'No Smoking' signage displayed at various locations in the facility to educate occupants / visitors

Minimum Fresh Air Ventilation

IEQ Mandatory Requirement 2

Intent:

Provide adequate outdoor air ventilation to avoid pollutants affecting indoor air quality.

Compliance Options:

- **Air-Conditioned Spaces**

Demonstrate that the fresh air ventilation in all regularly occupied areas meets the minimum ventilation rates, as prescribed in ASHRAE Standard 62.1 - 2022.

Documentation Requirements:

Design & Build/ Operational

i. For each regularly occupied air-conditioned space, provide calculations of outdoor air intake to show compliance with the reference standard.

Indoor air quality Monitoring

Regularly Occupied Spaces

IEQ Credit 1.1 Credits: 2

Intent:

Continuously monitor and control indoor air quality, to ensure dust free environment for equipment and comfort & wellbeing for occupants.

Compliance Options:

❖ **Air Filtration** **Credit:1**

Demonstrate the data Center has installed filters to meet ISO Class 8 cleanliness.

Notes:

To achieve ISO Class 8 cleanliness, the following filtering mechanisms may be adopted by Data Centers.

- *The room air be continuously filtered with MERV 8 filters (as recommended by ASHRAE standard 127).*
- *Fresh air entering the data center shall be filtered with MERV 11 to MERV 13 filters (as recommended in Particulate and Gaseous Contamination in Datacom Environments ASHRAE 2009b).*

❖ **Regularly Occupied Spaces**
Credit:1

Demonstrate that the project has installed CO_2 sensors in return air ducts to maintain a differential CO_2 level of maximum 530 ppm in all regularly occupied areas.

Documentation Requirements:

Design & Build, Operational

i. Submit details of filter used for continuous air filtration and fresh air filtration installed in air handling units (AHU and PAHUs).

ii. Details of CO2 sensor installed in the return air duct of each AHU.

Indoor air quality Monitoring

IT Spaces

IEQ Credit 1.2 Credits: 2

Intent:

Ensure a healthy and corrosion-free environment within the data center's IT spaces by monitoring and controlling levels of specific gaseous contaminants that can potentially damage sensitive electronic equipment.

Compliance Options:

Conduct gaseous contaminant testing in representative IT spaces (e.g., server rooms, data halls) to assess the levels of the following contaminants:

- Sulphur-containing gases (SOx)
- Corrosive gases (chlorides, Cl2, HCl, H2S, NOx, NH3, ozone etc.)
- Other relevant gaseous contaminants as identified in ASHRAE's 2011 Gaseous and Particulate Contamination Guidelines for Data Centers or Gaseous contaminants & severity level as per ANSI 71.04.2013 or applicable industry standards.

Note: *Testing shall be performed in accordance with ISO 14644-8 or other recognized industry standards.*

- *Testing shall be conducted during normal operating conditions with IT equipment running at typical loads.*
- *Sampling locations shall be representative of the IT space, considering airflow patterns and potential contaminant sources.*
- *Testing shall be performed by a qualified and accredited laboratory or testing agency.*
- *Corrective measures in case gaseous contaminants/ severity level are not within recommended level as per ANSI -71.04.2013 or other applicable industry standards.*

Documentation Requirements:

Design & Build, **Operational**

i. A detailed plan outlining the testing methodology, sampling locations, contaminants to be tested, and acceptance criteria.

ii. A comprehensive report documenting the test results, contaminant levels measured at each sampling location and comparison of results against acceptance criteria and recommendations for corrective actions if any contaminant levels exceed acceptable limits.

Daylighting

IEQ Credit 2 Credits: 1

Intent:

Ensure connectivity between the interior and the exterior environment, by providing adequate daylighting.

Compliance Options:

Credits are awarded as below:

Percentage of Regularly Occupied Areas with Daylighting	Credits
≥ 70%	1

Measurement Approach

Demonstrate through daylight illuminance measurement that 80% of the regularly occupied spaces in the data center achieve daylight illuminance levels for a minimum of 110 Lux. Areas with 2,200 Lux or more daylight illumination levels shall be not considered.

Measurements shall be taken after installation of furniture, equipment & systems at work plane height at 9 am, 12 pm, and 3 pm, on a 10-foot square grid. To show compliance, consider the average of the measurements taken at 10 am, 1 pm, and 4 pm

Notes:

- *Regularly occupied areas (non-technical) are those where people sit or stand as they work, irrespective of the number of days occupied in a year. Regularly occupied areas shall include only enclosed spaces.*
- *Regularly occupied (non-technical) areas include work stations, cabins, meeting rooms, etc.; whereas, areas with audio-visual facilities such as auditoriums, conference rooms, etc., can be excluded from this credit calculation, with justification and supporting documents.*
- *Non-regularly (non-technical) occupied areas include toilets, store rooms, etc. For non-technical areas which are used for multi-purposes, such as cafeteria-cum-meeting room, can be considered as separate spaces based on the function. The room boundary need not be a physical boundary.*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Documentation Requirements:

Design & Build/ Operational

i. Submit Calibrated simulation and measurement report of non-technical areas in the data center achieving daylight illuminance levels of minimum 110 Lux.

Low-emitting Materials

IEQ Credit 3 Credits: 1-2

Intent:

Encourage use of materials and systems with low VOC emissions, so as to reduce adverse health impacts on building occupants in non-IT spaces.

Compliance Options:

- Use paints and coatings (including primers), Adhesives and Sealants with low or no VOC content (as specified in Tables given below) for 95% of interiors.

VOC Limits for Paints & Coatings

Type of Paints & Coatings	VOC Limit (g/L less water)
Non-flat (Glossy)	150
Flat (Mat)	50
Anti-corrosive/ Anti-rust	250
Clear Wood Finish: Varnish	350
Clear Wood Finish: Lacquer	550
Floor Coatings	100

VOC Limits for Adhesives and Sealants

Type of Adhesives	VOC Limit (g/L less water)
Glazing adhesives	100
Ceramic tile adhesives	65
Drywall and panel adhesives	50
Wood substrata adhesives	30
Wood flooring adhesives	100
HVAC duct insulation	850
Indoor Carpet adhesives	50
Multipurpose construction adhesives	70

Notes:

- *Paints & Coatings , Adhesives & Sealants that are certified by 'GreenPro' – Green Product Certification programme or having internationally accepted Eco-Label, can be used by the project to show compliance.*

- *Volatile organic compounds (VOCs) are carbon compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate). The compounds vaporize at normal room temperatures.*
- *If the data Center has used small quantities of non-complying paints & coatings, a VOC budget can be calculated to demonstrate that the weighted average VOC of all products (based on liters of each applied) is below the allowed limit, by each type.*

Exemplary Performance:

This credit is not eligible for exemplary performance.

Documentation Requirements:

Design & Build/ Operational

i. Submit procurement invoices of products with low or ultra-low VOC content from above tables.

Occupant Well-being Facilities

IEQ Credit 4 Credits: 1

Intent:

Provide occupant well-being facilities, so as to enhance physical, emotional and spiritual well-being of the operating and maintenance personnel.

Compliance Options:

- Demonstrate that the data Center has at least one of the well-being facilities (such as gymnasium, aerobics, yoga, meditation or any indoor/outdoor games).
- In case data Center located in a large campus/building demonstrate that the common wellbeing facilities are accessible to the operating and maintenance personnel of Data center.

Exemplary Performance:

This credit is not eligible for exemplary performance.

Documentation Requirements:

Design & Build/ Operational

i. Plan for wellbeing facilities for new data center and for existing data center, the details of wellbeing facilities available along with the photographs.

Innovation and Development

Innovation in Design

ID Credit 1 Credits: 1-5

Intent:

To encourage innovation in design, operation and maintenance of existing data centers so as to reduce environmental impacts

Compliance options:

Option-1: Innovation

Implement measures that are not addressed in the Green Data Center Certification although can significantly reduce environmental impacts.

(Or)

Option-2: Exemplary performance

The project is eligible for exemplary performance, if the design and / O&M measures greatly exceed the credit requirements of the Green Data Center Certification program.

Notes:

The project can apply for a maximum of 5 innovative measures for gaining Credits as part of this credit.

- *As a general rule, Credits for exemplary performance are awarded for doubling the credit requirements and / or achieving the next incremental percentage threshold.*
- *Eligibility criteria for various credits in the Green Data Center Certification program are defined in respective credits.*

Notes: *The project shall also meet the following criteria for achieving an Innovation Credit:*

- *Quantitative performance improvements (comparing a baseline and design case).*
- *The strategy must be significantly better than standard sustainable design practices.*
- *Measures must be taken voluntary. Measures that are mandated by the local byelaws and not addressed in the rating system are not eligible for Innovation.*
- *This is applicable for only credits, where Exemplary Performance is mentioned in the credit requirement.*

Documentation Requirements:

Design & Build/ Operational

i. For each innovation credit, submit the following:

- Intent
- Strategies adopted
- Measurable impacts
- How these measures can be sustained in future

ii. Identify the Exemplary performance in Green Data Center Certification Credits. If the project is crossing a maximum threshold of credit requirement, that credit is eligible for exemplary performance.

IGBC Accredited Professional

ID Credit 2 Credits: 1

Intent:

Support and encourage involvement of IGBC Accredited Professionals, so as to integrate appropriate green measures and streamline the certification process.

Compliance Options:

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

Documentation Requirements:

Design & Build/ Operational

i. Submit the IGBC AP certificate of at least one person from data center design or Operational team

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