SREDA
Sustainable and Renewable Energy Development Authority

Ministry of Power, Energy and Mineral Resources

ADB
ASIAN DEVELOPMENT BANK

Building Energy Efficiency & Environment Rating

GUIDELINE

FOR NEW CONSTRUCTIONS & EXISTING BUILDINGS

Version II - 2023

LOGO
SREDA to decide

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January, 2023

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BUILDING ENERGY EFFICIENCY & ENVIRONMENT RATING

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Guideline for New Construction & Existing Buildings

January 10, 2023

Sustainable And Renewable Energy Development Authority (SREDA)

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Rating Guideline for Building Energy Efficiency & Environment Rating
ISBN #

ACKNOWLEDGEMENTS

EnergySolve International (Pvt) Ltd. and Technobin Engineering (Pvt) Ltd. wish to express our gratitude to the Asian Development Bank and the Power Division of the Ministry of Power, Energy and Mineral Resources for appointing us as consultants to establish Building Energy Efficiency & Environment Rating (BEEER) system in Bangladesh.

The team of consultants also wishes to acknowledge the valuable contribution of the following key officials and experts to the development of BEEER Version 2

Bangladesh Power Sector Development Capacity Building Project Office & Power Division

- **Mr. Md. Nurul Alam,** *Additional Secretary*
- **Mr. Nirod C. Mondal,** *Joint Secretary*
- **Engr. S. K. Munir Ahmed,** *Director (Management), Power Cell*
- **Engr. Q. A. Sharhan Sadique,** *Deputy Director (Sustainable Energy & SDG), Power Cell*
- **Mr. Abdullah Al Muhit,** *Assistant Director (Act, Policy & Contract Management), Power Cell*
- **Mr. Md Shakil Ahmed,** *Ex-Assistant Director (Sustainable Energy & SDG), Power Cell*

Sustainable And Renewable Energy Development Authority (SREDA)

- **Ms. Farzana Mamtaz,** *Member (Additional Secretary)*
- **Mr. Niaz Rahman,** Secretary, Joint Secretary
- **Engr.Mohd Rezaul Hoq,** *Director (EE&C)*
- **Engr.Toufiq Rahman,** *Assistant Director (Standard & Labelling)*

Others

- **Ar. Md. Nafizur Rahman**, *Principal Research Officer, HBRI and lead author of BEEER V1*
- **Md. Md. Anisur Rahman Miah,** *Chairman, Rajdhani Unnayan Kartripakkha (RAJUK)*
- **Mr. Shakhawat Hossan,** Joint Director (Sustainable Finance Department), Bangladesh Bank
- **Ar. Md. Mahamudur Rahman,** *Chief Architect, Eco Design Consultants Bangladesh (EDCBD)*

We also regret very much our inability to appreciate the valued support and guidance of many other experts and consultants individually.

Inclusion of names of experts who contributed to BEEER v1 to be decided by SREDA in consultation with the Power Division of the Ministry of Power, Renewable Energy and Mineral Resources.

List of Abbreviations

AC	Air Conditioner
AHU	Air Handling Unit
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ATM	Automated Teller Machine
BED	Building Envelope Design
BEEER	Building Energy Efficiency and Environment Rating
BFRI	Bangladesh Forest Research Institute
BMS	Building Management System
BNBC	Bangladesh National Building Code
BOD	Biological Oxygen Demand
BPDP	Bangladesh Power Development Board
BRT	Bus rapid transit
BRTA	Bangladesh Road Transport Authority
BUET	Bangladesh University of Engineering and Technology
CH	Construction Health
CM	Construction Material
CNG	Compressed Natural Gas
COP	Coefficient of Performance
CSR	Corporate Social Responsibility
DAP	Detailed Area Plan
DD	Demand Draft
DOE	Department of Environment
DU	Dhaka University
EAA	Energy Audit and Accreditation
EE	Energy Efficiency
EE&C	Energy Efficiency and Conservation
EECMP	Energy Efficiency and Conservation Master Plan
EER	Energy Efficiency Ratio
EIA	Environmental Impact Assessment
EM	Energy Management
EMS	Energy Monitoring System
EPD	Environmental Product Declaration
ETP	Effluent Treatment Plant
FCU	Fan Coil Unit
GHG	Greenhouse Gases
GPS	Global Positioning System
GWP	Global Warming Potential
HBRI	Housing and Building Research Institute
HCFC	Hydrogen Chloro- Fluro Carbon
HVAC	Heating Ventilation and Air Conditioning
IAB	Institute of Architects Bangladesh
IEB	Institute of Engineers Bangladesh

IE	Indoor Environment
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
LED	Light Emitting Diode
LPD	Light Power Density
MAP	Management and Planning
MEP	Mechanical, Electrical, Plumbing
MGC	Maximum Ground Coverage
MJ	Mega- Joule
MRT	Mass Rapid Transit
NFPA	National Fire Protection Association
NOC	No Objection Certificate
ODS	Ozone Depleting Substances
PV	Photo Voltaic
RAJUK	Rajdhani Unnayan Kartripakkha
REHAB	Real Estate and Housing Association of Bangladesh
RE	Renewable Energy
RH	Relative Humidity
RMC	Ready-Mix Concrete
RWTP	Recycled Water Treatment Plant
SC	Shading Coefficient
SHGC	Solar Heat Gain Coefficient
SM	Site Management
SR	Solar Reflectance
SREDA	Sustainable and Renewable Energy Development Authority
SRI	Solar Reflectance Index
STP	Sewage Treatment Plant
TOR	Terms of Reference
TR	Ton of Refrigeration
UPVC	Unplasticized polyvinyl chloride
VFD	Variable Frequency Drive
VLT	Visible Light Transmittance
VOC	Volatile Organic Compounds
VRF	Variable Refrigerant Flow
VRV	Variable Refrigerant Volume
VVVF	Variable- Voltage and Variable- Frequency
WMS	Water Consumption Monitoring System
WPC	Wood Plastic Composite
WWR	Window-Wall Ratio
WWTP	Wastewater treatment plant

CONTENTS

PREFACE

The current economic development, industrialization, population growth and urbanization of Bangladesh have increased rapidly as Bangladesh records the highest growth rates in South Asia. It is also a country highly prone to natural disasters and greatly exposed to the impacts of climate change (e.g., sea-level rise, cyclones, floods and rising temperatures); which has led to increased stress on multiple vulnerable sectors. Particularly, the construction and building sectors are seriously affected by rising temperatures and it strongly influences the country's shift towards sustainable development.

Current building construction and operational practices in Bangladesh have led to higher resource (energy, water, material, etc.) consumption. According to the data published by the Ministry of Power, Energy and Mineral Resources, the residential sector alone consumed more than 56% of the total electricity generation in the year 2021, and the demand has continued to increase. According to Bangladesh Power Development Board (BPDB), electricity consumption has almost tripled in the last decade with fossil fuels becoming the main source of power generation, accounting for 92% of locally produced total generation, leading to increasing GHG emissions. Hence, the conservation of energy and other resources during both the construction and operation of the buildings should be given high priority. Implementation of cost-effective measures to reduce GHG emissions, ensures energy security, leading to sustainable growth.

Energy efficiency rating systems for buildings and labelling of equipment & materials are effective tools to incentivize the construction sector. In Bangladesh, Green Ratings for buildings are still in a nascent stage due to the absence of a specific local standard that has broader applications. Hence, the Building Energy Efficiency and Environment Rating system would strengthen the present initiatives of the government to promote sustainable development. The introduction of a rating system would provide technical expertise on green building concepts and access to green financing to encourage developers.

EXISTING POLICIES

The Dhaka Mahanagar Imarat Nirman Bidhimala – 2008 enforces the building set back, floor area ratio, maximum ground coverage, mandatory open space requirements, which are mostly passive approaches to reduce the energy use in buildings. However, the buildings are not regulated or inspected for any active energy or water-saving measures to reduce the demand for such resources.

The Bangladesh National Building Code (BNBC) is a mandatory legal document for building owners, developers, architects and engineers, which regulates minimum requirements of building types (office, residence, commercial building, etc.), size (height, floor area), structural strength, indoor condition, construction material, etc. In 2020, BNBC has been updated to include energy efficiency requirements and it is now a core document for promoting EE&C in Buildings. The following requirement on building energy efficiency have been specified in the updated version:

a. Heat insulation and/or ventilation performance of building envelope
b. Energy efficiency of building equipment (HVAC, lighting, fans, hot water supply, lift, escalator, renewable energy options)
c. Water efficiency, management and sanitation
d. Roof gardening and vegetation.

The Bangladesh Bank is promoting energy efficiency in buildings with soft loan facilities under their refinancing scheme. Single-digit loan (maximum 9%) facilities are available for 'Green Certified' buildings.

The Housing and Building Research Institute (HBRI) developed 'Recommendations for Green Building Code' in 2012 with the technical assistance of the International Finance Corporation (IFC). In addition to energy and water efficiency, recommendations target the reduction of environmental impacts caused by building construction, operation, and decommissioning. The survey conducted to develop the 'Recommendation of Green Building Code' has revealed that the baseline energy consumption of Dhaka is about 277 kWh/m^2 per year. According to the study that followed the survey, a Green Building Rating System for new buildings could avoid setting up of a 300MW power plant each year.

In 2016, SREDA developed the Energy Efficiency & Conservation Master plan which covers the period up to 2030. This Energy Efficiency & Conservation Master Plan (EECMP) is the supreme plan of Bangladesh's initiative on energy efficiency and conservation, which includes Energy Efficiency and Conservation Rules (2016). Under EECMP, all policies, programs, legal documents (Act, Rules, Regulations, Circulars or Standards etc.) and frameworks are to be established. The Master Plan aims to achieve this target through the adoption and implementation of EE&C regulatory measures, Energy Management Program (Energy Audit Program), EE Labelling Program, EE&C Buildings Program, and EE&C Financial Incentive Programs.

ABOUT BEEER

The Building Energy Efficiency & Environment Rating (BEEER) has been developed by SREDA to ensure energy and resource efficiency in buildings and to encourage sustainable practices in the construction industry. SREDA acts as the implementation and executing body for BEEER which will be a voluntary rating system at the initial stage. It is based on certain baselines and calculation procedures to evaluate the environmental, social, and economic impacts of buildings.

The rating system has been designed as a holistic approach to the development of green buildings by taking the entire environmental footprint of buildings (e.g., water waste, resources) into account. In addition to this, aspects such as social standards, working conditions and safety are also evaluated. Through the consideration of social standards and working conditions, BEEER will help to counteract weak practices and improve the construction industry.

In addition to the rating system, SREDA intends to carryout training and capacity building for architects, engineers, developers, construction companies and suppliers to address the poor awareness and knowhow. To ensure a comprehensive "GREENING" of Bangladesh's building sector, the program will support the integration and mainstreaming of green building practices into national and municipal policies as well as for public procurement. Furthermore, dialogues and cooperation between policymakers and financial institutions will be facilitated and financial institutions will be advised on the provision of financial incentives for green buildings.

Under an initiative by the Power Division of the Ministry of Power, Energy and Mineral Resources, funded by the Asian Development Bank, steps have taken to formally establish BEEER in Bangladesh, after reviewing and revising BEEER V1 of 2020. The revised version is identified as BEEER Version 2.

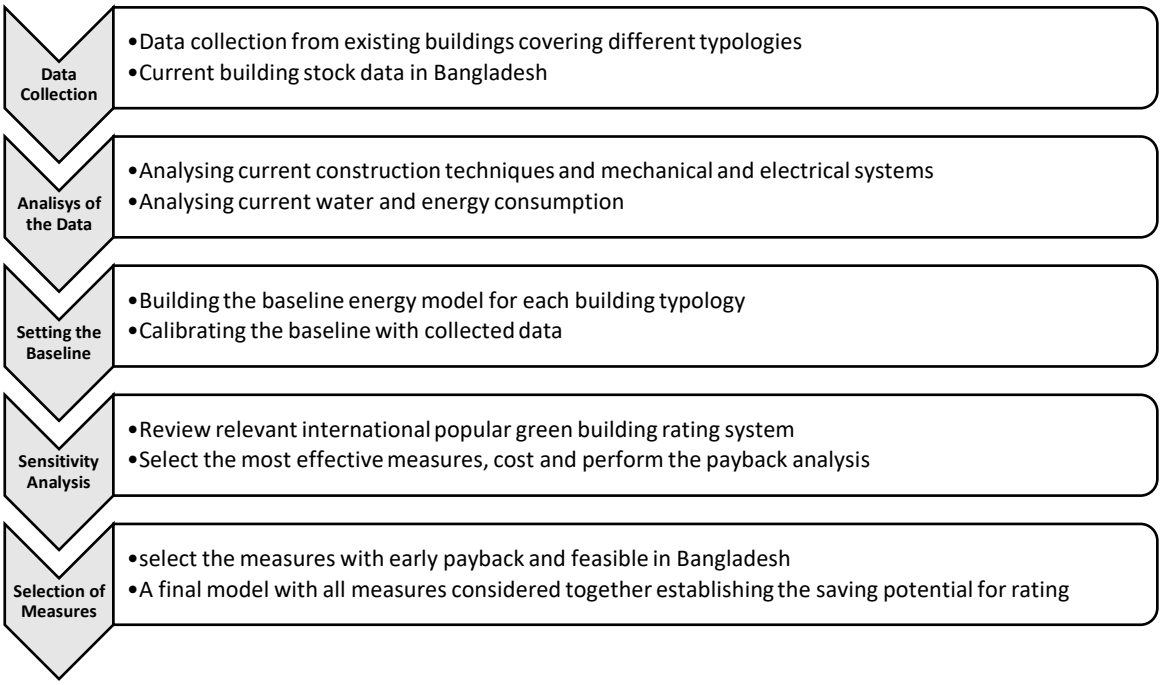


Figure 1: Development process of BEEER

GOALS OF BEEER

- Promote green and sustainable building practices on the supply and demand side of Bangladesh's construction sector.
- Contribute to climate change mitigation by conserving resources in the building sector while enhancing economic prosperity and competitiveness, as well as alleviating poverty by considering both green and social standards.
- Establish a building energy efficiency and environmental rating system which serves as a standard/reference for green building construction practices.
- Enhance the use of sustainable practices in the building sector through a rating system, providing consumer information and a distinctive grade for sustainable buildings.
- Mobilize and build the capacity of key stakeholders to get involved in green building design and construction.
- Promote green equipment and construction materials, fixtures and make the market ready.
- Encourage the use of indigenous green technologies.
- Capacity development of architects, engineers, energy managers & energy auditors involved in Green Construction.
- Provide access to soft and subsidized loan facilities for green building developers.

1 ADMINISTRATION OF BEEER

The Sustainable & Renewable Energy Development Authority (SREDA) was established by the Government in May 2014, as the national nodal organization for promoting Energy Efficiency and Conservation (EE&C) in the country. The Sustainable and Renewable Energy Development Authority Act 2012 has the provision to assist the Government in the formulation and implementation of rules/codes relating to energy-efficient building construction.

As per this mandate, SREDA addresses the energy efficiency and renewable energy use in the building sector, and it plays a prominent role in developing and acting as the administrator of Building Energy Efficiency and Environment Rating (BEEER) system as it can coordinate the activities with relevant Governmental bodies and financing institutions.

Two committees have been appointed to streamline the administration, oversee the application process, and future improvement of the BEEER rating system.

1.1 Steering Committee

Responsibilities of steering committee includes:

1. Decide a fee structure
2. Endorse the rating
3. Recommend incentives and awards to the Government
4. Endorse modifications/upgrades periodically

Composition of Steering committee is as follows:

1. Chairman, Sustainable and Renewable Energy Development Authority (Chair)
2. Representative from Power Division
3. Representative from Ministry of Housing and Public Works
4. Representative from Ministry of Environment, Forest and Climate Change
5. Representative from Local Government Division
6. Representative from Bangladesh Bank
7. Representative from Institute of Architects Bangladesh
8. Representative from Institute of Engineers Bangladesh
9. Representative from Bangladesh Institute of Planners
10. Representative from REHAB
11. Director, Sustainable and Renewable Energy Development Authority (Member Secretary)

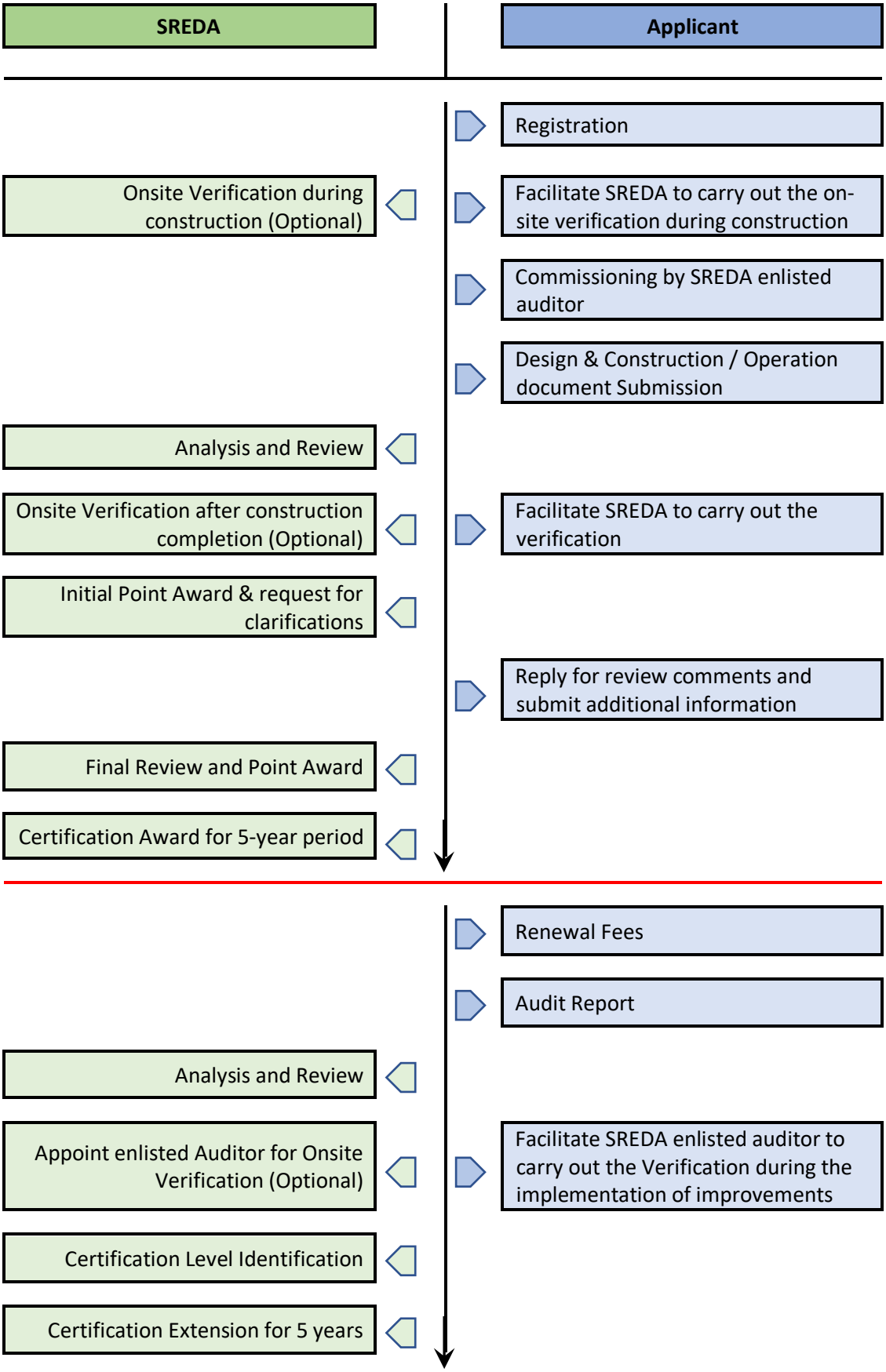
1.2 Technical Committee

Technical committee is responsible for providing technical advice on modification and upgradation of the BEEER Framework.

Composition of Technical committee is as follows:

1. Member (EE&C), Sustainable and Renewable Energy Development Authority (Chair)
2. Representative from Department of Environment
3. Representative from Department of Architecture, Government of Bangladesh
4. Representative from Public Works Department, Government of Bangladesh
5. Representative from RAJUK, Government of Bangladesh
6. Representative from City Corporations
7. Representative from Institute of Energy, University of Dhaka
8. Three members from BUET representing Department of Architecture, Mechanical Engineering Department, EEE Department & Civil Engineering, BUET
9. Representative from Housing and Building Research Institute (HBRI), Dhaka.
10. Representative from ASHRAE, Bangladesh Chapter
11. Representative from Department of Public Health Engineering
12. Representative from SREDA (Member Secretary)

2 BEEER Certification Process



2.1 Certification Process for New Construction

#	Activity	Responsibility	Remarks
1	Registration	Applicant	Online registration
2	On site verification during construction (Optional)	SREDA	
3	Commissioning by SREDA enlisted energy auditor	Applicant / Auditor	
4	Design & Construction document Submission	Applicant	Via BEEER online
5	Payment of document review fees	Applicant	
6	Analysis and review	SREDA Designated Reviewer	
7	On site verification after construction completion (Optional)	SREDA	
8	Initial point award and request for clarifications	BEEER Secretariat, SREDA	Via BEEER online
9	Respond to review comments and submit additional information	Applicant	Via BEEER online
10	Review and award final points	BEEER Technical Committee, SREDA	
11	BEEER Certification award for 5 Year Period	SREDA	

2.2 Certification Process for Existing Building or Certification Extension

#	Activity	Responsibility	Remarks
1	Registration	Applicant	Online registration
2	Carry out an energy audit	Applicant	
3	Commissioning by SREDA enlisted energy auditor	Applicant / Auditor	
4	Design & Operational document Submission	Applicant	Via BEEER online
5	Analysis and Review of submitted documents	SREDA Designated Reviewer	
6	On site verification after submission (Optional)	SREDA	
7	Initial point award and request for clarifications	BEEER Secretariat, SREDA	Via BEEER online
8	Respond to review comments and submit additional information	Applicant	Via BEEER online
9	Review and award final points	BEEER Technical Committee, SREDA	
10	BEEER Certification Award for next 5 Year Period	SREDA	

2.3 Recertification Process

- New Construction and Existing Buildings shall apply for recertification after 5 years from the date of award of the initial certification.
- Projects where major modifications have been carried out within the certification validity period (5-years) shall apply for new certification. Such buildings are not eligible for recertification.
- The recertification process is carried out manually (BEEER online is used only for initial certification).

#	Activity	Responsibility	Remarks
1	Registration and registration Payment	Applicant	Manual registration
2	Appoint SREDA enlisted energy auditor for onsite verification	SREDA / Applicant to facilitate	
3	Specify rectifications, improvements and request for additional information based on auditor's feedback	SREDA	
5	Submit details of improvements and information requested	Applicant	Manual Submission
6	Initial point award and request for clarifications	BEEER Secretariat, SREDA	
7	Reply for review comments and submit additional information	Applicant	Manual Submission
8	Review and award final Points	BEEER Technical Committee, SREDA	
9	BEEER Certification extension for next 5 Year Period	SREDA	

2.4 Evaluation Procedure

- **Step 01:** Appoint reviewers to the project by SREDA once the applicant makes the preliminary submission of design and construction documents or operational documents via BEEER online.
- **Step 02:** Review team commence the assessment and evaluation of submitted documents and information
- **Step 03:** Onsite verification by SREDA (optional)
- **Step 04:** Request for additional information, relevant reports, and documentary proofs to substantiate the submissions, where necessary
- **Step 05**: Final review of the information requested during Step 04.
- **Step 06**: The review panel can make recommendations to the BEEER Accreditation Board on the level of certification to be awarded to the project
- **Step 07**: The BEEER Accreditation Board assess the review outcome and recommend the level of certification to the Board of Directors

2.5 Categories of BEEER Professionals

Professionals will be enlisted for BEEER certification under the following four main categories:

1. **Certified Professional**
   Professionals from any discipline can take part in a short training on BEEER and sit an examination to obtain the qualification. Certified professionals will only take part in the knowledge sharing and implementing best practices.

2. **Accredited Professionals**
   Professionals from engineering or architecture backgrounds that have relevant experience in at least three Green Building projects will be entitled for BEEER Accredited Professional status. Accredited Professionals will provide necessary guidance to owners/developers to obtain BEEER certification and involve in the review of submissions.

3. **Application Reviewers**
   The eligibility criteria for Reviewers is the same as the Accredited Professionals. Each project will be reviewed by at least three and maximum of five reviewers in the fields of Architecture, Mechanical Engineering & Electrical Engineering. SREDA will prepare and maintain a list of reviewers.

4. **Enlisted Energy Auditors**
   Certified energy auditors with local or international energy auditing qualifications are being presently enlisted by SREDA. Enlisted energy auditors will carry out onsite verification, if required, perform commissioning and audits for existing building projects. SREDA will maintain a list of enlisted auditors.

2.6 Point Thresholds of Certification

Certification level	Points
Level 01	30-40
Level 02	41-50
Level 03	51-60
Level 04	61-80
Level 05	81 and above
Total points	**115**

BEEER Rating Guideline

3 BEEER RATING GUIDELINE

3.1 Minimum Requirements

- Any permanent building with a gross floor area of more than 10,000 sqft or an interior space of a permanent building with a gross floor area of more than 2,500 sqft may apply for BEEER certification.
- The total incomplete or unfinished area of the building shall not exceed 30% of the total gross floor area of the building.

3.2 Definitions

Architect: Architect means a person who has a Bachelor's Degree in Architecture and is a member of the Institute of Architects, Bangladesh (IAB). (BNBC 2020)

Building Envelope: The building envelope is the physical barrier between the exterior and interior environments enclosing a structure with all the elements of the outer shell that maintain a dry, heated, or cooled indoor environment and facilitate its climate control. (BNBC 2020)

Building Management System (BMS): Otherwise known as a Building Automation System (BAS), is a computer-based control system installed in buildings that controls and monitors the building's mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems, renewable energy, and security systems.

Building Orientation: Building orientation is the positioning of a building concerning the sun; usually done to maximize solar gain at the appropriate time of the year when required in a cold climate and to minimize solar gain in a hot climate, it also describes the positioning of windows, rooflines, and other features. (BNBC 2020)

Certified Wood: Certified wood is officially approved by a certification organization as coming from a responsibly managed forest by Bangladesh Forest Department. (BNBC 2020)

Cross Ventilation: Cross ventilation is a natural method of cooling that draws cold outside air into a building through a wall louvre, a gable, or open window, and forces warm interior air out through a roof vent, louvre, or window. (BNBC 2020)

Densely occupied Space: A building space where occupant density exceeds 25 people for 1,000 square feet.

Developed or Planned area: Land developed by a government or private development agency, company or by any person as per land development rule and approved by the concerned government organization.

Engineer: A person who has a bachelor's degree in engineering and is a member of the Institution of Engineers, Bangladesh (IEB). (BNBC 2020)

Environmentalist: Environmentalist means a person who has a bachelor's or a postgraduate degree in environmental science. (BNBC 2020)

Floor Area Ratio: FAR is a ratio between the area of a plot (A_p) and the sum of floor areas (A_b) of a building or buildings that are erected or intended to be erected. ($FAR = A_b/A_p$)

Hardscape: Hard landscape features incorporated into landscape built using materials such as concrete, stone, marble, and cement. Features such as roads, driveways, walkways, parking lots, paved areas, decks and staircases considered as hardscape.

Heat Island: A heat island is a metropolitan area that is much warmer than its surrounding rural areas and this heat is generated by all the energy from people, cars, trains, etc. in large cities or areas with lots of activity and lots of people. (BNBC 2020)

Individual Occupant Spaces: Spaces such as private offices or open plan working spaces with multiple workers where the user performs a task at a standard workstation.

Low Emission Vehicle: Electric Vehicles which are approved by BRTA or electric vehicles of Industrial/commercial use.

Passive Design: Passive design is a special architectural design that works with the native climate to maintain a comfortable temperature in the home, and it should reduce or eliminate the need for additional heating or cooling depending on any location and often relies on an active occupant to work properly. (BNBC 2020)

Pedestrian Access: Pedestrian access means a continuously accessible path of travel for movement with a minimum width of 1.2 meters without obstructions. (BNBC 2020)

Planner: Planner means a person who has a bachelor or a postgraduate degree in planning and is a member of the Bangladesh Institute of Planners (BIP). (BNBC 2020)

Post-consumer: Percentage of material in a product that was consumer waste. The recycled material was generated by household, commercial, industrial or institutional end-users and can no longer be used for its intended purpose. It includes returns of materials from the distribution chain. Examples include construction and demolition debris, materials collected through recycling programs, discarded products (e.g., furniture, cabinetry, decking), and landscaping waste (e.g., leaves, grass clippings, tree trimmings). (ISO 14021)

Pre-consumer: Percentage of material in a product that is recycled from manufacturing waste. Examples include planer shavings, sawdust, bagasse, walnut shells, culls, trimmed materials, overissue publications, and obsolete inventories. Excluded are rework, regrind, or scrap materials capable of being reclaimed within the same process that generated them. (ISO 14021)

Previously Developed Site: A Site where the natural conditions have been altered by the human activities such as construction of buildings, roads, paving, parking lots or other structures. Site altered for agricultural purposes, landscaping, forestry or has only been filled, cleared, or graded previously are not considered as previously developed sites.

Rapidly Growing Plant: Plants or trees that take 10 years or less to grow to a level that can be harvested in a sustainable manner.

Recycled Content: Percentage of post-consumer or pre-consumer recycled material content in a product or in an assembly by weight.

Regularly Occupied Spaces: Enclosed spaces where building users perform tasks or normally spend time for at least average one hour per person per day. Tasks including but not limited to seated or standing activities, study, resting, dining, or other focused activities.

Residential Institution: A building which provides temporary accommodation or continuing care for persons in need. Buildings such as hotels, motels, dormitories, hotels, boarding houses, hospitals, and nursing homes are considered as residential institutes.

Reused Materials: Construction materials that have been previously used in a building or for construction site and reused for the project.

Shared Multi-occupant Spaces: Spaces where multiple occupants share common space to performs a task where no standard workstations have been provided.

Stack Ventilation: Stack ventilation also known as the stack effect or chimney effect creates airflow using the natural force that emerges from changes in air pressure, temperature, and density levels between corresponding internal and external environments. (BNBC 2020)

Up-light: Light that spills beyond the horizontal axis drawn along the topmost point of a lighting fixture.

Vegetated roof: Roof of a building where vegetation has been grown on a growing medium laid over a waterproofing membrane. It may include features such as root barriers, drainage, and irrigation systems. Roofs that are covered with plants grown in pots or troughs are not considered as green roof.

3.3 Summary of BEEER Credits

The rating system comprises of 49 credits divided in to 10 categories. Each credit defines a specific set of requirements for the building and assigns points based on compliance level. The total number of aggregated credit points is 115.

Category	Credit No.		Description	Points		Remarks
				New	Existing	
Management and Planning	1	MAP-1	Recognized Professional	-	-	Mandatory
	2	MAP-2	Planning, Design & Approval	-	-	Mandatory
Project Site Management	3	SM-1	Assessment of the Site and Surroundings	2	N/A	
	4	SM-2	Site Selection	2	N/A	
	5	SM-3	Site Improvement & Protect or Restoration of Habitat	2	2	
	6	SM-4	Open Space Management	1	1	
	7	SM-5	Rainwater Runoff Management during Construction	2	N/A	
	8	SM-6	Heat Island Effect Reduction	2	2	
	9	SM-7	Outdoor Light Control on Site & Surrounding	1	1	

	10	SM-8	Access to the site	3	3	
	11	SM-9	Bicycle Parking	1	1	
	12	SM-10	Car Parking	2	2	
	13	SM-11	Community services	2	2	
Building Envelope Design	14	BED-1	Daylight	2	2	
	15	BED-2	Naturally Ventilated Spaces for Passive Building Design	6	8	
	16	BED-3	Building Orientation	1	N/A	
Water Management	17	WM-1	Water Metering	-	-	Mandatory
	18	WM-2	Outdoor Water Use Reduction	2	2	
	19	WM-3	Occupant Water Use Reduction	8	10	20% Mandatory
	20	WM-4	Water Reduction in Cooling Tower	2	2	
	21	WM-5	Rainwater Harvesting and Recharging	3	3	
Energy Management	22	EM-1	Energy Metering	-	-	Mandatory
	23	EM-2	Minimum Energy Performance	-	-	Mandatory
	24	EM-3	Building Commissioning	-	-	Mandatory
	25	EM-4	Advanced Energy Performance	20	22	
	26	EM-5	Demand Management	5	5	
	27	EM-6	Renewable Energy Use	10	12	3% Mandatory
	28	EM-7	Air Conditioning Equipment Performance	2	2	
	29	EM-8	Green Power	2	2	
Indoor Environment	30	IE-1	Minimum Ventilation Requirement	-	-	Mandatory
	31	IE-2	Tobacco Smoke Control	-	-	Mandatory
	32	IE-3	Low Emitting Materials	2	3	
	33	IE-4	Interior Lighting	1	1	
	34	IE-5	Acoustics Quality	1	1	
	35	IE-6	Clean Cooking (Homes)	1	1	
Construction Materials Management	36	CM-1	Reuse of Existing Buildings and Materials	5	-	
	37	CM-2	Certified Building Materials	4	4	
	38	CM-3	Construction and Demolition Waste Management	2	2	
	39	CM-4	Recycled and Reused Materials	2	N/A	
	40	CM-5	Mercury & Lead Pollution Reduction	1	N/A	
	41	CM-6	Rapidly Renewable Materials	1	N/A	
	42	CM-7	Certified Wood	1	N/A	
	43	CM-8	Local and Regional Construction Materials	2	N/A	
	44	CM-9	Material usage for building operation	N/A	12	
Health and Safety	45	HS-1	Safety Equipment, Signage and Emergency Equipment at Site	-	N/A	Mandatory
	46	HS-2	Safety During Building Operation	N/A	-	Mandatory
	47	HS-3	On site Facilities for Construction Workers	2	N/A	
Innovation	48	IN-1	Innovation	5	5	
Bonus Points	49	BP-1	Social Responsibility	2	2	
			Total	**115**	**115**	

Management and Planning

1. MAP-1: Recognized Professional

Applicability : New Constructions / Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable

Goal

Knowledge transfer, proper documentation, submission, and evaluation

Eligibility Criteria

At least one of the following Recognized Professional shall be involved in the project and preparation of submittal documents:

- BEEER accredited professional
- Either of the following professionals with a minimum 3 (three) years of working experience in building design and construction field and previous experience in green building design and construction:
    - Engineers with bachelor's degree in Civil, Electrical or Mechanical Engineering
    - Architecture with bachelor's degree in architecture
    - Above professionals shall have membership either of Institute of Engineers, Bangladesh or Institute of Architects of Bangladesh or any similar recognized international organization

Required Documentation

- Narrative stating list of professionals who involved in the project and their qualification
- Enlistment certificate
- BEEER accreditation certificate

2. MAP-2: Planning, Design & Approval

Applicability : New Constructions / Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable

Goal

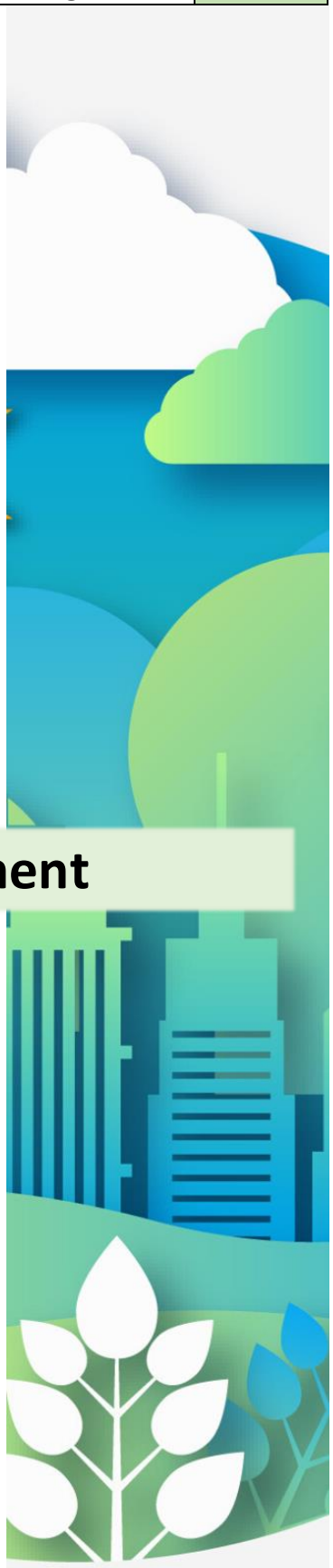
To avoid unethical practices

Eligibility Criteria

- All designs of the project must be done by registered professional architects, engineers and others as per BNBC 2020
- Land survey shall be done by civil engineer, planner or certified surveyor as per BNBC 2020
- All designs must be approved by concerned development authority or local body

Required Documentation

- Narrative including list of professionals, their qualification, and the involvement in the project design.
- Membership certificates of professional bodies such as The Institution of Engineers, Bangladesh (IEB) and Institute of Architects Bangladesh (IAB)
- Sample signature document for professionals where required.
- Approved drawings by concerned authorities.
- Land use clearance
- No objection clearance by local authority
- Environmental clearance where applicable



Project Site Management

3. SM 1: Assessment of the Site and Surroundings

Applicability : New Constructions
Points for Credit : 2 Points
Point options : Not Applicable
Remarks : Not applicable for existing buildings

Goal

To ensure proper utilization of site considering the surrounding context

Eligibility Criteria

- Analysis of the site conditions such as topography, soil conditions, ecology, hydrology, existing vegetation, flora and fauna, flood level and intensity, climatic condition, transportation facilities, sources of pollution for proper design
- Architects, engineers, surveyors, BEEER accredited professionals or others as specified in BNBC 2020 shall be considered competent to collect and submit project site analysis data.

Required Documentation

Submit a site assessment report containing:

- Narrative describing how the finding of the site assessment were adopted to the building design
- Site survey plan
- Environmental impact assessment (EIA) / Initial Environmental examination (IEE) where applicable
- Site master plan
- Contour map
- Underground water quality test data
- Climate data
- Site photographs, Aerial photograph etc.

4. SM 2: Site Selection

Applicability : New Constructions
Points for Credit : 2 Points
Point options : Not Applicable
Remarks : Not applicable for existing buildings

Goal

To encourage development in the planned area

Eligibility Criteria

Locate the project in a previously developed area or in an area planned to be developed by government institution or by private development agency /company or by an individual in accordance with land development regulations and approved by the concerned government organization.

Required Documentation

- Narrative describing how project meets the eligibility criteria
- Site Plan
- Construction Approval Documents
- Photo Proofs
- Land Use Clearance
- Land survey map

5. SM 3: Site Improvement & Protect or Restoration of Habitat

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 Points
Point options : Not Applicable

Goal

To restore the areas disturbed by construction activities and to preserve the existing natural areas within the project site

Eligibility Criteria

For New Constructions:

- Preserve topsoil up to 150mm depth and reuse for restoration.
- Protect existing natural water bodies and channels located within the project boundary.
- At least 50% of the existing matured trees shall be preserved or replanted within the site.
- Use native or adapted vegetation to restore at least 50% of the site excluding building footprint or 20% of the total site area, whichever is greater, to resemble natural vegetation in the area.

For existing buildings:

- Demonstrate that at least 50% of the site area excluding the building footprint or 20% of the total site area, whichever is greater, is covered with existing native or adapted vegetation.

  OR

- Use native or adapted vegetation to restore at least 50% of the site excluding building footprint or 20% of the total site area, whichever is greater, to resemble natural vegetation in the area.

Required Documentation

- Restored and Open Area Calculator
- Site master plan highlighting the restored areas
- Landscape plan including plant specifications and details of hardscape
- Photo proofs
- Pre-construction Tree survey and details of replantation.
- Details of existing natural water bodies
- Soil test report
- Narrative describing the restoration strategies.

6. SM 4: Open Space Management

Applicability : New Constructions / Existing Buildings
Points for Credit : 1 Point
Point options : Not Applicable

Goal

To encourage interaction with the environment and physical activities

Eligibility Criteria

- Provide at least 10% more of mandatory open area specified in applicable local regulation or provide at least 35% open area from the total site area if there is no applicable local regulation for open area.
- For the credit calculations, open area is considered as the total area of the project site excluding the building footprint.
- 50% of the provided open area must be vegetated and shall not be located over a basement.
- Vegetated roofs may be counted towards the credit compliance for projects where the floor-area ratio (FAR) is 1.8 or more. Such projects may also consider vegetated roof area to cover up to 25% of the minimum vegetation requirement.

Required Documentation

- Restored and Open Area Calculator
- Landscape plan indicating specifications of open spaces and details of hardscape.

7. SM 5: Rainwater Runoff Management During Construction

Applicability : New Constructions
Points for Credit : 2 Points
Point options : Not Applicable
Remarks : Not applicable for existing buildings

Goal

Manage the rainwater runoff during construction and reduce construction related pollution

Eligibility Criteria

- Prepare rainwater drainage plan for the construction site.
- Make drains and sedimentation pits for construction period to mange to rainwater runoff.
- Implement measures such as temporary landscaping, temporary drains, site fences, earth bumps and temporary covering to minimize the soil erosion and to prevent sedimentation of public drains or water bodies.

Required Documentation

- Drawings
- Photo evidence
- Periodic inspection report by the enlisted consultants
- Implementation report of runoff management activities.

8. SM 6: Heat Island Effect Reduction

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 Points
Point options : Option A – 1 point
Option B – 1 point

Goal

To reduce heat gain from horizontal surfaces.

Eligibility Criteria

Option A – Hardscape Measures

Use following strategies in any combination to cover at least 75% of the hardscape areas:

- Use Trees and plants to provide shading (Including playgrounds)
- Provide shade with solar photovoltaic or solar water heater panels
- Provide shade with architectural devices that have initial SR value of 0.33 or higher
- Use open-grid pavement system with less than 50% imperviousness
- Use materials with SR value of 0.33 or higher for hardscape areas

AND/OR

Option B – Roof Measures

Use following strategies in any combination to cover at least 75% of the roof areas:

- Use roofing materials or roof paint that have an SRI equal to or greater than 80
- Vegetated roofs
- Cover the roof with solar thermal collectors or photovoltaic panels

Required Documentation

- Heat Island Effect Reduction Calculator
- Submit the laboratory test data sheets or manufacturer documentation that confirms SRI Value of the materials
- Submit Drawings and Photographic evidence of Vegetation or covered area
- Architectural design for Roof Gardening & Landscaping

9. SM 7: Outdoor Light Control on Site & Surrounding

Applicability : New Constructions / Existing Buildings
Points for Credit : 1 Point
Point options : Not Applicable

Goal

Reduction of light pollution

Eligibility Criteria

- Maintain maximum LPD of 1.6 W/m^2 in outdoor area
- Outdoor lights shall be selected and installed to prevent up-lighting and light trespassing beyond site boundary
- Signage lights, directional/ signal lights, security lights, emergency lights, flagpole lights and internally illuminate signboard lights are excluded from above requirements

Required Documentation

- Exterior lighting design and drawings
- Manufacturers data sheet indicating polar diagram and rated power
- Exterior lighting power calculation

10. SM 8: Access to the site

Applicability : New Constructions / Existing Buildings
Points for Credit : 3 Points
Point options : Not Applicable

Goal

To reduce pollution and GHG emissions caused by the transportation activities

Eligibility Criteria

Provide pedestrian access to the facility with provision for persons with special needs

Option A

Select a project site where public transportation facilities (bus stoppage, boat/ferry, electrical vehicle stoppage, any other mode of public transport) are available within 500m walking distance from any functional entry of the project site or campus.

OR

Option B

Select a project site where either a rail station or water vehicle terminal or MRT or BRT station is located within 1 km walking distance from any functional entry of the project site or campus.

Required Documentation

- Building drawings and photographs indicating provision for persons with special needs
- Layout plan indicating surrounding transportation facilities, walking paths, distance between entry points and transportation facilities
- Detail of transportation routes, numbers, and frequencies
- Satellite maps updated within last 3 months or aerial photograph taken within 3 months.
- Photographic evidence

11. SM 9: Bicycle Parking

Applicability : New Constructions / Existing Buildings
Points for Credit : 1 Point
Point options : Not Applicable

Goal

To reduce pollution and GHG emissions caused by the transportation activities

Eligibility Criteria

- For non-residential buildings including residential institutions (Excluding industrial/factory projects and residential buildings) provide bicycle parking facilities equal to or more than 50% of the regular car parking requirements specified in the applicable government regulations (Number of Parking slots)
- For residential buildings (excluding residential institutions) provide bicycle parking facilities equal to or more than the number of residential units
- For factories and industrial buildings, provide bicycle parking facilities for the percentages of regular workers specified below:
  i. For first 1000 workers – 15%
  ii. For workers above 1000 up to 5000 – 10%
  iii. For workers above 5000 – 5%

  e.g., calculation for industrial building with 6,000 regular workers:

$$\underset{parking\ facilities}{Number\ of\ bicycle} = 1000 \times 15\% + 4000 \times 10\% + 1000 \times 5\% = 600$$

- For all types of buildings, changing rooms with shower facilities (for both Male and Female occupants excluding residents) shall be provided as per BNBC 2020

Required Documentation

- Bicycle Parking Capacity Calculator
- Site layout plan indicating bicycle parking area and access path to bicycle parking area
- Floor plan indicating shower and changing room
- Number of residential units or minimum number of car parking as per local regulation
- Photographic evidence

12. SM 10: Car Parking

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 Points
Point options : Option A – 1 Point
: Option B – 1 Point
Remarks : Residential buildings except residential institutions can earn 1 point by complying only the basic eligibility criteria

Goal

To reduce carbon footprint of transportation and promote sharing of resources

Eligibility Criteria

- For All types of buildings, provide parking facilities equal to the minimum requirements set out in BNBC 2020, Dhaka Imarat Bidhimala-2008 or other applicable government regulations (1 point for residential buildings except residential institutions)

AND

Option A (1- Point)

Applicable to all building types (including residential institutions) except residential buildings:

- Allocate at least 10% of the total parking slots for Low Emission Vehicle or Electric vehicles
- Allocate at least 10% of the total parking slots for pooling vehicles

AND/ OR

Option B (1- Point)

- All building types (including residential institutions) except residential buildings, provide Electrical Vehicle charging points for at least 2% of the total car parking slots (minimum 1 slot)
- For residential buildings (except for residential institutions) provide at least one Electrical Vehicle charging points for 50 residential units (minimum 1 slot)

Required Documentation

- Car Parking Capacity Calculator
- Drawings with Car parking layout
- Drawings and specification of car charging provisions
- Details of the charging point provided
- Photographic evidence

13. SM 11: Community services

Applicability : New Constructions / Existing Buildings
Points for Credit : 1-2 Points
Point options : 1 point for 5 to 9 facilities
2 points for 10 facilities or more

Goal

Encourage selection of sites with close proximity to existing community facilities to reduce energy use for transportation

Eligibility Criteria

- Five or more basic service facilities shall be available within 1 km walking distance from any functional entry of the project site or campus
- Unobstructed pedestrian access between the building and the services shall be available
- No basic service may be counted more than twice for credit compliance (e.g., If 5 grocery shops are available, only two can be counted)
- An additional point may be earned by demonstration availability of 10 or more basic service facilities that complies all above requirements

Examples of basic services include:

- Schools
- Restaurants
- Healthcare Facilities
- Fire and Ambulance Services
- ATM booths
- Banks
- Post offices or Courier services
- Grocery shops
- Pharmacies
- Market Place
- Convenience Stores
- Shopping malls
- Public parks
- Public playgrounds
- Childcare facilities
- Mosques of places of worship
- Community Centres

Required Documentation

- Vicinity map drawn on an updated satellite images or on an aerial photograph indicating project site, entrance, basic service facilities, pedestrian access paths to the services, walking distance from the entrance and the scale
- Photo evidence

Building Envelope Design

14. BED 1: Daylight

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 Points
Point options :

% Area complies with credit requirements	Points
≥50% and <75%	1
≥75%	2

Goal

To ensure optimum daylight performance and save energy

Eligibility Criteria

Maintain a minimum lighting level of 150 Lux from Natural daylight at work plane height (1m) in regularly occupied area under clear sky. The daylight level shall not create glare or over light or exceed 5000 Lux.

Option 1: Daylight Modelling

- Demonstrate compliance by daylight modelling through computer simulations (Illuminance calculation at 9 am and at 3 pm, both on a clear-sky day at the equinox.
- Regularly occupied area that complies the eligibility criteria at both at 9 am and 3 pm shall only be counted towards the credit compliance.

OR

Option 2: Daylight Measurements

Demonstrate compliance by measuring Illuminance level.

- Hourly measurements shall be taken between 9.00am and 3.00pm in a day with clear sky.
- Measurements shall be taken on a square grid not larger than 3mx3m while all artificial lights are off.
- Measuring points where hourly average is equal to or higher than 150 Lux shall only be counted towards the credit compliance. Points where light level is less than 110 Lux or more than 5000 Lux at any time between 9.00am and 3.00pm shall be excluded from calculation.

Required Documentation

- Daylight Calculator
- Architectural drawings
- Layout drawing indicating regularly occupied areas
- Glazing details or manufacturer data sheet
- Door, window, and skylight schedule with material specifications
- Day Lighting simulation report with complying percentage area calculation
- Illuminance level measurement report with complying percentage area calculation

15. BED 2: Naturally Ventilated Spaces for Passive Building Design

Applicability : New Constructions / Existing Buildings
Points for Credit : New Construction: 1 – 6 Points
Existing Buildings: 2 – 8 Points
Point options :

Floor area with passive features	Points (New)	Points (Existing)
≥20% and <40%	1	2
≥40% and <60%	2	4
≥60% and <80%	4	6
≥80%	6	8

Goal

To maximize naturally ventilated spaces and comfortable indoor environment though passive design features

Eligibility Criteria

Implement at least two of the following passive measures that improve natural ventilation and indoor comfort conditions in the building during both summer and winter. Points awarded based on the floor area of the building where at least two passive features have been implemented.

- Stack ventilation
- Cross ventilation
- Thermal Mass / Insulation
- Wind catcher (wind tower)
- Night flushing
- Shading
- Micro-climate control measures
- Evaporative cooling

Project team may implement passive measures not listed above if substantial contribution to improvement of indoor comfort conditions can be demonstrated.
During the building commissioning, indoor ambient parameters such as temperature, air velocity and RH shall be measured, and a report shall be submitted indicating the performance of the passive features.

Required Documentation

- Passive Building Design Calculator
- Details and drawings of the passive features implemented. architectural drawings, sections, and 3D rendering images
- Door & window schedule, types, percentage of opening and materials of window
- Narrative/ calculation about each feature explaining how it maintain acceptable ambient condition during both summer and winter
- Measurement data in both summer and winter/ simulation report
- Photographic evidence
- Occupancy information

16. BED 3: Building Orientation

Applicability : New Constructions
Points for Credit : 1 Point
Point options : Not Applicable
Remarks : Not applicable for existing buildings

Goal

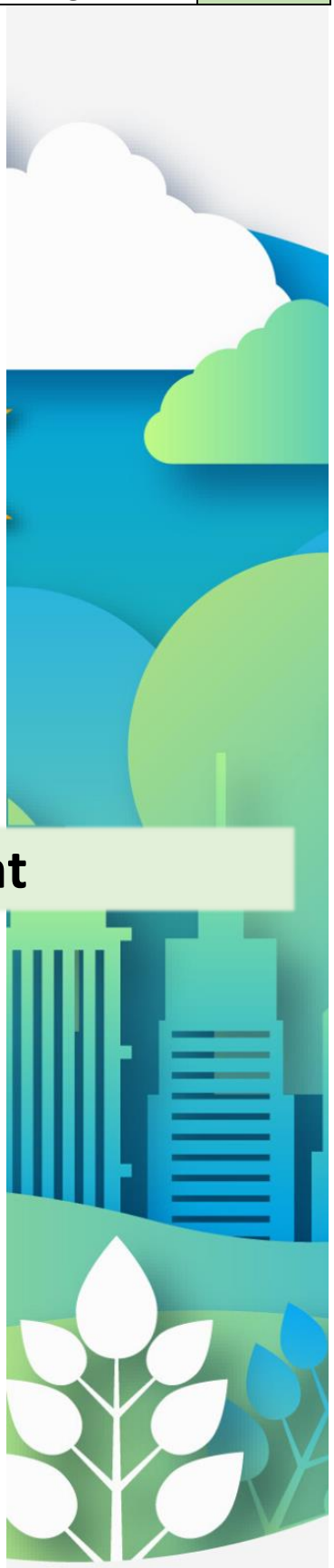
To optimize the building orientation for maximum exposure to natural wind flow and daylight

Eligibility Criteria

- Determine the building orientation to ensure that the building receives an adequate amount of daylight, while minimizing the solar heat gain into the building.
- Utilize methods such as low-e glass, shading, perforated wall, screening wall or other innovative solutions to reduce heat gain and glare from the east/west facing windows.

Required Documentation

- Architectural drawings
- Narrative explaining how design has been done to meet the eligibility criteria
- Shading details



Water Management

17. WM 1: Water Metering

Applicability : New Constructions / Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable

Goal

To measure water consumption to reduce water, energy, and resource footprint.

Eligibility Criteria

Install water meter/ prepaid water meter for the building.

Required Documentation

For New construction:
Water balance diagram with meter locations.

For Existing Buildings:
Monthly water Consumption data for at least 3 months.

18. WM 2: Outdoor Water Use Reduction

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 Points
Point options : Option A – 1 point
Option B – 1 point
Remarks : Credit is only applicable for project with a minimum landscape area of 10% from the total site area.

Goal

To reduce water usage for landscape irrigation and encourage use of alternative water sources.

Eligibility Criteria

- Prevent leakage during irrigation

AND

Option A: **Irrigation water use reduction**

- Use native drought prone plants and trees that do not require regular watering once established to cover at least 50% of the landscaping area
- Use drip irrigation or similar efficient irrigation technology for irrigation of other plants and trees.

AND/OR

Option B: Use alternative water sources for irrigation

- Use alternative water sources such as treated wastewater from STP/ ETP, harvested rainwater, recovered condensate, etc.

Required Documentation

- Detailed landscape design
- List of landscape species and the properties
- Details and drawings of irrigation system
- Plumbing drawings showing the recycled water usage for Irrigation
- STP/ETP/WWTP/Rainwater harvesting system design

19. WM 3: Occupant Water Use Reduction

Applicability : New Constructions / Existing Buildings
Points for Credit : New Constructions – 2 to 8 points
Existing Buildings – 3 to 10 points
Point options :

Percentage reduction	Points (New)	Points (Existing)
≥20% and <25%	Mandatory	Mandatory
≥25% and <30%	2	3
≥30% and <35%	3	4
≥35% and <40%	4	5
≥40% and <45%	5	6
≥45% and <50%	6	8
≥50%	8	10

Remarks : 20% reduction from baseline is mandatory

Goal

To reduce indoor water use

Eligibility Criteria

Implement measures to reduce the occupant water usage compared to the calculated baseline consumption:

- All water fixtures shall have SREDA or equivalent rating or test data indicating the flow rates.
- Alternative water sources such as treated wastewater from STP/ETP, harvested rainwater, recovered condensate, etc. may be used to reduce the potable water consumption.
- Mandatory 20% reduction shall be achieved only with fixture efficiency, without using alternative water sources.
- Calculate the baseline consumption using the volumes and flow rates shown in Tables.

Table 1: Flow Fixtures

Flow Fixtures	Baseline		Occupants	Visitors	Retail customers	Residents
Private lavatory faucet	9 lpm at 400 kPa	Uses	3	0.5	0.2	5
		Duration	15 sec	15 sec	15 sec	15 sec
Public lavatory faucet	3 lpm at 400 kPa	Uses	3	0.5	0.2	N/A
		Duration	15 sec	15 sec	15 sec	N/A
Kitchen faucet	9 lpm at 400 kPa	Uses	1	0	0	4
		Duration	15 sec	N/A	N/A	60 sec
Faucet for Ablution	3 lpm at 400 kPa	Uses	2	0	0	5
		Duration	15 sec	N/A	N/A	15 sec
Shower head per stall	12 lpm at 500 kPa	Uses	0.1	0	0	1
		Duration	300 sec	N/A	N/A	480 sec
Hand Shower	8 lpm at 415 kPa	Uses	0.1	0	0	1
		Duration	300 sec	N/A	N/A	480 sec

Table 2: Flush Fixtures

Flush Fixtures	Baseline	Gender	Number of Uses			
			Occupants	Visitors	Retail customers	Residents
Water Closet or Squatting pan with cistern	6/4 lpf (Dual Flush)	Female	3	0.5	0.2	5
		Male	1	0.1	0.1	5
Water Closet or Squatting pan with cistern (No Urinals)	6/4 lpf (Dual Flush)	Female	3	0.5	0.2	5
		Male	3	0.5	0.2	5
Urinal	4 lpf	Female	0	0	0	N/A
		Male	2	0.4	0.1	N/A

- Number of uses shown in above tables for occupants, visitors and retail customers are for an 8-hour period whereas number of uses for residents are for a 24-hour period.

Required Documentation

- Narrative including list of building user types and the numbers
- Occupant Water Use Reduction Calculator
- Manufacturers cut sheet indicating flow/flush rates
- Plumbing drawings showing the recycled water for Flushing
- STP/ETP/WWTP Design

20. WM 4: Water Use Reduction in Cooling Towers

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 points
Point options : 10% from alternative water sources – 1 point
20% from alternative water sources – 2 points

Goal

To reduce potable water, use in building services

Eligibility Criteria

- Use cooling tower equipped with drift eliminators.
- Install a water meter to measure the make-up water quantity

AND

- Use water from alternative sources such as treated wastewater from STP/ETP, harvested rainwater and recovered condensate in cooling towers to meet the make-up water demand in following percentages.
    - At least 10% of the make-up water demand.
    - At least 20% of the make-up water demand

- The water quality must be maintained as per the requirements of the building service system.

Required Documentation

- Cooling tower technical data sheet
- Makeup water demand calculation
- Plumbing drawings indicating the recycled water usage for cooling tower
- Water quality test reports of the reclaimed water and the make-up water
- Water quality parameters recommended by the equipment manufacturer
- STP/ETP/WWTP Design where applicable

21. WM 5: Rainwater Harvesting and Recharging

Applicability : New Constructions / Existing Buildings
Points for Credit : 3 Points
Point options : Not Applicable

Goal

To utilize naturally available water

Eligibility Criteria

- Design the rainwater harvesting system to collect runoff from the roof area of the building.
- Rainwater Storage capacity shall be calculated based on size of the roof area using following calculation.

$$T = A \times p \times I \times C$$

Where;

T- Tank capacity (m3)

A – Roof area excluding vegetated roofs (m2)

p – Percentage roof area (40%)

I – daily average rain fall (m) where;

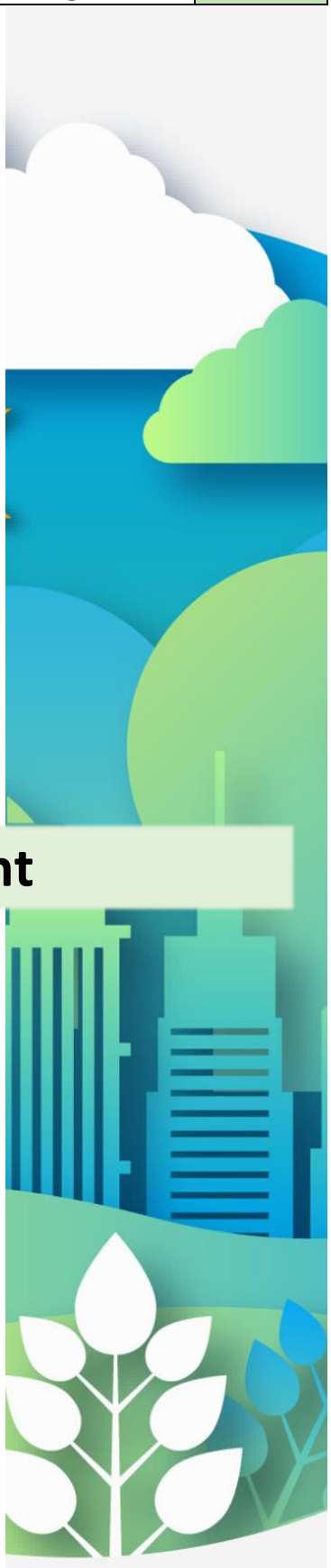
$$I = Average\ Annual\ rain\ fall\ of\ last\ 5\ years \div Average\ number\ of\ rainy\ days\ per\ annum$$

C – Roof run-off coefficient (shall be considered as 90%)

- Use collected rainwater for end uses such as toilet flushing, gardening, firefighting water storage.
- Excess rainwater shall be recharged to below ground with filtration or grease/oil trapping system

Required Documentation

- Rainwater Harvesting and Recharging Calculator
- Plumbing drawings indicating the rainwater collection and use in buildings
- Rainwater filtration system and/or treatment plant design
- Layout plan and design of recharge well/rainwater storage tank



Energy Management

22. EM 1: Energy Metering

Applicability : New Constructions / Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable

Goal

Measure the energy consumptions to maintain the efficiency level of the building

Eligibility Criteria

Install building-level, tenant-level or unit-level energy meters to monitor whole building energy consumption. Meters shall be installed to monitor all energy sources such as electricity, natural gas, diesel, etc.

Required Documentation

- Connection certificate from energy utility agency/ companies.
- Electrical drawings and single line diagram indicating the energy meter location.

23. EM 2: Minimum Energy Performance

Applicability : New Constructions / Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable

Goal

To improve the energy efficiency level of the building to reduce the negative environmental and economic impacts

Eligibility Criteria

Option 1 – Performance Path for New Constructions

Demonstrate a minimum 5% energy saving excluding renewable energy, from building systems and envelop compared with the minimum requirements specified in BNBC 2020 or ASHRAE Standard 90.1-2010 under the following sections.

- Building envelops
- Heating, ventilation air conditioning and refrigeration
- Lighting
- Domestic hot water
- Motors and other miscellaneous equipment

Option 2 – Prescriptive Path for New construction

- Applicable only for buildings that has gross floor area less than 50,000sqft
- Not applicable to industrial and manufacturing buildings
- Following parameters shall not exceed more than 20% of the minimum values specified in ASHRAE 90.1-2010 or in applicable sections of BNBC 2020:
    - U values of roofs walls, roofs, slabs, floors, and opaque doors
    - U values and SHGC values of vertical fenestration
- Window to wall ratio shall not exceed 40%
- Following parameters shall be at least 10% better than the minimum requirement specified in ASHRAE 90.1-2010 or in applicable sections of BNBC 2020:
    - Performance value (COP/EER) of air conditioning equipment (cooling and heating)
    - Average lighting power density.
- Following equipment shall meet or exceed the minimum efficiencies specified in ASHRAE 90.1-2010 or in applicable sections of BNBC 2020:
    - Water heating equipment and storage
    - Auxiliary equipment in HVAC systems such as fans, pumps, and cooling towers
    - Elevators and escalators
    - Other Pumps and motors

Option 03 – Compliance Path for Existing Buildings:

- Conduct an energy audit to identify the energy efficiency measures. Implement the identified energy efficiency measures to achieve the desired energy savings.
- Collect a minimum of 3 months' energy consumption data after implementing the energy efficiency measures and calculate the monthly average.
- Normalise the monthly average value against the relevant parameters such as production output, occupancy, operating hours, etc.
- Demonstrate at least 5% of energy savings compared to the monthly average energy consumption of the previous year.
- Renewable Energy sources shall not be considered as an energy efficiency measure and the energy generated by such sources shall be included in the monthly average energy consumption calculation.
- For buildings where energy efficiency measures have already been implemented within previous two years and can demonstrate 5% of energy savings compared to the monthly average energy consumption of the previous year (prior to EE measure implementation) deem to have complied with the credit requirement.

Required Documentation

For all options:

- Details of implemented energy efficiency measures.
- Mechanical, electrical, lighting and plumbing design documents with drawings
- Power and energy load calculation
- Steam load calculation (if any)
- Technical details/ manufacturer data sheets for HVAC equipment including chillers, AHUs, FCUs, Cooling towers, pumps, direct expansion units, ventilation/exhaust fans, etc.
- Anticipated load of process equipment and receptable loads
- Technical details/manufacturer data sheets of lighting fixtures
- Details of building envelop components

Option 1

- Minimum Energy Performance Calculator
- Energy simulation input and output reports of both baseline and proposed case and/or detailed calculations to demonstrate energy savings

Option 2

- Envelope U value calculation and comparison with baseline
- Window to wall ratio calculation
- Lighting power density calculation and comparison with baseline
- HVAC equipment efficiency comparison with baseline

Option 3

- Energy audit report and details of efficiency measure implemented
- Actual and normalised historical energy data of at least 1 year
- Normalised average energy consumption and energy saving % calculation

24. EM 3: Building Commissioning

Applicability : New Constructions / Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable

Goal

To ensure compliance of desired level of performance

Eligibility Criteria

Option 1 – for New Constructions

Complete the commissioning process for mechanical, electrical, water supply, renewable energy systems and building envelop in accordance with BNBC 2020, Part-8, Chapter-2 (Air-condition, Heating and Ventilation) or in accordance with ASHRAE Guideline 0–2005 and ASHRAE Guideline 1.1–2007 for HVAC & R systems. Commissioning process shall be carried out by a SREDA enlisted Energy Auditor.

Following tasks shall be carried out by the auditor:

- Visual inspection of the systems and inspection
- Check and approve test procedure for each system
- Installation verification
- Functional testing of for mechanical, electrical, plumbing, renewable energy systems
- Check building envelop
- Prepare a log of issues identified and recommendations
- Check systems manual updates and delivery
- Check the effectiveness of training of system operators

Commissioning agent shall check the following items as applicable:

- Mechanical, Electrical and Plumbing Design
- Set points for systems such as air conditioning and lighting controls
- Space parameters such as light level, temperature, Relative humidity and CO_2 levels
- Water fixture flow and flush rates
- Power and Energy Load Calculation
- Design and operations of STP/ETP/WWTP
- Steam load calculation and boiler details
- Refrigerant details
- Lighting floor plan, LPD and cut sheet of interior lighting fixtures
- Technical details/ manufacturer data sheets for HVAC equipment including chillers, AHUs, FCUs, Cooling towers, pumps, direct expansion units, ventilation/exhaust fans, etc.
- Verify the compliance of following credits where applicable:
    - SM7: outdoor light control on site & surrounding
    - BED2: Naturally ventilated spaces for passive building design
    - IE1: Minimum ventilation requirement
    - IE4: Interior lighting

Option 2 – for Existing Buildings

- Meet the requirements of Option 1
- Check the functionality and performance of energy efficiency measures implemented

Required Documentation

- Credential of the auditor
- Commissioning report including the outcome of the tasks performed in Option 1 and Option 2

25. EM 4: Advanced Energy performance

Applicability : New Constructions / Existing Buildings
Points for Credit : New Construction – 1 to 20 Points
Existing Buildings – 2 to 22 Points
Point options : Option 1 and Option 3 – Points as per the table

Energy Saving %	New Construction	Existing Buildings
≥6% and < 8%	1	2
≥8% and < 10%	2	3
≥10% and < 12%	3	4
≥12% and < 15%	4	5
≥15% and < 18%	5	6
≥18% and < 21%	6	7
≥21% and < 24%	7	8
≥24% and < 27%	8	9
≥27% and < 30%	9	10
≥30% and < 34%	10	12
≥34% and < 38%	12	14
≥38% and < 42%	14	16
≥42% and < 46%	16	18
≥46% and < 50%	18	20
≥50%	20	22

: Option 2 - 1 to 5 points

Goal

To improve the energy efficiency level of the building to reduce the negative environmental and economic impacts

Eligibility Criteria

Option 1 – Performance path for New Construction

Use whole building energy simulation to demonstrate optimized energy performance by:

- Interior and exterior lighting power density (LPD) reduction
- Improvement of thermal performance of building envelope
- Energy efficient HVAC systems
- Using renewable energy sources
- Use energy efficient equipment

Follow the Minimum Energy Performance criteria specified in ASHRAE Standard 90.1-2010 Appendix G to calculate the percentage improvement in the proposed building performance compared with the baseline performance defined in BNBC 2020 or ASHRAE Standard 90.1-2010.

Energy simulation software shall comply with the requirement specified in the ASHRAE Standard 90.1-2010 Appendix G, section G2.2

Option 2 – Prescriptive Path for New construction

- Not applicable for industrial and manufacturing buildings or for buildings with gross floor area more than 50,000sqft
- Comply the minimum requirement specified EM2: Minimum Energy Performance
- Demonstrate that performance values (COP/EER) of air conditioning equipment (cooling and heating) is 20% higher than the minimum requirement specified in ASHRAE 90.1-2010 or in applicable sections of BNBC 2020 (Applicable only for buildings with at least 25% conditioned area) – 2 points
- Average lighting power density shall be lower than the minimum requirement specified in ASHRAE 90.1-2010 or in applicable sections of BNBC 2020:
    - 20% Lower – 1 point
    - 30% Lower – 2 Point
- U values of roofs, walls, slabs, floors, opaque doors and SHGC and U values of fenestration do not exceed more than 10% of the minimum values specified in ASHRAE 90.1-2010 or in applicable sections of BNBC 2020. – 1 point
- Exceed the minimum efficiencies specified in ASHRAE 90.1-2010 or in applicable sections of BNBC 2020 by 10% of at least two of the following types of equipment – 1 point:
    - Water heating equipment and storage
    - Auxiliary equipment in HVAC systems such as fans, pumps, and cooling towers
    - Elevators and escalators
    - Other Pumps and motors

Option 3 – For Existing Buildings

- Demonstrate energy savings compared to the monthly average energy consumption of the previous year
- Follow the same calculation procedure used in EM2: Minimum Energy Performance
- Energy generated by renewable sources may be counted towards the credit compliance

Required Documentation

For all options:

- Details of implemented energy efficiency measures
- Mechanical, Electrical, Lighting and Plumbing design documents with drawings
- Power and energy load calculation
- Steam load calculation (if any)
- Technical details/ manufacturer data sheets for HVAC equipment including chillers, AHUs, FCUs, Cooling towers, pumps, direct expansion units, ventilation/exhaust fans, etc.
- Anticipated load of process equipment and receptable loads
- Technical details/manufacturer data sheets of lighting fixtures
- Details of building envelop components

Option 1

- Energy Performance Calculation sheet
- Energy simulation input and output reports of both baseline and proposed case and/or detailed calculations to demonstrate energy savings

Option 2

- Envelope U value calculation and comparison with baseline
- Lighting power density calculation and comparison with baseline
- HVAC equipment efficiency comparison with baseline
- Appliances and other equipment efficiency comparison with baseline

Option 3

- Energy audit report and details of efficiency measure implemented
- Actual and normalised historical energy data of at least 1 year
- Normalised average energy consumption
- Energy Saving Percentage calculation

26. EM 5: Demand Management

Applicability : New Constructions / Existing Buildings
Points for Credit : 5 Points
Point options : Option 1 – 2 points
: Option 2 – 2 points
: Option 3 – 1 point

Goal

To encourage the technologies and programs that make energy generation and distribution systems more efficient

Eligibility Criteria

Option 1 – Building Management System (BMS)

Install a BMS with the following features:

- Monitor and control the operation of chillers, pumps, AHUs and cooling towers of central air conditioning system (1 Point)
- Monitor and control at least three of the main MEP systems in the project such as VRV systems, generators, boilers, compressors, ventilation systems, STP/WWTP and Water supply systems. (1 Point)

AND/OR

Option 2 – Energy Metering

- Install a centralized energy monitoring system (EMS) with the following features or integrate the following features in to the BMS
- Monitor the total consumption of each energy source of the project
- Monitor energy consumption and demand of the end uses that are more than 10% of total load
- Ability to record the demand and consumption on an hourly basis and display hourly, daily and monthly usage trends
- A minimum 36-month data storage and remote accessibility to energy data
- Ability to shut down non-essential equipment to manage the peak demand

AND/OR

Option 3 – Water Metering

Install a centralized water consumption monitoring system (WMS) with the following features or integrate the following features in to the BMS:

- Monitor water consumption of the project and any end uses that are more than 10% of total consumption
- A minimum 36-month data storage and remote accessibility to water consumption data

- Ability to record water consumption in hourly basis and display hourly, daily, and monthly usage trends

Required Documentation

- List of the system and parameters monitored
- List of Energy / water end uses that are monitored and not monitored.
- Specifications of the BMS, energy monitoring and water monitoring systems
- BMS point schedule / Schematic Diagram of Energy and water monitoring systems
- Real time performance data obtained from BMS, EMS and WMS

27. EM 6: Renewable Energy Use

Applicability : New Constructions / Existing Buildings
Points for Credit : New Construction – 1 to 10 Points
Existing Buildings – 1 to 12 Points
Point options :

Renewable Energy %	Points	
	New Construction	Existing Buildings
3%	Mandatory	
≥5% and <10%	1	1
≥10% and <15%	2	2
≥15% and <20%	3	3
≥20% and <30%	4	5
≥30% and <40 %	5	6
≥40% and <50%	6	7
≥50% and <75%	7	8
≥75% and <100%	8	10
100% (Net Zero Building)	10	12

Remarks : 3% renewable energy use is Mandatory

Goal

To reduce the negative environmental and economic impacts associated with fossil fuel usage for energy generation

Eligibility Criteria

- Use renewable energy generated from onsite or offsite sources, in the project building to offset the energy usage of the project.
- Ownership of the offsite renewable system shall be retained for at least 10 years.
- Excess electricity generated from renewable energy sources may be fed to the national grid and counted towards the credit compliance.
- Solar PV, solar thermal, wind power, biofuels, hydro power, geothermal energy, wave/tidal energy are considered as qualifying renewable energy sources for the credit.
- Biomass harvested from forests, municipal solid waste and treated wood are ineligible for the credit compliance.

Required Documentation

- Renewable Energy Use Calculator
- Annual energy usage and cost of the project
- Annual energy generation report for each renewable energy source
- Investment information and ownership details of the systems
- Design drawings and specification of renewable energy systems

28. EM 7: Air-conditioning Equipment Performance

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 Points
Point options : Not Applicable

Goal

To reduce the energy consumption, GHG emissions and eliminate Ozone layer depletion associated with the air conditioning equipment.

Eligibility Criteria

- Refrigerants with zero Ozone depletion potential shall be used and the maximum allowable refrigerant leakage is 2% per annum.
- The cooling equipment shall meet or exceed the minimum efficiency requirement stated in the table below at AHRI approved test conditions.

Description	Capacity	Input (kW/TR)
Air cooled chillers	All Capacities	1.13
Water cooled electrically operated positive displacement (rotary screw, scroll and Reciprocating) chillers	<150 TR	0.70
	≥150 TR and <300 TR	0.61
	≥300 TR	0.56
Water cooled electrically operated centrifugal chillers	<300 TR	0.57
	≥300 TR and <600 TR	0.55
	≥600 TR	0.54
Air cooled absorption single effect chillers	All Capacities	0.57
Water cooled absorption single effect chillers	All Capacities	0.67
Water cooled absorption double effect (indirect fired) chillers	All Capacities	0.95
Water cooled absorption double effect (Direct fired) chillers	All Capacities	0.95
Air-cooled air conditioner and package units	<6 TR	1.00
	>6 TR and < 12 TR	1.02
	> 12 TR < 20 TR	1.04
	>20 TR	1.14
Water-cooled air conditioners and package units	<6 TR	0.93
	> 6 TR and < 12 TR	0.94
	> 12 TR and 20 TR	0.91
	>20 TR	0.92
Variable refrigerant flow air conditioners (VRF)	<6 TR	0.92
	> 6 TR and < 12 TR	0.92
	> 12 TR and 20 TR	0.93
	>20 TR	1.03

Required Documentation

- Performance data sheets, catalogues, and technical date sheets of the equipment
- Refrigerant leakage check record

29. EM 8: Green power

Applicability : New Constructions / Existing Buildings
Points for Credit : 1-2 Points
Point options :

% Green power generation	Point
≥20% and <50 %	1
≥50 %	2

Goal

To reduce the negative environmental and economic impacts associated with conventional power system

Eligibility Criteria

- Invest in or have a contract with offsite renewable energy sources to generate electricity. Ownership or contract shall be retained for a minimum 5-year period.
- Renewable energy generation and emission reduction from the offsite sources shall not be counted for credit compliance of any other BEEER projects during the 5-year period.
- For New Constructions, percentage for green power shall be calculated from proposed case electricity consumption estimated in 'EM2: Minimum energy performance' credit.
- For Existing Buildings, percentage for green power shall be calculated from annual electricity consumption predicted using monthly average electricity consumption estimated in 'EM2: Minimum energy performance' credit.
- Electricity generated from renewable sources that are accounted in 'EM 6: Renewable Energy Use' credit shall be deducted from the annual electricity consumption prior to calculation of green power requirement.
- When 100% project electrical energy usage is offset by renewable energy sources accounted in 'EM 6: Renewable Energy Use' credit, the project is deemed to have complied the credit requirement.

Required Documentation

- Green Power Calculator
- Contract document
- Actual energy consumption data for existing buildings
- Estimated annual energy consumption for new projects

Indoor Environment Quality

30. IE 1: Minimum Ventilation Requirement

Applicability : New Constructions / Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable

Goal

To ensure proper ventilation and comfortable indoor environment

Eligibility Criteria

- Adequately ventilate all living spaces by mechanical or natural means
- For mechanically ventilated spaces, comply the minimum requirements specified in BNBC 2020, Part-8, Chaper-2 (Air-condition, Heating and Ventilation) or ASHRAE Standard 62.1-2010, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata)
- For Naturally ventilated spaces, comply with requirements specified in BNBC 2020, Part viii, section 2.11 or ASHRAE Standard 62.1-2010, Section 5.1
- Monitor CO_2 concentrations within all densely occupied spaces. CO_2 monitors must be between 3 and 6 feet above the floor

Required Documentation

- Minimum Ventilation Requirement Calculator
- Mechanical ventilation system design
- Architectural floor plan, furniture/ workstation layout and door/ window schedules
- Natural ventilation calculation

31. IE 2: Tobacco Smoke Control

Applicability : New Constructions / Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable

Goal

To ensure Tobacco smoke free indoor environment and passive smoking is avoided completely

Eligibility Criteria

- Display signage at a visual level and provide proper awareness to building users as per government policies and regulations.

AND

Option 01 – Prohibit Smoking

- Prohibit smoking within the entire project premises

OR

Option 02 – Dedicated Smoking Area

- Provide a dedicated smoking room with exclusive ventilation or a dedicated outdoor space for smoking at least 25 feet away from the building openings and outdoor air intakes

Option 03 – For Residential buildings excluding residential institutions

- Prohibit smoking within the entire project premises

OR

- Prohibit smoking in public areas of the building
- Prevent tobacco smoke leaking into the common areas from the residential units.
- Provide a dedicated smoking room with exclusive ventilation or a dedicated outdoor space for smoking at least 25 feet away from the building openings and outdoor air intakes

Required Documentation

- Smoking policy of the project
- Details of signage of smoking regulation
- Design and layout of smoke zone
- Photographic evidence.

32. IE 3: Low Emitting Materials

Applicability : New Constructions / Existing Buildings
Points for Credit : New Construction – 2 Points
: Existing Buildings: – 3 Points
Point options : **Option A:**

Percentage of low emitting material out of total number of products	Points
≥50% and <80%	1
≥80%	2

: **Option B**: 1 Point

Goal

To ensure Low VOC in Indoor Environment

Eligibility Criteria

Option A – for New Constructions and Existing Buildings

Applicable for all new constructions and for existing buildings where more than 20% of the floor area have been renovated within one year from the date of project registration or intended to be renovated more than 20% floor area after the project registration:

- Interior paints and coatings shall comply with the VOC levels specified in the Table - 01
- Adhesives and sealants shall comply with VOC levels specified in Table – 02
- All products must have the VOC level certification from ISO or similar internationally accredited laboratory
- Veneer wood, particle boards and all types of composite wood products shall not contain added Urea Formaldehyde

AND/OR

Option B – for Existing Buildings

Conduct an air quality test to demonstrate following contaminants are within acceptable levels. Testing of each parameter shall be carried out in accordance with the respective ISO standard or any other equivalent international standard.

Contaminant	Maximum Concentration	Test standard
Carbon monoxide (CO)	9 ppm	ISO 4224
Formaldehyde	27pbm	ISO 16000-3
Total volatile organic compounds (TVOC s)	500 µg/m3	ISO 16000-6
Particulates (PM10)	50 µg/m3	ISO 7708

- Air quality test shall be carried out when the building and the ventilation systems are in normal operation.
- At least one air sample shall be collected from the areas served by each ventilation system.
- For large open areas, air sample shall be collected for every 2,500sqm area.

Table 1: Maximum Allowable VOC levels for paints and coatings

Coating	VOC (g/ltr)	Coating	VOC (g/ltr)
Bond breakers	350	Mastic coatings	500
Clear Wood finishes	275	Metallic Pigmented coatings	500
– Varnish / Lacquer	275	Multicolour coatings	250
– Sanding Sealers	275	Nonflat coatings	50
Clear brushing lacquer	275	Nonflat high gloss	50
Concrete-curing compounds	100	Pigmented lacquer	275
Dry-fog coatings	150	Pre-treatments wash primers	420
Fire-retardant coatings		Primers, sealers, undercoats	100
– Clear	650	Quick-dry enamels	50
– Pigmented	350	Quick-dry primers, sealers, undercoats	100
Flats	50	Rust: preventive coatings	100
Floor coatings	50	Shellac	
Graphic arts (sign) coatings	500	– Repair	650
Industrial maintenance (im) coatings	100	– Clear	340
High temperature im coatings	420	Stains – Interior	100
Zinc-rich im primers	100	Swimming pool coatings	340
Japans/faux finishing coatings	450	Waterproofing sealers	100
Magnesite cement coatings	300	Waterproofing concrete, masonry sealers	100

Table 2: Maximum Allowable VOC levels for Adhesives and sealants

Architectural Applications	**VOC (g/l) less water**	**Specialty Applications**	**VOC (g/l) less water**
Indoor carpet adhesives	50	PVC welding	510
Carpet pad adhesives	50	CPVC welding	490
Wood flooring adhesives	100	ABS welding	325
Rubber floor adhesives	60	Plastic cement welding	250
Subfloor adhesives	50	Adhesive primer for plastic	550
Ceramic tile adhesives	65	Contact adhesive	80
VCT and asphalt adhesives	50	Special purpose contact adhesive	250
Drywall and panel adhesives	50	Structural wood member adhesive	140
Cove base adhesives	50	Sheet applied rubber lining operations	850
Multipurpose construction adhesives	70	Top and trim adhesive	250
Structural glazing adhesives	100		
Substrate Specific Applications	**VOC (g/l) less water**	**Sealants**	**VOC (g/l) less water**
Metal to metal	30	Architectural	250
Plastic foams	50	Nonmembrane roof	300
Porous material (except wood)	50	Roadway	250
Wood	30	Single-ply roof membrane	45
Fiberglass	80	Other	420
Sealant Primers	**VOC (g/l) less water**		
Architectural, nonporous	250		
Architectural, porous	775		

Required Documentation

- Low Emitting Materials Calculator
- Materials inventory indicating all interior paints, coatings, adhesives, sealants and composite wood products
- Manufacturer data sheet
- Lab report (VOC emission) of Product.
- Procurement invoices
- Air quality test report

33. IE 4: Interior Lighting

Applicability : New Constructions / Existing Buildings
Points for Credit : 1 Point
Point options : Not Applicable

Goal

To ensure optimum use of lighting and improve occupant comfort

Eligibility Criteria

- For at least 90% of individual occupant spaces, provide individual lighting controls that enable occupants to adjust the lighting to suit their individual tasks and preferences, with at least three lighting levels or scenes (on, off and a midlevel between 30% to 70% of the maximum illumination level).

- Daylight contributions shall be excluded from the calculations.

- For all shared multi-occupant spaces, have in place multi-level control systems that enable occupants to adjust the lighting to meet preferences, with at least three lighting levels or scenes (on, off, midlevel).

Required Documentation

- Interior Lighting Calculator
- Design information of lighting control- Location, specifications
- Floor layout indicating individual workstations and multi-occupant spaces

34. IE 5: Acoustics Quality

Applicability : New Constructions / Existing Buildings
Points for Credit : 1 Point
Point options : Not Applicable

Goal

To reduce noise generation from appliances

Eligibility Criteria

- Comply BNBC 2020, Part-8, Chaper-2 (Air-condition, Heating and Ventilation) and Chapter-3 (Building Acoustics)

OR

- Implement measures to attenuate noise from Electrical Generators and Air-conditioning equipment. The maximum allowable noise levels for occupiable indoor spaces are as follows.
    - Residential/Commercials – 33 – 48 dB
    - Factory/Industry – 63 – 78 dB

Required Documentation

- Noise level measurement data
- Attenuation measures design and Documents

35. IE 6: Clean Cooking

Applicability : New Constructions / Existing Buildings
Points for Credit : 1 Point
Point options : Not Applicable
Remarks : Applicable only for domestic cooking applications

Goal

To Eliminate Indoor Environment Pollution

Eligibility Criteria

- Use tier 4 cooking solution on Indoor space
- Use a proper exhaust system for both cooking stove and cooking place
- For an electric cooker, the maximum wattage for a single burner shall be less than 2 kW
- Comply with the ventilation and thermal comfort requirements of BNBC 2020, Part-8, Chaper-2 (Air-condition, Heating and Ventilation)

Required Documentation

- Manufacturer data sheet of cooking stoves
- Efficiency and pollution level lab test reports of the stove
- HVAC drawings
- Architectural drawings indicating cooking area

Construction Materials Management

36. CM 1: Reuse of Existing Buildings and Materials

Applicability : New Constructions
Points for Credit : 5 Points
Point options : Option A – 5 points
Option B – 4 points
Option C – 1-3 points
Option D – 5 points

Remarks : Not applicable for existing buildings

Goal

Reduce energy and resource footprint of construction and building materials production by preserving or reusing existing buildings, building component and materials

Eligibility Criteria

Option A

Full Preservation / Restoration/ Revitalization of existing heritage building which has been declared a heritage building by a relevant authority such as City Development Authorities, City Corporations, Municipalities, Department of Archaeology, etc. No demolition shall be carried out without the prior approval from the relevant authority.

Option B

Renovate existing building to a level it can be utilized safely for productive use while retaining at least 70%, by surface area, of the existing building structure, envelop, and interior components such as interior walls, slabs, partitions, doors, etc. Structurally weak building components may be removed or demolished and excluded from the calculations.

Option C

Reuse or salvage building materials as percentage of the surface area from off-site or on-site sources. Points are awarded as per the percentages listed in Table below.

Percentage of Reused materials	Points
≥25% and <40%	1
≥40% and <60%	2
≥60%	3

Option D

Perform a life-cycle assessment structure and enclosure of new constructions to demonstrates a minimum of 10% reduction in global warming potential and two other impact categories listed below, compared with a baseline building:

- Global warming potential (greenhouse gases), in CO_2.
- Depletion of the stratospheric ozone layer, in kg CFC-11.

- Formation of tropospheric ozone, in kg NOx, kg O_3 eq, or kg ethane.
- Depletion of non-renewable energy resources, in MJ.
- Acidification of land and water sources, in moles H+ or kg SO_2
- Eutrophication, in kg nitrogen or kg phosphate

The following criteria shall be followed in performing the LCA:

- Baseline building shall have the same size, function, orientation, and energy performance as the proposed case building.
- The service life of both the baseline and proposed buildings shall be considered as 60 years.
- For baseline and proposed buildings, LCA shall be carried out using same software and same data set compliant with ISO 14044.
- As defined in ISO 21930, stages including construction materials (Sections A1-A3), transportation to site (Sections A4), maintenance and material replacements (Sections B1-B3), Deconstruction (C1-C4).
- Interior finishes, electrical and mechanical equipment, plumbing fixtures, fire detection and alarm system, conveying systems, excavation and other site development, parking lots, non-structural walls, furniture may be excluded from the LCA.

Required Documentation

For option A

- Evidence of Historic project
- As-built Drawings
- Photo evidence

For option B

- As-built Drawings
- Photo evidence
- Buildings and Materials Reuse Calculator

For Option C

- As-built Drawings
- Photo evidence
- Buildings and Materials Reuse Calculator

For option D

- LCA result indicating percentage improvements
- Narrative describing the compliance with LCA procedure specified in eligibility criteria

37. CM 2: Certified Building Materials

Applicability : New Constructions / Existing Buildings
Points for Credit : 4 Points
Point options : Option A – 2 points
Option B – 2 points

Goal

To encourage cleaner production of construction materials

Eligibility Criteria

Option A

For New Construction:

Out of main construction materials such as bricks, tiles, cement, readymade concrete, steel, wood, particle board, and glass; four shall have the Life Cycle Assessment conforming to ISO 14044 that have at least a cradle to gate scope or Environmental Product Declaration (EPD) which conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

OR

For Interior Spaces and Existing Buildings:

A minimum 5 types of furniture (minimum 5 numbers from each type) shall have EPD which conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

Option B

At least four main construction material should be procured from BEEER or similar International green rated factory.

Required Documentation

- EPD Certificate of the Materials or Lifecycle assessment report of materials
- Certification proof of the Factory and materials procurement agreement copy (Option B).

38. CM 3: Construction and Demolition Waste Management

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 Points
Point options : 1 point for 50% waste Recycling or Reuse
2 points for 75% waste Recycling or Reuse

Remarks : Not Applicable

Goal

To encourage reduce, reuse and recycle of building waste materials during construction

Eligibility Criteria

- Recycle or reuse 50% or 75 % by weight of the waste generated during construction of the project.
- Waste materials may be reused or recycle on-site or off-site.
- Organic waste such as food waste and the waste generated from land clearing is excluded from the credit requirements.

AND

- Reduce the construction waste generation below 2.5 kg/ft^2 of built-up area.

Required Documentation

- Construction and Demolition Waste Management Calculator
- Waste management plan
- Implementation report of waste management plan
- Total quantity of waste generated during the construction period
- Inventory of the generated waste and recycled or reused quantity
- Photo evidence

39. CM 4: Recycled and Reused Materials

Applicability : New Constructions
Points for Credit : 2 Points
Point options : Option A – 1 point
Option B – 1 point

Remarks : Not applicable for existing buildings

Goal

To encourage the use of recycled and reused materials for construction and reduce the demand for virgin materials

Eligibility Criteria

- Material installed permanently in the project shall be considered for calculation of both below options.
- Mechanical, electrical, plumbing components shall be excluded from the calculations.

Option A

- Use construction materials with recycled content that contributes to at least 10% of the total construction materials cost of the project.
- In calculating the recycle content, 100% weighing factor shall be applied for post-consumer recycled content and 50% weighing factor shall be applied for pre-consumer recycled content.

AND/OR

Option B

- Use reused or salvaged materials that contribute to at least 10% of the total construction materials cost of the project

Required Documentation

- Recycled and Reused Materials Calculator
- Manufacturer cut sheet
- Lab test reports of the product
- Document relating to the cost of material
- Proof of purchasing or sourcing of materials

40. CM 5: Mercury & Lead Pollution Reduction

Applicability : New Constructions
Points for Credit : 1 Point
Point options : Not Applicable
Remarks : Not applicable for existing buildings

Goal

To encourage use of construction materials and equipment that do not contain hazardous substances

Eligibility Criteria

- Use of Mercury-free lights and bulbs to meet 90% of total lighting load.
- Use of Lead-free paint materials for all interior and exterior paint except heat proof coating, special paints, and sealants.

Required Documentation

- Lighting fixture schedule with quantity and specifications
- List of all paints and coatings
- Manufacturer cut sheets of light fittings and paints
- Lab test reports of the paints and coatings
- Documents related to procurement of light fittings and paints

41. CM 6: Rapidly Renewable Materials

Applicability : New Constructions
Points for Credit : 1 Point
Point options : Not Applicable
Remarks : Not applicable for existing buildings

Goal

To encourage use of rapid growing plant-based material and reduce negative impact of raw material extraction

Eligibility Criteria

- Use materials that contains rapidly growing plant-based constituents, such as particle board, wood-plastic composites, veneer boards, etc. to construct at least 500 sqft surface area or 1% of the building gross floor area whichever is higher.
- If a product or an assembly is partly made of rapidly growing plant-based constituents, percentage by weight shall be used as a weighing factor to calculate the complying surface area.
- All such products shall be certified by Bangladesh Forest Research Institute (BFRI) or any Similar International Organization.

Required Documentation

- List of the product and their applications
- Drawings indicating the surface areas of construction
- Manufacturer cut sheets
- Lab test reports of the products
- Calculation of complying surface area

42. CM 7: Certified Wood

Applicability : New Constructions
Points for Credit : 1 Point
Point options : Not Applicable
Remarks : Not applicable for existing buildings

Goal

To encourage use of commercially grown timber and short life cycle wood to protect natural forests.

Eligibility Criteria

80% of timber used in the project shall be sourced from wood that is certified by Bangladesh Forest Research institute or any similar international organization and have plant maturity life shorter than or equal to 15 Years.

Required Documentation

- Certificate from concerned authority
- Quantities of total and certified wood used.
- Documents related to procurement of wood products

43. CM 8: Local and Regional Construction Materials

Applicability : New Constructions
Points for Credit : 2 Points
Point options : 1 point for use of 30% regional materials
2 points for use of 60% regional materials
Remarks : Not applicable for existing buildings

Goal

To encourage use of regional and local construction materials to reduce GHG emissions and costs of transportation

Eligibility Criteria

- Use regional construction materials which are extracted, manufactured, and assembled within Bangladesh for a minimum of 30% or 60%, based on cost, of the total construction material cost of the project.
- Only the material installed permanently in the project shall be considered for the calculations.
- Mechanical, electrical, and plumbing components shall be excluded from the calculations.

Required Documentation

- Local and Regional Construction Materials Calculator
- Documents confirming extraction, manufacturing, and assembling locations of the products

44. CM 9: Material Usage for Building Operation

Applicability : Existing Buildings
Points for Credit : 12 Points
Point options :

Percentage of Sustainable Material by cost	Points
≥20% and < 40%	2
≥40% and < 60%	4
≥60% and < 80%	6
≥80% and <100%	9
100%	12

Remarks : Not applicable for New Constructions

Goal

To encourage use sustainable materials for building operation needs

Eligibility Criteria

Material purchased for building operation and maintenance activities during the previous 2 years (excluding electrical and mechanical equipment, office appliances, furniture) that comply with one or more of the sustainability criteria listed below can be counted towards the credit compliance. Points are awarded based on the percentage cost of materials which comply with sustainability criteria out of the total material purchased during the previous 2 years:

A. Construction materials with recycled content AND/OR reused or salvaged materials.
B. Mercury-free Lights and Bulbs AND/OR Lead-free Paint materials for all interior and exterior paint except heat-proof coating, special paints, and sealants.
C. Materials that contain rapidly growing plant-based constituents, such as particle boards, wood-plastic composites, veneer boards. All such products shall be certified by Bangladesh Forest Research Institute (BFRI) or any Similar International Organization.
D. Timber sourced from wood that are certified by Bangladesh Forest Research institute or any Similar International Organization and have Plant Maturity Life shorter than or equal to 15 years.
E. Regional Construction Materials which are extracted, manufactured, and assembled within Bangladesh.

Required Documentation

- Material Usage for Building Operation Calculator
- Document related to cost of eco-friendly material and total cost of material used
- For Criteria A, B & C:
    - Manufacturer cut sheet
    - Lab test reports of the product
    - Proof of purchasing or sourcing of materials
- For Criteria C & D: Certificate from concerned authority
- For Criteria E: Extraction/Manufacturing and Assembling Location and Information

Health and Safety

45. HS 1: Safety Equipment, Signage and Emergency Equipment at Site

Applicability : New Construction
Points for Credit : Mandatory Credit
Point options : Not Applicable
Remarks : Not applicable for existing buildings

Goal

Ensure safety during the construction process

Eligibility Criteria

Comply following safety requirements as required by BNBC 2020 or other applicable local regulations:

- Provide all required safety gear such as safety vests, gloves, noise & welding protection equipment to all construction workers.
- Provide instant firefighting equipment and first aid box on site.
- Arrange safety training for worker at least once in every 3 months.
- Mark with safety and quotation signage, emergency lights and emergency exits during construction.
- Provide temporary railing or barrier to stair, lift core and parapet areas.
- Assign a Physician for regular health check-up once in a month and emergency response period.
- Provide Fencing around the site of 3m height.
- Provide a safety net for both horizontal and vertical direction for construction above 20ft height.
- Provide group insurance for all construction workers if required by the applicable regulations.

Required Documentation

- Layout drawings indicating safety measure details
- List of safety equipment and gear provided.
- Schedule and content of safety training
- Details of safety measures implemented
- Workers lists
- Photo evidence
- Proof of group Insurance policy documents
- Fence details
- Details of the health check-up and Physician

46. HS 2: Safety During Building Operation

Applicability : Existing Buildings
Points for Credit : Mandatory Credit
Point options : Not Applicable
Remarks : Not applicable for New Constructions

Goal

Ensure Safety during the operation period of the building

Eligibility Criteria

- Upgrade the fire safety system to comply the applicable local regulations
- Design fire safety information (Drawings) as per BNBC 2020 part 4 or NFPA
- Conduct regular fire drills as per applicable regulations
- Use non-ODS and non-HFC firefighting equipment

Required Documentation

- Fire Safety compliance certificate
- Fire protection equipment lists with manufacturer's cut sheet
- Detail Drawings and Design of Safety
- Drawings and photographs of safety signs.
- Fire Drill Report (not more than 3 months old) from Fire Service and Civil Defence Department.

47. HS 3: On site Facilities for Construction Workers

Applicability	**:** New Construction
Points for Credit	**:** 2 Points
Point options	**:** 1 point for compliance of any one option 2 points for compliance of any two out of the four option
Remarks	**:** Applicable only for new constructions of which the floor area is more than 20,000 sqft

Goal

Ensure construction workers are provided with basic facilities

Eligibility Criteria

- Provide separate accommodations and resting for Regular Construction workers or 20% of the peak number of construction workers whichever is higher
- Provide separate accommodation for female construction workers with separate latrines as per applicable local standards
- Provide onsite cooking and dining facilities for workers
- Provide clean drinking water

Required Documentation

- Information about applicable local regulations
- Worker lists
- Photo evidence
- Layout plan of accommodation, toilet, and dining facilities

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Innovations

48. IN: Innovations

Applicability : New Constructions / Existing Buildings
Points for Credit : 5 Points
Point options : 1 point for each innovation

Goal

To encourage the project to achieve improved performance through innovative activities

Eligibility Criteria

Perform Innovative activities that has substantial positive environmental impact, such as,

- Waste to energy generation
- Environmental Awareness Program for school children/ university students
- National and International Seminar and Workshop
- Educational and capacity building programs on EE&C activities
- Innovative transportation
- Any other innovative activity with substantial positive contribution to sustainability

Required Documentation

- Narrative about the activity and its positive impacts.
- Photographic evidence
- Details of the activities performed.

Bonus Points

49. BP: Social Responsibility

Applicability : New Constructions / Existing Buildings
Points for Credit : 2 Points
Point options : One point for each activity

Goal

Encourage Social Responsibility

Eligibility Criteria

Engage in activities that have a positive social impact such as CSR activities

Required Documentation

- CSR Plan
- Activity Photo Proof
- Write-up about the activity

Annexure 01: Supporting Documents BEEER Certification

Applicants may use the documents and spreadsheets listed below as additional guidance for BEEER certification and to perform credit related calculations. All documents are available for download on BEEER online.

1. Credit Related Calculation Spreadsheets:
   - i SM 03 & SM 04: Restored and Open Area Calculator
   - ii SM 06: Heat Island Effect Reduction Calculator
   - iii SM 09: Bicycle Parking Capacity Calculator
   - iv SM 10: Car Parking Capacity Calculator
   - v BED 01: Daylight Calculator
   - vi BED 02: Passive Building Design Calculator
   - vii WM 03: Occupant Water Use Reduction Calculator
   - viii WM 05: Rainwater Harvesting and Recharging Calculator
   - ix EM 02: Minimum Energy Performance Calculator
   - x EM 06: Renewable Energy Use Calculator
   - xi EM 08: Green power Calculator
   - xii IE 01: Minimum Ventilation Requirement Calculator
   - xiii IE 03: Low Emitting Materials Calculator
   - xiv IE 04: Interior Lighting Calculator
   - xv CM 01: Buildings and Materials Reuse Calculator
   - xvi CM 03: Construction and Demolition Waste Management Calculator
   - xvii CM 04: Recycled and Reused Materials Calculator
   - xviii CM 08: Local and Regional Construction Materials Calculator
   - xix CM 09: Material Usage for Building Operation Calculator
2. General Guideline for Design, Construction and Material Selection for BEEER Certification
3. Facility Survey Questionnaires for BEEER Existing Building Evaluation
4. Financial Evaluation Sheet for EE/WE Measures

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3) Chittagong Imarat Nirman Bidhimala 2008
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5) Bangladesh Bank – Sustainable Financing Policy for Banks and Financial Institutions
6) Bangladesh Bank – SFD circular 4 – Guide Note for on lending/refinancing under Green Transformation Fund
7) Bangladesh Bank – SFD circular 2 – Refinancing Fund for Technological Development of Export-Oriented Industries
8) Detailed Area Plan (DAP) 2022-2035
9) GreenSL Rating System for Built Environment. Green Building Council of Sri Lanka
10) Green Mark Certification Scheme, Building and Construction Authority, Singapore
11) IGBC Rating Systems, Indian Green Building Council
12) LEED Reference Guide, United States Green Building Council
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