



Green Building in the Philippines

Promoting and Sustaining Resiliency

フィリピンにおけるグリーン・ビルディング
レジリエンスの持続と普及のために

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About the PHILGBC

フィリピン グリーンビルディング評議会について

- An established member of the World Green Building Council;
- Founded in 2007;
- PHILGBC facilitates the sharing of knowledge on green building in industry to ensure a sustainable environment;
- PHILGBC certified under the BERDE Program
 - 100 green building projects in the Philippines;
 - 1000 green building professionals;
 - 100 green building assessors;
- More than 120 green building fellowships awarded;
- More than 350 corporate members representing leading companies in the Philippines;
- Contributed to more than 3M m² to the 3.5B of m² of green building space designed, built, operated, and assessed in more than 70 NGBCs; and
- Strategic alliance partners with government, civil society groups and academia.

・世界グリーンビルディング評議会メンバー

・2007年に設立

・持続可能な環境のため産業界におけるグリーンビルディングに関する知識の普及

・プログラムの認定:

フィリピン国内100のグリーンビルプロジェクト

1000人のグリーンビル専門家の育成

100人のグリーンビル評価者の育成

・120以上のビルフェローシップの認定

・350以上のフィリピン大手企業が参加

・グリーンビルの増加 300万m²から35億m²へ

・政府・市民社会・大学機関と連携

Issues and Challenges 課題

- Ever increasing rate of Solid Waste generation;
廃棄物の果てしない増加
- Increasing cost of energy;
エネルギーコストの増加
- Rapidly depleting freshwater resources;
水資源の急激な枯渇
- Need to rapidly decarbonize in the property sector;
不動産分野の脱炭素の必要性
- Rising heat island effect in major metros in the Philippines;
フィリピン主要都市部でのヒートアイランドの増加
- Perception that green technologies are expensive;
グリーン技術は高価であるという先入観
- Need to create green jobs to sustain green enterprises to support greening of economy;
「グリーン・ジョブ」企業と人材育成の必要性

- Solutions needed to promote, build and sustain resilience industry-wide/country-wide;
国内全産業界に普及するためのソリューションが必要
- Lack of capacity and coordination at the national level
政府レベルでの能力や調整が不足
- Gaps in policies and lack of guidance in implementation
政策と現場での導入のためのガイダンスの乖離
- Lack of focus on cities and urbanization
都市や都市化という視点の不足
- Complex institutional arrangements
複雑な手続き
- Incompatibility of codes and lack of enforcement
基準の不統一や遵守の不足
- Lack of qualified human resources
専門人材の不足
- Inadequate understanding among the general public
一般市民の理解の不足
- Regulations asymmetric with technical practice and available technology;
設定される基準が現状の技術や手法と一致してない
- Need to adopt, adapt or develop relevant and appropriate industry standards to support greening and building resiliency in the property sector.
グリーンビルディングやレジリエンスをサポートするための業界の基準が必要

Opportunities

機会

- Resilient infrastructures prevent further socioeconomic losses, and increase disaster resilience
- Early warning systems in place enables different sectors to act early and accordingly.
- Implementing disaster risk reduction can foster economic growth and employment.
- Implementing disaster risk reduction not only reduce disaster risks, but also improve the quality of life in urban settings.
- Built infrastructure systems can be supported by ecological features to reduce disaster risk, while simultaneously protecting and improving biodiversity.

・レジリエンスの高いインフラは、社会経済損失を防ぎ、防災効果も高い

・早期警報システムの設置によって様々な分野における早期の適切な対応が可能になる

・防災措置の強化によって経済成長や雇用の増加につながる

・防災は、災害リスクの軽減だけでなく都市における生活の質の向上をもたらす

・インフラ整備にエコな特徴を加えることによって、災害リスクを低減しつつ生物多様性を保護し改善していくことができる

Legal Framework 法整備

- 1987 Constitution – State policy to protect the environment
 - Republic Act 8749 Clean Air Act
 - Republic Act 9003 Ecological Solid Waste Management Act
 - Republic Act 9513 Renewable Energy Act
 - Republic Act 11825 Energy Efficiency and Conservation Act
 - Republic Act 9729 Climate Change Act
 - Republic Act 10121 Disaster Risk Reduction and Management Act
 - PD 1096 Building Code
 - Local ordinances (local government laws) that support green building and resiliency exists; and
 - Several local governments incent project proponents who build green.
- 1987年 環境基本法
 - 共和国法大気浄化法
 - 生態的固形廃棄物管理法
 - 再生可能エネルギー法
 - エネルギー効率保全法
 - 気候変動法
 - 防災リスク軽減管理法
 - 建築基準法
 - グリーンビルディングやレジリエンス強化のための地方条例
 - 一部地方自治体がグリーンプロジェクトを助成

Voluntary Programs

自主的な取り組み

- BERDE – Building for Ecologically Responsive Design Excellence
 - Applicable to tenants, buildings and districts;
 - Covers design, construction and operation;
 - May be used in residential, commercial, industrial and educational applications
 - BERDE (優れたエコ対応デザインのビルディング)
テナント、ビル、地区が対象
デザイン、建築、運営が対象
住宅地、商業地、工業地、教育施設が対象
- ANZ/PH – Advancing Net Zero/Philippines – operated under the auspices of the WorldGBC;
 - Measure and disclose;
 - Reduce energy demand;
 - Generate balance from renewables;
 - Verification.
 - ANZ/PH (ネットゼロ増進)
計測し公開する
エネルギーデマンドを削減
再生可能エネルギーとのバランスを図る
検証を行う
- PHILGBC Health and Well-being for Building;
- Certification activities undertaken by the PHILGBC for both private and public buildings;
 - 民間・公共の両方の建物が対象の認証制度
- These programs are designed to complement existing regulations.
 - これらの取り組みは既存の法規制を補完するために実施

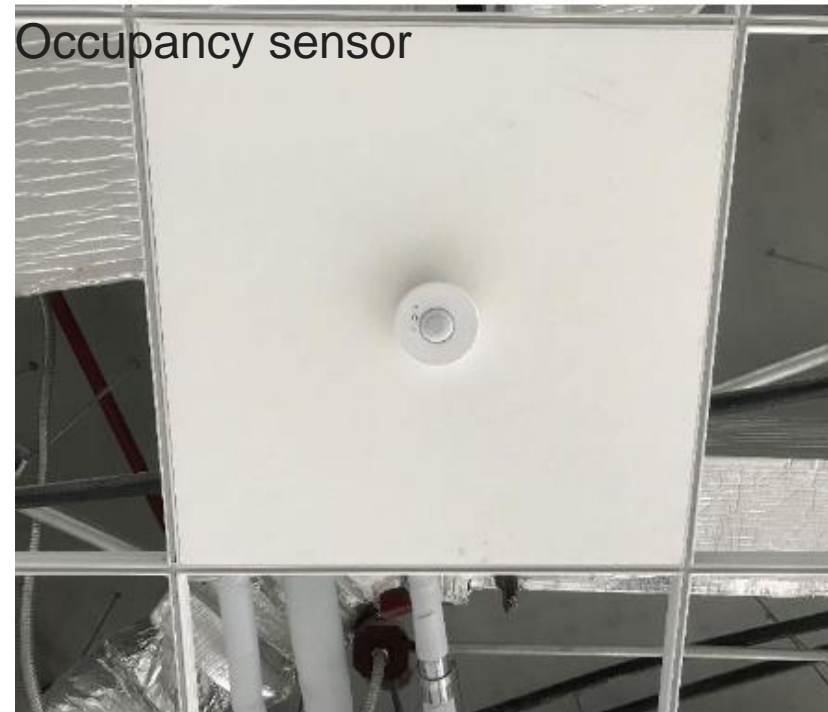
Arthaland Century Pacific Tower

アーサランド センチュリーパシフィックタワー

Energy efficient lighting
エネルギー効率の高い照明



Energy efficient lighting fixtures



Occupancy sensor

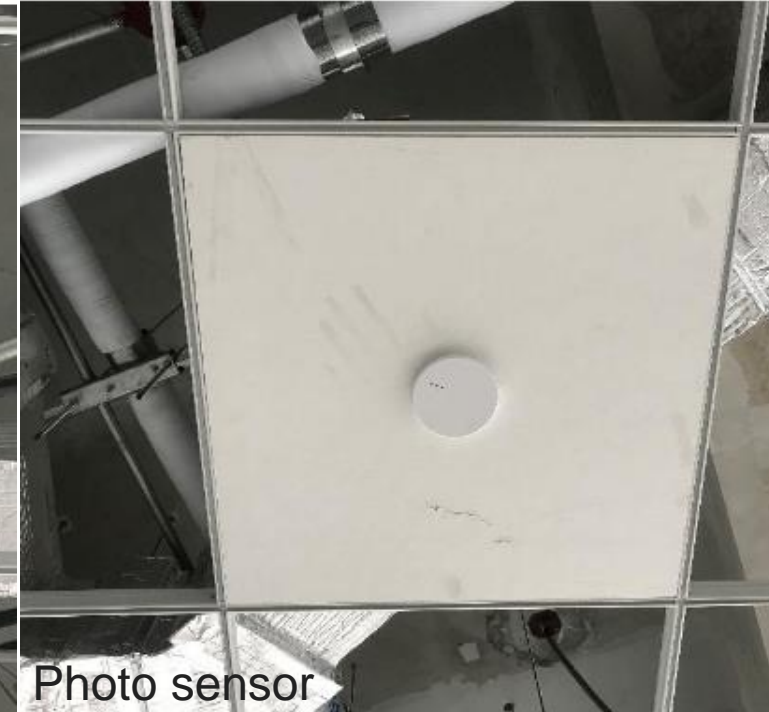


Photo sensor

Arthaland Century Pacific Tower

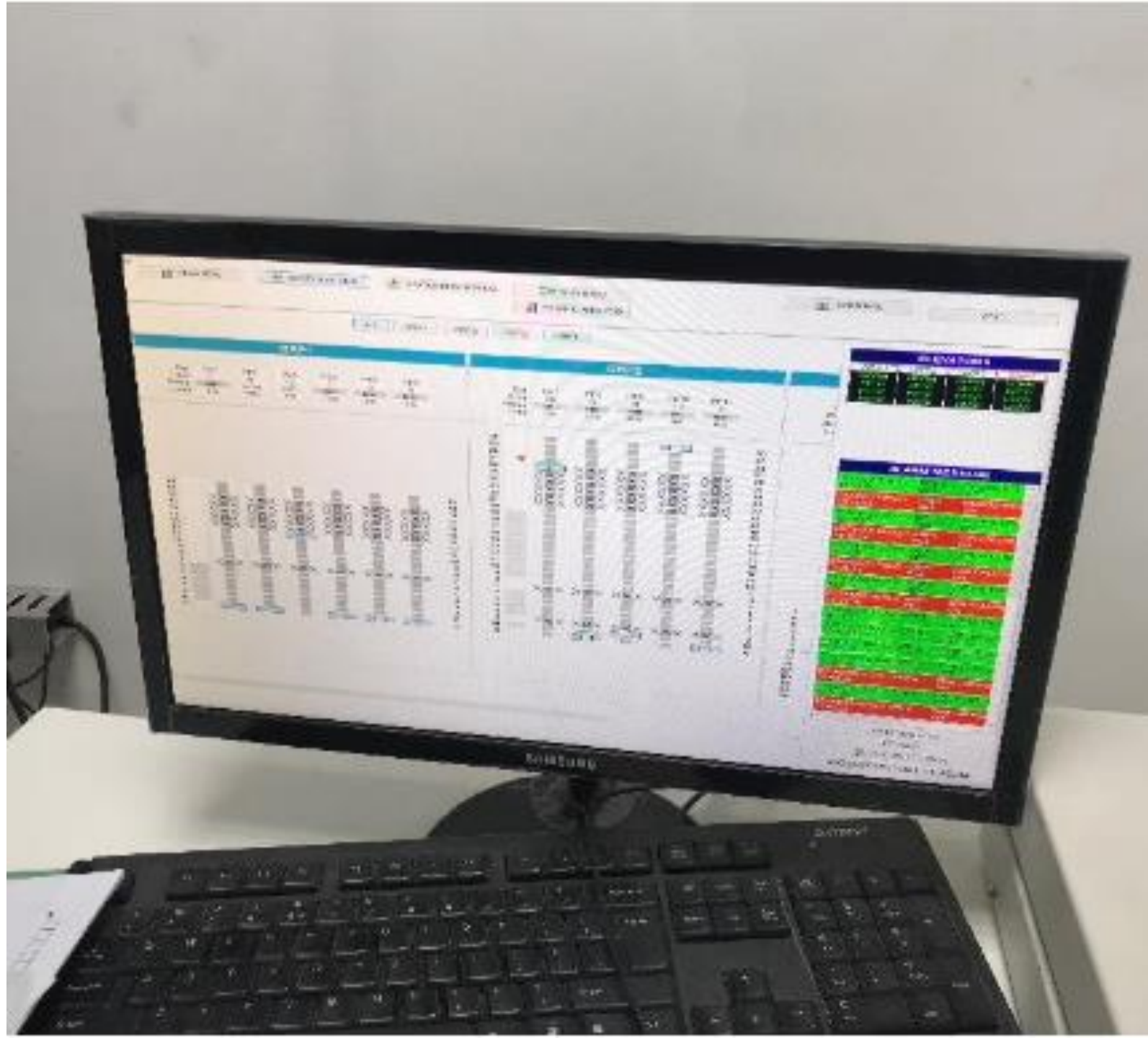
アーサランド センチュリーパシフィックタワー

The building automation system of the project includes monitoring the following systems:

- Lighting;
- Pumps;
- Elevators; and
- Ventilation systems.

The project team has also installed an energy management system that monitor the performance of the sub-meters of the tenant spaces and common areas.

照明、ポンプ、エレベーター、
空調などのシステムを自動化



Laguna Lake Development Authority

ラグーナ湖開発公社

Laguna Lake Development Authority used natural ventilation, building envelope, energy efficient products such as lighting and air-conditioning. Through these strategies, the project has identified a 12.5% reduction in the project's energy consumption.

自然空調や建物外皮、エネルギー効率性の高い照明やエアコンなどの製品などを採用し、エネルギー消費を12.5%削減



Six/NEO

Six/NEO, owned by NEO Property Management, is a **BERDE**-certified New Construction project that has recently undergone **BERDE** Certification for its Operations. This project implemented natural ventilation, daylighting, building envelope, and energy efficient products. Through these strategies, they were able to reduce 26% of their energy consumption. In addition, the project uses off-site renewable energy.

BERDE認証を受けた新しい開発事業Six/NEO.

自然空調、建物外皮、採光、エネルギー効率性の高い製品の採用などを行い、26%のエネルギー消費削減を実現。



Arya Residences

アリア住宅開発



Open space



Building roof with high SRI paint



Green Wall

BERDE Online

berdeonline.org



Clean and intuitive design.

BERDE Online is responsive to any device, from your laptop to your phone.



Website to print.

Download the book layout of the GBRs by simply printing **BERDE** Online.



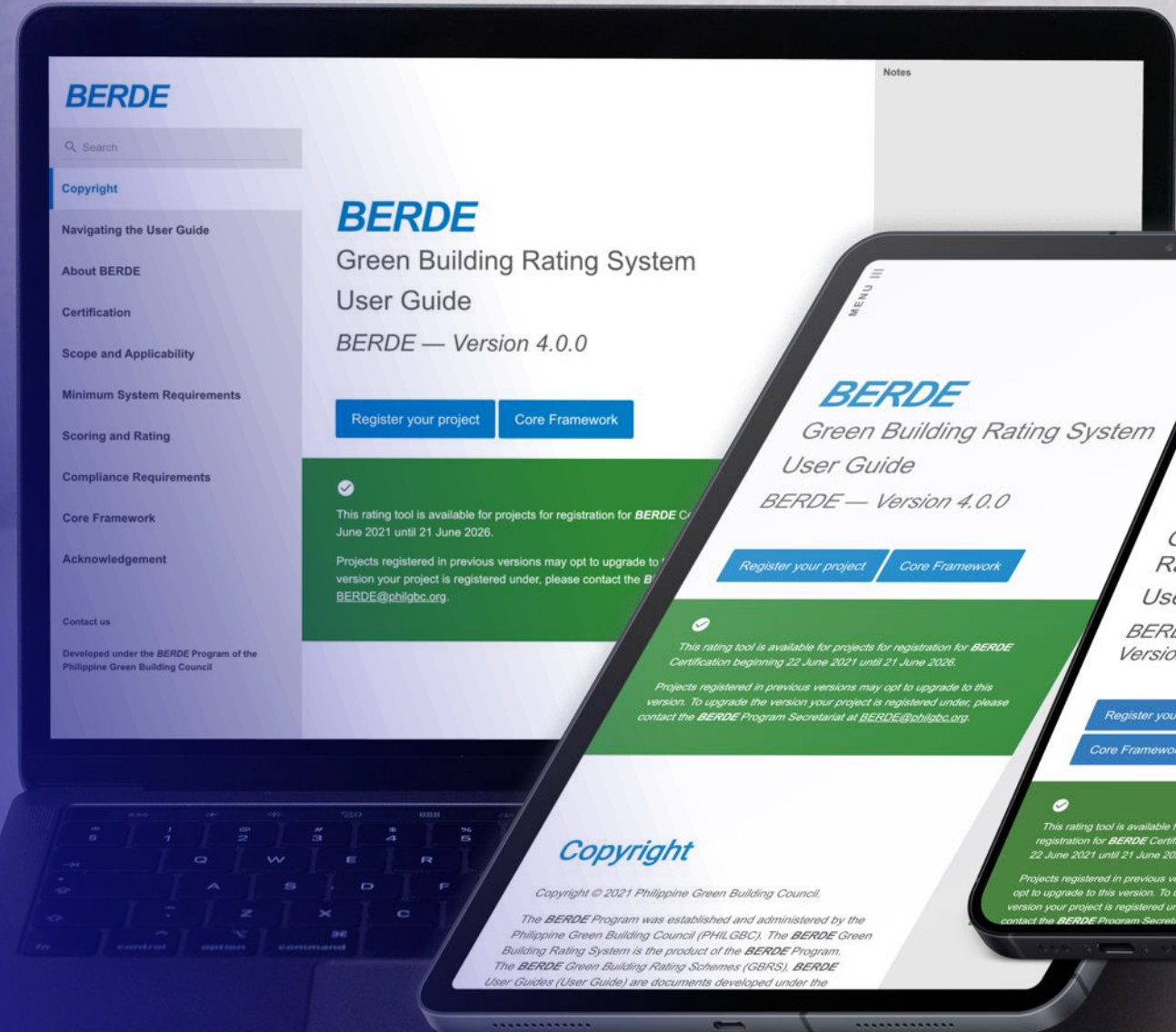
Quick search function.

Searching is made easy and swiftly in the site using only keywords to find what you need from **BERDE**.



Faster updates and addenda.

BERDE is published web-first to ensure users have access to the latest version.



Companies who trust **BERDE**

BERDEを信頼する企業

Project owners of **BERDE** projects under different stages in the certification process.



Companies who trust **BERDE**

BERDEを信頼する企業

Companies that have been involved in the delivery of the design and construction, or the operations of **BERDE** projects.

A. F. Navarrete Consultants and Associates	EcoSolutions	N-One BGC Properties, Inc.
Abraham Lee Construction, Inc.	Ecotektonika, Inc.	N-Plaza BGC Properties, Inc.
Aeroplus Multi-services, Inc.	Eduardo H. Tan and Associates (EHTA)	N-Quad BGC Properties, Inc.
Aidea Philippines Inc.	FPD Asia Property Services, Inc.	N-Square BGC Properties, Inc.
Arcadis Philippines, Inc.	GF & Partners, Architects	NBF Consulting, Inc.
ArthaLand Corporation	HTLand Inc.	NEO Property Management
Benedicto Limjap Gaviño Façade Design Consultancy	International Elevator & Equipment, Inc.	Noel B. Franco Consulting Inc. (NBF)
BL Ventures, Inc.	Jones Lang LaSalle Philippines, Inc.	Ove Arup and Partners Hong Kong, Ltd.
BNProjekTechnik Corporation	Light Plan, Inc.	Partners Against Pests Inc.
Cebu District Property Enterprise, Inc.	Makati Development Corporation	PestBusters
Cebu Landmasters, Inc.	Malaking Ibong Bughaw Security Services, Inc.	PL Light In Existence Corporation
Cebu Lavana Land Corporation	Manila Commercial Fit-out Corp. (MCFC)	R. R. Encabo Constructors, Inc.
Constech Management Group, Inc.	MasterCard Singapore Holding Pte. Ltd.	R.A. Mojica & Partners
CRÉARIS Environmental Design	Megawide Construction Corporation	R.J. Calpo & Company
Cushman and Wakefield	Meinhardt Philippines, Inc.	Roy Barry & Associates
DATEM, Inc.	Monark	SGS Designs Landscape Architecture
DCCD Engineering Corporation	Monocrete Construction Philippines, Inc.	SY^2 + Associates, Inc.
DCMi (The Project Management Company)	N-Cube BGC Properties, Inc.	T&M Consultancy and Allied Services
De La Salle University		The Sage Group Asia (TSG)
Design Coordinates, Inc.		...and other proper proponents involved in BERDE projects.

Advancing Net Zero Energy

anzph.org

ネットゼロエネルギーを推進



Conserve

保護

Prioritize the conservation of energy using **passive design strategies** to reduce the operational energy demand.

パッシブデザインを取り入れる



Optimize

最適化

Further reduce the operational energy demand using **energy-efficient technologies and strategies.**

エネルギー効率性の高い技術や考え方を取り入れる



Renew

再生

Use **renewable energy** for the reduced operational energy demand of the project.

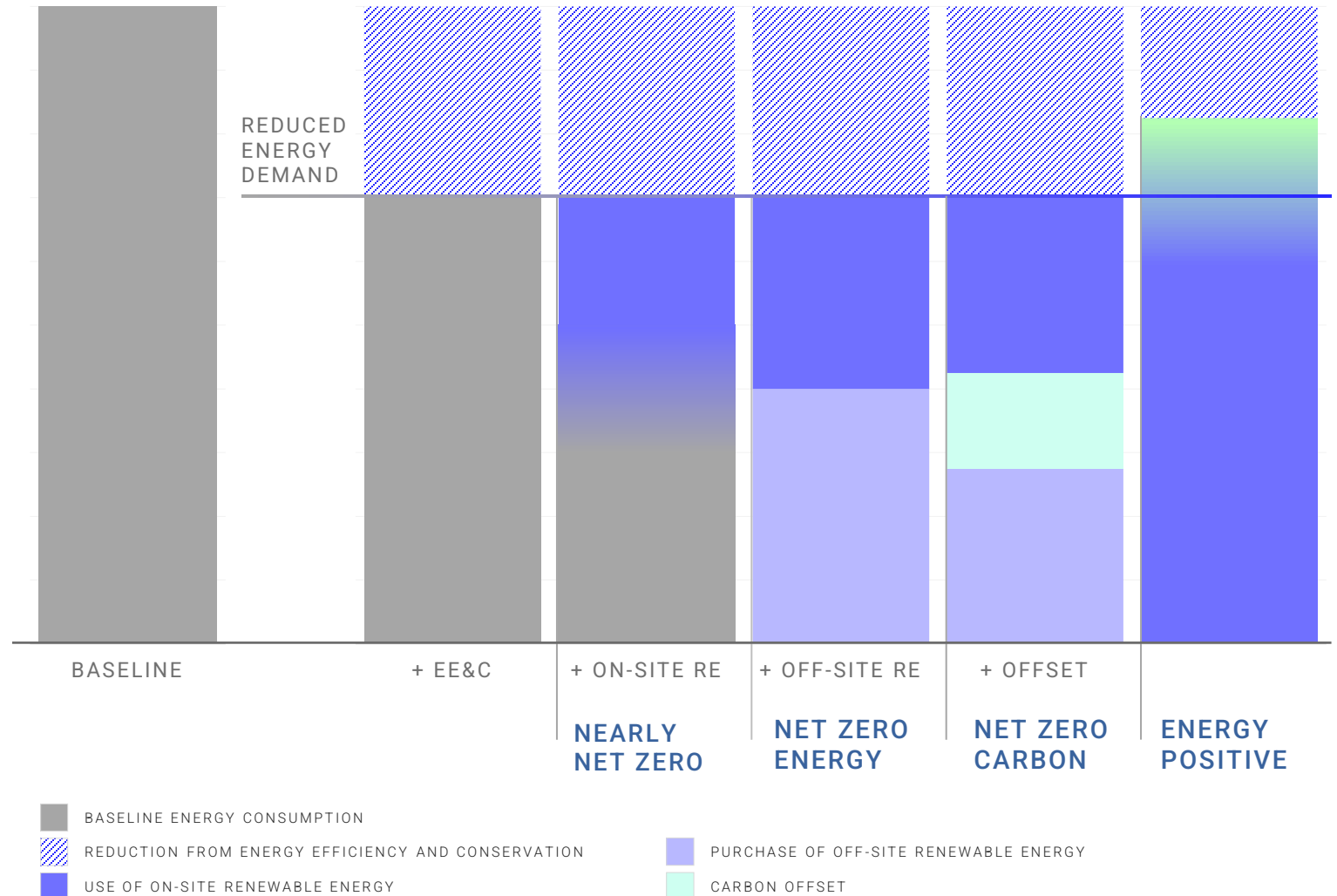
再生可能エネルギーを使う

Net Zero

ネットゼロエネルギーを推進

The general trend is a move towards **performance-based metrics** and **ensuring that building projects are accountable for the resources they use** – materials, energy, water and more.

WorldGBC’s *Net Zero Carbon Buildings Commitment* (the Commitment) challenges companies, cities, states and regions to reach net zero operating emissions in their global portfolios by 2030, and to advocate for all buildings to operate at net zero by 2050.

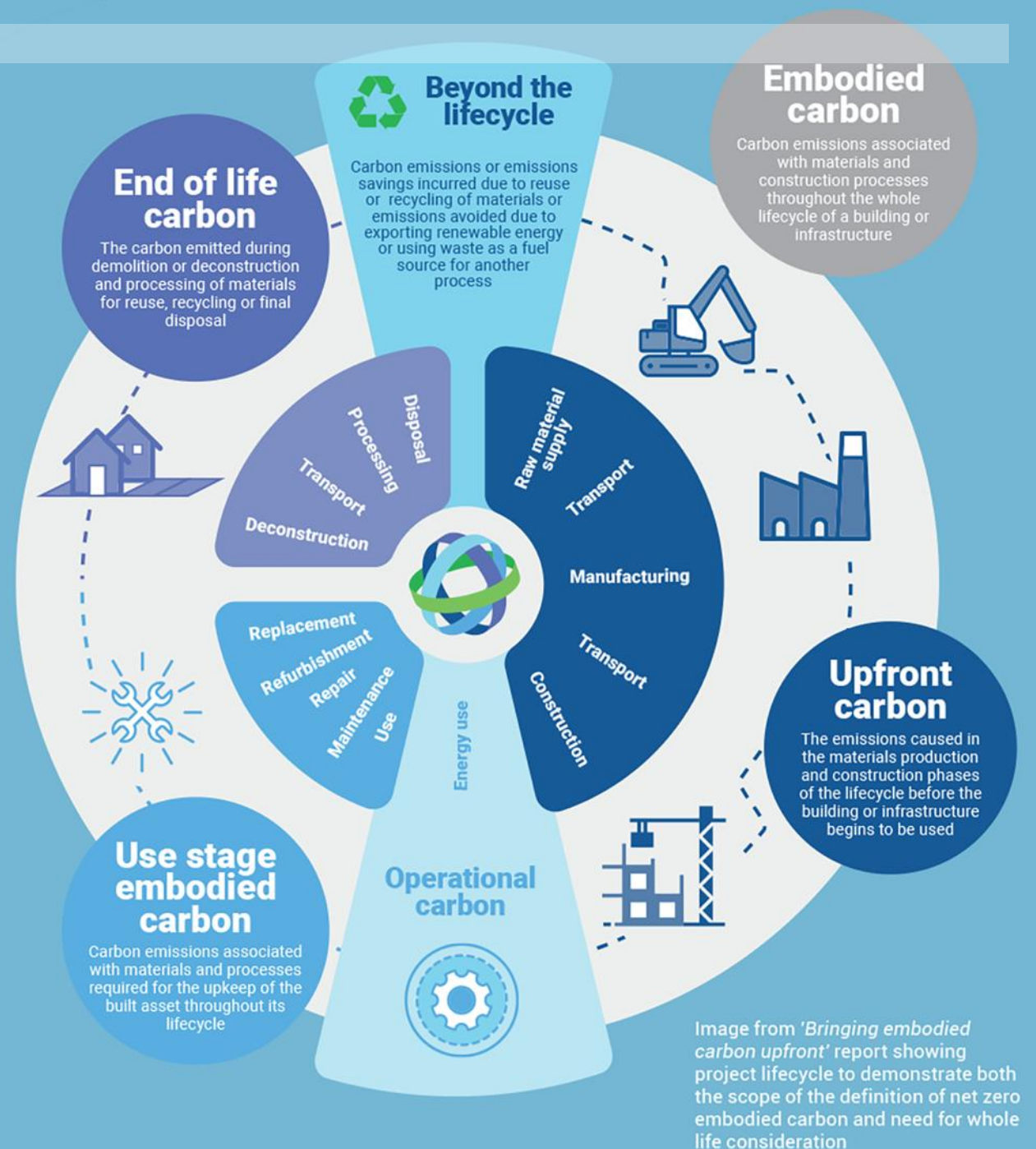


Burrows, V. K., Adams, M., & Black, M. (2020). *Advancing Net Zero Status Report 2020* (p. 24) [Status Report]. World Green Building Council.
https://www.worldgbc.org/sites/default/files/ANZ%20Status%20Report%202020_PUBLICATION.pdf

The transition to Net Zero Carbon requires **concerted actions from business leaders, governments and NGOs.**

This ambitious vision cannot be achieved by one part of the supply chain alone. It relies on a combination of clear, demand-side signals, policy roadmaps, financial investment and supply chain solutions to create industry confidence to facilitate the systemic change needed.

ネットゼロカーボンへの移行のためには、経済界、政府、非営利の連携した行動が必要：明確なデマンドサイドからの要求、政策ロードマップ、資金の投入やサプライチェーンの整備によって、変化に対応できる自信に。



Energy Efficiency and Conservation

エネルギー効率と保全

Strategies to reduce and properly manage the use of energy in buildings may include:

- Passive design strategies for energy conservation, such as:
 - designing and constructing an efficient building envelope;
 - maximizing natural ventilation;
 - maximizing daylighting; and
 - using co-generation and tri-generation systems.
- Active energy-efficient technologies and products incorporated in the following energy-related building systems:
 - Building envelope systems;
 - Mechanical systems, which should include:
 - heating, ventilating, and air conditioning (HVAC) and refrigeration systems, and
 - steam and hot water systems;
- Electrical systems, which should include:
 - lighting systems for both indoors and outdoors,
 - electric pumps and motors, and
 - escalators and elevators;
- Electric power and distribution, which should include:
 - transformers,
 - power supply and distribution, and
 - building management systems;
- Receptacle loads.
- Renewable energy systems, which can be either on- or off-site renewable energy.

建物におけるエネルギー消費の削減や賢い管理運営のために必要な戦略として:

- エネルギー節約のためのパッシブデザイン
- エネルギー効率の高い技術や製品
- 再生可能エネルギーシステムの導入

Heat Island Reduction

ヒートアイランド対策

- Urban heat islands refer to areas that have higher temperatures compared to their surroundings. These areas can have temperatures 1° to 3°C warmer than surrounding rural or undeveloped areas. (Oke, 1997)
- Heat island are formed due to:
 - **Reduced vegetation in urban areas.** As cities develop, more vegetation is lost, and more surfaces are paved or covered with buildings. The change in ground cover results in less shade and moisture to keep urban areas cool. Built up areas evaporate less water, which contributes to elevated surface and air temperatures.
 - **Properties of urban materials.** Solar reflectance, thermal emissivity, and heat capacity of materials used in buildings and infrastructures influence urban heat island development, as they determine how the sun's energy is reflected, emitted, and absorbed.
- **Urban geometry.** Urban geometry influences wind flow, energy absorption, and a given surface's ability to emit long-wave radiation back to space. In developed areas, surfaces and structures are often at least partially obstructed by objects, such as neighboring buildings, and become large thermal masses that cannot release their heat very readily because of these obstructions.
- **Anthropogenic heat.** Anthropogenic heat contributes to atmospheric heat islands and refers to heat produced by human activities. It can come from a variety of sources and is estimated by summing all the energy used for heating and cooling, running appliances, transportation, and industrial processes

ヒートアイランドの原因

- ・都心部の緑の減少
- ・都心のビルに使用される建材
- ・都心の建築物の配置が風やエネルギーの吸収などに与える影響
- ・人間活動による熱の発生

Heat Island Reduction

ヒートアイランド対策

Issues and Challenges

- Plants and animals sensitive to temperature fluctuations may find habitat affected by heat islands inhospitable.
- Human health may suffer because exposure to ground-level pollution is often worse in places affected by heat islands.
- Heat islands increase cooling loads in the summer, necessitating larger, more powerful air-conditioners that use more electricity, in turn increasing cooling costs, producing more greenhouse gases, and generating pollution.

課題

- ヒートアイランドによって温度差に敏感な動植物の生息が困難になる
- ヒートアイランドの影響を受ける場所での大気汚染による人体への影響
- ヒートアイランドによる特に夏季のエネルギー消費の増大

Opportunities

- Heat island reduction minimizes contribution to the increasing temperature of the immediate microclimate of the site.
- It contributes to protecting, restoring and improving the local biodiversity.
- It reduces the need for increasing the cooling loads dry season to reduce energy consumption, thereby reducing the GHG emissions attributed to excessive energy use.

機会

- ヒートアイランド削減によって温暖化効果を削減
- 生物多様性の保護、再生、改善に寄与する
- 冷却デマンドの削減によりエネルギー消費が軽減、温室効果ガスが削減

Heat Island Reduction

ヒートアイランド対策

Strategies for heat island reduction in buildings may include:

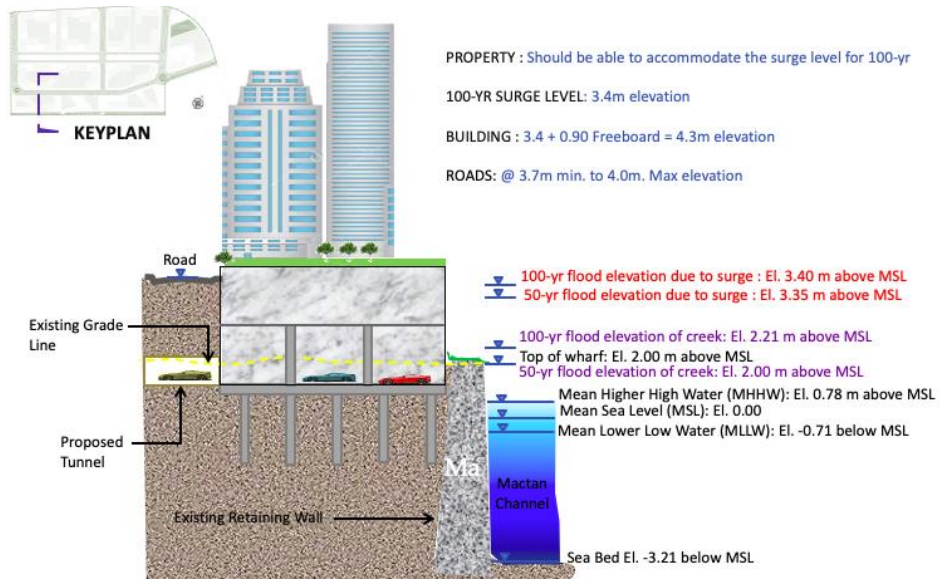
- Shading for hardscapes,
- Vegetated open-grid pavement systems,
- Vegetated open spaces,
- Green roofs and green walls, and
- Building roofs with high solar reflectance index (SRI) value.

ヒートアイランド削減のための戦略

- 影を作る
- 歩道の緑化
- オープンスペースの緑化
- 屋上や壁面の緑化
- ビル屋上にSRI効果の高い材料を使用

Disaster Risk Reduction Examples

防災対策の事例



- Arthaland Century Pacific Tower, owned by Arthaland Corporation, selected a project site in a low flood risk area. ACPT has a storage tank to store stormwater located the basement level. The stormceptor a capacity of 262 m³. The capacity of the stormwater was absed on the quantity of 1-year ad 2-year, 24-hr design storm.
- Arya Residences, owned by Arthaland Corporation, selected a project site in a low flood risk area and provided an elevation from the street level.
- Gatewalk Central Superblock, owned by Cebu District Property Enterprises, Inc., has elevated ground levels of at least 3.40 meters above mean sea level (amsl). The project will also install flood barriers for possible entry points. The project will also install flood barriers for possible entry points. In addition, the project has a 228 m³ capacity rainwater detention tank, located at basement of the project.
- Mandani Bay Suites Tower 1 and 2, owned by HTLand, Inc., has elevated ground levels of 4.30 meters above the average mean sea level of the project to accommodate the 100-yr surge level of 3.4 meters.
 - ・アーサランド・センチュリー・パシフィック・タワーでは、洪水リスクの低い土地を選定しかさ上げしてビルを建設、容量262m³の雨水調整タンクを地下に設置、など。
 - ・ゲイトウオークセントラルスーパーブロックでは、最低3.4mかさ上げし、出入りに洪水バリアを設置、地下に雨水調整タンクを設置。

Thank you!

For comments to improve this material, please e-mail BERDE@philgbc.org.

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