How Green building Councils driving for "Advancing Net Zero"

31 March 2022

The 58th Meeting of APEC Expert Group on Energy Efficiency & Conservation (EGEEC 58)

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Executive Director Hong Kong Green Building Council

Title

1. World Green Building Council's " Advancing Net Zero " vision
2. Green building Councils' strategies and actions
3. Asia pacific network's net-zero readiness framework
4. Hong Kong Green Building Council's strategy for "Advancing Net Zero"
5. Retro-commissioning , an opportunity to collaborate

Whole Life Carbon Vision

2050

New buildings, infrastructure and renovations will have **net zero embodied carbon**, and all buildings, including existing buildings, must be **net zero operational carbon**

Net Zero Operational Carbon

Definition

A net zero carbon building is highly energy efficient with all remaining energy from onsite and/or offsite renewable sources

Guiding Principles

1. **Measure and disclose carbon**
   Carbon is the ultimate metric to track, and buildings must achieve an annual operational net zero carbon emissions balance based on metered data
2. **Reduce energy demand**
   Prioritise energy efficiency to ensure that buildings are performing as efficiently as possible, and not wasting energy
3. **Generate balance from renewables**
   Supply remaining demand from renewable energy sources, preferably on-site followed by off-site, or from offsets
4. **Improve verification and rigour**
   Over time, progress to include embodied carbon and other impact areas such as zero water and zero waste

Net Zero Carbon Buildings Commitment
All buildings within direct control to operate at net zero carbon by 2030

2030

New buildings, infrastructure and renovations will have at least 40% less embodied carbon with significant upfront carbon reduction, and all new buildings must be net zero operational carbon

Net Zero Opertational Carbon

Net Zero Embodied Carbon

Net Zero Embodied Carbon

Definition

A net zero embodied carbon building (new or renovated) or infrastructure asset is highly resource efficient with upfront carbon minimised to the greatest extent possible and all remaining embodied carbon reduced or, as a last resort, offset in order to achieve net zero across the lifecycle

Guiding Principles

1. **Prevent**
   Avoid embodied carbon from the outset by considering alternative strategies to deliver the desired function
2. **Reduce and optimise**
   Evaluate each design choice in terms of the upfront carbon reductions and as part of a whole lifecycle approach
3. **Plan for the future**
   Take steps to avoid future embodied carbon during and at end of life
4. **Offset**
   As a last resort, offset residual embodied carbon emissions within the project or organisational boundary where possible or if necessary through verified offset schemes

WORLD GREEN BUILDING COUNCIL

Around the world in ANZ

Advancing Net Zero Snapshot: India

WORLD GREEN BUILDING COUNCIL

Context

The Government of India is driving action on climate change through the various missions of the National Action Plan on Climate Change (NAPCC). India Green Building Council's (IGBC) Net Zero Energy Buildings rating supports the implementation of these missions and addresses net zero concepts for both new and existing buildings to achieve net zero performance. The pilot programme focuses on net zero energy and aims to enable market transformation of technologies and services especially in key areas of energy efficiency and renewable energy. As India progresses, IGBC will work towards developing tools in the future that facilitate adoption of net zero concepts for carbon, water and waste.

Pathway: Certification

Launch date: November 2018

The IGBC Net Zero Energy Buildings rating requires a reduction in energy consumption through passive and active design and encourages appropriate use of renewable energy sources to meet remaining energy demand. A Net Zero Energy building should be able to demonstrate Energy Performance Index Ratio (EPI Ratio) less than one to qualify as net zero energy performance. A building may also demonstrate compliance by following prescriptive approach, to meet minimum performance requirements of individual components such as building envelope, air-conditioning, lighting and electrical systems. The rating system promotes use of 100% renewable energy and reduction in operational GHG emissions.

Pilot Projects

10 Registered*

06 Certified*

*as of April 2020

GBC Definition

Net Zero Energy buildings are those that are designed to have the lowest energy demand, high energy efficiency during its operation and thereafter its energy requirements are met through renewable energy sources.

1. Measure and Disclose Carbon

Net Zero Energy rating mandates projects to measure operational energy use and disclose actual annual energy consumption as well as renewable energy generation to estimate total carbon emissions. The Net Zero Energy Buildings certification is awarded based on annual energy performance for the preceding year.

2. Reduce Energy Demand

Buildings must reduce their energy demand by improving the Energy Performance Index. To lower the energy demand, buildings must focus on performance improvements to building envelope, air-conditioning, lighting and appliances.

3. Generate Balance from Renewables

The building must meet the annual energy demand through the use of either onsite, offsite or a combination of these renewable energy sources. Net Zero Energy Building rating encourages maximum utilisation of onsite renewable energy sources thereby reducing transmission and distribution losses.

4. Improve Verification and Rigour

The building should follow the International Performance Measurement and Verification Protocol (IPMVP) for measurement and verification of building energy performance. The pilot programme focuses only on energy with subsequent versions to address net zero carbon, water and waste.

Methodology and Verification

- The building should submit documentation for verification to IGBC in the prescribed format. The building will be evaluated by a third-party assessor based on the actual energy performance data submitted. The Net Zero Energy Buildings rating will only be awarded where this performance is sustained for an annual period. Net Zero Energy Buildings at Design must showcase Net Zero Energy performance as well as submit annual data for validation to achieve net zero status during operation.

Additional Information

- EPI Ratio = Actual EPI / Baseline EPI
  (EPI = Energy Performance Index)
- During the IGBC's Green Building Congress 2018 at Hyderabad, stakeholders from the building community, corporates, owners and operators showed voluntary commitment towards Net Zero by participating in the signature campaign on 'Mission towards Advancing Net Zero'

Find out more

- IGBC
- WorldGBC's Advancing Net Zero global project

Advancing Net Zero

WorldGBC's global project to accelerate uptake of net zero carbon buildings to 100% by 2050. These snapshots outline specific GBC action, and how it relates to the project framework, including the four key principles shown left.

What is Paris Proof?

Paris Proof is a term that the Dutch Green Building Council introduced as a common sustainable goal for urban buildings to achieve the Paris climate accords. Many buildings will need to be renovated and made more energy efficient. Energy production must come from sustainable sources, and as we cannot produce the same amount of sustainable energy as total energy used today, buildings will have to be redesigned to use no more than a third of current energy consumption. This is what makes a building Paris Proof.

Advancing Net Zero Philippines

User Guide

Advancing Net Zero Energy Rating Scheme

Version 1.0.0

11 February 2021

Net zero carbon: energy performance targets for offices

JANUARY 2020

Figure 1: UK trajectory to a net zero economy

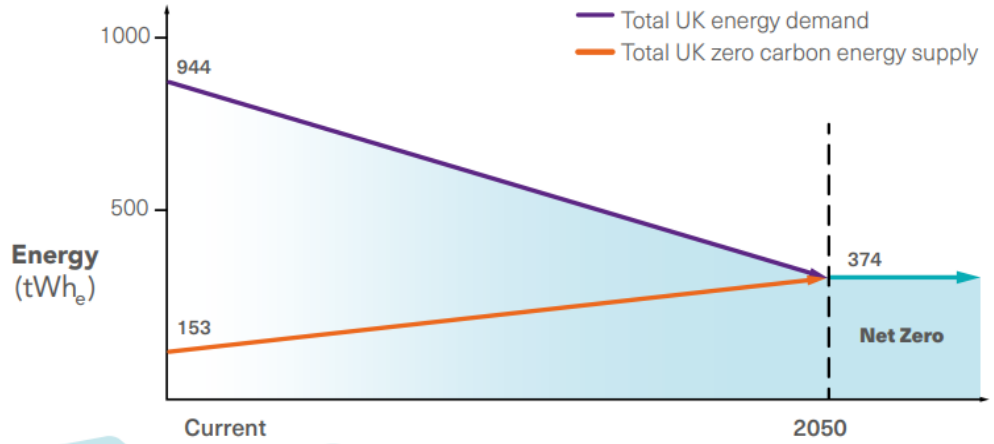


Figure 2: Trajectory for offices targeting net zero carbon

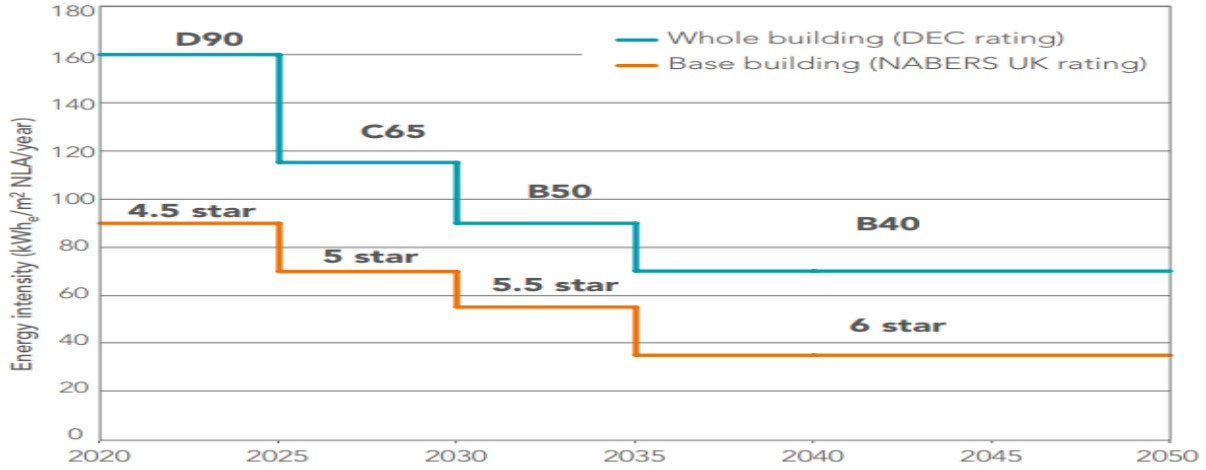


Table 1: Energy performance targets for buildings targeting net zero carbon for operational energy

		Interim Targets			Paris Proof Target
Scope	Metric	2020-2025	2025-2030	2030-2035	2035-2050
Whole building energy	kWh$_e$/m^2 (NLA) / year	160	115	90	70
	kWh$_e$/m^2 (GIA) / year	130	90	70	55
	DEC rating	D90	C65	B50	B40
Base building energy	kWh$_e$/m^2 (NLA) / year	90	70	55	35
	kWh$_e$/m^2 (GIA) / year	70	55	45	30
	NABERS UK star rating	4.5	5	5.5	6
Tenant energy	kWh$_e$/m^2 (NLA) / year	70	45	35	35

NLA = net lettable area GIA = gross internal area

WORLD GREEN BUILDING COUNCIL

Asia Pacific Region - Net Zero Readiness Framework

ASIA PACIFIC REGIONAL NETWORK

WORLD GREEN BUILDING COUNCIL

ADVANCING NET ZERO

Asia-Pacific Economic Cooperation

The 58th Meeting of the APEC Expert Group on Energy Efficiency & Conservation (EGEEC 58)

ASIA PACIFIC NET ZERO READINESS FRAMEWORK

Framework Structure

5 Categories - 25 Goals - 75 Indicators

Government Leadership

Goal 1: Establish carbon emission target

Goal 2: Produce carbon emission roadmap

Goal 3: Mandatory regulations / performance requirements relating to achievement of Net Zero.

Goal 4: National grid decarbonisation plan and ready availability of clean energy options to industry.

Goal 5: Availability and access to a local carbon market

Technical Solutions /Approaches

Goal 1: Clear agreed definition of

Indicator 1: Climate Action Plan / Climate Target Plan

Indicator 2: Government to produce carbon emission roadmap

performance improvement strategy

Goal 5: Integration of renewable energy and getting buildings to be carbon-ready.

Goal 6: Have an Embodied carbon calculator.

Goal 7: Availability of Net Zero certification scheme

Finance

Goal 1: Industry financial model projects

lines on project d planning for net

g net zero with ESG ratings.

Goal 4: Guidelines for Net Zero project verification.

Data

Goal 1: Net Zero target setting tools.

Goal 2: Net Zero benchmarking tools for different types of buildings.

Goal 3: Digital solution developments such as AI, 5G, big data.

Goal 4: Transparency of data to promote accountability and trust.

Goal 5: Availability and access to a local carbon market

Mindset

Goal 1: Public declaration of Net Zero commitments to secure corporate action.

Goal 2: Net Zero Leadership

Goal 3: Incentives and promotion of Net Zero

Goal 4: Awareness, Training and Development.

Goal 5: Positive Perceptions of net zero initiatives

Asia-Pacific Economic Cooperation

ADVANCING NET ZERO ASIA PACIFIC REGIONAL NETWORK

WORLD GREEN BUILDING COUNCIL

Singapore + Hong Kong

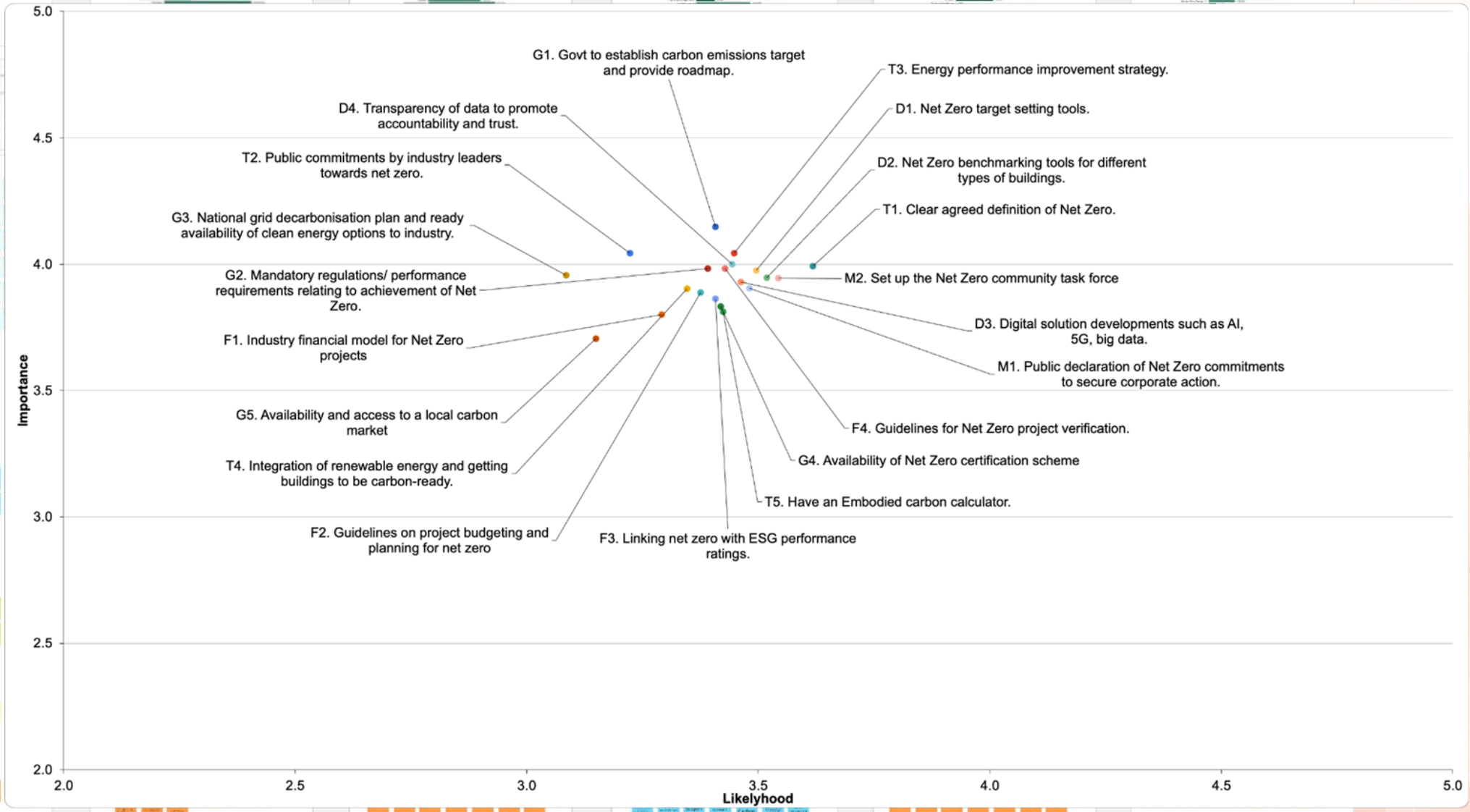
India

The Philippines

Indonesia

Malaysia

Vietnam



Challenges

Government Leadership

Technical Solutions/Approaches

Finance

Data

Mindset

Mindset

Mindset

Technical Solutions/Approaches

Mindset

Mindset

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Conservati

ASIA PACIFIC NET ZERO READINESS FRAMEWORK

Most important and most likely:

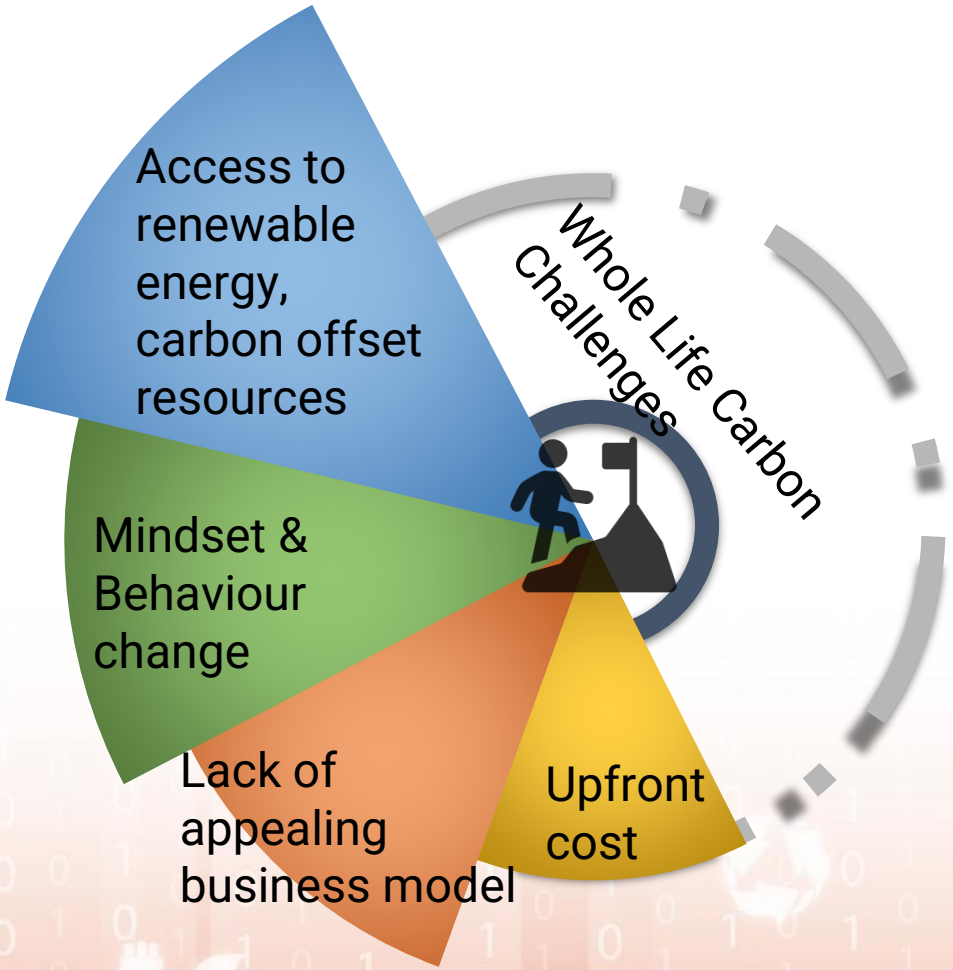
SG+HK	India	The Philippines	Indonesia	Malaysia	Vietnam
G - Establish Carbon Emission target and provide roadmap	D - Net Zero benchmarking tools for different types of buildings	T - Energy performance improvement strategy	D - Net Zero benchmarking tools for different types of buildings	D - Net Zero benchmarking tools for different types of buildings	T - Energy Performance improvement strategy
T - Clear agreed definition of Net Zero	T - Clear agreed definition of Net Zero	T - Clear agreed definition of Net Zero	T - Clear agreed definition of Net Zero.	G - Establish Carbon Emission target and provide roadmap	T - Clear agreed definition of Net Zero.
D - Net Zero target setting tools	F - Guidelines for Net Zero project verification	M - Public declaration of Net Zero commitments to secure corporate action.	D - Net Zero target setting tools	M - Public declaration of Net Zero commitments to secure corporate action.	F - Guidelines for Net Zero project verification
		T - Integration of renewable energy and getting buildings to be carbon-ready	M - Set up the Net Zero community task force	F - Guidelines for Net Zero project verification	

ASIA PACIFIC NET ZERO READINESS FRAMEWORK

Most important and less likely:

SG+HK	India	The Philippines	Indonesia	Malaysia	Vietnam
D - Transparency of data to promote accountability and trust	G - Government to establish carbon emission target and provide roadmap.	G - Govt to establish carbon emissions target and provide roadmap	G - Govt to establish carbon emissions target and provide roadmap	F - Guidelines on project budgeting and planning for net zero	D - Transparency of data to promote accountability and trust
G - Mandatory regulations/performance requirements relating to achievement of Net Zero.	G - Mandatory regulations/performance requirements relating to achievement of Net Zero.	G - Mandatory regulations / performance requirements relating to achievement of Net Zero.	T - Public commitments by industry leaders towards net zero.	F - Industry financial model for Net Zero projects	G - Mandatory regulations / performance requirements relating to achievement of Net Zero.
G - National grid decarbonisation plan and ready availability of clean energy options to industry.	G - National grid decarbonisation plan and ready availability of clean energy options to industry.	G - National grid decarbonisation plan and ready availability of clean energy options to industry	G - National grid decarbonisation plan and ready availability of clean energy options to industry	G - National grid decarbonisation plan and ready availability of clean energy options to industry	G - National grid decarbonisation plan and ready availability of clean energy options to industry
	F - Industry financial model for Net Zero projects.				

ASIA PACIFIC NET CHALLENGES & TOP ACTIONS LIST



Top To Do list

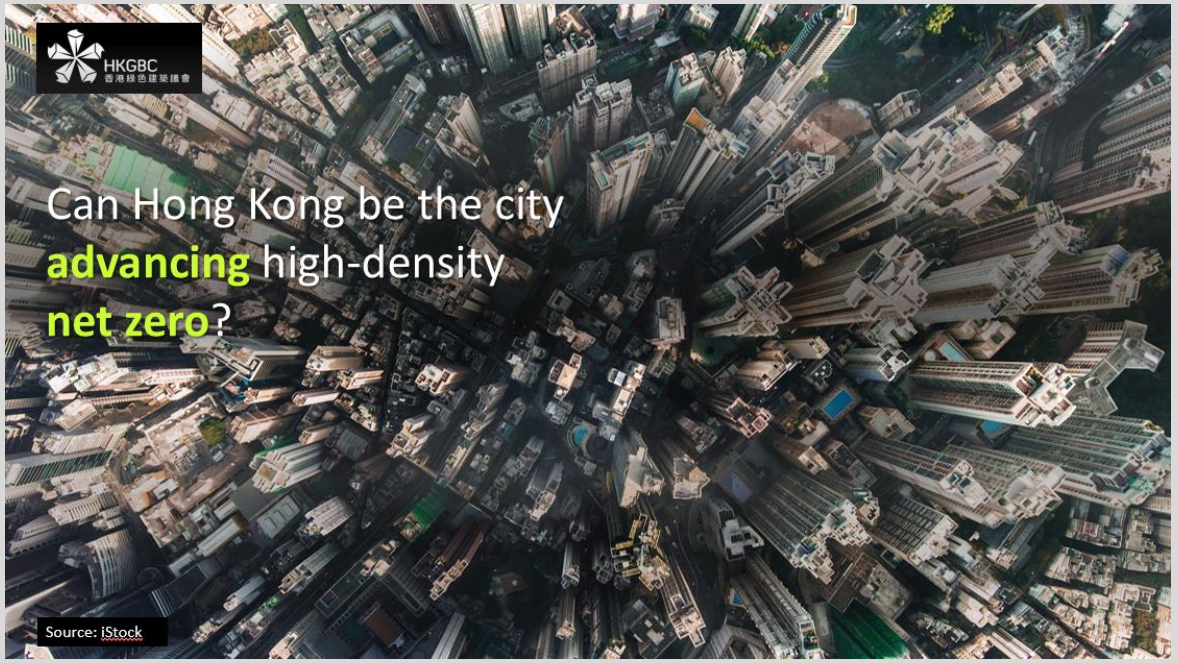
- ➔ Net Zero benchmarking and target setting tools
- ➔ National carbon emission target and roadmap
- ➔ Clear definition of Net Zero

An Advancing Net Zero kick-off seminar cum workshop 29 November 2019

https://www.hkgbc.org.hk/eng/global-movement/world-gbc/advancing-net-zero/advancing-net-zero-seminar-cum-workshop/index.jsp

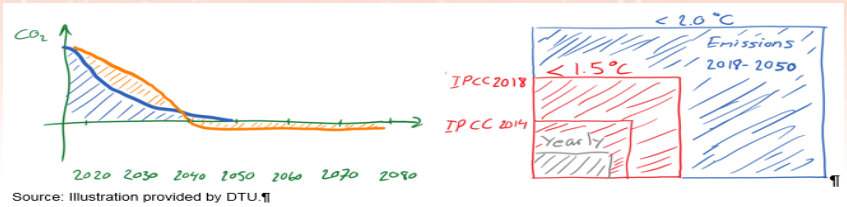
ANZ Video

https://youtu.be/0NoDKf_coTk



ANZ Video

https://www.youtube.com/watch?v=2wq0lMp_YSg



Source: Illustration provided by DTU.¶

2050

Target setting *knowing your goal*

Certification *tracking progress, having recognition*

Competition *generate ideas, accelerate development and adoption of new idea and technologies*

International conference *sharing with other compact cities*

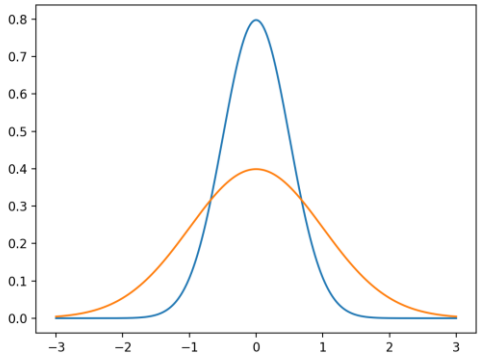
Researches *sustain advancement*

Reference of other cities

A Energy certification

- Benchmarking + recognition of good performers
- Low; extra low; super low; ANZ
- Route 1 : EUI against criteria (commercial buildings + hotel)
- Route 2 : % reduction against a set baseline year by applicant
- Covers new, existing , landlord or whole
- Use simulation for baseline if no database available

How Good I am



Re-constructed EUI profile

B Target setting + progress certification

- Recognition of target setting and achieving progress
- Route 1 : target year to achieve EUI of Low; Extra ;Super ;ANZ
- Route 2 : target year to achieve 10%;25%;40%;65%
- Target certification : target set below a criteria line
- Progress certification : achieved the target set within the targeted time

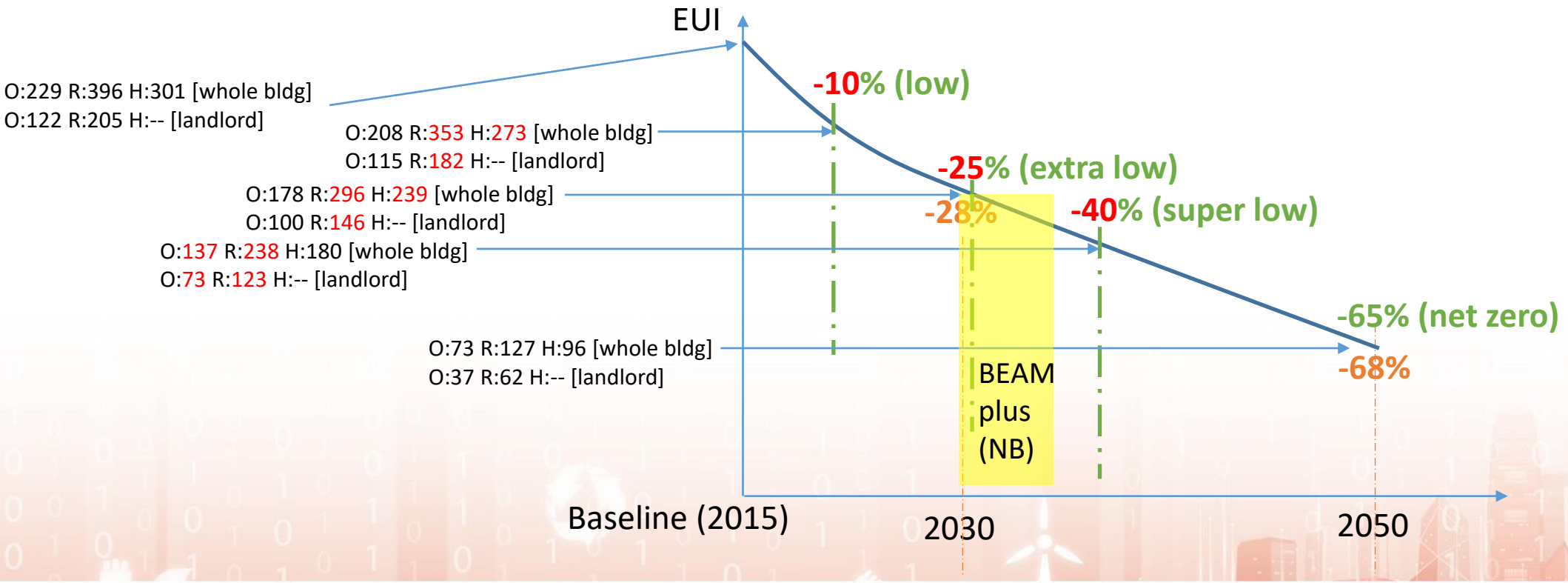
How far I need to go
Am I getting there

1 Target setting :

1st route (for buildings with low EUI): Set a targets for key years base on EUI *ie. Extra low by 2020 , Extra low by 2030 , net zero by 2045*

2nd route (for buildings with high EUI) : Set reduction targets for key years based on a selected baseline between 2005-2015

i.e 28% by 2030 , 40% by 2040, 68% by 2050 (note % reduction target must be at least or higher than shown in the below curve)



2 Progress certification : Buildings will be awarded a certification at the year they achieve their set target

Vision : *Mainstreaming best practices for energy efficient buildings*

- Collaborate with CLP to extend our RCx training and services to more buildings
- Collaboration wih APEC
- 2nd RCx competition

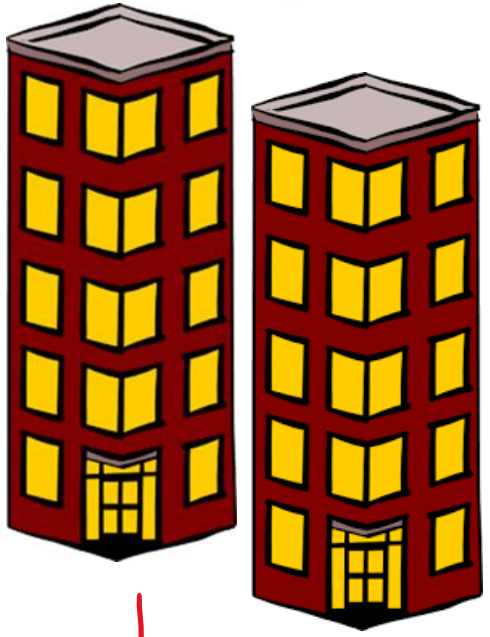
Retro-fitting

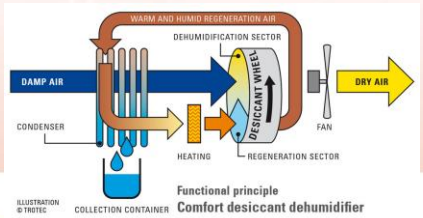
A technical hub with real buildings as living laboratory
Test out new ideas/products; measure& verification of performance; mainstreaming the workable solutions
Engaging Property management companies & hospitality industry

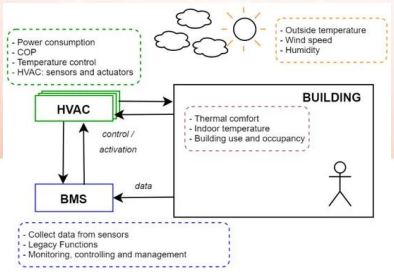
Driving for AI

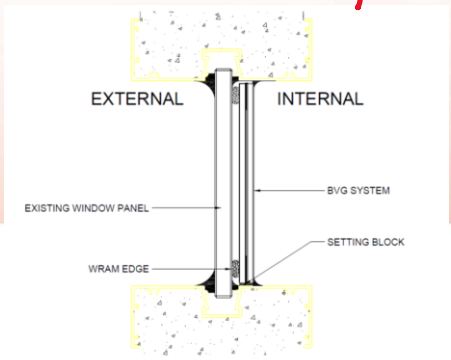
Smart competition on the adoption of AI for retro-fitting of existing systems

Living Laboratory --- Matching newly/less adopted technologies / ideas

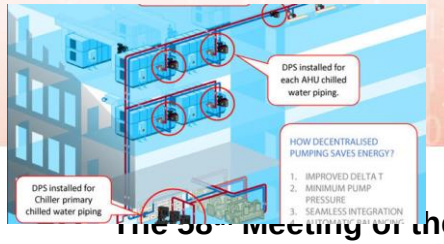








TYPICAL DETAILS



APEC Asia-Pacific Economic Cooperation

Installation (13/2/22)

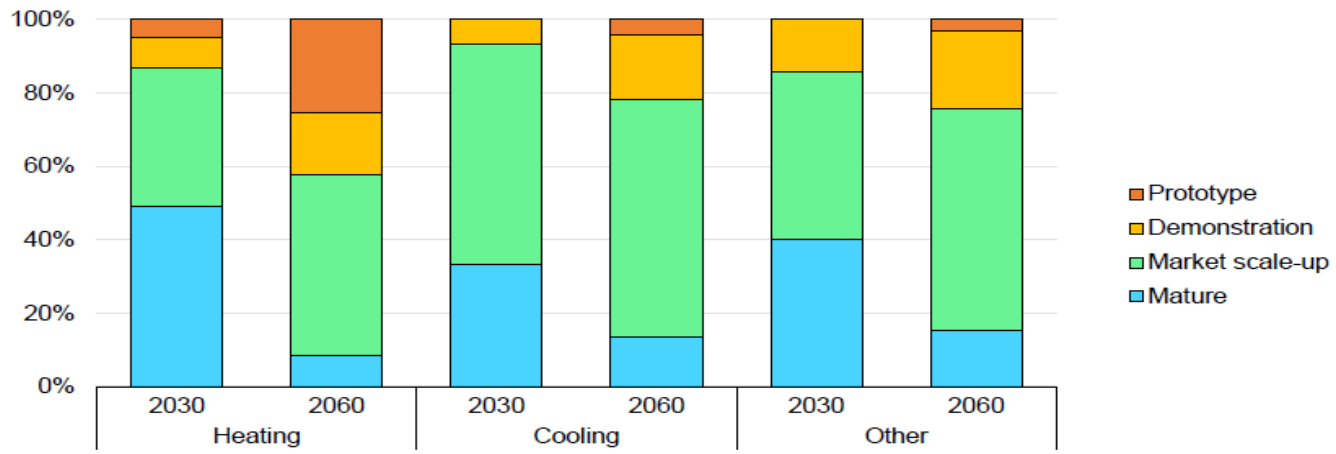
An Energy Sector Roadmap to Carbon Neutrality in China

International Energy Agency

Some key points for the building sector

This transformation of energy use in buildings is mostly achieved by using technologies that already exist today, such as heat pumps, efficient buildings design and materials, and renewables, though incremental improvements in performance are needed. ***Around two-thirds of the emissions reductions in buildings to 2060 are obtained from technologies already mature or at the early adoption stage***. **Technologies at the demonstration and prototype stage account for the rest, mainly after 2040.** The greatest need for innovation is in boosting the efficient operation of heating equipment in cold climates and multifamily buildings, deploying demand-side response as well as integrating energy storage into buildings, grid balancing and efficient climate-friendly cooling equipment. New business models will also be essential to encourage more building retrofits and make appliances and equipment responsive to real-time price signals.

Figure 3.27 Share of building CO_2 emissions reductions by maturity category and end use in China in the APS



IEA, 2021.

Note: Maturity categories are assigned based on the detailed assessment of the technology readiness of designs presented in the IEA Clean Energy Technology Guide (IEA, 2020b).

Nearly 90% of the emissions reductions in buildings to 2030 come from existing technologies, but full decarbonisation of building end uses requires new designs

Zero-carbon-ready buildings

They progressively require zero-carbon ready buildings, which *are highly energy efficient and resource efficient, and either use renewable energy directly or are conceived to rely on zero carbon in 2060*. Improvements to the building envelope – of existing and new buildings is a key first step towards zero-carbon-ready buildings. There are a broad variety of ways of achieving this depending on climate, from high insulation and airtightness in cold climates to *ventilation and shading in warmer climates*.
Lowering building energy needs helps to reduce overall peaks in heating and cooling demand and, therefore, the need to install capacity to meet those needs in both buildings themselves and in power and heat generation.

In the APS, thanks to policies that *encourage the development and deployment of replicable retrofit packages, nearly all buildings still standing are renovated to zero-carbon-ready levels by 2060.*

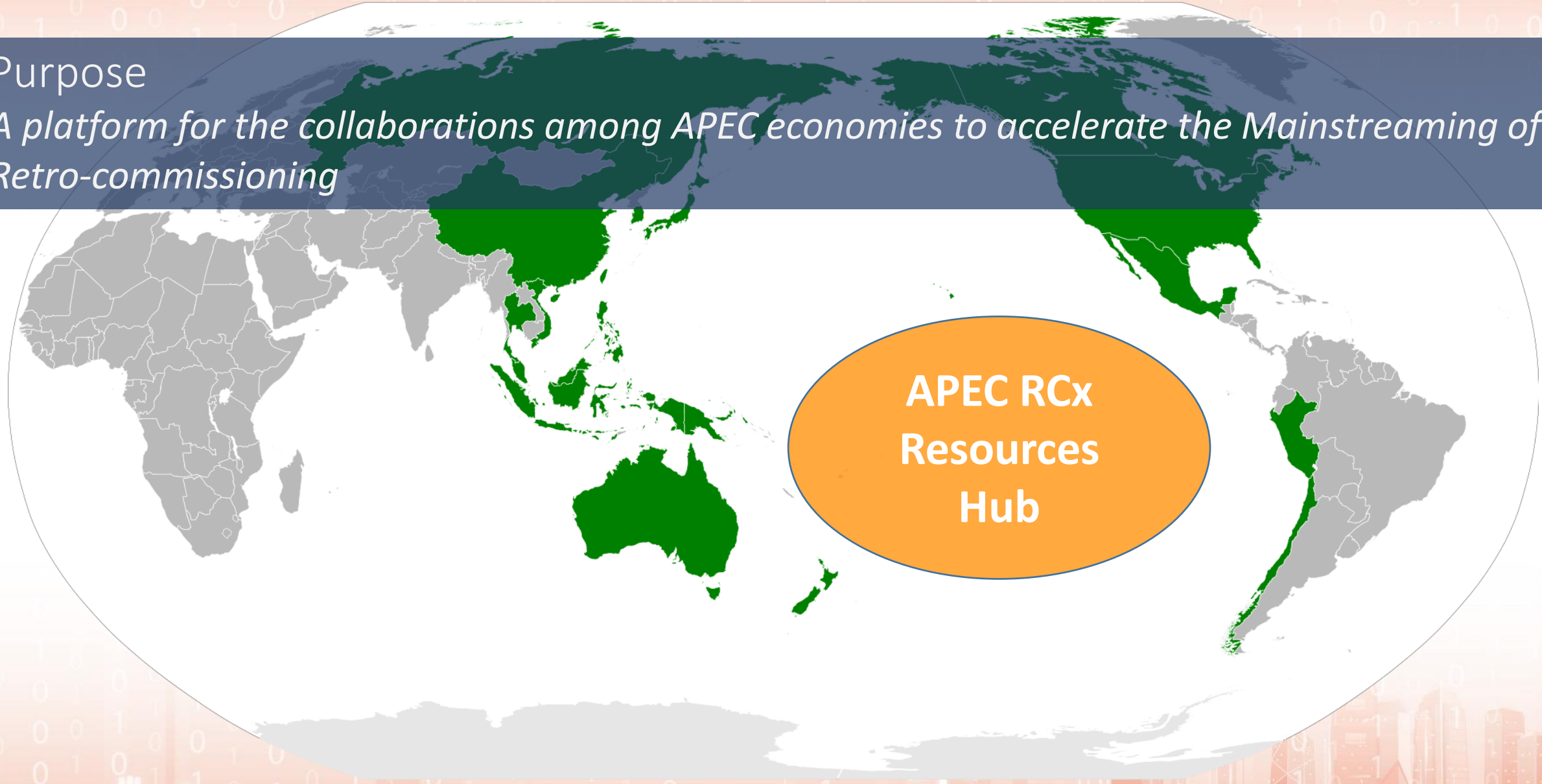
In the APS, as a result of these codes and retrofits, *nearly all floor area in China is zero-carbon-ready in 2060, leading to a* ***reduction in final energy intensity*** *– or the final energy consumed per square metre – of more than 65% for heating and* ***more than 45% for cooling between 2020 and 2060****.*


Planning
Stage 1
Investigation
Stage 2
Implementation
Stage 3
On-going Commissioning
Stage 4
RCx


Collaboration
WORKING TOGETHER
Manage
Community
STRATEGY
Task
UNION
PEOPLE
GROUP
HELP
Association
BUSINESS
Cooperation
Companies
Management
Learning
SKILLS
Knowledge
COLLABORATIVE
PARTICIPATION
Intra-organization
TEAM
GOAL
STRATEGY
Alliance
PARTNER
Joint effort
Solutions
Organizations
COMMUNICATION
GROUPS
Process
Together
Project
SUCCESS
Management
Team
IDEAS
Problem solving
PARTNERSHIP

Purpose

A platform for the collaborations among APEC economies to accelerate the Mainstreaming of Retro-commissioning



APEC RCx Resources Hub

RCx technical guidelines; Best practices; showcases; strategies …

Joint pilot projects; development of new practices through real buildings as living laboratories ..

Conferences; sharing sessions and expert dialogue sessions…

Competitions

Training; coaching; mentoring; examination; registration schemes for professional and services providers; Continuous Professional Development

THANK YOU