Bureau of Energy Efficiency

सत्यमेव जयते
Government of India
Ministry of Power

german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

ANGAN

Augmenting Nature by Green Affordable New-habitat

A Courtyard for Revolutionary Change in Building Energy Efficiency

An International Conference on Building Energy Efficiency

9th-11th September, 2019 | Hotel The LaLiT, New Delhi

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THIS PRESENTATION WAS SHARED BY

Rashmi Jawahar

IPEEC

FOR THE SESSION:

"Steps towards Net Zero Energy Buildings"

DURING ANGAN 2019

Knowledge Partner

teri The Energy and Resources Institute
Creating Innovative Solutions for a Sustainable Future

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Steps towards Net Zero Energy Buildings

Augmenting Nature by Green Affordable New-habitat (ANGAN)

The International Building Energy Efficiency Conference

9th ~ 11th September 2019, New Delhi, India

TEN TASK GROUPS TACKLE KEY SECTORAL ISSUES

High Efficiency Low Emissions Task Group **(HELE)**

Super-efficient Equipment and Appliance Deployment initiative (**SEAD**)

Networked Devices Task Group/ Connected Devices Alliance (**NDTG/CDA**)

Transport Task Group (**TTG**)

Top Ten EE Best Practices and Best Available Technologies Task Group (**TOPTENs**)

Energy Efficiency Finance Task Group (**EEFTG**)

Improving Policies through Energy Efficiency Indicators **(IPEEI)**

Buildings Energy Efficiency Task Group (**BEET**)

Energy Management Action Network (**EMAK**)

Energy Management Working Group (**EMWG**)

Buildings Energy Efficiency Task Group (BEET)

Sectoral importance:

- Buildings are some of the largest energy users in the world, accounting for over **30%** of global final energy consumption and more than **55%** of global electricity demand.
- Potential to save **3 700 TWh** through more efficient buildings.

Purpose:

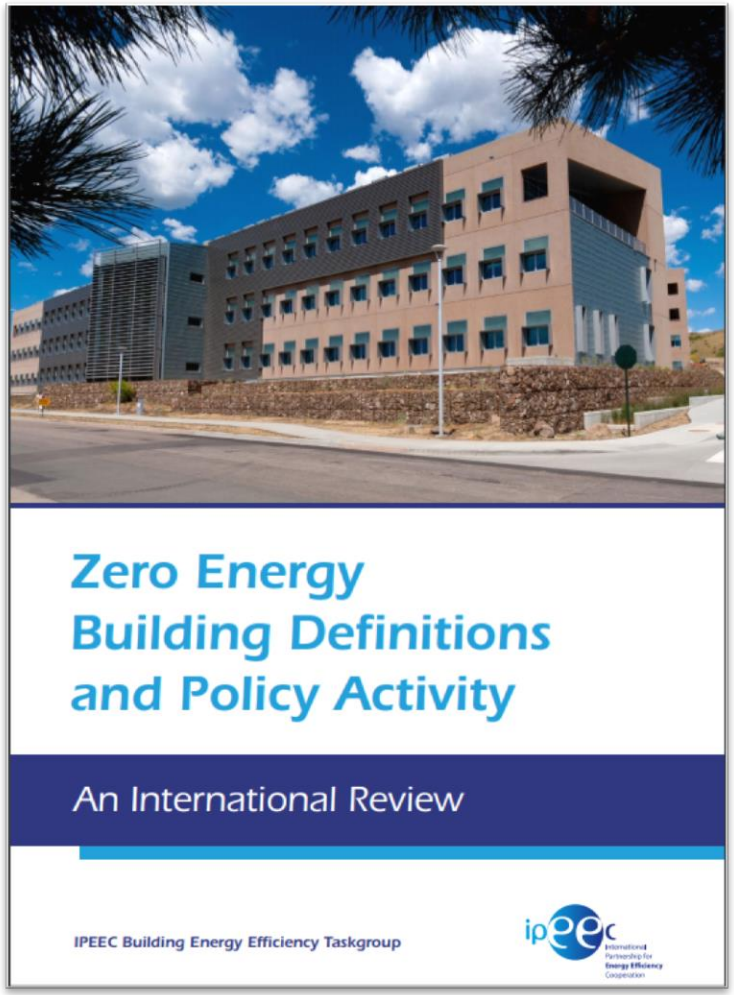
Collaborative platform for countries to research, inform and support the development and implementation of effective building energy efficiency policies, with a core focus on building rating systems and building codes.

Key highlights of BEET 7 Report

BEET published **Zero-Energy Building Definitions and Policy Activity: An International Review (BEET 7),** which is expected to be a key reference for future government policy activity in the sector.

BEET 7 report:

- Provides an overview of relevant definitions covering all types of ZEB
- Offers energy and building policy makers an easy way to better understand and navigate the many definitions on standards for measuring building energy consumption
- Emphasizes the importance of supporting and incentivising ZEB policies at all levels of government in order to achieve desired growth and progress



Lessons Learned

- Achieving ZEBs that **exclude plug loads is easier**, especially in climate zones where heating and cooling loads are relatively moderate.
- Generating enough energy on site is challenging for buildings **higher than four to six floors** even if they are high performing and very efficient low energy buildings.
- The most successful jurisdictions use a **mix of ambitious** regional or national/state/provincial policy leadership in combination with grassroots local policy activity, environmental advocates, and industry leaders.
- Key risks relate to building operation resulting in higher energy consumption, excessive energy generation causing scaling back in other renewable energies, and "**performance gaps**" resulting from extra costs for ZEB achieving status.

Taisei ZEB Demonstration Building, Yokohama, Japan

Key Parameters and Boundaries in Leading ZEB Definitions

Country/Region	Definition/Policy/Initiative	Metric			Plug loads included in energy consumption?	Calculated (C) vs Actual/ Measured (M) Energy Use	RE system boundary		Minimum requirements	
		Primary (Source) energy	Final (Site) energy	Carbon emissions			On-site	Off-site	EE*	RE* share
Australia	Carbon Neutral Certified Building			✓	✓	M		✓	✓	
California	ZNE	✓			✓	C	✓		✓	✓
EU	EPBD	✓				C or M	✓		✓	✓
France	EPBD Implementation	✓				C	✓	✓	✓	✓
Germany	EPBD Implementation	✓				C	✓	✓	✓	
Italy	EPBD Implementation	✓				C	✓		✓	✓
Japan	Zero Energy Building Definition	✓				C			✓	
Korea	Zero Energy Building Certification	✓				C			✓	
UK	Zero-carbon building			✓		C	✓		✓	
US	Zero Energy Building (DOE)	✓			✓	M	✓		✓	
US	Architecture 2030 ZERO CODE	✓			✓	C		✓	✓	
World	Passive House		✓		✓	C			✓	
World	World GBC Net Zero Carbon			✓	✓	C		✓		

Leading ZEB Dates and Characteristics

Country/ Region	Responsible Agency/ Organization	Year Initiated	Date for ZEB Target		Unique Characteristics
			New Public Buildings	All New Buildings	
EU EPBD	European Commission, Individual Member States	2010	2019	2021	Set EU wide framework definition for nearly ZEB, but delegates full definition and implementation to individual EU Member States
California	California Energy Commission, Public Utilities Commission	2007		2020 for residential buildings, 2030 for commercial	Initial goals for full ZNE compliance by these dates, and have scaled back specific requirements to phase in major market shift
Japan	METI	2014	2020	2030	Includes very significant funding for pilot projects

Areas for Further Study

Freiburg Town Hall, net surplus-energy building, Germany

Including the need for more studies on ZEB targets for tall buildings in dense urban settings, and proving the ZEB concept effectively to industry associations, governments and the public.

BEET 8 : Energy Efficiency Obligation Schemes and Energy Efficiency in Buildings

This work will assess the potential for market-based instruments to deliver deeper reform in the building sector.

- Considers major case studies from Canada, the UK and Portugal
- Includes an evaluation of pay-for-performance programmes targeting Retro-commissioning in Massachusetts and Standard Offers in Texas.

BEET 9 : The Performance Gap in Buildings

- Recognises the disparity between what builders are required to build, and how the resulting building actually performs.
  - ➢ This is the Performance Gap between designed and actual energy consumption.
  - ➢ Anticipated savings from efficiency policies such as building codes are significantly discounted due to post-occupancy energy performance being much higher than what was predicted.

- Examines the technical and policy reasons for disparities between predicted and actual energy consumption.

International development on energy efficiency collaboration in buildings

Global Alliance for Buildings and Construction

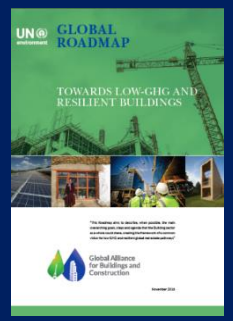
UN environment

The Global Alliance for Buildings and Construction (GlobalABC)

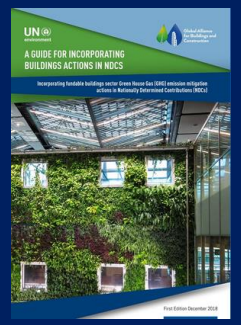
ipeec

Key Activities of GABC

Forging a pathway to low-carbon buildings and construction



Global Roadmap



NDC guide

Facilitating regional **knowledge exchange**

Regional Roundtables

Keeping the buildings and construction sector **under review**

Global Status Report

Shaping the **global agenda**

HIGH-LEVEL POLITICAL FORUM ON SUSTAINABLE DEVELOPMENT
WUF9
GLOBAL CLIMATE ACTION SUMMIT
G20 ARGENTINA 2018
HABITAT III QUITO - OCTOBER 2016
COP21 · CMP11 PARIS 2015 UN CLIMATE CHANGE CONFERENCE

High-Level Events and Local Alliances

Awareness & Education

Public Policies

Finance

Market Transformation

Building Measurement, Data and Information

5 Work Areas

ipeec

www.globalabc.org

Summary

ZEB definitions:

- outcome-based and need to consider the diversity among local regions
- Broad and long-term societal benefits
- Based on existing voluntary codes

Policy implications: Need a phased approach, district level ZEB or others, with combined top-down and bottom-up

Structural challenges: ZEB issues are beyond building sector (BEE, RE, Plug loads, grid integration)-- needs-coordination between inter-ministries, implementation gap between central and local governments

Akshay Urja Bhawan, HAREDA

Thank you for your attention!

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