



Bureau of Energy Efficiency



सत्यमेव जयते
Government of India
Ministry of Power



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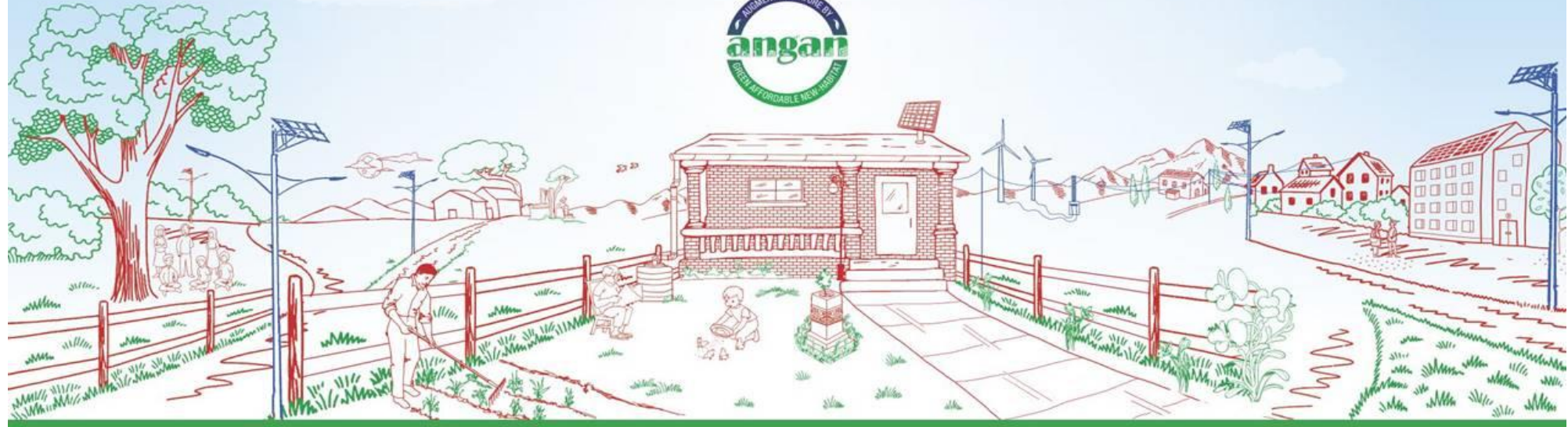
ANGAN

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

Dr. Peter Graham

International Secretariat, REEEP, Vienna, Austria

FOR THE SESSION:

“Steps towards Net Zero Energy Buildings”

DURING ANGAN 2019

Knowledge Partner

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ANGAN

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Net Zero Emissions Buildings – Global Influences

Dr. Peter Graham – Executive Director, GBPN



Building Policies for a Better World

2030



Source: www.jasperjames.co.uk

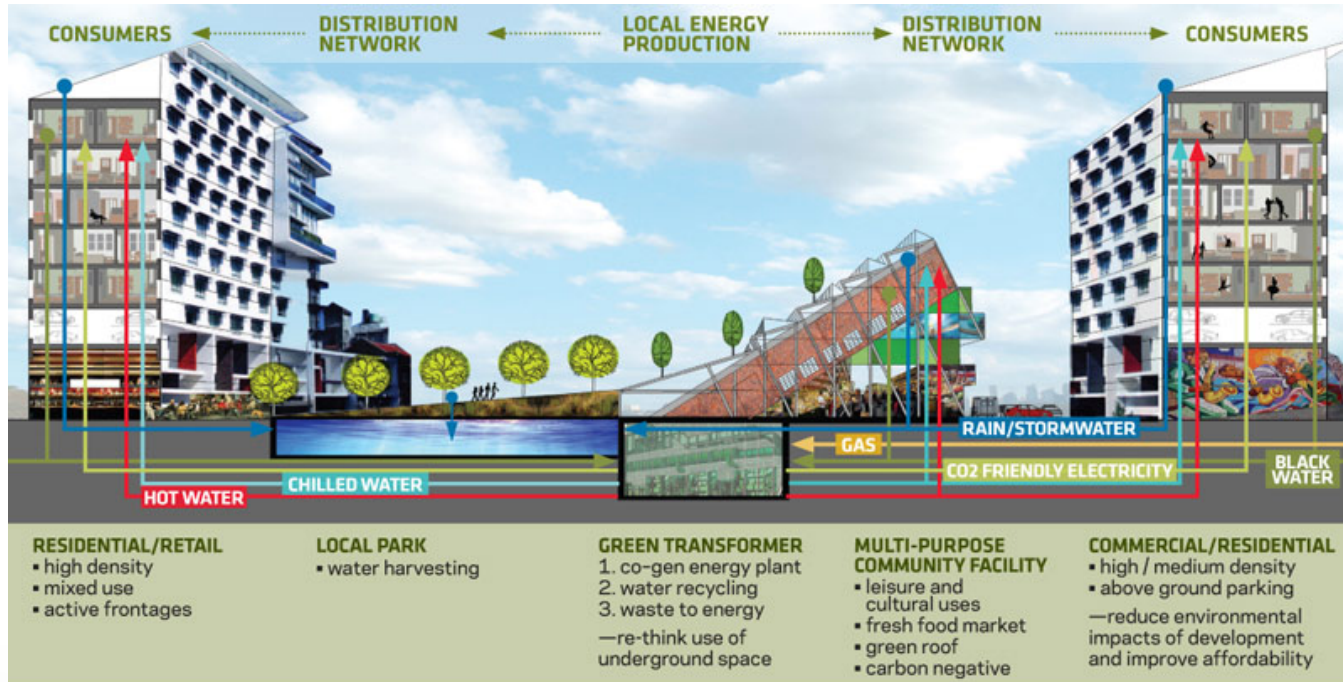
Imperative:

Clear Goals, Targets & Integrated Plans for Decarbonization

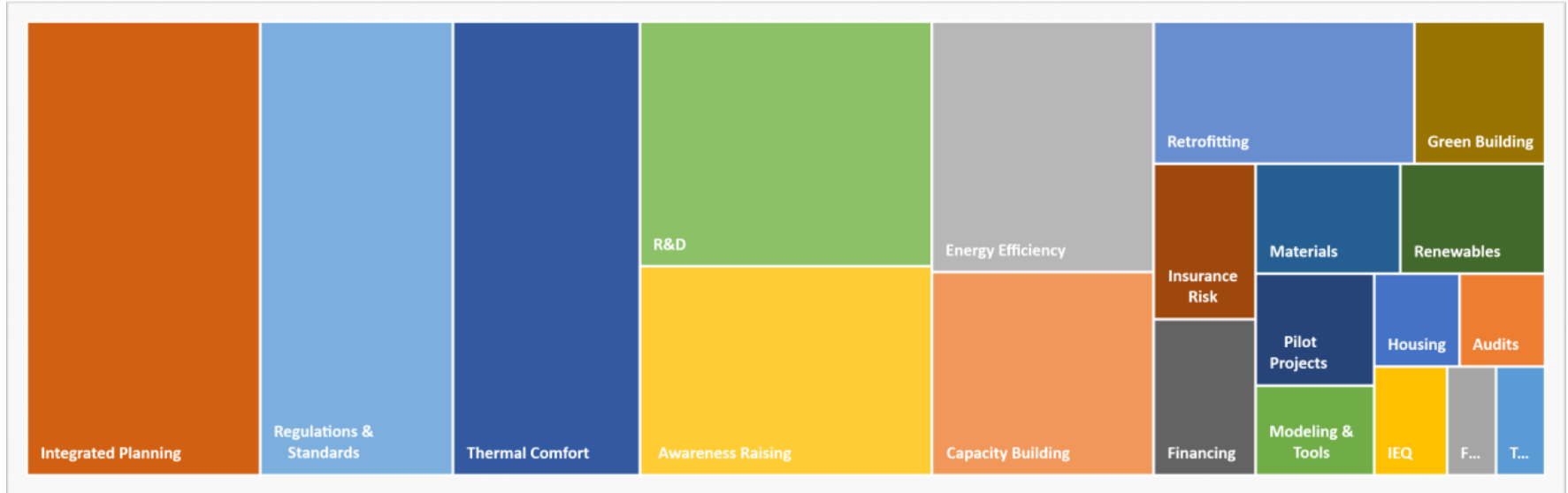
1. **Integration: in Planning & Design.** Buildings as energy service providers in zero emissions built-environments;
2. **Performance: Net Zero to Positive buildings as minimum required performance.** New Policies and better Compliance
3. **Markets: Public Financing & Private Investment.** Markets for Efficiency are improving but need development;
4. **Learning & Innovation: Learning by Doing** The cost of delaying action is increasing daily as inefficiency is 'locked-in'

Integration: Urbanization & Densification

Integrating Urban Planning & Design - NZEB – or Net Zero Districts or Communities?



Integration: Vulnerability & Adaptation



Performance: Definition

Increasing Ambition

ZE ready

Very low energy;
Passive house

Net Zero;
Energy neutral

Zero energy

Energy positive

ZEB definitions

Just space conditioning
and water heating

Whole building
(including all plugs and
miscellaneous loads)

"Regulated" loads addressed

Allowing purchased renewable
energy credits to offset on-site
consumption/ emissions

Allowing nearby off-site
renewable energy to offset
on-site consumption/ emissions

All on-site consumption/
emissions offset by on-site
renewable energy production

Boundary for energy or emissions

Performance: Policy

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

IPEEC, 2018 p23

ZEB Plans: Canada, Korea, Australia

Architecture 2030: ZERO Code



580 ZEBs - 13,906 houses
Nbi, 2019 NZE Coalition, 2017



7 Registered & 1 Verified
WGBC, 2019



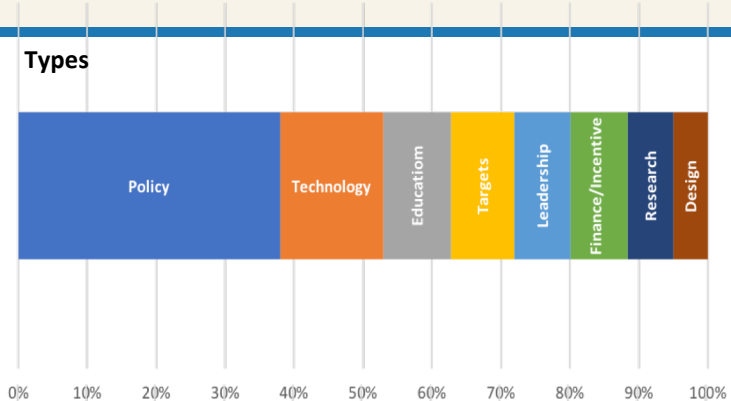
2 million m² NZEBs in 2017
APEC, 2018



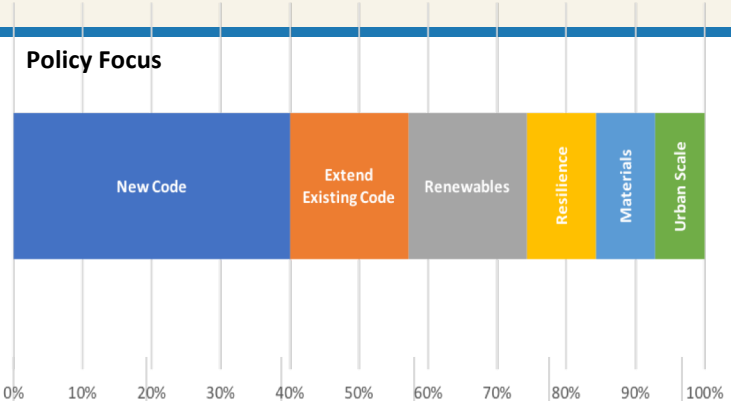
20 to 117 kWh/m²/y Res.
25 to 110 kWh/m²/y Non.Res

Performance: Mitigation Commitments

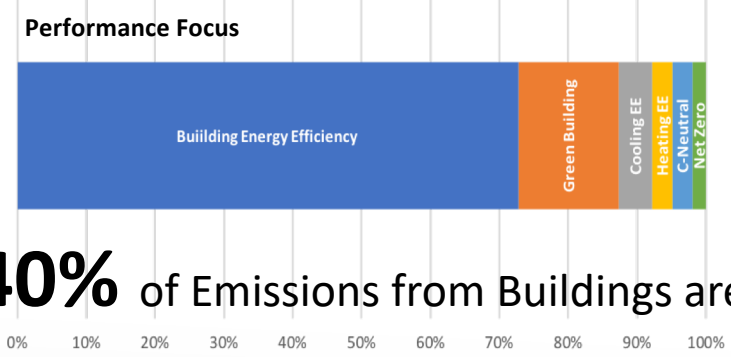
Types



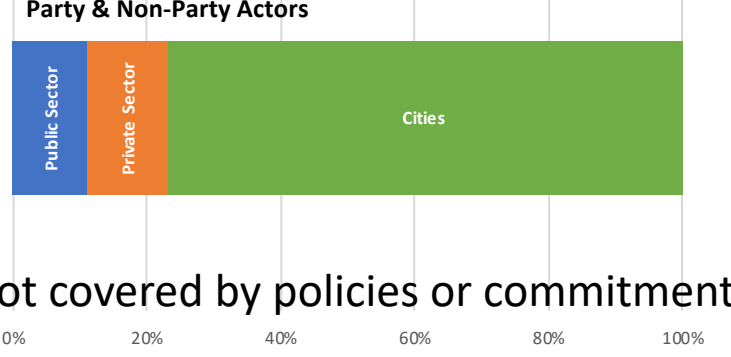
Policy Focus



Performance Focus



Party & Non-Party Actors



40% of Emissions from Buildings are not covered by policies or commitments

Holistic Approach

- ✓ Performance Approach
- ✓ Includes All Energy
- ✓ Energy Efficiency & Renewable Energy

Dynamic Process

- ✓ Zero Energy Target
- ✓ Revision Cycle
- ✓ Levels Beyond Minimum

Implementation

- ✓ Enforcement Standards
- ✓ Certification
- ✓ Policy Packages

Technical Requirements

- ✓ Building Shell
- ✓ Technical Systems
- ✓ Renewable Energy Systems

Overall Performance

- On-site energy
- Primary Energy
- GHG Emissions



Building Policies for a Better World

Source: www.gbpn.org

Codes & Standards lack coverage & enforcement

Comprehensive coverage	Addressed overall, unless more voluntary than mandatory measures are included
Progress towards good coverage	Addressed by most economies, unless more voluntary than mandatory measures are included
Significant gaps in coverage	Addressed by less than half of economies

Performance: Code Implementation



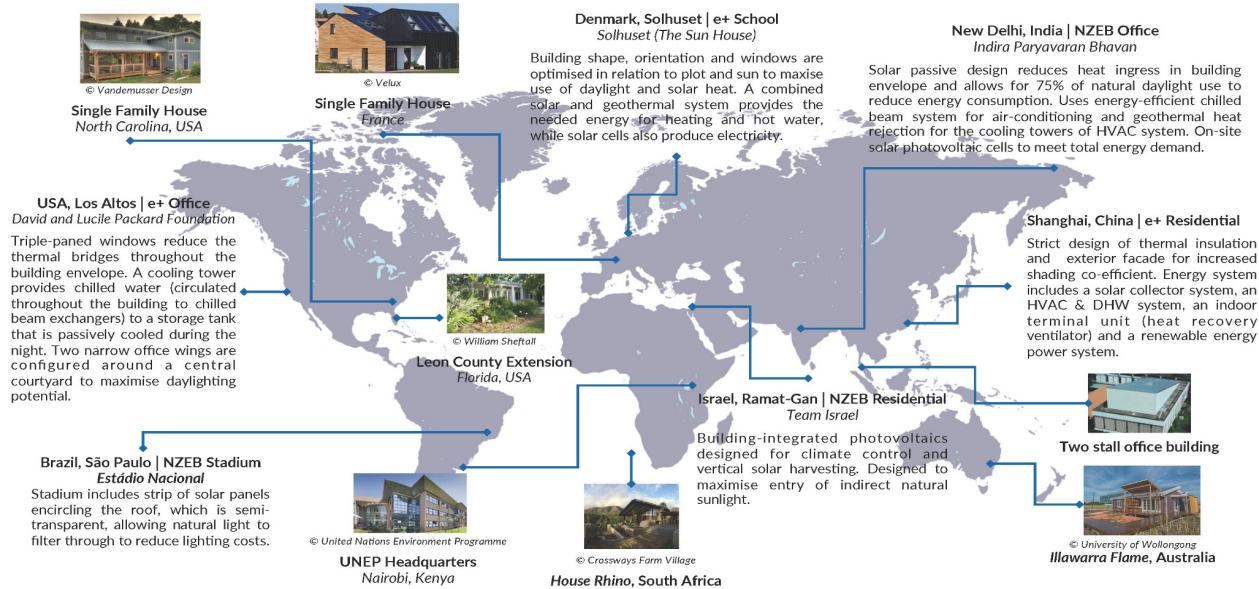
But voluntary green building standards are commonly available ...

	Australia	China	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam
New commercial	•	•	e	•	e	•	•	e
Commercial renovation	•		•		•	•		•
New large residential	•	e	e	e	e	•	e	e
New Other (e.g. hotels)	•		e	•	e	•	e	•

Small/Medium Residential
 Industrial Buildings
 Renovations
 Existing Stock
 Compliance & Enforcement
 Zero Energy Targets
 Regular Code Review & Updates

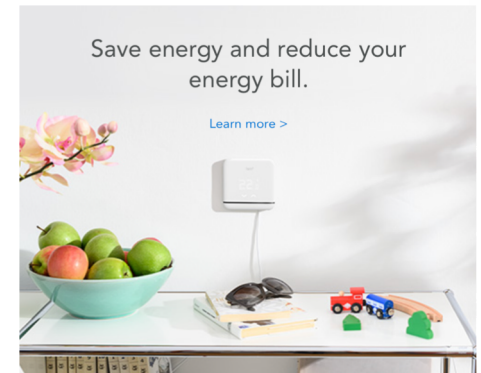
Markets & Finance

US\$15bn in 2015



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

Demand for net zero and passive buildings is growing, as they become more necessary to achieve the 2°C scenario.



IOT & Smart Controls

Learning & Innovation : The Evidence Base

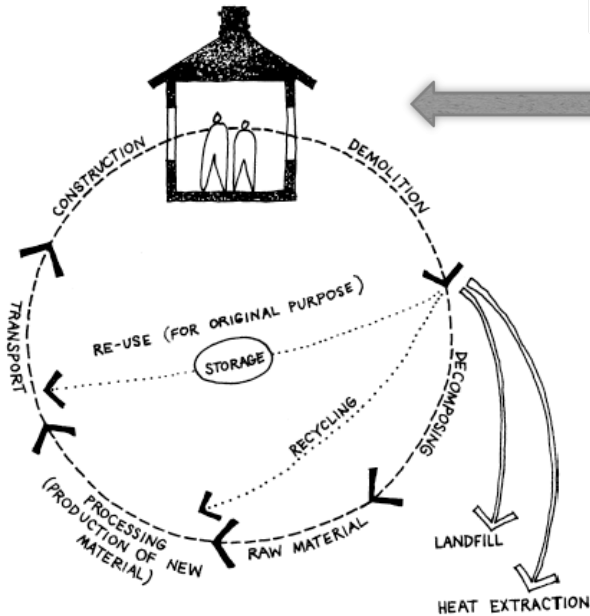
Top 5 Source of Evidence



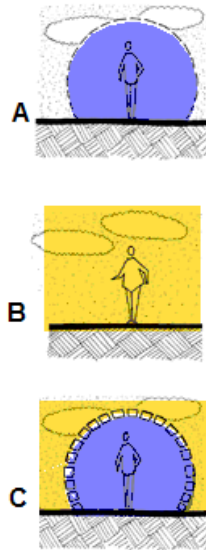
- Ask 'What is Known?' rather than 'What I/we know?' ...
- Should be 'Best-Available' i.e.
 - Trustworthy
 - Relevant
- Evidence ≠ Answers



Learning & Innovation : Education & Training

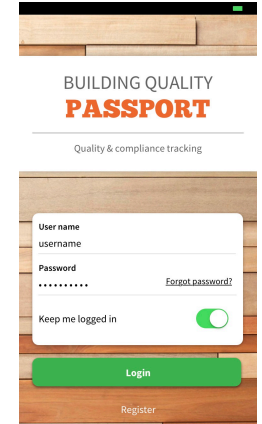


Life-Cycle Thinking



Bio-climatic Design

Qualifications



M-Learning

Thank you!

Consult our web site: www.globalbuildings.org

Follow us on Twitter: [@GBPNetwork](https://twitter.com/GBPNetwork)

Send us an email: info@gbpn.org



Building Policies for a Better World