



# GREEN BUILDINGS FOR A SMARTER WORLD

[www.edgebuildings.com](http://www.edgebuildings.com)

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**Emerging markets are in the  
midst of a construction boom**



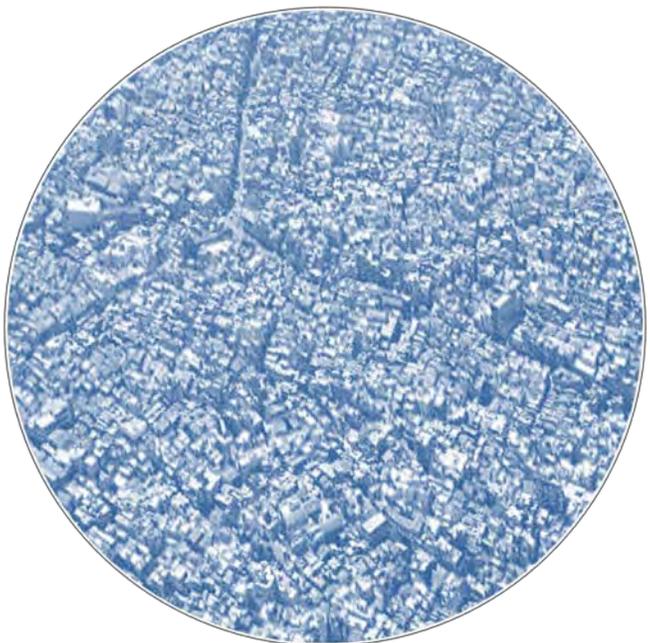
# DESIGNING NEW BUILDINGS FOR GREATER EFFICIENCY IS ONE OF THE BIGGEST AND MOST COST EFFECTIVE WAYS TO REDUCE GHGS.

Current GHG from USA  
6.8 Gt



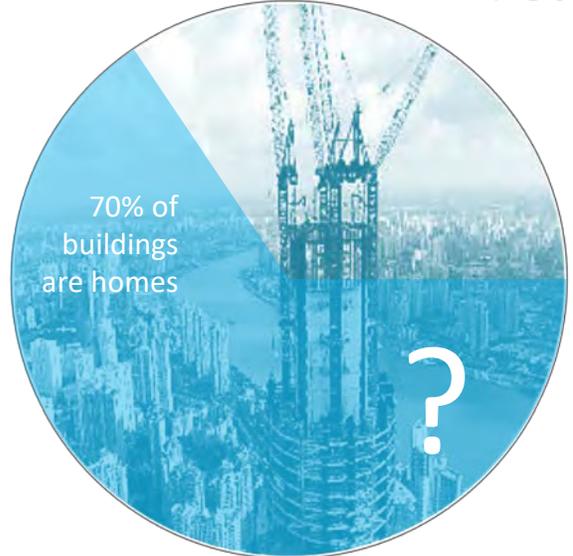
Current GHG from India  
1.7Gt

Current GHG from buildings  
9Gt



+

Additional GHG from buildings by 2030  
7Gt



Green building options are commercially viable. By greening the building stock now one has the opportunity to make long term investments in low carbon.

# Problem



If the right investment choices are not made today, we will lock into a high-energy urban infrastructure for decades.

# Problem



Meanwhile, a lot of ordinary projects are being sold as green - creating a lack of trust and skepticism

# Problem



How can green projects get recognized for it?

# Problem

*"We would fund efficient buildings, but there is no demand for them."*



Home Owners

*"We would like lower utility bills but there aren't any efficient homes."*



Investors

CIRCLE OF  
BLAME



Builders

*"We would ask for energy-efficient homes, but investors won't finance them."*



Developers

*"We can build energy-efficient homes, but developers don't ask for them."*

Problem



How can clients make the right choices?

# THE FREE SOFTWARE SHOWS HOW THE WAY TO RESOURCE INTENSITY

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AN INNOVATION OF



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Homes Hotels Retail Offices Hospitals

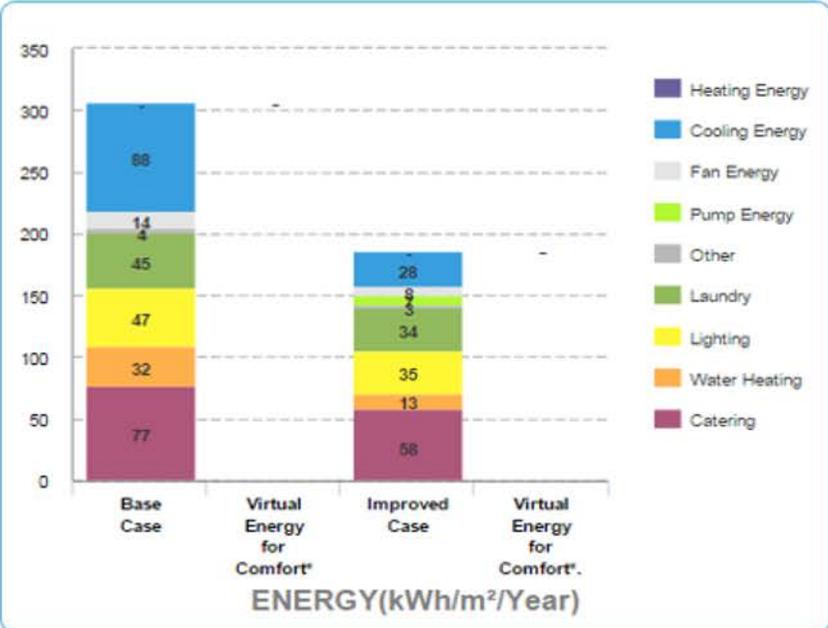
<b>Base Case Utility Cost</b> <span style="border: 1px solid white; padding: 2px 10px;">402,432</span> \$/Month	<b>Incremental Cost</b> <span style="border: 1px solid white; padding: 2px 10px;">915,675</span> \$
<b>Utility Costs Reduction</b> <span style="border: 1px solid white; padding: 2px 10px;">40,040</span> \$/Month	<b>Payback in Years</b> <span style="border: 1px solid white; padding: 2px 10px;">1.9</span> Yrs.

## Energy Efficiency Measures

Select options from the list below

- Reduced Window to Wall Ratio - WWR of 40%
- External Shading Devices - Annual Average Shading Factor (AASF) of 0.58
- Insulation of Roof Surface - U Value of 0.45
- Insulation of External Walls - U Value of 0.45
- Low-E Coated Glass - U Value of 3 W/m<sup>2</sup> K and SHGC of 0.45
  
- Higher Thermal Performance Glass - U Value of 1.95 W/m<sup>2</sup> K and SHGC of 0.28
  
- Natural Ventilation - Corridors
- Natural Ventilation - Guest Rooms with Auto Controls
- Variable Refrigerant Volume (VRV) Cooling System - COP of 3.45
- Air Conditioning with Air Cooled Screw Chiller - COP of 3.2
- Air Conditioning with Water Cooled Chiller - COP of 5.39

39.3% Meets EDGE Energy Standard



Category	Heating Energy	Cooling Energy	Fan Energy	Pump Energy	Other	Laundry	Lighting	Water Heating	Catering
Base Case	0	88	14	4	45	47	32	77	0
Virtual Energy for Comfort	0	0	0	0	0	0	0	0	0
Improved Case	0	28	8	3	34	35	13	58	0
Virtual Energy for Comfort	0	0	0	0	0	0	0	0	0

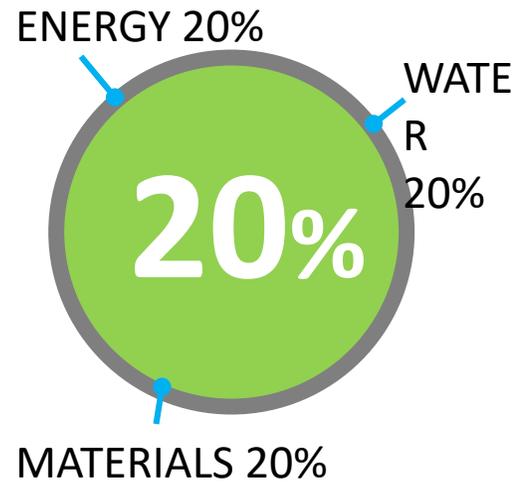
# EDGE

## EXCELLENCE IN DESIGN FOR GREATER EFFICIENCIES

### ① FREE SOFTWARE



### ② SIMPLE STANDARD



### ③ SCALABLE LABEL



# EDGE CERTIFICATION IS DELIVERED BY THE LARGEST AND MOST PRESTIGIOUS NETWORKS IN THE WORLD



## Worldwide



Green Business Certification Inc.



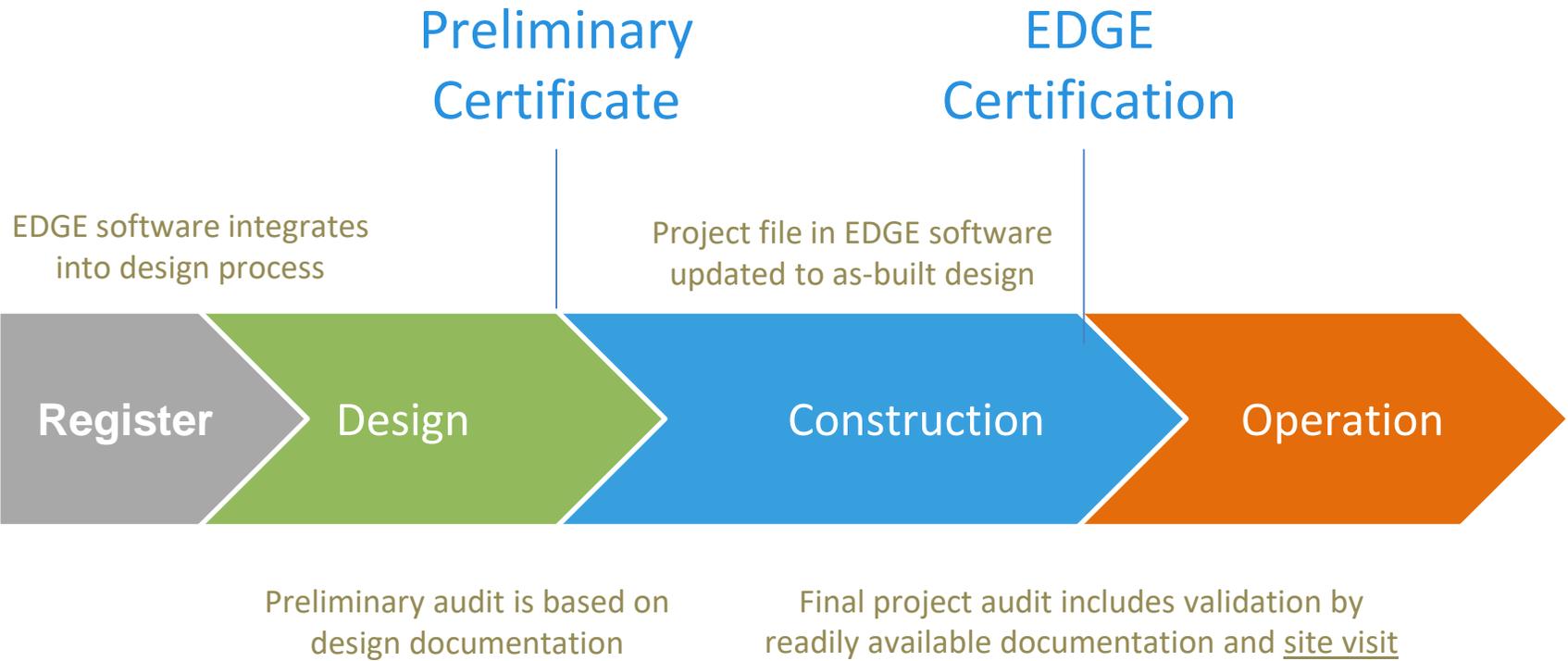
thinkstep

thinkstep-SGS joint venture

IFC currently works with five Certifiers to help scale up green building growth.

# EDGE CERTIFICATION PROCESS REQUIRES LITTLE ADDITIONAL DOCUMENTATION

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ENERGY

33%



WATER

39%



MATERIALS

23%



# THERE IS A CLEAR OPPORTUNITY TO ENGAGE MUCH MORE OF THE MARKET TO FOCUS ON GREEN BUILDINGS.



Recognizing that this approach was missing, IFC created EDGE

# MILESTONES

- EDGE software: in 5 languages; 125 countries.
- EDGE certifiers are now the largest green building network in the world
- EDGE used by Green Bond Principles, commercial banks (India, Turkey, South Africa, Costa Rica, Oman, Philippines)
- Member: UN Global Alliance for Buildings and Construction; Building Efficiency Accelerator

## 2 billion +

Dollars Invested by IFC alone using EDGE software.  
FY13-17.

## 1 million +

Square meters of area already certified across 100 projects

## 20,000

unique users



# IFC INVESTMENT SUPPORTS DEMONSTRATIONS WITH DEVELOPERS AND FINANCIAL INSTITUTIONS

- Government regulations – new green building codes
- **Investing in construction of new homes**

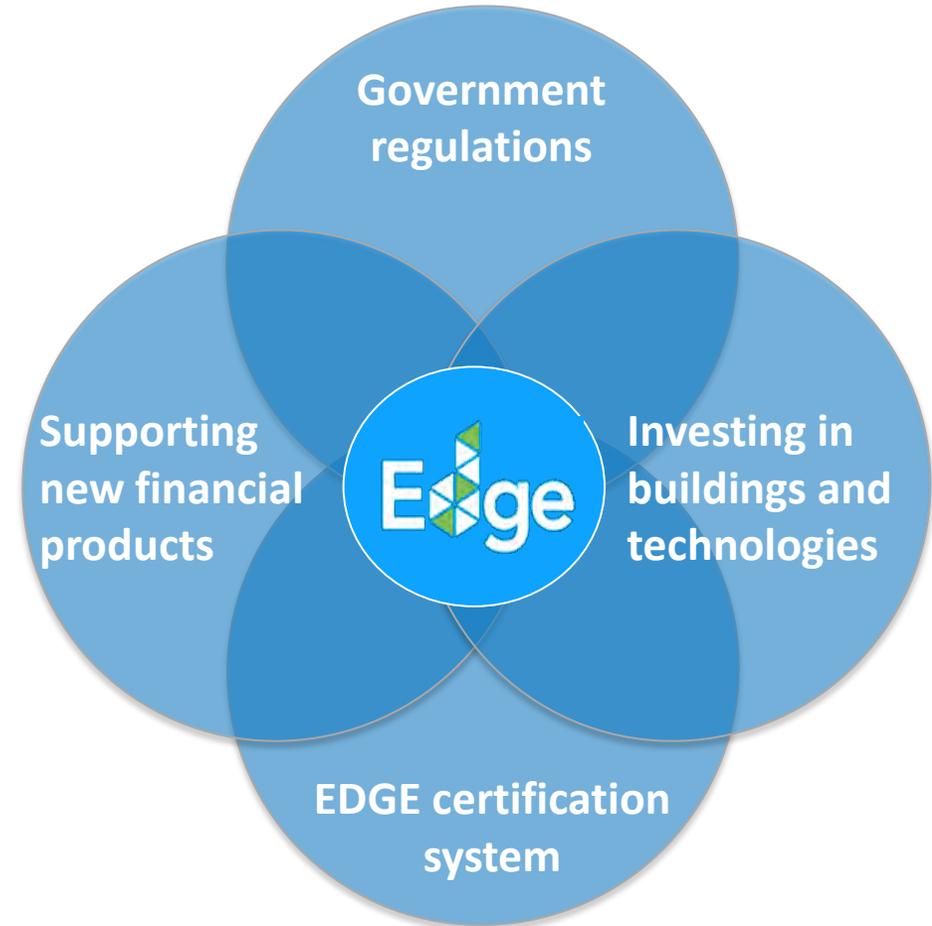
**Creates green stock**

- EDGE certification system
- Partnerships with local Green Building Council

**Certifies green stock**

- Training and capacity building with banks
- **Investment in credit lines**

**Scales green stock**



*A four-pronged approach to incentivize market adoption of green building practices*

# IFC'S SUPPORT ON GREEN BUILDINGS CODES

## 1. Indonesia

National   Jakarta   Bandung   Makassar\*   Surabaya\*

*Green Building Code*

## 2. Vietnam

*Energy Efficiency Code*

## 3. Bangladesh\*

## 4. Colombia

## 5. Philippines

National   Mandaluyong

*Green Building Code*

## 6. Peru\* & Costa Rica\*

*\* In development/  
waiting approval*

## 7. Mongolia & Myanmar

*In early planning stage*

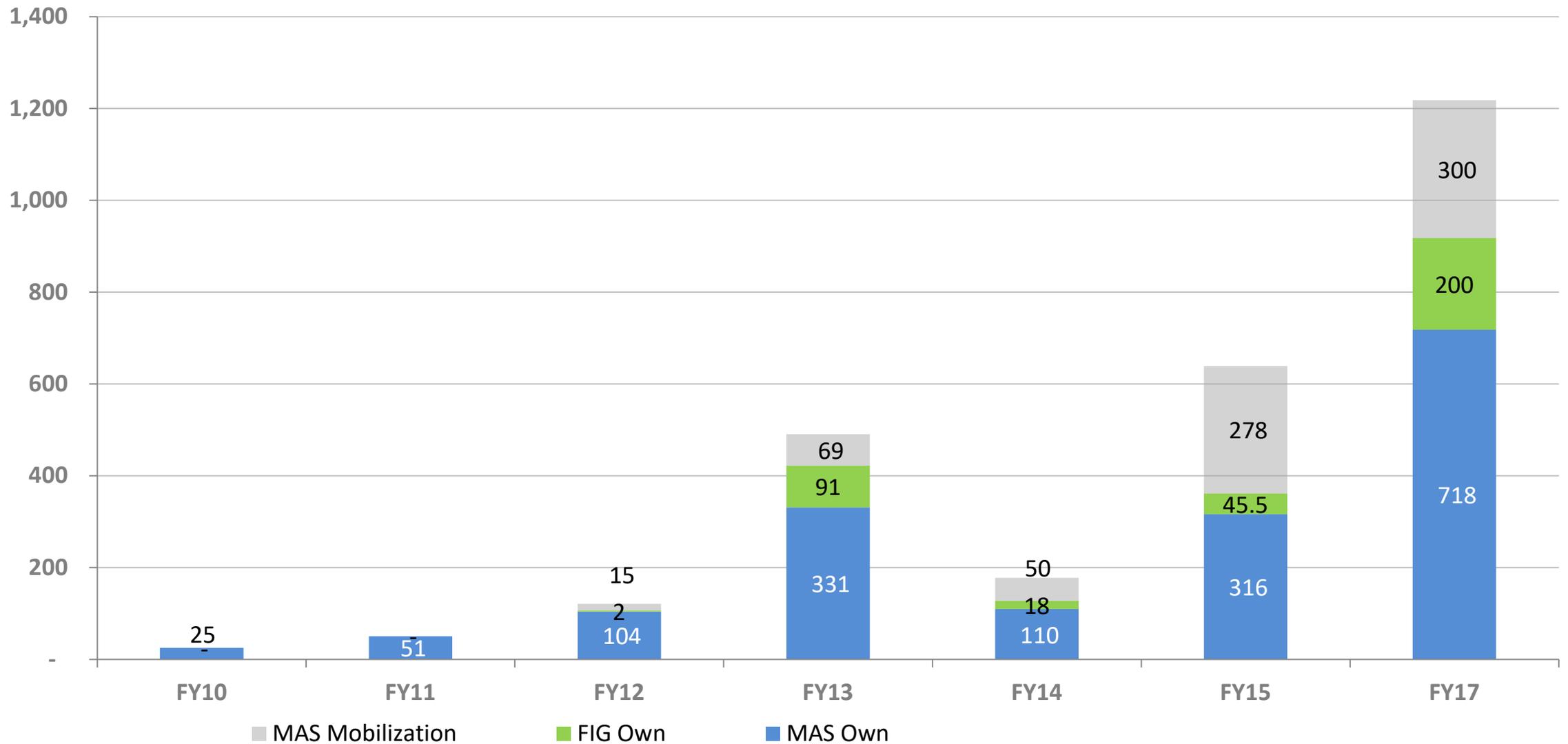
↑  
About  
18 Million m2 of  
new building space  
has complied with  
these codes

↓  
Equivalent to  
~1/3<sup>rd</sup> of office  
buildings in  
Manhattan



# IFC GREEN BUILDING INVESTMENTS HAVE BEEN GROWING RAPIDLY

USD millions



# WHAT WILL SUCCESS LOOK LIKE?



DEVELOPERS USE EDGE TO DIFFERENTIATE



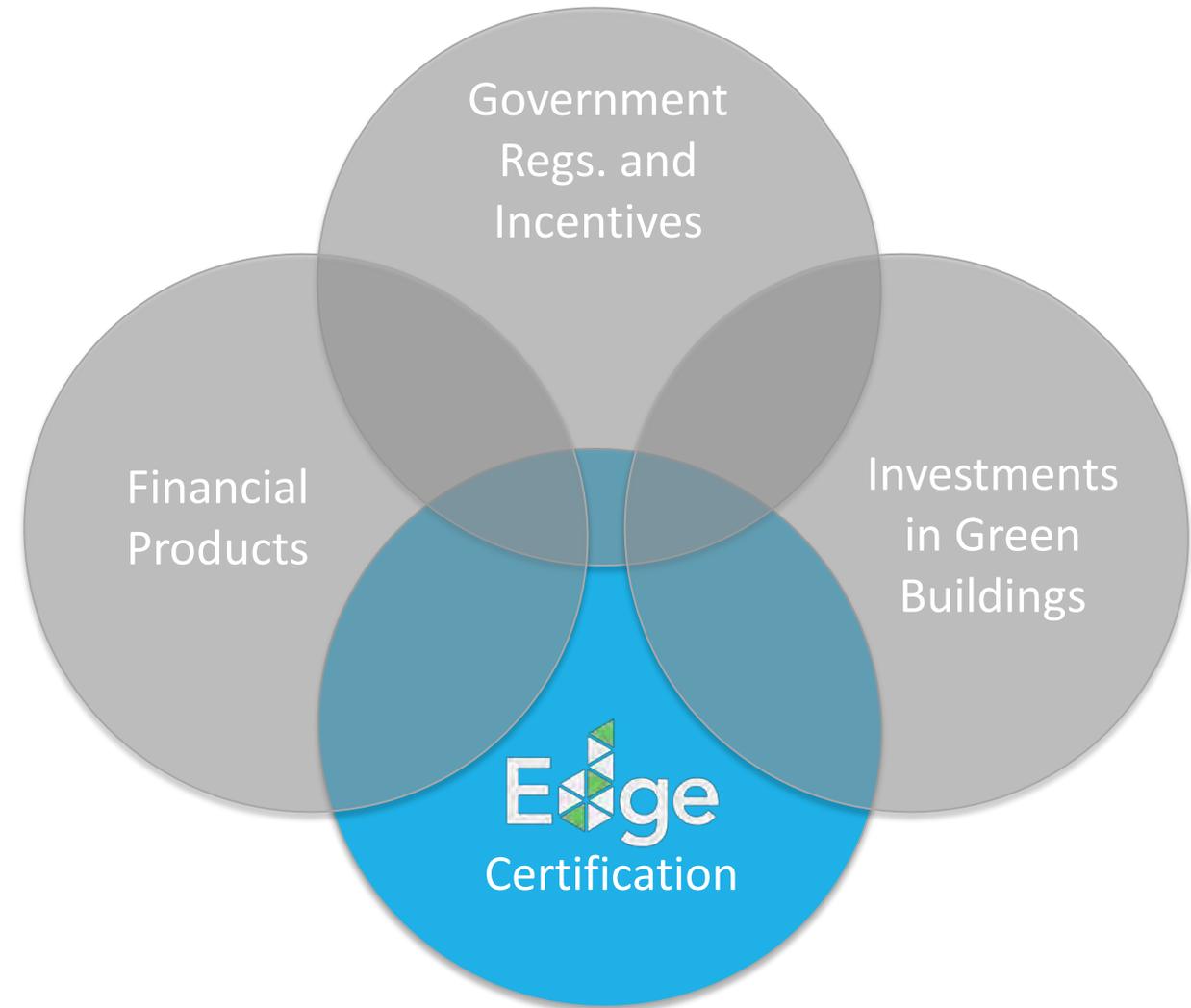
BANKS TARGET GB MARKET WITH NEW PRODUCTS



OWNERS RECOGNIZE OPERATING BENEFITS



GOVERNMENT OFFER INCENTIVES AND ENABLES ALIGNMENT OF EE CODE



20% of new construction to be green in target markets in 5-7years.

# “GREEN” DIFFERENTIATION MEASURES ARE BEING EMPLOYED BY DEVELOPERS (1/2)

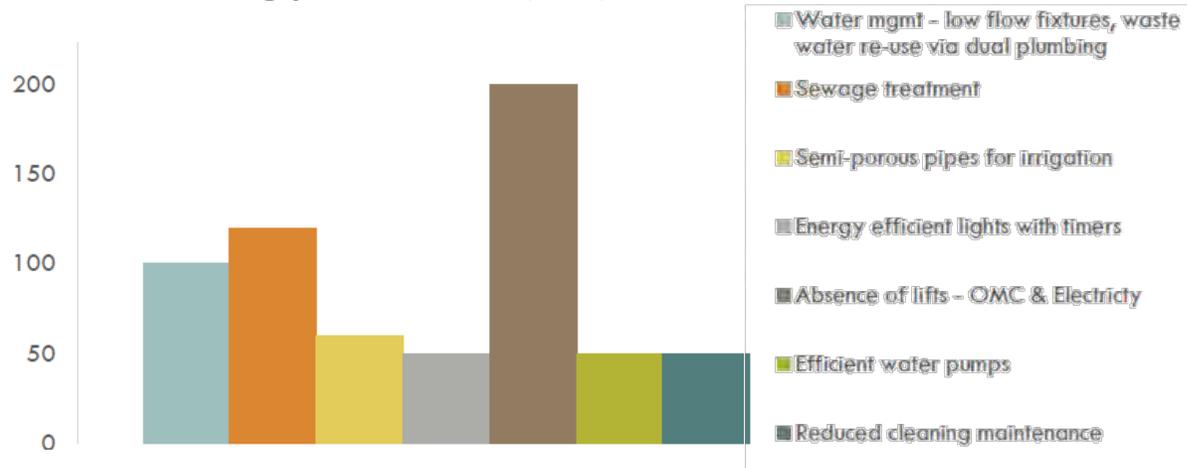
## Lower maintenance and utility costs

Developers especially in the low income and affordable housing space are the most keen users of “maintenance cost” differentiation.

The EDGE certified Kesar City project in India is a case-in-point –it achieved 80% savings in maintenance over benchmark costs.



## Actual saving per measure (INR)



Kesar was the **fastest to sell** among 14 projects which went to market in 2015 in the Maraiya region despite being the largest. Several projects in the vicinity remain unsold.

# NEW BUSINESS MODELS ARE HELPING ALIGNMENT OF SPLIT INCENTIVES IN GREEN HOMES (1/1)

In Philippines, Imperial Home's Via Verde is a solar powered community of 1,000 houses.

Imperial Homes install 500 watts roof top solar PV panels with every on every unit for free to allow buyers to enjoy lower electricity rate through the **PV lease-back program**.



PREDICTED SAVINGS		TECHNICAL SOLUTIONS
	32% Higher Energy Efficiency	Reduced window to wall ratio, energy-saving lighting, and solar photovoltaics.
	28% Higher Water Efficiency	Low-flow showerheads, low-flow faucets for washbasins and kitchen sinks, and water-conserving toilets.
	38% Less Embodied Energy in Materials	Corrugated zinc sheets for roof construction, in-situ reinforced external walls, ferrocement panels for internal walls, and steel window frames.

# NEW BUSINESS MODELS ARE HELPING ALIGNMENT OF SPLIT INCENTIVES IN GREEN HOMES

VBHC's EDGE homes costed 2% more By reducing construction **duration by 66%** they have in lowering working capital requirements.

The improving cash-cycle more than makes up the incremental capital cost green features.



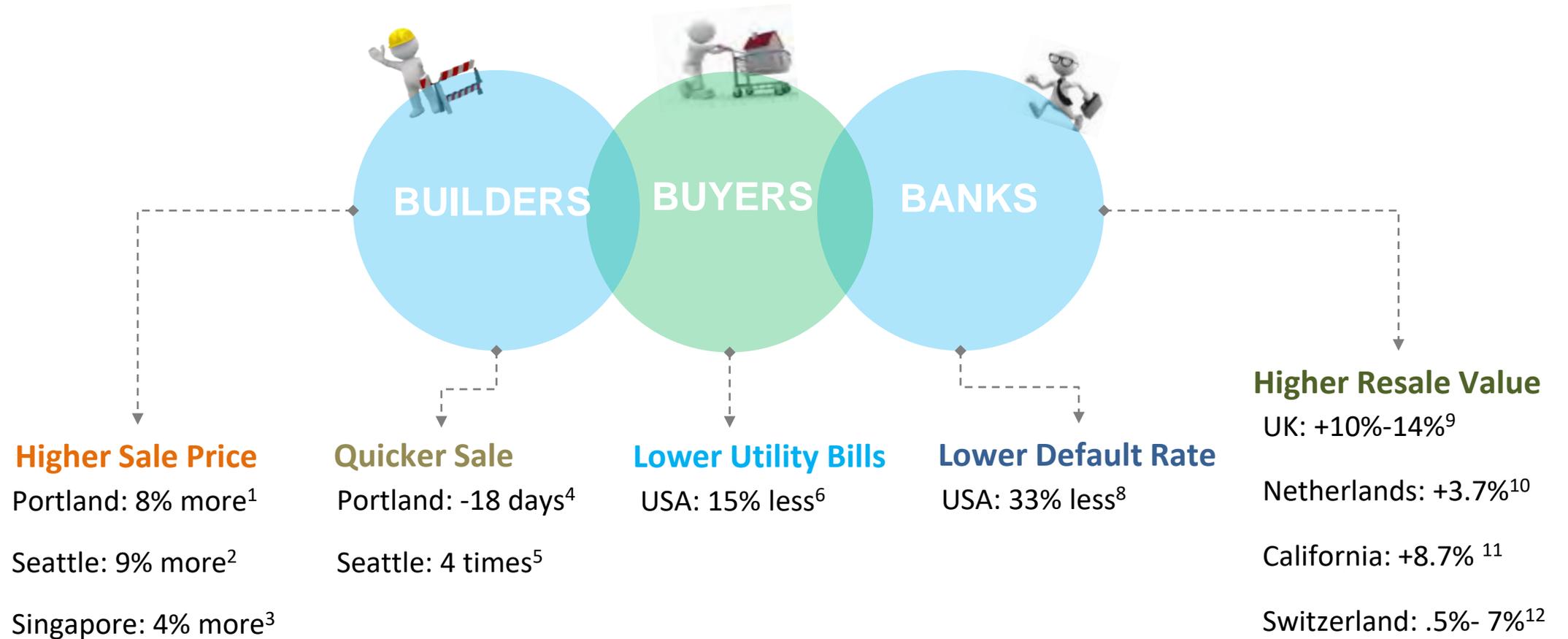
Concrete formwork technology allows rapid construction and also has lower embodied impact than bricks



Shambhu ST with his family at his VBHC flat. The 35-year-old's compact, two-bedroom apartment on the outskirts of Bangalore bought the flat for Rs.11 lakh (US\$17,000).

PREDICTED SAVINGS		TECHNICAL SOLUTIONS
	33% Higher Energy Efficiency	Reduced window to wall ratio, reflective paint for external walls, external shading devices, energy-efficient ceiling fans, energy-saving light bulbs in internal spaces/commons areas/external spaces, and solar hot water collectors.
	39% Higher Water Efficiency	Low-flow showerheads, low-flow faucets for washbasins, dual flush water closets, rainwater harvesting systems, and recycled black water for flushing.
	23% Less Embodied Energy in Materials	150mm in-situ reinforced external and internal walls.

# BUSINESS CASE FOR GREEN HOMES



Energy efficient homes already demonstrate commercial value in developed markets. Emerging markets needs a smart labeling system to demonstrate the same business



Diverting brown finance to green

# BANKS, FUNDS, HOTELS, AND OTHER DEVELOPERS ARE TURNING TO EDGE

    **NATIONAL HOUSING BANK**  
Wholly Owned by Reserve Bank of India

Development Banks

  **odeabank**

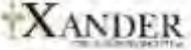
Banks in developing countries

  **RMB | westport**  
REAL ESTATE DEVELOPMENT FUND

Real estate funds

  **Radisson**

Hotels

Other



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BOP Families spends up to 40% of income on energy<sup>1</sup>

Power outages for 46 days per year

60 million people own generators to provide electricity- 30% of electricity is produced by dirty and inefficient private generators

Higher cost of inefficient energy-using devices is an added cost of being poor.

Energy scarcity is constraining growth

Housing sector consumes 53% of Nigeria's electricity

**Designing *new* buildings for greater efficiency is one of the biggest and most cost effective ways to reduce GHGs.**