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

Mr. Spondon Bhagowati

Green Building Consultant, International Finance Corporation (IFC)

FOR THE SESSION:

"Policy Framework for Energy Efficiency in Buildings (Rating and Labelling System)"

DURING ANGAN 2019

Knowledge Partner

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

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Excellence In Design For Greater Efficiencies

IFC International Finance Corporation WORLD BANK GROUP

Creating Markets, Creating Opportunities

Key Policies and Strategies for Developing Green Buildings & Introduction to EDGE

ANGAN, 2019

URBANIZATION IN INDIA

India has a population of 1.3 billion (272 million households)

17.7% of the world's population

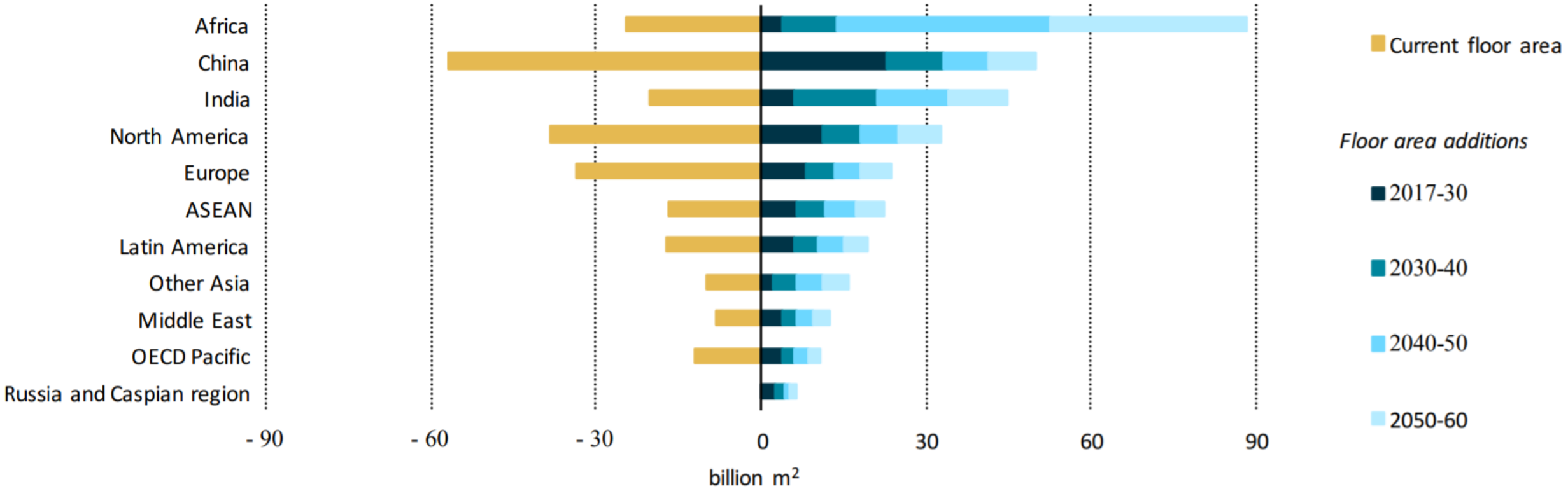
450 million Indians live in cities

More than the total population of the US

Source: United Nations DESA, Population Division (February, 2019), Census of india (2011), United Nations DESA, Population Division (February, 2019), GOI Estimate (May, 2018), Housing Conditions In Delhi (November, 2014) - Directorate of Economics and Statistics, https://ahmedabadcity.gov.in/portal/jsp/Static_pages/demographics.jsp

GROWTH OF INDIA'S BUILDING SECTOR FOOTPRINT

Floor area additions to 2060 by key regions

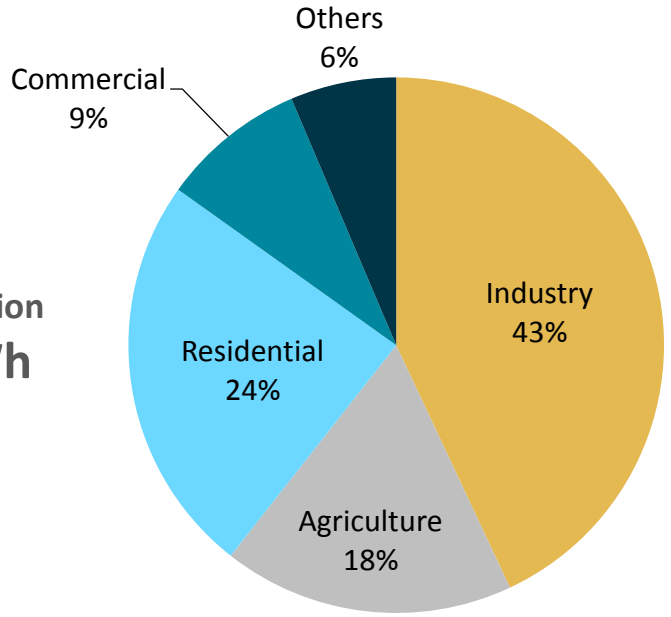


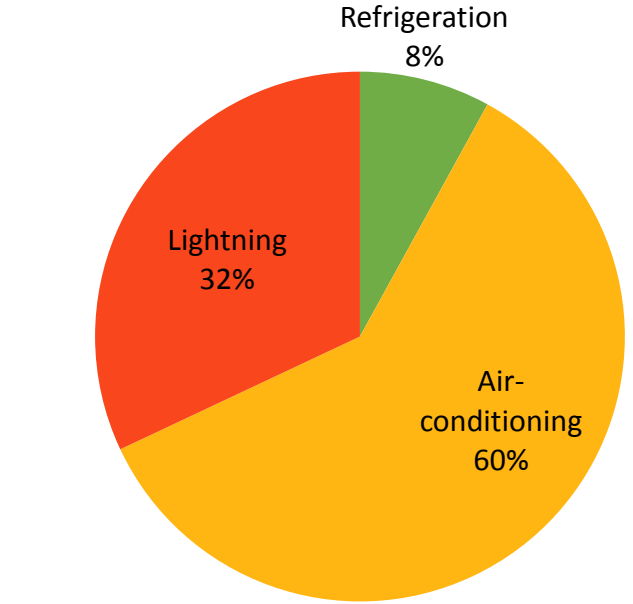
Source: : IEA (2017), Energy Technology Perspectives 2017, IEA/OECD, Paris, Global Status Report 2017 - World Green Building Council

ENERGY CONSUMPTION PATTERNS OF BUILDINGS

Electricity Consumption

2015 - 985 TWh

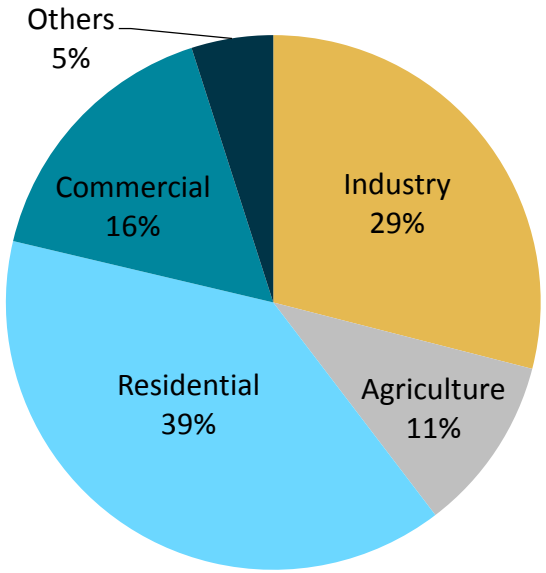


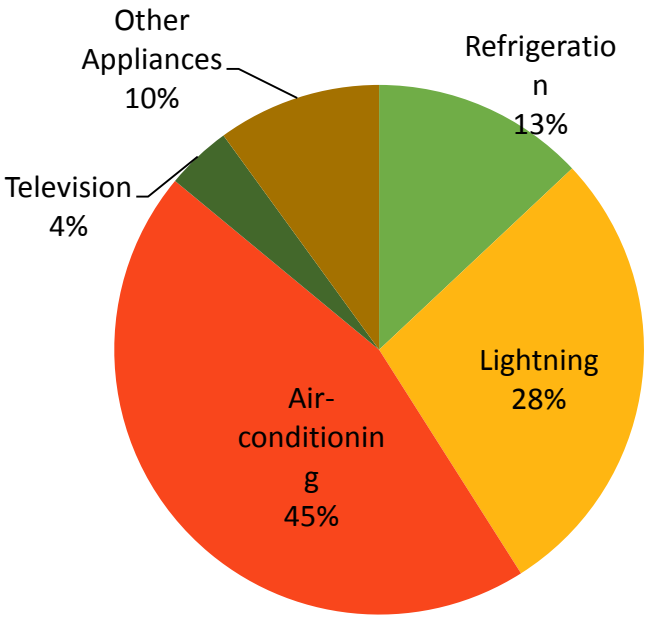


Typical **commercial building** estimated average electricity consumption

Electricity Consumption

2047 - 4711 TWh

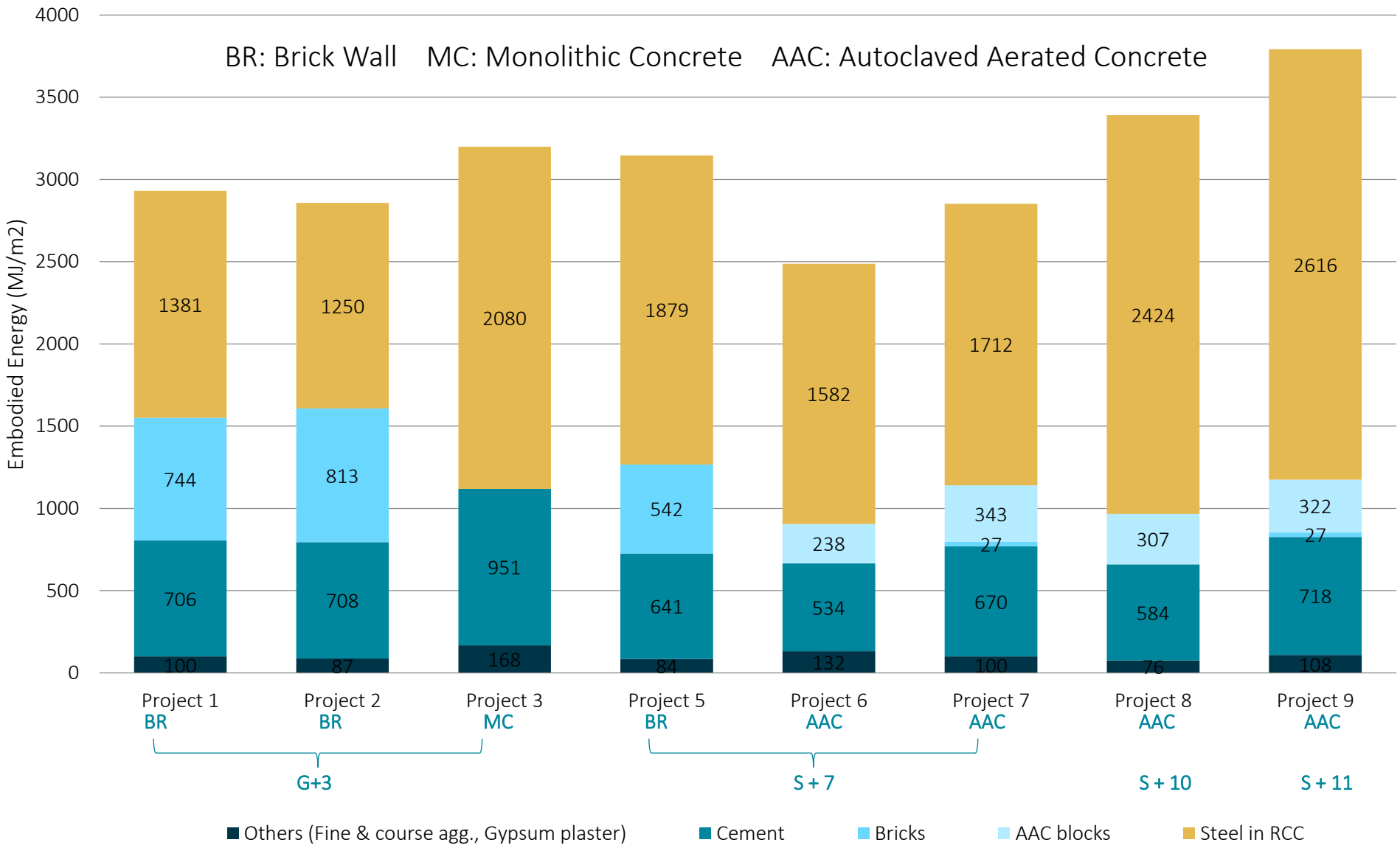




Typical **residential building** estimated average electricity consumption

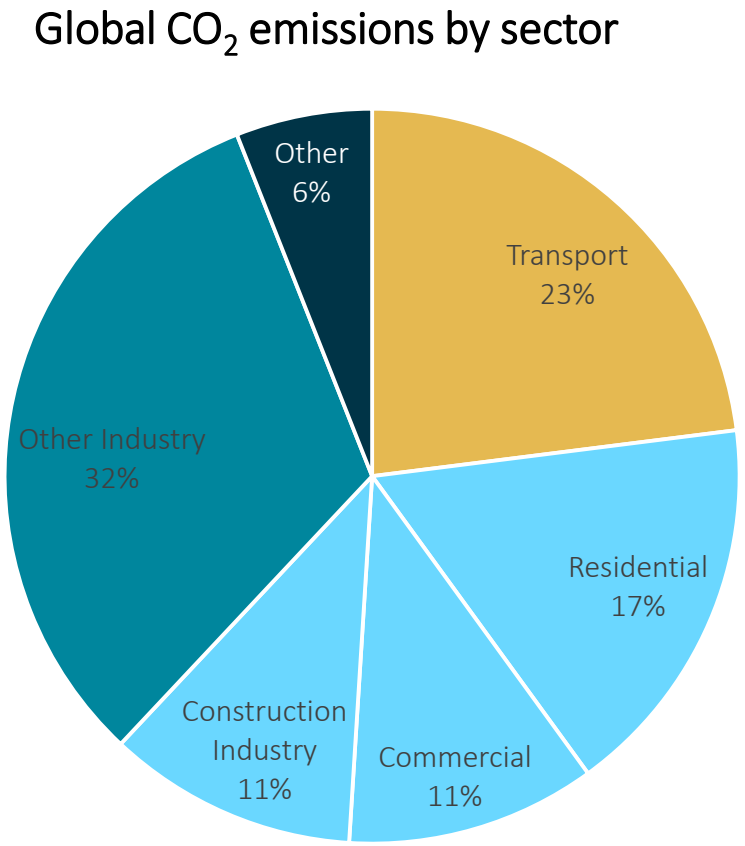
Source: NiITI Aayog IESS, BEE

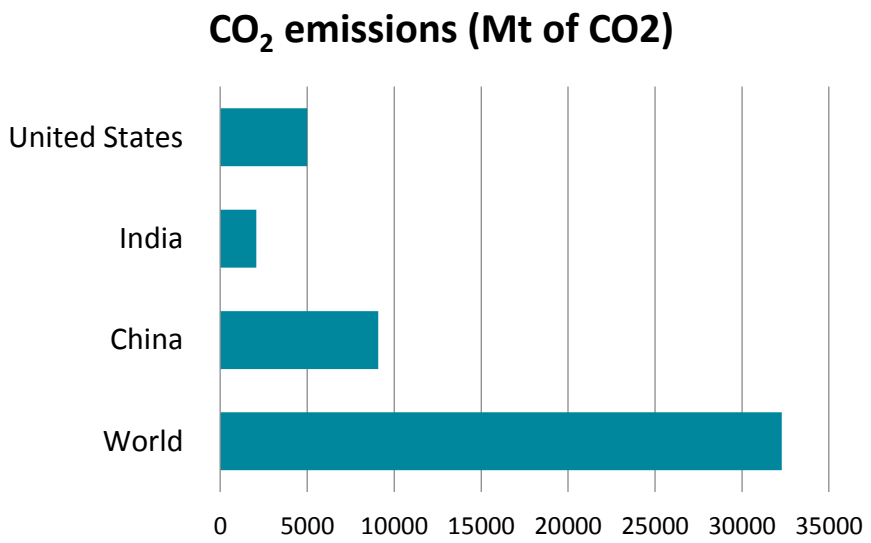
EMBODIED ENERGY PATTERNS FOR BUILDING MATERIALS

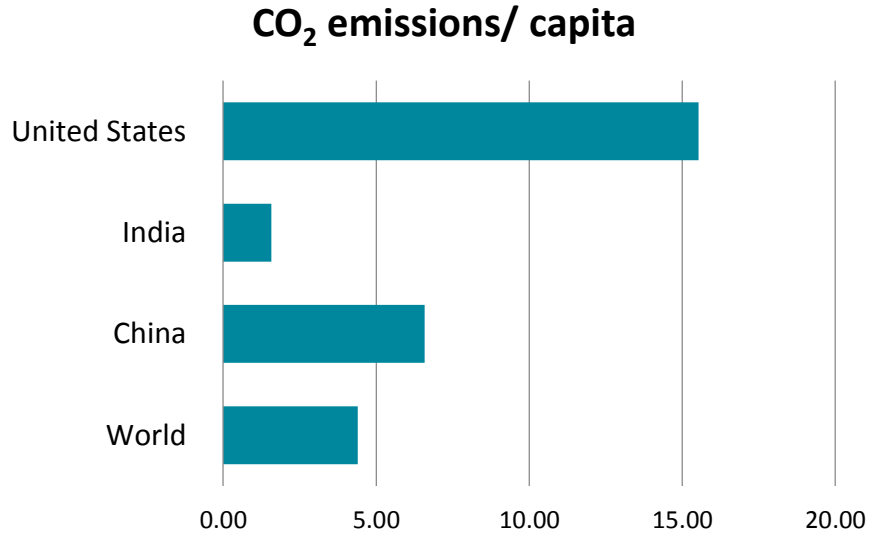


Source: Ashok B. Lall Architects, Greentech Knowledge Solutions Pvt. Ltd.

INDIA'S BUILDING SECTOR EMISSIONS







Source: Global Status Report 2018,

IMPACTS OF NON-GREEN BUILDINGS

Non-green buildings have major negative impacts !!!

Degradation of Natural Eco-systems

Source: iucn.org

Unhealthy Indoor Spaces & Rising Healthcare Costs

Source: World Bank

Scarcity of Resources & Higher Operational Costs

Source: telegraph.co.uk

KEY POLICIES & INTERVENTIONS FOR SCALING UP GREEN BUILDINGS

- **Expedited Permitting**
    - Fast Tracking of Environmental Clearance (EC) for green certified projects
- **Reduced Permitting**
    - Reduced GST on green certified projects & sustainable materials
- **Reduced stamp duty & Property Tax Incentive**
- **Height bonus or Extra FAR**
- **Green Building Legislation**
- **Grants**
- **Loan Programs**

IFC's GREEN BUILDING MARKET TRANSFORMATION STRATEGY

DEFINITION OF A GREEN BUILDING

BETTER
PERFORMANCE
THAN THE
LOCAL BASELINE

&

CERTIFIABLY GREEN
AS VERIFIED BY
AN INDEPENDENT
THIRD PARTY

&

QUANTIFIED
IMPACT REPORTING

HOW CAN YOU CHOOSE **THE MOST COST-EFFECTIVE OPTIONS** TO DESIGN GREEN? AND HOW WILL END USERS **RECOGNIZE THE VALUE?**

THE SOLUTION IS **EDGE**

① FREE SOFTWARE

② ACHIEVABLE STANDARD

20%

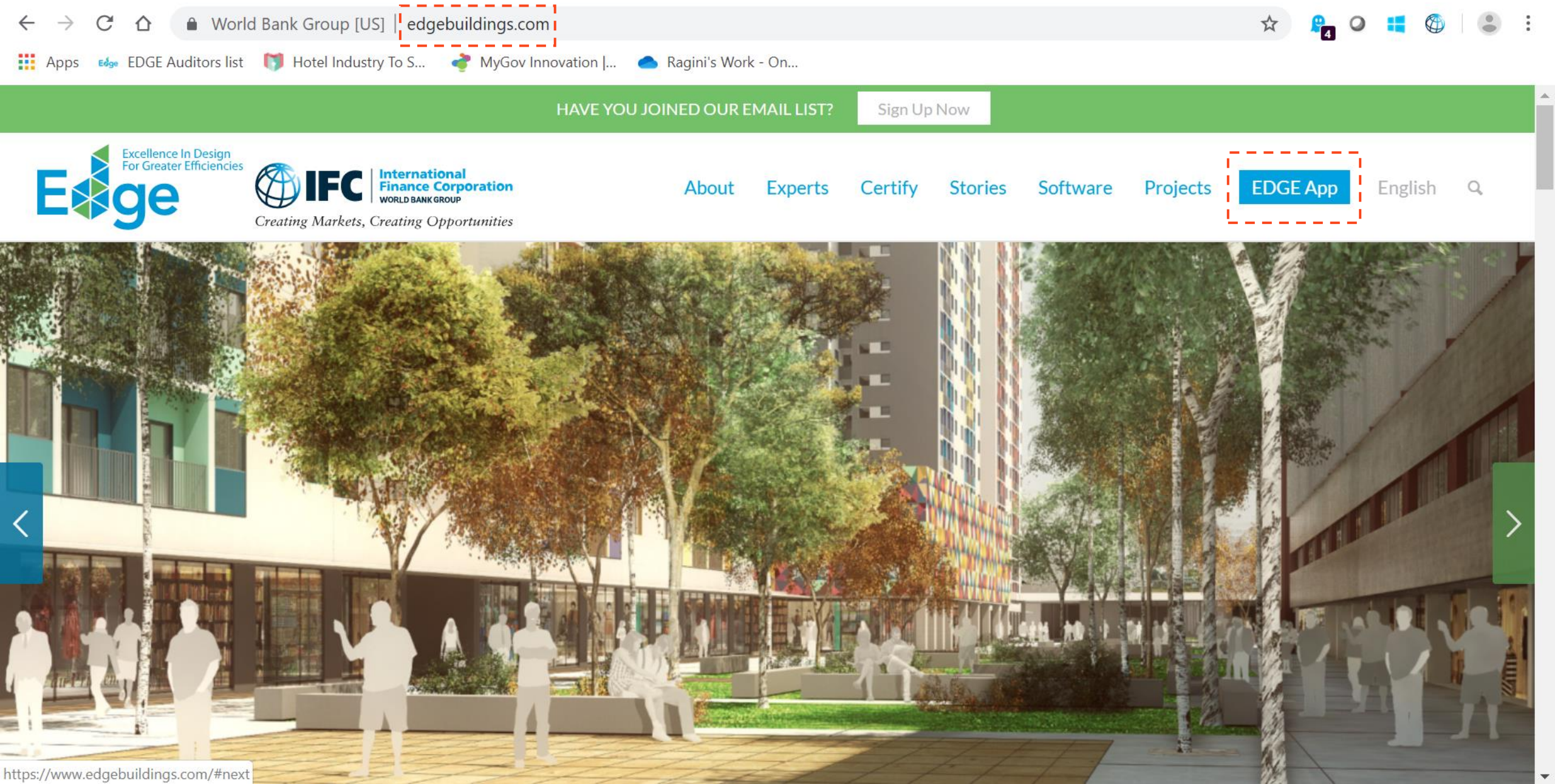
③ VERIFIED GREEN LABEL

THE **FREE SOFTWARE** SHOWS HOW TO CUT BACK ON THE RESOURCE INTENSITY OF A BUILDING'S DESIGN

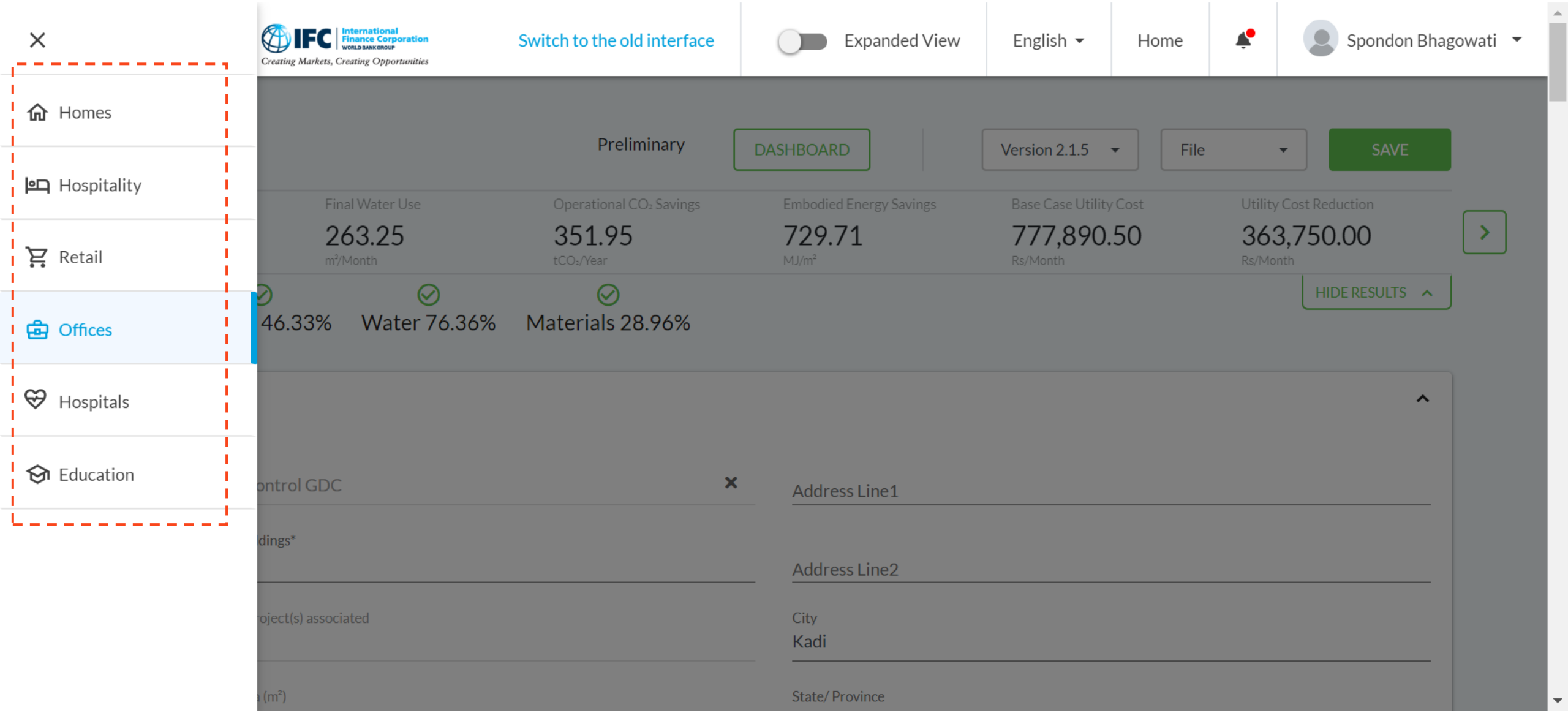
THE EDGE STANDARD FOCUSES ON THREE CATEGORIES OF **RESOURCE EFFICIENCY**

EDGE CERTIFICATION VERIFIES THE GREEN BENEFITS

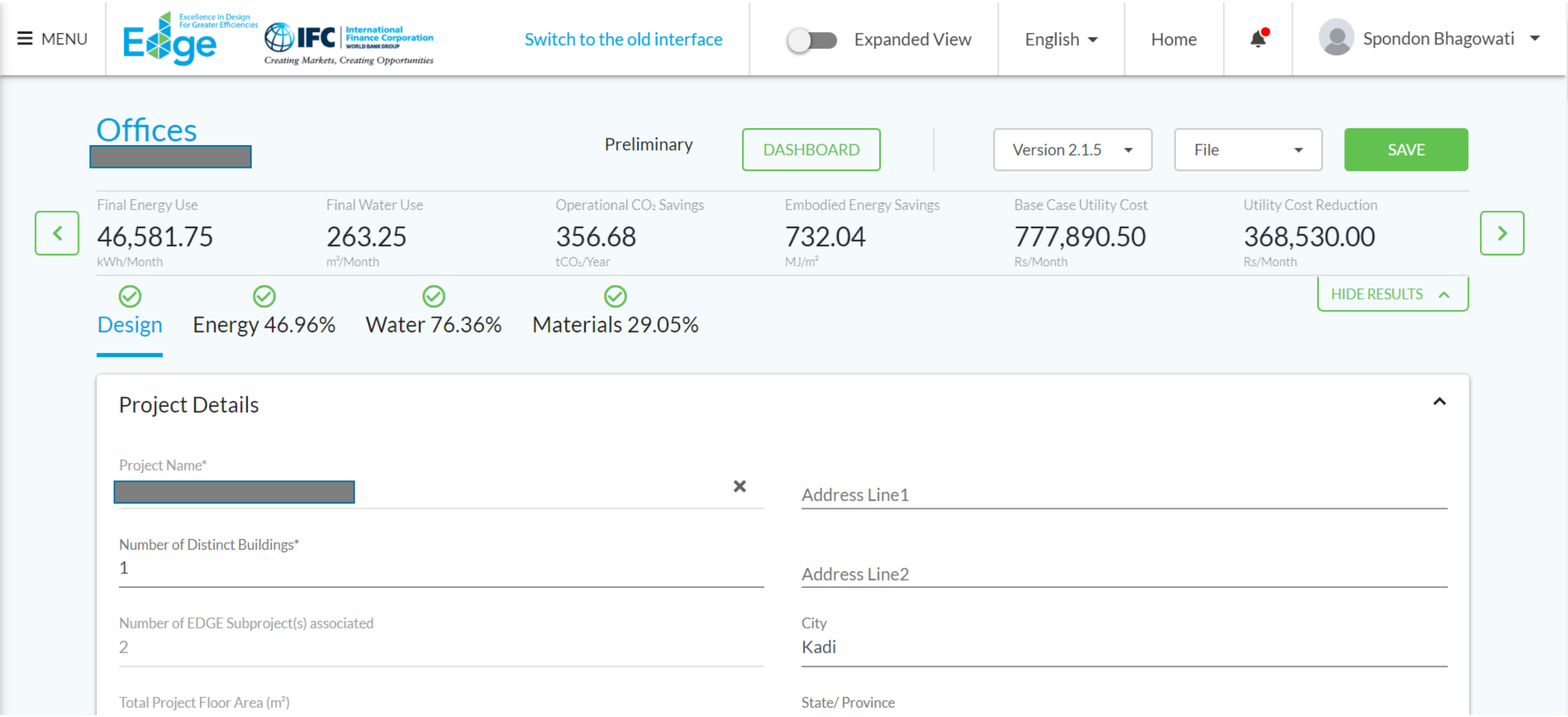
THE EDGE APP IS FREE & AVAILABLE ONLINE AT WWW.EDGEBUILDINGS.COM



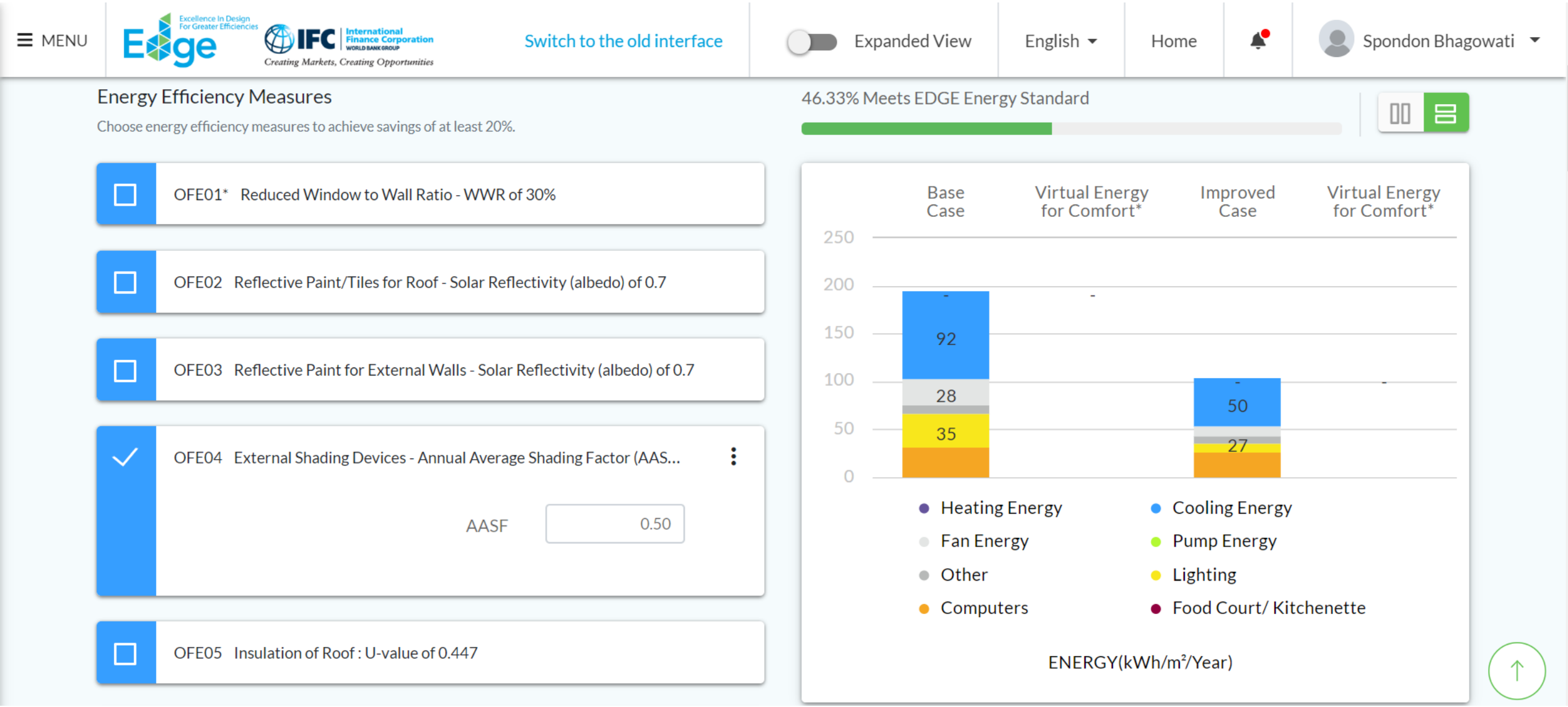
SIX BUILDING TYPOLOGIES MAY BE EVALUATED IN EDGE



USER FRIENDLY INTERFACE



ENERGY EFFICIENCY PARAMETERS



KEY ENERGY EFFICIENCY STRATEGIES FOR EDGE COMPLIANCE

- **Optimized Window to Wall Ratio (WWR)**
- **External shading devices for glazing**
- **High thermal performance glazing**
- **Reflective paints /tiles for roofs**
- **Energy-efficient lighting**
- **Lighting controls**
- **Renewable energy**

MATERIALS EFFICIENCY PARAMETERS

Materials Efficiency Measures

Choose building material options to achieve savings of at least 20%, indicating thickness.

28.96% Meets EDGE Material Standard

OFM01*

Floor Slabs

In-Situ Reinforced Concrete Slab

Thickness (mm)	Steel Rebar (kg/m²)
150	25

OFM02*

Roof Construction

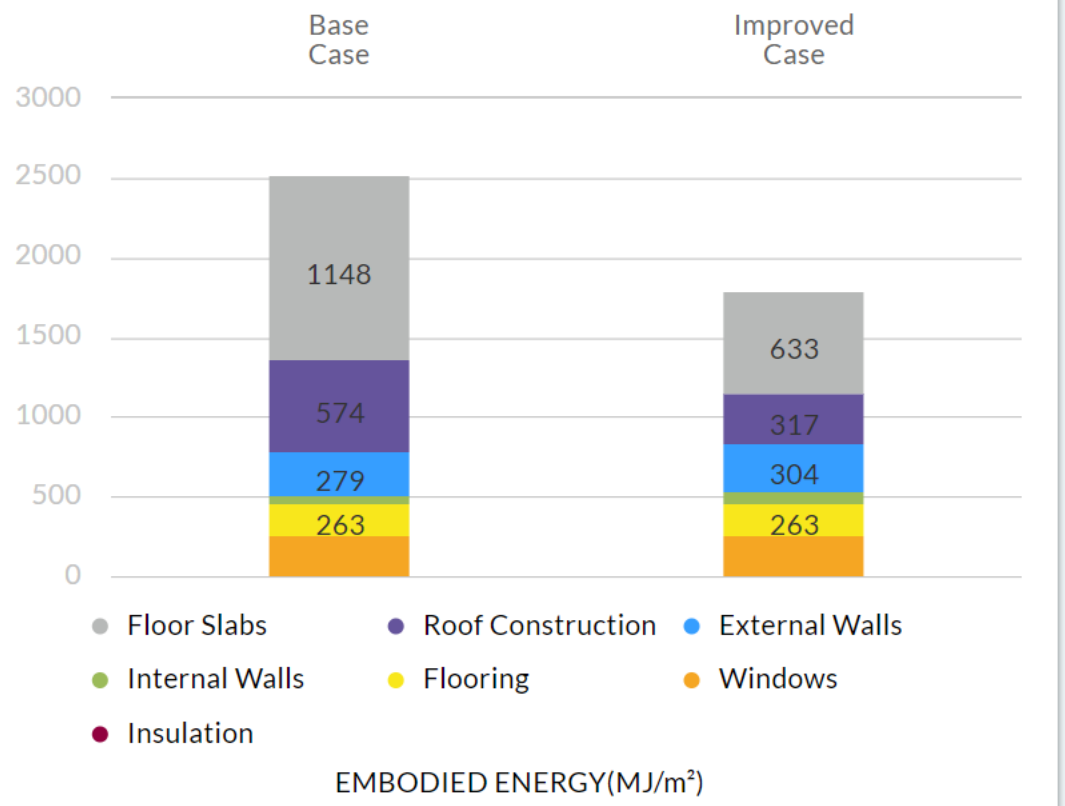
Type 1

In-Situ Reinforced Concrete Slab

Proportion %	Thickness (mm)	Steel Rebar (kg/m²)
100	150	25

External Walls

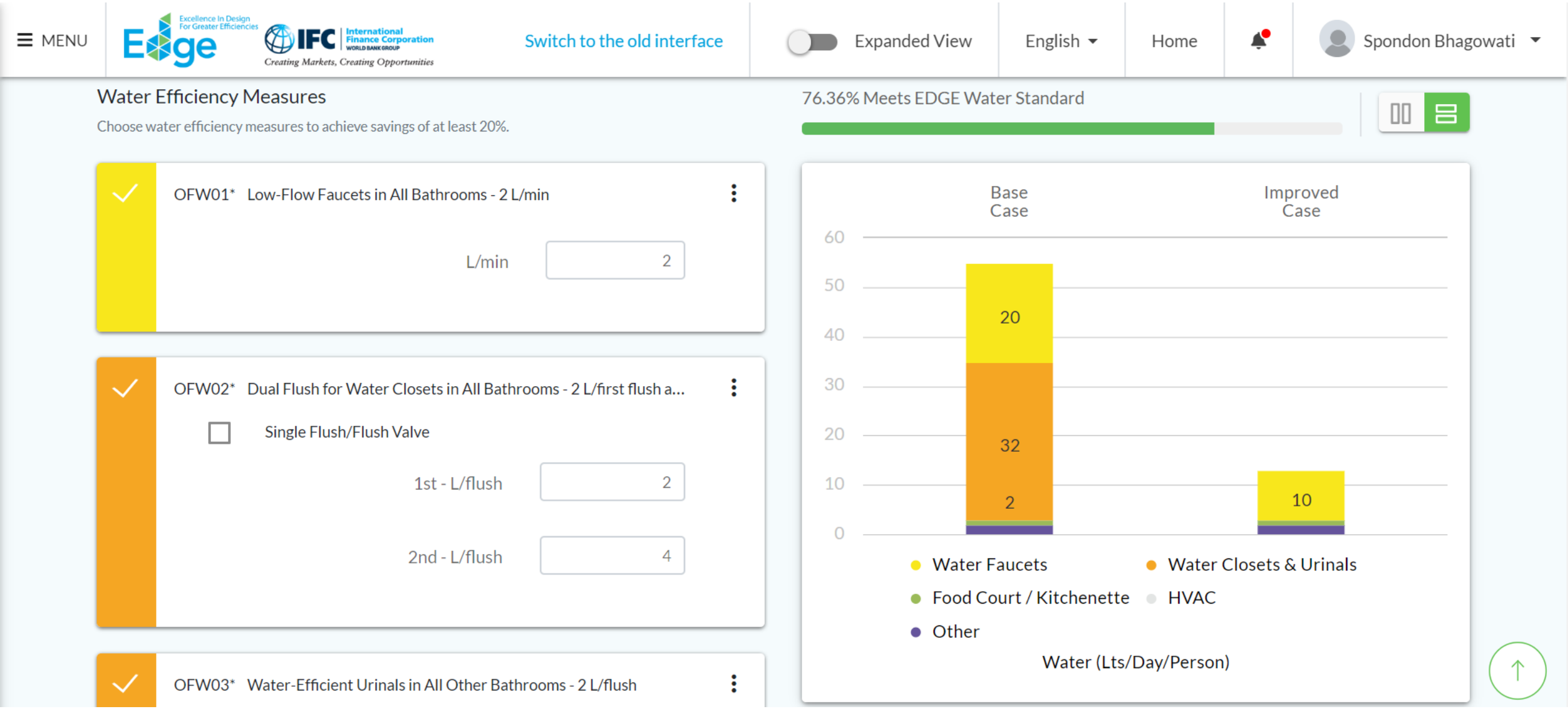
Type 1



KEY MATERIAL EFFICIENCY STRATEGIES FOR EDGE COMPLIANCE

- **Optimized RCC structure**
- **Materials containing recycled content**
- **Locally available materials**

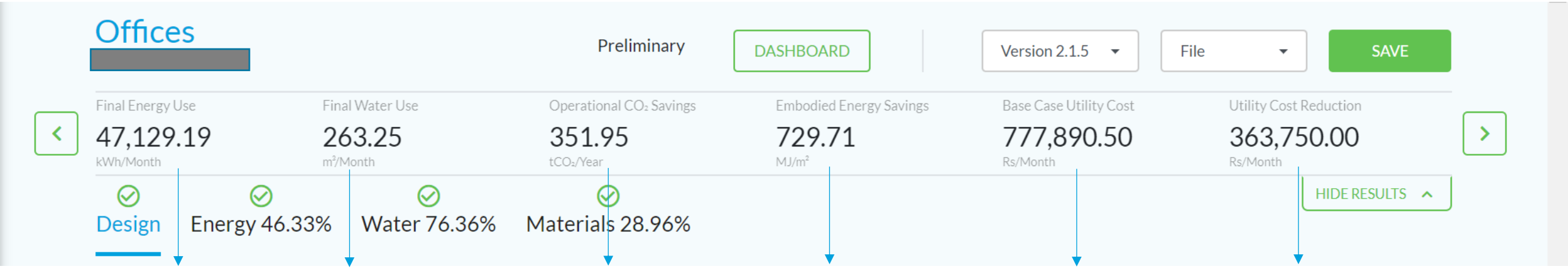
WATER EFFICIENCY PARAMETERS



KEY ENERGY EFFICIENCY STRATEGIES FOR EDGE COMPLIANCE

- **Low-flow taps and showers**
- **Dual-flush**
- **Recycling and Reuse of waste water for daily usage like flushing, landscaping etc.**
- **Rainwater harvesting and use**

OTHER RESULTS WHICH MAY BE DERIVED FROM THE EDGE TOOL



Final Energy Use

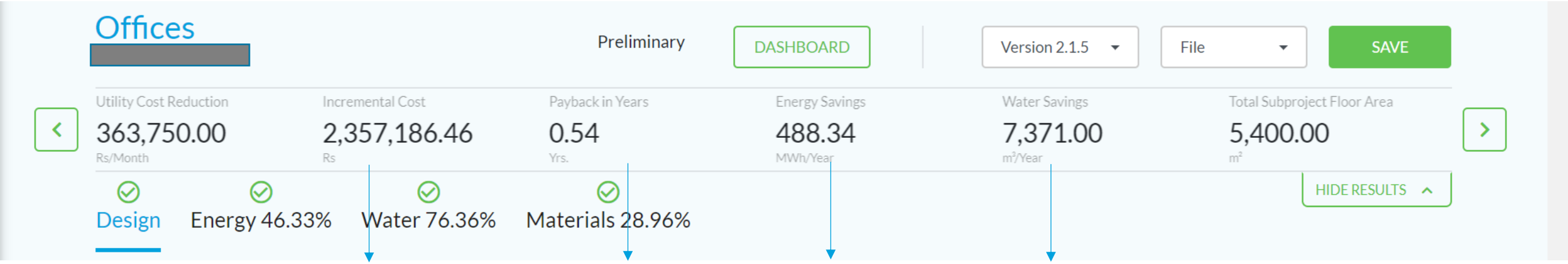
Final Water Use

Operational CO_2 savings

Embodied energy savings

Base Case Utility costs

Utility Cost Reduction



Incremental Cost

Payback in Years

Energy Savings

Water Savings

EACH CERTIFIED PROJECT RECEIVES A **PROJECT STUDY.**

~33% ENERGY SAVINGS

~29% WATER SAVINGS

~23% EMBODIED ENERGY SAVINGS

VBHC VAIBHAVA

GREEN MEASURES

- Reduced window to wall ratio
- Energy-efficient lighting & fans
- Reflective paints on the roof
- Low-flow fixtures
- Recycled black water for flushing
- Optimized RCC structure

EACH CERTIFIED PROJECT RECEIVES A **PROJECT STUDY.**

~21% ENERGY SAVINGS

~23% WATER SAVINGS

~30% EMBODIED ENERGY SAVINGS

SAMHI's Fairfield by Marriott

GREEN MEASURES

- Reduced window to wall ratio
- Low-E coated glass
- Energy-saving light bulbs
- Air conditioning with water cooled screw chiller
- Variable speed drives
- Dual flush water closets in all bathrooms
- Black water treatment and recycling system
- Optimized RCC structure
- Laminated wooden flooring

EACH CERTIFIED PROJECT RECEIVES A **PROJECT STUDY.**

27% ENERGY SAVINGS

26% WATER SAVINGS

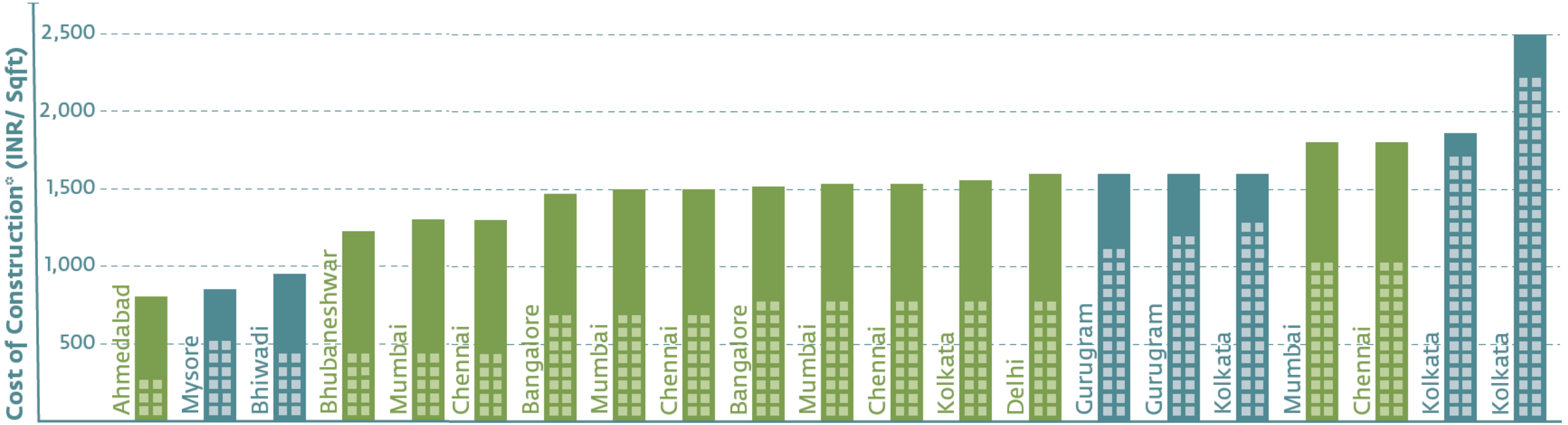
25% EMBODIED ENERGY SAVINGS

TPARK BANGPLEE 4, THAILAND

GREEN MEASURES

- Reduced window to wall ratio
- Low-E coated glass
- Energy-saving light bulbs
- Energy-efficient Air Conditioning systems
- Dual flush water closets in all bathrooms
- Black water treatment and recycling system

GREEN RESIDENTIAL BUILDINGS DO NOT COST MORE



Green Homes

Non-green Homes

Number of floors (2 windows represent 1 floor)

*Cost of construction does not include land acquisition or infrastructure costs

EDGE **DEMONSTRATION**

CERTIFICATION WORKFLOW FOR EDGE

Use the EDGE App for self-assessment & project registration

Submit design documents into the EDGE App

Submit as-built documents into the EDGE App

REGISTER → DESIGN → CONSTRUCTION → OPERATION

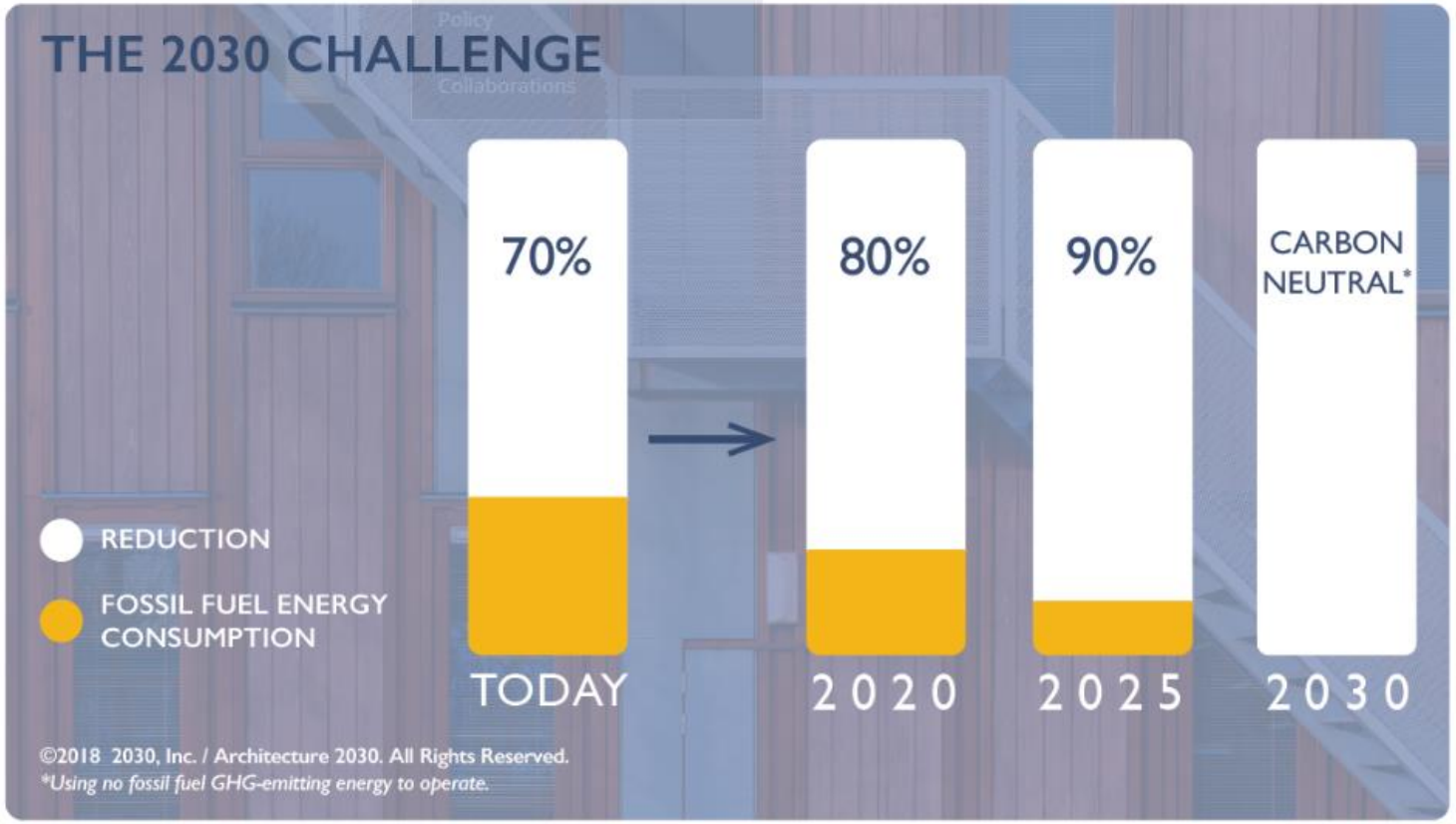
PRELIMINARY EDGE CERTIFICATE

- EDGE co-marketing and project study for sales promotion
- Preliminary Certificate serves as **proof of compliance** for the investor

FINAL EDGE CERTIFICATION

- Final proof of compliance
- Impact reporting for the project
- Model unit showcase opportunity

EDGE IS A JOURNEY TOWARD NET ZERO CARBON

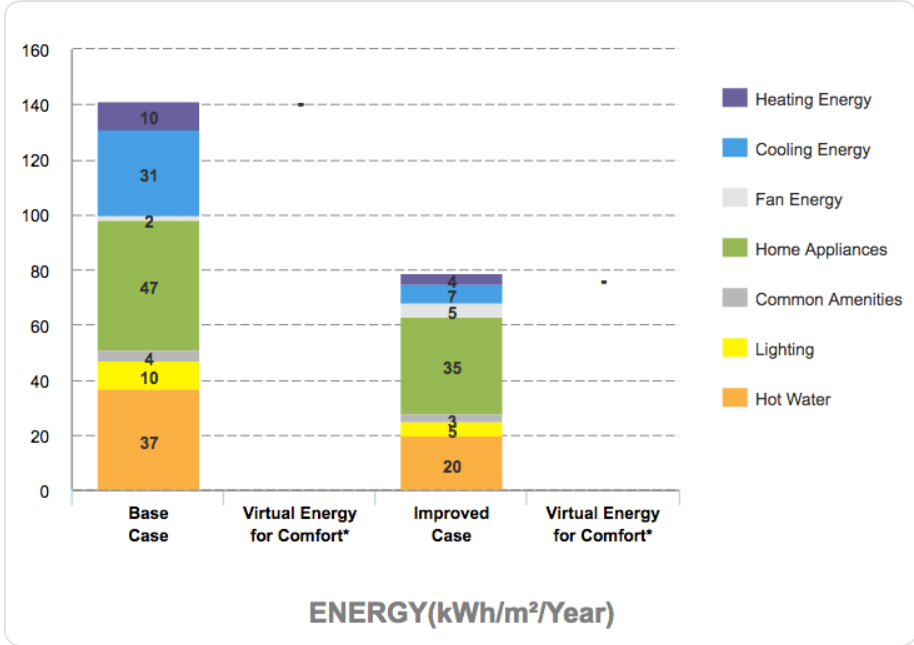


architecture 2030

Excellence In Design For Greater Efficiencies

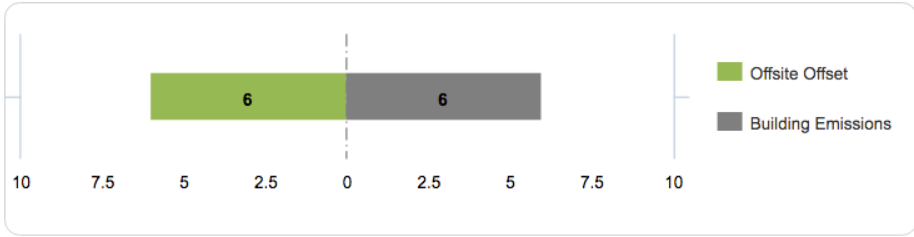
Edge

45.65% Meets EDGE Energy Standard



Show the Carbon Savings

0.00 tCO_2/Year **Meets Zero Net Carbon Standard**



HOW EDGE IS UNIQUE

FINANCIAL CALCULATOR

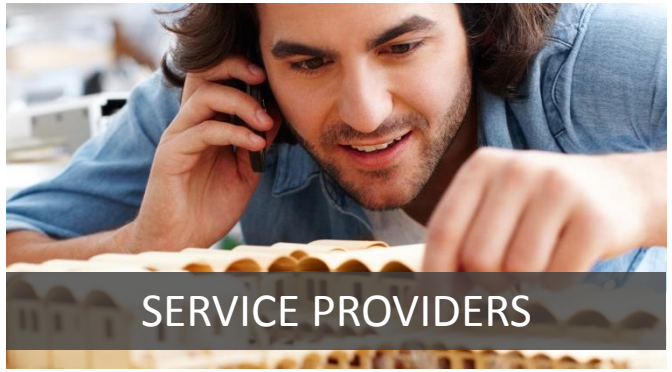
EASY IMPACT REPORTING

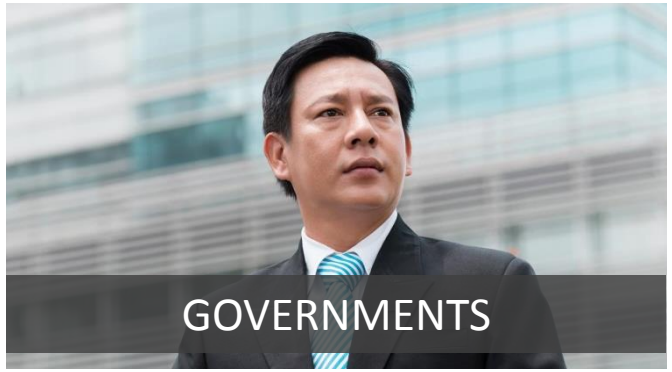
SIMPLIFIED COMPLIANCE

COST-EFFECTIVE

REDUCED PROCESSING

WORLD BANK GROUP BRAND





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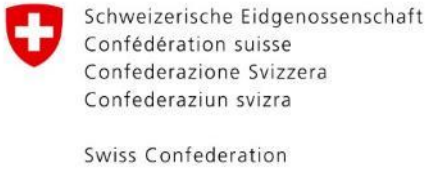
GREEN BUILDINGS
FOR A SMARTER WORLD

EDGE ACKNOWLEDGMENTS

The following major donors have demonstrated their generous support of the EDGE program:



Federal Department of Economic Affairs,
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State Secretariat for Economic Affairs SECO

IFC also wishes to express its appreciation to the following donors:

The European Union; the Ministry of Finance of Japan; the Hungarian Export Import Bank; the Canada Climate Change Program and the Department of Foreign Affairs, Trade and Development Canada; the Royal Ministry of Foreign Affairs of Denmark and the Danish Green Growth Fund; the Federal Ministry of Finance of Austria; and the Ministry of Foreign Affairs of Finland. In addition, the support of the GEF-IFC Earth Fund Platform and the Energy Sector Management Assistance Program (ESMAP) of the World Bank helped seed EDGE.


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Edge