

SAARC ENERGY CENTER WEBINAR: PROMOTING ENERGY EFFICIENT BUILDINGS IN SAARC REGION USING EDGE GREEN BUILDING RATING SYSTEM

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Scheme of Presentation

1. Sustainability in Buildings
 2. Green Building Rating Systems
 3. Introduction to EDGE
 4. Energy Efficiency Features in EDGE
 5. EDGE Methodology
 6. EDGE Projects – Case Studies
 7. Steps for EDGE Certification of Projects
 8. EDGE Expert & EDGE Auditor Training
 9. EDGE App Interface
 10. Q & A Session
- 5 minutes
- 20 minutes
- 5 minutes
- 5 minutes
- 05 minutes

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- } 5 minutes
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Green Buildings & Sustainability

Sustainability & Sustainable Buildings (3 Ps)

- **PLANET**

- Efficient Use of Resources e.g. Energy, Water and lesser GHG emissions

- **PEOPLE**

- Human Comfort e.g. sufficient lighting , air temp, humidity etc.

- **PROFIT**

- low utility bills and lower life cycle costs



Green Building Rating Systems



USGBC / GBCI Rating Systems



© 2018 Green Business Certification

LEED
WELL
PEER
GRESB
SITES
EDGE
PARKSMART
TRUE
ICP

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EDGE by IFC, World Bank

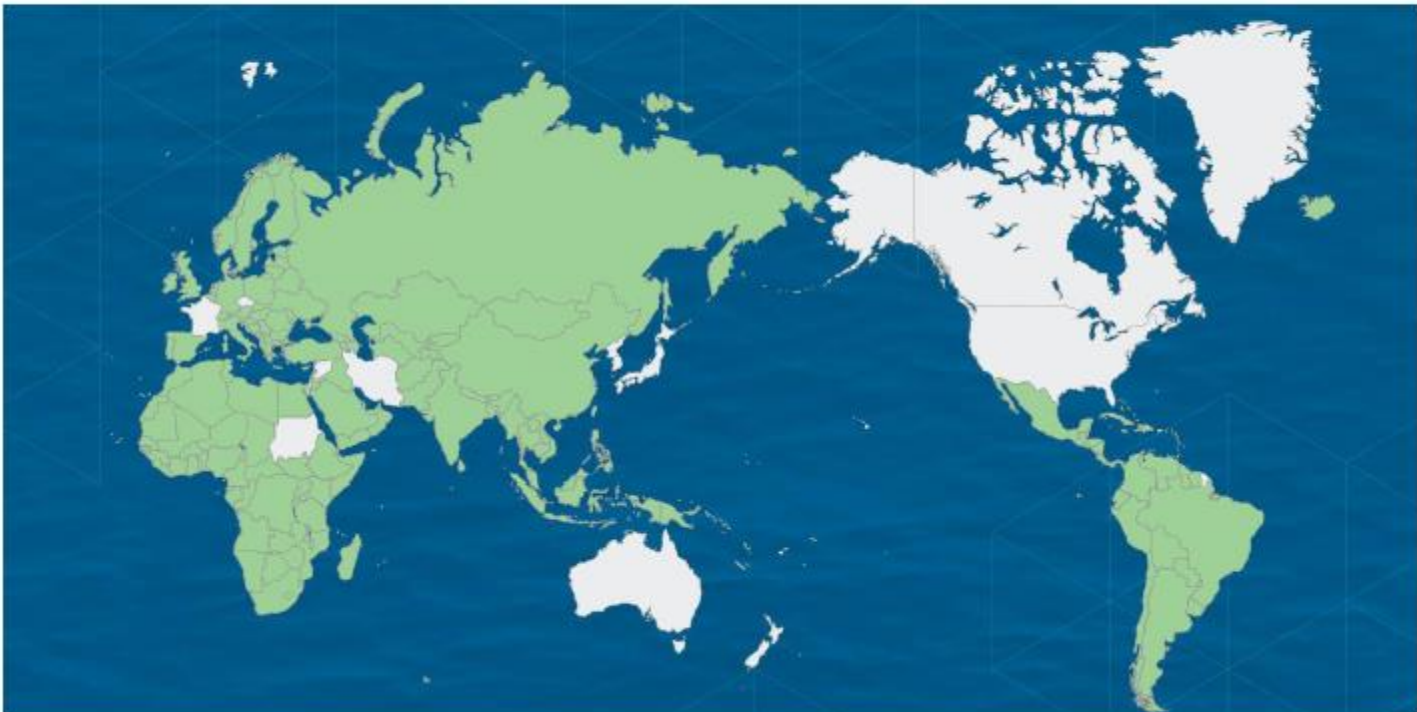
A resource efficiency certification system for **new and existing buildings** in emerging markets.

EDGE software reveals technical solutions for going green and captures **capital costs and projected operational savings**.

EDGE software can be used by all building professionals.

EDGE Markets

EDGE IS AVAILABLE IN MORE THAN 160 COUNTRIES AND GROWING



EDGE – An Integrated Approach

Assessment Tool



www.edgebuildings.com

- Free to use
- Simple interface
- Global tool

Global Standard



20% improvement

- Water, energy & embodied energy
- Typical construction practice as baseline

Certification System



Validation

- Certification after Design audit and Construction audit
- Simplified auditing

EDGE: A Building Design Tool



www.edgebuildings.com

- Localized for utility costs, climate etc.
- Design-specific results using building physics calculations
- Design Guidance on multiple technical measures
- Investment planning for building owners

EDGE Standard

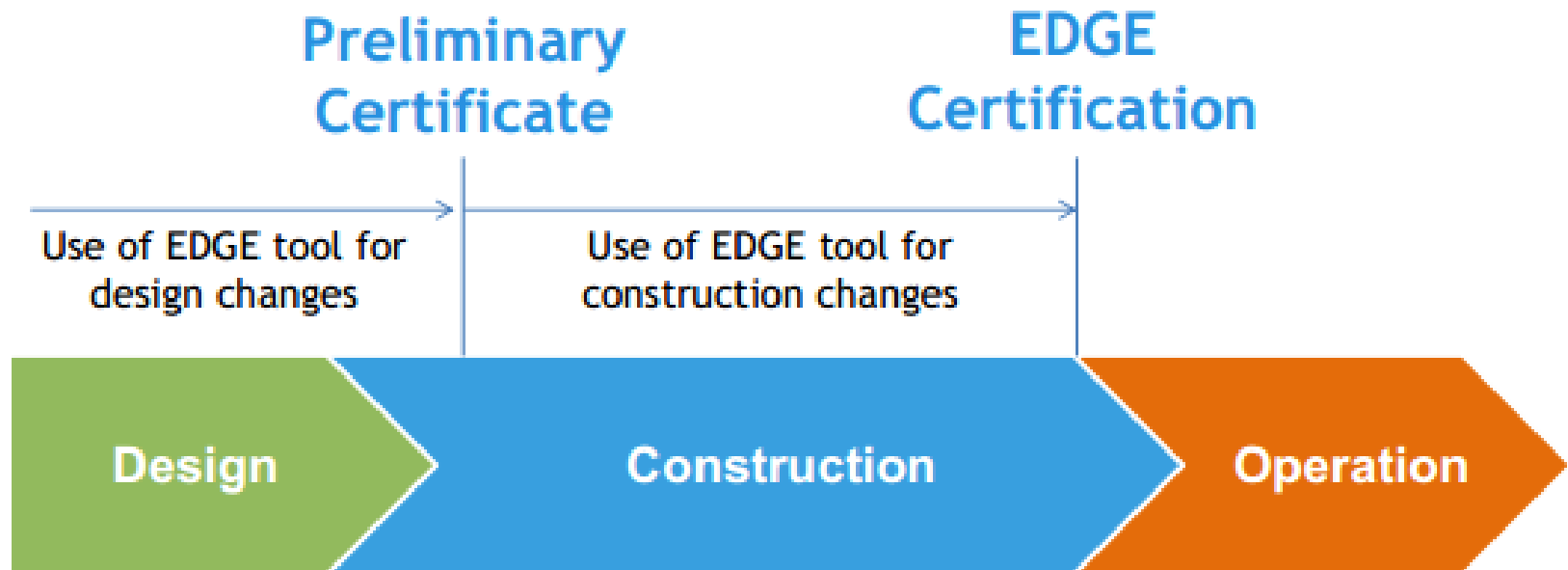


'A building that has **20% less energy, water and material consumption** compared to an equivalent local benchmark.'

EDGE Advance: 40% Savings in Energy (by Energy Efficiency)

EDGE Zero Carbon: EDGE Advance + Onsite / Offsite RE + Carbon Offset

EDGE Certification Cycle



EDGE Projects Types

- Conditioned (heated or cooled) or naturally ventilated structure
- 1 or more FTE occupant
- At least 200 SQM (50 SQM minimum for single family homes)



Homes



Retail



Hotels



Offices



Hospitals



Education



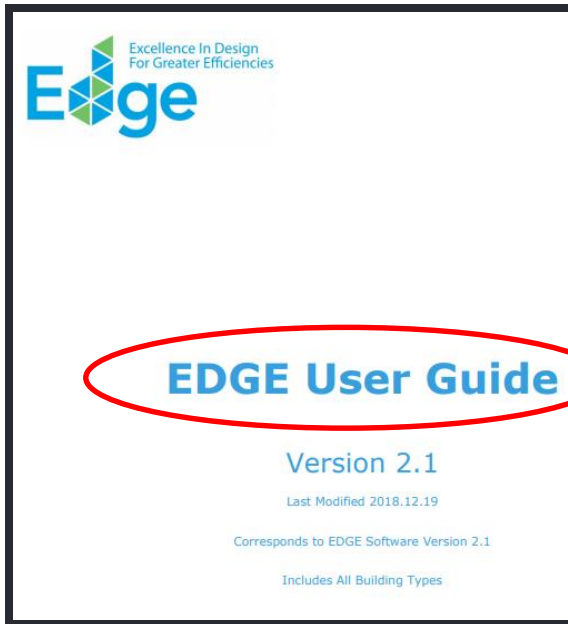
- ✓ New construction
- ✓ Core and Shell

- ✓ Retrofits
- ✓ Existing Buildings

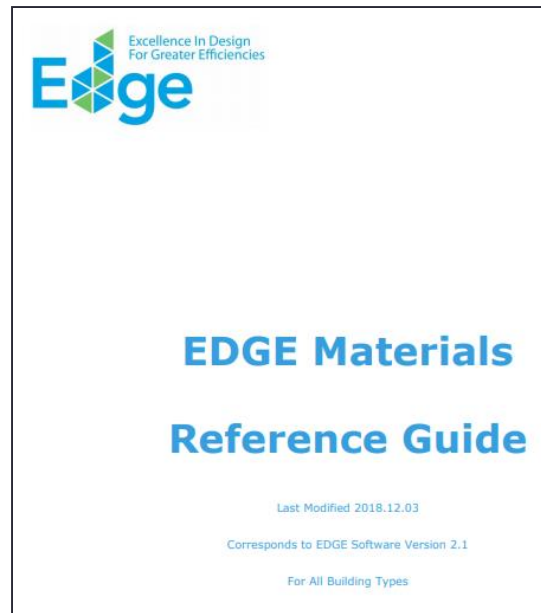
Unique Benefits of Learning EDGE

- Fundamentals of Green Buildings
- Free of Cost Resources
- Most Suitable Rating System for Developing Countries
- Gaining experience with GBCI family of certifications
- Internationally Recognized Professional Credentials
 - EDGE Expert
 - EDGE Auditor
- Expanding expertise to other Rating Systems
 - LEED
 - Living Building Challenge
 - BREEM
 - WELL
 - DGNB

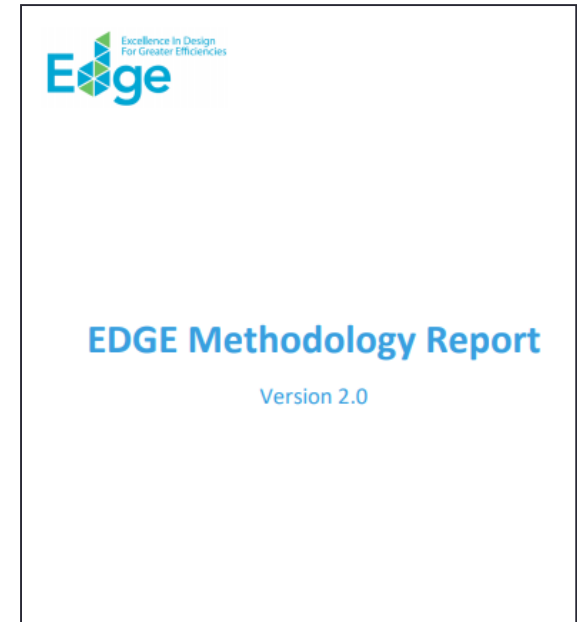
EDGE Primary Resources



288 Pages

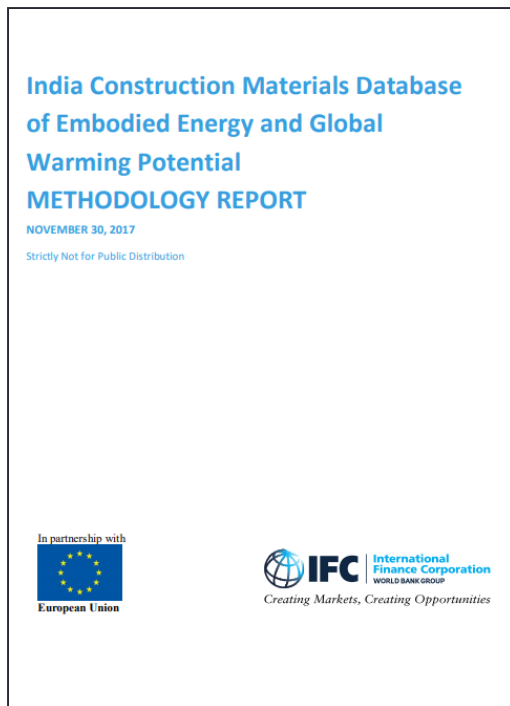


160 Pages

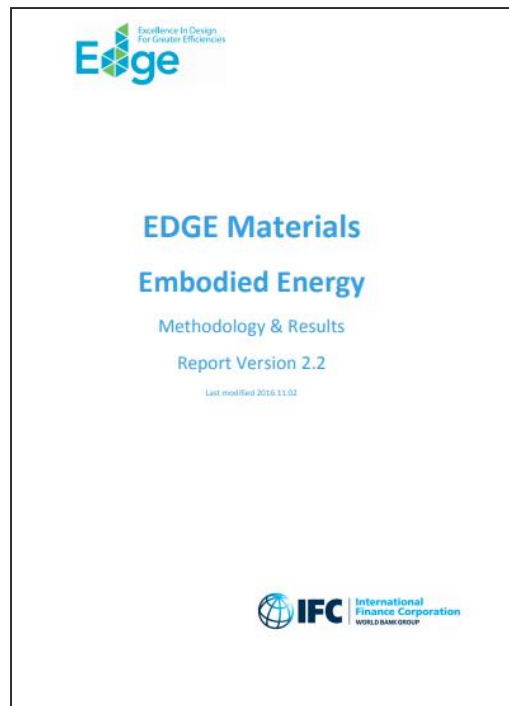


10 Pages

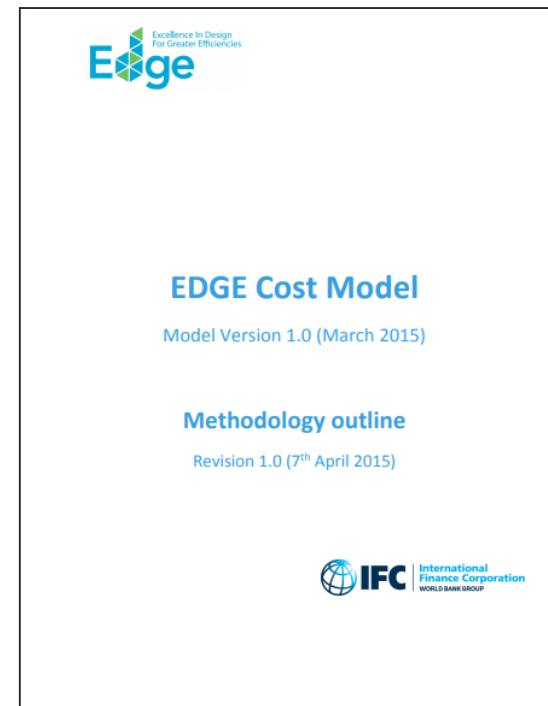
EDGE Reference Resources



100 Pages



42 Pages



15 Pages

Energy Efficiency Measures in EDGE

- A. Building Envelope
- B. HVAC
- C. Water Heating
- D. Lighting / Misc.
- E. Renewable Energy

Energy Efficiency Measures in EDGE Building Envelope

1. Reduced Window to Wall Ratio
2. External Shading Devices
3. Reflective Paint / Tiles for Roof
4. Reflective Paint for External Walls
5. Insulation of Roof
6. Insulation of External Walls
7. Low-E-Coated Glass
8. High Thermal Performance Glass

Energy Efficiency Measures in EDGE HVAC

- 9. Natural Ventilation
- 10. Ceiling Fans
- 11. Air Conditioning System
- 12. Air Conditioning with Air Cooled Chiller
- 13. Air Conditioning with Water Cooled Chiller
- 14. VRF Cooling System
- 15. Absorption Chiller Powered by Waste Heat
- 16. Air Economizer During Favorable Outdoor Conditioner

Energy Efficiency Measures in EDGE HVAC

- 17. CO2 Sensor / Controlled Ventilation for Fresh Air Intake
- 18. Earth Air Tunnel System to Pre-Cond Supply Air Intake
- 19. Variable Speed Drives on the Fans on Cooling Towers
- 20. VSF or VFD in AHUs
- 21. Variable Speed Drive Pumps
- 22. Ground Source Heat Pumps
- 23. Radiant Heating and Cooling System
- 24. Sensible Heat Recovery from Exhaust Air

Energy Efficiency Measures in EDGE Water Heating

- 25. High Efficiency Condensing Boiler for water Heating
- 26. Recovery of Waste Heat from Generator for water Heating
- 27. High Efficiency Boiler for Water Heating
- 28. Heat Pump for Hot Water

- 29. Preheat Water Using Waste Heat from the Generator
- 30. Heat Recovery from Grey Water
- 31. Heat Recovery from Laundry Waste Water

Energy Efficiency Measures in EDGE Lighting / Misc.

- 32. Energy Saving Light Bulbs
- 33. Lighting Controls
- 34. Skylight(s) to Provide Daylight to 50% of Top Floor Area
- 35. Variable Speed Hoods with Automated Fan Controls
- 36. Energy Efficient Refrig. and Clothes Washing Machines
- 37. Higher Efficiency Refrigerated Cases
- 38. Smart Meters

Energy Efficiency Measures in EDGE Renewable Energy

- 39. Solar Hot Water Collectors
- 40. Solar Photovoltaics
- 41. Other Renewable Energy for Electricity Generation
- 42. Offsite Renewable Energy Procurement
- 43. Carbon Offset

EDGE – Water Efficiency

1. Low Flow Showerheads
2. Low Flow Faucets for Washbasins
3. Water Efficient Water Closets
4. Water Efficient Urinals
5. Water Efficient Kitchen Faucets
6. Low Flow Pre-Rinse Spray Valves for Dishwasher
7. Water Efficient Dishwashers
8. Water Efficient Front-Loading Washing Machines
9. Laundry Rinse Water Reclamation System
10. Condensate Water Recovery System
11. Water Efficient Landscaping

EDGE – Water Efficiency

- 12. Swimming Pool Cover
- 13. Rainwater Harvesting System
- 14. Grey Water Treatment and Recycling System
- 15. Black Water Treatment and Recycling System

EDGE – Embodied Energy / Materials

1. Floor Slabs
2. Roof Construction
3. External Walls
4. Internal Walls
5. Flooring
6. Window Frames
7. Insulation
8. Insulation

EDGE Methodology

EDGE calculations are based on the following:

1. Climatic conditions of the location

- Monthly average wet and dry bulb temperature
- Monthly average outdoor wind velocity
- Monthly average outdoor humidity
- Solar radiation intensity
- Annual average rainfall
- Carbon dioxide intensity of the electricity grid
- Average cost of energy (by fuel type) and water

2. Building type and occupant use (refer to Methodology Report)

3. Design and specifications

- Base Case vs. Improved Case
- **Baseline Assumptions**

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Greenox Residence, Istanbul, Turkey



Water

- Low-flow showerheads
- low-flow faucets for kitchens and bathrooms
- dual-flush water closets.

Materials

- Concrete filler slabs for floors and roofs and
- cored bricks with plaster on both sides for internal and external walls.



35%

Energy Savings*



42%

Water Savings



41%

Less Embodied Energy in Materials

Energy

- Reduced window to wall ratio
- Reflective paint for external walls
- Insulated roof and external walls
- Low-E coated glass
- Variable refrigerant volume (VRV) cooling system
- High-efficiency boilers for heating and hot water
- Energy-saving lighting and lighting controls for common areas and outdoors.

FINSA office, Aguascalientes, New Mexico



Water

- Dual-flush water closets
- Low-flow faucets in bathrooms
- Water-efficient faucets for kitchen sinks.

Materials

- In-situ reinforced concrete for the floor
- concrete filler slab with polystyrene blocks for the roof
- Cored bricks with plaster for internal and external walls
- Precast concrete panels for external walls,
- Finished concrete and nylon carpets for the flooring.



45%

Energy Savings*



35%

Water Savings



52%

Less Embodied Energy in Materials

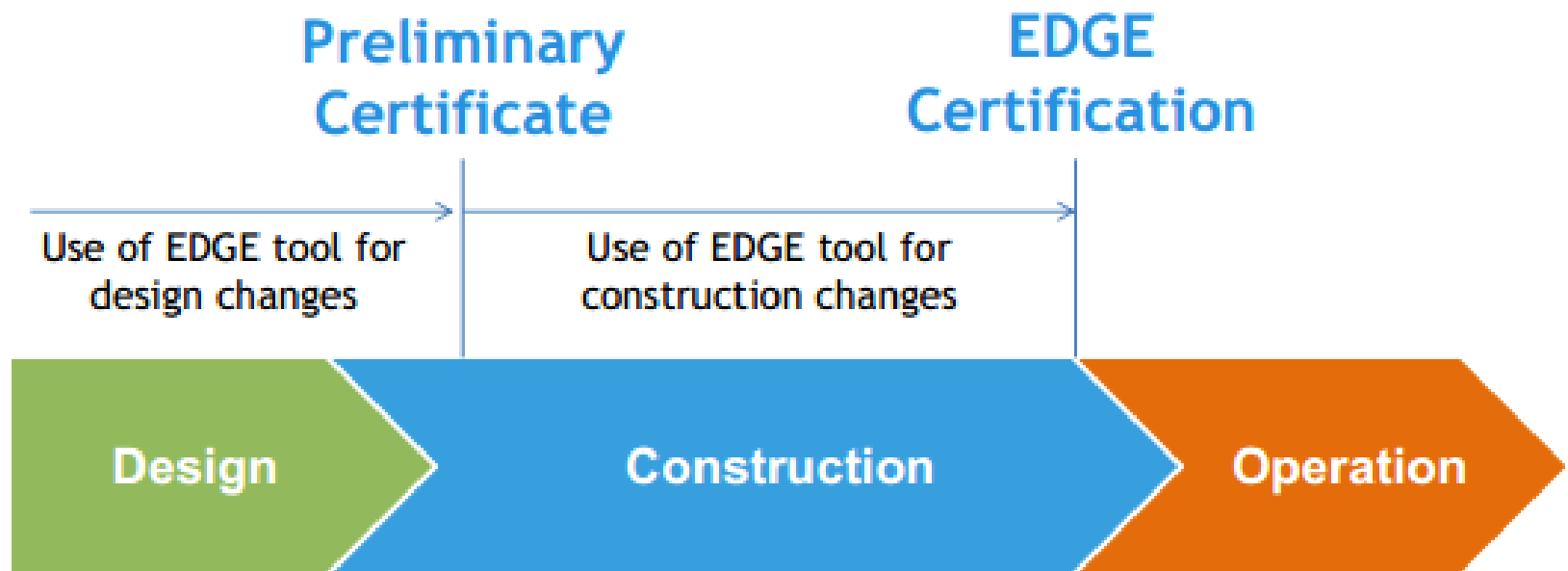
Energy

- Reduced window to wall ratio
- Reflective paint/tiles for the roof
- External shading devices
- Low-E coated glass, a variable
- Refrigerant volume (VRV) cooling system
- Energy-saving lighting in internal and external spaces
- Occupancy sensors in bathrooms
- Conference rooms and closed cabins.

EDGE Expert & EDGE Auditor Training

- EDGE Expert Training (GBCI & ThinkStep-SGS)
 - Fee: 150USD
 - On-Demand videos (recorded)
 - Live stream, Online
 - Face to Face, In-person
- EDGE Expert Exam (Prometric Exam Center)
 - Optional Practice Exam (30 USD)
 - Online Exam (100 USD)
- EDGE Auditor Training (399 USD, 150 USD annual)
- Separate for both GBCI & ThinkStep-SGS
- **EDGE Expert & EDGE Auditor credentials: Valid Worldwide**

Steps for EDGE Certification of Projects



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EDGE APP

World Bank Group [US] <https://app.edgebuildings.com/project/homes>

Edge Excellence in Design For Greater Efficiencies IFC International Finance Corporation world bank group Creating Markets, Creating Opportunities

Expanded View English Homepage Sign In

Homes

DASHBOARD

VERSION 2.1.5 FILE SAVE

Final Energy Use	Final Water Use	Base Case Utility Cost	Utility Cost Reduction	Incremental Cost	Payback in Years
932.19 kWh/Month/Unit	22.45 kL/Month/Unit	1,988.73 ZAR/Month/Unit	- ZAR/Month/Unit	- ZAR/Unit	NA Yrs.

HIDE RESULTS

Design Energy 0.00% Water 0.00% Materials 0.00%

Project Details

Subproject Details

Location Data

Country
South Africa

City
Bloemfontein

Income Category
High



EDGE APP | World Bank Group [US] | https://app.edgebuildings.com/project/homes

Edge | IFC International Finance Corporation | Expanded View | English | Homepage | Sign In

Homes

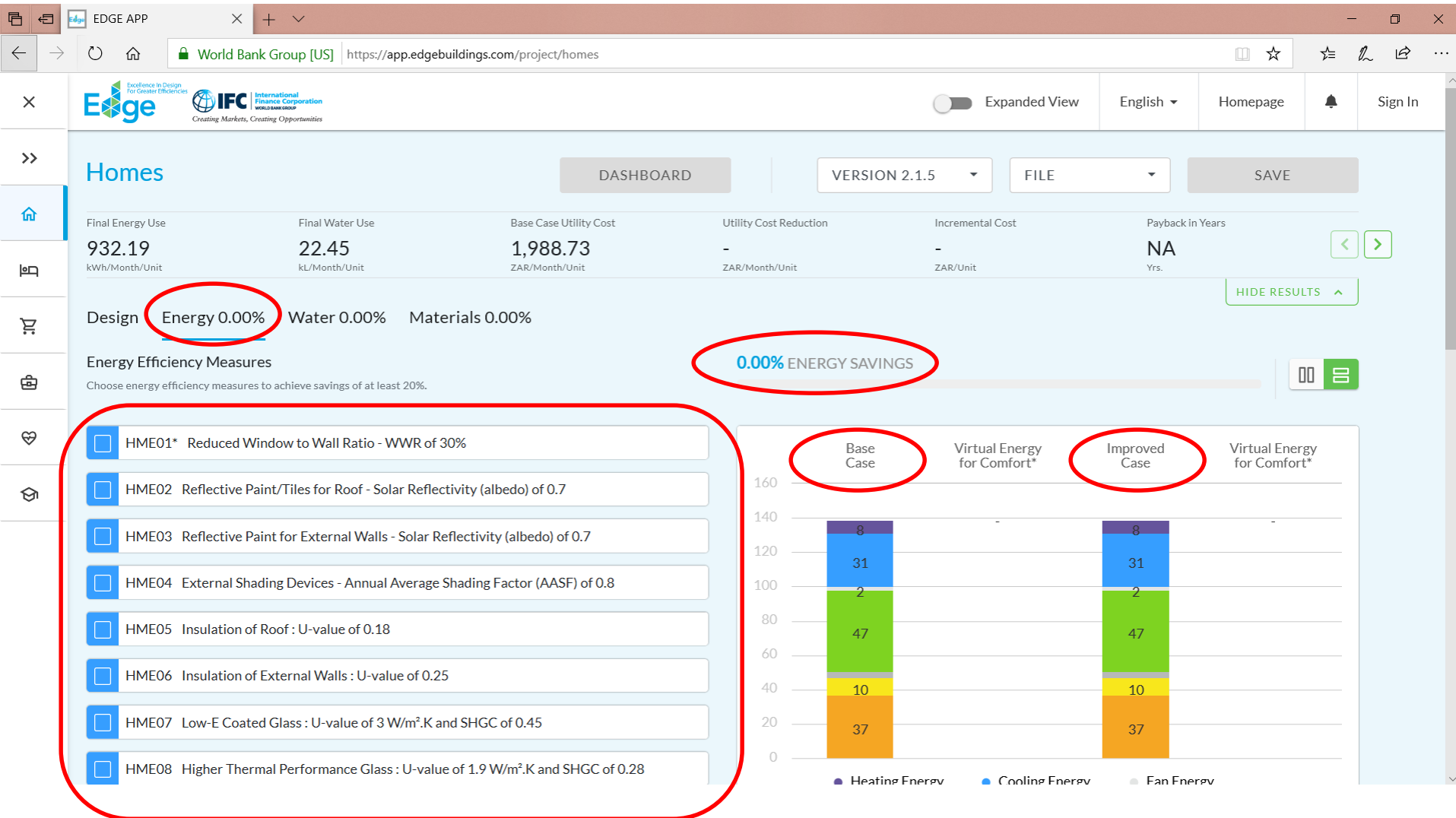
DASHBOARD | VERSION 2.1.5 | FILE | SAVE

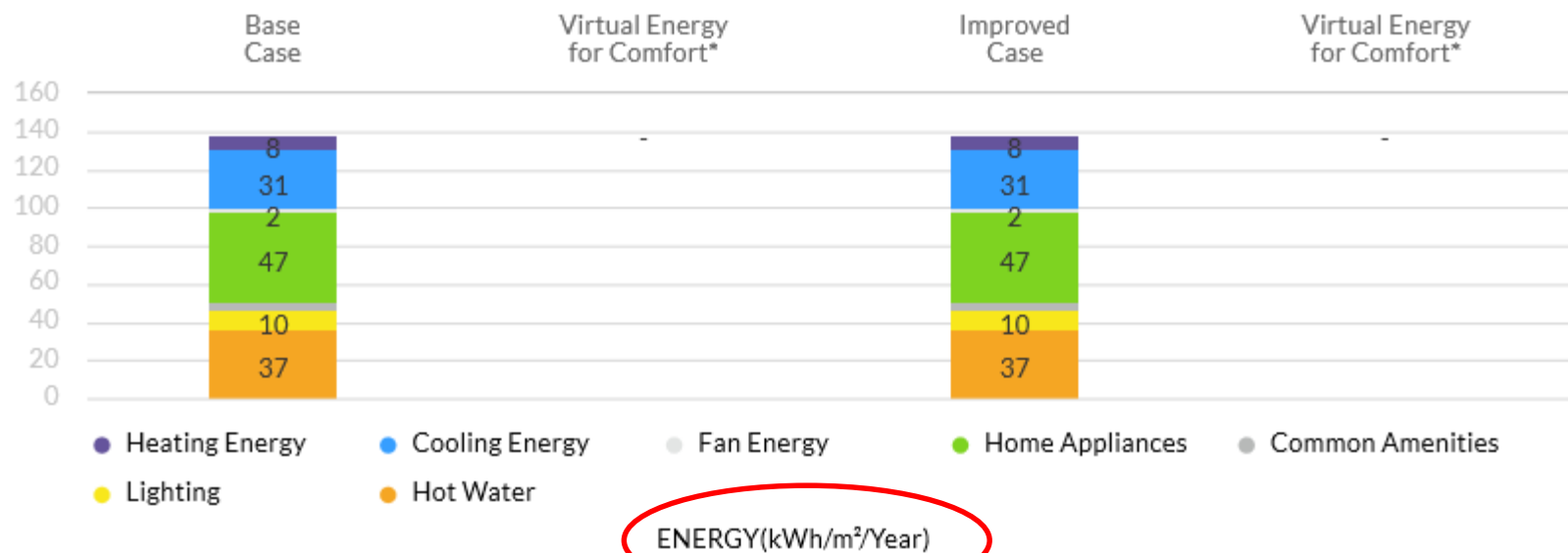
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Design | Energy 0.00% | Water 0.00% | Materials 0.00% | HIDE RESULTS

Building Data - Area Details

Enter Building Data	Default	User Entry
Type of Unit Flats/Apartments	Bedroom (m²) 20	Bedroom (m²)
Average Unit Area (m²) 80	Kitchen (m²) 8	Kitchen (m²)
Bedrooms/Unit (no.) 2	Living/Dining (m²) 32	Living/Dining (m²)
Floors (no.) 10	Bathroom (m²) 6	Bathroom (m²)
Units (no.) 50	Utility, Balcony, Service Shaft** (m²) 13.60	
Occupancy (People/Unit) (no.)	Gross Internal Area (m²)	



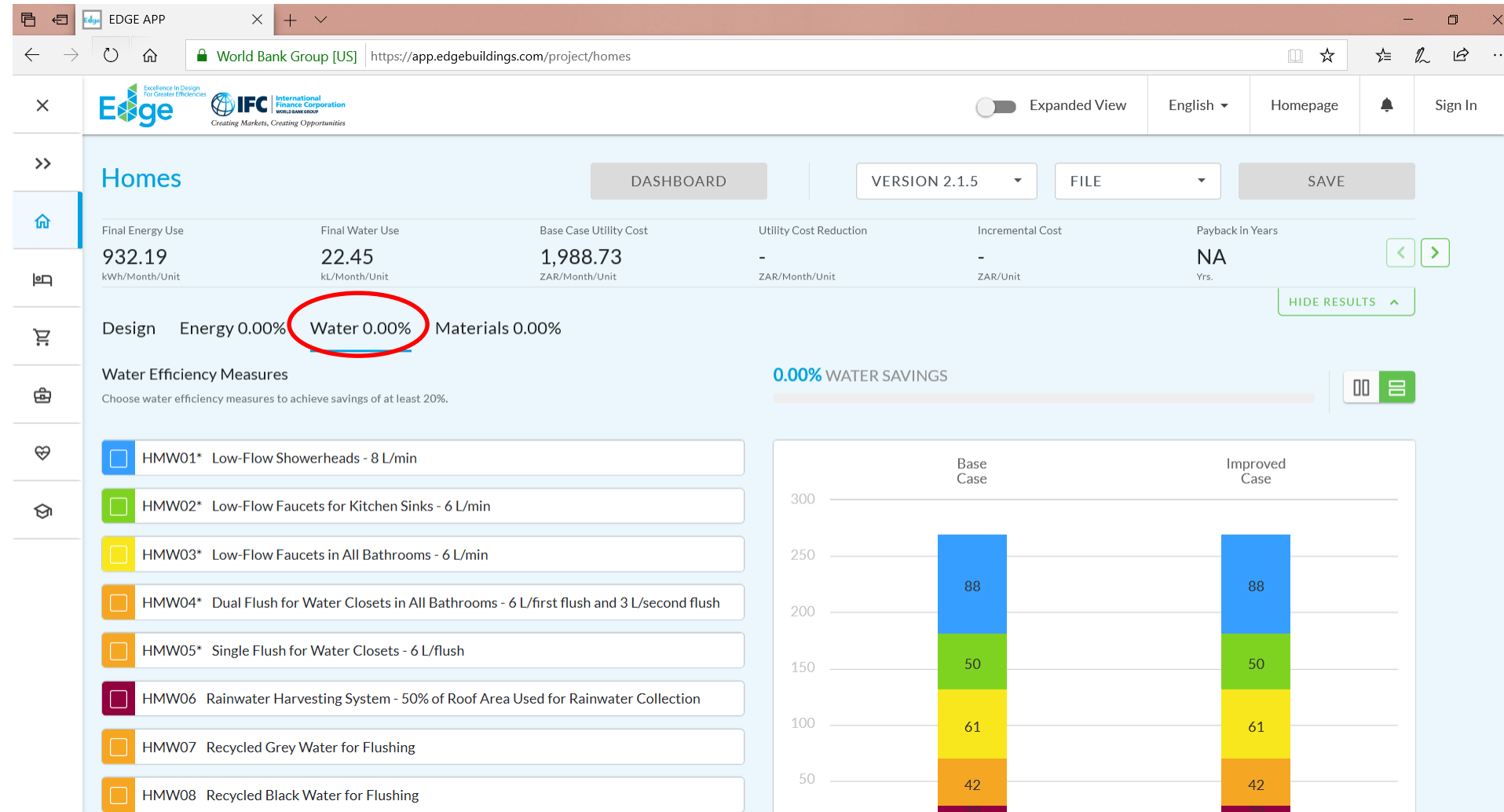


Hide the Carbon Emissions/Offset

9.30 tCO₂/Year/Unit



*Virtual energy is the amount of energy that will be required based on the assumption that the home or flat will eventually install air conditioning or heating.



EDGE APP | World Bank Group [US] | https://app.edgebuildings.com/project/homes

Edge | IFC International Finance Corporation | Expanded View | English | Homepage | Sign In

Homes

DASHBOARD | VERSION 2.1.5 | FILE | SAVE

Final Energy Use 932.19 kWh/Month/Unit	Final Water Use 22.45 kL/Month/Unit	Base Case Utility Cost 1,988.73 ZAR/Month/Unit	Utility Cost Reduction - ZAR/Month/Unit	Incremental Cost - ZAR/Unit	Payback in Years NA Yrs.
--	---	--	---	-----------------------------------	--------------------------------

Design | Energy 0.00% | Water 0.00% | **Materials 0.00%**

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

0.00% EMBODIED ENERGY SAVINGS

Floor Slabs

HMM01* In-Situ Reinforced Concrete Slab

Thickness (mm) Steel Rebar(kg/m²)

Roof Construction

HMM02* In-Situ Reinforced Concrete Slab

Proportion % Thickness (mm) Steel Rebar(kg/m²)

External Walls

Base Case

Improved Case

Category	Base Case	Improved Case
1026	1026	1026
114	114	114
529	529	529
474	474	474
44	44	44
Total	351	351

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