GREEN BUILDINGS RETURN ON INVESTMENT: HOMES

IFC | International Finance Corporation
WORLD BANK GROUP

Creating Markets, Creating Opportunities

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HOMES IN EAST ASIA

ROI ON MEASURES NEEDED TO REACH THE EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Cambodia	$60 / unit	$12 / unit	0.4
China	2,000 ¥ / unit $290 / unit	¥ 80 / unit $12 / unit	1.8
Fiji	$190 / unit	$40 / unit	0.4
Indonesia	400 Thousand Rp / unit $27 / unit	40 Thousand Rp / unit $3 / unit	0.1
Philippines	5,300 PhP / unit $100 / unit	500 PhP / unit $10 / unit	0.8
Thailand	$100 / unit	$15 / unit	0.45
Vietnam	3.5 MVND / unit $150 / unit	350,000 VND / unit $15 / unit	0.80

Image sourced from: https://www.edgebuildings.com/projects/first-home-premium-binh-duong/

ENERGY

The best interventions to reach the EDGE standard include:

- Reduced Window To Wall Ratio
- Natural Ventilation & Lighting Controls
- Energy-saving Light Bulbs
- Low-E Coated Glass

For Upper Income, home appliances become a larger proportion of total energy use

In cooler climates, most energy is consumed in the form of heating energy, so best interventions include:

- High Efficiency Boiler for Space Heating

WATER

Most cost efficient strategies include:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins
- Dual Flush Water Closets

MATERIALS

- Floor slabs are biggest cost drivers ranging from 35% - 40% of material costs out of 7 total interventions
- Using other materials in these elements of a house usually saves over 20%

HOMES IN SOUTH ASIA

ROI ON MEASURES NEEDED TO REACH EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Bangladesh	$65 / unit	$10 / unit	0.8
India (Delhi)	Rs 9,060 / unit $120 / unit	Rs 455 / unit $10 / unit	1.7
India (Mumbai)	Rs 9,700 / unit $130 / unit	Rs 420 / unit $10 / unit	1.9
Sri Lanka	$100 / unit	$10 / unit	0.7

https://www.edgebuildings.com/projects/flora-fuji

ENERGY

The most cost effective interventions include:

- Reduced Window to Wall Ratio
- Natural Ventilation
- Energy-Saving Light Bulbs

In the Medium Income category, Low Medium Income category, Low-E Coated Glass, Insulation of Roof, and Solar hot water collectors are effective.

In more humid environments, efficient Air Conditioning with de-humidifiers can be cost-effective.

WATER

EDGE standard can typically be reached through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins
- Dual Flush Water Closets

MATERIALS

Potential strategies to reach material efficiency include:

- In-Situ concrete for floor slabs and roof both
- UPVC window frames
- Autoclaved Aerated Concrete Blocks

HOMES IN AFRICA

ROI ON MEASURES NEEDED TO REACH THE EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Angola	$245 / unit	$35/unit	0.6
Cote D'Ivoire	$100 / unit	$10/unit	0.9
Ghana	$250 / unit	$20/unit	1
Kenya	$100 / unit	$15/unit	0.6
Nigeria	$20 / unit	$10/unit	0.3
South Africa	ZAR 570 / unit $40 / unit	ZAR 90/unit $10/unit	0.5

Image sourced from: https://www.edgebuildings.com/projects/exchange-complex-residential-blocks-a-b/

ENERGY

- Reduced Window to Wall Ratio is one of the key ways to save energy.
- Energy-Saving Light Bulbs can be key savings drivers in residential units across Africa.
- Water interventions can give a significant boost to energy savings.
- In some countries low-E coated glass helps drive energy savings while still achieving cost efficiencies.

WATER

- Some of the most effective strategies include Efficient Water Closets.
- Low-Flow Faucets for Washbasins and Kitchen Sinks also provides savings.
- Recycled Gray Water for Flushing is often a highly effective intervention, though it is rare in some areas.

MATERIALS

- In multiple story housing, floor slabs are the biggest area driving efficiencies, accounting for approximately 30% - 50% of savings available in the materials section.

HOMES IN LATIN AMERICA

ROI ON MEASURES NEEDED TO REACH THE EDGE STANDARD

	Incremental Cost / unit	Utility Savings / month / unit	Payback Period in Years
Argentina	$185	$6	2.7
Brazil	$840	$12	5.9
Colombia	$630	$20	2.9
Costa Rica	114,000 CRC $200	12,230 CRC $20	0.6
Mexico	$345	$15	2
Peru	865 S $260	55 S $15	1.3

http://brazildirect.org/fortaleza-property

ENERGY

The most cost effective measures include:

- Reduced Window to Wall Ratio
- Natural Ventilation
- Energy Saving Light Bulbs
- Insulation of Roof

For Upper Income households, Energy Efficient Home Appliances play a bigger role in savings potential.

WATER

The best ROI is from the following measures:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins and Kitchen Sink
- Dual Flush Water Closets

MATERIALS

- Floors and Walls are the biggest efficiency drivers and each made up of 40% of material usage.
- Reducing concrete usage is the most efficient way to meet the EDGE standard.

HOMES IN MENA

ROI ON MEASURES NEEDED TO REACH EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Egypt	$240 /unit	$10 /unit	2
Jordan	$250 /unit	$10 /unit	1.5
Morocco	$250 /unit	$10 /unit	2
Pakistan	$250 /unit	$4 /unit	4.5

Image sourced from: https://www.edgebuildings.com/projects/first-home-premium-binh-duong/

ENERGY

The most cost effective interventions include:

- Reduced Window to Wall Ratio - WWR of 20%
- Reflective Paint/Tiles for Roof
- Energy-Saving Light Bulbs

Water savings also influence energy savings.

WATER

The best green strategies include:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins
- Dual Flush Water Closets

MATERIALS

- Floor slabs are biggest efficiency drivers ranging from 35% - 40% of material options
- Using other materials in these elements of a house usually saves over 20%

HOMES IN EUROPE

ROI ON MEASURES NEEDED TO REACH EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Armenia	$780/unit	$18/ unit	4
Poland	$1,095/unit	$42/ unit	2
Russian Federation	$1,170/unit	$13/ unit	7
Serbia	$600/unit	$25/ unit	2
Ukraine	$550/unit	$4/ unit	13
Turkey	$460/unit	$16/ unit	2

ENERGY

The best ROI can be found in these interventions:

- Natural Ventilation and Reduced Window To Wall Ratio
- Lighting Controls
- Insulation of Wall and Roof
- Energy saving lightbulbs
- In Upper Income residences, home appliances become a larger proportion of total energy use so efficient appliances and air-conditioning becomes important

WATER

The best green interventions include:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Single and Dual Flush for Water Closets

MATERIALS

- External Walls are biggest cost drivers ranging from 25% - 30% of material costs out of 6 total interventions
- Using other materials in these elements of a house usually saves over 20%

GREEN BUILDINGS RETURN ON INVESTMENT: HOMES IN EAST ASIA

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HOMES – CAMBODIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m²	2	10	50

Energy Measures – 21% Savings through:

- Natural Ventilation & Lighting Controls
- Energy Saving Light Bulbs
- Low-E Coated Glass

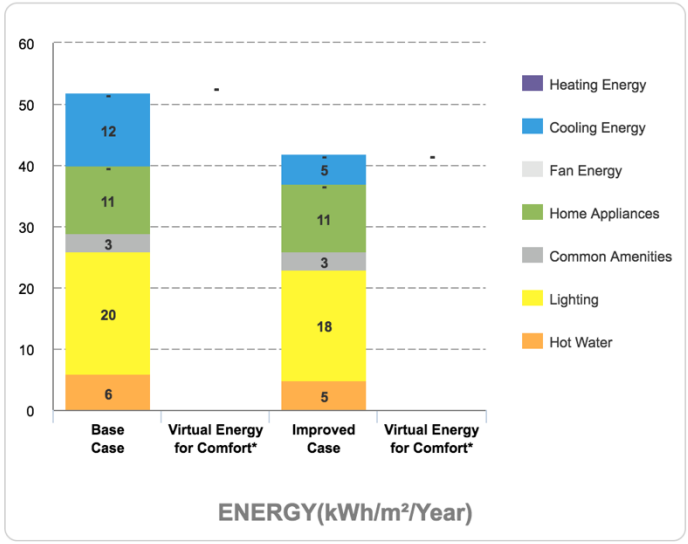
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 28% Savings through:

- Timber Floor Construction Floor Slabs

20.97% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
$60 / unit

Utility Costs Savings
$12 / unit / month

Payback in Years
0.40

Operational CO_2 Savings
0.70 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 32% Savings through:

- Reduced Window to Wall Ratio
- Energy-Saving Lighting
- Solar PV

Water – 28% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets
- Water-Conserving Toilets

Materials – 38% Savings through:

- Corrugated zinc sheets for roof construction
- In-situ reinforced external walls
- Ferrocement panels for internal walls

IMPERIAL HOMES (PHILIPPINES)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – CHINA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m²	2	10	50

Energy Measures – 26% Savings through:

- Reduced Window to Wall Ratio
- Air Conditioning System

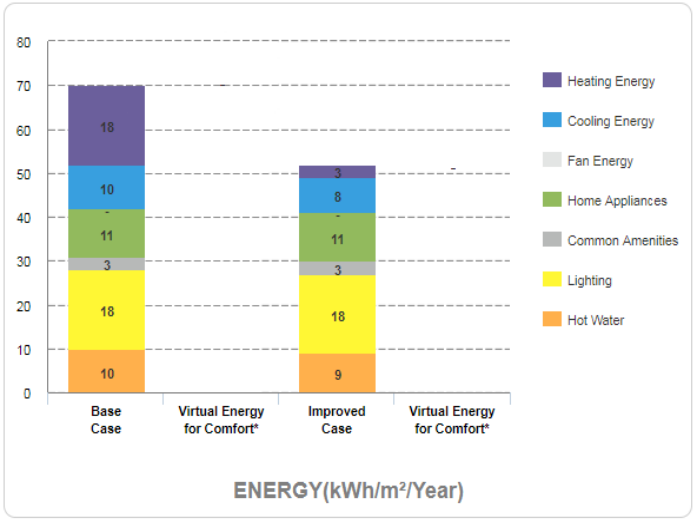
Water – 20% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 28% Savings through:

- Timber Floor Construction Floor Slabs

26.35% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
2,000 ¥/unit

Utility Costs Savings
¥80 / unit / month

Payback in Years
1.8

Operational CO_2 Savings
2 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 29% Savings through:

- Reduced Window to Wall Ratio
- Energy-Saving Light Bulbs for Internal Spaces
- Reflective Paint for External Walls
- Insulation of Roof and External Walls
- External Shading Devices
- High-Efficiency Boiler for Hot Water

Water – 26% Savings through:

- Low-Flow Plumbing Fixtures for Washbasins and Kitchens

Materials – 25% Savings through:

- Cellular Lightweight Concrete Blocks
- Laminated Wooden Flooring and Roof Insulation

FOREST IN THE SKY (VIETNAM)

In-country certified project to replace related example once an EDGE project is certified.

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HOMES – FIJI CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m²	2	10	50

Energy Measures – 32% Savings through:

- Natural Ventilation & Lighting Controls
- Energy Saving Light Bulbs
- Low-E Coated Glass

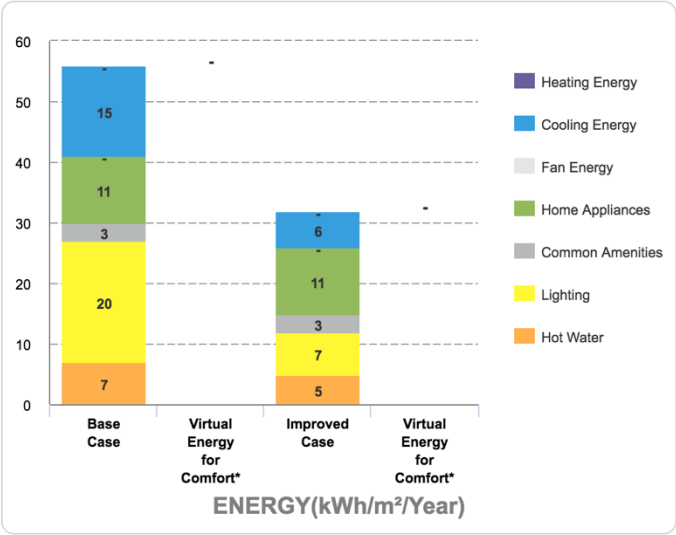
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

42.35% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
$190/unit

Utility Costs Savings
$40 / unit / month

Payback in Years
0.4

Operational CO_2 Savings

1 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 42% Savings through:

- Reduced Window to Wall Ratio
- Energy-Saving Lighting
- Solar PV

Water – 49% Savings through:

- Low-Flow Plumbing Fixtures for Washbasins and Kitchens
- Single-Flush Water Closets
- Rainwater Harvesting System

Materials – 45% Savings through:

- Solid Dense Concrete Blocks
- Aluminum Sheets for Roof Construction
- Finished Concrete Flooring

VILLAGE LA FONTAINE (HAITI)

In-country certified project to replace related example once an EDGE project is certified.

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HOMES – INDONESIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 47% Savings through:

- Natural Ventilation & Lighting Controls
- Energy Saving Light Bulbs - Internal and External
- Low-E Coated Glass

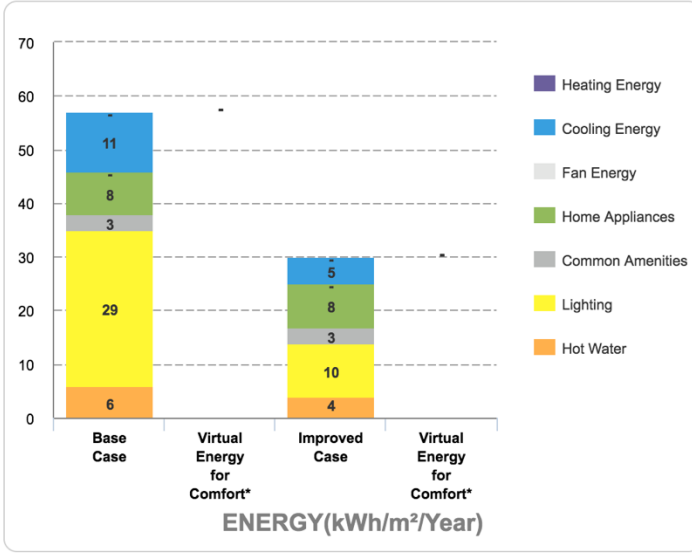
Water – 32% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 27% Savings through:

- Timber Floor Construction Floor Slabs

46.74% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
400
Thousand Rp/unit

Utility Costs Savings
40 Thousand Rp / unit / month

Payback in Years
0.10

Operational CO_2 Savings
2 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 82% Savings through:

- Reduced Window to Wall Ratio
- External Shading Devices
- Insulation of Roof and External Walls
- Air Conditioning System with High COP
- Energy-Saving Lighting System for Internal Spaces
- Solar Hot Water Collectors and Solar Photovoltaics

Water – 31% Savings through:

- Low-Flow Faucets in Kitchens and Bathrooms, and Dual-Flush Water Closets

Materials – 47% Savings through:

- Cellular Light Weight Concrete Blocks for Internal and External Walls, Parquet and Wood Block Finishes and UPVC Window Frames

ECOLOFT JABABEKA CIKARANG (BEKASI)

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HOMES –PHILIPPINES CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m²	2	10	50

Energy Measures – 20% Savings through:

- Natural Ventilation
- Reduced Window to Wall Ratio
- Energy Saving Light Bulbs

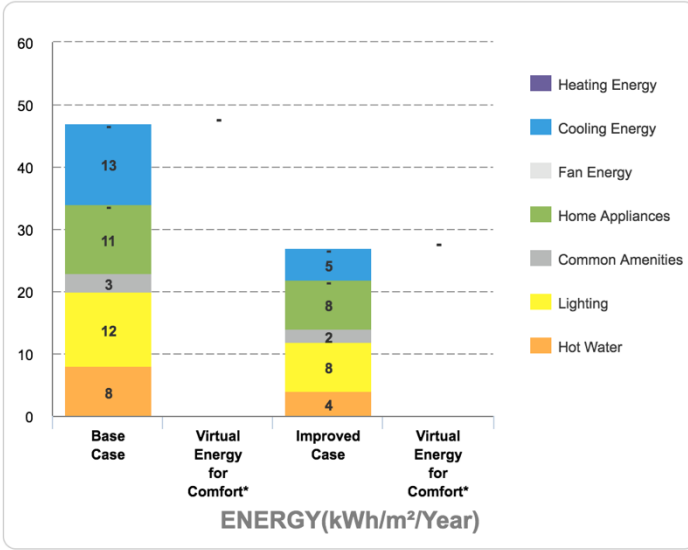
Water – 34% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

42.19% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
5,300 PhP/unit

Utility Costs Savings
500 PhP/month/unit

Payback in Years
0.8

Operational CO_2 Savings
0.80 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 33% Savings through:

- External Shading Devices
- Insulation of Roof and External Walls
- Energy-Saving Lighting System
- Solar Photovoltaics

Water – 37% Savings through:

- Low-Flow Plumbing Fixtures
- Dual-Flush Water Closets

Materials – 32% Savings through:

- Medium weight hollow concrete blocks for internal and external wall construction

PRIMAVERA RESIDENCES (CAGAYAN DE ORO)

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – THAILAND CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m²	2	10	50

Energy Measures – 22% Savings through:

- Natural Ventilation & Lighting Controls
- Low-E Coated Glass
- Reflective Paint/Tiles for Roof
- Solar Hot Water Collectors

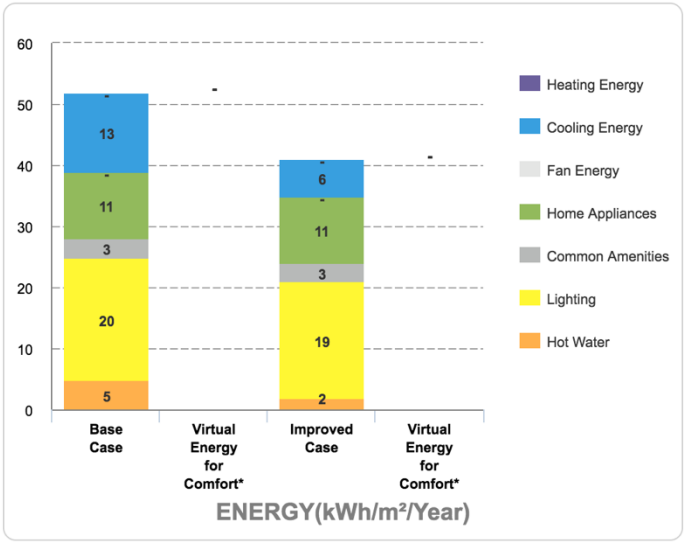
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins and Kitchen Sinks
- Dual Flush for Water Closets

Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

22.17% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
$100/unit

Utility Costs Savings
$15/unit/month

Payback in Years
0.45

Operational CO_2 Savings
0.50 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 30% Savings through:

- Reduced Window to Wall Ratio
- External Shading Devices
- Insulation of Roof and External Walls
- Natural Ventilation
- Energy-Saving Light Bulbs for Internal Spaces

Water – 26% Savings through:

- Low-Flow Plumbing Fixtures for Kitchen Sinks, Washbasins and Shower-Heads
- Dual Flush Water Closets

Materials – 60% Savings through:

- Micro concrete tiles on steel rafters for roof construction
- Autoclaved aerated concrete blocks for external and internal walls

CITRA MAJA RAYA (INDONESIA)

In-country certified project to replace related example once an EDGE project is certified.

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HOMES – VIETNAM CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 21% Savings through:

- Natural Ventilation
- Energy Saving Light Bulbs
- Lighting Controls
- Low-E Coated Glass

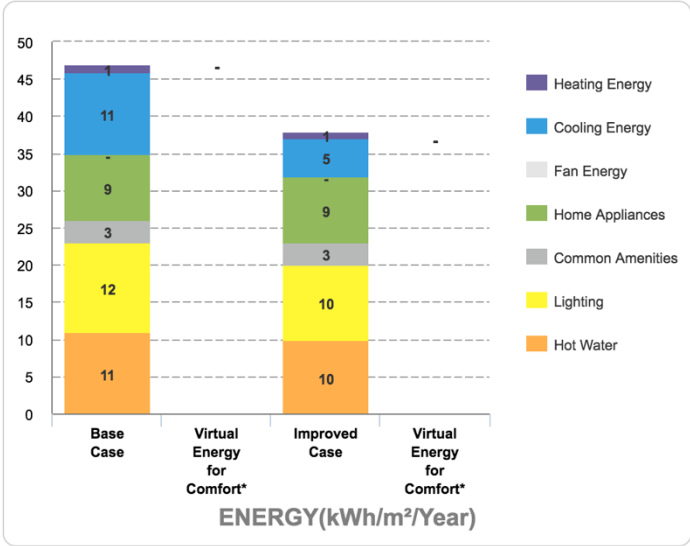
Water – 28% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins and Kitchen Sinks
- Dual Flush for Water Closets

Materials – 27% Savings through:

- Timber Floor Construction Floor Slabs

21.39% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
3.5 MVND/unit

Utility Costs Savings
350,000 VND / month / unit

Payback in Years
0.80

Operational CO_2 Savings

RELEVANT CERTIFIED PROJECT

Energy Measures – 29% Savings through:

- Reduced Window to Wall Ratio
- Reflective Paint for External Walls & External Shading Devices
- Insulation of Roof & External Walls
- Energy-Saving Light Bulbs for External & Internal Spaces and Common Areas
- Solar Photovoltaics

Water – 30% Savings through:

- Low-Flow Plumbing Fixtures for Washbasins and Kitchens

Materials – 39% Savings through:

- In-situ Reinforced Concrete Slab for Floors and Roof, Ceramic Tiles for Floors
- Cellular Light-Weight Concrete Blocks for Internal Walls and Aluminum Windows

ECOHOME PHUC LOI (HA NOI)

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HOMES – BANGLADESH CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

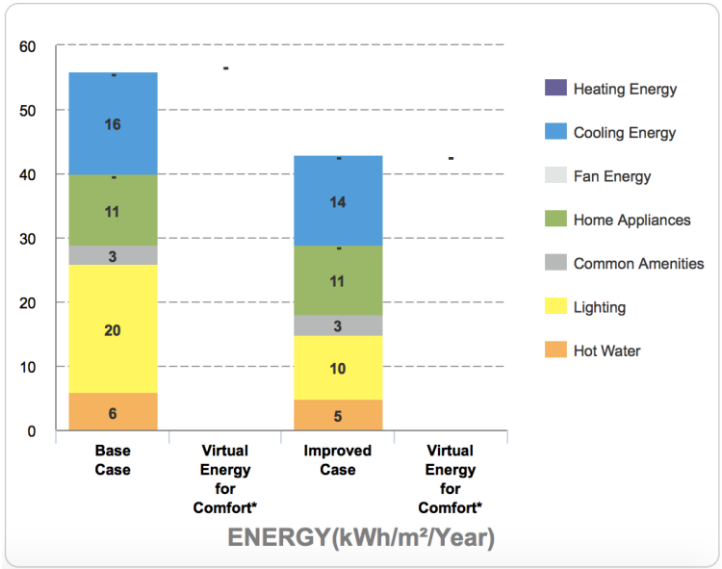
Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income Housing	80m^2	2	10	50

Energy Measures – 24% Savings through:
- Reduced Window to Wall Ratio
- Energy Saving Light Bulbs

Water – 22% Savings through:
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 33% Savings through:
- In-Situ concrete for roof and slab
- Aerated Autoclaved Concrete bricks
- UPVC Window frames and ceramic tiles

23.65% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
$65/unit

Utility Costs Savings
$10 / unit / month

Payback in Years
0.8

Operational CO_2 Savings
0.70 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 27% Savings through:
- Low E-Coated Glass
- Reflective paint for roof & external walls
- External shading devices
- Energy saving lighting for indoor & outdoor areas
- Energy efficiency ceiling fans

Water – 35% Savings through:
- Low-Flow Showerheads and Faucets
- Dual flush water closets

Materials – 36% Savings through:
- In-Situ concrete reinforced for roof and slab
- Autoclaved Aerated Concrete Blocks for external and internal walls

KOLKATA WEST INTERNATIONAL CITY

In-country certified project to replace related example once an EDGE project is certified.

HOMES – INDIA (DELHI) CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

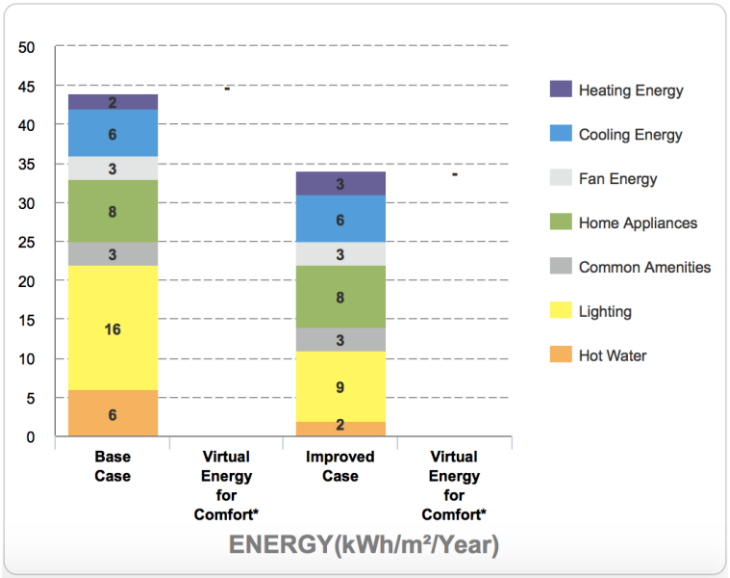
Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Medium Income Housing	80m^2	2	10	50

Energy Measures – 25% Savings through:
- Reduced Window to Wall Ratio
- Reflective Paint for Roof and External Wall.
- Energy Saving Light Bulbs
- Solar Hot Water Collector

Water – 24% Savings through:
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Low Flow Shower Head
- Dual Flush for Water Closet

Materials – 21% Savings through:
- In-Situ concrete >30% PFA, for floor slab.
- UPVC Window frames and ceramic tiles

25.05% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
Rs. 9,060/unit

Utility Costs Savings
Rs. 455/unit/month

Payback in Years
1.7

Operational CO_2 Savings
0.68 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 23% Savings through:
- Reduced Window to Wall Ratio
- Reflective paint and tiles for roof
- External shading devices
- Energy saving lighting in outdoor areas

Water – 24% Savings through:
- Low-Flow faucets for kitchen sink
- Recycled Black water for flushing

Materials – 71% Savings through:
- In-Situ concrete > 30% PFA
- Internal and external walls made of FalG blocks
- UPVC window frames
- Ceramic tile flooring

KESAR CITY

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – INDIA (MUMBAI) CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

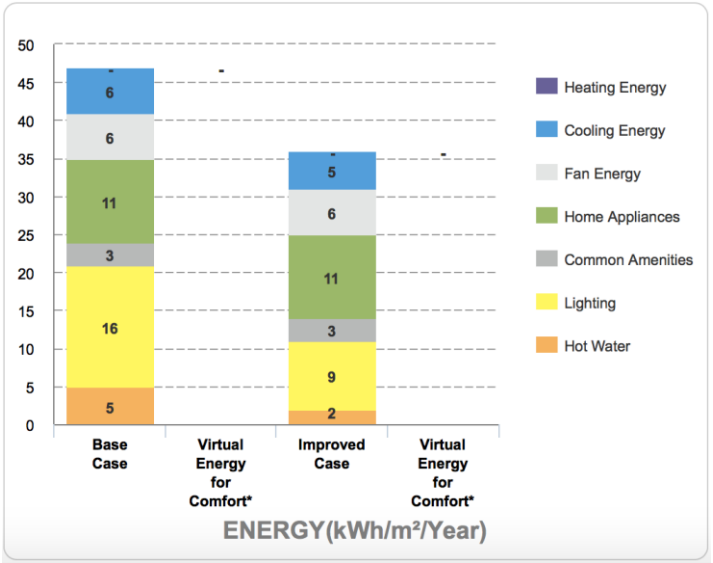
Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Medium Income Housing	80m^2	2	10	50

Energy Measures – 22% Savings through:
- Energy saving light bulbs
- Insulation of roof & Low E-Coated glass
- Solar hot water collector

Water – 32% Savings through:
- Low Flow Shower Head
- Low-Flow Faucets for Washbasins & Kitchen Sinks

Materials – 37% Savings through:
- In-Situ concrete for roof and slab >30% PFA
- Aerated Autoclaved Concrete Bricks
- UPVC Window frames and ceramic tiles

22.34% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
Rs. 9,700/unit

Utility Costs Savings
Rs. 420 / unit / month

Payback in Years
1.9

Operational CO_2 Savings
0.63 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 33% Savings through:
- Reduced Window to Wall Ratio
- Reflective paint for roof & external walls
- External shading devices
- Energy saving lighting for indoor & outdoor areas
- Solar Hot water collector

Water – 39% Savings through:
- Low-Flow Showerheads and Faucets
- Dual flush water closets
- Recycled Black water for flushing
- Rain water harvesting

Materials – 23% Savings through:
- In-Situ concrete reinforced for roof and slab

VBHC – VAIBHAV BANGALORE

In-country certified project to replace related example once an EDGE project is certified.

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HOMES – SRILANKA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

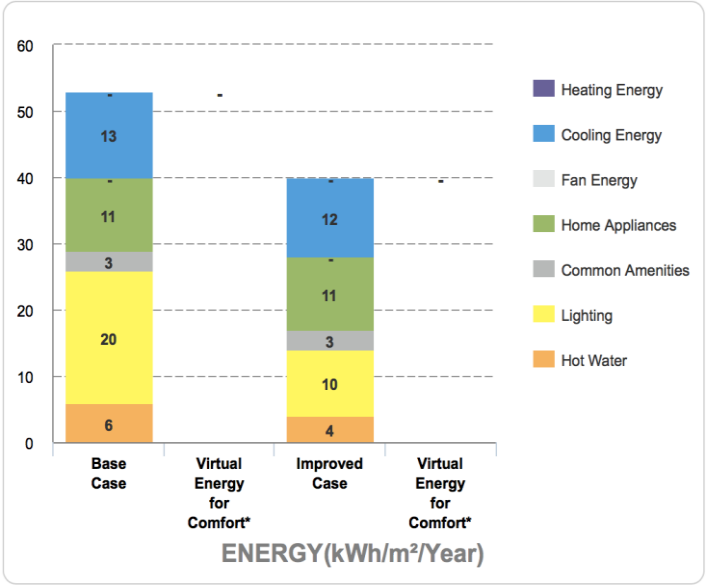
Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income Housing	80m²	2	10	50

Energy Measures – 25% Savings through:
- Reduced Window to Wall Ratio
- Energy saving light bulbs

Water – 22% Savings through:
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 40% Savings through:
- In-Situ concrete for roof and slab
- Aerated Autoclaved Concrete bricks
- UPVC Window frames and ceramic tiles

24.63% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost
$100/unit

Utility Costs Savings
$10 / unit / month

Payback in Years
0.7

Operational CO_2 Savings
0.80 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 22% Savings through:
- Reduced Window to Wall Ratio
- Reflective paint and tiles for roof
- External shading devices
- Energy saving lighting in outdoor areas

Water – 25% Savings through:
- Low-Flow Showerheads and Faucets
- Dual flush water closets
- Recycled gray water for flushing

Materials – 70% Savings through:
- In-Situ concrete for roof and slab
- Aerated Autoclaved Concrete bricks for internal and external walls
- UPVC window frames
- Ceramic tile flooring

TCP ALTURA (INDIA)

In-country certified project to replace related example once an EDGE project is certified.

GREEN BUILDINGS RETURN ON INVESTMENT: HOMES IN AFRICA

IFC International Finance Corporation
WORLD BANK GROUP

Creating Markets, Creating Opportunities

HOMES – ANGOLA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 23% Savings through:

- Energy Saving Light Bulbs
- Water Savings

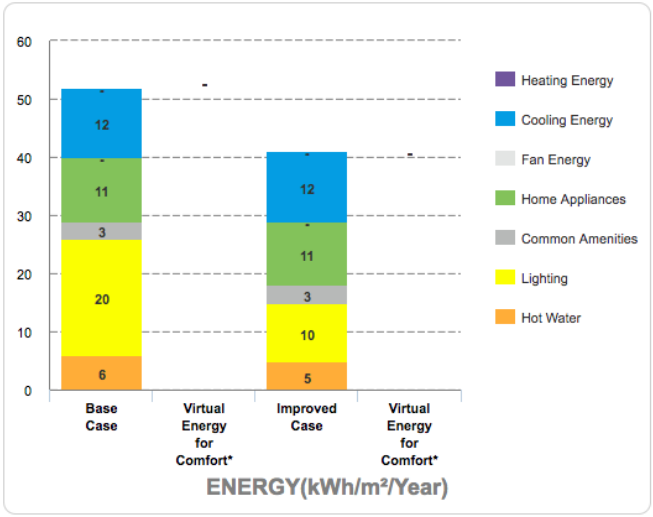
Water – 21% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins
- Dual Flush for Water Closets

Materials – 28% Savings through:

- In-Situ Trough Concrete Floor Slabs

23.29% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$245/unit

Utility Costs Savings

$35 / unit / month

Payback in Years

0.6

Operational CO_2 Savings

0.62 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 49% Savings through:

- Reduced Window to Wall Ratio
- Reflective paint and tiles for roof
- Energy-Saving Lighting
- Solar PV

Water – 24% Savings through:

- Low-Flow Faucets
- Water-Conserving Toilets

Materials – 45% Savings through:

- Medium-weight hollow concrete blocks for internal/external walls
- UPVC window frames

VILLA FLORA (HAITI)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – COTE D'IVOIRE CASE STUDY & CERTIFIED PROJECT

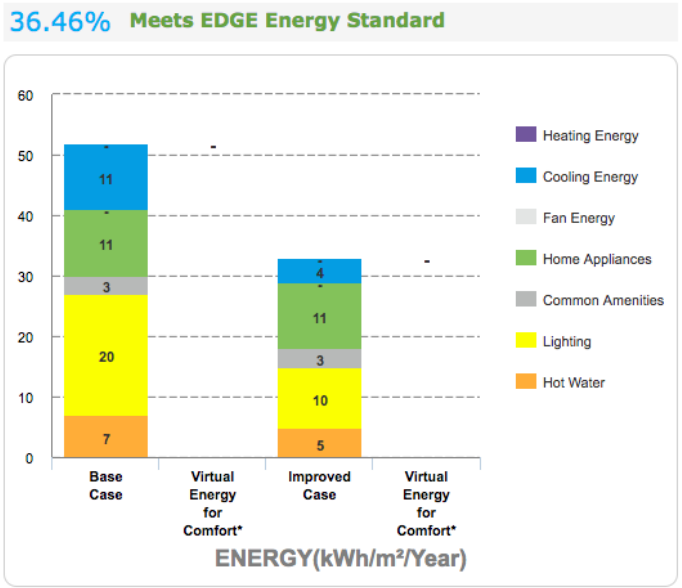
BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 36% Savings through:
- Low-E coated glass
- Natural ventilation
- Energy Saving Light Bulbs
- High-efficiency boiler for hot water

Water – 21% Savings through:
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 24% Savings through:
- Composite In-Situ Concrete Floor Slabs



PROJECT METRICS

Incremental Cost

$100/unit

Utility Costs Savings

$10 / unit / month

Payback in Years

0.9

Operational CO_2 Savings

0.74 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 23% Savings through:
- Reduced window to wall ratio
- Reflective paint for roof and walls
- External shading
- Energy efficient ceiling fans and lighting systems

Water – 24% Savings through:
- Low-flow faucets
- Recycled black water for flushing

Materials – 71% Savings through:
- In-situ concrete with greater than 30% PFA
- Internal walls made of FALG blocks

KESAR CITY (INDIA)

In-country certified project to replace related example once an EDGE project is certified.

HOMES – GHANA CASE STUDY & CERTIFIED PROJECT

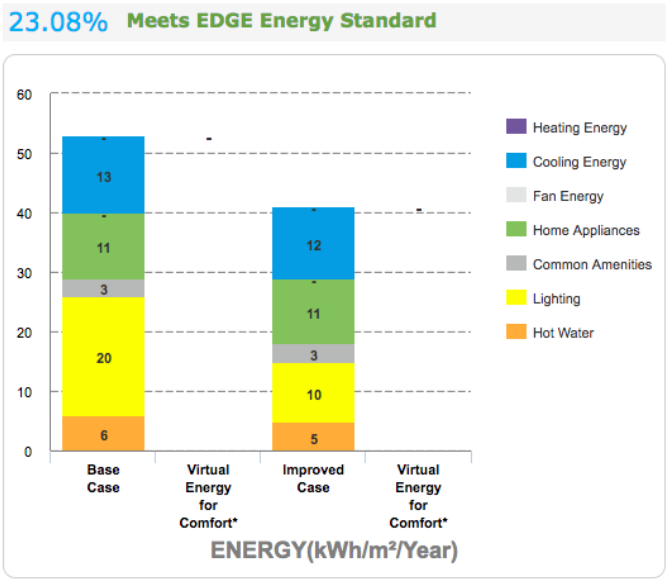
BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m²	2	10	50

Energy Measures – 23% Savings through:
- Energy Saving Light Bulbs
- Energy savings from water interventions

Water – 21% Savings through:
- Low-Flow showerheads
- Low-Flow Faucets for washbasins
- Dual-Flush for water closets

Materials – 22% Savings through:
- Concrete filler slab



PROJECT METRICS

Incremental Cost

$250/unit

Utility Costs Savings

$20 / unit / month

Payback in Years

1

Operational CO_2 Savings

0.39 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 30% Savings through:
- Insulation of roof
- Low-E coated class
- Air conditioning system with high COP
- Energy saving light bulbs for internal/external spaces and common areas

Water – 25% Savings through:
- Low-Flow plumbing fixtures
- Dual flush water closets

Materials – 28% Savings through:
- Medium weight hollow concrete blocks for internal/external walls
- Solid dense concrete blocks for external walls

EXCHANGE COMPLEX (GHANA)

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – KENYA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

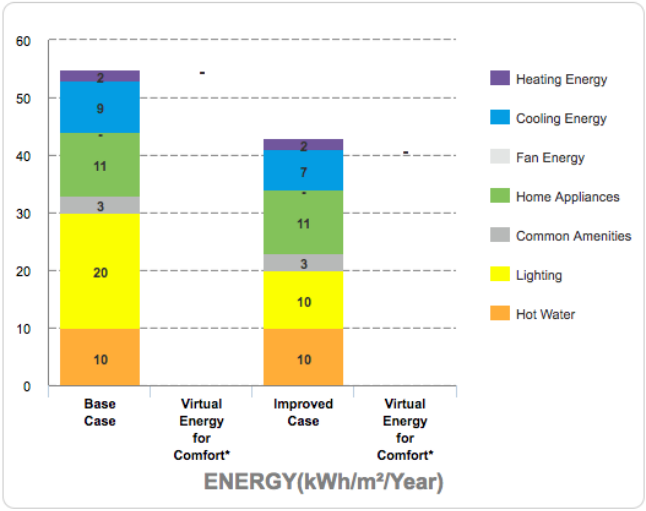
Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 25% Savings through:
- Low E-Coated Glass
- Energy Saving Light Bulbs
- Savings from Water interventions

Water – 24% Savings through:
- Dual Flush for Water Closets
- Low Flow Showers
- Low Flow Faucets

Materials – 23% Savings through:
- In-Situ Trough Concrete Floor Slabs

25.06% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$100/unit

Utility Costs Savings

$15 / unit / month

Payback in Years

0.6

Operational CO_2 Savings

0.50 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 32% Savings through:
- Reduced Window to Wall Ratio
- Roof insulation
- Heat pump for hot water

Water – 25% Savings through:
- Low-flow faucets in bathrooms
- Dual-flush water closets

Materials – 35% Savings through:
- Clay roofing tiles on timber rafters for roof constrution
- Cored bricks with plater on both sides for internal/external walls
- Cellulose roof insulation

FOURLEAF ESTATE (SOUTH AFRICA)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – NIGERIA CASE STUDY & CERTIFIED PROJECT

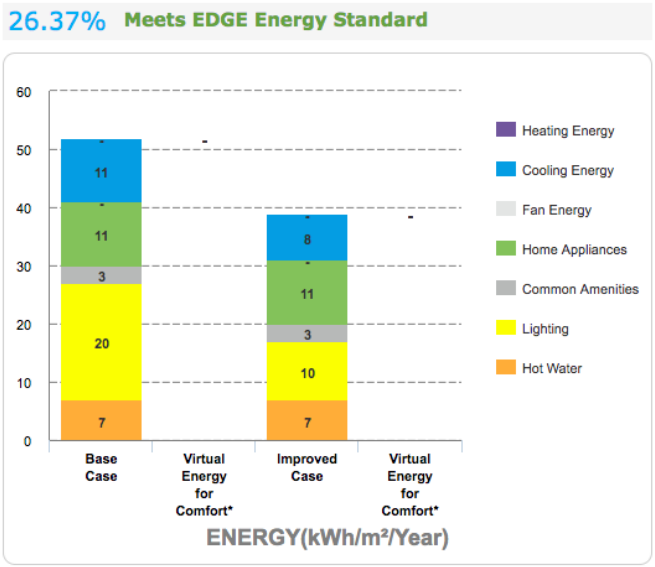
BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 26% Savings through:
- Low-E coated glass
- High-efficiency boiler for hot water
- Energy Saving Light Bulbs for Internal Spaces

Water – 24% Savings through:
- Low Flow Showers
- Low Flow Faucets

Materials – 22% Savings through:
- Concrete Filler Floor Slab



PROJECT METRICS

Incremental Cost

$20/unit

Utility Costs Savings

$6 / unit / month

Payback in Years

0.3

Operational CO_2 Savings

0.45 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 21% Savings through:
- Roof insulation
- Low-E coated glass
- Natural ventilation
- Energy-Saving Lighting for internal/external spaces
- Lighting controls for common areas/outdoors
- Solar hot water collectors
- Smart meters

Water – 27% Savings through:
- Low-flow faucets in Kitchens and Bathrooms
- Dual-flush water closets

Materials – 49% Savings through:
- Precast RC planks and joist system
- Clay roofing tiles on timber rafters
- Solid dense concrete blocks for internal/external walls

WATERFALL PARK (SOUTH AFRICA)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – SOUTH AFRICA CASE STUDY & CERTIFIED PROJECT

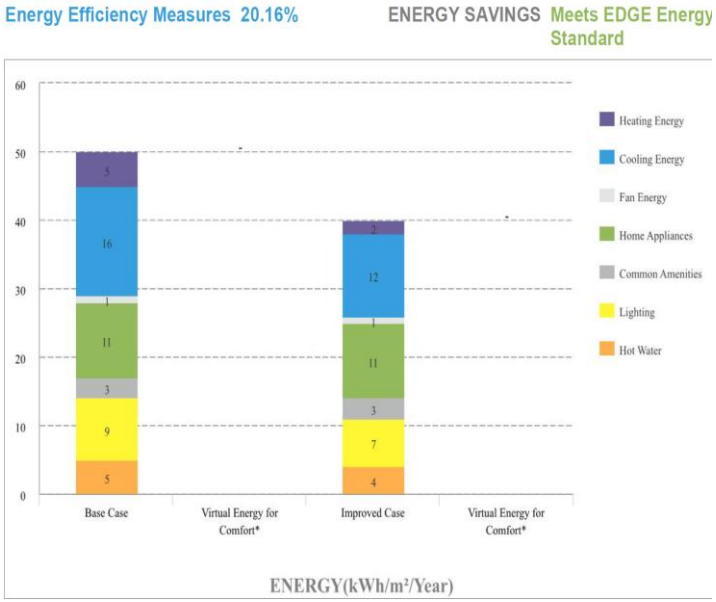
BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 20% Savings through:
- Reflective Paint for External Walls
- Efficient Air Conditioning System
- Energy-Saving Light Bulbs
- Savings from Water interventions

Water – 21% Savings through:
- Low-Flow Showerheads - 8 lt./min
- Dual Flush for Water Closets

Materials – 24% Savings through:
- Composite In-Situ Concrete and Steel Deck



PROJECT METRICS

Incremental Cost
ZAR 570

Utility Costs Savings
ZAR 90 / unit / month

Payback in Years
0.5

Operational CO_2 Savings
0.8 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 25% Savings through:
- Reduced window to wall ratio.
- Natural ventilation
- Energy-efficient heat pump for hot water
- Energy-saving lighting systems
- Lighting controls for common areas and outdoors

Water – 24% Savings through:
- Low-flow plumbing fixtures and dual-flush water closets.

Materials – 54% Savings through:
- Solid dense concrete blocks for internal and external walls.

THE VILLAGE CLUBVIEW (SOUTH AFRICA)

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

GREEN BUILDINGS RETURN ON INVESTMENT: HOMES IN LATIN AMERICA

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HOMES – ARGENTINA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 25% Savings through:

- Energy Saving Light Bulbs

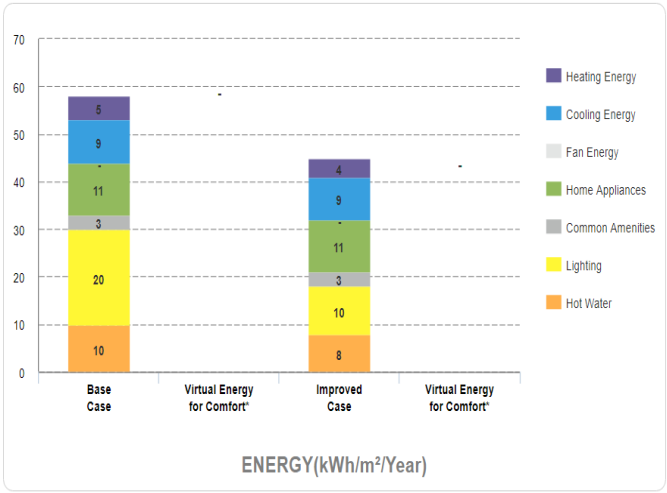
Water – 21% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 28% Savings through:

- Hollow Core Precast Floor Slab
- Honey Comb Clay Wall With Internal External Plaster External Wall

25.07% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$185/unit

Utility Cost Savings

$6/month/unit

Payback in Years

2.7

Operational CO_2 Savings

1.73 tCO_2/Year/unit

RELEVANT CERTIFIED PROJECT

Energy Measures – 27% Savings through:

- Reduced Window To Wall Ratio
- Reflective Paint For Roof And Walls
- External Shading Device
- Roof Insulation
- Energy-saving Light Bulbs For Internal, External , And Common Spaces

Water – 30% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets
- Dual Flush for Water Closet

Materials – 35% Savings through:

- In-situ trough concrete slab for floor slabs
- Concrete filler slab with polystyrene blocks for roof construction
- Honeycomb clay blocks with internal and external plaster for external walls
- Honeycomb clay blocks with plaster on both sides for internal walls.

EDIFICIO VERONA (COLOMBIA)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – BRAZIL CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Mid Income	80m²	2	10	50

Energy Measures – 25% Savings through:

- External Shading Device
- Reduce Window to Wall Ratio
- Energy Saving Light Bulbs
- Ceiling Fans in all Habitable Rooms

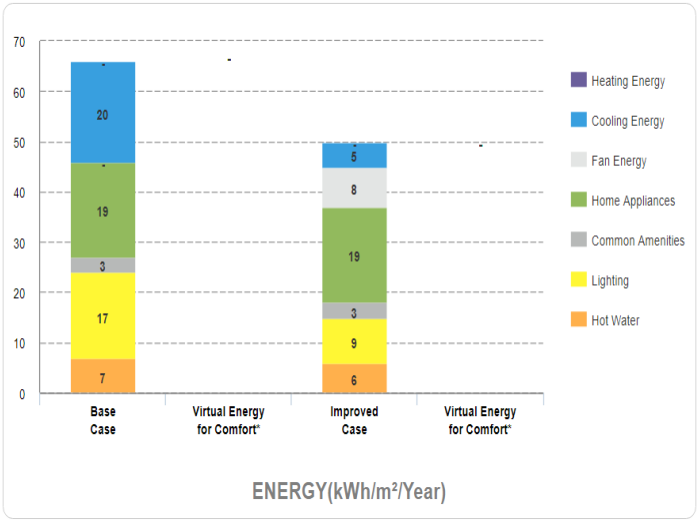
Water – 24% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 28% Savings through:

- Pre-Cast Concrete Panel for External Wall
- Composite Slim Slabs with Steel I-Beam Floor

24.96% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$840/unit

Utility Cost Savings

$12/month/unit

Payback in Years

5.9

Operational CO_2 Savings

1.85 tCO_2/Year/unit

RELEVANT CERTIFIED PROJECT

Energy Measures – 23% Savings through:

- Reduced Window To Wall Ratio
- Energy-saving Lighting And Lighting Controls For Common Areas And Outdoor Spaces.

Water – 23% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets
- Dual Flush Water Closet

Materials – 57% Savings through:

- In-situ Reinforced Concrete For Floors And Roofs
- Medium Weight Hollow Concrete Blocks For Internal And External Walls.

JULIO PRESTES (BRAZIL)

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – COLOMBIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

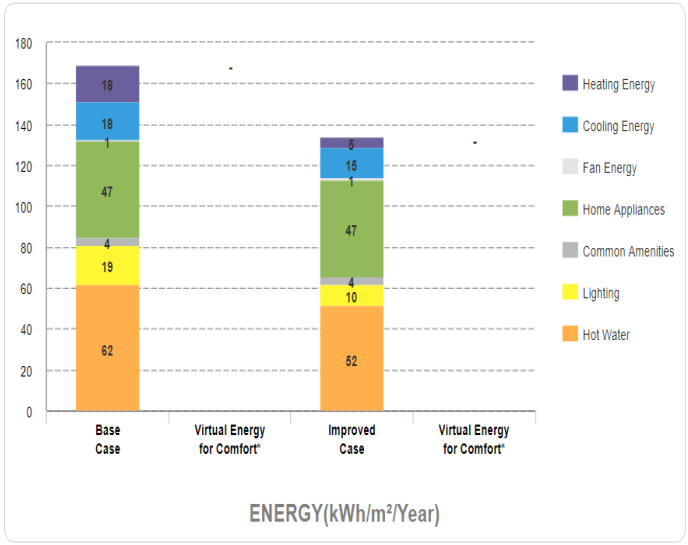
Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
High Income	80m²	2	10	50

Energy Measures – 21% Savings through:
- Low-E Coated Glass
- Energy Saving Light Bulbs in All Areas
- Natural Ventilation
- Ceiling Fans in all Habitable Rooms
- Energy Efficient Refrigerators and Clothes Washing Machines

Water – 24% Savings through:
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 35% Savings through:
- Concrete Filler Floor Slab

21.43% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

$630/unit

Utility Cost Savings

$18/month/unit

Payback in Years

2.9

Operational CO_2 Savings

2.3 tCO_2/Year/unit

RELEVANT CERTIFIED PROJECT

Energy Measures – 28% Savings through:
- Reduced Window to Wall Ratio
- external shading devices
- energy-saving lighting system for internal spaces, common areas and external spaces
- lighting controls for common areas and outdoors.

Water – 52% Savings through:
- Low-Flow Faucets in Kitchen and Bathroom
- Dual-flush Water Closets

Materials – 47% Savings through:
- In-situ trough concrete slab for floor slabs and roof construction
- exposed cored bricks with internal plaster for external walls
- honeycomb clay blocks with plaster on both sides for internal walls.

EDIFICIO BIEL (COLOMBIA)

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – COSTA RICA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Mid Income	80m²	2	10	50

Energy Measures – 25% Savings through:

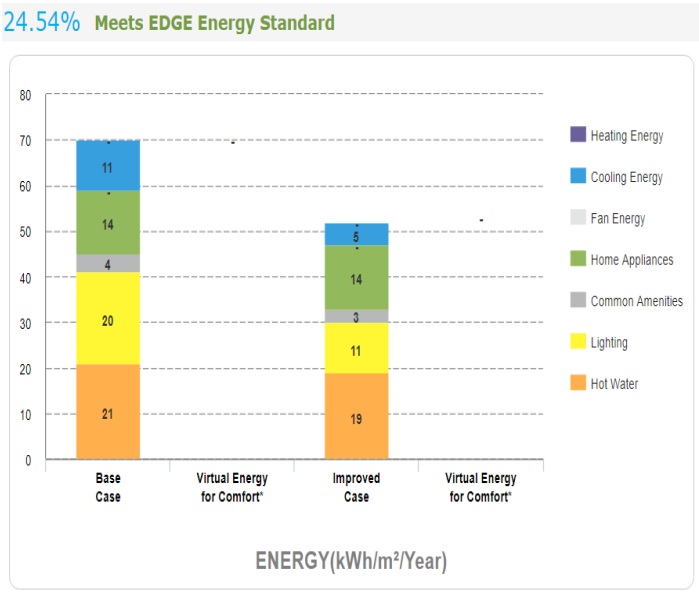
- Energy Saving Light Bulbs
- External Shading Device
- Insulation of Roof

Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 30% Savings through:

- Hollow Concrete Precast Floor Slabs



PROJECT METRICS

Incremental Cost
114,000 CRC/unit

Utility Cost Savings
12,230
CRC/month/unit

Payback in Years
0.6

Operational CO_2 Savings
0.75 tCO_2/Year/unit

RELEVANT CERTIFIED PROJECT

Energy Measures – 54% Savings through:

- Reduced Window to Wall Ratio
- natural ventilation
- energy-saving lighting

Water – 27% Savings through:

- Low-Flow Faucet for kitchen sinks and washbasins
- Low-Flow Flush for Water Closet

Materials – 55% Savings through:

- Concrete beam vault with insulation
- corrugated zinc sheets for roof
- medium weight hollow concrete blocks for internal and external walls
- finished concrete floor

CONDOMINIO LINDA VISTA EL MIRADOR (COSTA RICA)

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – MEXICO CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 26% Savings through:

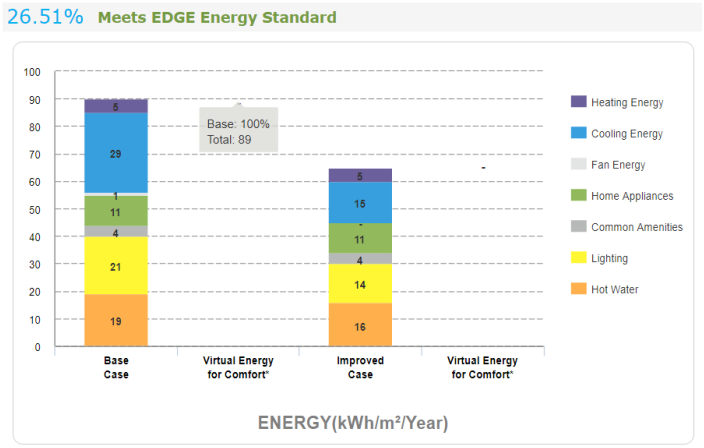
- Reduced Window to Wall Ratio
- Energy Saving Light Bulbs
- Natural Ventilation

Water – 27% Savings through:

- Recycled Grey Water for Flushing
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets

Materials – 21% Savings through:

- Concrete Filler Floor Slabs



PROJECT METRICS

Incremental Cost

$345/unit

Utility Cost Savings

$14/month/unit

Payback in Years

2

Operational CO_2 Savings

2.6 tCO_2/Year/unit

RELEVANT CERTIFIED PROJECT

Energy Measures – 35% Savings through:

- Reduced Window To Wall Ratio
- Energy-saving Lighting Systems For Internal Spaces, Common Areas And External Spaces

Water – 22% Savings through:

- Low-flow Faucets In Kitchens And Bathrooms
- Dual-flush Water Closets

Materials – 30% Savings through:

- Concrete Filler Slab With Polystyrene Blocks For Floor Slabs And Roof Construction
- Honeycomb Clay Blocks With Plaster On Both Sides For Internal And External Walls

ACALLI (MEXICO)

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – PERU CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m²	2	10	50

Energy Measures – 26% Savings through:

- Insulation of Roof
- Energy Saving Light Bulbs, Internal and Common Area
- Natural Ventilation

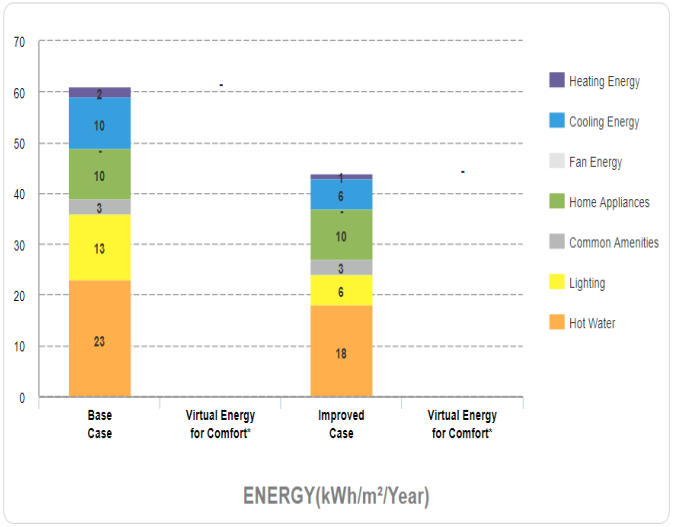
Water – 24% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Kitchen Sinks
- Dual Flush for Water Closets

Materials – 20% Savings through:

- Concrete Filler Floor Slabs

26.35% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

865 S /unit

Utility Cost Savings

55 S/month/unit

Payback in Years

1.3

Operational CO_2 Savings

1.9 tCO_2/Year/unit

RELEVANT CERTIFIED PROJECT

Energy Measures – 32% Savings through:

- Reduced Window To Wall Ratio
- Insulation Of Roof And External Walls

Water – 36% Savings through:

- Low-flow Faucets In Kitchens And Bathrooms
- Dual-flush Water Closets

Materials – 41% Savings through:

- Concrete Filler Slab For Floor Slabs And Roof Construction
- In-situ Reinforced Wall And Cored Bricks With Internal And External Plaster For External Walls
- Cored Bricks With Plaster On Both Sides For Internal Walls
- Laminated Wooden Flooring And Ceramic Tile

EDIFICIO MULTIFAMILIAR MARISCAL CASTILLA (PERU)

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

GREEN BUILDINGS RETURN ON INVESTMENT: HOMES IN MENA

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HOMES – EGYPT CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 23% Savings through:

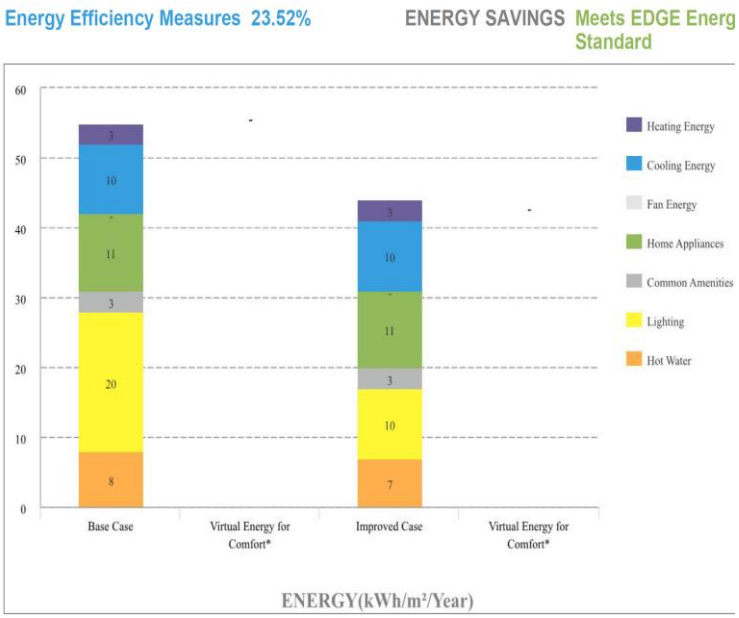
- Reduced Window to Wall Ratio
- Reflective Paint/Tiles for Roof
- Energy-Saving Light Bulbs - Internal Spaces

Water – 21% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins
- Dual Flush for Water Closets

Materials – 22% Savings through:

- Concrete Filler Slab



PROJECT METRICS

Incremental Cost
$ 240

Utility Costs Savings
$ 10 / month

Payback in Years
2

Operational CO_2 Savings
$ 0.5 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 33% Savings through:

- 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
- Solar hot water collectors.

Water – 39% Savings through:

- Low-flow plumbing fixtures.
- Dual-flush water closets.
- Black water treatment and recycling system.
- Rainwater harvesting systems

Materials – 23% Savings through:

- 150mm in-situ reinforced internal and external walls.

VBHC – VAIBHAVA BANGALORE (INDIA)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – JORDAN CASE STUDY & CERTIFIED PROJECT

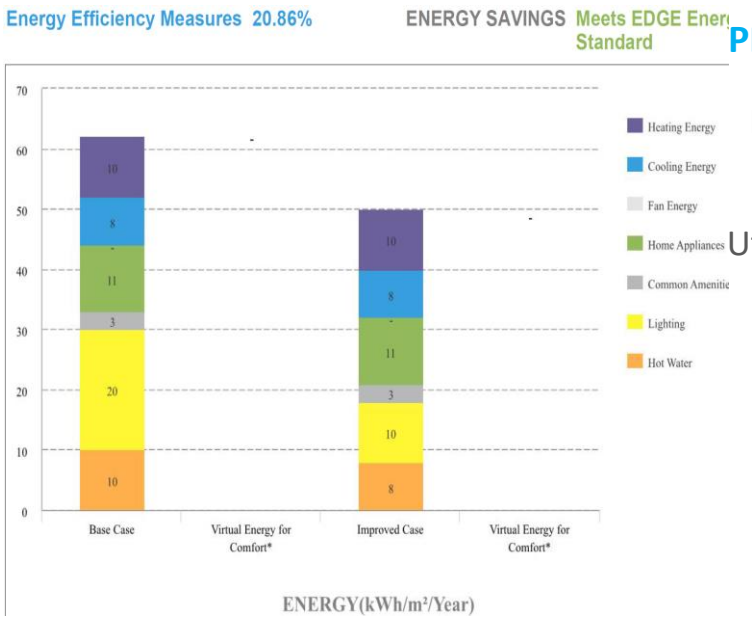
BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 21% Savings through:
- Reduced Window to Wall Ratio
- Energy-Saving Light Bulbs - Internal Spaces

Water – 21% Savings through:
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins
- Dual Flush for Water Closets

Materials – 24% Savings through:
- Composite In-Situ Concrete and Steel Deck



PROJECT METRICS

Incremental Cost
$250

Utility Costs Savings
$ 10 / month

Payback in Years
1.5

Operational CO_2 Savings
$ 1 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 82% Savings through:
- Reduced window to wall ratio.
- insulation of roof and external walls
- Higher performance glass
- Energy-saving lighting systems for internal and external spaces

Water – 31% Savings through:
- Low-flow faucets in kitchens and bathrooms
- Dual-flush water closets.

Materials – 47% Savings through:
- Concrete filler slab for roof construction.
- Autoclaved aerated concrete blocks for internal and external walls.
- UPVC window frames.

ECOLOFT JABABEKA CIKARANG (INDONESIA)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – MOROCCO CASE STUDY & CERTIFIED PROJECT

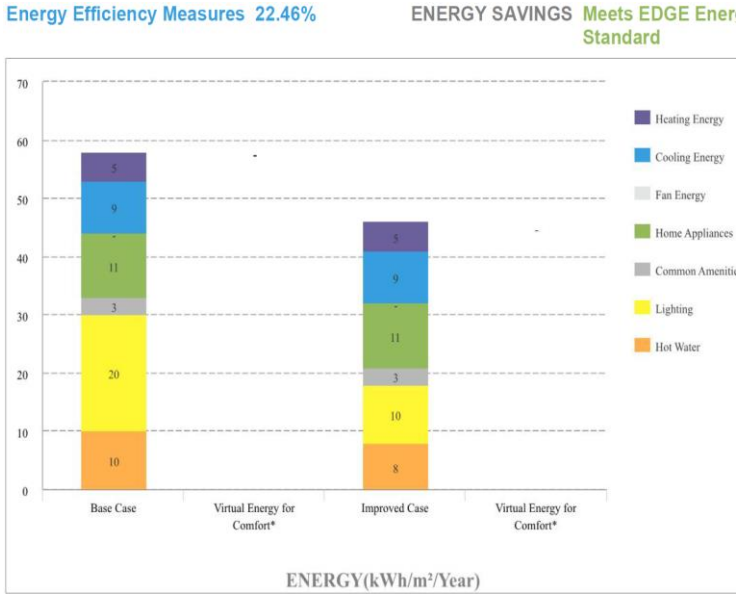
BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 23% Savings through:
- Reduced Window to Wall Ratio
- Energy-Saving Light Bulbs

Water – 21% Savings through:
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins
- Dual Flush for Water Closets

Materials – 24% Savings through:
- Composite In-Situ Concrete and Steel Deck



PROJECT METRICS

Incremental Cost
$250

Utility Costs Savings
$ 10 / month

Payback in Years
2

Operational CO_2 Savings
$ 1 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 21% Savings through:
- Reduced window to wall ratio.
- Reflective paint for external walls.
- External shading devices.
- Insulation of roof and external walls.
- Energy-saving light bulbs for internal spaces.

Water – 24% Savings through:
- Low-flow plumbing fixtures for washbasins.
- Water closets and shower-heads.

Materials – 24% Savings through:
- In-situ reinforced wall concrete.
- Medium weight hollow concrete blocks.
- Laminated wooden flooring and ceramic tile.

THE LINK 345 (VIETNAM)
In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

Offices

HOMES – PAKISTAN CASE STUDY & CERTIFIED PROJECT

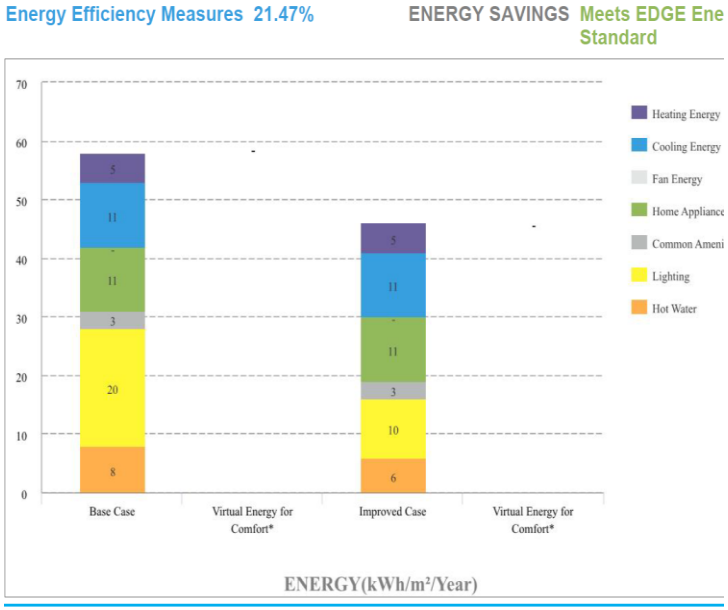
BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 20% Savings through:
- Reduced Window to Wall Ratio
- Energy-Saving Light Bulbs

Water – 21% Savings through:
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins
- Dual Flush for Water Closets

Materials – 24% Savings through:
- Composite In-Situ Concrete and Steel Deck



PROJECT METRICS

Incremental Cost
$ 250

Utility Costs Savings
$ 4 / month

Payback in Years
4.5

Operational CO_2 Savings
$ 0.5 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 22% Savings through:
- solar hot water collectors supplying 80% of annual hot water demand.
- External shading
- lighting controls for corridors and outdoors

Water – 21% Savings through:
- Low-flow plumbing fixtures.
- Dual-flush water closets.

Materials – 54% Savings through:
- In-situ concrete with greater than 30% pulverized fly ash Medium weight hollow concrete blocks for external and internal walls

CANOPUS - CONSTELAÇÃO (BRAZIL)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

GREEN BUILDINGS RETURN ON INVESTMENT: HOMES IN EASTERN EUROPE

IFC International Finance Corporation
WORLD BANK GROUP

Creating Markets, Creating Opportunities

HOMES – ARMENIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 44% Savings through:

- Air conditioning system
- Reduced Window to Wall Ratio
- Solar Photovoltaics

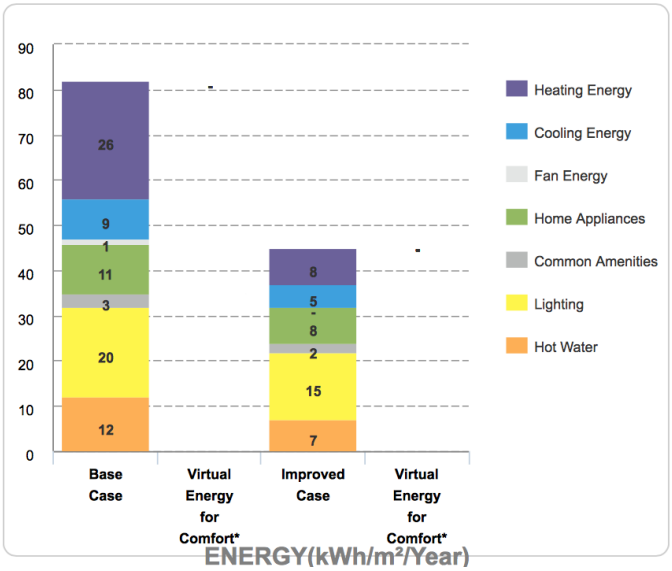
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Single and Dual Flush for Water Closets

Materials – 25% Savings through:

- External Walls – Cement Fiber Boards on Timber Studs

43.94% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$780/unit

Utility Costs Savings

$18/ unit / month

Payback in Years

3.7

Operational CO_2 Savings

1.84 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 23% Savings through:

- Reduced Window to Wall Ratio
- Insulation of Roof and External Walls

Water – 41% Savings through:

- Low-Flow faucets in kitchens and bathrooms
- Dual Flush Water Closets

Materials – 69% Savings through:

- Concrete filler slab for floor slabs and roof construction
- Medium weight hollow concrete blocks for internal and external walls
- Ceramic tile

GOLF LOS INCAS (PERU)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – POLAND CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 46% Savings through:

- Air conditioning system
- Reduced Window to Wall Ratio
- Solar Photovoltaics

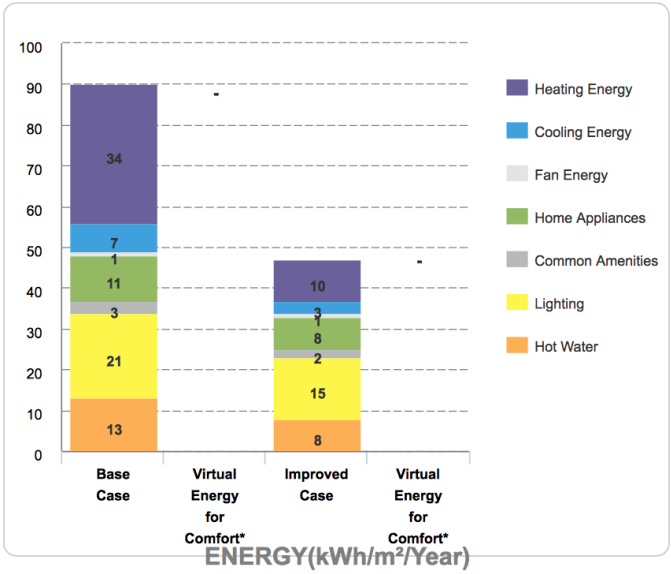
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Single and Dual Flush for Water Closets

Materials – 21% Savings through:

- External Walls – Cement Fiber Boards on Timber Studs

46.35% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$1,095/unit

Utility Costs Savings

$42/ unit / month

Payback in Years

2.1

Operational CO_2 Savings

2.62 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 30% Savings through:

- Reduced Window to Wall Ratio
- Roof insulation
- Solar hot water collectors and smart heaters

Water – 28% Savings through:

- Low-Flow Showerheads and Faucets
- Dual-Flush water closets

Materials – 36% Savings through:

- Hollow core precast floor slabs
- Steel sheets on timber rafters
- Facing brick and solid concrete blocks for external walls
- Solid dense concrete blocks for internal walls

CANDLEWOOD CRESCENT (SOUTH AFRICA)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – RUSSIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 21% Savings through:

- Reduced Window to wall ratios
- Natural ventilation
- Insulation of external walls
- Air conditioning system

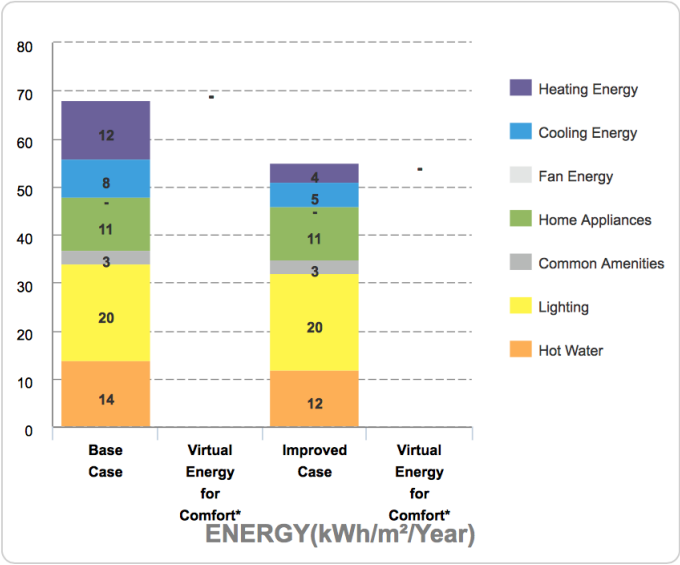
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Single and Dual Flush for Water Closets

Materials – 21% Savings through:

- External Walls – Cement Fiber Boards on Timber Studs

20.84% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$1,171/unit

Utility Costs Savings

$13/ unit / month

Payback in Years

7

Operational CO_2 Savings

0.5 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 22% Savings through:

- Reduced Window to Wall Ratio
- Energy-Saving Lighting in outdoor areas
- Reflective paint and tiles for the roof
- External shading devices

Water – 25% Savings through:

- Low-Flow Showerheads
- Water-efficient kitchen and bathroom faucets
- Dual-flush water closets
- Recycled grey water for flushing

Materials – 70% Savings through:

- Autoclaved aerated concrete blocks for internal and external walls
- Ceramic tile flooring and UPVC window frames

TCP ALTURA (INDIA)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – SERBIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 22% Savings through:

- Air conditioning system
- Reduced Window to Wall Ratio

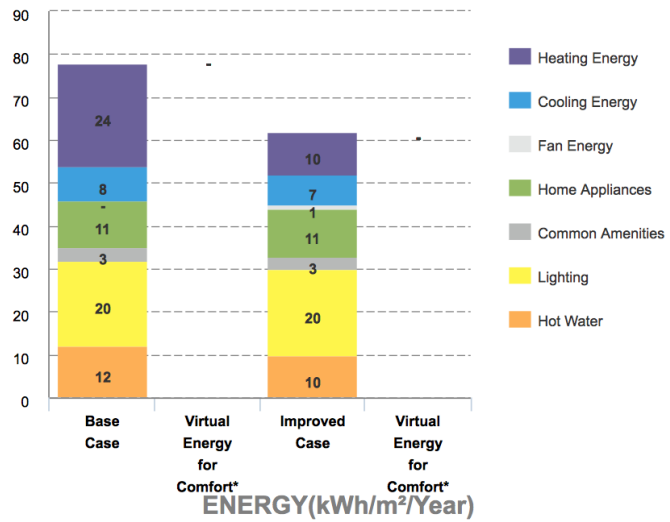
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Single and Dual Flush for Water Closets

Materials – 21% Savings through:

- External Walls – Cement Fiber Boards on Timber Studs

22.43% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$601/unit

Utility Costs Savings

$25/ unit / month

Payback in Years

2

Operational CO_2 Savings

1 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 32% Savings through:

- Reduced Window to Wall Ratio
- Roof insulation
- Heat pump for hot water

Water – 25% Savings through:

- Low-Flow Faucets
- Dual-flush water closets

Materials – 35% Savings through:

- Clay roofing tiles on timber rafters for roof construction
- Cored bricks with plaster on both sides for internal and external walls
- Cellulose roof insulation

FOURLEAF ESTATE (SOUTH AFRICA)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – UKRAINE CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 26% Savings through:

- Air conditioning system
- Insulation of External walls
- Solar Hot Water Collectors
- Reduced Window to Wall Ratio

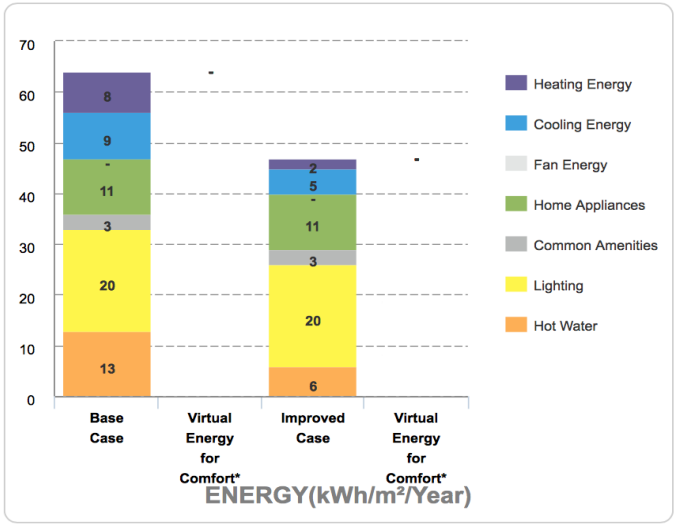
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Single and Dual Flush for Water Closets

Materials – 21% Savings through:

- External Walls – Cement Fiber Boards on Timber Studs

26.14% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$553

Utility Costs Savings

$40/ unit / month

Payback in Years

1

Operational CO_2 Savings

0.8 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 30% Savings through:

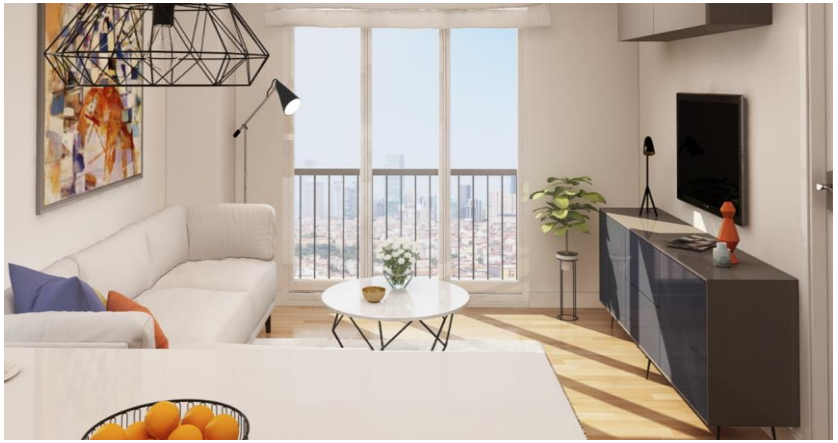
- Reduced window to wall ratio
- Insulation of roof and external walls
- Higher performance glass
- Energy-saving lighting systems for internal spaces, common areas and external spaces

Water – 20% Savings through:

- Low-flow faucets in kitchens and bathrooms
- Dual-flush water closets

Materials – 41% Savings through:

- Concrete filler slab for roof construction
- Autoclaved aerated concrete blocks for internal and external walls
- UPVC window frames



MINT CAGLAYAN (TURKEY)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

HOMES – TURKEY CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Average Unit Area	Bedrooms / Unit	Floors	Units
Low Income	80m^2	2	10	50

Energy Measures – 31% Savings through:

- Air conditioning system
- Energy saving Lightbulbs – Internal Spaces

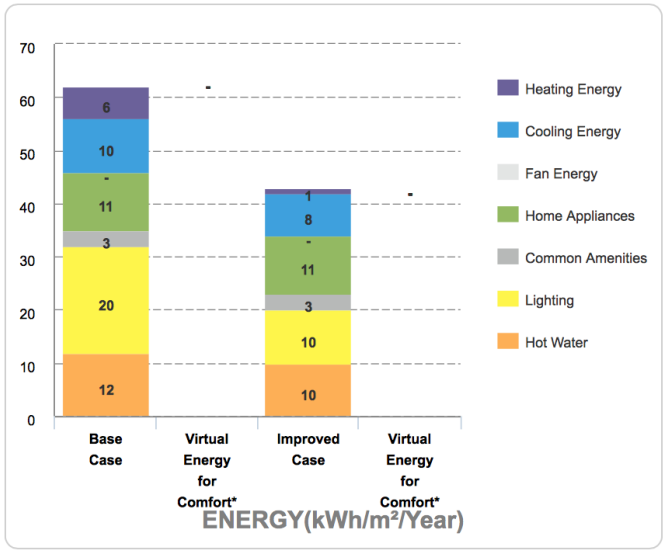
Water – 22% Savings through:

- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Single and Dual Flush for Water Closets

Materials – 26% Savings through:

- External Walls – Facing Brick and Hollow Concrete Blocks
- Floor Slabs – Light Gauge Steel Floor Cassette

31.41% **Meets EDGE Energy Standard**



PROJECT METRICS

Incremental Cost

$464/unit

Utility Costs Savings

$16/ unit / month

Payback in Years

2

Operational CO_2 Savings

0.6 tCO_2/Year

RELEVANT CERTIFIED PROJECT

Energy Measures – 35% Savings through:

- Reduced Window To Wall Ratio
- Low E-coated glass
- VRV cooling system
- Reflective Paint and Insulation For External Walls
- Energy-Saving Lighting Systems
- High-efficiency boilers for heating and hot water

Water – 42% Savings through:

- Low-flow showerheads and faucets in kitchens and bathrooms
- Dual-flush water closets

Materials – 41% Savings through:

- Concrete filler slabs for floors and roofs
- Cored bricks with plaster for internal and external walls

GREENOX RESIDENCE (TURKEY)

In-country certified project to replace related example once an EDGE project is certified.

Case study for illustration purposes only, access more projects at https://www.edgebuildings.com/projects/

METHODOLOGY, NOTES, ACKNOWLEDGMENTS

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Creating Markets, Creating Opportunities

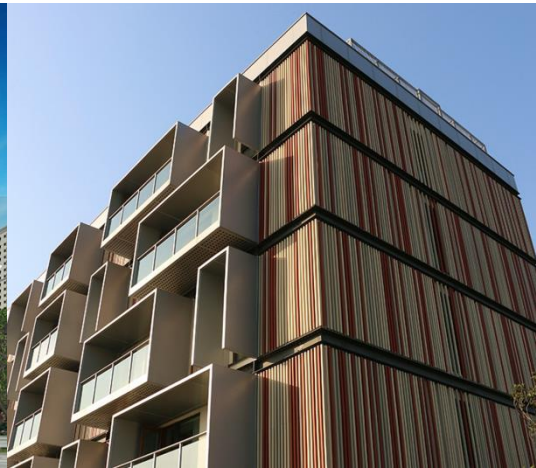
RESEARCH OBJECTIVE: MOST EFFECTIVE INTERVENTIONS TO REACH THE EDGE STANDARD

Reach 20% savings across the Energy, Water, and Materials categories in the most cost effective manner.

Analyzed focus countries in order to understand the environment and geographic impact on interventions.

Analyzed six sectors in each country – Homes, Hospitals, Hotels, Schools, Offices, and Retail – for best interventions unique to the sector and country in question in order to obtain EDGE certification.

By utilizing EDGE, we sought the most effective interventions in the passive building design phase that would in turn lead to the lowest possible payback and lowest cost for investors and builders.



OVERVIEW OF EDGE: A SOFTWARE, STANDARD, AND GREEN BUILDING CERTIFICATION SYSTEM

The EDGE application helps to determine the most cost-effective options for designing green within a local climate context. Free on-line application is available from www.edgebuildings.com.

A building has reached the EDGE standard when it achieves 20% reduction in each of the 3 categories: energy, water, and embedded energy in materials.

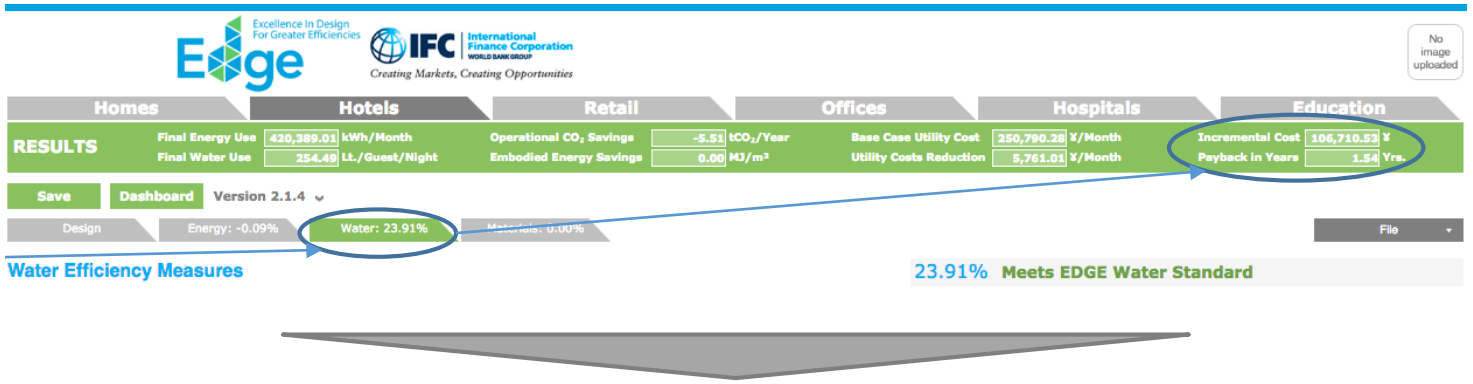
Third party certification verifies the resource efficiency savings so they can be credibly communicated between investors, developers, and buyers.

RESEARCH METHODOLOGY

The most cost effective interventions were determined through an iterative process using the EDGE application.

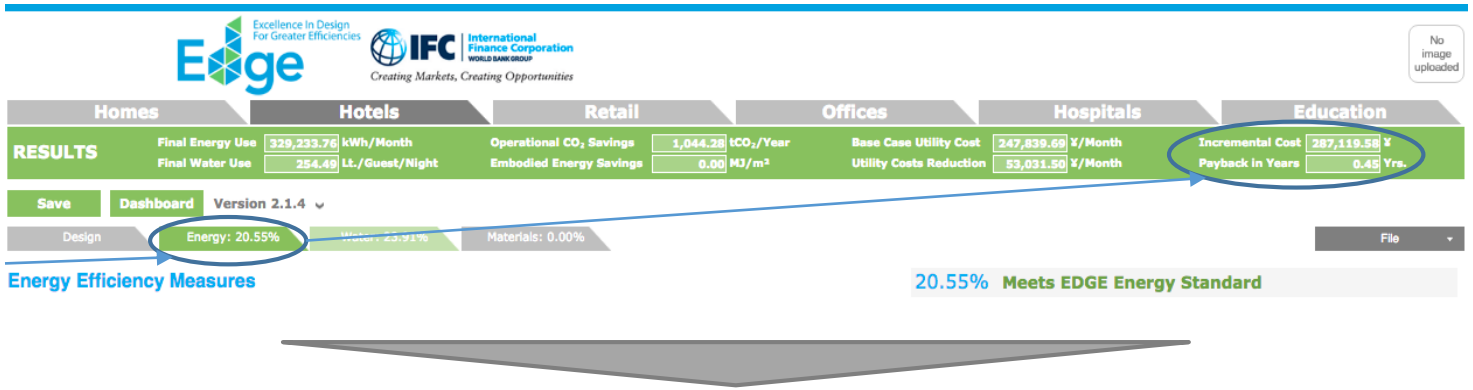
1

Determine top water measures that allow to pass the 20% minimum at the lowest Cost & Payback. Water was chosen first because it is tied to energy savings.



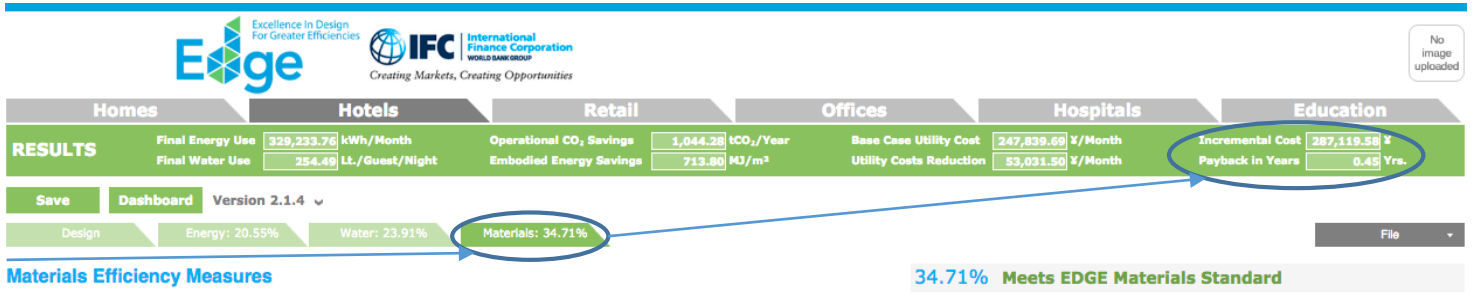
2

Once determined, proceed with next measure (energy) and repeat the process. Note: Water and energy measures may directly impact multiple categories.



3

Proceed to test materials measures and review the final Incremental Cost & Payback in Years.



4 Repeat.

NOTES

- Case studies and certified projects are given for **illustrative purposes** only.
- Case studies included several assumptions in the building design, as per EDGE default values.
- Since case studies were chosen for the capital city only, the key takeaways for a country may be different in countries with varying climactic conditions across geographic regions.
- Education and Light Industrial are **new sectors** added to the EDGE application, have few certified buildings.
- Investors and developers of buildings should **use the dynamic EDGE software** with inputs specific to their respective building and climactic conditions, and then choose green interventions that **best address their specific needs**.
- IFC is **collecting additional data**, including operational savings of certified buildings – the operational data will be forthcoming, as will the ROI analysis for other regions.
- This research is part of ongoing series provided by IFC – in-depth country studies are available from: https://www.edgebuildings.com/marketing/research/

ACKNOWLEDGEMENTS

DONOR ACKNOWLEDGEMENT

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COLLABORATION ACKNOWLEDGEMENT

IFC thanks the Georgetown University McDonough School of Business for collaborating on developing the market intelligence reports.

Visit www.edgebuildings.com for more information