



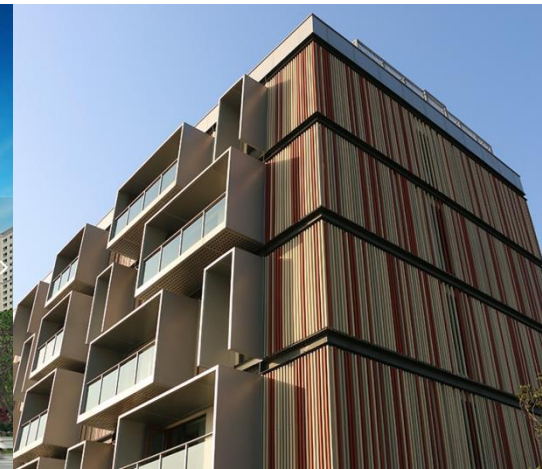
GREEN BUILDINGS RETURN ON INVESTMENT: EAST ASIA



Creating Markets, Creating Opportunities

TABLE OF CONTENTS

Cambodia	Pages 3 – 10
China	Pages 11 – 18
Fiji	Pages 19 – 26
Indonesia	Pages 27 – 34
Thailand	Pages 35 – 42
Vietnam	Pages 43 – 50
Methodology, Notes, Acknowledgements	Pages 51– 56





CAMBODIA: GREEN BUILDINGS RETURN ON INVESTMENT



Creating Markets, Creating Opportunities

HOMES – CAMBODIA 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 & Lighting Controls
- Energy Saving Light Bulbs
- Low-E Coated Glass



Water – 22% Savings through:

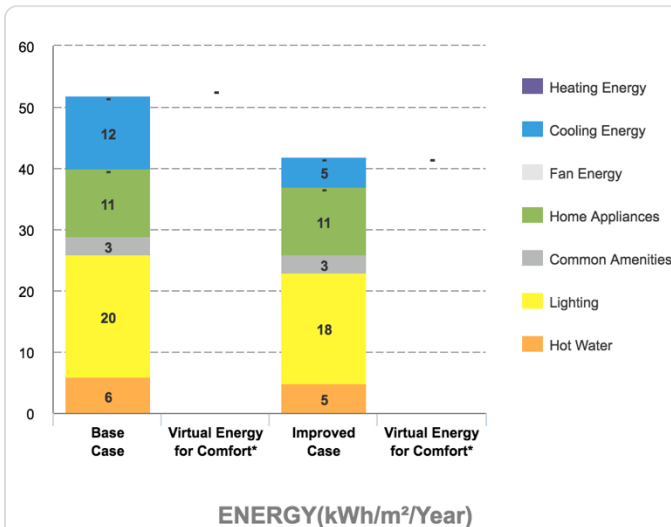
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets



Materials – 28% Savings through:

- Timber Floor Construction Floor Slabs

20.97% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$60/unit

Payback in Years

0.40

Operational CO₂ Savings

0.70 tCO₂/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.

HOTELS – CAMBODIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Hotel	Floors Above Ground	Total Guest Units	Internal Area
4 Star Hotel	8	200	15,599 m ²



Energy Measures – 21% Savings through:

- Heat Pump for Hot Water
- Energy Saving Light Bulbs
- Solar Hot Water Collectors



Water – 37% Savings through:

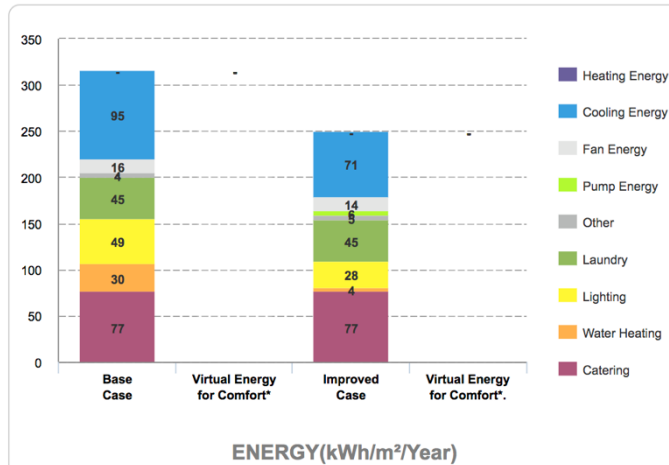
- Low-Flow Showerheads and Faucets Guestrooms
- Gray Water Treatment and Recycling System
- Rainwater Harvesting System



Materials – 36% Savings through:

- In-Situ Trough Concrete Slab Flooring

20.90% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$2,000

Payback in Years
0.01

Operational CO₂ Savings
780 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 23% Savings through:

- Reduced Window to Wall Ratio, Low-E Coated Glass
- Air Conditioning with Air Cooled Screw Chiller
- Energy Saving Lighting for back-of-house, internal, external spaces



Water – 28% Savings through:

- Low-Flow Faucets in Kitchens and Bathrooms
- Single Flush and Flush Valve for Water Closets
- Water-Efficient Urinals
- Aerators and Auto Shut-off Faucet in Bathrooms



Materials – 51% Savings through:

- Facing Brick and Hollow Concrete Blocks for External Walls



AC HOTEL VERACRUZ (MEXICO)

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

SHOPPING CENTERS – CAMBODIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Site Area	Car Parking	Landscaped Area	Amenities
15,000 m ²	Indoor Car Parking	1,000,000 m ²	Supermarket, Food Court



Energy Measures – 27% Savings through:

- Insulation of Roof, Natural Ventilation
- Air Conditioning with Air Cooled Screw Chiller
- Energy Saving Light Bulbs, Sales Area



Water – 23% Savings through:

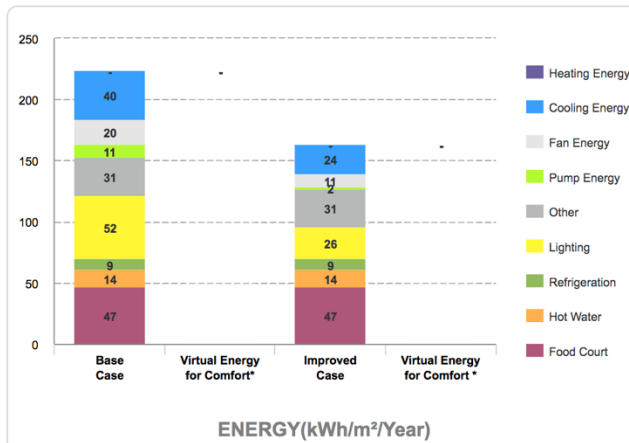
- Dual Flush for Water Closets



Materials – 31% Savings through:

- Timber Floor Construction Floor Slabs

27.16% Meets EDGE energy standard



PROJECT METRICS

Incremental Cost

\$125,000

Payback in Years

0.80

Operational CO₂ Savings

700 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 29% Savings through:

- Reduced Window to Wall Ratio, Reflective Paint for Roof
- Variable Refrigerant Volume (VRV) Cooling System
- Energy Saving Lighting, Solar Photovoltaics



Water – 49% Savings through:

- Low-Flow Plumbing Fixtures
- Aerators and Auto Shut-off Faucet in All Washrooms
- Rainwater Harvesting System



Materials – 36% Savings through:

- In-Situ Reinforced Concrete Floor Slabs, Steel Sheets on Steel Rafters Roof
- Steel Profile Cladding for External Walls; Autoclaved Aerated Concrete for Internal and External Walls



SAVEMAX SUPER GROSIR CIBUBUR (INDONESIA)

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

OFFICES – CAMBODIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Gross Internal Area	Floors Above Grade	Floors Below Grade	Floor-to-Floor Height
5000m ²	3	2	3.5m



Energy Measures – 20% Savings through:

- Natural ventilation with operable windows and no A/C
- Variable refrigerant flow system



Water – 56% Savings through:

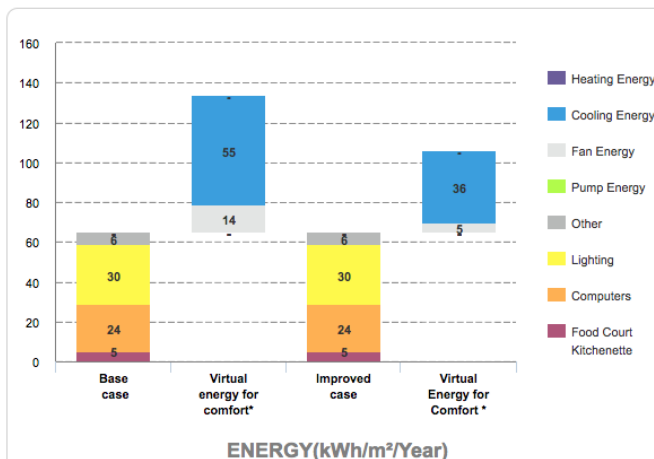
- Water-efficient bathroom urinals and faucets for kitchen sinks
- Dual flush for water closets in bathrooms



Materials – 35% Savings through:

- Timber Floor Construction Floor Slabs

20.50% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$19,000

Payback in Years

76

Operational CO₂ Savings

0 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 30% Savings through:

- Reflective Paint, Tiles, and Insulation for Roof
- Low E-Coated Glass
- Variable Refrigerant Volume Cooling System
- Sensible Heat Recovery from Exhaust Air
- Energy-Saving Light Bulbs for Internal and External Spaces



Water – 70% Savings through:

- Low-Flow Faucets in Kitchens and Bathrooms
- Water-Efficient Urinals and Water Closets
- Grey Water Treatment and Recycling System



Materials – 45% Savings through:

- Curtain Walling for External Walls



DAAN MOGOT BARU OFFICE PARK (INDONESIA)

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

SCHOOLS – CAMBODIA CASE STUDY

BUILDING DETAILS

Occupancy Density	Operational Hours	Working Days	Holidays / Year
3	6	5	60



Energy Measures – 28% Savings through:

- Natural Ventilation for Corridors & Classrooms
- Low-E Coated Glass
- Insulation of Roof



Water – 23% Savings through:

- Dual Flush
- Water-Efficient Urinals
- Water-Efficient Faucets for Kitchen Sinks



Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

PROJECTED PROJECT METRICS

Incremental Cost

\$3,741

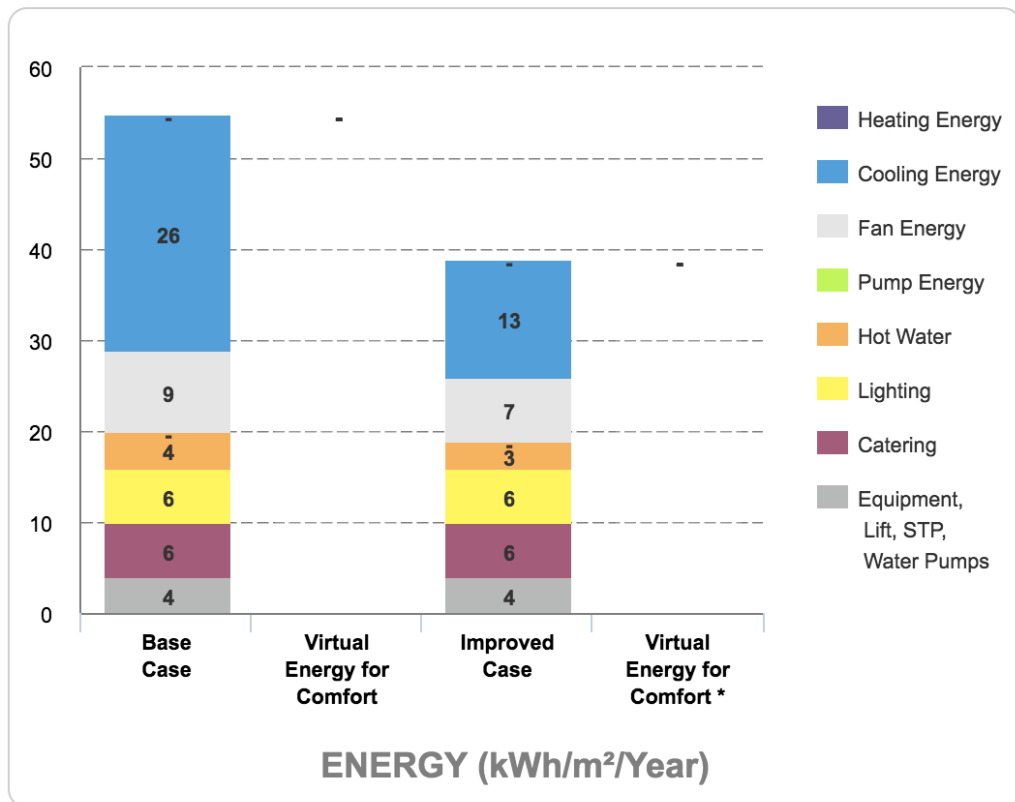
Payback in Years

0.30 Years

Operational CO2 Savings

61 tCO₂/Year

28.2% Meets EDGE Energy Standard



Education is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.

HOSPITALS – CAMBODIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Gross Internal Area	Occupancy Rate	Floors	Beds
Multi Specialty	9,700m ²	70%	7	100



Energy Measures – 22% Savings through:

- Variable Refrigerant Flow Cooling Systems
- Energy Saving Light Bulbs - Internal & External Spaces
- Absorption Chiller Powered by Waste Heat



Water – 22% Savings through:

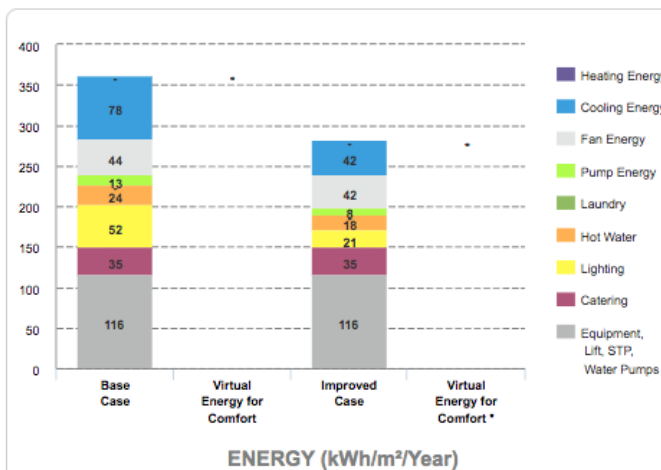
- Variable Refrigerant Flow Cooling Systems
- Water-Efficient Dishwashers and Bathroom Faucets
- Pre-rinse Valve for Rinsing Operation



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

22.46% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$12,000

Payback in Years

0.10

Operational CO₂ Savings

600 tCO₂/Year

RELEVANT CERTIFIED PROJECT – LEBANON



Energy Measures – 56% Savings through:

- Reduced Window To Wall Ratio
- Insulation Of Roof And External Walls
- Low E-coated Glass
- Air Conditioning With Air Cooled Chiller
- Energy-saving Lighting Systems For Internal And External Spaces
- Solar Hot Water Collectors
- Solar Photovoltaics



Water – 33% Savings through:

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



Materials – 42% Savings through:

- Aluminum Sheets On Steel Rafters For Roof Construction
- 3-D Wire Panel With “Shot-crete” On Both Sides For External And Internal Walls
- Ceramic Tile Flooring



KOMFO ANOKYE HOSPITAL (GHANA)

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

LIGHT INDUSTRY– CAMBODIA CASE STUDY

BUILDING DETAILS

Floors Above Ground	Floors Below Ground	Gross Internal Area
1	0	15,000 m ²



Energy Measures – 21% Savings through:

- Variable Frequency Driver in Air Handling Units
- Air Conditioning with Air Cooled Screw Chiller
- Solar Hot Water Collectors



Water – 54% Savings through:

- Dual Flush, Water-Efficient Urinals
- Auto Shut-off, Efficient Faucets
- Rainwater Harvesting System



Materials – 27% Savings through:

- Re-Use of Existing Floorslab

PROJECTED PROJECT METRICS

Incremental Cost

\$59,388

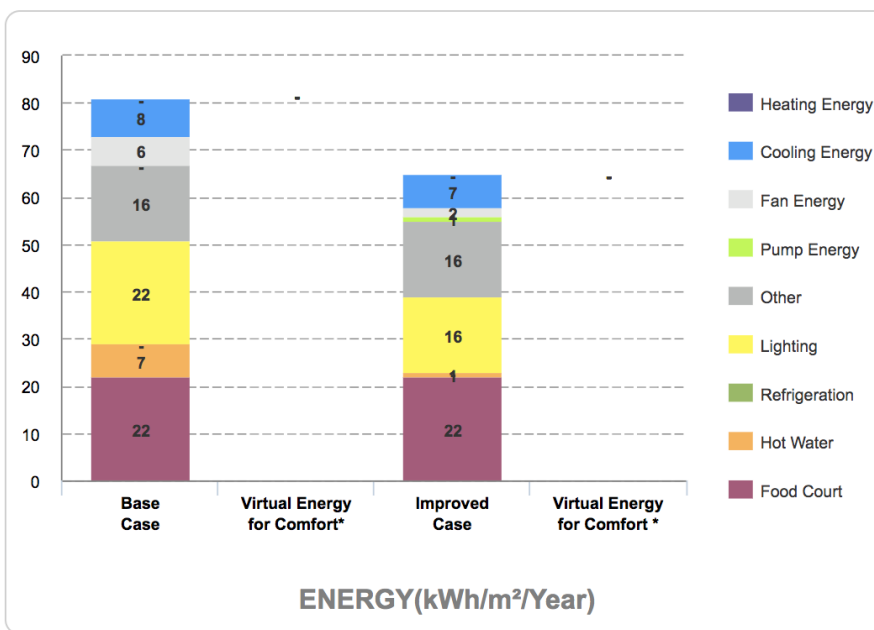
Payback in Years

1.32

Operational CO₂ Savings

195 tCO₂/Year

20.89% Meets EDGE energy standard



Light Industry is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.



CHINA: GREEN BUILDINGS RETURN ON INVESTMENT



Creating Markets, Creating Opportunities

HOMES – CHINA 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



Water – 20% Savings through:

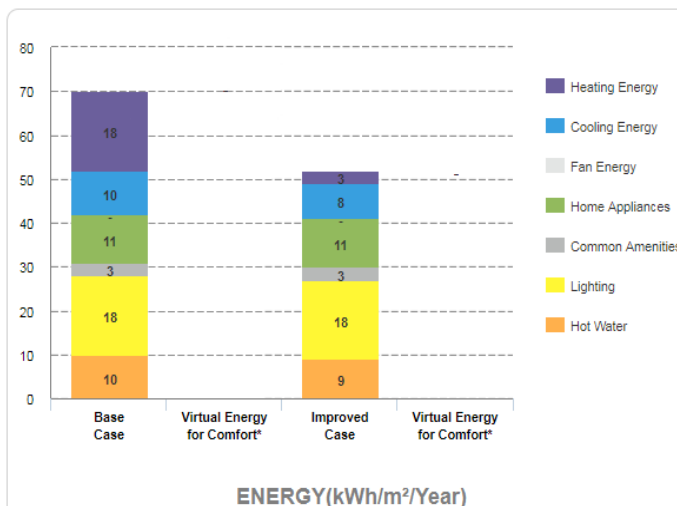
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets



Materials – 28% Savings through:

- Timber Floor Construction Floor Slabs

26.35% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

2,000 ¥/unit

Payback in Years

1.80

Operational CO₂ Savings

2 tCO₂/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.

HOTELS – CHINA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Hotel	Floors Above Ground	Total Guest Units	Internal Area
4 Star Hotel	8	200	15,599 m ²



Energy Measures – 23% Savings through:

- External Shading Devices, Natural Ventilation
- Low E-Coated Glass
- DX Split System (Cooling), Heat Pump for Hot Water
- Absorption Chiller, Powered by Waste Water
- Sensible Heat Recovery from Exhaust Air



Water – 24% Savings through:

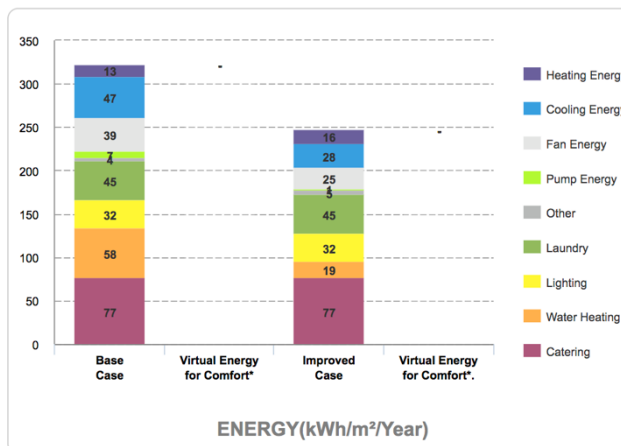
- Grey Water Treatment and Recycling System



Materials – 34% Savings through:

- In-Situ Trough Concrete Slab Flooring

23.23% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

650,000 ¥

Payback in Years

0.95

Operational CO₂ Savings

1,400 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 47% Savings through:

- External Shading Devices, Insulation of Roof and External Walls
- Higher Thermal Performance Glass, Energy-Efficient Air Conditioning, Energy-Saving Lighting System



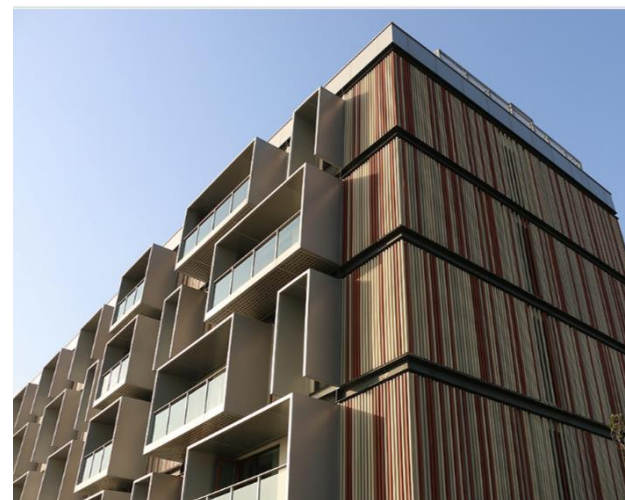
Water – 42% Savings through:

- Low-Flow Showerheads and Faucets, Dual Flush Toilets
- Rainwater Harvesting System
- Gray Water Treatment & Recycling System



Materials – 34% Savings through:

- Solid Dense Concrete Blocks for Internal and External Walls
- Laminated Wooded Floors
- Timber Window Frames



BRUCK PASSIVE HOUSE HOTEL (NANJING)

SHOPPING CENTERS – CHINA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Site Area	Car Parking	Landscaped Area	Amenities
15,000 m ²	Indoor Car Parking	1,000,000 m ²	Supermarket, Food Court



Energy Measures – 28% Savings through:

- Variable Frequency Drives in Air Handling Units
- Sensible Heat Recovery from Exhaust Air
- Solar Hot Water Collectors



Water – 24% Savings through:

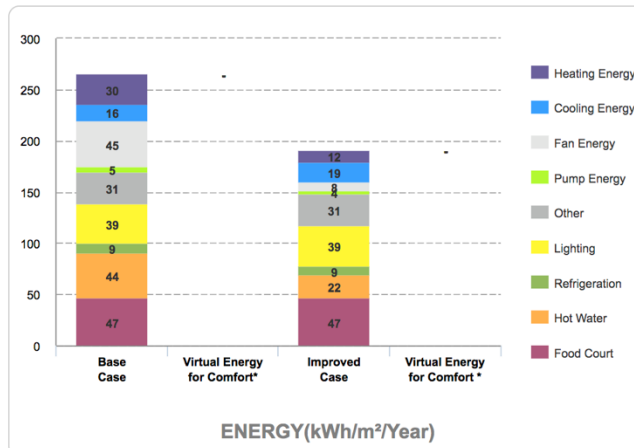
- Dual Flush for Water Closets
- Water Efficient Urinals in all Bathrooms



Materials – 30% Savings through:

- Timber Floor Construction Floor Slabs

28.09% Meets EDGE energy standard



PROJECT METRICS

Incremental Cost

775,000 ¥

Payback in Years

0.90

Operational CO₂ Savings

1,300 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 47% Savings through:

- Reduced Window to Wall Ratio, Reflective Paint and Insulation for Roof and Walls, Recovery of Waste Heat from Generator for Heating
- High Efficiency Condensing Boiler for Space Heating
- High Efficiency Refrigerated Cases and Energy Efficient Lighting



Water – 42% Savings through:

- Dual Flush Water Closets, Water Efficient Urinals
- Aerators and Auto Shut-Off Faucets



Materials – 34% Savings through:

- Corrugated Zinc Sheets for Roof, Steel Profile Cladding for External Walls and Solid Dense Concrete Blocs for External Walls



KAUFLAND (BULGARIA)

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



OFFICES – CHINA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Gross Internal Area	Floors Above Grade	Floors Below Grade	Floor-to-Floor Height
5000m ²	3	2	3.5m



Energy Measures – 24% Savings through:

- External Shading Devices
- Recovery Waste Heat from the Generator for Space Heating
- Air conditioning with air air cooled screw chiller



Water – 49% Savings through:

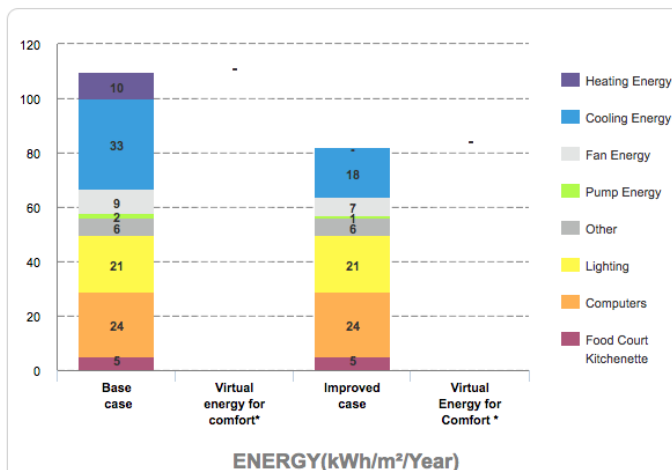
- Black water treatment and recycling system



Materials – 34% Savings through:

- Timber Floor Construction Floor Slabs

24.44% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

90,000 ¥

Payback in Years

0.75

Operational CO₂ Savings

105 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 45% Savings through:

- Reduced Window to Wall Ratio
- Insulation of Roof and External Walls
- Higher Thermal Performance Glass
- Energy-Efficient Air Conditioning with Water-Cooled Chiller
- Sensible Heat Recovery from Exhaust Air



Water – 42% Savings through:

- Low-Flow Plumbing Fixtures and Dual-Flush Water Closets
- Grey Water Treatment and Recycling System



Materials – 21% Savings through:

- In-situ Concrete with Pulverized Fly Ash for Floor Slabs and Roof Construction



JOHNSON CONTROLS HQ (SHANGHAI)

SCHOOLS— CHINA CASE STUDY

BUILDING DETAILS

Occupancy Density	Operational Hours	Working Days	Holidays / Year
3	6	5	60



Energy Measures – 22% Savings through:

- Sensible Heat Recovery from Exhaust Air



Water – 23% Savings through:

- Dual Flush
- Water-Efficient Urinals
- Water-Efficient Faucets for Kitchen Sinks



Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

PROJECTED PROJECT METRICS

Incremental Cost

2,719 ¥

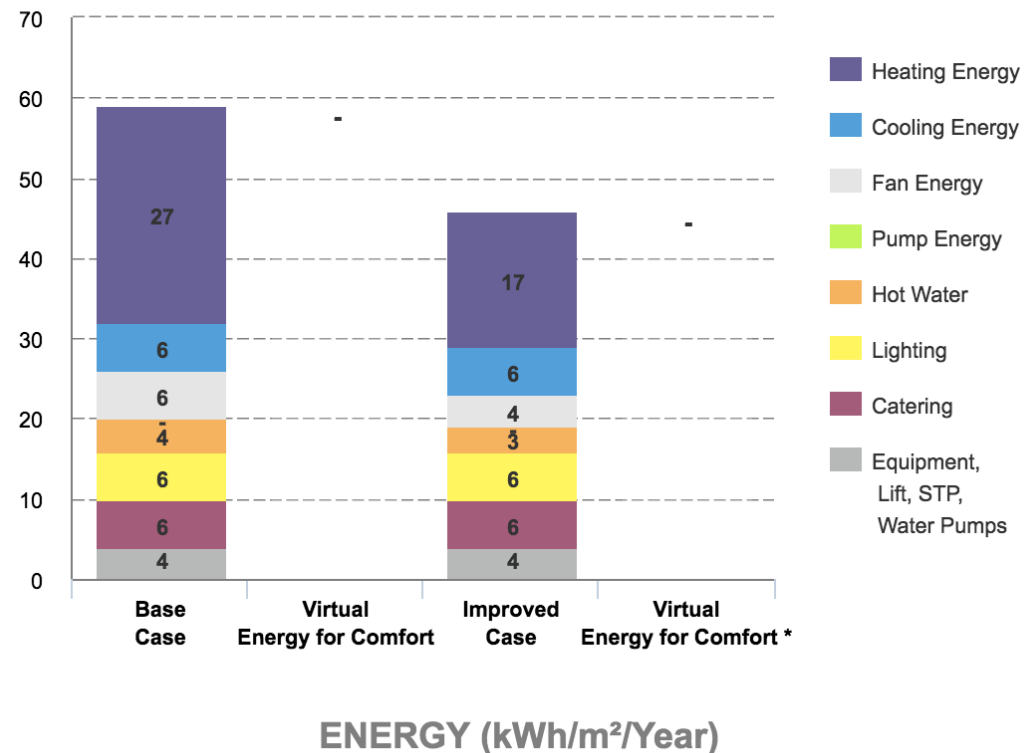
Payback in Years

0.09 Years

Operational CO₂ Savings

80 tCO₂/Year

22.1% Meets EDGE Energy Standard



Education is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.

HOSPITALS – CHINA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Gross Internal Area	Occupancy Rate	Floors	Beds
Multi Specialty	9,700m ²	70%	7	100



Energy Measures – 21% Savings through:

- Absorption Chiller Powered by Waste Heat
- Energy Saving External Light Bulbs
- Recovery of Waste Heat from Generator for Heating



Water – 22% Savings through:

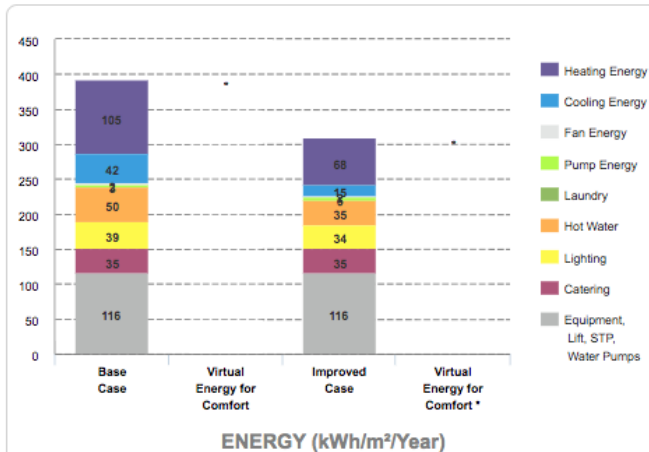
- Water-Efficient Dishwashers, Bathroom Faucets, Kitchen Sink, Urinals, and Water Closets
- Pre-rinse Valve for Rinsing Operation



Materials – 31% Savings through:

- Timber Floor Construction Floor Slabs

21.04% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

450,000 ¥

Payback in Years

1.00

Operational CO₂ Savings

950 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window to Wall Ratio
- Higher Thermal Performance Glass
- Wall Insulation
- Air Economizers
- Energy-Efficient Air Conditioning with Air Cooled Chiller
- Sensible Heat Recovery from Exhaust Air



Water – 25% Savings through:

- Low-Flow Faucets and Dual Flush Water Closet in bathrooms
- Water-Efficient Faucets for Kitchen Sinks



Materials – 26% Savings through:

- Clay Roofing Tiles on Steel Rafters



KESERWAN MEDICAL CENTER (LEBANON)

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

LIGHT INDUSTRY– CHINA CASE STUDY

BUILDING DETAILS

Floors Above Ground	Floors Below Ground	Gross Internal Area
1	0	15,000 m ²



Energy Measures – 27% Savings through:

- Variable Refrigerant Flow Cooling System
- Variable Frequency in Air Handling Systems
- Sensible Heat Recovery, Solar Hot Water Heaters



Water – 28% Savings through:

- Water-Efficient Urinals and Faucets
- Rainwater Harvesting and Gray Water Treatment



Materials – 26% Savings through:

- Re-use of Existing Floorslab

PROJECTED PROJECT METRICS

Incremental Cost

93,738 ¥

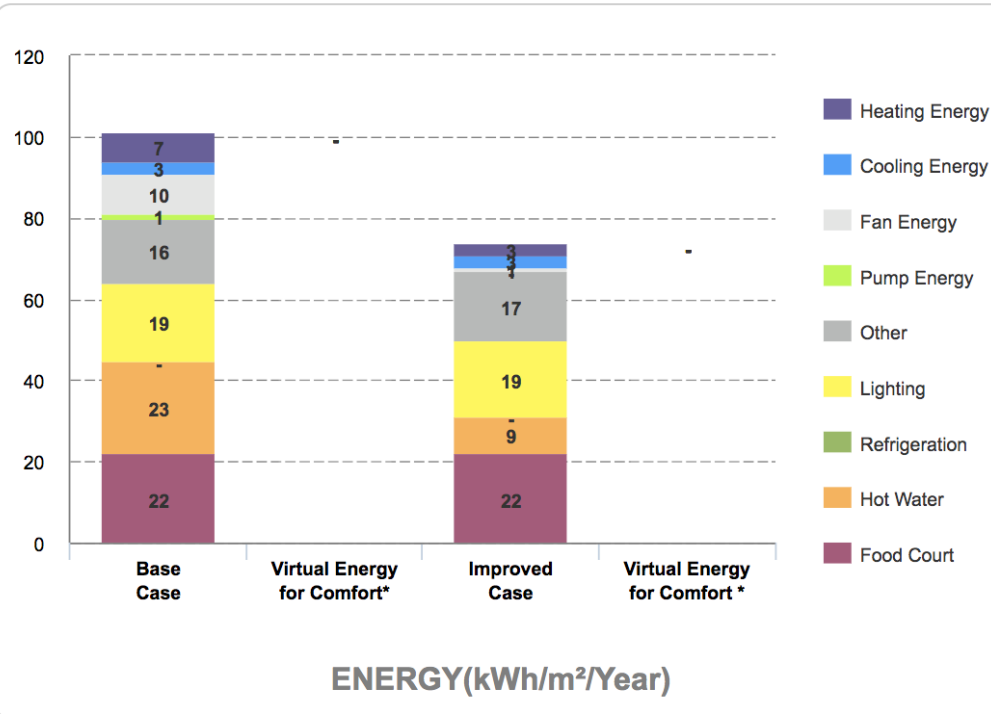
Payback in Years

0.25

Operational CO₂ Savings

483 tCO₂/Year

26.97% Meets EDGE energy standard



Light Industry is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.



FIJI: GREEN BUILDINGS RETURN ON INVESTMENT



Creating Markets, Creating Opportunities

HOMES – FIJI 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 – 42% Savings through:

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



Water – 22% Savings through:

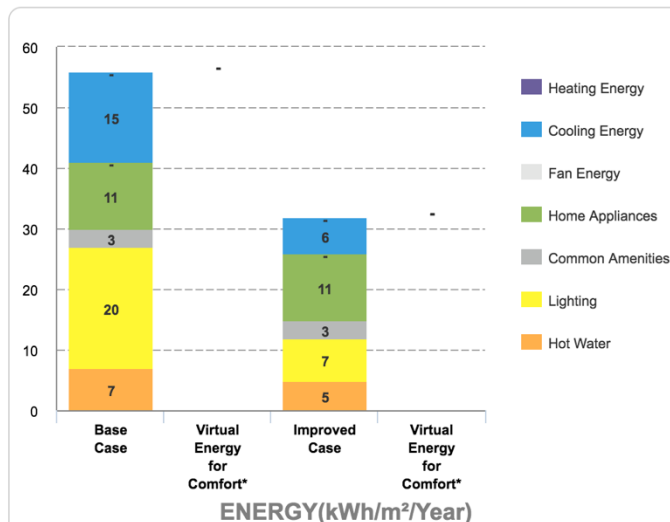
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets



Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

42.35% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$90/unit

Payback in Years
0.15

Operational CO₂ Savings
1 tCO₂/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.

HOTELS – FIJI CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Hotel	Floors Above Ground	Total Guest Units	Internal Area
4 Star Hotel	8	200	15,599 m ²



Energy Measures – 25% Savings through:

- External Shading Devices
- Air Conditioning with Air Cooled Screw Chiller
- Heat Pump for Hot Water
- Energy Saving Light Bulbs



Water – 37% Savings through:

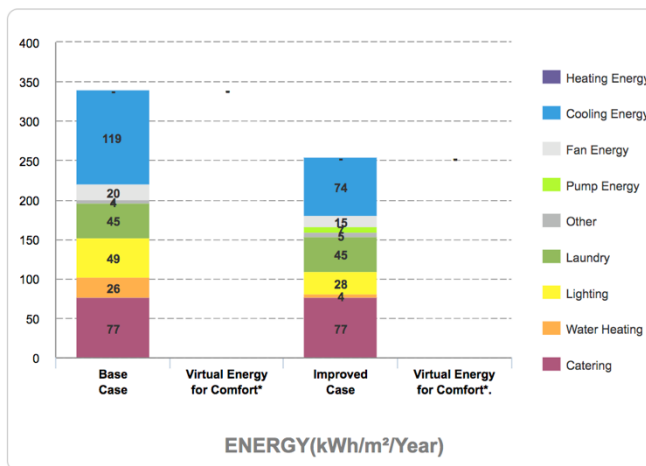
- Low-Flow Showerheads and Faucets in Guestrooms
- Gray Water Recycling, Rainwater Harvesting System



Materials – 36% Savings through:

- In-Situ Trough Concrete Slab Flooring

25.44% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$13,000

Payback in Years

0.03

Operational CO₂ Savings

700 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 63% Savings through:

- Reduced Window to Wall Ratio, External Shading Device
- Low-E Coated Glass, Variable Refrigerant Volume Cooling System
- Heat Pump for Hot Water, Energy Saving Lighting



Water – 22% Savings through:

- Low-Flow Faucets in Kitchens and Bathrooms
- Dual Flush Water Closets
- Water-Efficient Urinals, Dishwashers and Landscaping
- Aerators and Auto Shut-off Faucet in Bathrooms



Materials – 44% Savings through:

- Autoclaved Aerators Concrete Blocks for External and Internal Walls
- UPVC Window Frames



THE 101 YOGYAKARTA TUGU (INDONESIA)

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

SHOPPING CENTERS – FIJI CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Site Area	Car Parking	Landscaped Area	Amenities
15,000 m ²	Indoor Car Parking	1,000,000 m ²	Supermarket, Food Court



Energy Measures – 29% Savings through:

- Insulation of Roof, Solar Hot Water Collectors
- Air Conditioning with Air Cooled Screw Chiller
- Variable Frequency Drives for Air Handling Units
- Energy Saving Light bulbs, Sales Area



Water – 50% Savings through:

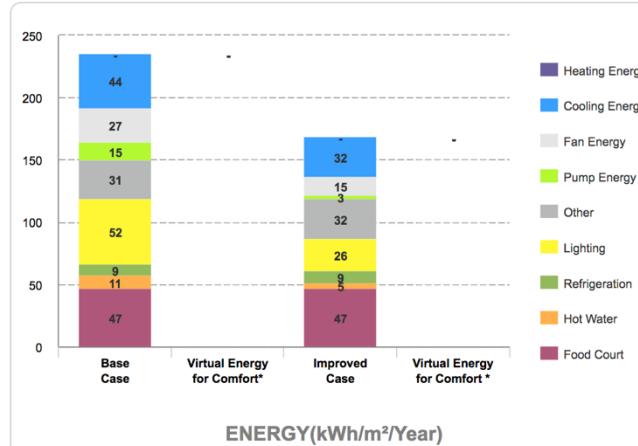
- Dual Flush, Water Efficient Urinals for all Bathrooms
- Gray Water Treatment, Rainwater Harvesting System



Materials – 42% Savings through:

- Re-Use of Existing Floorslab

28.73% Meets EDGE energy standard



PROJECT METRICS

Incremental Cost
\$95,000

Payback in Years
0.30

Operational CO₂ Savings
550 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 29% Savings through:

- Reduced Window to Wall Ratio, Insulated Roofs and External Walls
- Occupancy Sensors in Bathrooms, Energy saving lighting



Water – 24% Savings through:

- Single Flush Water Closets
- Water-Efficient Urinals
- Aerators and Auto Shut-Off Faucet in Bathrooms



Materials – 23% Savings through:

- Steel Sheets on Steel Rafters Roof Construction
- Cement Fibre Boards on Metal Studs for all External Walls and In-Situ Reinforced External Walls



RETAIL AT SANTA VERDE (COSTA RICA)

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



OFFICES – FIJI CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Gross Internal Area	Floors Above Grade	Floors Below Grade	Floor-to-Floor Height
5000m ²	3	2	3.5m



Energy Measures – 27% Savings through:

- Variable Refrigerant Flow System
- Energy Saving Light Bulbs for Internal Spaces



Water – 21% Savings through:

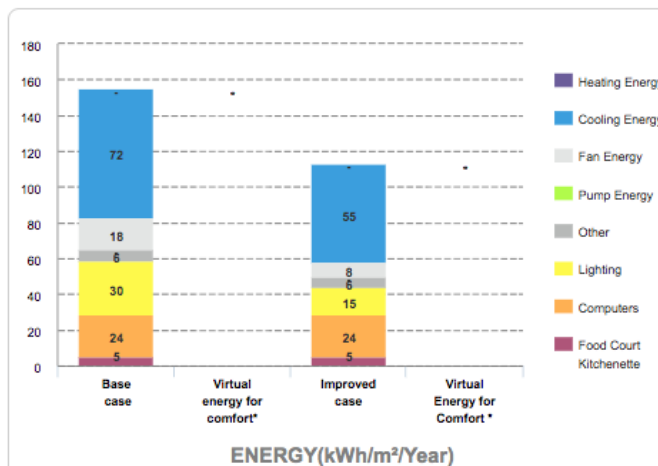
- Low-Flow Faucets in Bathrooms and Kitchen Sinks
- Water-Efficient Urinals in all Bathrooms



Materials – 35% Savings through:

- Timber Floor Construction Floor Slabs

27.10% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$45,000

Payback in Years

0.70

Operational CO₂ Savings

110 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 38% Savings through:

- Reduced Window To Wall Ratio
- Reflective Paint for Roof and Walls
- Roof and Wall Insulation
- Energy-Saving Lightning for Internal and External Spaces



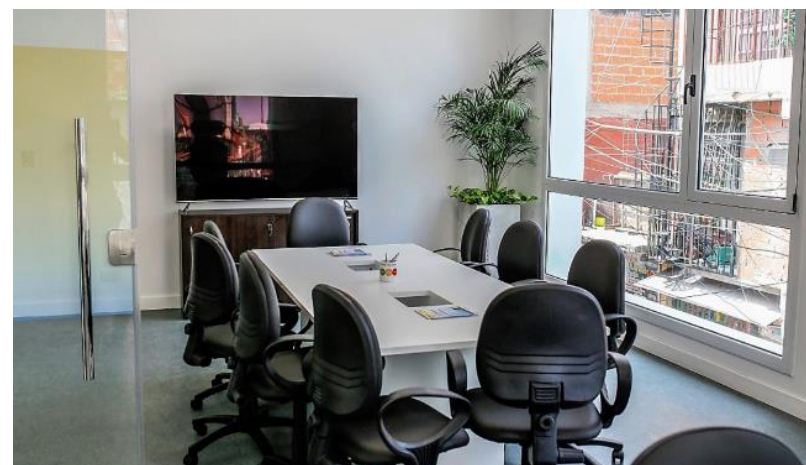
Water – 23% Savings through:

- Rainwater Harvesting System
- Low-Flow Plumbing Fixtures for Kitchen Sinks, Washbasins, Water Closets and Shower Heads



Materials – 63% Savings through:

- Reuse of Existing Floor Slabs and External Walls With Steel Profile Cladding, Plasterboards on Metal Studs for Internal Walls, Steel Sheets on Steel Rafters for the Roof and Ceramic Tile



CeDEL (ARGENTINA)

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

SCHOOLS – FIJI CASE STUDY

BUILDING DETAILS

Occupancy Density	Operational Hours	Working Days	Holidays / Year
3	6	5	60



Energy Measures – 32% Savings through:

- Natural Ventilation for Corridors & Classrooms
- Insulation of Roof & External Walls
- Low-E Coated Glass
- Energy Efficient Ceiling Fans



Water – 23% Savings through:

- Dual Flush
- Water-Efficient Urinals
- Water-Efficient Faucets for Kitchen Sinks



Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

PROJECTED PROJECT METRICS

Incremental Cost

\$8,513

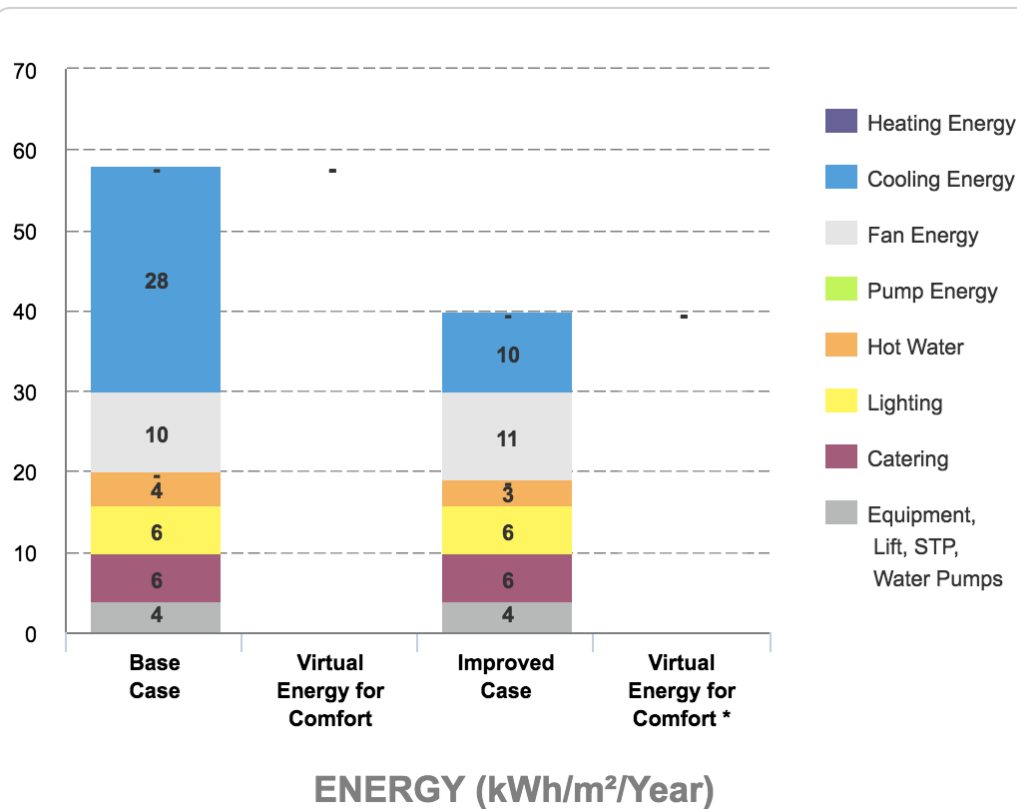
Payback in Years

0.28 Years

Operational CO₂ Savings

51 tCO₂/Year

32.0% Meets EDGE Energy Standard



Education is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.

HOSPITALS – FIJI CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Gross Internal Area	Occupancy Rate	Floors	Beds
Multi Specialty	9,700m ²	70%	7	100



Energy Measures – 25% Savings through:

- Variable Refrigerant Flow Cooling Systems
- Energy Saving Light Bulbs - Internal & External Spaces
- Sensible Heat Recovery from Exhaust Air
- External Shading Devices
- Solar Hot Water Collectors



Water – 44% Savings through:

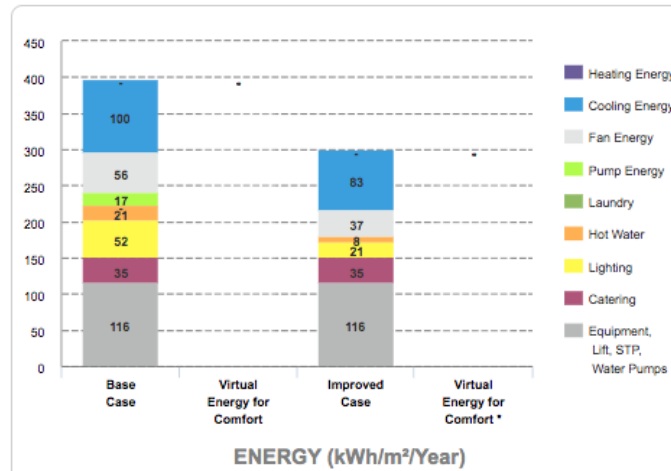
- Variable Refrigerant Flow Cooling Systems
- Water-Efficient Bathroom Faucets and Kitchen Sink



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

24.60% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$8,000

Payback in Years
0.02

Operational CO₂ Savings
520 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- Reduced Window To Wall Ratio
- Reflective Paint and Insulation For External Walls
- Natural Ventilation For Corridors
- Energy-Saving Lighting Systems
- Occupancy Sensors In Bathrooms
- Solar Photovoltaics



Water – 35% Savings through:

- Low-flow Faucets In Kitchens And Bathrooms
- Single-flush And Flush Valve For Water Closets
- Water-efficient Urinals, Faucets And Landscaping
- Rainwater Harvesting System



Materials – 43% Savings through:

- Steel Sheets On Steel Rafters For Roof Construction
- Medium Weight Hollow Concrete Blocks For Internal And External Walls
- Finished Concrete Flooring



SEDE DE EBAIS (COSTA RICA)

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

LIGHT INDUSTRY– FIJI CASE STUDY

BUILDING DETAILS

Floors Above Ground	Floors Below Ground	Gross Internal Area
1	0	15,000 m ²



Energy Measures – 22% Savings through:

- Insulation of External Walls, Natural Ventilation
- Variable Frequency Drives in Air Handling Units
- Energy Saving Light Bulbs in Food Court



Water – 46% Savings through:

- Rainwater Harvesting System
- Water Efficient, Auto Shut-Off Faucets



Materials – 32% Savings through:

- Re-use of Existing Floorslab

PROJECTED PROJECT METRICS

Incremental Cost

\$430.77

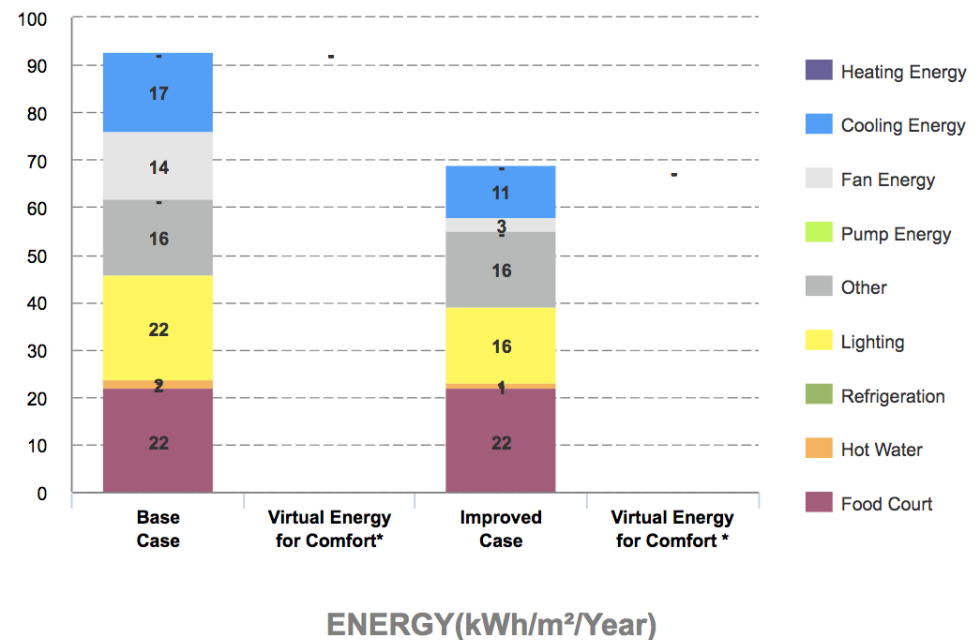
Payback in Years

0.52

Operational CO₂ Savings

151 tCO₂/Year

26.62% Meets EDGE energy standard



Light Industry is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.



INDONESIA: GREEN BUILDINGS RETURN ON INVESTMENT



Creating Markets, Creating Opportunities

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:

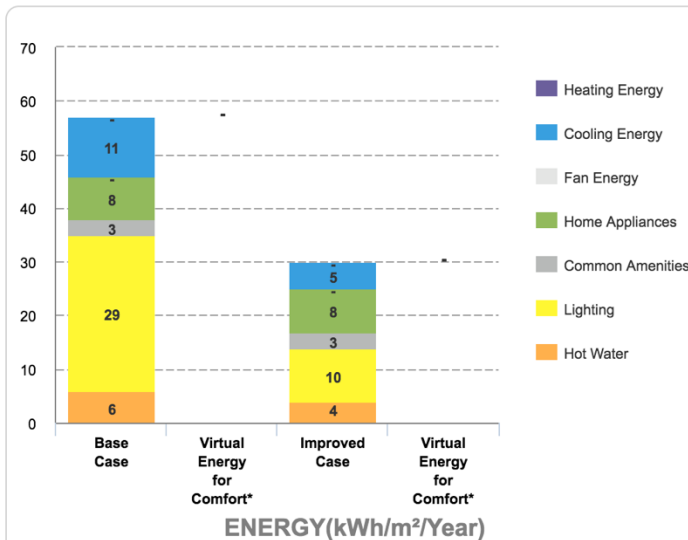
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins & Kitchen Sinks
- Dual Flush for Water Closets



Materials – 27% Savings through:

- Timber Floor Construction Floor Slabs

46.74% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

400

Thousand Rp/unit

Payback in Years

0.10

Operational CO₂ Savings

2 tCO₂/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)

HOTELS – INDONESIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Hotel	Floors Above Ground	Total Guest Units	Internal Area
4 Star Hotel	8	200	15,599 m ²



Energy Measures – 22% Savings through:

- Air Conditioning with Air Cooled Screw Chiller
- Heat Pump for Hot Water
- Energy Saving Light Bulbs
- Solar Hot Water Collectors



Water – 40% Savings through:

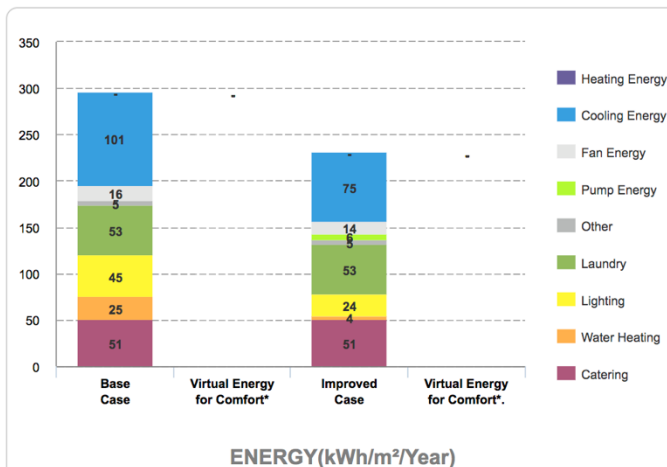
- Low-Flow Showerheads and Faucets in Guestrooms
- Gray Water Treatment, Rainwater Harvesting System



Materials – 56% Savings through:

- Re-Use of Existing Floorslab

21.68% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

525,000
Thousand Rp

Payback in Years

0.80

Operational CO₂
Savings

600 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window to Wall Ratio and External Shading Devices
- Insulation of Roof and External Walls, Natural Ventilation in Corridors, Air Conditioning with Air Cooled Screw Chiller
- Energy-Saving Light Bulbs and Solar Photovoltaics



Water – 21% Savings through:

- Low-Flow Plumbing Fixtures for Washbasins and Showerheads,
- Dual Flush Water Closets
- Water-Efficient Kitchen Faucets and Landscaping



Materials – 37% Savings through:

- Micro Concrete Tiles on Steel Rafters for Roof, Stone Profile Cladding and Autoclaved Aerated Concrete Block Walls, Wood Block Finish Flooring



SPRINGHILL CONDOTEL AT JIMBARAN JIJAU (BALI)

SHOPPING CENTERS – INDONESIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Site Area	Car Parking	Landscaped Area	Amenities
15,000 m ²	Indoor Car Parking	1,000,000 m ²	Supermarket, Food Court



Energy Measures – 22% Savings through:

- Reflective Paint/Tiles for Roof
- Variable Speed Drives on Fans of Cooling Towers
- Energy Saving Light bulbs in Sales Area



Water – 25% Savings through:

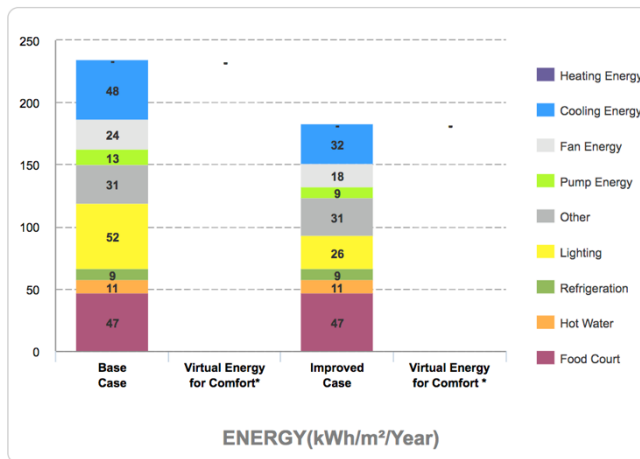
- Dual Flush for Water Closets
- Water-Efficient Urinals



Materials – 31% Savings through:

- Timber Floor Construction Floor Slabs

21.67% Meets EDGE energy standard



PROJECT METRICS

Incremental Cost

815,000

Thousand Rp

Payback in Years

0.56

Operational CO₂ Savings

548.93 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 29% Savings through:

- Reduced Window to Wall Ratio, Reflective Paint for Roof
- Variable Refrigerant Volume (VRV) Cooling System
- Energy Saving Lighting, Solar Photovoltaics



Water – 49% Savings through:

- Low-Flow Plumbing Fixtures
- Aerators and Auto Shut-off Faucet in All Washrooms
- Rainwater Harvesting System



Materials – 36% Savings through:

- In-Situ Reinforced Concrete Floor Slabs, Steel Sheets on Steel Rafters Roof
- Steel Profile Cladding for External Walls; Autoclaved Aerated Concrete for Internal and External Walls



SAVEMAX SUPER GROSIR CIBUBUR (BOGOR)



OFFICES – INDONESIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Gross Internal Area	Floors Above Grade	Floors Below Grade	Floor-to-Floor Height
5000m ²	3	2	3.5m



Energy Measures – 29% Savings through:

- External Shading Devices
- Insulation of Roof and External Walls
- Energy-Saving Light Bulbs



Water – 50% Savings through:

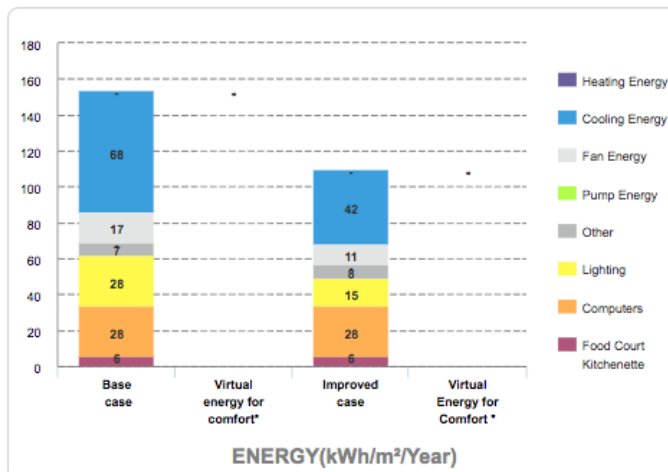
- Black Water Treatment and Recycling System



Materials – 35% Savings through:

- Timber Floor Construction Floor Slabs

28.64% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

190,000
Thousand Rp

Payback in Years

0.5

Operational CO₂
Savings

150 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 27% Savings through:

- High Performance Glass
- Reduced Window To Wall Ratio
- Energy-Saving Lighting
- Efficient Cooling Systems



Water – 65% Savings through:

- Low-Flow Faucets For Washbasins
- Dual Flush For Water Closets
- Water-efficient Urinals



Materials – 37% Savings through:

- Gypsum Walls And Stone Tile Floors For The Retail Space
- Steel Profile Cladding and Finished Concrete Floors



CITRA TOWERS KEMAYORAN (JAKARTA)

SCHOOLS – INDONESIA CASE STUDY

BUILDING DETAILS

Occupancy Density	Operational Hours	Working Days	Holidays / Year
3	6	5	60



Energy Measures – 30% Savings through:

- Natural Ventilation for Corridors & Classrooms
- Low-E Coated Glass
- Insulation of Roof



Water – 23% Savings through:

- Dual Flush
- Water-Efficient Urinals
- Water-Efficient Faucets for Kitchen Sinks



Materials – 27% Savings through:

- Timber Floor Construction Floor Slabs

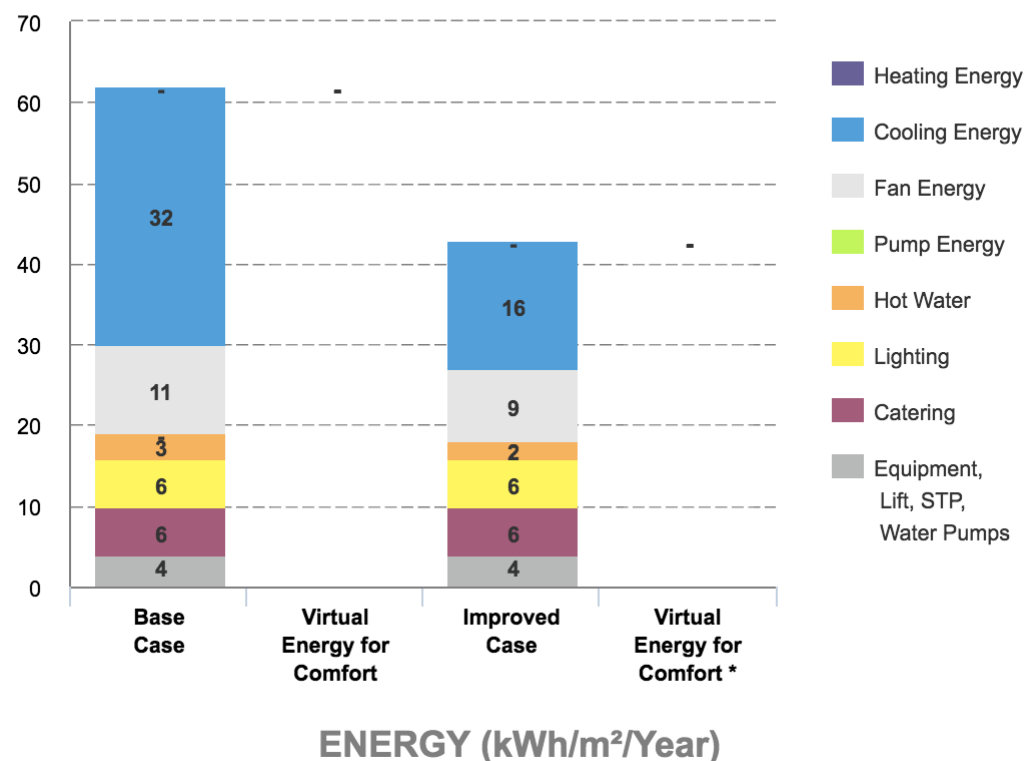
PROJECTED PROJECT METRICS

Incremental Cost
21,859 Thousand Rp

Payback in Years
0.16 Years

Operational CO2 Savings
70 tCO₂/Year

30.2% Meets EDGE Energy Standard



Education is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.

HOSPITALS – INDONESIA CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Gross Internal Area	Occupancy Rate	Floors	Beds
Multi Specialty	9,700m ²	70%	7	100



Energy Measures – 21% Savings through:

- Variable Refrigerant Flow Cooling Systems
- Low-E Coated Glass
- Sensible Heat Recovery from Exhaust Air
- Energy-Saving Light Bulbs Internal & External Spaces
- Solar Hot Water Collectors



Water – 26% Savings through:

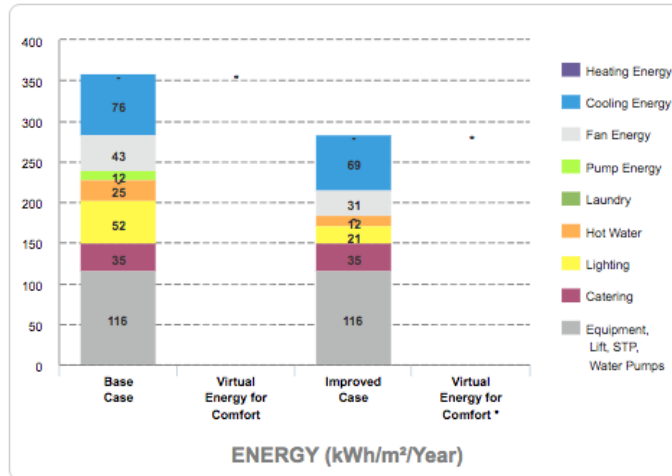
- Variable Refrigerant Flow Cooling Systems



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

20.91% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
425,000
Thousand Rp

Payback in Years
0.40

Operational CO₂
Savings
550 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window to Wall Ratio
- Higher Thermal Performance Glass
- Wall Insulation
- Air Economizers
- Energy-Efficient Air Conditioning with Air Cooled Chiller
- Sensible Heat Recovery from Exhaust Air



Water – 25% Savings through:

- Low-Flow Faucets and Dual Flush Water Closet in bathrooms
- Water-Efficient Faucets for Kitchen Sinks



Materials – 26% Savings through:

- Clay Roofing Tiles on Steel Rafters



KESERWAN MEDICAL CENTER (LEBANON)

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

LIGHT INDUSTRY– INDONESIA CASE STUDY

BUILDING DETAILS

Floors Above Ground	Floors Below Ground	Gross Internal Area
1	0	15,000 m ²



Energy Measures – 21% Savings through:

- Variable Frequency Driver in Air Handling Units
- Air Conditioning with Air Cooled Screw Chiller
- Solar Hot Water Collectors



Water – 55% Savings through:

- Dual Flush, Water-Efficient Urinals
- Auto Shut-off, Efficient Faucets
- Rainwater Harvesting System



Materials – 42% Savings through:

- Re-use of Existing Floorslab

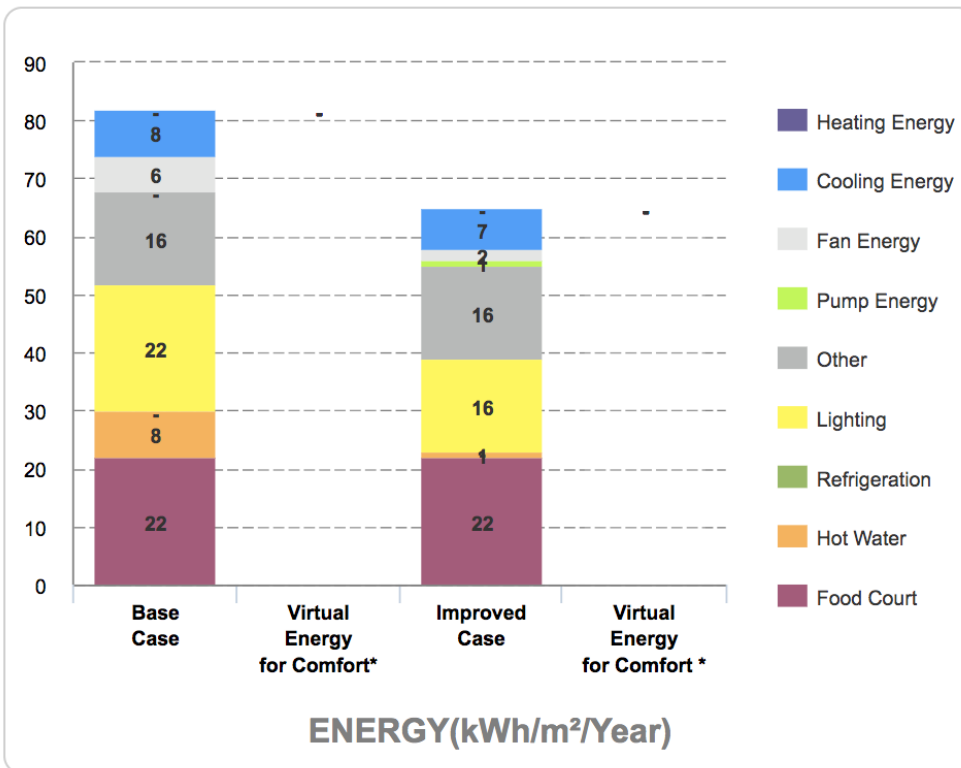
PROJECTED PROJECT METRICS

Incremental Cost
727,713 Thousand Rp

Payback in Years
1.05

Operational CO₂ Savings
184.78 tCO₂/Year

20.90% Meets EDGE energy standard



Light Industry is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.



THAILAND: GREEN BUILDINGS RETURN ON INVESTMENT



Creating Markets, Creating Opportunities

HOMES – THAILAND 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:

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



Water – 22% Savings through:

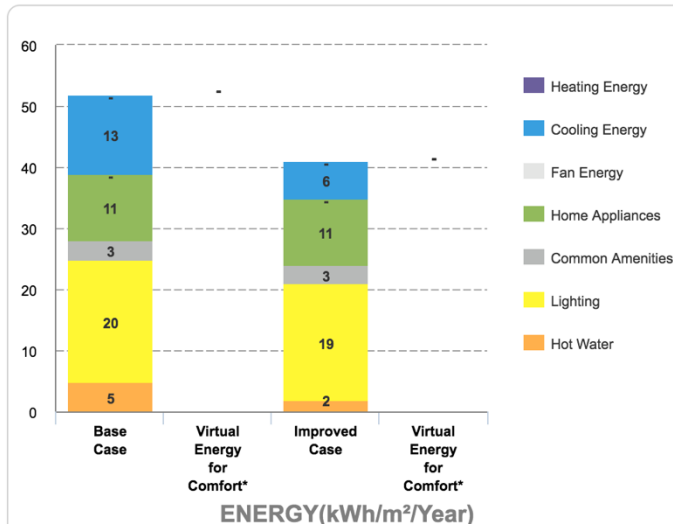
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins and Kitchen Sinks
- Dual Flush for Water Closets



Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

22.17% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$100/unit

Payback in Years
0.45

Operational CO₂ Savings
0.50 tCO₂/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.

HOTELS – THAILAND CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Hotel	Floors Above Ground	Total Guest Units	Internal Area
4 Star Hotel	8	200	15,599 m ²



Energy Measures – 24% Savings through:

- External Shading Devices
- Air Conditioning with Air Cooled Screw Chiller
- Heat Pump for Hot Water
- Energy Saving Light Bulbs



Water – 34% Savings through:

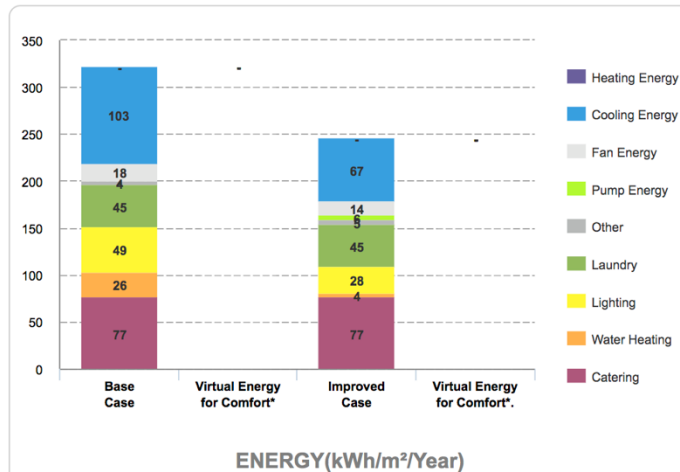
- Low-Flow Showerheads in Guestrooms
- Gray Water Recycling, Rainwater Harvesting System



Materials – 57% Savings through:

- Re-use of Existing Floorslabs

23.89% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$35,000

Payback in Years
0.60

Operational CO₂
Savings
600 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 46% Savings through:

- Reduced Window to Wall Ratio, External Shading Device
- Low-E Coated Glass, Variable Refrigerant Volume Cooling System
- Heat Pump for Hot Water, Energy Saving Lighting



Water – 25% Savings through:

- Low-Flow Faucets in Kitchens and Bathrooms
- Dual Flush Water Closets
- Water-Efficient Urinals, Dishwashers and Landscaping
- Aerators and Auto Shut-off Faucet in Bathrooms



Materials – 41% Savings through:

- Autoclaved Aerators Concrete Blocks for External and Internal Walls
- UPVC Window Frames



THE 101 BOGOR SURYAKANCANA (INDONESIA)

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

SHOPPING CENTERS – THAILAND CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Site Area	Car Parking	Landscaped Area	Amenities
15,000 m ²	Indoor Car Parking	1,000,000 m ²	Supermarket, Food Court



Energy Measures – 27% Savings through:

- Insulation of Roof
- Air Conditioning with Air Cooled Screw Chiller
- Energy Saving Light bulbs, Sales Area



Water – 24% Savings through:

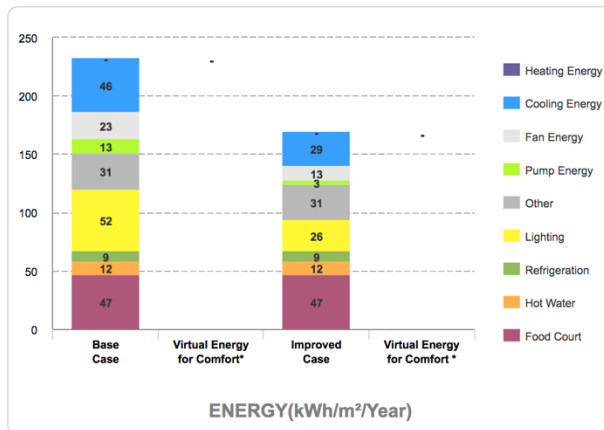
- Dual Flush for Water Closets



Materials – 41% Savings through:

- Re-use of Existing Floorslab

27.49% Meets EDGE energy standard



PROJECT METRICS

Incremental Cost

\$85,000

Payback in Years

1.65

Operational CO₂ Savings

480 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 29% Savings through:

- Reduced Window to Wall ratio, Insulated Roofs and External Walls
- Occupancy Sensors in Bathrooms, Energy saving lighting



Water – 24% Savings through:

- Single Flush Water Closets
- Water-Efficient Urinals
- Aerators and Auto Shut-Off Faucet in Bathrooms



Materials – 23% Savings through:

- Steel Sheets on Steel Rafters Roof Construction
- Cement Fibre Boards on Metal Studs for all External Walls and In-Situ Reinforced External Walls



RETAIL AT SANTA VERDE (COSTA RICA)

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



OFFICES – THAILAND CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Gross Internal Area	Floors Above Grade	Floors Below Grade	Floor-to-Floor Height
5000m ²	3	2	3.5m



Energy Measures – 32% Savings through:

- Air conditioning with water cooled chiller



Water – 20% Savings through:

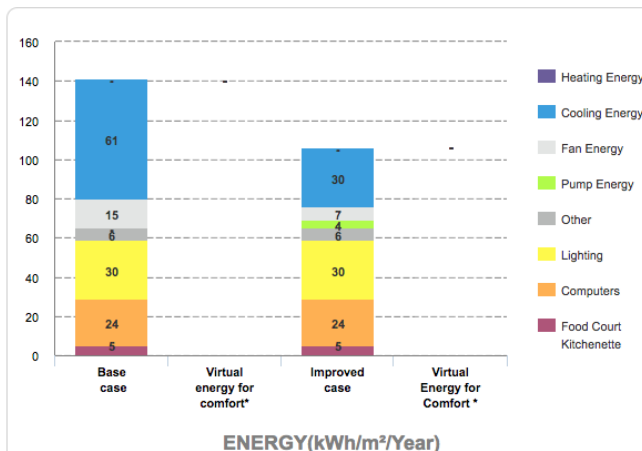
- Black water treatment and recycling system



Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

23.78% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$32,000

Payback in Years

3.50

Operational CO₂ Savings

84 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 33% Savings through:

- Reduced Window To Wall Ratio
- Higher Thermal Performance Glass
- Variable Refrigerant Volume (VRV) Cooling System
- Sensible Heat Recovery From Exhaust Air
- Energy Saving Light-Bulbs In Internal And External Spaces



Water – 68% Savings through:

- Low-Flow Plumbing Fixtures
- Dual-flush Water Closets
- Black Water Treatment And Recycling System



Materials – 32% Savings through:

- Honeycomb Clay Blocks For External Walls And UPVC Window Frames



QUASITUM INTELISOFT (INDIA)

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

SCHOOLS – THAILAND CASE STUDY

BUILDING DETAILS

Occupancy Density	Operational Hours	Working Days	Holidays / Year
3	6	5	60



Energy Measures – 24% Savings through:

- Natural Ventilation for Corridors & Classrooms
- Reflective Paint/Tiles for Roof & Walls
- Low-E Coated Glass
- Energy Efficient Ceiling Fans



Water – 23% Savings through:

- Dual Flush
- Water-Efficient Urinals
- Water-Efficient Faucets for Kitchen Sinks



Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

PROJECTED PROJECT METRICS

Incremental Cost

\$459

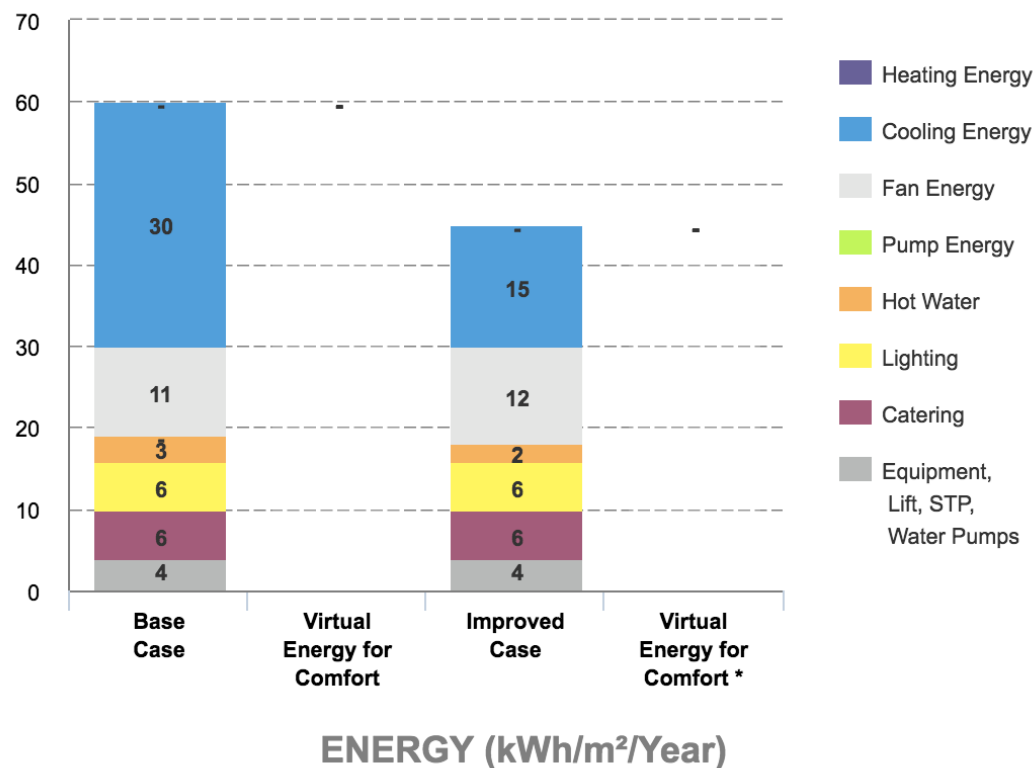
Payback in Years

0.16 Years

Operational CO2 Savings

37 tCO₂/Year

24.0% Meets EDGE Energy Standard



Education is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.

HOSPITALS – THAILAND CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Unit	Gross Internal Area	Occupancy Rate	Floors	Beds
Multi Specialty	9,700m ²	70%	7	100



Energy Measures – 21% Savings through:

- Variable Refrigerant Flow Cooling Systems
- Energy Saving Light Bulbs - Internal & External Spaces
- Absorption Chiller Powered by Waste Heat



Water – 20% Savings through:

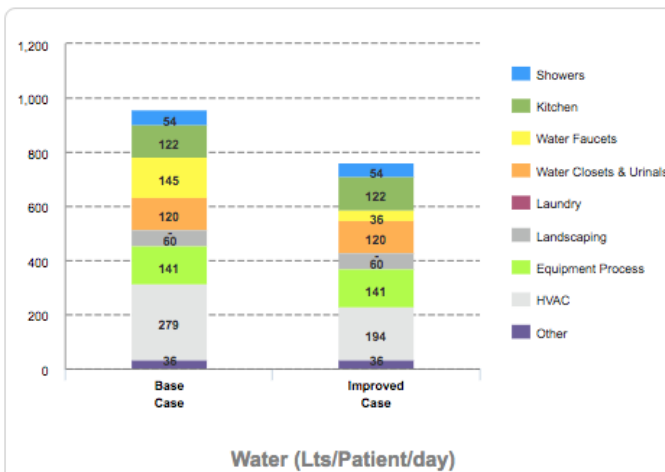
- Water-Efficient Bathroom Faucets



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

20.26% Meets EDGE Water Standard



PROJECT METRICS

Incremental Cost

\$2,000

Payback in Years

0.06

Operational CO₂ Savings

400 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window to Wall Ratio
- Higher Thermal Performance Glass
- Wall Insulation
- Air Economizers
- Energy-Efficient Air Conditioning with Air Cooled Chiller
- Sensible Heat Recovery from Exhaust Air



Water – 25% Savings through:

- Low-Flow Faucets and Dual Flush Water Closet in bathrooms
- Water-Efficient Faucets for Kitchen Sinks



Materials – 26% Savings through:

- Clay Roofing Tiles on Steel Rafters



KESERWAN MEDICAL CENTER (LEBANON)

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

LIGHT INDUSTRY– THAILAND CASE STUDY

BUILDING DETAILS

Floors Above Ground	Floors Below Ground	Gross Internal Area
1	0	15,000 m ²



Energy Measures – 20% Savings through:

- Demand-Controlled Ventilation for Fresh Air Intake
- Energy Saving Light Bulbs in Food Court
- Skylights, Solar Hot Water Collectors



Water – 54% Savings through:

- Dual Flush Water Closets
- Water-Efficient Urinals, Faucets
- Rainwater Harvesting Systems



Materials – 42% Savings through:

- Re-use of Existing Floorslab

PROJECTED PROJECT METRICS

Incremental Cost

\$17,905.05

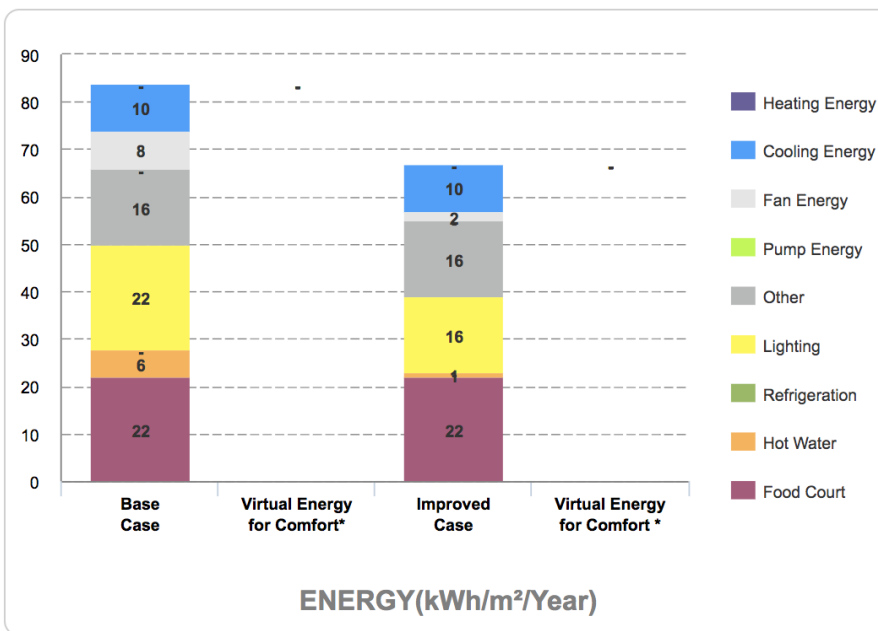
Payback in Years

0.96

Operational CO₂ Savings

126.25 tCO₂/Year

20.02% Meets EDGE energy standard



Light Industry is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.



VIETNAM: GREEN BUILDINGS RETURN ON INVESTMENT



Creating Markets, Creating Opportunities

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:

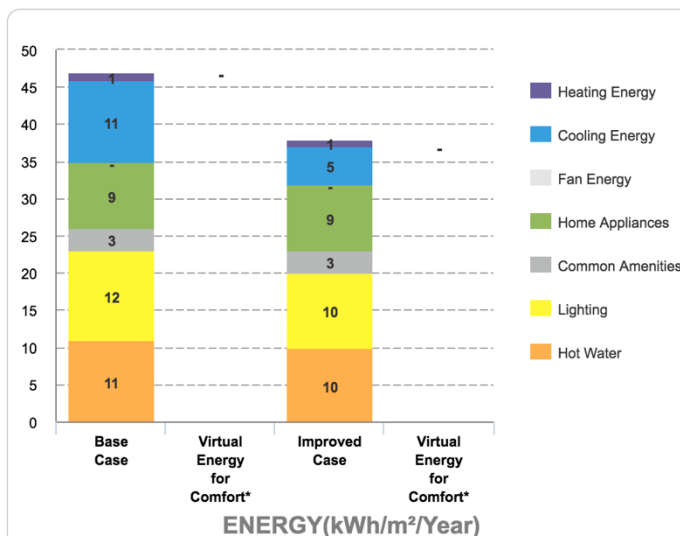
- Low-Flow Showerheads
- Low-Flow Faucets for Washbasins and Kitchen Sinks
- Dual Flush for Water Closets



Materials – 27% Savings through:

- Timber Floor Construction Floor Slabs

21.39% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

3.5 Mvnd/unit

Payback in Years

0.80

Operational CO₂ Savings

0.35 tCO₂/Year

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)

HOTELS – VIETNAM CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Type of Hotel	Floors Above Ground	Total Guest Units	Internal Area
4 Star Hotel	8	200	15,599 m ²



Energy Measures – 26% Savings through:

- External Shading Devices
- Air Conditioning with Air Cooled Screw Chiller
- Heat Pump for Hot Water
- Energy Saving Light Bulbs



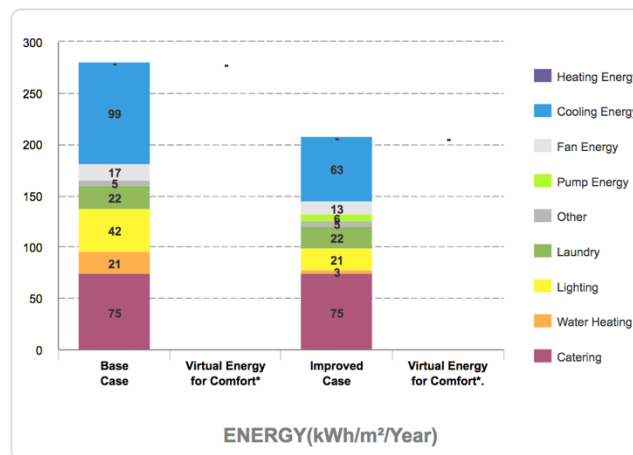
Water – 34% Savings through:

- Low-Flow Showerheads in Guestrooms
- Gray Water Recycling, Rainwater Harvesting System



Materials – 57% Savings through:

- Re-use of Existing Floorslab



PROJECT METRICS

Incremental Cost

120 mVND

Payback in Years

0.04

Operational CO₂ Savings

480 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window to Wall Ratio Low-E Coated Glass, Variable Speed Drives on the Fans of Cooling Tower
- Air Conditioning with Water Cooled Screw Chiller
- Energy Saving Lighting for Back of House, Heat Pumps



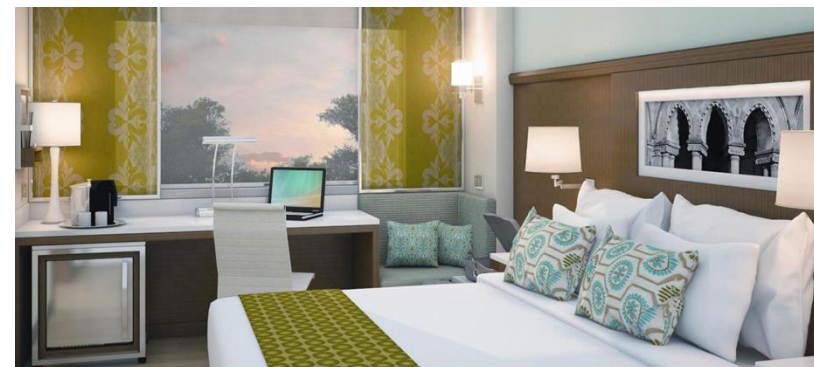
Water – 23% Savings through:

- Dual Flush Water Closets
- Blackwater Treatment and Recovery System



Materials – 30% Savings through:

- 150mm In-Situ Reinforced Concrete Slab for Floors and Roof
- 200mm Solid Dense Concrete Blocks for Internal and External Walls
- Laminated Wooden Flooring



SAMHI- FAIRFIELD BY MARRIOTT (INDIA)

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

SHOPPING CENTERS –VIETNAM CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Site Area	Car Parking	Landscaped Area	Amenities
15,000 m ²	Indoor Car Parking	1,000,000 m ²	Supermarket, Food Court



Energy Measures – 22% Savings through:

- Reflective Paint/Tiles for Roof
- Variable Speed Drives on Fans of Cooling Towers
- Energy Saving Light bulbs in Sales Area



Water – 22.32% Savings through:

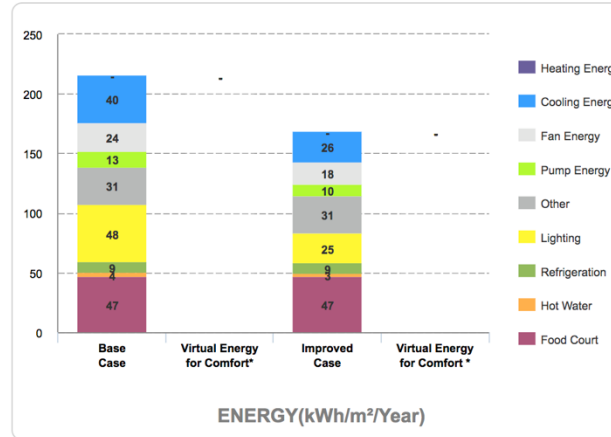
- Dual Flush for Water Closets
- Water Efficient Urinals
- Auto Shut-off Faucets



Materials – 31% Savings through:

- Timber Floor Construction Floor Slabs

21.82% Meets EDGE energy standard



PROJECT METRICS

Incremental Cost

1,600 mVND

Payback in Years

1.06

Operational CO₂ Savings

290 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 47% Savings through:

- Reduced Window to Wall Ratio, Reflective Paint and Insulation for Roof and Walls, Recovery of Waste Heat from Generator for Heating
- High Efficiency Condensing Boiler for Space Heating
- High Efficiency Refrigerated Cases and Energy Efficient Lighting



Water – 42% Savings through:

- Dual Flush Water Closets, Water Efficient Urinals
- Aerators and Auto Shut-Off Faucets



Materials – 34% Savings through:

- Corrugated Zinc Sheets for Roof, Steel Profile Cladding for External Walls and Solid Dense Concrete Blocs for External Walls



KAUFLAND (BULGARIA)

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

OFFICES – VIETNAM CASE STUDY & CERTIFIED PROJECT

BUILDING DETAILS

Gross Internal Area	Floors Above Grade	Floors Below Grade	Floor-to-Floor Height
5000m ²	3	2	3.5m



Energy Measures – 23% Savings through:

- Energy Saving Light Bulbs – Internal & External
- Reflective Paint/Tiles for Roof and Walls
- Insulation of Roof and External Walls



Water – 43% Savings through:

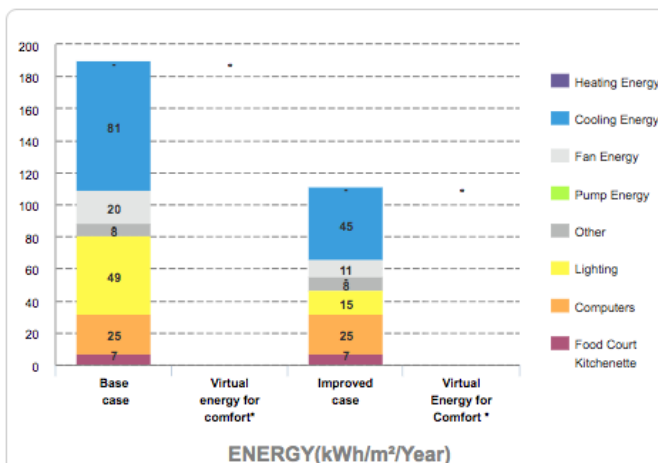
- Black water treatment and recycling system



Materials – 35% Savings through:

- Timber Floor Construction Floor Slabs

41.31% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

220 mVND

Payback in Years

0.25

Operational CO₂ Savings

160 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- External Shading
- Roof Insulation
- Variable Refrigerant Volume Cooling System
- Energy-saving Lighting System
- Solar Photovoltaics



Water – 54% Savings through:

- Low-flow Faucets, Dual Flush Water Closets And Water-efficient Urinals



Materials – 38% Savings through:

- Concrete Filler Slabs For Floors
- Solid Dense Concrete Blocks For External Walls



DIPOA (COSTA RICA)

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

SCHOOLS – VIETNAM CASE STUDY

BUILDING DETAILS

Occupancy Density	Operational Hours	Working Days	Holidays / Year
3	6	5	60



Energy Measures – 28% Savings through:

- Natural Ventilation for Corridors & Classrooms
- Reflective Paint/Tiles for Roof & Walls
- Low-E Coated Glass
- Energy Efficient Ceiling Fans
- Solar Hot Water Collectors



Water – 23% Savings through:

- Dual Flush
- Water-Efficient Urinals & Kitchen Sinks



Materials – 29% Savings through:

- Timber Floor Construction Floor Slabs

PROJECTED PROJECT METRICS

Incremental Cost

14 mVND

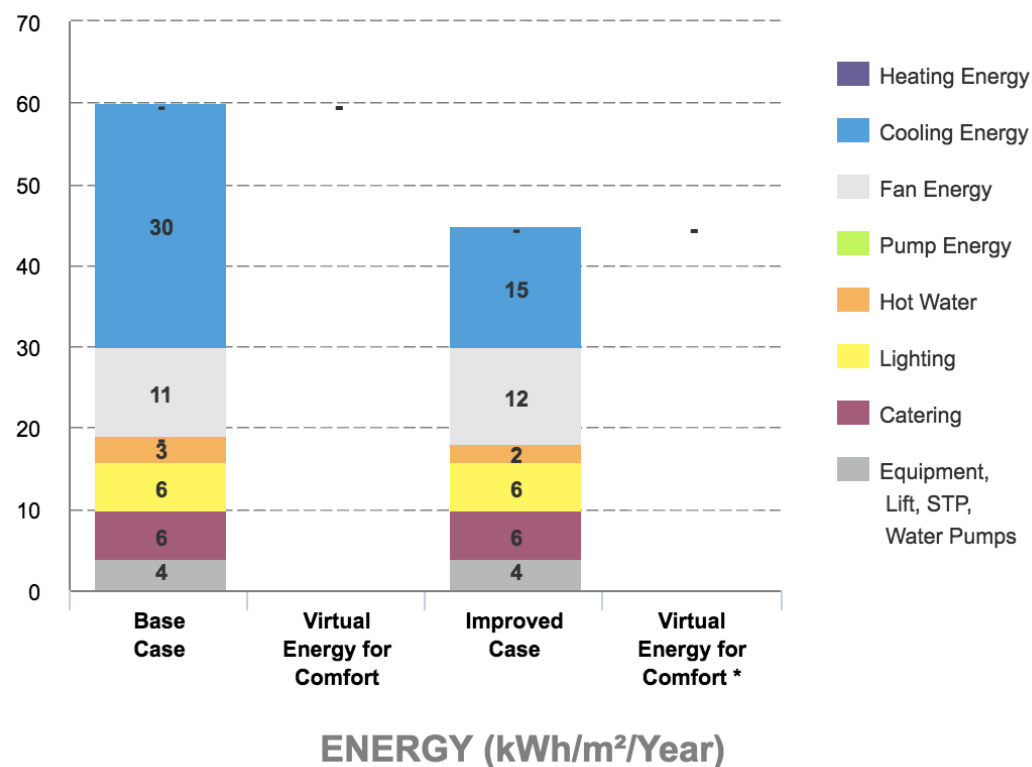
Payback in Years

0.14 Years

Operational CO₂ Savings

31 tCO₂/Year

24.0% Meets EDGE Energy Standard



Education is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.

HOSPITALS – VIETNAM CASE STUDY & CERTIFIED PROJECT

BUILDING DETAIL

Type of Unit	Gross Internal Area	Occupancy Rate	Floors	Beds
Multi Specialty	9,700m ²	70%	7	100



Energy Measures – 27% Savings through:

- External Shading Devices and Roof Insulation
- Low-E Coated Glass
- Variable Refrigerant Flow Cooling System
- Sensible Heat Recovery from Exhaust Air
- Energy Saving Light Bulbs – Internal & External
- Photoelectric Sensors to Harvest Daylight
- Solar Hot Water Collectors



Water – 30% Savings through:

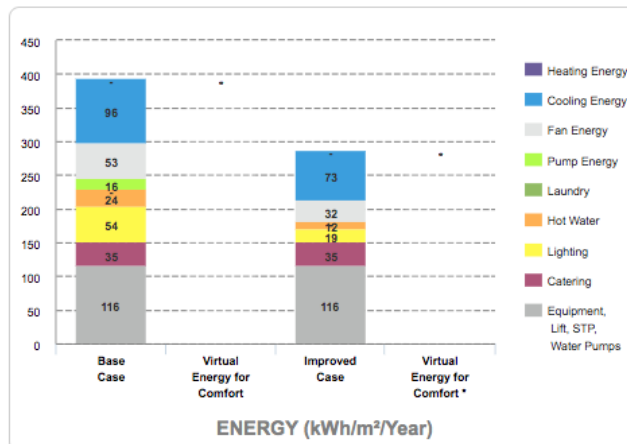
- Variable Refrigerant Flow Cooling System



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

27.22% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

125 mVND

Payback in Years

0.08

Operational CO₂ Savings

450 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- Reduced Window To Wall Ratio
- Reflective Paint and Insulation For External Walls
- Natural Ventilation For Corridors
- Energy-Saving Lighting Systems
- Occupancy Sensors In Bathrooms
- Solar Photovoltaics



Water – 35% Savings through:

- Low-flow Faucets In Kitchens And Bathrooms
- Single-flush And Flush Valve For Water Closets
- Water-efficient Urinals, Faucets And Landscaping
- Rainwater Harvesting System



Materials – 43% Savings through:

- Steel Sheets On Steel Rafters For Roof Construction
- Medium Weight Hollow Concrete Blocks For Internal And External Walls
- Finished Concrete Flooring



SEDE DE EBAIS (COSTA RICA)

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

LIGHT INDUSTRY– VIETNAM CASE STUDY

BUILDING DETAILS

Floors Above Ground	Floors Below Ground	Gross Internal Area
1	0	15,000 m ²



Energy Measures – 27% Savings through:

- Insulation of External Walls, Natural Ventilation
- Variable Frequency Drives in Air Handling Units
- Demand-Controlled Ventilation
- Energy-Saving Light Bulbs, Skylights



Water – 46% Savings through:

- Rainwater Harvesting Systems, Auto Shut-off Faucets



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

PROJECTED PROJECT METRICS

Incremental Cost

430 mVND

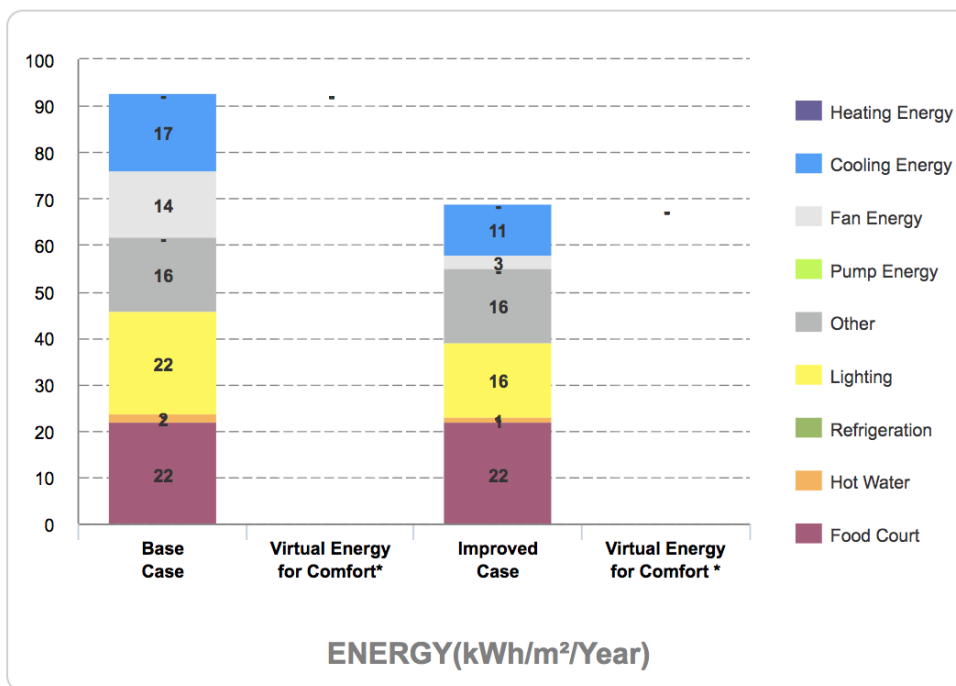
Payback in Years

0.52

Operational CO₂ Savings

121 tCO₂/Year

26.62% Meets EDGE energy standard



Light Industry is a new sector in the EDGE application.
Relevant certified project to be included as soon as case study is published.



METHODOLOGY, NOTES, ACKNOWLEDGMENTS



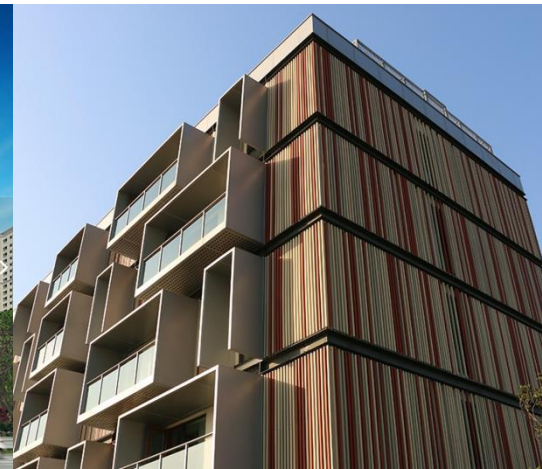
RESEARCH OBJECTIVE: MOST EFFECTIVE INTERVENTIONS TO REACH THE EDGE STANDARD

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.

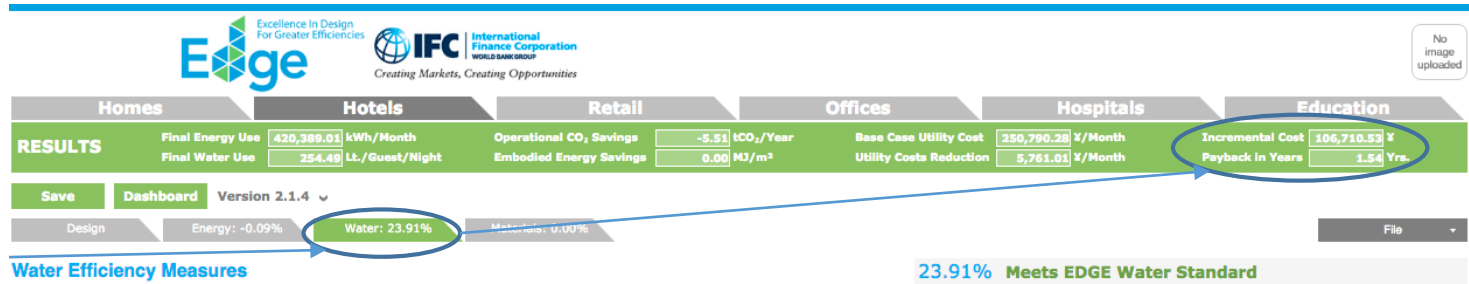
Third party certification verifies the resource efficiency savings so they can be credibly communicated between investors, developers, and buyers.

RESEARCH METHODOLOGY

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

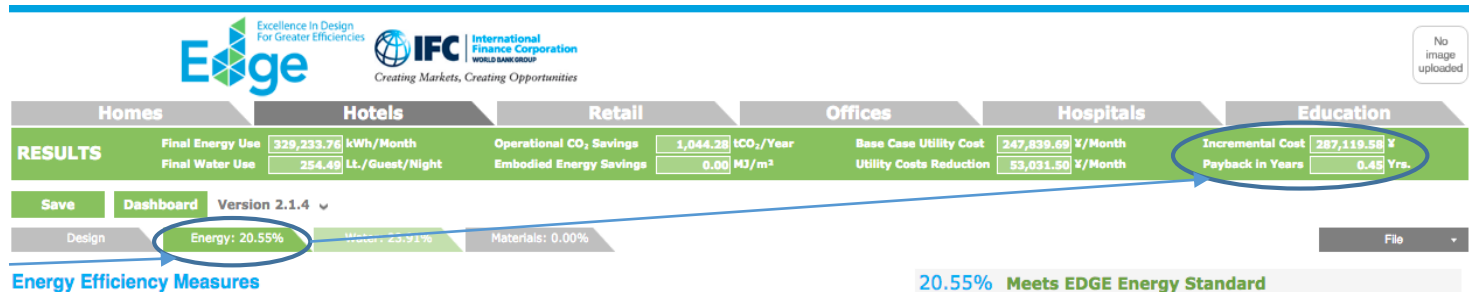
1

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.



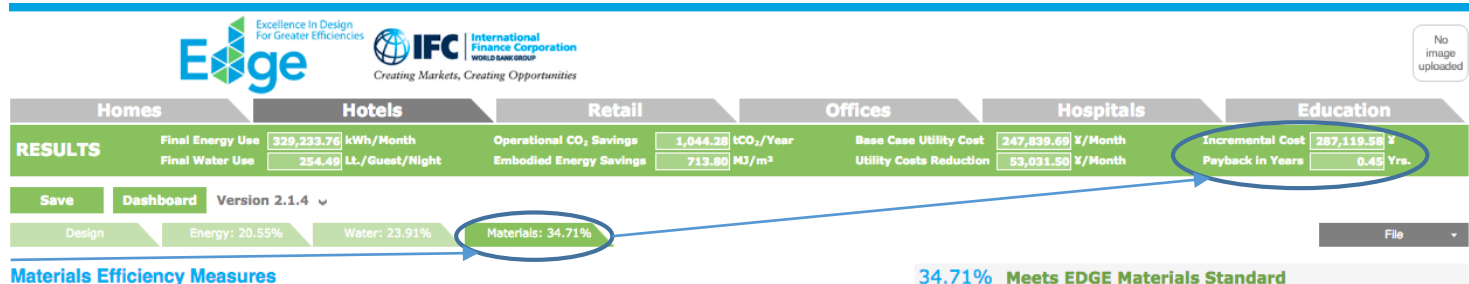
2

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.

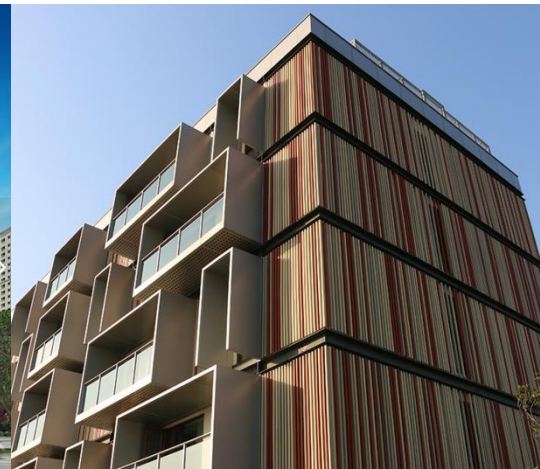


4

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

IFC thanks the following national donors for their generous support of the EDGE program: the State Secretariat for Economic Affairs of Switzerland (SECO); 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, IFC thanks contributors to the GEF-IFC Earth Fund Platform, and the Energy Sector Management Assistance Program (ESMAP) of the World Bank whose support helped seed EDGE.

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