



GREEN BUILDINGS RETURN ON INVESTMENT: HOSPITALS



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HOSPITALS IN EAST ASIA



ROI ON MEASURES NEEDED TO REACH THE EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Cambodia	\$12,000	\$10,000	0.1
China	450,000 ¥ \$65,000	35,000 ¥ \$5,000	1
Fiji	\$8,000	\$8,000	0.1
Indonesia	425,000 Thousand Rp \$28,000	88,000 Thousand Rp \$5,800	0.4
Philippines	700,000 PhP \$13,000	700,000 PhP \$13,000	0.1
Thailand	\$2,000	\$2,000	0.1
Vietnam	125 M VND \$5,300	125 M VND \$5,300	0.08



ENERGY

The most cost effective interventions include:

- Reduced Window To Wall Ratio
- Energy Saving Light Bulbs
- Absorption Chiller Powered by Waste Heat
- Variable Refrigerant Flow Cooling Systems
- Low-E Coated Glass



WATER

The best ROI can be found through these interventions:

- Water-Efficient Dishwashers, Showerheads, and Faucets
- Pre-rinse Valve for Rinsing Operations
- Grey Water Treatment and Recycling System



MATERIALS

- Floor slabs are biggest drivers for efficiency, ranging from 35% - 40% of material costs out of 7 total interventions



HOSPITALS IN SOUTH ASIA



ROI ON MEASURES NEEDED TO REACH EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Bangladesh	\$16,655	\$1,540	0.9
India (Delhi)	Rs2,717,545 \$36,700	Rs185,530 \$2,500	1.2
India (Mumbai)	Rs856,690 \$11,500	Rs255,060 \$3,400	0.3
Sri Lanka	\$10,800	\$9,200	1



ENERGY

The most effective measures include:

- External shading
- Insulation of roof and external wall
- Energy saving light bulbs for internal & external space
- Occupancy sensors in bathroom
- Air economizer except OT and ICU



WATER

The EDGE standard can typically be reached through:

- Water efficient urinals in all Bathrooms
- Dual-Flush for Water Closets in all Bathrooms
- Water-Efficient Faucets for Kitchen Sinks



MATERIALS

Potential strategies include:

- In-Situ Concrete reinforced
- Aerated Autoclaved Concrete Blocks for internal and external walls



HOSPITALS IN AFRICA



ROI ON MEASURES NEEDED TO REACH THE EDGE STANDARD

	Incremental Cost	Payback Period in Years	Utility Savings / month
Angola	\$126,000	0.3	\$33,765
Cote D'Ivoire	\$83,320	1.1	\$6,090
Ghana	\$83,420	0.2	\$31,620
Kenya	\$60,570	0.5	\$9,870
Nigeria	\$55,680	1.2	\$3,790
South Africa	ZAR 64,925 \$4,500	0	ZAR 142,000 \$9,800



Image sourced from: <https://www.edgebuildings.com/projects/mbu/>



ENERGY

The most effective measures include:

- Energy Saving Light Bulbs
- Air Economizers
- Energy savings also result from Water interventions



WATER

The EDGE standard can typically be reached with these measures:

- Low-Flow Faucets in Bathrooms
- Dual-Flush for Water Closets in All Bathrooms



MATERIALS

- Floor slabs are the biggest efficiency drivers, ranging from 25% - 45% of material costs out of 7 total interventions.

HOSPITALS IN LATIN AMERICA



ROI ON MEASURES NEEDED TO REACH THE EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Argentina	\$452,560	\$5,820	6.5
Brazil	\$119,000	\$8,075	1.3
Colombia	\$256,700	\$8,420	2.5
Costa Rica	196,186,000 CRC \$343,000	6,744,400 CRC \$11,800	2.4
Mexico	\$300,970	\$5,430	4.6
Peru	878,900 S \$266,000	31,900 S \$9,650	2.3



ENERGY

The most cost effective interventions include:

- Energy Saving Light Bulbs
- Insulation of Roof and External Wall
- Solar Hot Water Collection
- Variable Refrigerant Flow Cooling Systems
- Air Conditioning with Air Cooled Chiller



WATER

The best ROI can be achieved through the following:

- Water-Efficient Dishwashers and Urinals
- Water Efficient Showerhead and Faucets for bathroom
- Dual Flush Water Closet



MATERIALS

- Floor Slabs are the biggest efficiency drivers and contributed to over 40% of all of the material portions. Savings can be achieved through reduced concrete usage.



PAYBACK PERIOD NEEDED TO REACH EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Egypt	\$160,500	\$7,200	2
Jordan	\$160,000	\$6,500	2
Morocco	\$170,000	\$8,000	2
Pakistan	\$88,000	\$3,700	2



ENERGY

Some potential strategies include:

- Energy-Saving Light Bulbs
- Low-E Coated Glass



WATER

The EDGE Standard can be reached through:

- Low-Flow Faucets in all Bathrooms
- Dual Flush for Water Closets in all Bathrooms
- Single Flush/Flush Valve



MATERIALS

- Floor slabs are biggest efficiency drivers ranging from 35% - 40% of material options out of 7 total interventions



HOSPITALS IN EASTERN EUROPE



ROI ON MEASURES NEEDED TO REACH EDGE STANDARD

	Incremental Cost	Utility Savings / month	Payback Period in Years
Armenia	\$847,400	\$11,380	6.2
Poland	\$2,330	\$30,280	0.1
Russian Federation	\$56,760	\$33,460	0.1
Serbia	\$668,350	\$11,710	4.8
Ukraine	\$13,080	\$5,380	0.2
Turkey	\$696,560	\$14,300	4



ENERGY

Effective measures include:

- Reduced Window To Wall Ratio
- Insulation of Roofs and External Walls
- Absorption Chiller Powered by Waste Heat
- Variable Refrigerant Flow Cooling Systems
- Energy Saving Light Bulbs for Internal & External Spaces
- Solar Hot Water Collectors



WATER

Potential green strategies include:

- Low-Flow Showerheads and Faucets
- Dual Flush for Water Closets
- Water-Efficient Urinals and faucets for Kitchen Sinks



MATERIALS

- Floor slabs are biggest cost drivers averaging 30% of material costs out of 6 total interventions
- Using other materials in these elements of a hospital usually saves over 20%



GREEN BUILDINGS RETURN ON INVESTMENT: HOSPITALS IN EAST ASIA



Creating Markets, Creating Opportunities

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:

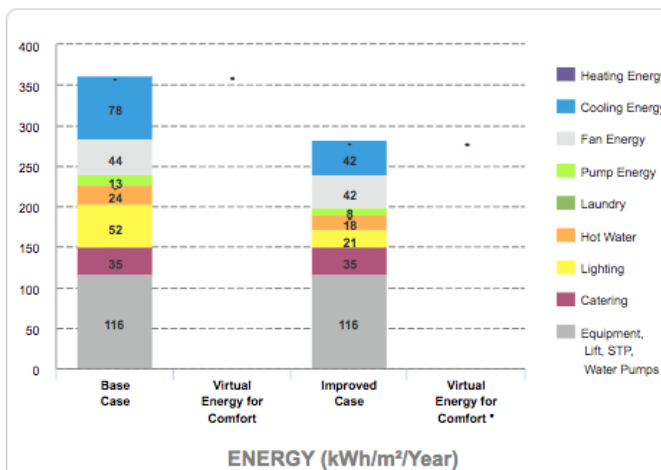
- Variable Refrigerant Flow Cooling Systems
- Water-Efficient Dishwashers and Bathroom Faucets
- Pre-rinse Valve for Rinsing Operation



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

22.46% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$12,000

Utility Cost Savings
\$10,000 / month

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.

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:

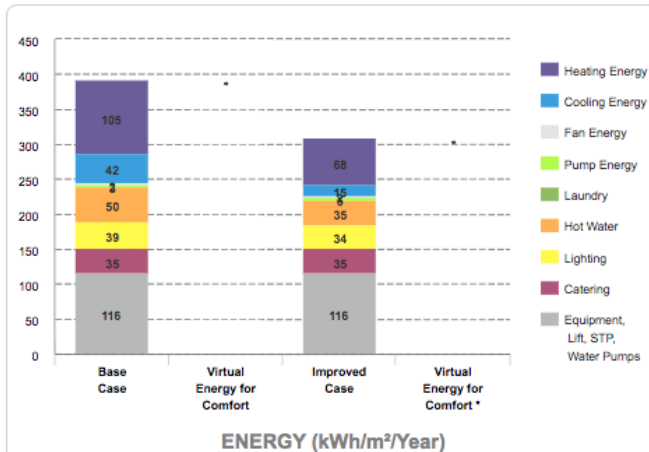
- Water-Efficient Dishwashers, Bathroom Faucets, Kitchen Sink, Urinals, and Water Closets
- Pre-rinse Valve for Rinsing Operation



Materials – 31% Savings through:

- Timber Floor Construction Floor Slabs

21.04% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
450,000 ¥

Utility Cost Savings
37,500 ¥ / month

Payback in Years
1

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.

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:

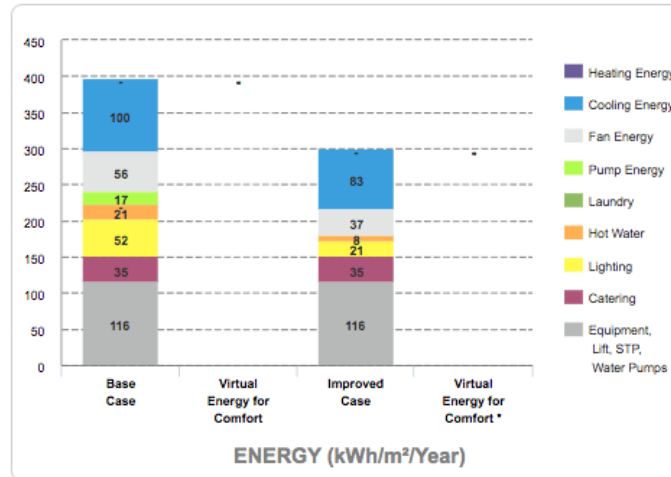
- Variable Refrigerant Flow Cooling Systems
- Water-Efficient Bathroom Faucets and Kitchen Sink



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

24.60% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$8,000

Utility Cost Savings
\$8,000 / month

Payback in Years
0.1

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.

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:

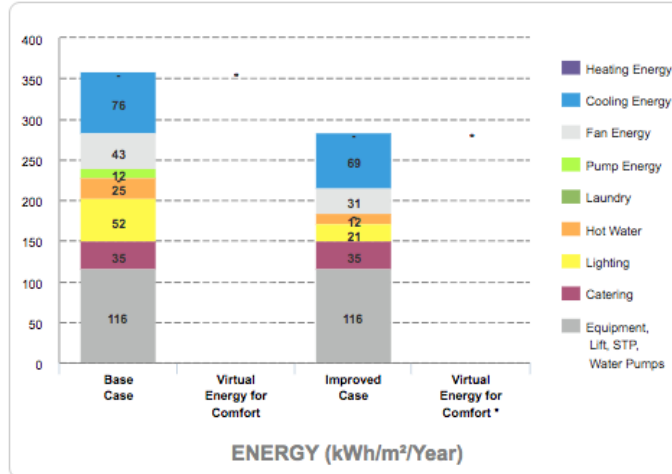
- Variable Refrigerant Flow Cooling Systems



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

20.91% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
425,000
Thousand Rp

Utility Cost Savings
88,000 Thousand Rp
/ month

Payback in Years: 0.4

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.

HOSPITALS – PHILIPPINES 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 – 24% Savings through:

- Energy-Saving Light Bulbs - External & Internal Space
- Absorption Chiller Powered by Waste Heat
- External Shading Devices



Water – 20% Savings through:

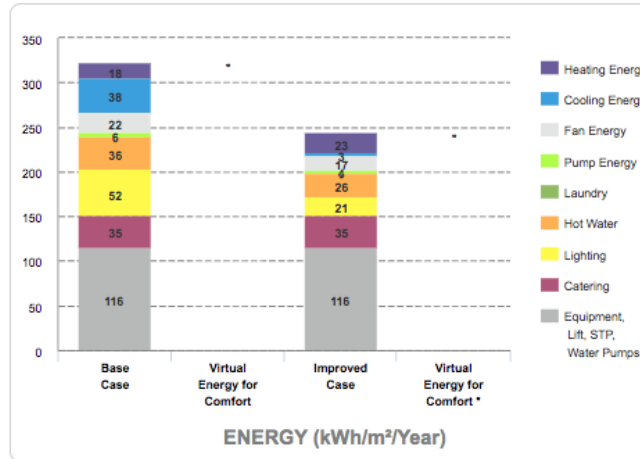
- Water Efficient Dishwashers, Kitchen and Bathroom Faucet, and Urinals



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

24.11% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
700,000 PhP

Utility Cost Savings
700,000 PhP / month

Payback in Years
0.1

Operational CO₂
Savings
350 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.

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:

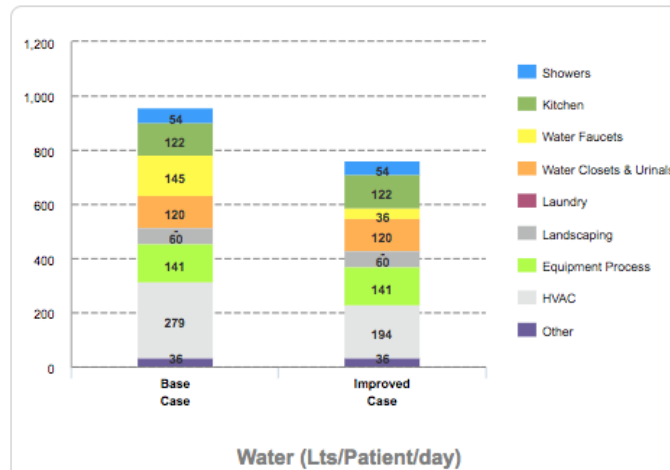
- Water-Efficient Bathroom Faucets



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

20.26% Meets EDGE Water Standard



PROJECT METRICS

Incremental Cost
\$2,000

Utility Cost Savings
\$2,000 / month

Payback in Years
0.1

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.

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:

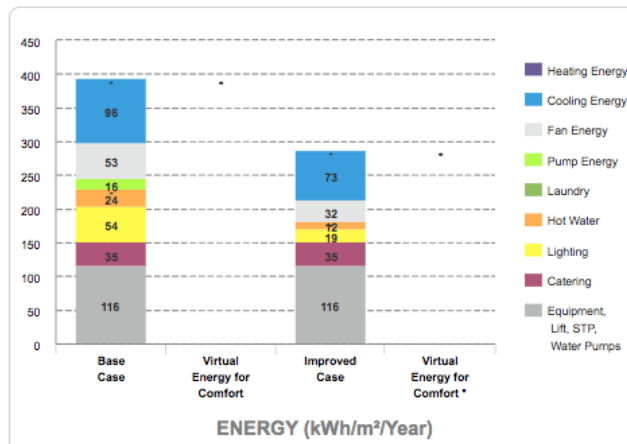
- Variable Refrigerant Flow Cooling System



Materials – 32% Savings through:

- Timber Floor Construction Floor Slabs

27.22% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
125 M VND

Utility Cost Savings
125 M VND / month

Payback in Years
0.1

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.



GREEN BUILDINGS RETURN ON INVESTMENT: HOSPITALS IN SOUTH ASIA



Creating Markets, Creating Opportunities



BUILDING DETAILS

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



Energy Measures – 23% Savings through:

- External shading device
- Natural ventilation in patient room
- Insulation of roof and external wall



Water – 20% Savings through:

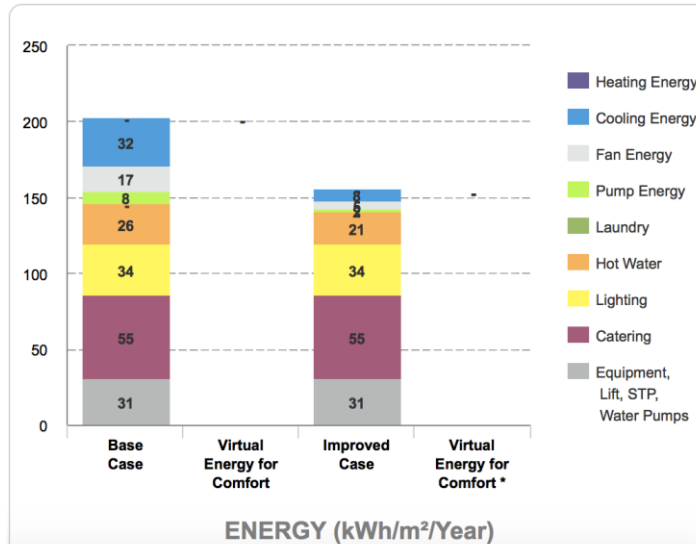
- Low-Flow Faucets in all Bathrooms
- Water efficient dishwasher and pre-rinse valve
- Water-Efficient Urinals in all bathrooms



Materials – 33% Savings through:

- In-Situ Concrete reinforced concrete
- Aerated Autoclaved Concrete Blocks

23.49% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$16,655

Utility Costs Savings
\$1,540 / month

Payback in Years
0.9

Operational CO₂ Savings
147.92 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- Reduced Window To Wall Ratio
- Insulation of Roofs and External Walls
- Reflective paint for external wall
- Natural ventilation n for corridor
- Energy-Saving Lighting System for Internal and External Spaces
- Solar Photovoltaics



Water – 35% Savings through:

- Low-flow Faucets In Bathrooms and water efficient urinals
- Single flush and flush valve for water closet
- Rainwater harvesting



Materials – 43% Savings through:

- Steel Sheets on Steel Rafters for Roof Construction
- Medium weight hollow concrete blocks for External and Internal Walls
- Finished concrete flooring



SEDE de EBAIS de ESCOBAL de BELEN

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

HOSPITALS – INDIA (DELHI) 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:

- External shading
- Insulation of roof and external wall
- Energy saving light bulbs for internal & external space
- Occupancy sensors in bathroom



Water – 21% Savings through:

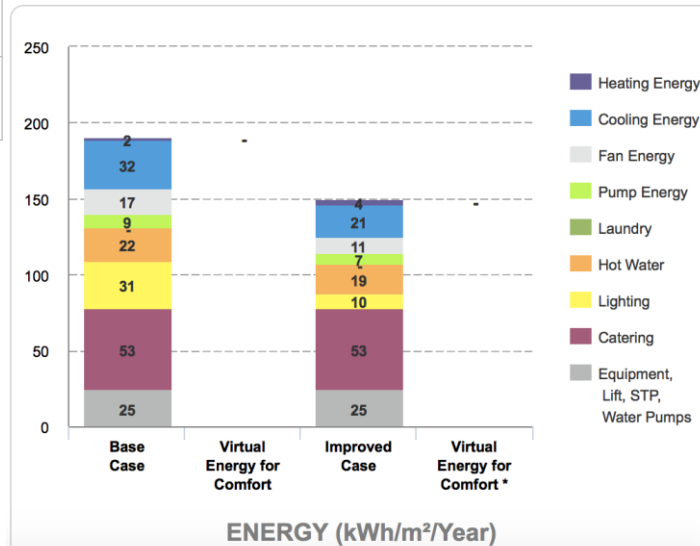
- Low-Flow Faucets and shower heads in all Bathrooms
- Dual-Flush for Water Closets in all Bathrooms
- Water-Efficient urinals in bathroom



Materials – 25% Savings through:

- In-Situ Concrete reinforced
- Aerated Autoclaved Concrete Blocks

22.15% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

Rs 2,717,545

Utility Costs Savings

Rs 185,530 / month

Payback in Years

1.2

Operational CO₂

Savings

160 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window To Wall Ratio and insulation of external wall
- High performance glass and air economizer
- Air Conditioning with Air Cooled Chiller
- Energy-Saving Lighting System for Internal and External Spaces
- Solar Hot Water Collectors
- Variable frequency drive in AHU and variable speed drives
- Sensible heat recovery from exhaust air



Water – 25% Savings through:

- Low-flow Faucets In Bathrooms and Dual-flush Water Closets
- Water efficient faucets in kitchen sink



Materials – 26% Savings through:

- Clay roofing tiles on Steel Rafters for Roof Construction
- Medium weight hollow concrete blocks for External
- Vinyl flooring and lightweight concrete blocks for internal walls



KESERWAN MEDICAL CENTRE

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

HOSPITALS – INDIA (MUMBAI) 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:

- Air economizer except for OT and ICU



Water – 20% Savings through:

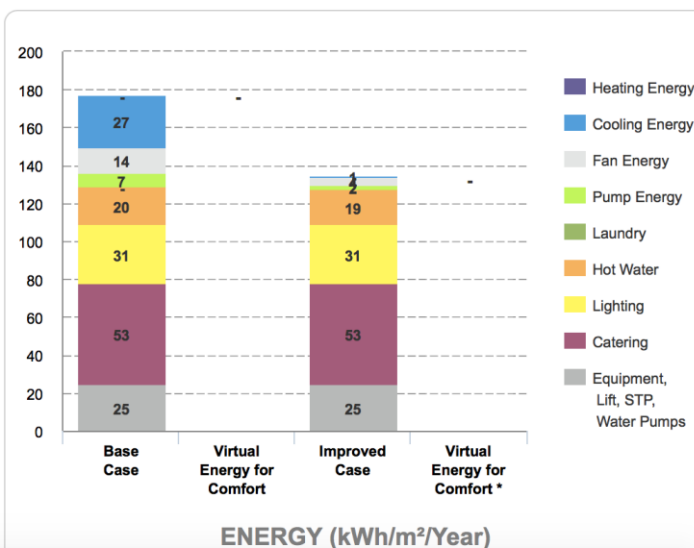
- Water efficient urinals in all Bathrooms
- Dual-Flush for Water Closets in all Bathrooms
- Water-Efficient Faucets for Kitchen Sinks



Materials – 33% Savings through:

- In-Situ Concrete reinforced
- Aerated Autoclaved Concrete Blocks

24.50% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

Rs. 856,690

Utility Costs Savings

Rs. 255,050 / month

Payback in Years

0.3

Operational CO₂ Savings

163 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window To Wall Ratio and insulation of external wall
- High performance glass and air economizer
- Air Conditioning with Air Cooled Chiller
- Energy-Saving Lighting System for Internal and External Spaces
- Solar Hot Water Collectors
- Variable frequency drive in AHU and variable speed drives
- Sensible heat recovery from exhaust air



Water – 25% Savings through:

- Low-flow Faucets In Bathrooms and Dual-flush Water Closets
- Water efficient faucets in kitchen sink



Materials – 26% Savings through:

- Clay roofing tiles on Steel Rafters for Roof Construction
- Medium weight hollow concrete blocks for External
- Vinyl flooring and lightweight concrete blocks for internal walls



KESERWAN MEDICAL CENTRE

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

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:

- Higher Thermal Performance Glass
- Energy Saving Light Bulbs - Internal & External Spaces
- Reduced Window to Wall Ratio



Water – 28% Savings through:

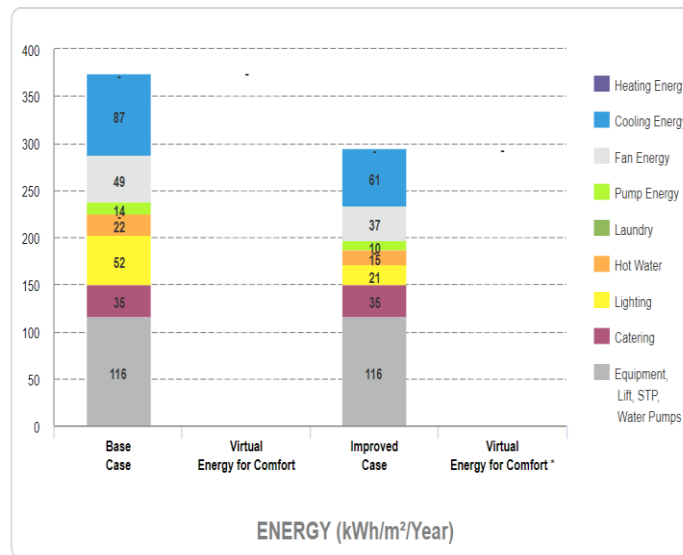
- Low-Flow Faucets in all Bathrooms
- Dual-Flush for Water Closets in all Bathrooms
- Water-Efficient Faucets for Kitchen Sinks



Materials – 22% Savings through:

- In-Situ Concrete with greater than 30% PFA

21.54% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$10,800

Utility Costs Savings

\$9,200 / month

Payback in Years

1

Operational CO₂ Savings

827 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 56% Savings through:

- Reduced Window To Wall Ratio
- Insulation of Roofs and External Walls
- Low E-Coated Glass
- Air Conditioning with Air Cooled Chiller
- Energy-Saving Lighting System 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 “Short-Crete” on both sides for External and Internal Walls
- Ceramic Tile Flooring



KOFO ANOKYE HOSPITAL (GHANA)

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



GREEN BUILDINGS RETURN ON INVESTMENT: HOSPITALS IN AFRICA



Creating Markets, Creating Opportunities

HOSPITALS – ANGOLA 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 – 28% Savings through:

- Air Economizers Except for Critical Areas
- Energy Saving Light Bulbs



Water – 45% Savings through:

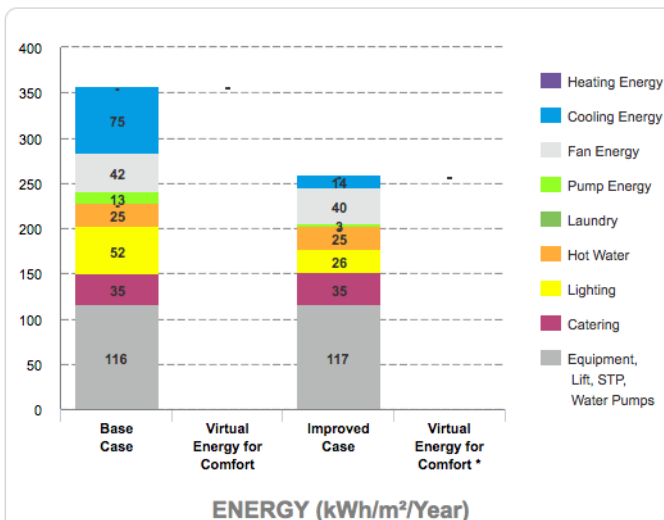
- Low-Flow Faucets in Bathrooms
- Dual-Flush for Water Closets in All Bathrooms



Materials – 27% Savings through:

- In-situ trough concrete slab

27.73% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$126,000

Utility Costs Savings
\$33,765 / month

Payback in Years
0.3

Operational CO₂
Savings
610 tCO₂/Year

RELEVANT CERTIFIED PROJECT



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.

HOSPITALS – COTE D'IVOIRE 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 – 29% Savings through:

- Air Economizers Except for Critical Areas
- Energy Saving Light Bulbs



Water – 31% Savings through:

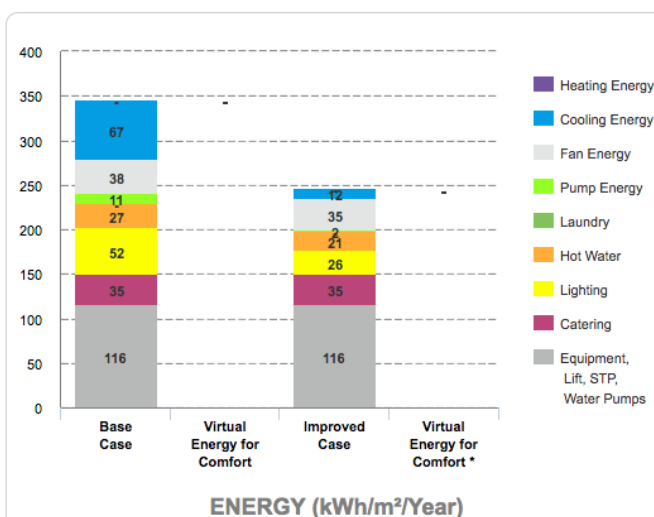
- Low-Flow Faucets in All Bathrooms



Materials – 25% Savings through:

- Concrete Filler Floor Slabs

28.83% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$83,320

Utility Costs Savings
\$6,090 / month

Payback in Years
1.1

Operational CO₂
Savings
467 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 37% Savings through:

- Reduced Window To Wall Ratio
- Reflective paint for external walls
- Insulation of roof and external walls
- Natural ventilation for corridors
- Variable Refrigerant Volume (VRV) cooling system
- Energy-saving lighting systems
- Occupancy sensors in bathrooms
- Solar PVs



Water – 39% Savings through:

- Low-flow faucets in bathrooms
- Single-flush and flush valves for water closets and Water-efficient urinals
- Water-efficient landscaping
- Rainwater Harvesting System



Materials – 39% Savings through:

- Steel sheets on steel rafters for roof construction
- Medium-weight hollow concrete blocks for internal, external walls
- Finished concrete flooring



SEDE DE EBAIS DE LA RIBERA DE BELEN (COSTA RICA)

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

HOSPITALS – GHANA 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 – 24% Savings through:

- Air Economizers Except for Critical Areas
- Energy Saving Light Bulbs



Water – 26% Savings through:

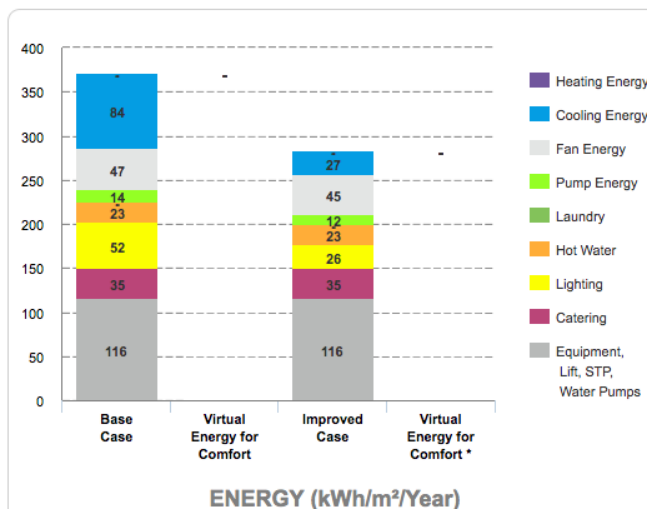
- Dual-Flush for Water Closets in All Bathrooms



Materials – 27% Savings through:

- In-Situ Trough Concrete Floor Slabs

23.77% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$83,420

Utility Costs Savings
\$31,620 / month

Payback in Years
0.2

Operational CO₂
Savings
340 tCO₂/Year

RELEVANT CERTIFIED PROJECT



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)

HOSPITALS – KENYA 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 – 23% Savings through:

- Air Economizers Except for Critical Areas
- Variable Refrigerant Flow Cooling System
- Recovery of Waste Heat from Generator for Space Heating



Water – 25% Savings through:

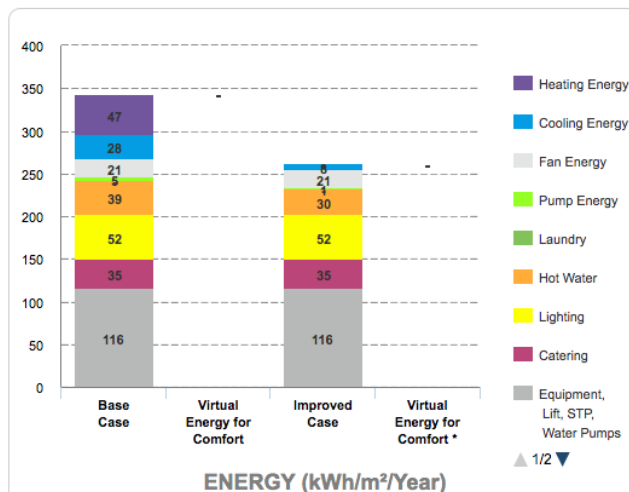
- Low-Flow Faucets in All Bathrooms



Materials – 22% Savings through:

- In-situ waffle concrete slab

23.41% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$60,570

Utility Costs Savings

\$9,870 / month

Payback in Years

0.5

Operational CO₂ Savings

354 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- Reduced window to wall ratio
- Reflective paint for external walls
- Insulation of roof and 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, landscaping
- Rainwater harvesting system



Materials – 43% Savings through:

- Steel sheets on steel rafters for roof construction
- Medium weight hollow concrete blocks for internal, external walls
- Finished concrete flooring



SEDE DE EBAIS DE ESCOBAL DE BELEN (COSTA RICA)

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

HOSPITALS – NIGERIA 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 – 20% Savings through:

- Air Economizers Except for Critical Areas



Water – 31% Savings through:

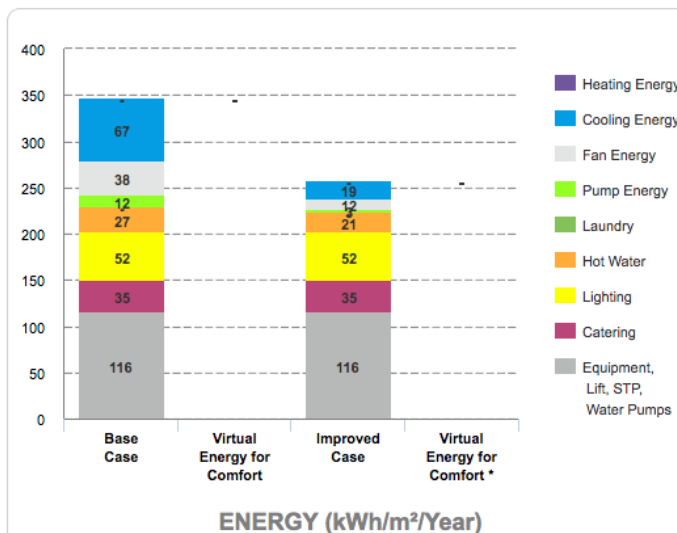
- Low-Flow Faucets in Bathrooms



Materials – 22% Savings through:

- Precast concrete double tee units

25.65% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$55,680

Utility Costs Savings
\$3,790 / month

Payback in Years
1.2

Operational CO₂
Savings
350 tCO₂/Year

RELEVANT CERTIFIED PROJECT



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.



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:

- Higher Thermal Performance Glass
- Variable Refrigerant Flow (VRF) Cooling System



Water – 25% Savings through:

- Low-Flow Faucets in all Bathrooms

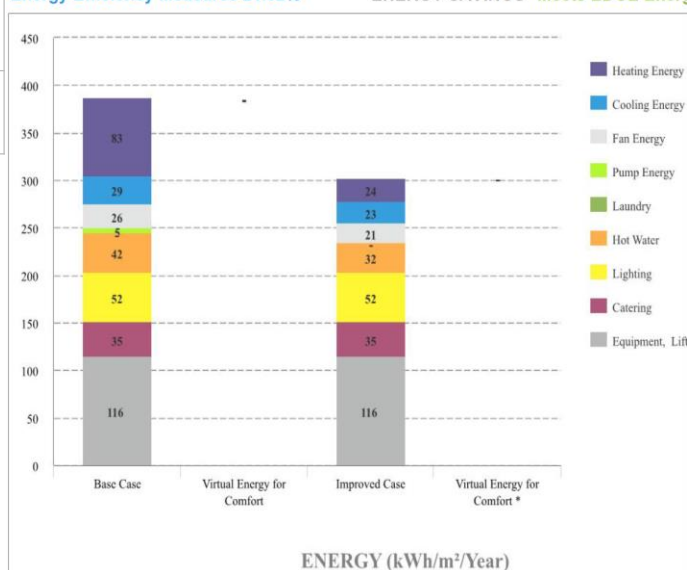


Materials – 24% Savings through:

- Composite In-Situ Concrete and Steel Deck

Energy Efficiency Measures 21.62%

ENERGY SAVINGS Meets EDGE Energy



PROJECT METRICS

Incremental Cost
ZAR 64,925

Utility Costs Savings
ZAR 142,000 / month

Payback in Years
0

Operational CO₂
Savings
785 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window To Wall Ratio
- Insulation Of Roof And External Walls
- Higher thermal performance glass
- Air economizers
- Energy-efficient air conditioning with air-cooled chiller



Water – 25% Savings through:

- Low-flow Faucets In Bathrooms
- Dual-flush Water Closets
- Water-efficient faucets for kitchen sinks.



Materials – 26% 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



KESERWAN MEDICAL CENTER (LEBANON)

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



GREEN BUILDINGS RETURN ON INVESTMENT: HOSPITALS IN LATIN AMERICA



Creating Markets, Creating Opportunities

HOSPITALS – ARGENTINA 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 – 32% Savings through:

- Variable Refrigerant Flow Cooling Systems
- Energy Saving Light Bulbs - Internal & External Spaces
- Insulation of Roof and External Wall
- Air Conditioning with Air and Water Screwed Chiller



Water – 37% Savings through:

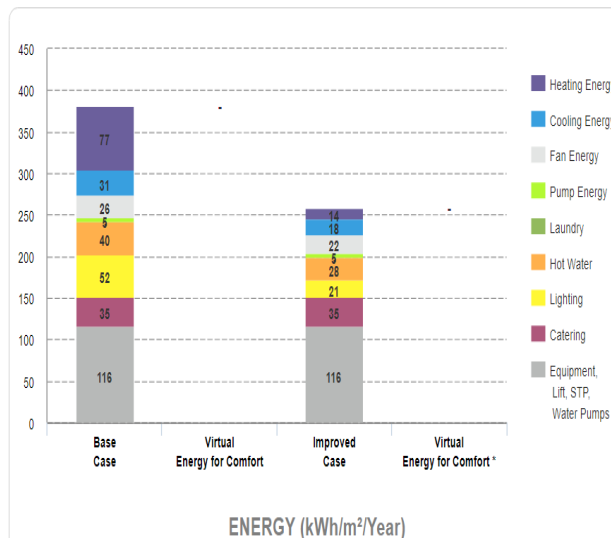
- Low Flow Faucet in Bathroom
- Dual Flush for Water Closet in all Bathrooms
- Water Efficient Urinals and Faucet in Kitchen



Materials – 27% Savings through:

- In-Situ Trough Concrete Floor Slabs

32.16% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$452,580

Utility Cost Savings

\$5,820/month

Payback in Years

6.5

Operational CO₂ Savings

1240 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- Reduced window to wall ratio, natural ventilation for corridors
- reflective paint for external walls, insulation of roof and external walls
- 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 de Escobal de Belén(COSTA RICA)

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

HOSPITALS – BRAZIL 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 – 26% Savings through:

- Variable Refrigerant Flow Cooling Systems
- Energy Saving Light Bulbs - Internal & External Spaces
- Air Conditioning with Air or Water Chiller
- Sensible Heat Recovery from Exhausted Air



Water – 32% Savings through:

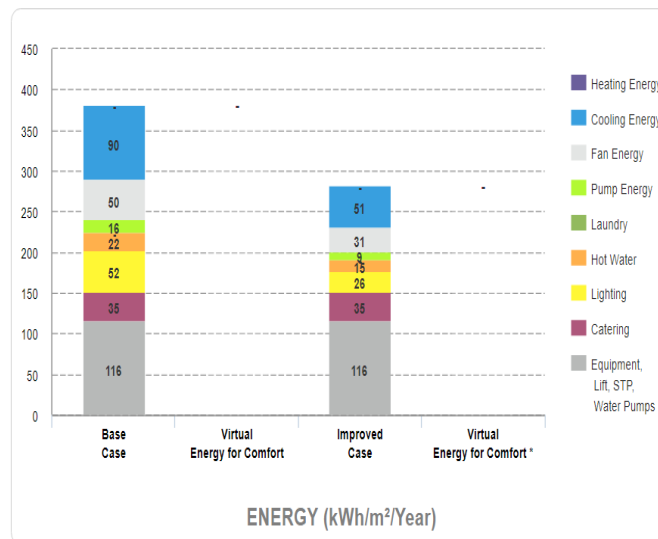
- Low Flow Faucet in all Bathroom
- Dual Flush Water Closet
- Water Efficient Urinal and Kitchen Faucet



Materials – 25% Savings through:

- Concrete Filler Floor Slabs

25.80% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$119,000

Utility Cost Savings

\$8,075/month

Payback in Years

1.3

Operational CO₂ Savings

1210 tCO₂/Year

RELEVANT CERTIFIED PROJECT



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.

HOSPITALS – COLOMBIA 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 – 30% Savings through:

- Variable Refrigerant Flow Cooling Systems
- Air Conditioning with Air or Water Chiller
- Insulation of Roof and External Wall



Water – 32% Savings through:

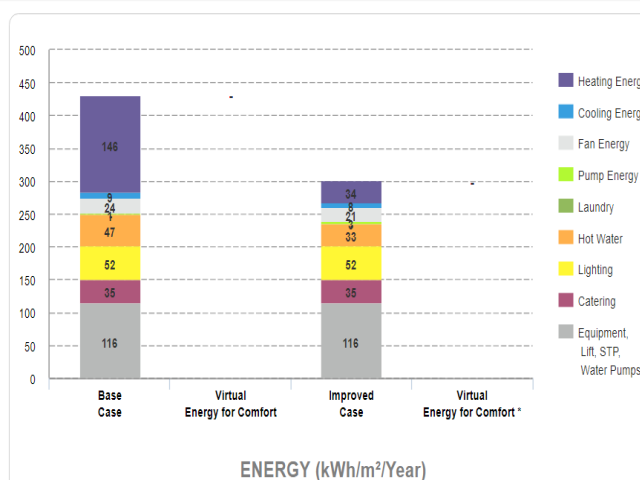
- Low Flow Showerhead and Faucet
- Water-Efficient Urinals and Kitchen Faucet



Materials – 38% Savings through:

- Concrete Filler Floor Slabs

30.05% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$256,700

Utility Cost Savings

\$8,420/month

Payback in Years

2.5

Operational CO₂ Savings

645 tCO₂/Year

RELEVANT CERTIFIED PROJECT – LEBANON



Energy Measures – 21% Savings through:

- Reduced Window To Wall Ratio
- Insulation Of Roof And External Walls And Higher Thermal Performance Glass
- Air Economizers
- Energy-efficient Air Conditioning With Air-cooled Chiller, Variable Frequency Drives In AHUs, And Variable Speed Drive Pumps
- Sensible Heat Recovery From Exhaust Air
- Energy-saving Lighting



Water – 25% Savings through:

- Low-flow Faucets In Bathrooms
- Dual Flush For Water Closets In Bathrooms
- Water-efficient Faucets For Kitchen Sinks



Materials – 26% Savings through:

- Clay Roofing Tiles On Steel Rafters
- Medium Weight Hollow Concrete Blocks For External Walls
- Lightweight Concrete Blocks And Drywall System For Internal Walls
- Vinyl Flooring.



KESERWAN MEDICAL CENTER (LEBANON)

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

HOSPITALS – COSTA RICA 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 System
- Insulation of Roof and External Wall
- Variable Frequency Driver on AHUs
- Variable Speed Drive Pump
- Energy Saving Light Bulb Internal Space (exclude OT)



Water – 22% Savings through:

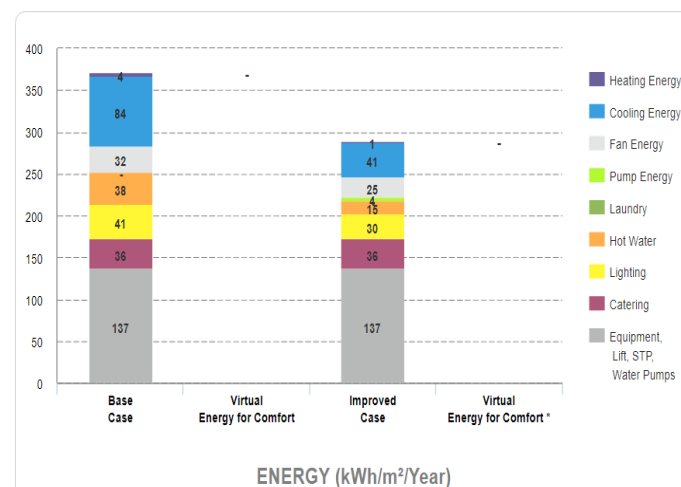
- Low Flow Showerheads and Faucets
- Dual Flush Water Closet
- Water-Efficient Urinals



Materials – 25% Savings through:

- Concrete Filler Floor Slab

22.50% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

196,186,000 CRC

Utility Cost Savings

6,744,000 CRC/month

Payback in Years

2.4

Operational CO₂ Savings

490 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.

HOSPITALS – MEXICO 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
- Insulation of Roof and external Wall
- Air Conditioning with Aired Cooled Chiller



Water – 35% Savings through:

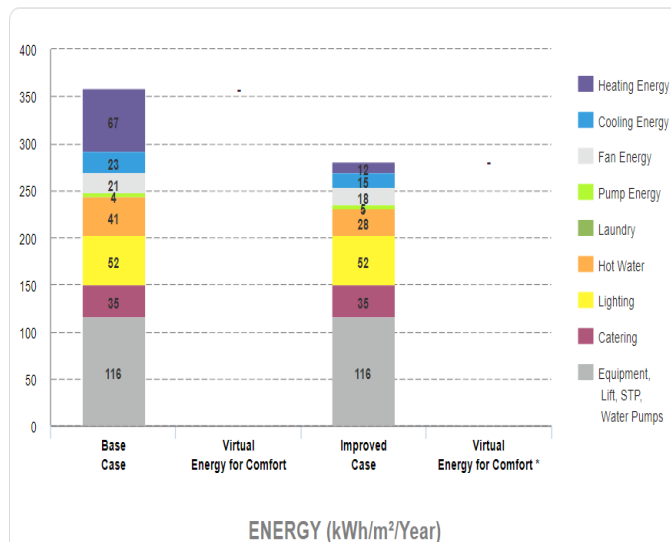
- Low Flow Faucet and Showerhead
- Dual Flush Water Closet
- Water-Efficient Urinals
- Water-Efficient Faucets for Kitchen Sinks



Materials – 30% Savings through:

- In-Situ Concrete with > 25% GGBS Floor Slabs

21.64% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$300,970

Utility Cost Savings

\$5,430/month

Payback in Years

4.6

Operational CO₂ Savings

1250 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- Reduced window to wall ratio, natural ventilation for corridors
- reflective paint for external walls, insulation of roof and external walls
- 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 de Escobal de Belén(COSTA RICA)

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

HOSPITALS – PERU 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
- Insulation of Roof and External Wall
- Energy Saving Light Bulbs - Internal Spaces



Water – 39% Savings through:

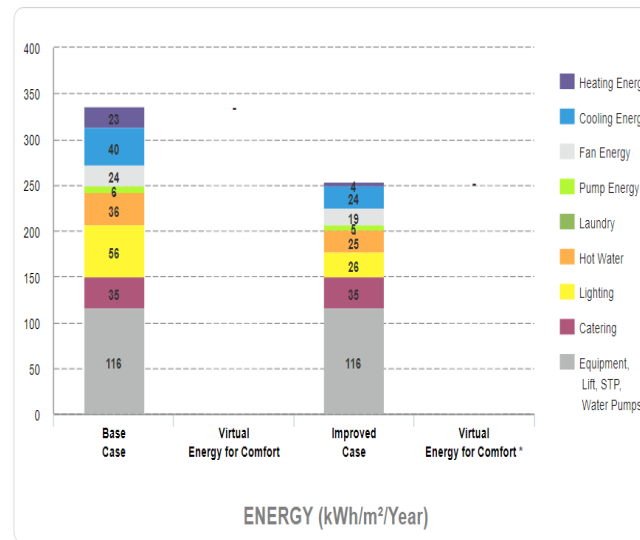
- Low Flow Showerhead and Faucet
- Dual Flush Water Closet
- Water Efficient Urinals



Materials – 20% Savings through:

- In-Situ Concrete with > 25% GGBS Floor Slabs

24.55% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

878,900 S

Utility Cost Savings

31,900 S/month

Payback in Years

2.3

Operational CO₂ Savings

1200 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- Reduced window to wall ratio, natural ventilation for corridors
- reflective paint for external walls, insulation of roof and external walls
- 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 de Escobal de Belén(COSTA RICA)

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



GREEN BUILDINGS RETURN ON INVESTMENT: HOSPITALS IN MENA



Creating Markets, Creating Opportunities

HOSPITALS – EGYPT 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 – 24% Savings through:

- Earth Air Tunnel System to Pre-Cool/Pre-Heat Supply Air Cooling/Heating Air Intake
- Energy-Saving Light Bulbs - Internal Spaces



Water – 23% Savings through:

- Dual Flush for Water Closets in all Bathrooms
- Low-Flow Faucets in all Bathrooms
- Single Flush/Flush Valve

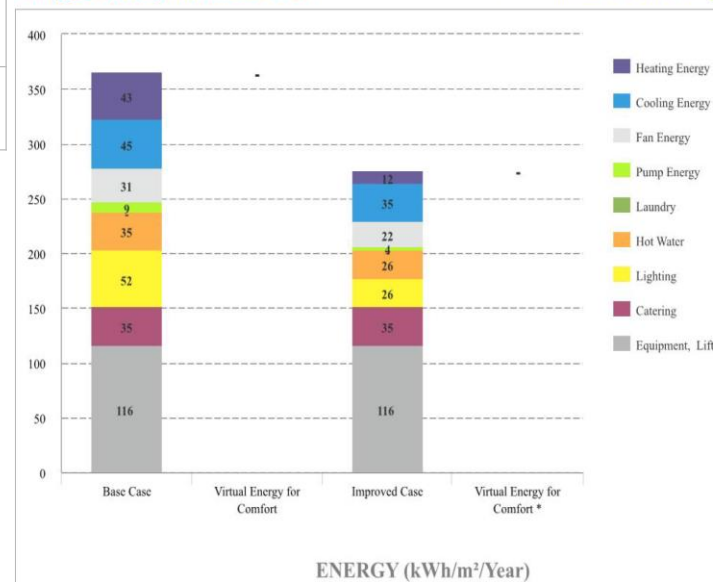


Materials – 28% Savings through:

- Composite In-Situ Concrete and Steel Deck

Energy Efficiency Measures 24.30%

ENERGY SAVINGS Meets EDGE Energy



PROJECT METRICS

Incremental Cost
\$ 160,500

Utility Costs Savings
\$ 7,200 / month

Payback in Years
2

Operational CO₂
Savings
\$ 370 tCO₂/Year

RELEVANT CERTIFIED PROJECT



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 and 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 7 Internal Walls
- Ceramic Tile Flooring



MBU at Komfo Anokye Teaching Hospital (Ghana)

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

HOSPITALS – JORDAN 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:

- Earth Air Tunnel System to Pre-Cool/Pre-Heat Supply Air Cooling/Heating Air Intake
- Energy-Saving Light Bulbs - Internal Spaces



Water – 26% Savings through:

- Dual Flush for Water Closets in all Bathrooms
- Single Flush/Flush Valve
- Low-Flow Faucets in all Bathrooms

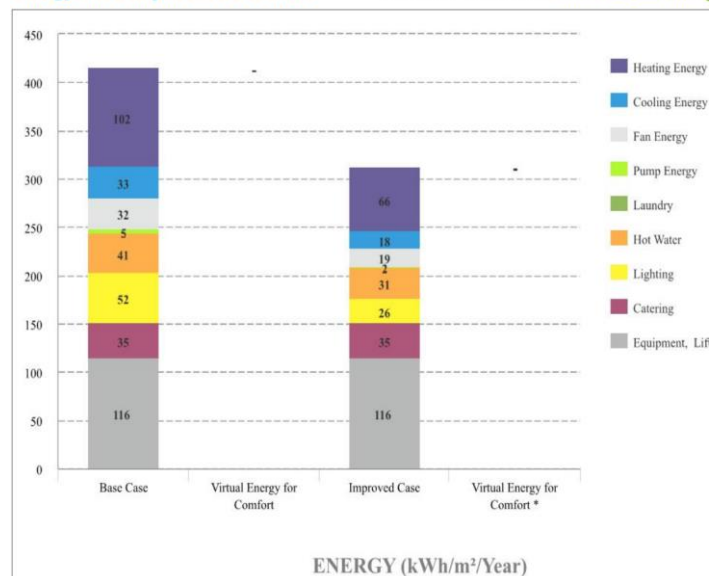


Materials – 28% Savings through:

- Composite In-Situ Concrete and Steel Deck

Energy Efficiency Measures 24.71%

ENERGY SAVINGS Meets EDGE Energy



PROJECT METRICS

Incremental Cost
\$ 158,700

Utility Costs Savings
\$ 6,500 / month

Payback in Years
2

Operational CO₂
Savings
\$ 600 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 21% Savings through:

- Reduced Window To Wall Ratio
- Insulation Of Roof And External Walls
- Higher thermal performance glass
- Air economizers
- Energy-efficient air conditioning with air-cooled chiller



Water – 25% Savings through:

- Low-flow Faucets In Bathrooms
- Dual-flush Water Closets
- Water-efficient faucets for kitchen sinks.



Materials – 26% 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



Keserwan Medical Center (Lebanon)

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

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:

- Low-E Coated Glass
- Earth Air Tunnel System to Pre-Cool/Pre-Heat Supply Air Cooling/Heating Air Intake
- Energy-Saving Light Bulbs - Internal and External Spaces



Water – 25% Savings through:

- Low-Flow Faucets in all Bathrooms
- Dual Flush for Water Closets in all Bathrooms
- Single Flush/Flush Valve

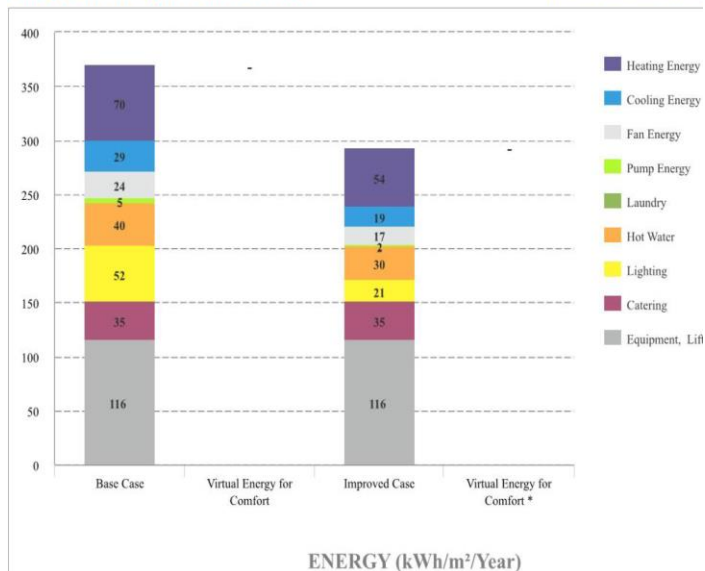


Materials – 28% Savings through:

- Composite In-Situ Concrete and Steel Deck

Energy Efficiency Measures 20.54%

ENERGY SAVINGS Meets EDGE Energy



PROJECT METRICS

Incremental Cost
\$ 170,000

Utility Costs Savings
\$ 8,000 / month

Payback in Years
2

Operational CO₂
Savings
\$ 400 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 37% Savings through:

- Reduced Window To Wall Ratio
- Reflective paint for external walls
- Insulation of roof and external walls
- Natural ventilation for corridors
- Variable refrigerant volume cooling system



Water – 39% Savings through:

- Low-flow Faucets In Bathrooms
- Single-flush and flush valves for water closets
- water-efficient landscaping, and a rainwater harvesting system.



Materials – 39% 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 de La Ribera de Belén (Costa Rica)

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

HOSPITALS – PAKISTAN 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:

- Earth Air Tunnel System to Pre-Cool/Pre-Heat Supply Air Cooling/Heating Air Intake



Water – 22% Savings through:

- Low-Flow Faucets in all Bathrooms
- Dual Flush for Water Closets in all Bathrooms
- Single Flush/Flush Valve



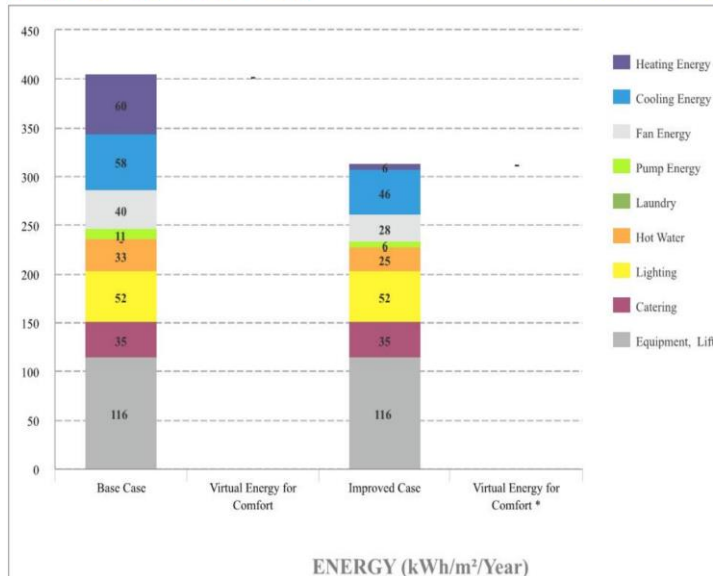
Materials – 28% Savings through:

- Composite In-Situ Concrete and Steel Deck

Energy Efficiency Measures 22.35%

ENERGY SAVINGS Meets EDGE Energy

PROJECT METRICS



Incremental Cost
\$ 88,000

Utility Costs Savings
\$ 3,700 / month

Payback in Years
2

Operational CO₂
Savings
\$ 450 tCO₂/Year

RELEVANT CERTIFIED PROJECT



Energy Measures – 32% Savings through:

- Reduced Window To Wall Ratio
- Reflective paint for external walls
- Insulation of roof and external walls
- 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.



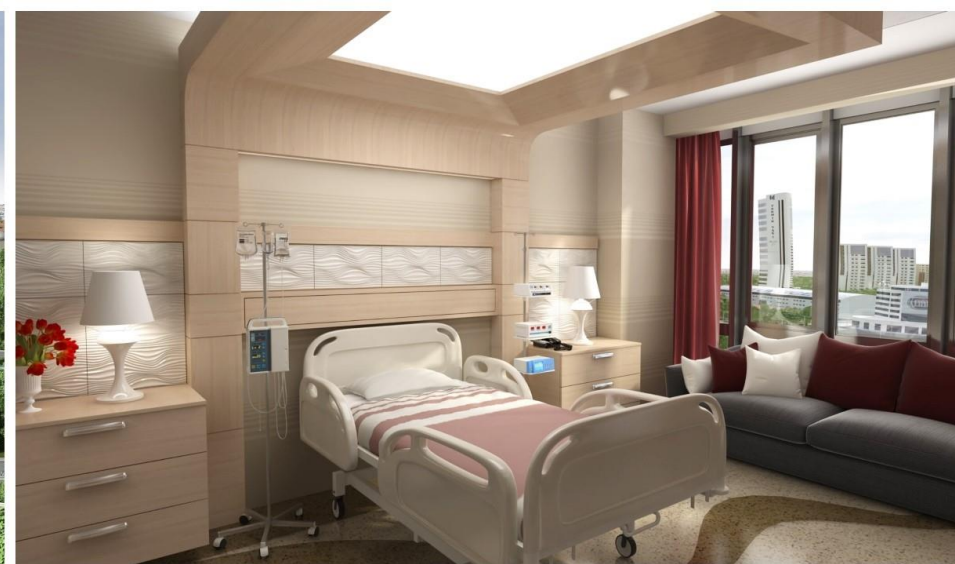
Materials – 43% Savings through:

- Steel sheets on steel rafters for roof construction
- Medium weight hollow concrete blocks for internal and external walls



Sede de EBAIS de Escobal de Belén (Costa Rica)

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



GREEN BUILDINGS RETURN ON INVESTMENT: HOSPITALS IN EASTERN EUROPE



Creating Markets, Creating Opportunities

HOSPITALS – ARMENIA 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 – 35% Savings through:

- Reduced Window to Wall ratios
- Insulation of Roof and External Walls
- Variable Refrigerant Volume Cooling System



Water – 37% Savings through:

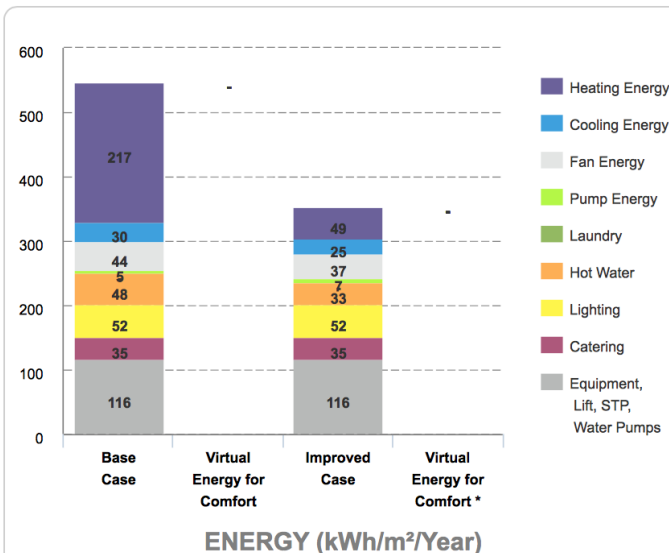
- Low-Flow Showerheads and Faucets
- Dual Flush for Water Closets
- Water-Efficient Urinals and faucets for Kitchen Sinks



Materials – 33% Savings through:

- Timber Floor Construction Floor Slabs

35.22% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$847,406

Utility Costs Savings

\$11,387/ month

Payback in Years

6.2

Operational CO₂

Savings

801 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.

HOSPITALS – POLAND 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 – 42% Savings through:

- Reduced Window to Wall ratios
- Insulation of Roof and External Walls
- Variable Refrigerant Volume Cooling System
- Solar Hot Water Collectors



Water – 36% Savings through:

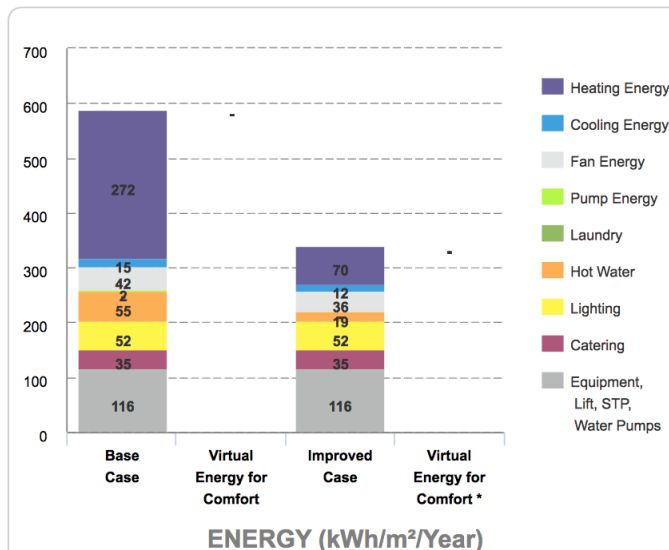
- Low-Flow Showerheads and Faucets
- Dual Flush for Water Closets
- Water-Efficient Urinals and faucets for Kitchen Sinks



Materials – 21% Savings through:

- Timber Floor Construction Floor Slabs

42.35% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$2,334

Utility Costs Savings

\$30,289/ month

Payback in Years

0.01

Operational CO₂

Savings

1,912 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.

HOSPITALS – RUSSIA 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 – 45% Savings through:

- Reduced Window to Wall ratios
- Insulation of Roof and External Walls
- Variable Refrigerant Volume Cooling System
- Recovery of Waste Heat from the Generator for Space Heating



Water – 35% Savings through:

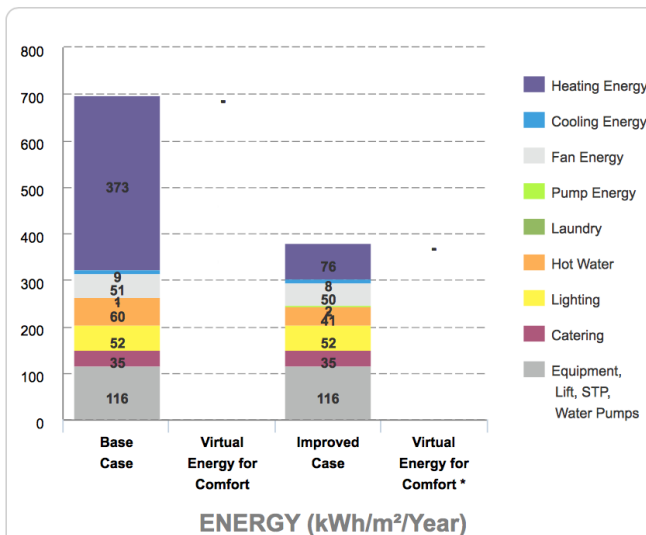
- Low-Flow Showerheads and Faucets
- Dual Flush for Water Closets
- Water-Efficient Urinals and faucets for Kitchen Sinks



Materials – 22% Savings through:

- Timber Floor Construction Floor Slabs

45.37% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$56,762

Utility Costs Savings

\$33,468/ month

Payback in Years

0.14

Operational CO₂ Savings

1,351 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.

HOSPITALS – SERBIA 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 – 35% Savings through:

- Reduced Window to Wall ratios
- Insulation of Roof and External Walls
- Variable Refrigerant Volume Cooling System



Water – 38% Savings through:

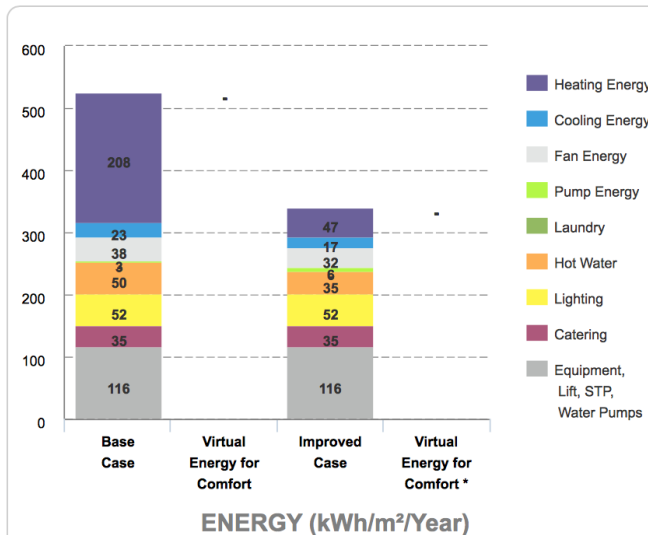
- Low-Flow Showerheads and Faucets
- Dual Flush for Water Closets
- Water-Efficient Urinals and faucets for Kitchen Sinks



Materials – 21% Savings through:

- Timber Floor Construction Floor Slabs

35.33% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$668,359

Utility Costs Savings

\$11,717/ month

Payback in Years

4.8

Operational CO₂

Savings

1,511 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 and solar photovoltaics



Water – 33% Savings through:

- Low-flow faucets in bathrooms
- 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



MBU at KOMFO ANOKYE HOSPITAL (GHANA)

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

HOSPITALS – UKRAINE 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 – 39% Savings through:

- Reduced Window to Wall ratios
- Insulation of Roof and External Walls
- Variable Refrigerant Volume Cooling System
- Solar Hot Water Collectors



Water – 36% Savings through:

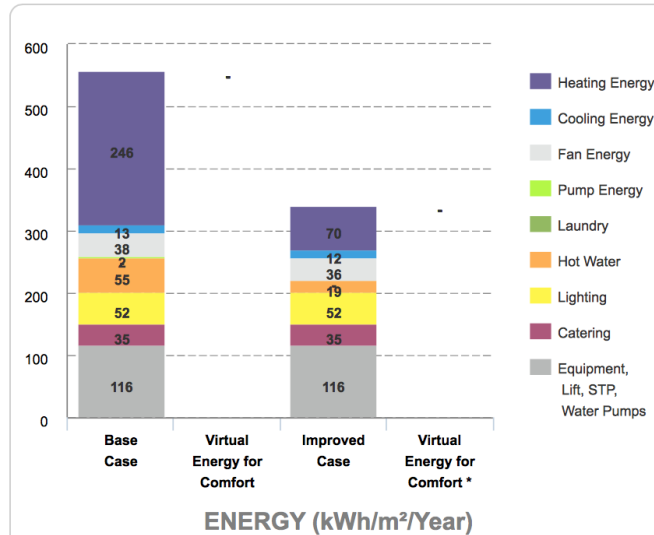
- Low-Flow Showerheads and Faucets
- Dual Flush for Water Closets
- Water-Efficient Urinals and faucets for Kitchen Sinks



Materials – 22% Savings through:

- Timber Floor Construction Floor Slabs

38.79% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost
\$13,084

Utility Costs Savings
\$5,387/ month

Payback in Years
0.2

Operational CO₂ Savings
1,258 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.

HOSPITALS – TURKEY 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 – 31% Savings through:

- Reduced Window to Wall ratios
- Insulation of Roof and External Walls
- Variable Refrigerant Volume Cooling System



Water – 37% Savings through:

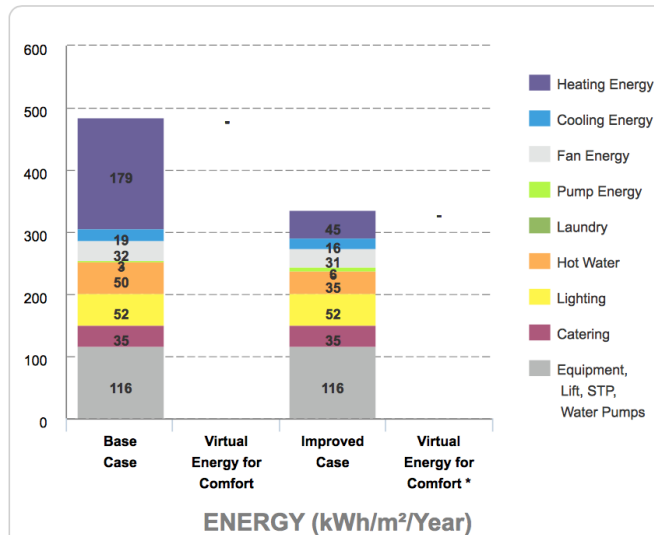
- Low-Flow Showerheads and Faucets
- Dual Flush for Water Closets
- Water-Efficient Urinals and faucets for Kitchen Sinks



Materials – 22% Savings through:

- Timber Floor Construction Floor Slabs

31.18% Meets EDGE Energy Standard



PROJECT METRICS

Incremental Cost

\$696,566

Utility Costs Savings

\$14,304/ month

Payback in Years

4.06

Operational CO₂

Savings

568 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.



METHODOLOGY, NOTES, ACKNOWLEDGMENTS

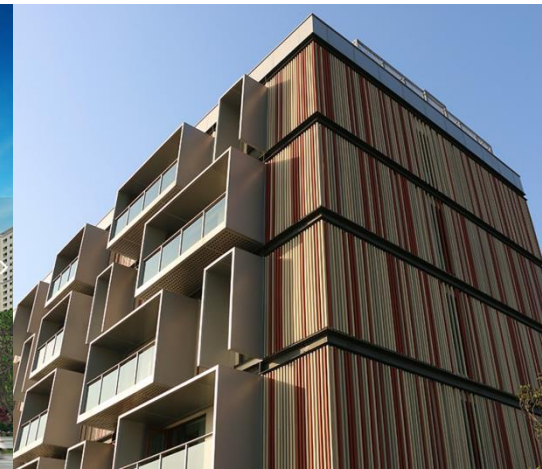
RESEARCH OBJECTIVE: MOST EFFECTIVE INTERVENTIONS TO REACH THE EDGE STANDARD

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



20%



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.

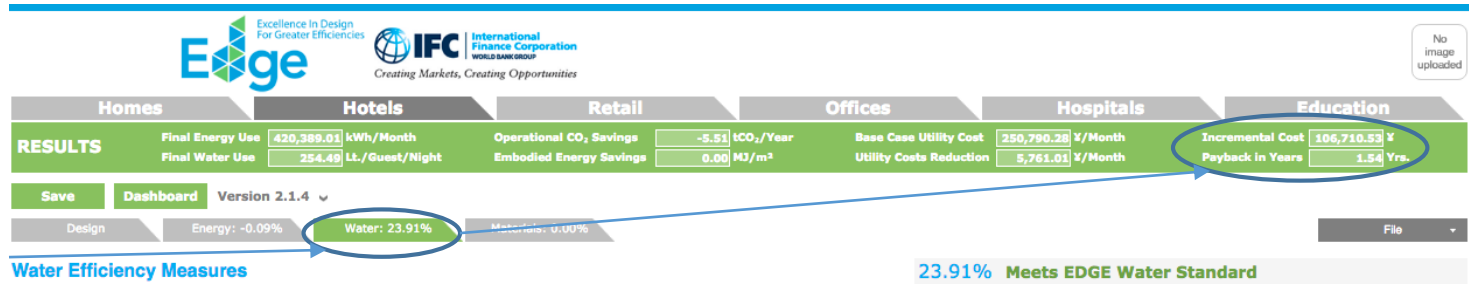
Third party certification verifies the resource efficiency savings so they can be credibly communicated between investors, developers, and buyers.

RESEARCH METHODOLOGY

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

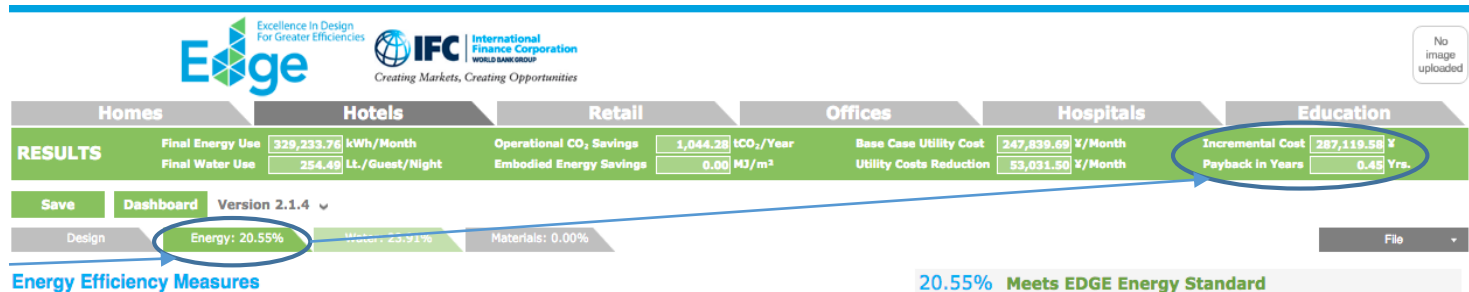
1

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.



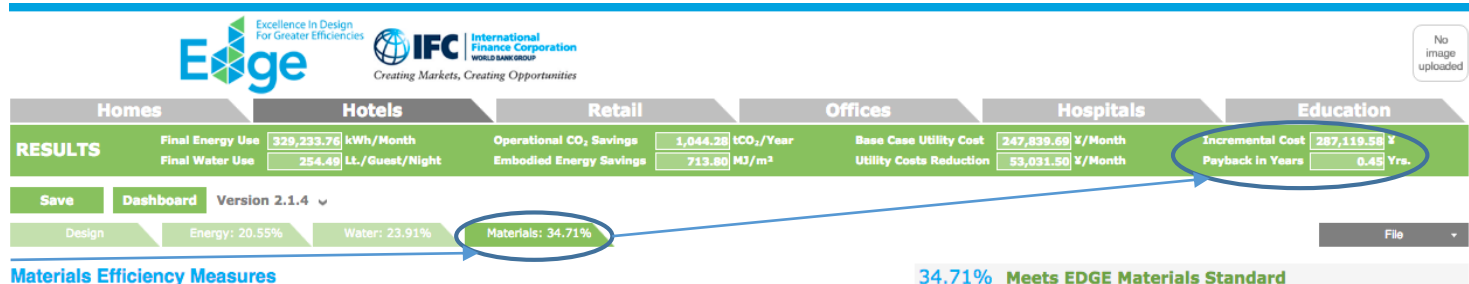
2

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.

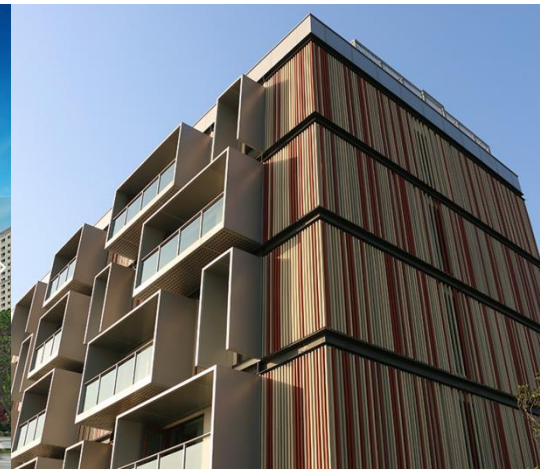


4

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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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