SMART HEALTH CARE FACILITIES

SAFE + GREEN = SMART

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Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

PAHO SMART HOSPITALS

SAFE + GREEN = SMART

SAFE	GREEN	MAINTAINED	= SMART
Resiliency	Environmentally Sound	Sustainability	

Improve resilience to hazards

Reduce impact of Climate Change & Reduce operational costs

Conservation & Planned Preventative Maintenance

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PAHO SMART HOSPITALS

- **5** -year Project funded by DFID, UK

- **7** countries: Grenada, St. Lucia, St. Vincent and the Grenadines, Dominica, Guyana, Belize and Jamaica

- Over **400** Health facilities assessed (safe & green)

- Smart App created with database

- "SMARTing" of at least **4** facilities in each country

- Improved Technical material/ Tools

- Develop National & Regional Capacity

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Why Smart?

Majority HF's = HSI B or C

Only 2 HF's are SMART

Category C
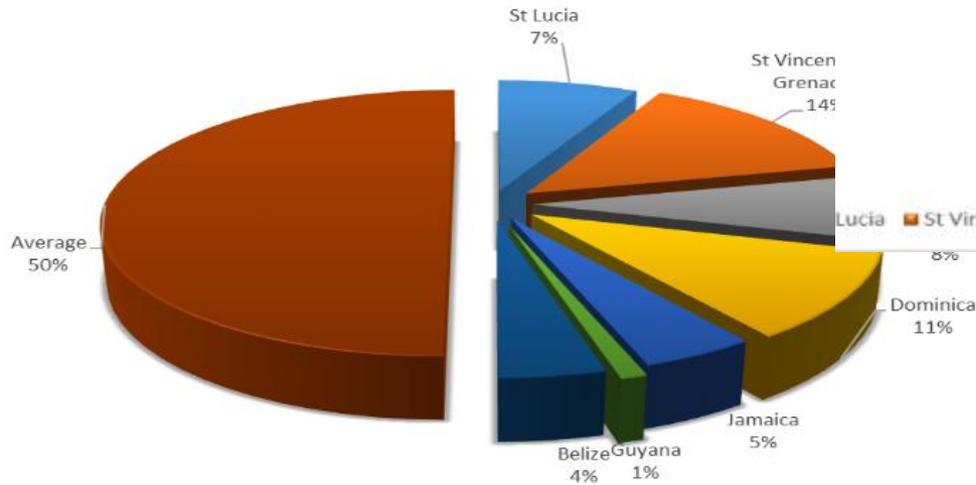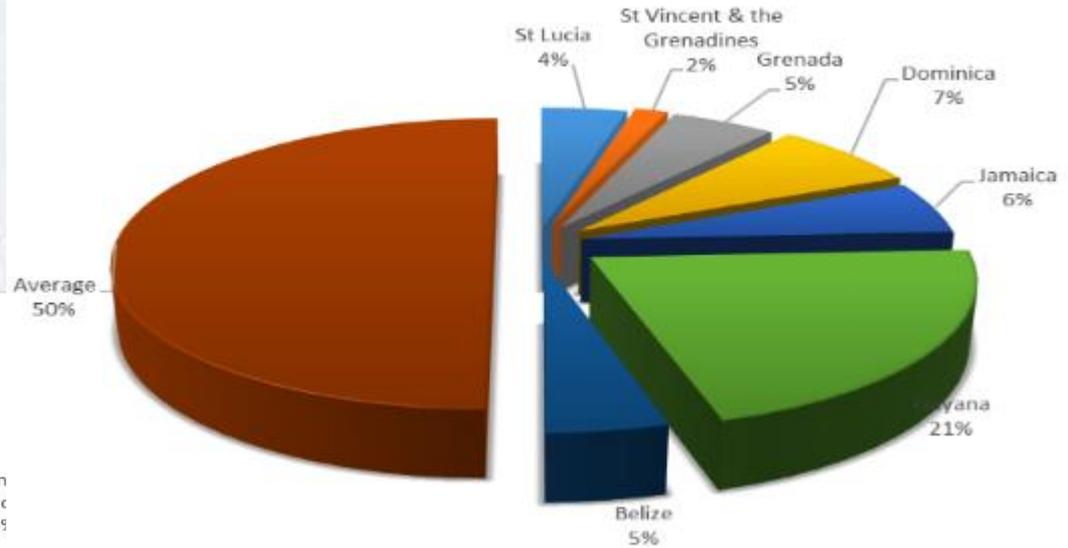
Category B

Making Healthcare Facilities in the Caribbean

S M A R T

A platform for integrating Disaster Risk Reduction, Climate Change Adaptation, Environmental Management, and Conservation Efforts

RESILIENCY

SAFE A+

- Sound Roof & Foundation
- Improved Security & Signage
- Secured Equipment & Fuel Storage
- Protected & Efficient Doors and Windows
- Good Drainage
- Back-up Power
- Water Reserve
- Disaster Management Plans
- Comprehensive Maintenance Planning
- Disability Access

SMART HOSPITAL

Hospital safety Index –Score A
Green checklist –Scores above 70%

ENVIRONMENTALLY SOUND

GREEN 70+

- Water Efficiency
- Waste Minimization & Management
- Pollution Reduction
- Rain Water Harvesting
- Alternative Power Using Renewable Energy
- Efficient Lighting & Cooling
- Improved Indoor Air Quality

SUSTAINABILITY

SMART

- Reduced Downtime
- Resilient Structure
- Reduced Operating Cost
- Improved Safety
- Satisfied Patients and Staff
- Environmentally Sound Operations
- Improved emergency care and services for the community

SMART HOSPITAL
SAFE + GREEN = SMART

Smart Healthcare Facilities in the Caribbean

Providing safer greener health facilities to deliver care in disasters

Average Electricity Cost (US$ / kWh)
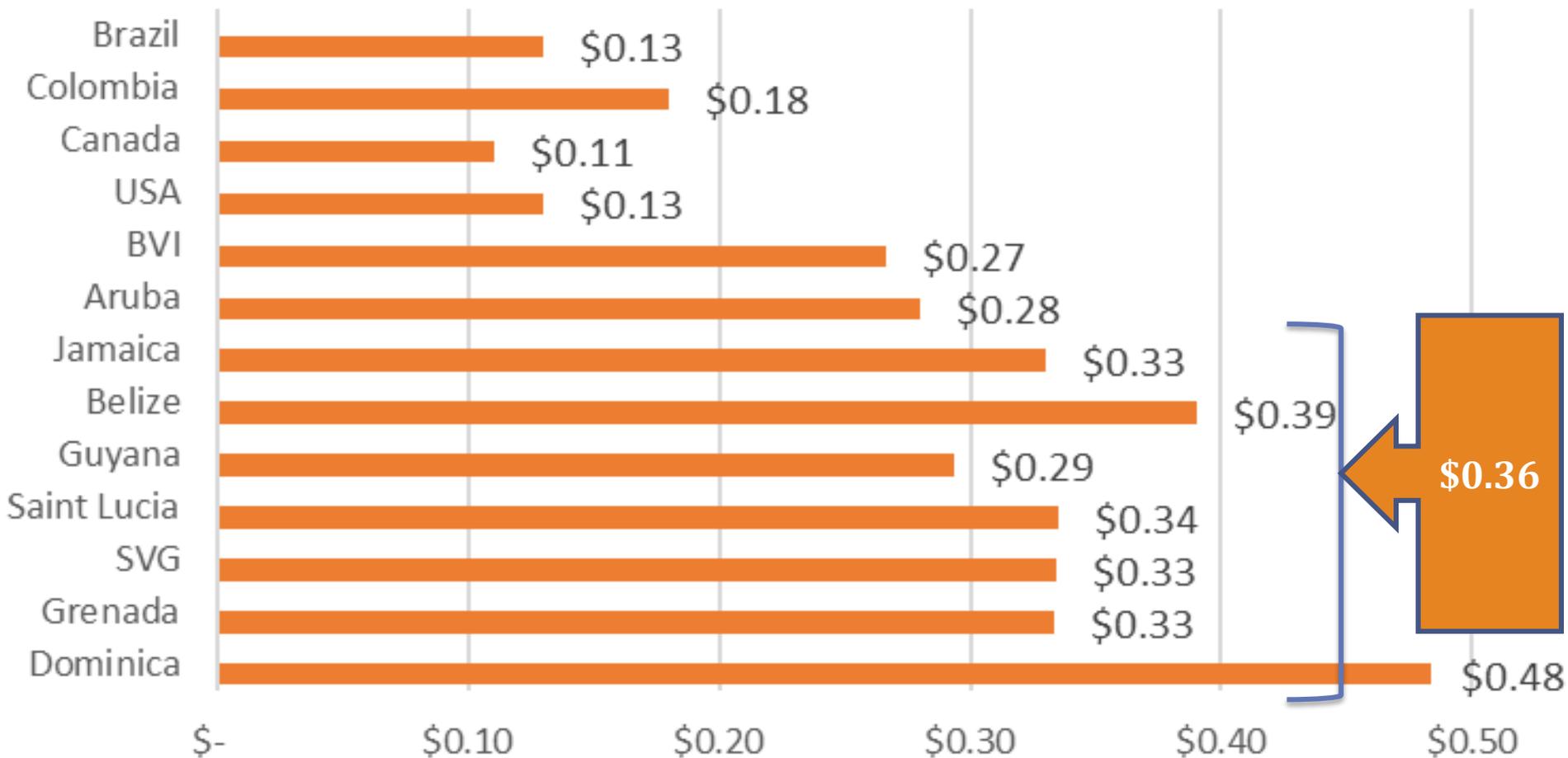
Country	Cost
Brazil	$0.13
Colombia	$0.18
Canada	$0.11
USA	$0.13
BVI	$0.27
Aruba	$0.28
Jamaica	$0.33
Belize	$0.39
Guyana	$0.29
Saint Lucia	$0.34
SVG	$0.33
Grenada	$0.33
Dominica	$0.48

$0.36

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Health Care Facilities

Electrical usage at health care facilities by equipment
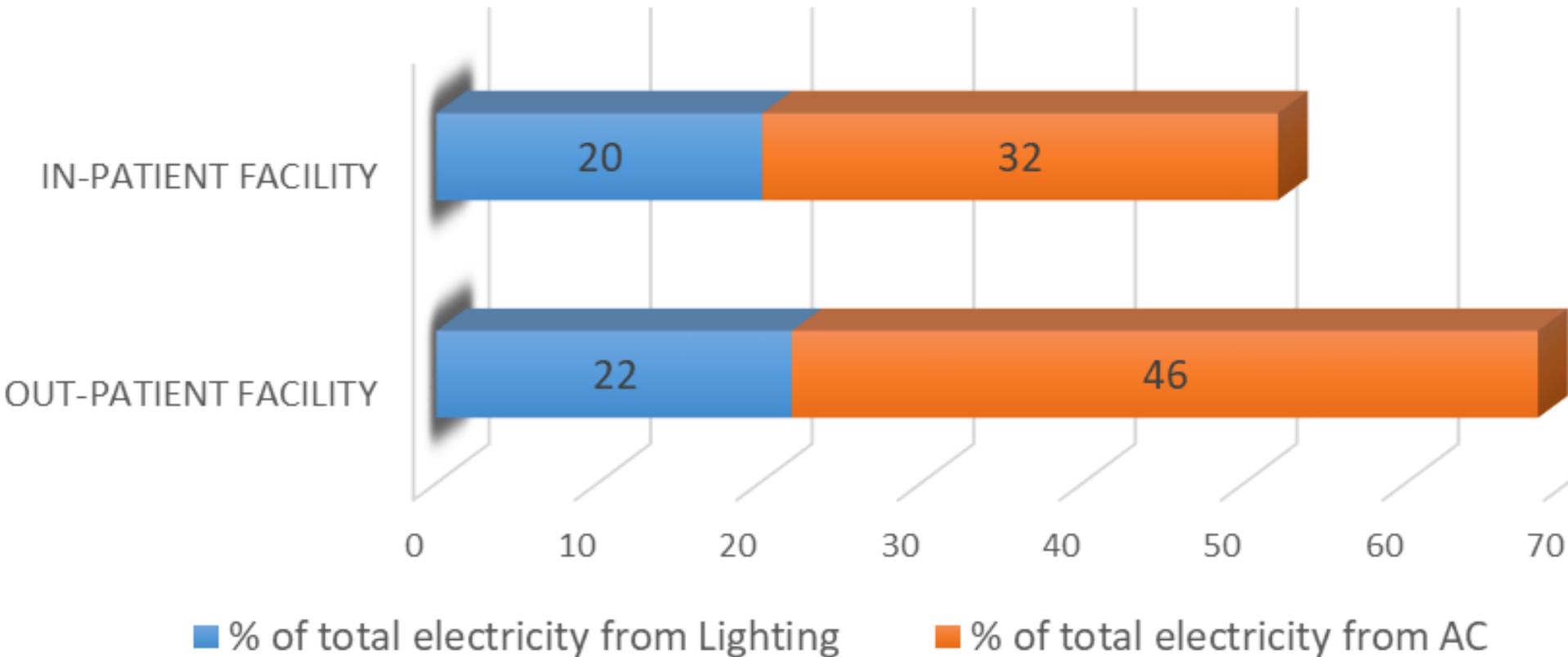
IN-PATIENT FACILITY: 20, 32

OUT-PATIENT FACILITY: 22, 46

■ % of total electricity from Lighting   ■ % of total electricity from AC

Health Care Facilities

ESTIMATED SAVINGS FROM ELECTRICAL RETROFIT TO LIGHTS & AC ONLY
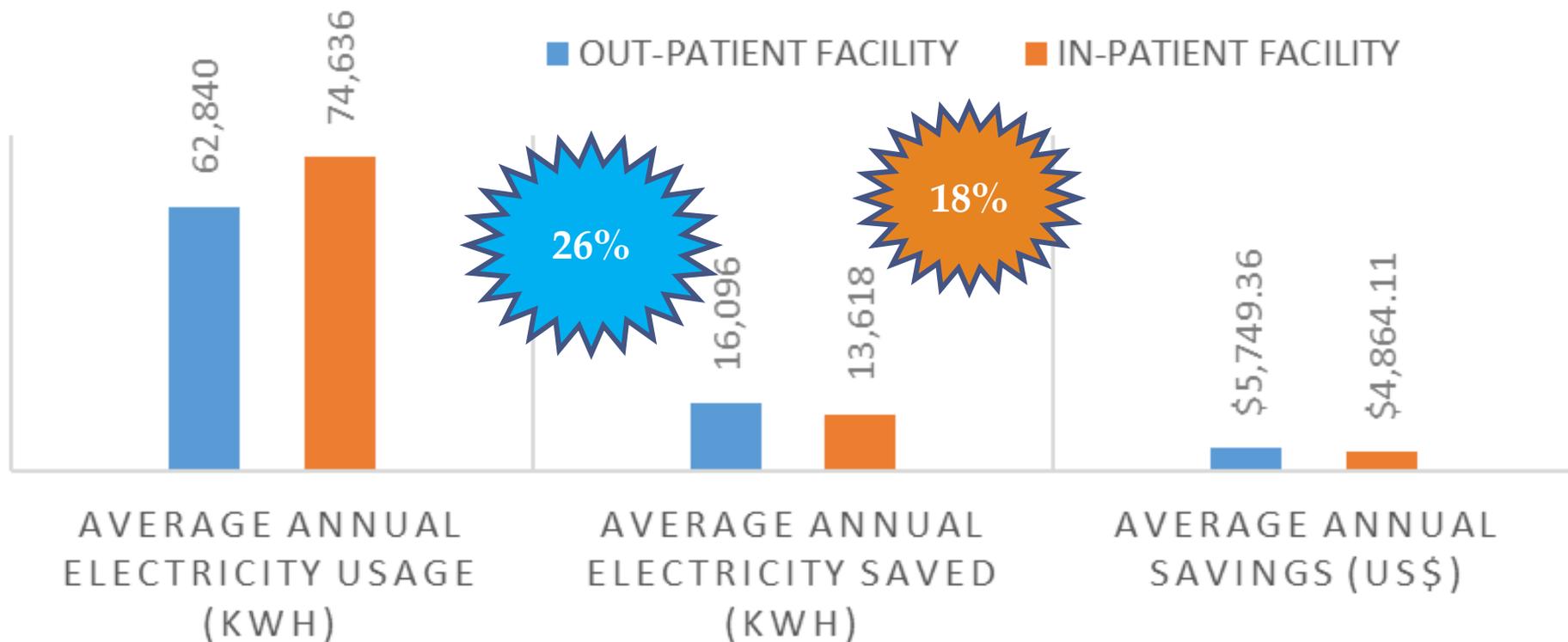
■ OUT-PATIENT FACILITY   ■ IN-PATIENT FACILITY

- 62,840
- 74,636
- 26%
- 18%
- 16,096
- 13,618
- $5,749.36
- $4,864.11

AVERAGE ANNUAL ELECTRICITY USAGE (KWH)

AVERAGE ANNUAL ELECTRICITY SAVED (KWH)

AVERAGE ANNUAL SAVINGS (US$)

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Health Care Facilities

HVAC: Average payback period = 5.6 years

HVAC: A
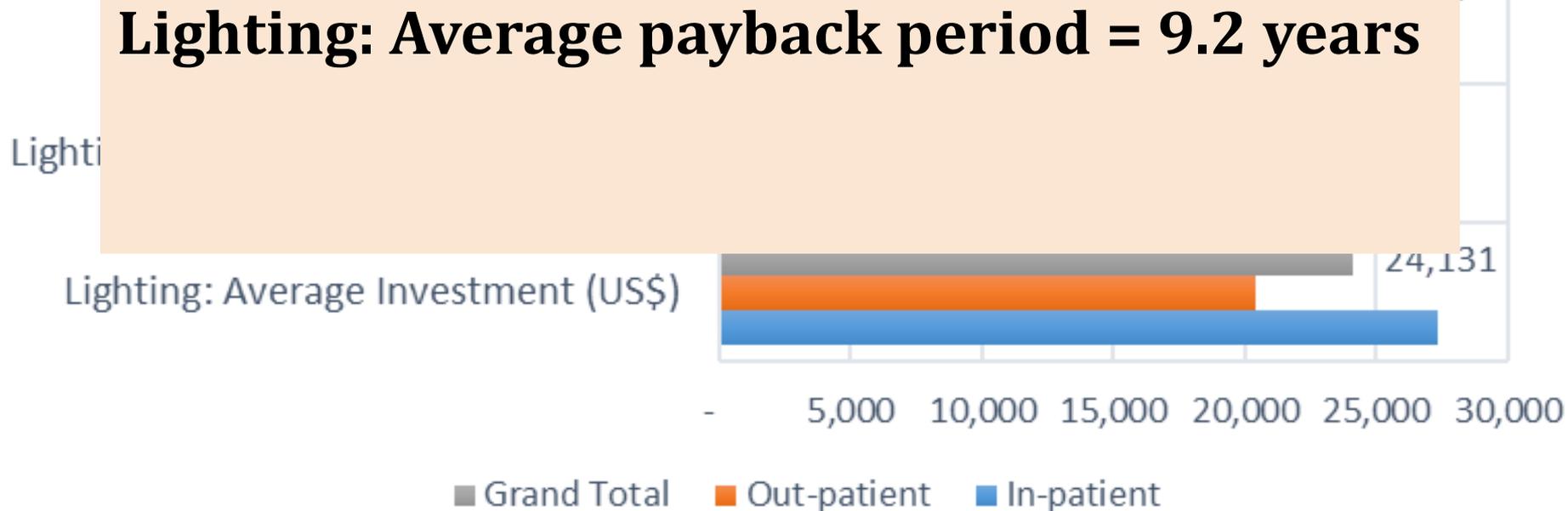
Lighting: Average payback period = 9.2 years

Lighti

25,386

Lighting: Average Investment (US$)

24,131

| - | 5,000 | 10,000 | 15,000 | 20,000 | 25,000 | 30,000 |

■ Grand Total   ■ Out-patient   ■ In-patient

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Energy retrofit:

Sounds EASY!

b) Breakdown of recorded economic losses (US$) per disaster type 1998-2017

Ref: Cred Crunch Issue No. 52 Oct. 2018

23%
US$ 661 billion

23%
US$ 656 billion

46%
US$ 1,330 billion

4%
US$ 124 billion

2%
US$ 68 billion

2%
US$ 61 billion

US$ 8 billion
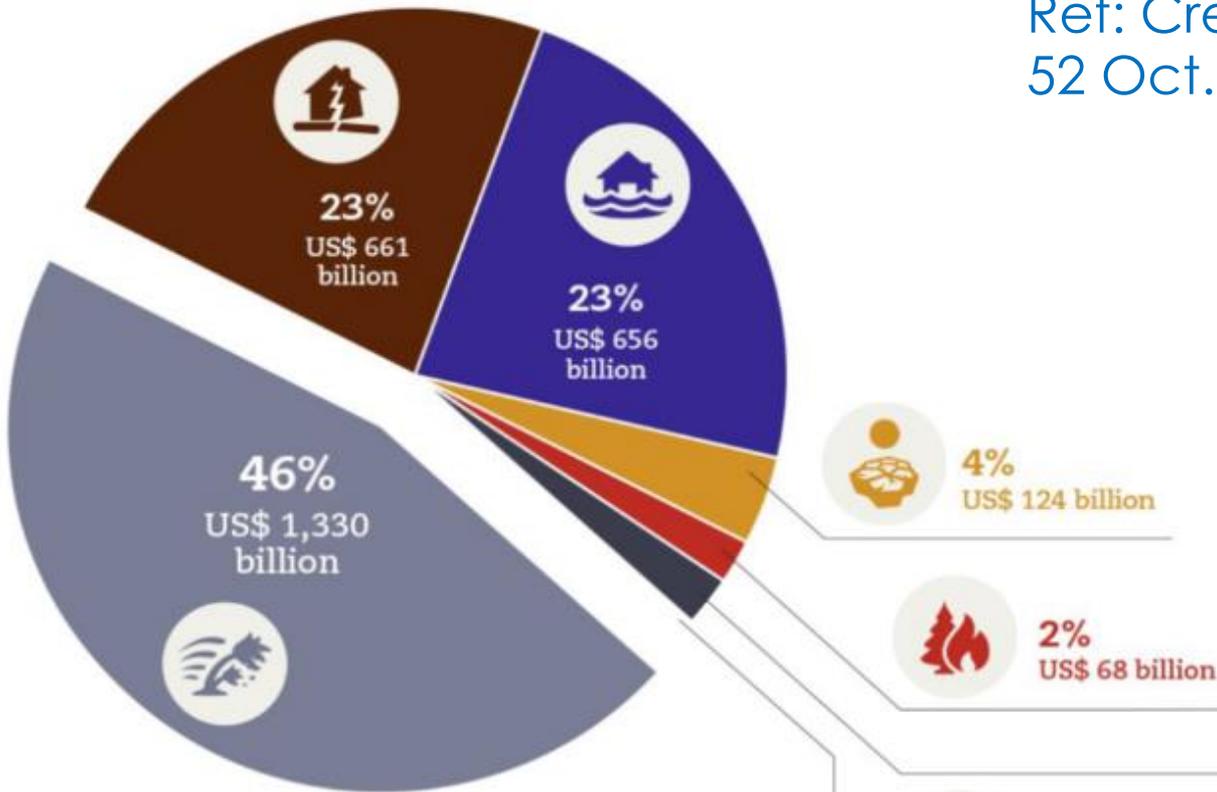
- ☐ Storm
- ☐ Earthquake
- ☐ Flood
- ☐ Drought
- ☐ Wildfire
- ☐ Extreme temperature
- ☐ Others : Landslide, Volcanic activity, Mass movement

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Natural Disaster

# Designing for Resilience

PAY ATTENTION TO GEOMETRY AND SITING!

- No risk if facility located in safe location
- **Avoid building in flood planes**

Geometry

Use simple geometry rather than complex geometry
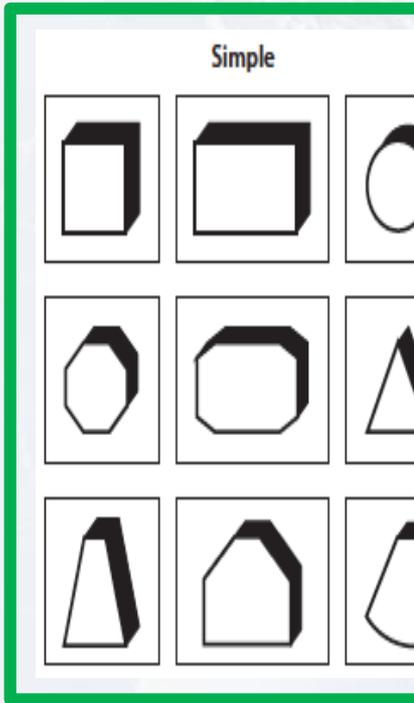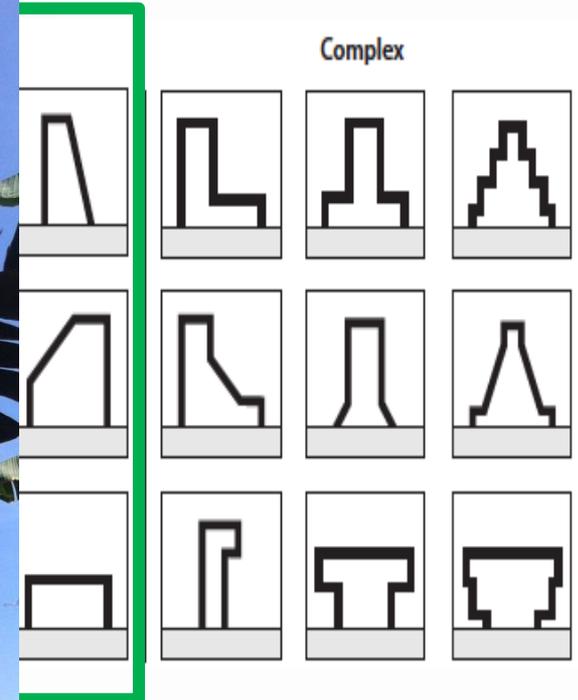
Plan Geometry ... Elevation

Favourable Roof Geometry
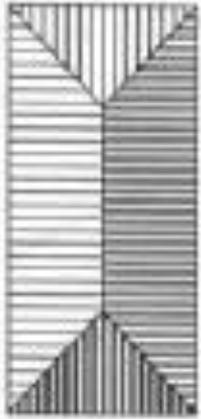
Hip Roof with pitch ≥ 20°
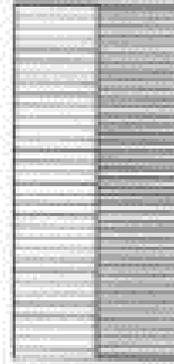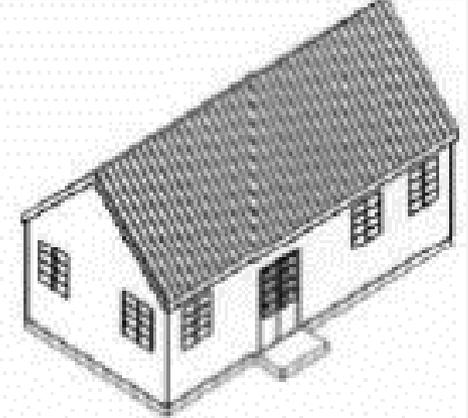
Gable Roof with pitch ≥ 20°
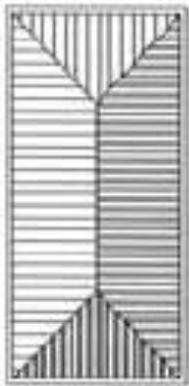
Hip Roof with parapet, pitch ≥ 15°

Gable Roof with parapet, pitch ≥ 20°

# Correct geometry

PV panels, post-Maria

Parapet walls

Smart Energy Retrofit

- Solar shading versus increased lighting
- Include insulation, small capital cost = big operational savings
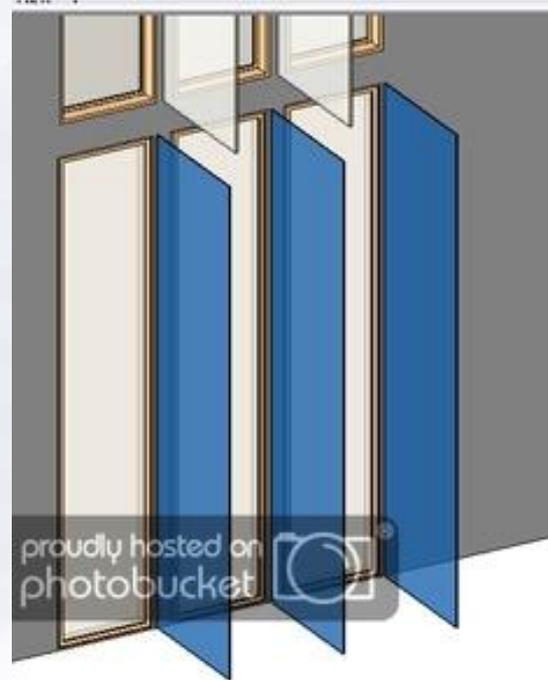
Apco.net

proudly hosted on photobucket

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Smart Energy Retrofit

- Incorporate natural ventilation

Temp./CO_2

Temp./CO_2

Ref. windowmaster.com

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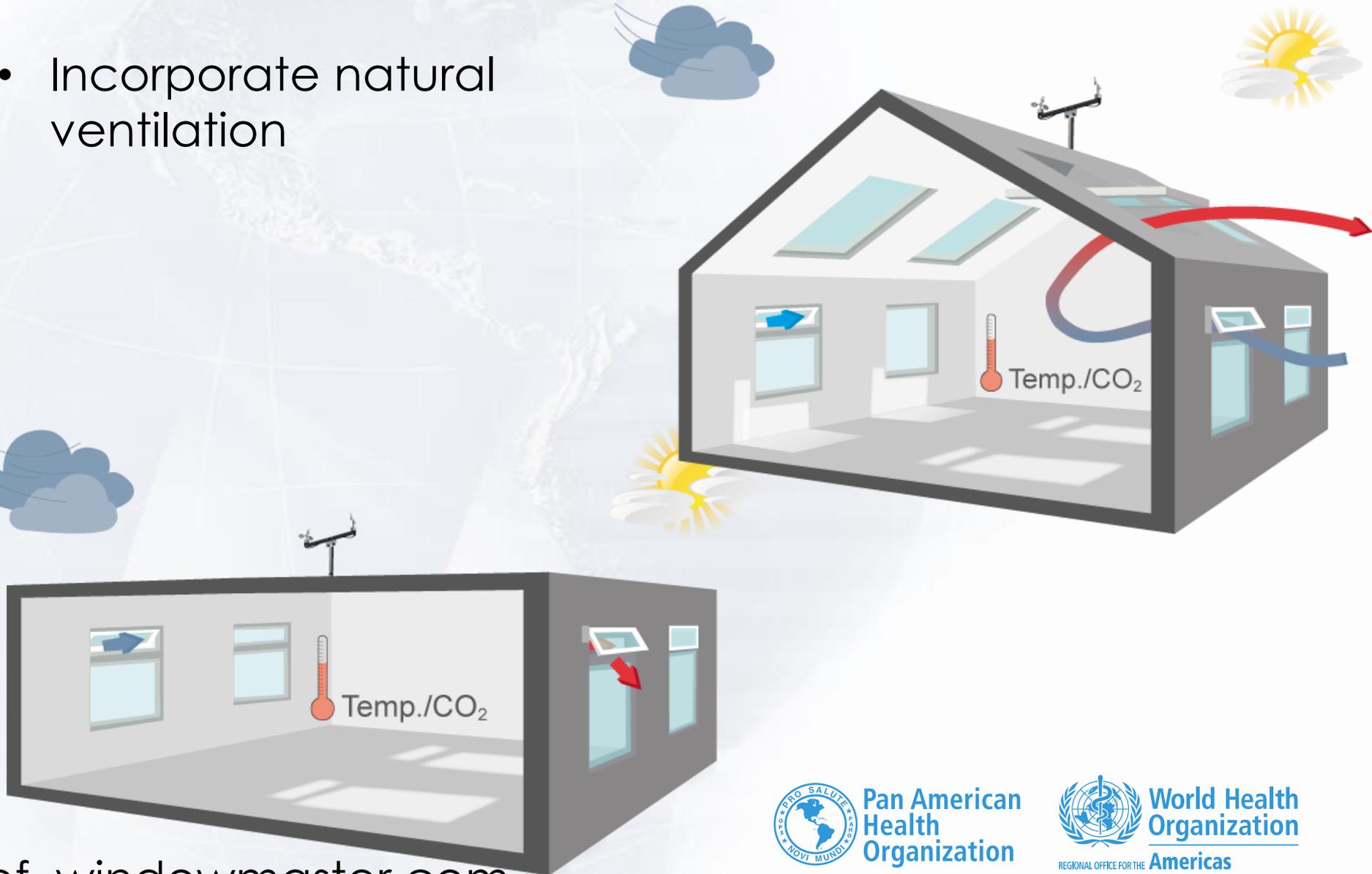
Smart HF Retrofit
Comfort Bay Senior Citizens Home, Saint Lucia
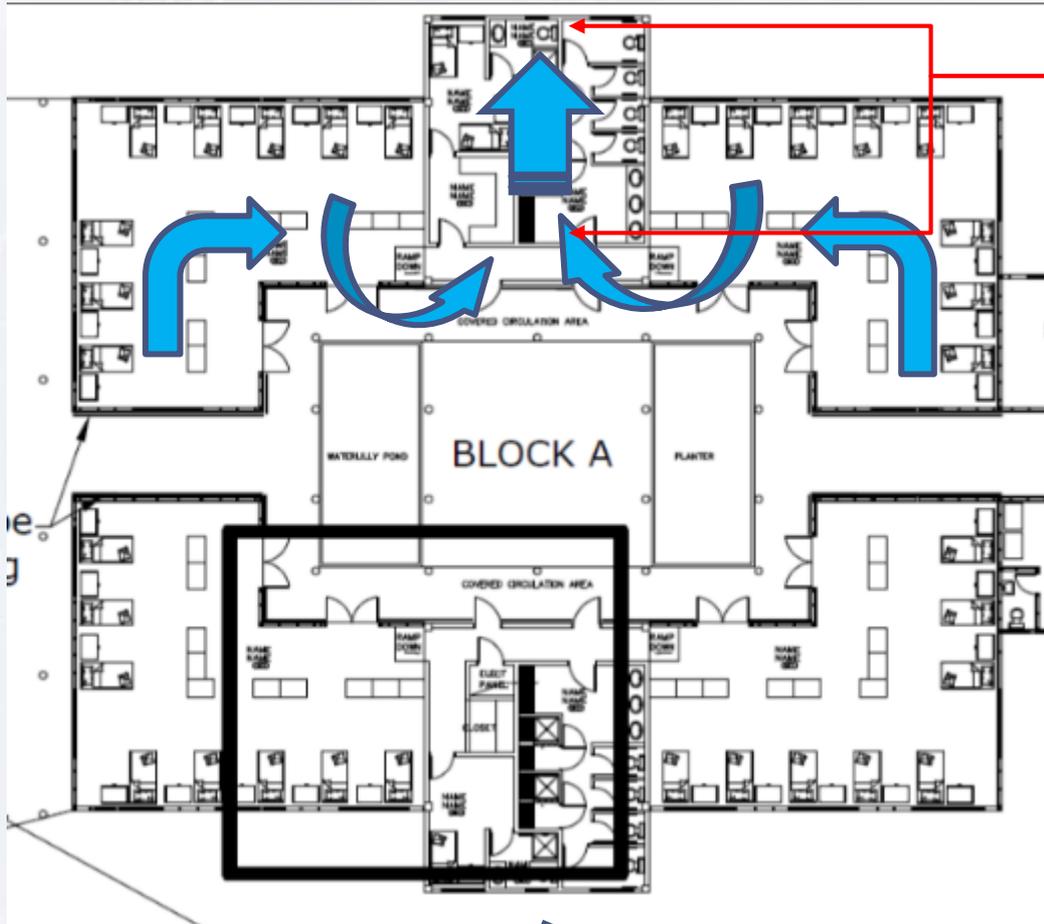
Mechanical vent

Natural
Wind flow

Smart Energy Retrofit

- Include natural lighting
- Include occupancy sensors for conservation
- Regular maintenance for optimal efficiency
- Use energy efficiency fixtures: lights, AC and appliances
- Supplement with renewable energy

- **Safety first!**

Smart HF Retrofit

Georgetown Hospital, St Vincent and the Grenadines

BEFORE 17/5/2012

AFTER 11/7/2013

Natural lighting transoms

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Smart Health Care Facilities

INFORMATION

➕

AWARENESS

➕

LEADING BY EXAMPLE

⏸

TRANSFORMATION

➡
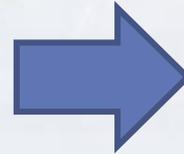
- Belize - EU Smart Hospitals retrofit
- Jamaica - WB Health Section Vulnerability Assessment
- BVI – Smart schools & hotels
- Grenada – partial retrofits other donors

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Smart Hospitals:
http://www.paho.org/disasters