

**INTER-AMERICAN
DEVELOPMENT BANK**

Caribbean Sustainable Energy Independence: Making It Happen

Financing Energy Independence in the Caribbean

Christiaan Gischler

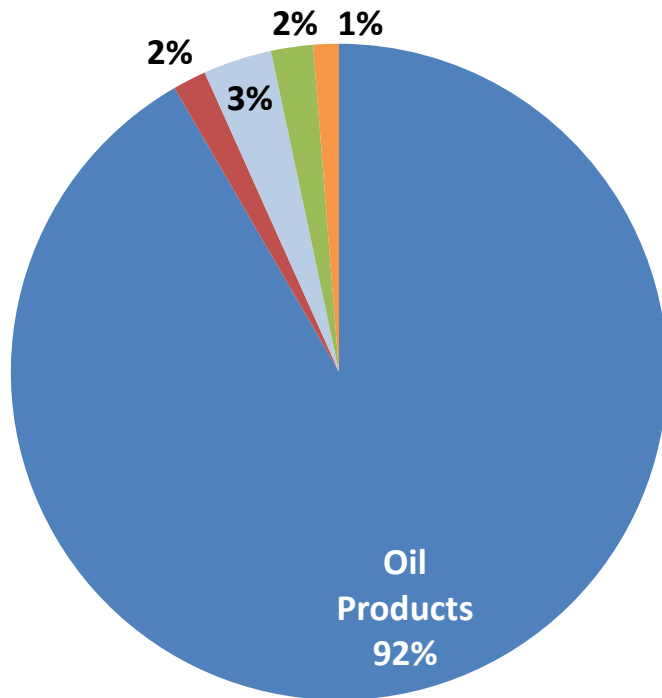
Lloyd Erskine Sandiford Centre
Central Bank of Barbados and BREB
Bridgetown, Barbados
November 10 – 11, 2016



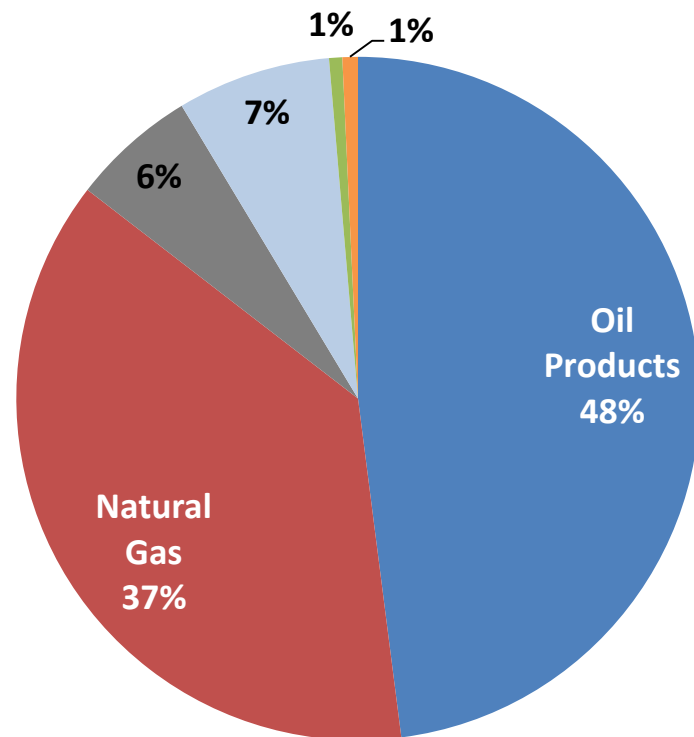
ENERGY SECTOR CHALLENGES IN THE CARIBBEAN

Dependency on Oil Imports

Caribbean Electricity Matrix
(excluding T&T and DR)



Caribbean Electricity Matrix

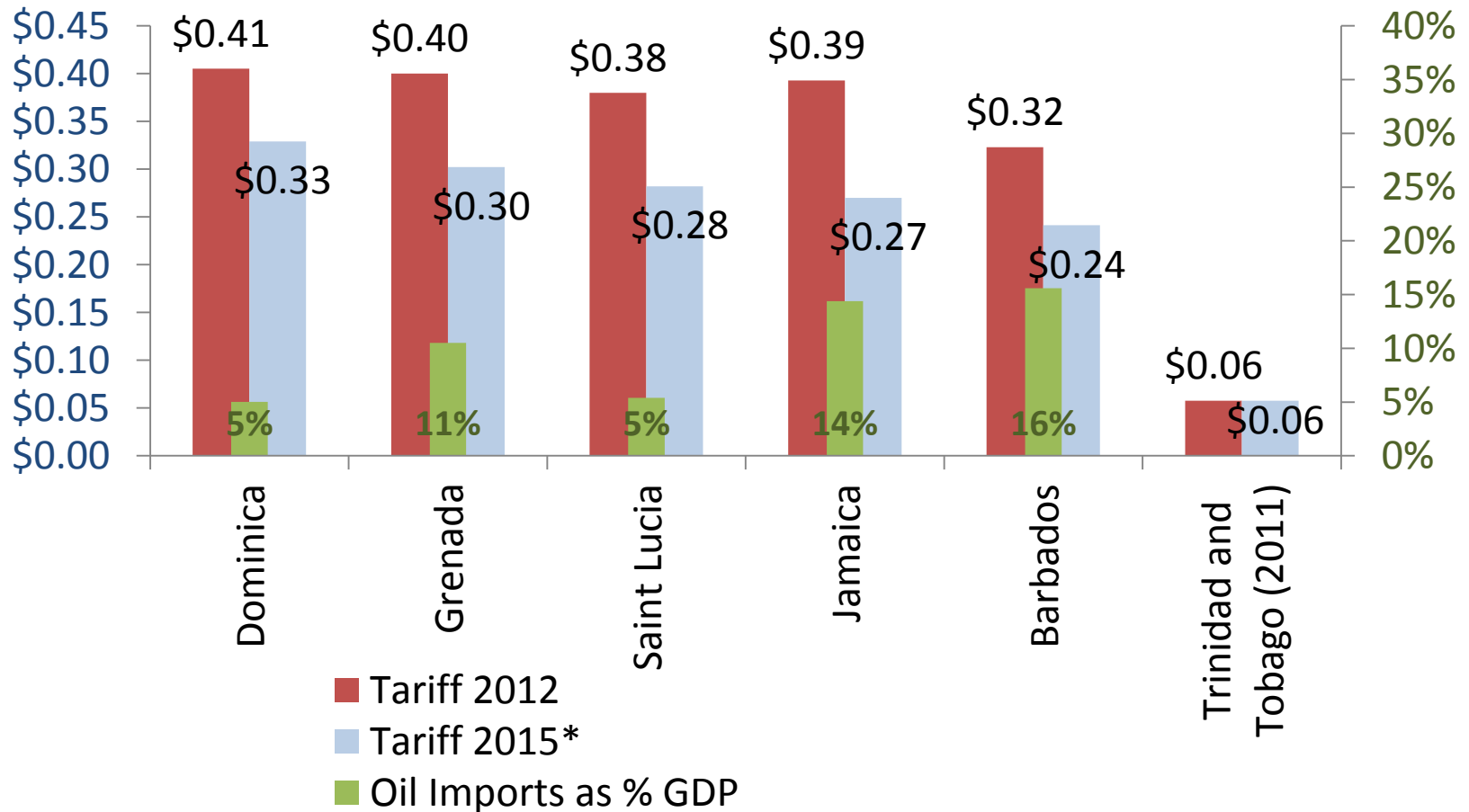


High vulnerability to oil price shocks

US\$ per kWh

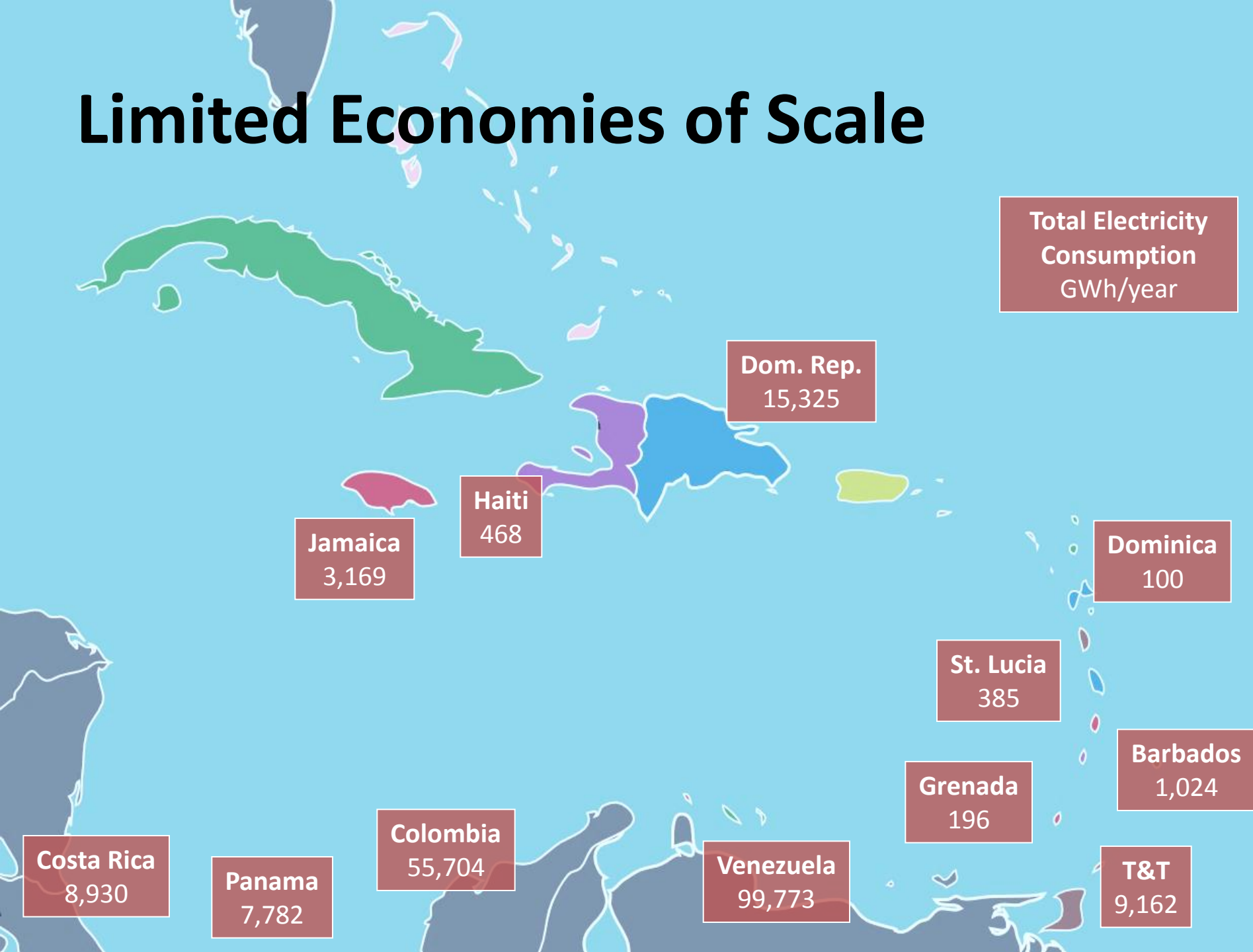
Average Electricity Tariffs in the Caribbean
& Oil Imports as % of GDP (2013)

%Oil/GDP

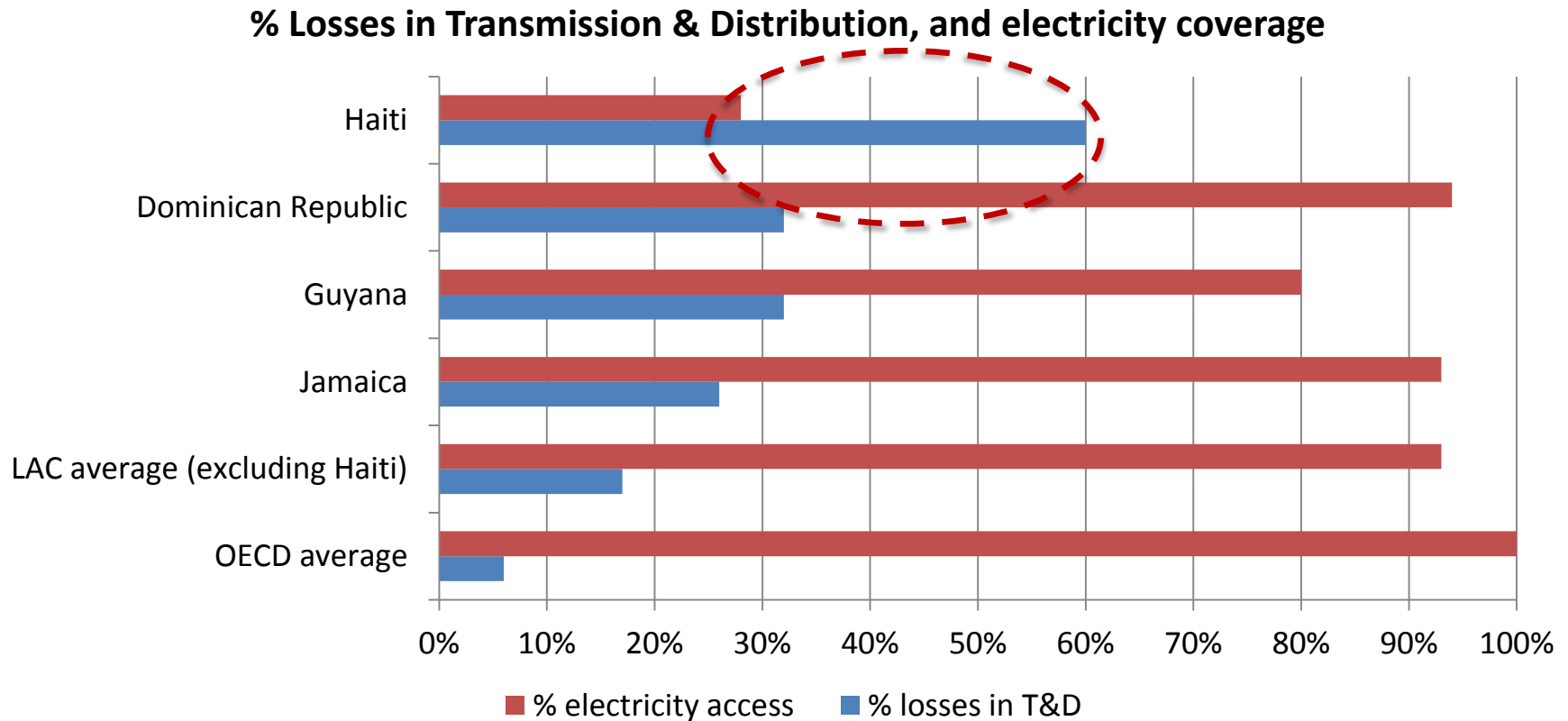


**Estimates for 2015 based on average price of oil in 2015 of US\$48 per barrel*

Limited Economies of Scale

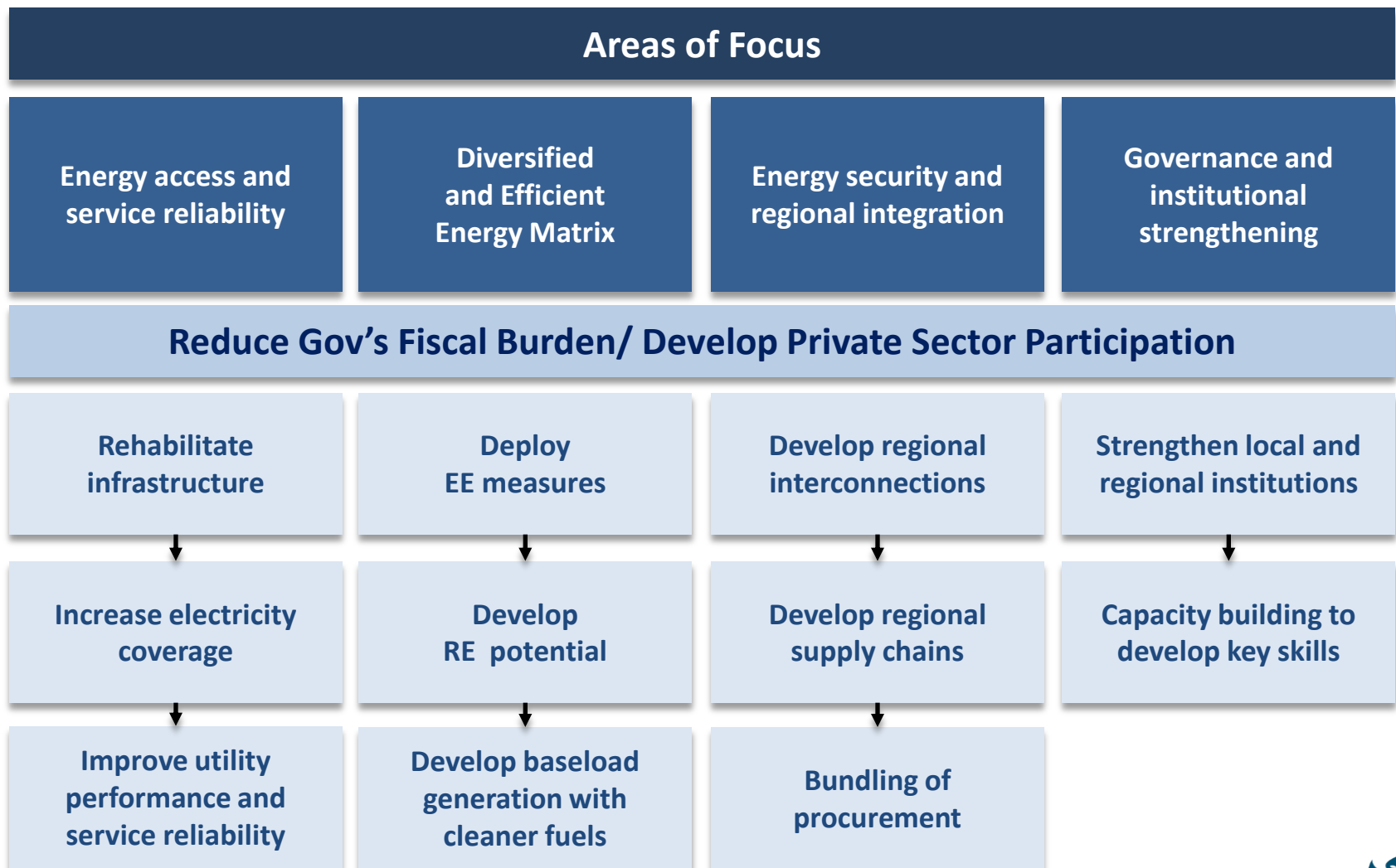


High losses in T&D and low electricity access (in some cases)



IDB STRATEGY IN THE CARIBBEAN ENERGY SECTOR: HOW DO WE GET THERE

IDB Strategy in Caribbean Energy



CARICOM has adopted an ambitious strategy for transitioning to sustainable energy.

Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS)

Renewable Power generation: 47% renewable power capacity by 2027.

Energy Efficiency:
33% reduction in energy intensity by 2027.

CO2 emissions:
reductions of 36 % by 2027.

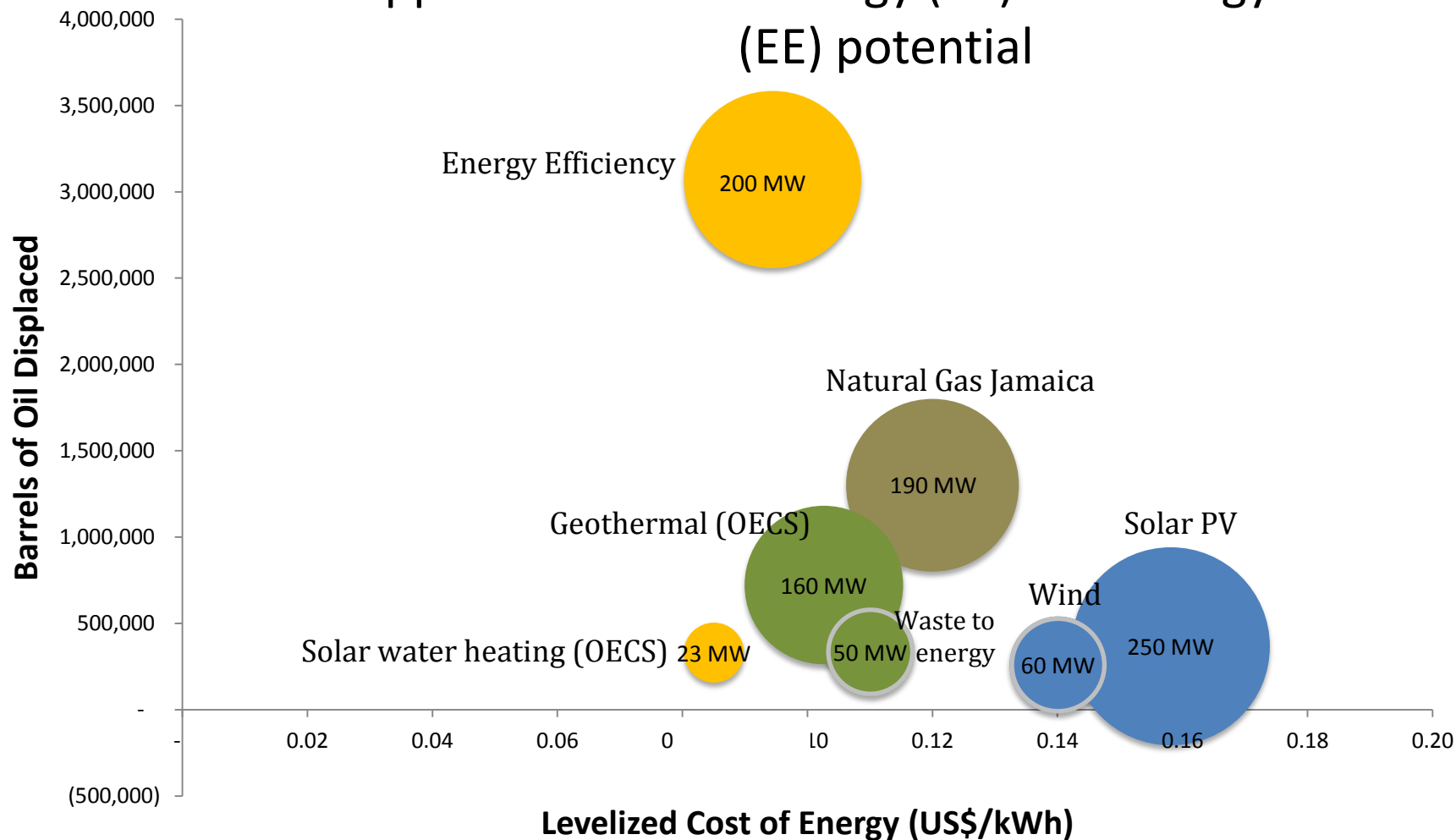
Achieving these targets will require:

- Long-term commitment with prioritizing the transformation of the energy sector
- Capacity to mobilize substantial investments
- Effectiveness of regulation
- Addressing critical challenges associated with the generation, distribution, storage and use of energy in the short run.

OPPORTUNITIES IN THE CARIBBEAN ENERGY SECTOR

Sustainability: energy efficiency & RE

Untapped Renewable Energy (RE) and Energy Efficiency (EE) potential



Renewable Baseload

Fossil fuel baseload

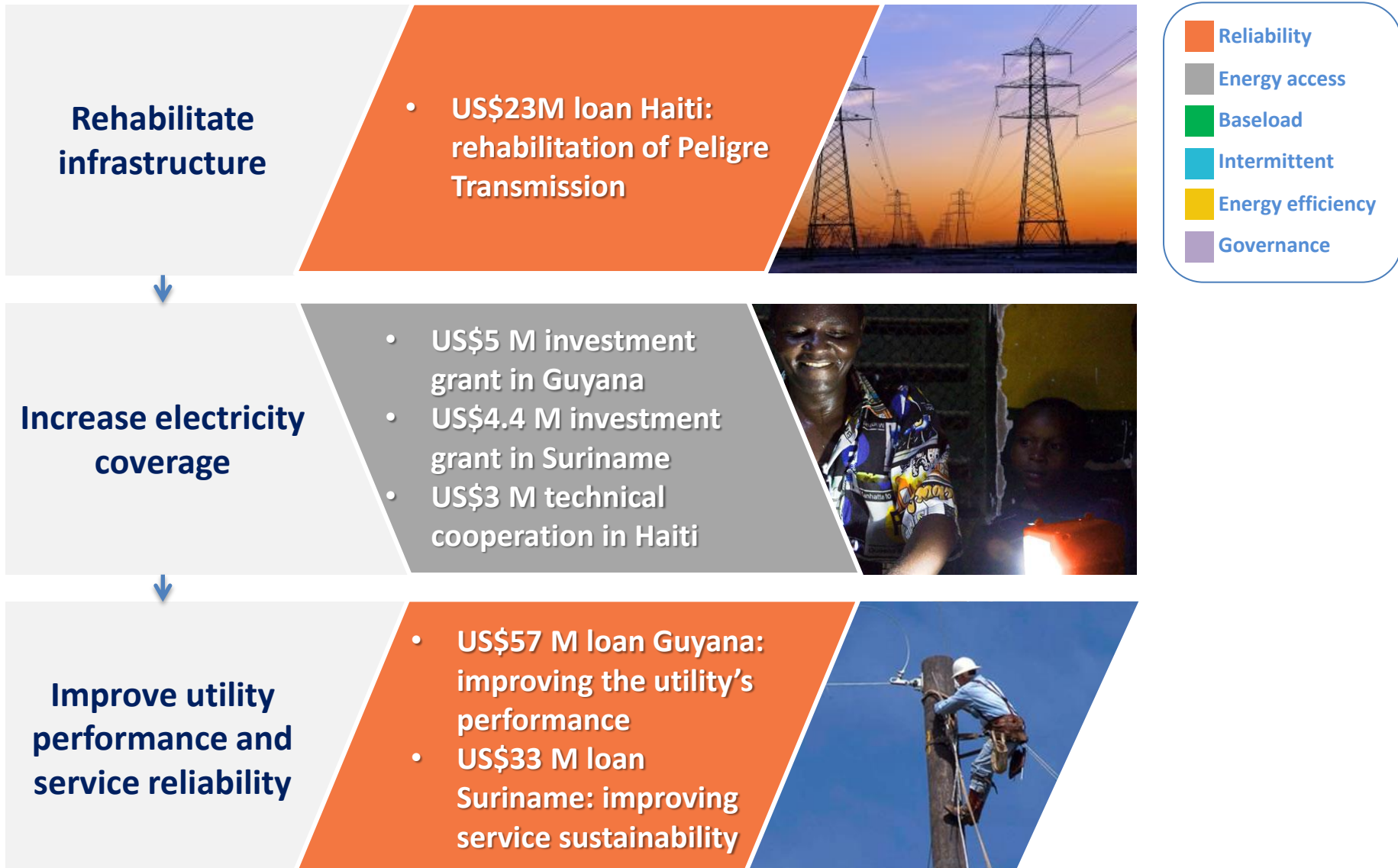
Energy efficiency

Renewable Intermittent

Size of the bubble is potential in MW

ENERGY ACCESS AND SERVICE RELIABILITY

Energy access and service reliability





**Over 70% of
Haiti's population
lacks access to
electricity**

**Photo: Haiti's Refugee
camps
Retrofitted with
solar PV
street lights**

Opportunity combining solar energy and access: case study Haiti

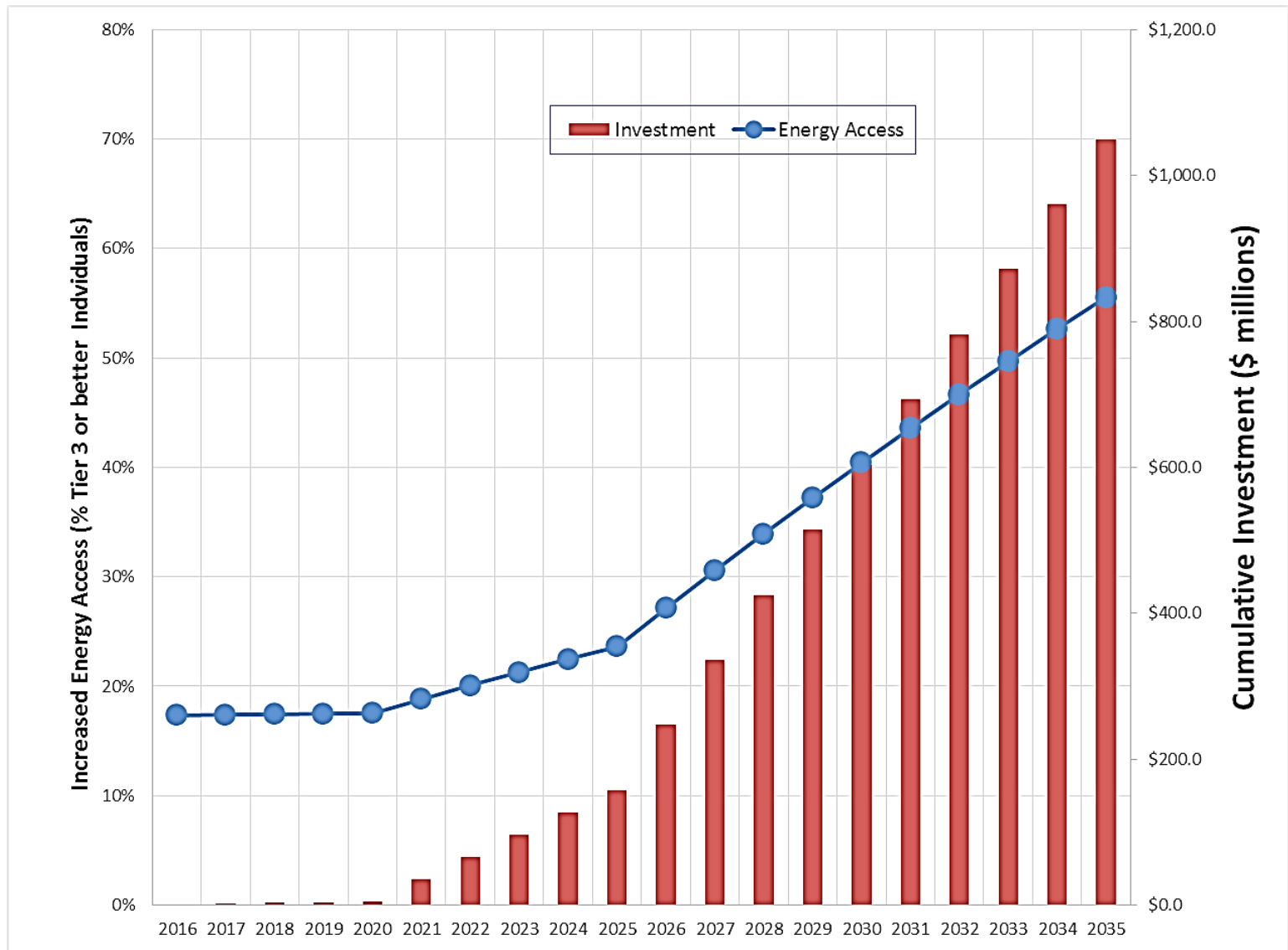


**Solar Mini Grid in Port-a-Piment,
Coteaux & Roche-a-Bateau**

After Matthew...



Energy Access in Haiti

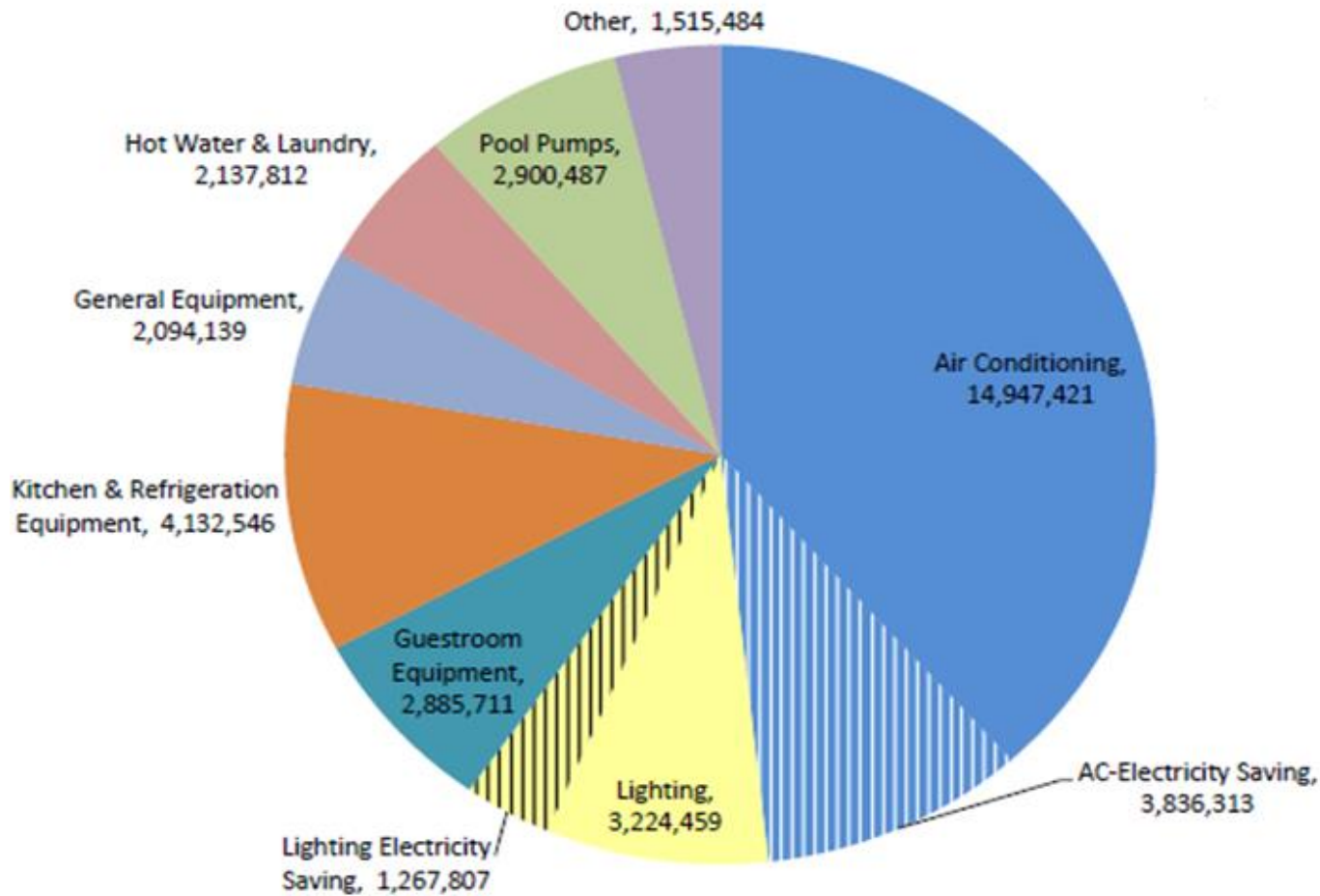


Source: Navigant Report funded by IDB

ENERGY EFFICIENCY

Energy Use in Hotels (*results from CHENACT*)

End-use electricity consumption and savings (kWh)

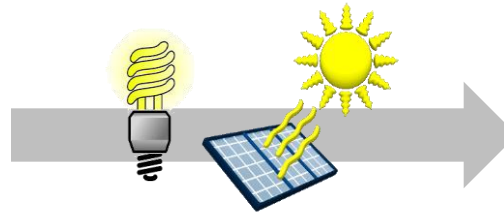
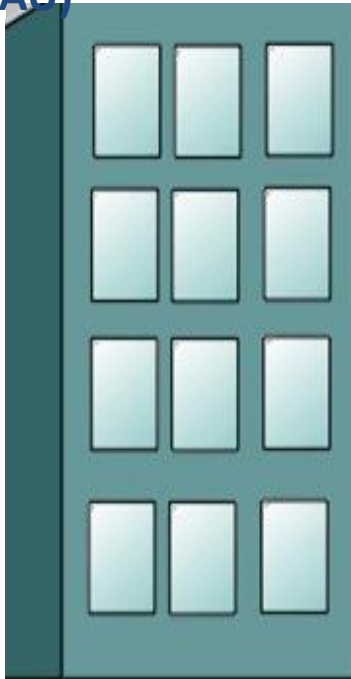


Air Conditioning and Lighting account for nearly 2/3 of all electricity consumed in Hotels.

Savings potential of 30-40% in energy and 40-50% in water

Estimated impact of the intervention on a single building/hotel

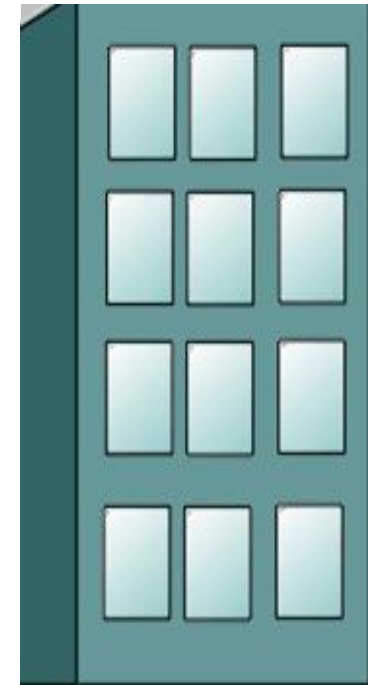
Business As Usual (BAU)



- *Efficient LED lights*
- *Intelligent lighting*
- *Efficient computers & electronics*
- *Energy Efficient Condensers*
- *≈85kW roof mounted solar PV*
- *Training to bldg. users*

Est. US\$475,000

After Intervention



Electricity consumption= **1.5 GWh/yr**

Tariff= 0.27 US\$/kWh

Electricity savings over BAU=0%

Annual Savings=**US\$0**

Electricity bill=US\$420,000

Electricity consumption= **1.1 GWh/yr**

Tariff= 0.27 US\$/kWh

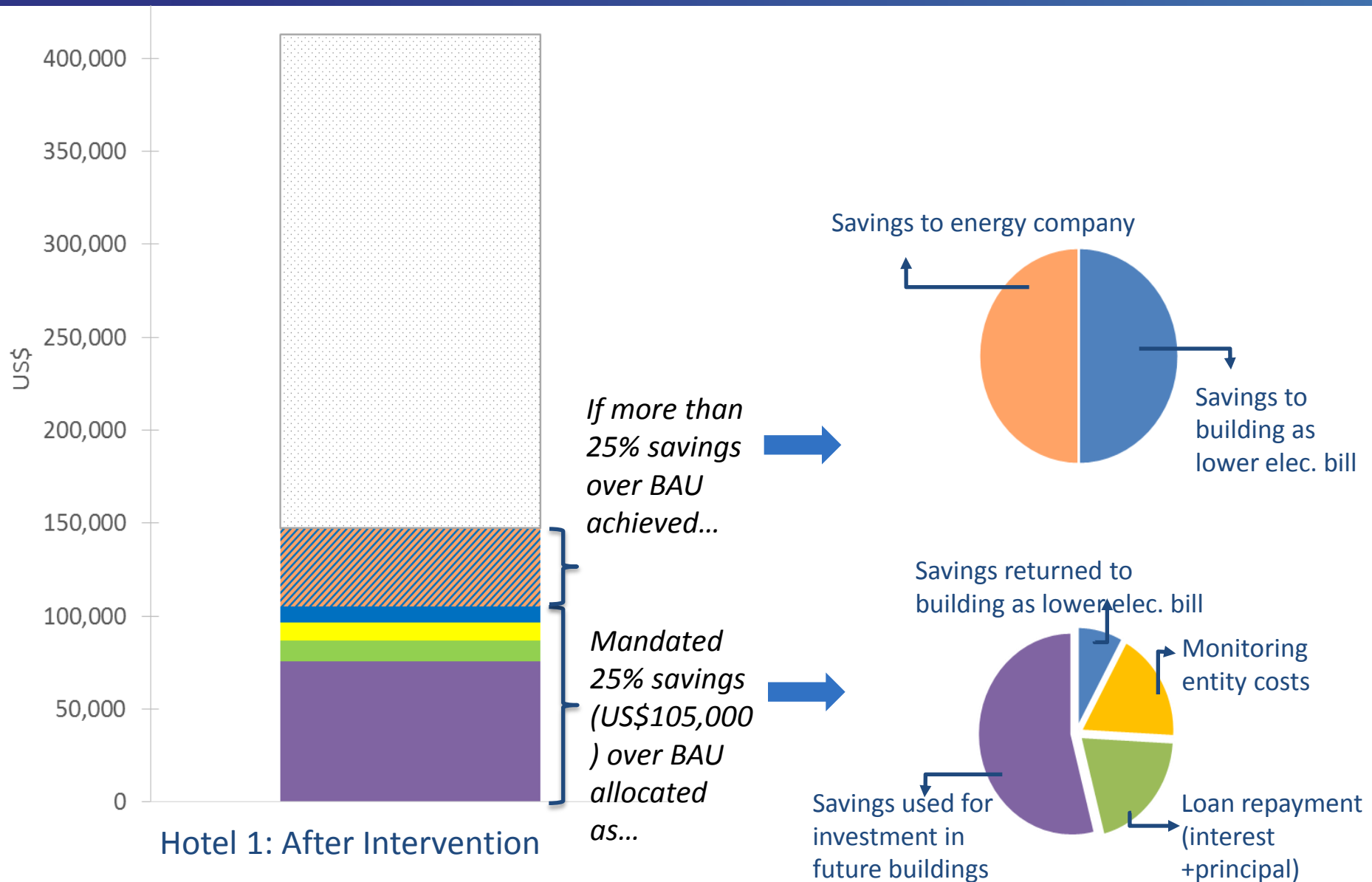
Mandated electricity savings over BAU=25%

Annual Savings=**US\$105,000**

Electricity bill=US\$315,000

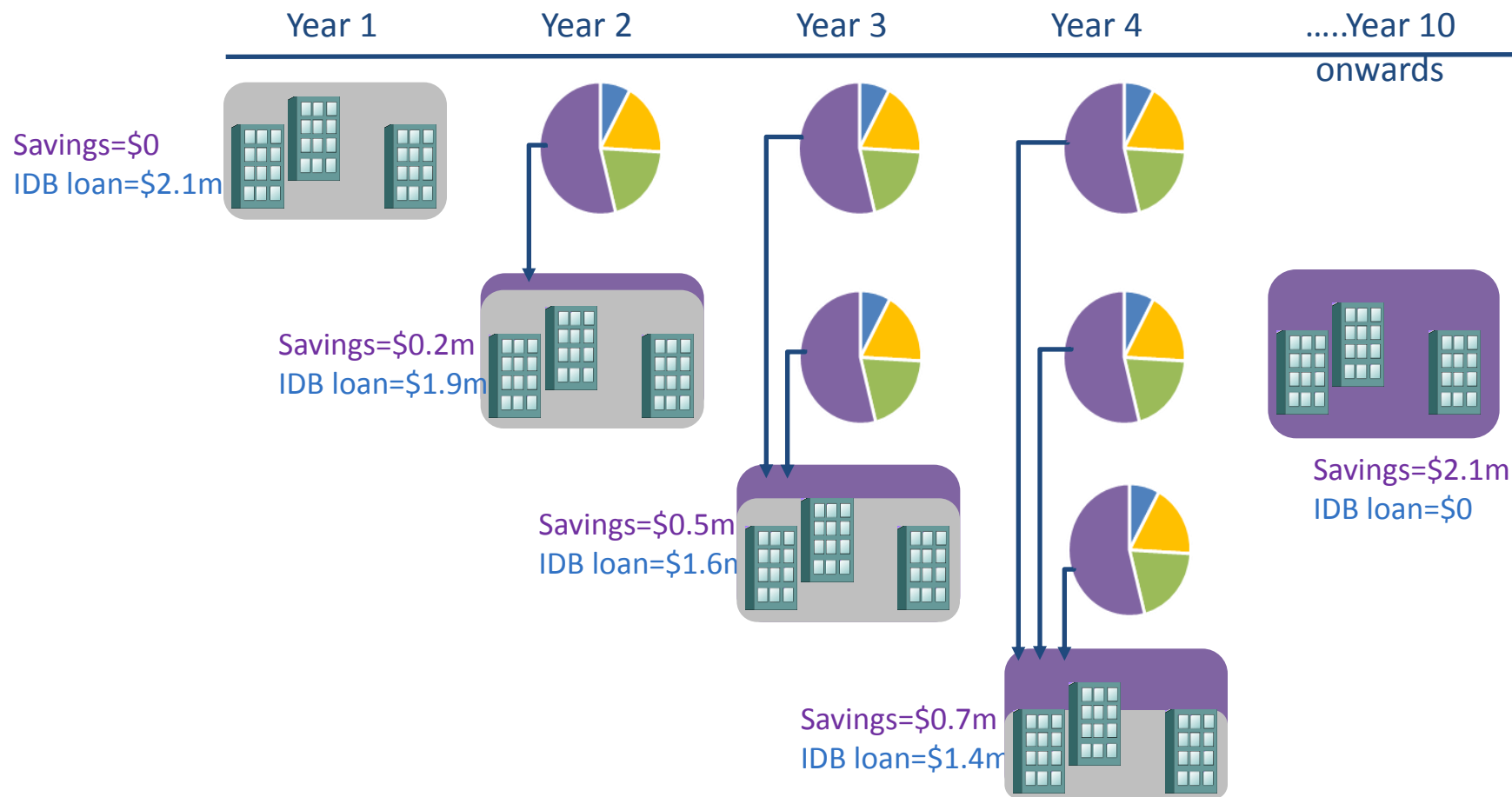
Simple payback=4.5 years

Allocate savings \$ in the following way....



Use savings \$ and IIC/IDB funding draw-downs to ramp up # buildings/hotels retrofitted

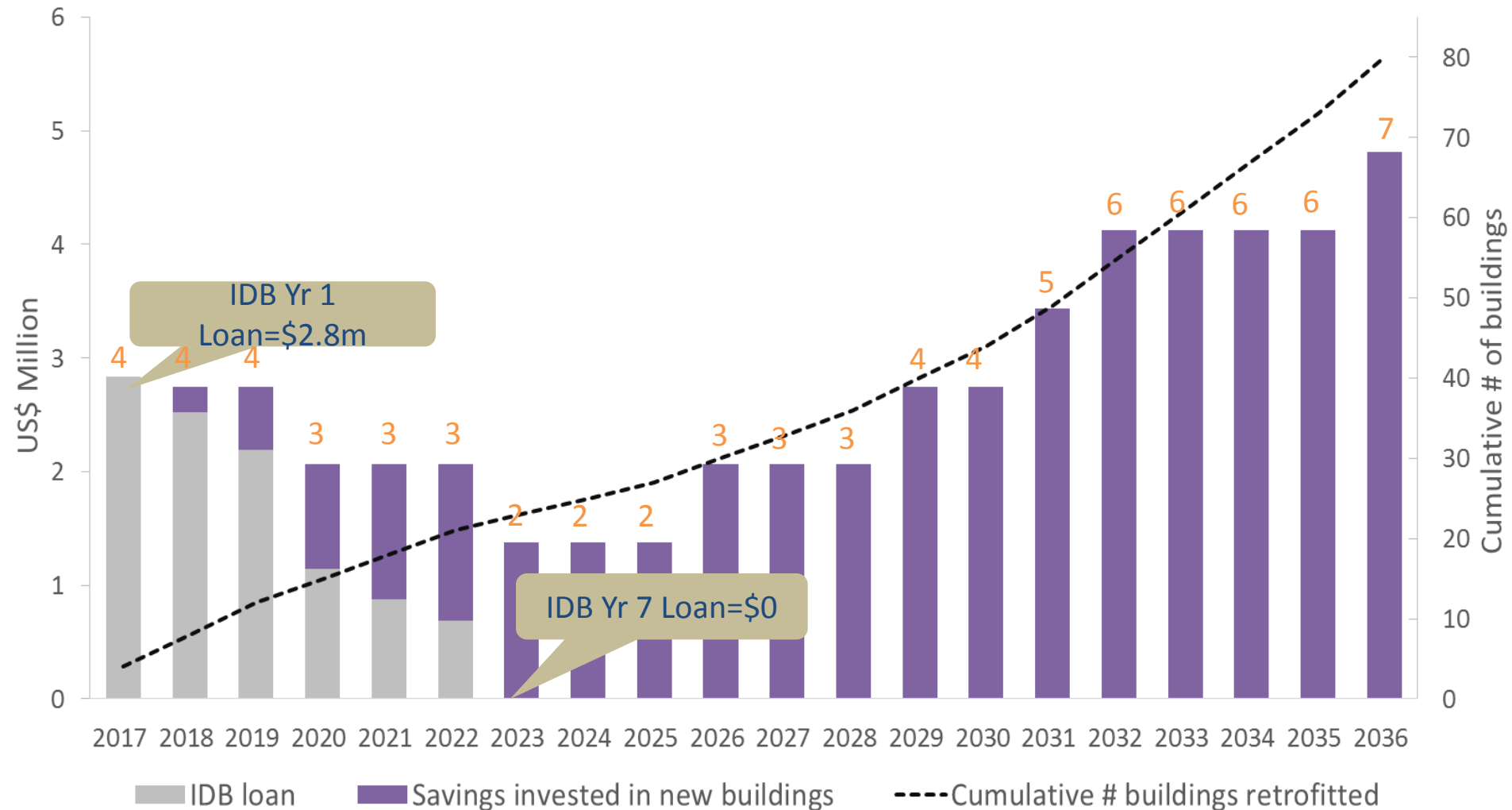
3 buildings retrofitted every year...



Model assumptions:

- Bldgs similar profile
- US\$0.27/kWh avg tariff
- IDB loan conditions
- Tariff growth 1% p.a.

Increasing savings + decreasing loans : more # of buildings/hotels retrofitted with less initial capital



RENEWABLE ENERGY

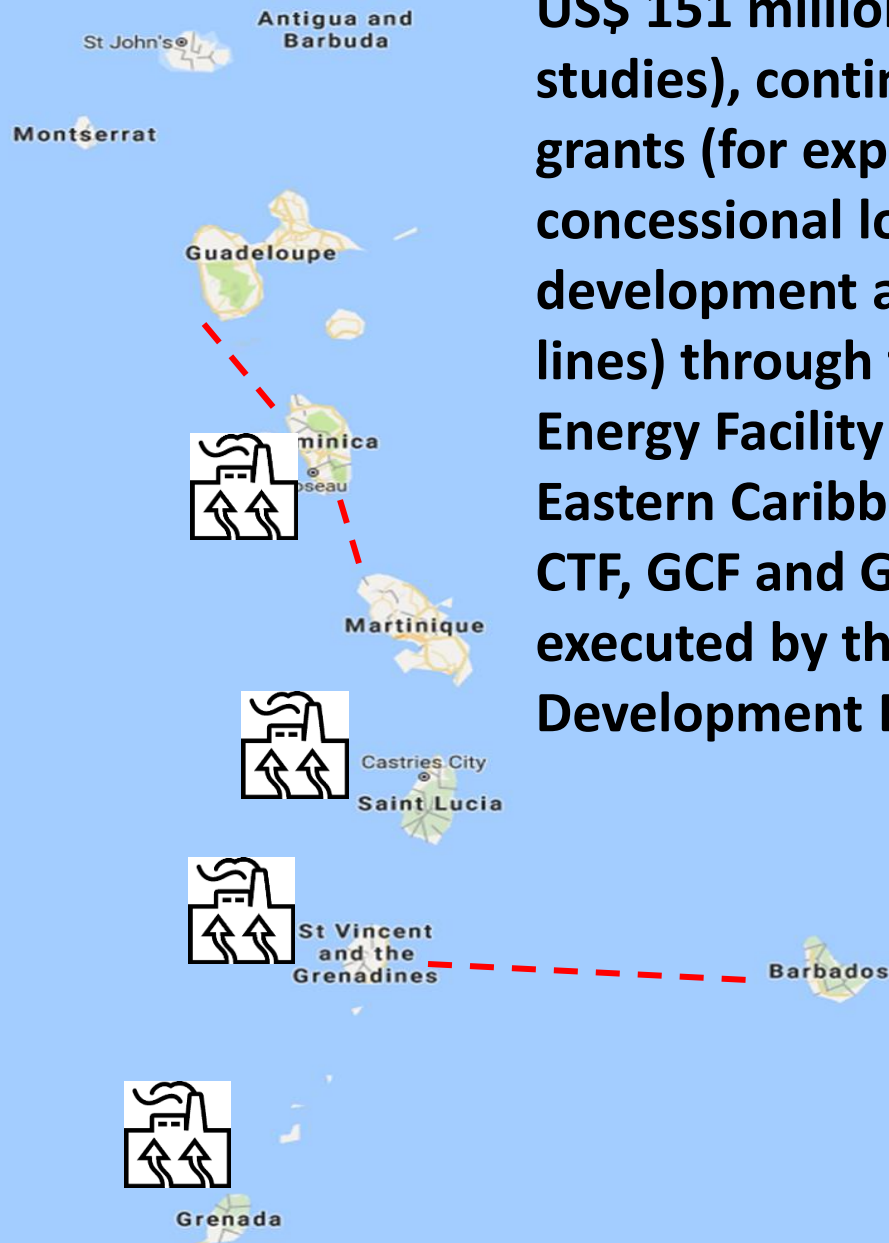
Geothermal Power Eastern Caribbean



Possible Geothermal plants

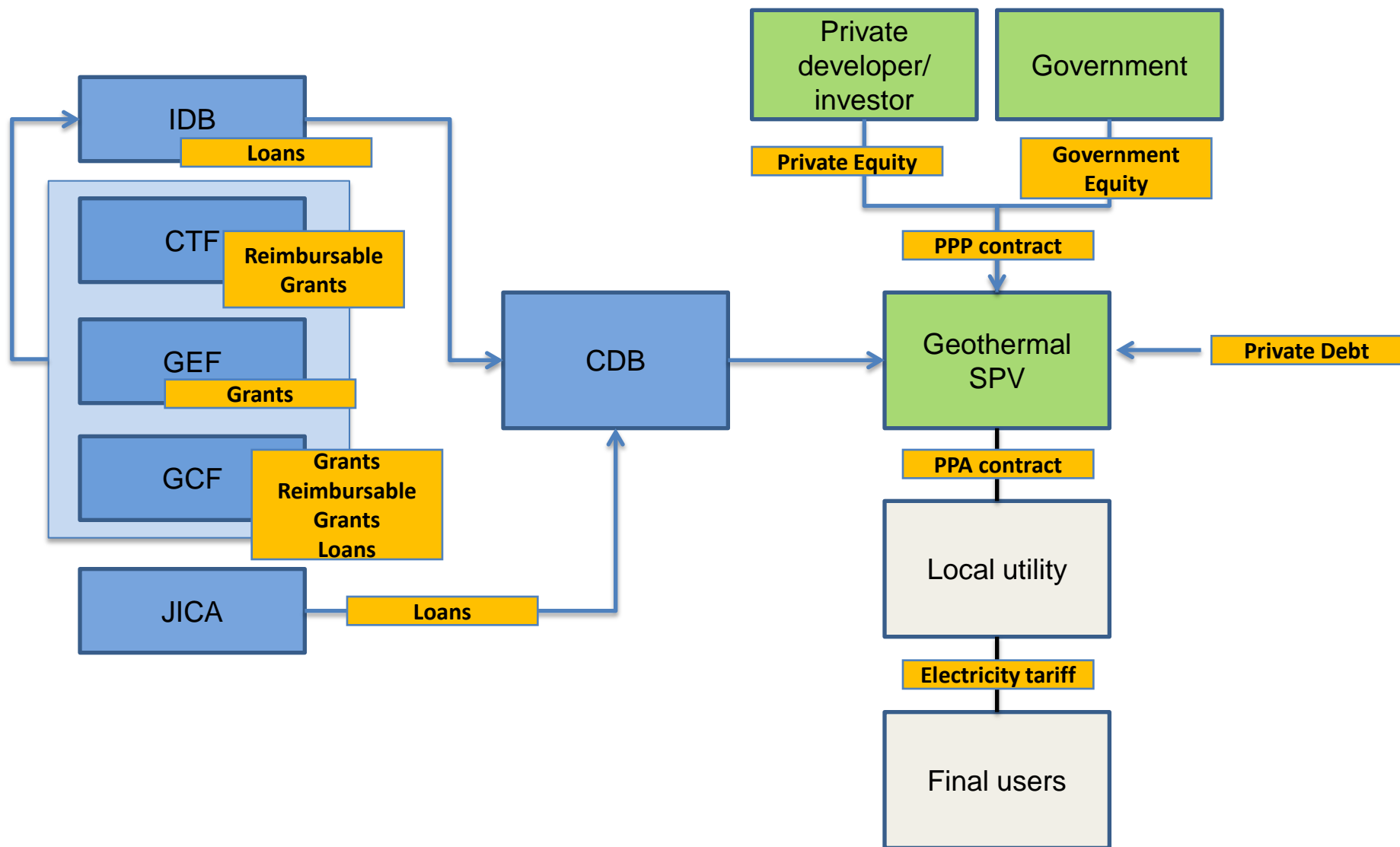


Possible undersea
Transmission line



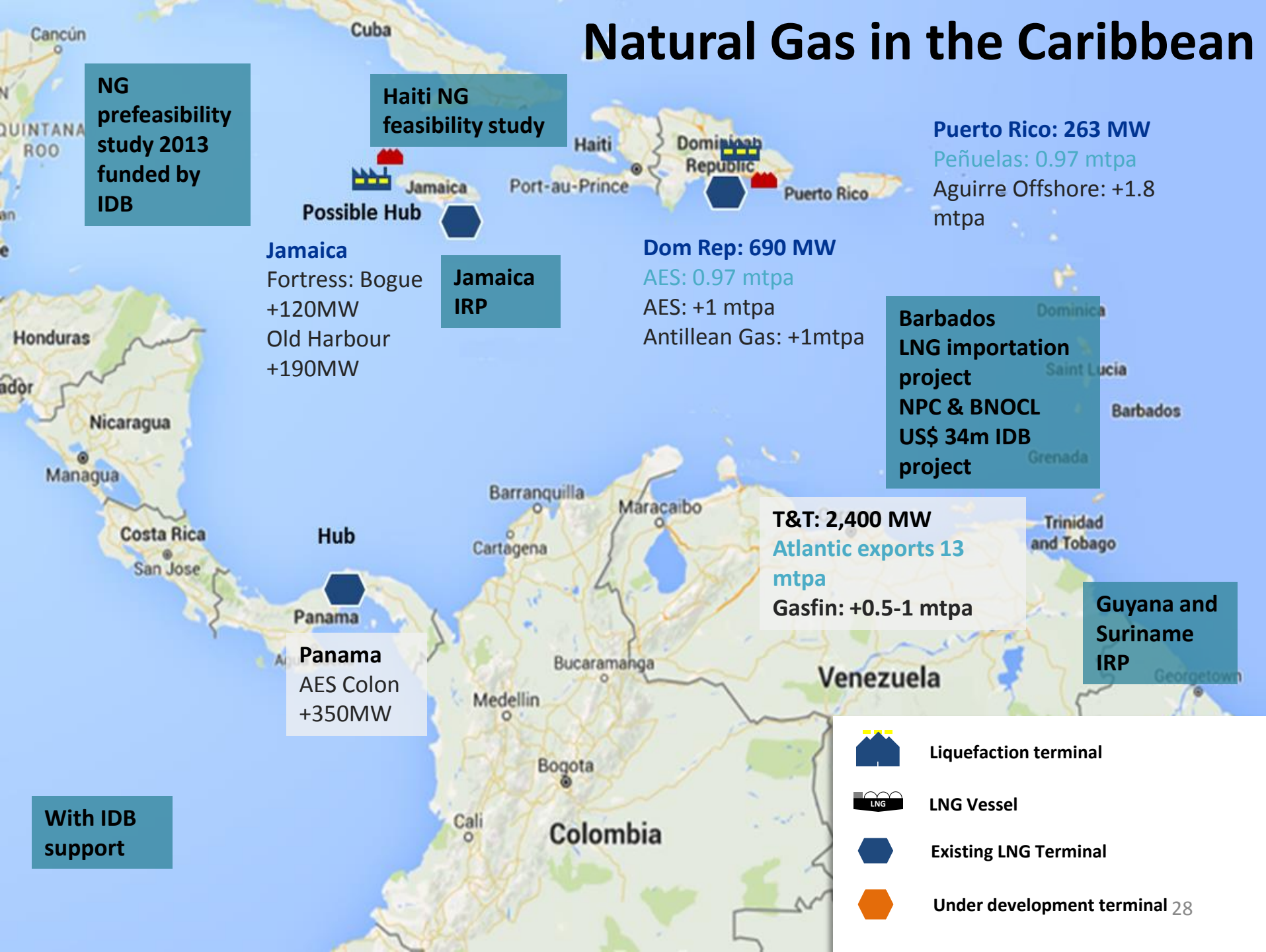
US\$ 151 million in grants (for studies), contingent recovery grants (for exploration) and concessional loans (for plants development and transmission lines) through the Sustainable Energy Facility (SEF) for the Eastern Caribbean with IDB, CTF, GCF and GEF funding, executed by the Caribbean Development Bank

Sustainable Energy Facility for the Eastern Caribbean



NATURAL GAS

Natural Gas in the Caribbean



INSTITUTIONAL STRENGTHENING AND PARTNERSHIPS

BRIDGE in Sustainable Energy (SE) & Information and Communication Technologies



Objective

To reduce gap between current workforce capacity and skill level & future workforce required to meet sustainable energy demand.



Partners



SCOTTISH
DEVELOPMENT INTERNATIONAL



Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH



Progress

- ✓ SE & ICT needs assessments completed
- ✓ 131 students/ professionals + 36 faculty trained
- ✓ 129 participated in SE fieldtrips
- ✓ 16 internships (8 international, 8 local).
- ✓ Gender contest conducted in 3 countries



Partnerships



The Caribbean Renewable Energy Forum (CREF) was held in Miami from October 19, 2015. President Luis Alberto Moreno and Dr. Warren Smith, President of the CDB were the opening speakers at the event. The Sustainable Energy Facility (SEF) for the Eastern Caribbean was signed that day.

On November 10th, 2015 Bank President Luis Alberto Moreno, United States Energy Secretary Ernest Moniz, and United States Trade and Development Agency Director Leocadia Zak signed a joint MoU promoting energy cooperation in the Caribbean to: increase energy security, reduce energy vulnerability, and promote RE, EE and low-carbon technologies.



The Bank, CARICOM, CDB and DOE signed an MOU on May 5th, 2016 to cooperation with Governments of the Caribbean in: a) EE and regulation; b) clean vehicle standards; c) grid management and increased RE deployment; d) energy education; and e) clean energy financing.

A HOLISTIC APPROACH IS CRITICAL FOR SUCCESS



MODULE 01



- Analyzes MFI energy consumption and carbon footprint
- Reduces energy consumption and carbon footprint
- Implements an environmental corporate policy
- Builds climate change awareness inside MFI and creates momentum for green product

MODULE 02



- Analyzes climate change vulnerability of MFI portfolio
- Projects climate change impact in future portfolio performance
- Creates tools to manage climate change risks
- Trains risk officers in climate risk management

MODULE 03



- Identifies potential market for green finance products
- Designs a green finance product adapted to local demand and tests it through a pilot
- Creates strategic alliances with technology suppliers, extension services providers and other climate change stakeholders
- Builds internal capacity to commercialize and scale up the designed products

HOW TO PARTICIPATE



Call for proposals Second Quarter 2017

Check for further details on: www.ecomicro.org

or contact

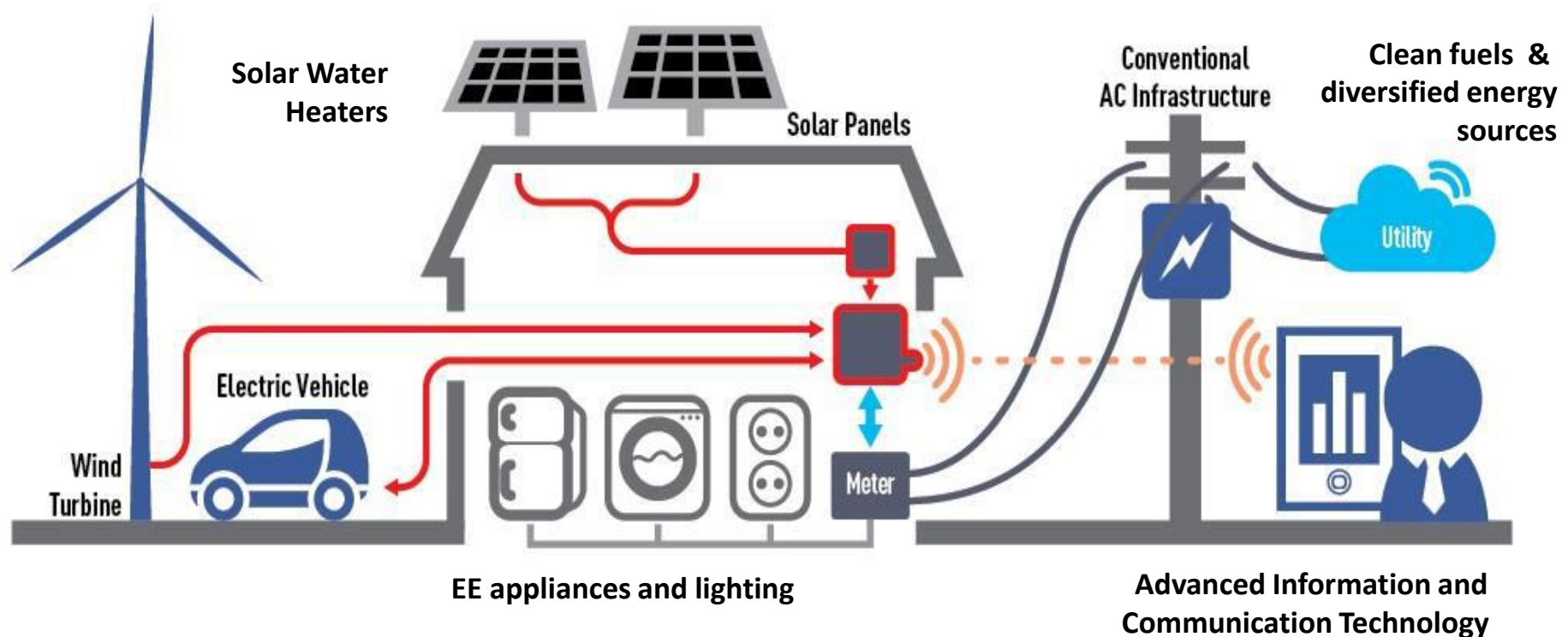
Gregory Watson, Lead Specialist MIF
gregoryw@iadb.org

Ruth Houlston, EcoMicro Coordinator
ruthh@iadb.org



MOVING FORWARD

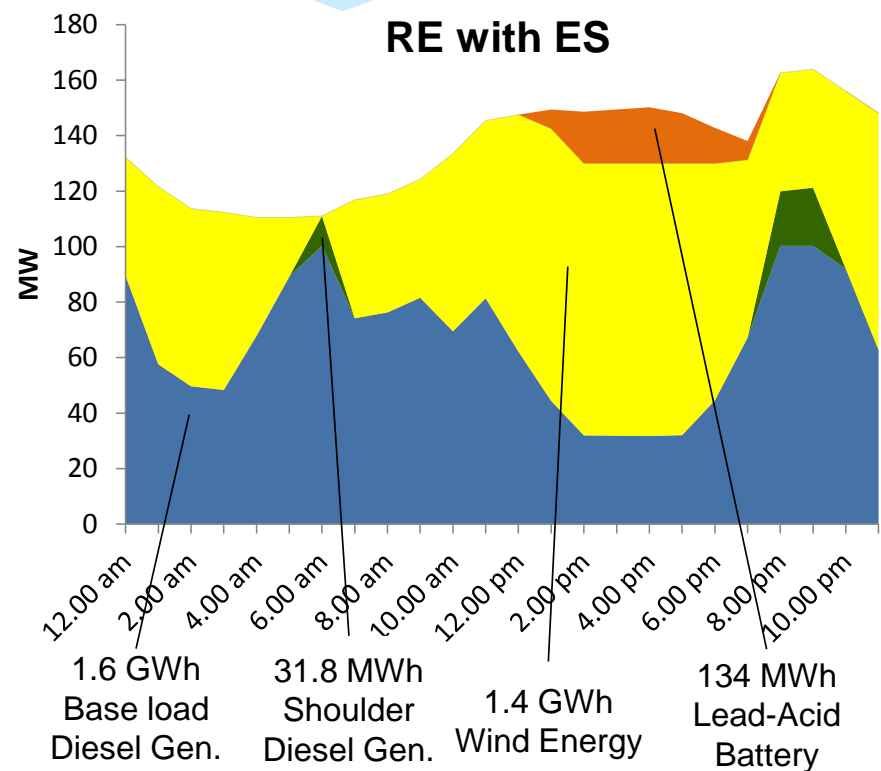
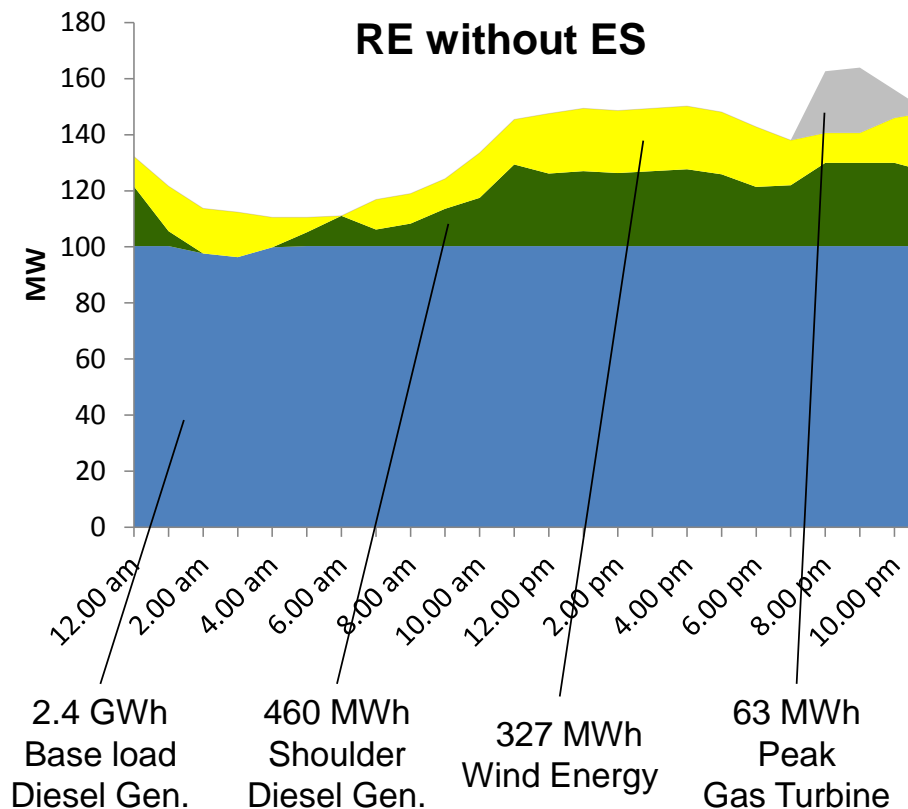
Moving Forward: Smart grids, smart buildings and interconnectivity



By how much can ES increase the share of RE in total generation?

Small Island Country

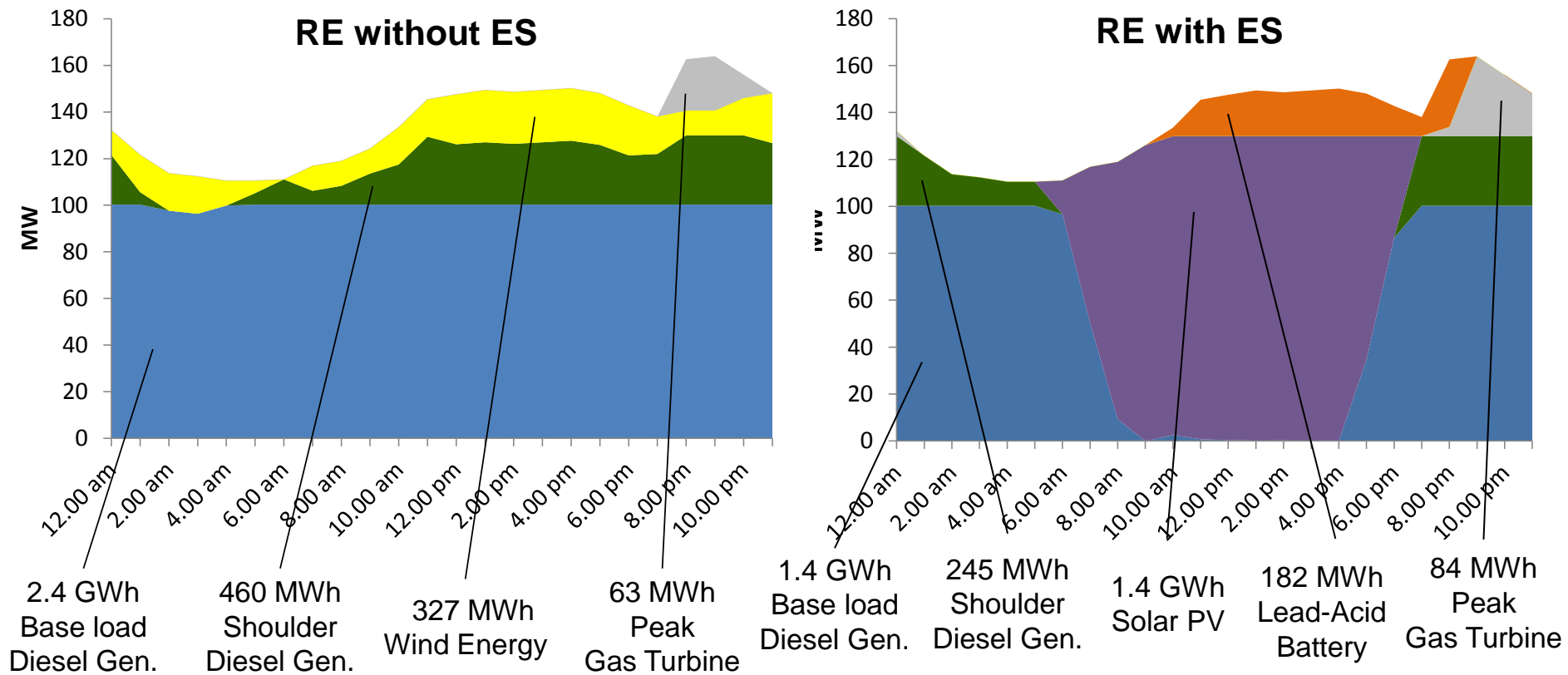
- ES increases RE by ~1GWh/day
- 33% reduction in diesel generation



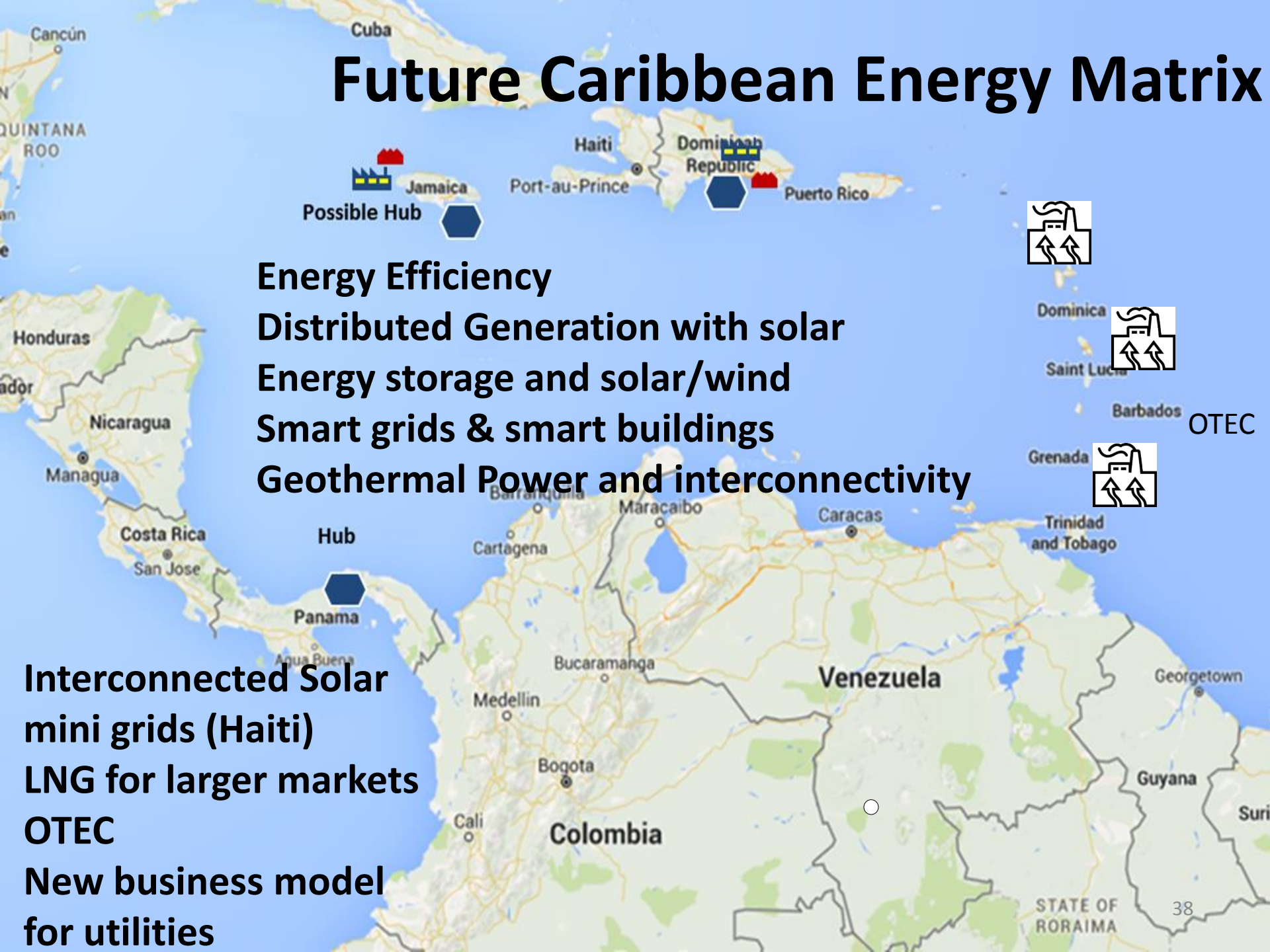
Note: even with -50% solar PV costs, combination with ES would yield negative benefits

By how much can Solar PV increase the share of RE in total generation if viable?

Small Island Country



Future Caribbean Energy Matrix



Energy Efficiency

Distributed Generation with solar

Energy storage and solar/wind

Smart grids & smart buildings

Geothermal Power and interconnectivity

**Interconnected Solar
mini grids (Haiti)**

LNG for larger markets

OTEC

**New business model
for utilities**

OTEC

THANKS

Christiaan Gischler
Lead Energy Specialist
christiaan@iadb.org
1-202-6233411

