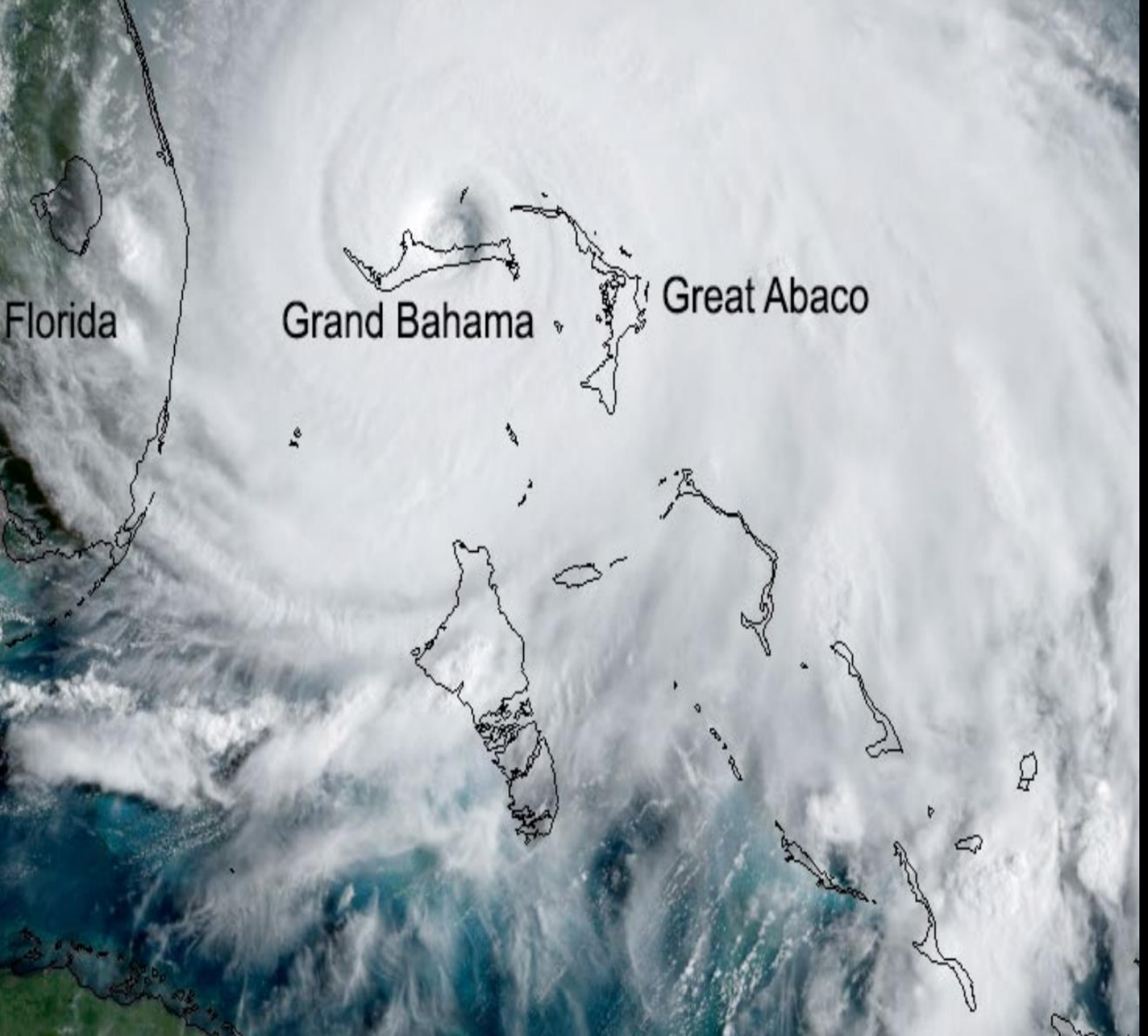


Abaco Community Center, Microgrid

Microgrids in Communities Vulnerable to Extreme Weather Events

CLINTON FOUNDATION

Background

- CCI partners with 15 countries across the Caribbean and Indian Ocean, bringing together critical stakeholders from across the public and private sectors and NGOs to enable the transition to a low-carbon, more resilient economies and societies.
- CCI has assisted in developing more than 70 megawatts of clean energy projects, lowering emissions by over 90,000 metric tons of carbon dioxide, and attracted more than $125 million in project investments.

CLINTON FOUNDATION

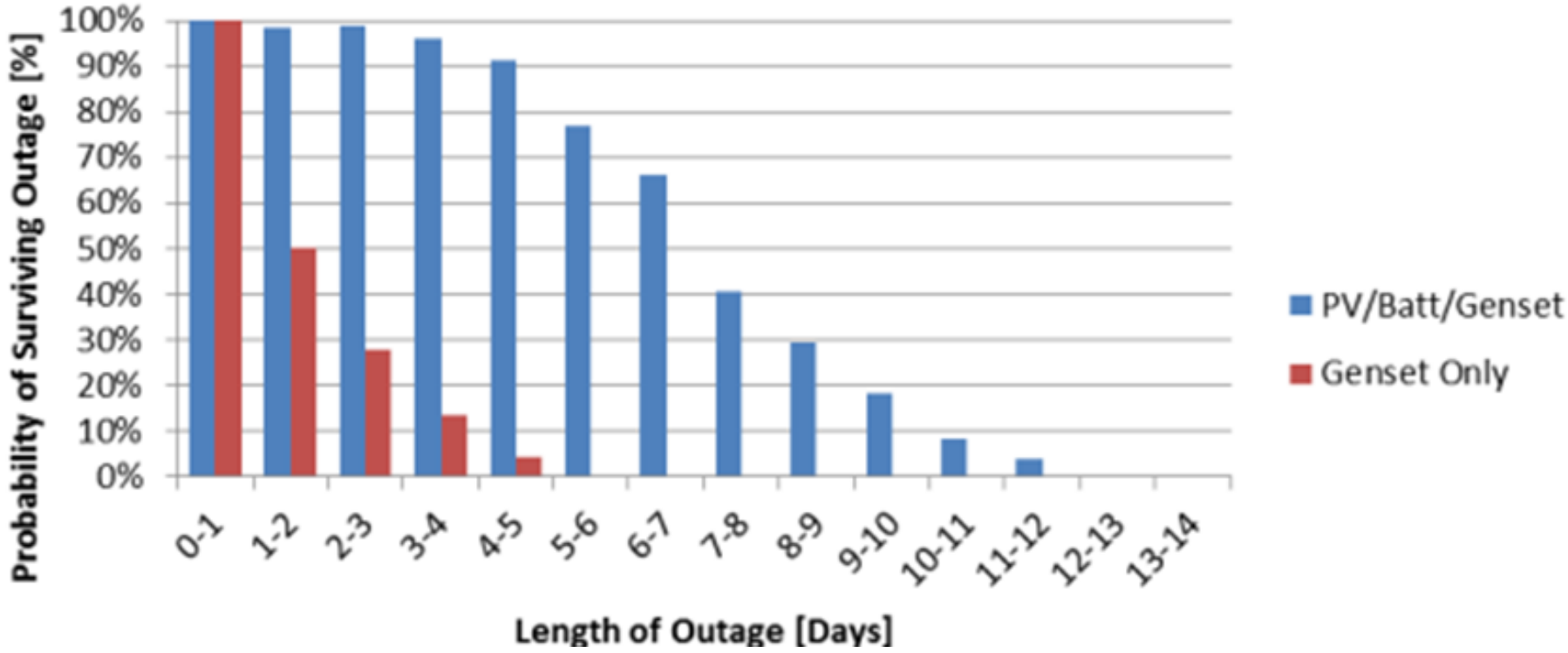
Impact of Extreme Weather on Small Island Developing States

- Hurricane Dorian made landfall on the Abaco Islands with maximum sustained winds of 185 mph (295 km/h), making it the strongest hurricane on record to affect the Bahamas.
- Hurricane Dorian knocked out the power and other critical services on the Abacos.

CLINTON FOUNDATION

Resiliency

Microgrid analysis to determine the probability of surviving a grid outage using generators



Source : How Solar PV Can Support Disaster Resiliency | State, Local, and Tribal Governments | NREL

Aim to Build Back Better

Main Features of Abaco Community Center

- 10,272 square feet
- ≈800 evacuees
- Constructed to withstand 185 mph wind and designed to International Code Council, Standard for the Design and Construction of Storm Shelters ICC-500 standards
- Site would be elevated above historical storm surge level
- All electrical equipment would meet high energy efficiency standard

CLINTON FOUNDATION

Abaco Community Center Microgrid

Three (3) options were investigated for the installation of solar PV and storage at the facility.

- **Option 1** – Includes solar PV, energy storage and diesel generator. Estimated cost of system is ≈$ 0.7 million.
- **Option 2** – Considers solar PV and energy storage. Estimated cost of system is ≈$ 2.5 million.
- **Option 3** – Looks at critical loads, which make up about 40% of the total building load. Estimated cost of system is ≈ $ 0.45 million.

CLINTON FOUNDATION

Selected System — Option 1

The main components of the system would be:

- ≈134 kWp roof-mounted solar PV array
- 130 kW inverter
- 130 kW diesel generator, and
- ≈470 kWh battery energy storage system (Li-Ion)
- Microgrid controls
- 64% of energy would be produced by renewables and 36% would be grid purchase/ diesel generator
- The solar array would utilize ≈ 70% of the available roof space

CLINTON FOUNDATION

Key Recommendations from Solar Under Storm II

- ✓ If top-down clamps are required, use clamps that hold modules individually or independently. Another option would be to specify through-bolting of modules.
- ✓ Specify bolt hardware that is vibration-resistant and appropriate for the environment.
- ✓ Pitched-roof systems should only have modules installed within the envelope of the roof structure (no overhanging modules over the roof edges).
- ✓ Requirement that structural engineering be performed in accordance with ASCE 7 and site conditions, with sealed calculations for wind forces, reactions, and attachment design.

  https://www.clintonfoundation.org/our-work/clinton-climate-initiative

CLINTON FOUNDATION

Additional cost of increased resilience

- ✓ The project would incur an increase of approximately 5% in costs versus the standard Category 3 or 4 rated solar PV installations.
- ✓ Additional costs come in the form of labor for the extra time needed to fasten modules and install more connections.
- ✓ Additional costs in material (higher rated modules, racking supports, and fasteners).

Key Takeaway

HOMER software optimized design, combined with expert analysis of pass failures can support the creation of microgrids that:

- are cost effective
- provide resilience
- enhance reliability
- reduce diesel use

CLINTON FOUNDATION

HOMER MICROGRID AND HYBRID POWER INTERNATIONAL

9TH ANNUAL • VIRTUAL
OCTOBER 12-14, 2021

Clinton Foundation
1633 Broadway, 5th Floor, New York, NY 10019
Mobile: +1.631.809.8335
ldesouza@clintonfoundation.org | www.clintonfoundation.org

CLINTON FOUNDATION