Optimizing Cross-Sector Sustainable Energy Deployment
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Background: Investing for Strategic Impact

“Our nation needs a new grand strategy and this is it.”
Admiral Mike Mullen, (USN-Ret), Former Chairman of the Joint Chiefs of Staff
Two Ad-Hoc Post-Hurricane Efforts

Marshall Plan for the Caribbean/Caribbean Climate Smart Plan

Build Better Project
Marshall Plan: What We Proposed

Integrate rebuilding across five sectors
• Energy
• Housing
• Transportation
• Water
• Food

Leap-frog to future system now
• Renewable/Distributed/Storage
• Better housing materials
• New transportation patterns
• Greenhouse food production
• Distributed Water/Wastewater

Core Concepts
• Participatory planning
• Import substitution
• Resilience and redundancy
• Financed from savings of expected insured losses
Marshall Plan: What We Signed 12 Dec 2018

A new development paradigm for the planet that:
(a) Builds durable ecosystems, resilient households, cohesive communities and competitive economies;
(b) advances the adoption of cleaner and cheaper energy solutions;
(c) values natural capital, sustainable livelihoods, social justice and sustainable and inclusive socio-economic growth; and
(d) builds human capital.

We agree to catalyse urgent action on:
(i) community shelter and housing
(ii) renewable energy and energy efficiency;
(iii) tourism, coastal resilience and the blue economy;
(iv) physical infrastructure;
(v) government systems and security;
(vi) food security, water and climate smart agriculture; and
(vii) building human capacity for regeneration and a resilient future.
Build Better

Long Haul Homes
- Function: Project Management
- Patrick Doherty, President
- Col. Mark “Puck” Mykleby, (USMC-Ret)
- Michael Peters, LEED AP, EcoDistrict AP

DECOIHAUS
- Function: Architectural Design
- MIT Prof. Mark Goulthorpe, AIA

AXIAmaterials
- Function: Panel Manufacturing
- Justin Jin, CEO

Waterfront Composite Solutions
- Function: Structural Engineer
- Mark Bishop, Principal

Our Purpose: Build Better
- To protect the most vulnerable
- To rapidly restore the residences of islanders
- To minimize future hurricane damage
- To reduce carbon emissions
- To generate local employment
Build Better Project: TASK & PURPOSE

**Task:** Rebuild residential housing after 2018 Hurricane Season
- **What:** Polymeric Glass Fiber Composite Homes
- **Where:** BVI & Barbuda first ➔ Scale across affected region
- **Stronger:** Higher Hurricane Resistance
- **Greener:** Net Zero Energy Ready; Integration w/ RMI Rebuilding Caribbean
- **Faster:** 115 homes/mo. & 7 day max construction times
- **Smarter:** Work with stakeholders to design in resilience

**Purpose:** Build Better
- To protect the most vulnerable during rebuilding
- To rapidly restore the residences of islanders
- To minimize future hurricane damage
- To reduce carbon emissions from the housing sector
- To generate local employment
Build Better Project: SMARTER

- Participatory community planning
  - Modified EcoDistrict protocol
  - Community design charrettes
  - Ensures equity and inclusion
  - Integration with RMI Rebuilding the Caribbean

- Homeowner-driven design process
  - Range of size & floorplan options
  - Local “architectural vernacular” elements
  - Off-the-shelf units available for airlift for most vulnerable
Composite SIPs: Hurricane Strength

- High performance composite boats move at Category 5 speeds through water, which is 800x more dense.
- Our joints and anchor attachments are over-specified for 200 mph wind loads.
- By distributing the load across a large area, composite panels will never face more than 1/5th of their fatigue strength.

4” thick composite panel (composite skin thickness 0.03”, FR EPS 1.89”)
Composite SIPs: GREENER

- Net Zero Energy/Passive House Certification
- Rooftop Solar Ready
- R25-50 Insulated Walls
- No Thermal Bridge
- Insulated Windows & Doors
- All Recyclable Panels
- No VOCs
- Approx. $370/occupant/year energy savings (Barbuda)
Composite SIPS: FASTER

• 115 homes/mo current max capacity; 550 homes/mo in 2018; +price drop
• Shipped flat-packed by container to nearest port
• On-site construction time < 7 days
Composite Homes: Living Lightly on Our Planet

- PV-Ready Roof
- Net-Zero Energy Ready
- Daylighting & LEDs
- High R-Value Panels
- High-Efficiency A/C
- No Concrete
- Usable Windows and Vents
- Water-Saving Fixtures & Appliances
- Recyclable Structure
- Lower Embodied Energy than Traditional Materials
Thank You

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