



Sustainable, Democratic Energy and Public Health

Recovery & Resilience in Puerto Rico and the U.S. Virgin Islands

June 4, 2020

Materials will be available at:

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Energy Study Institute

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- Now an **independent**, bipartisan **nonprofit** with no Congressional funding.
- We provide **fact-based information** on **energy** and **environmental** policy for Congress and other policymakers.
- We focus on **win-win solutions** to make our energy, buildings, and transportation sectors **sustainable** and **resilient**.

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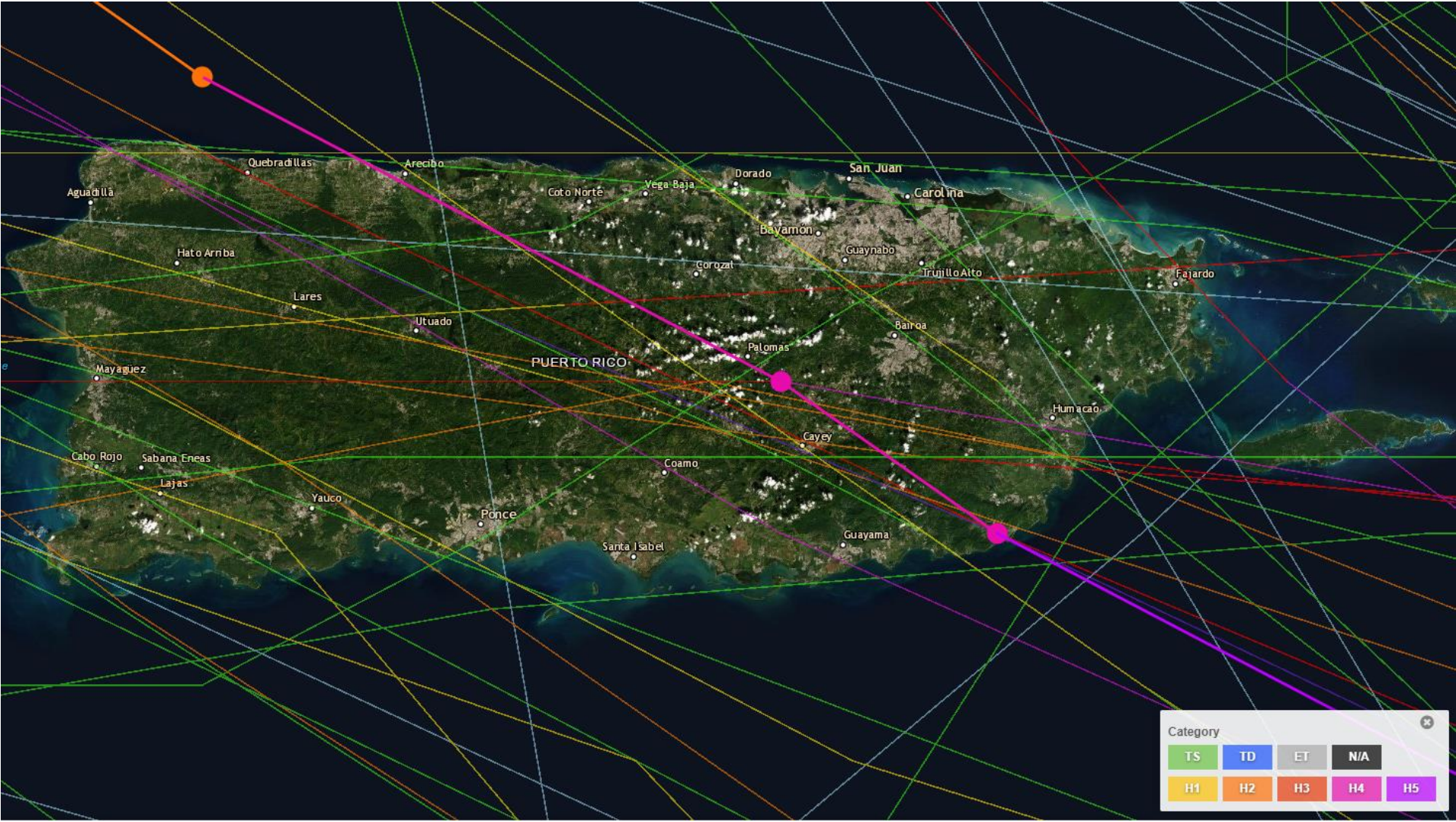
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Beyond Recovery to Energy Democracy

Ruth Santiago, JD,LLM

El Puente-Latino Climate Action Network,

Comité Dialogo Ambiental, Inc.





——— 230 kV
 ——— 115 kV
 ——— 38 kV

Impacts of Hurricane Maria

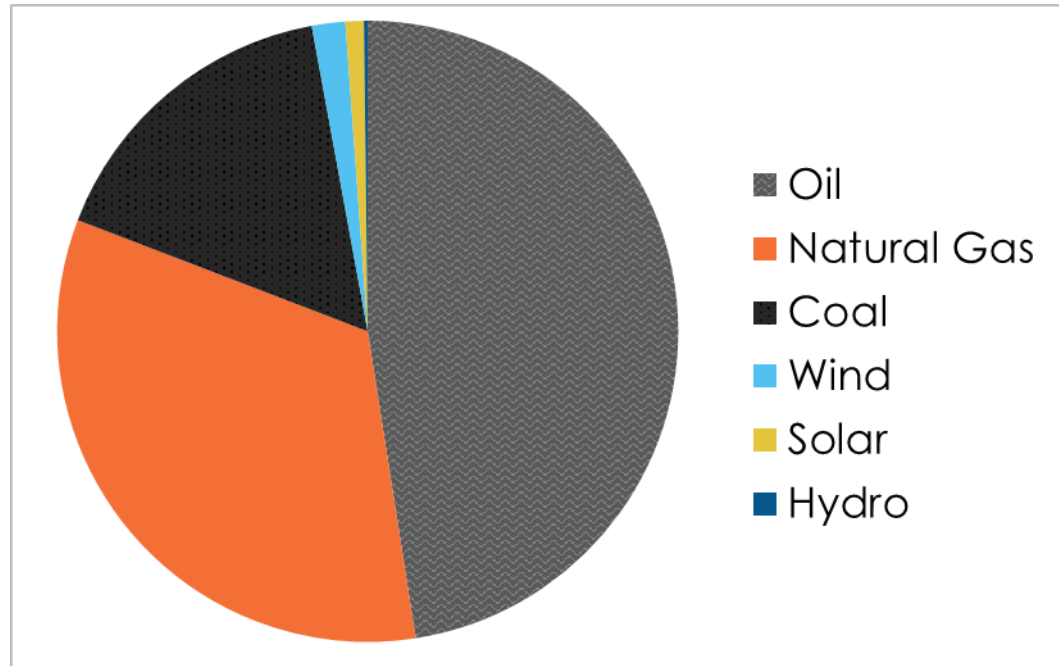
- Estimated 80% of the transmission and distribution systems seriously damaged. Prof. Efrain O’Neill, PhD, UPRM
- Estimated 50,000 poles, 500 transmission towers down. USACE
- Knocked out 100% power
- Communications failure
- “Generator Island” diesel fumes, high noise levels
- Immense human suffering and deaths.



Central Station Fossil Fueled Generation Vulnerable to Earthquakes, Floods, Sea Level Rise, etc



Puerto Rico Current Energy Mix



- ~33% Bunker C Residual Oil/Diesel
- ~43% “Natural” Methane Gas
- ~20% Coal
- ~2% Renewables





PREPA'S INTEGRATED RESOURCE PLAN





REBUILD THE EXISTING SYSTEM?



www.QueremosSolpr.com

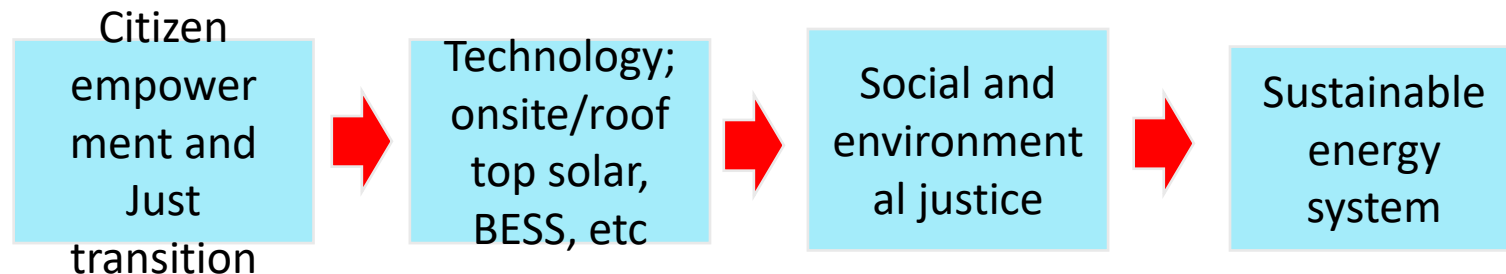


Queremos
SOL

SOSTENIBLE. LOCAL. LIMPIO

Beyond technology: sustainable energy through community mutual aid and PREPA transformation

- Community shared solar: A system that provides electric power and socio-economic benefits to a community.
- Solar communities: Potential for local socio-economic development through technology, citizen empowerment, environmental and social justice, aligned with sustainable energy principles.



VIABILITY OF ON-SITE SOLAR, BESS

- The draft Integrated Resource Plan (IRP) prepared by Siemens Industry, Inc for the Puerto Rico Electric Power Authority (PREPA) indicates that the unit costs for all customer alternatives considered are lower than the final all-in (ESM and S4S2) generation portfolio rates. (Pages 8-30 and 8-46 of the 6/2019 IRP draft). The cost of customer owned generation is significantly lower than the total rate of PREPA's preferred plans.
- Expert consensus on economic and technical viability of roof-top, on-site solar generation and battery energy storage systems (BESS) in Puerto Rico at the technical hearings for PREPA's IRP held Feb. 3-7, 2020.

Transition? New Fortress Energy-NFEnergia Conversion SJ 5&6 Methane

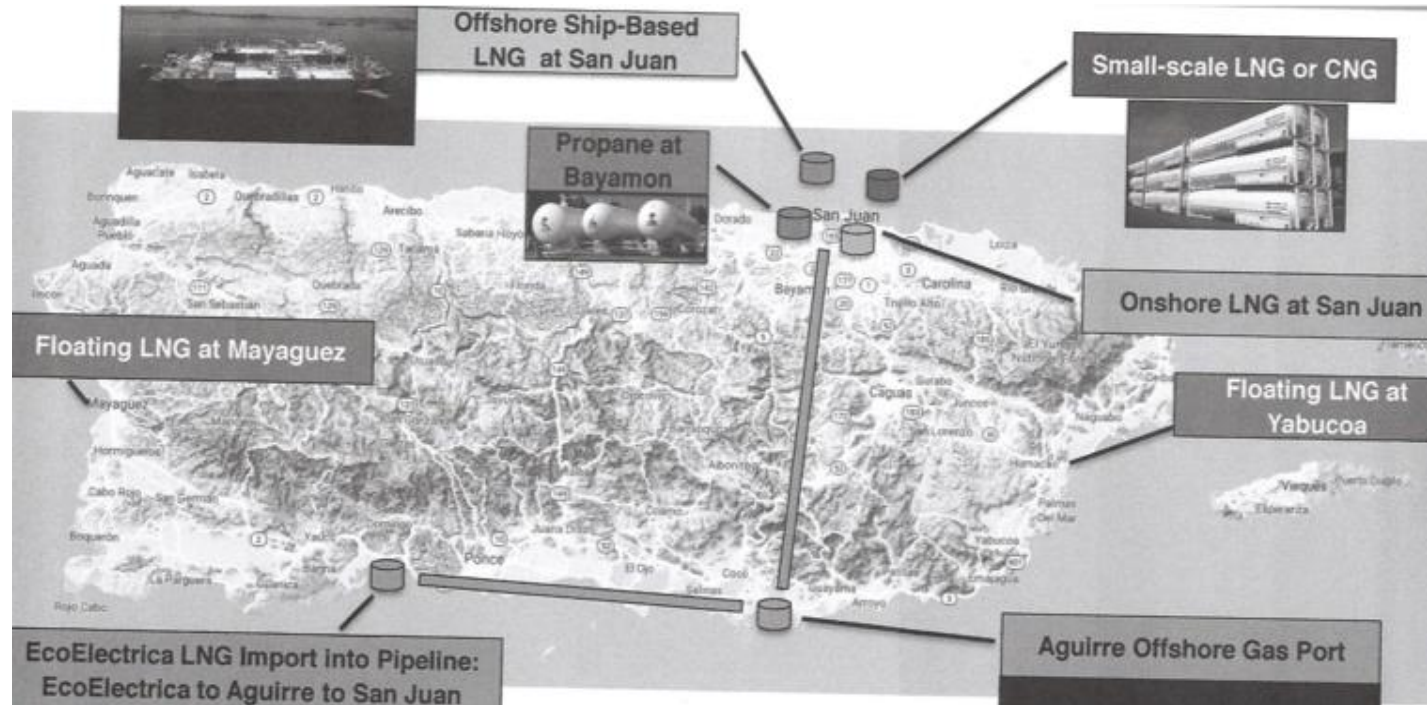
- LNG ports



- Central station power plants



New Methane Gas Infrastructure, T&D FEMA funding?



Source: Siemens





USVI Hazard Mitigation and Resilience Plan

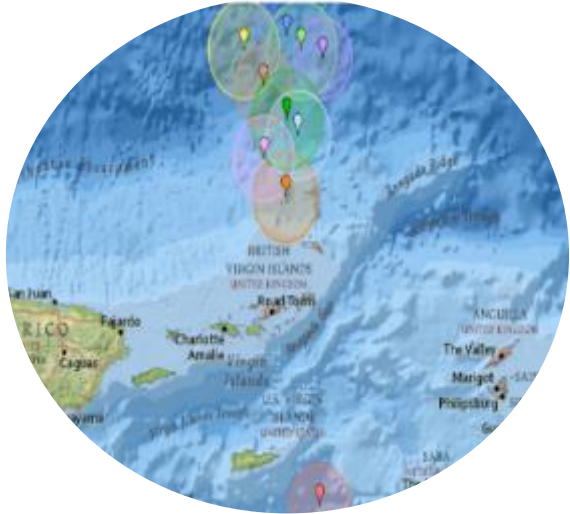
Building a Comprehensive Approach to Risk
Reduction in the Virgin Islands



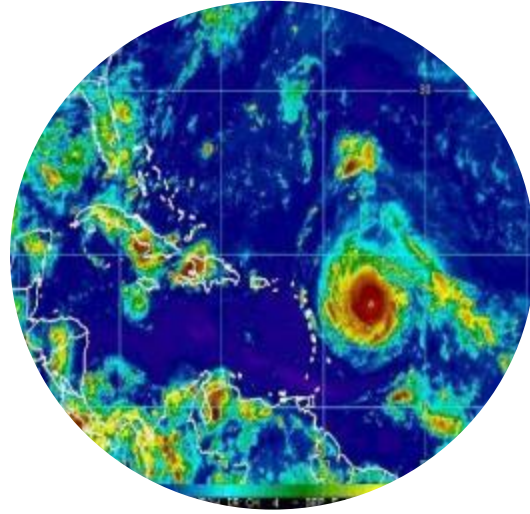


IrMaria: A Shock To The System

We Are Vulnerable to Many Hazards, Amplified by Climate Change



**Earthquakes, Tsunamis,
Landslides,...**



**Stronger & Intense
Storms**



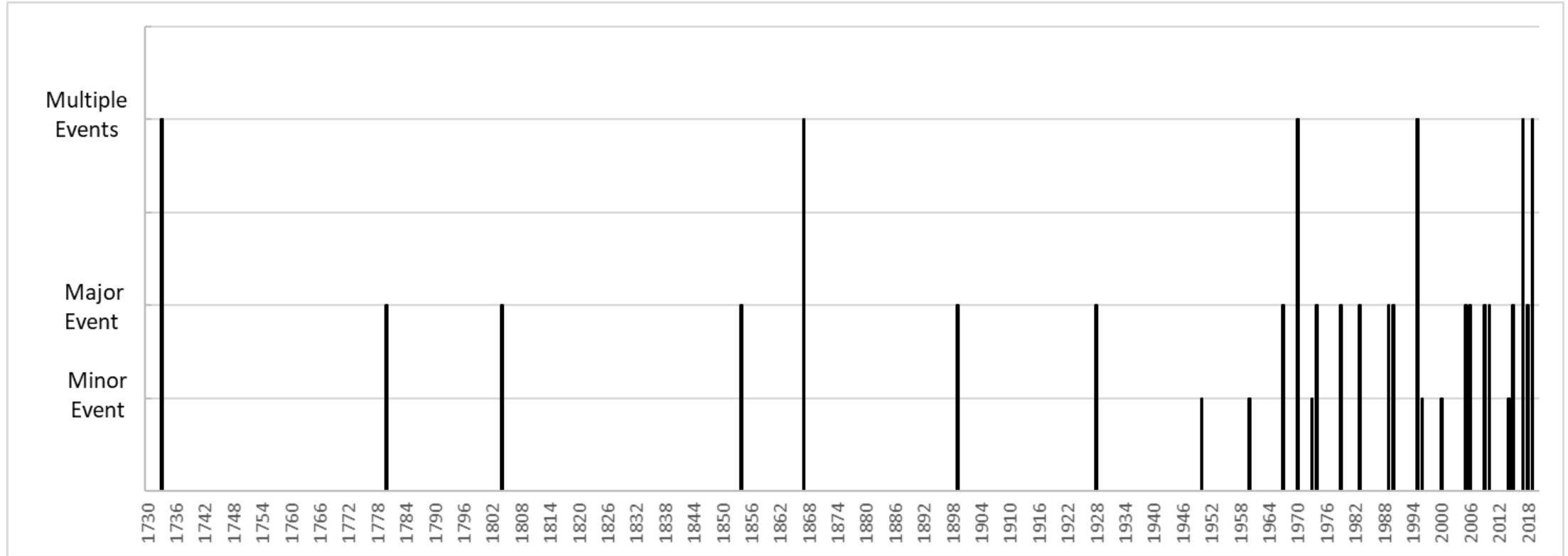
Longer Droughts



**Sea-Level Rise &
Higher Temperatures**

**Natural hazards can devastate our economy and
communities**

Intensity and Frequency of Events is Increasing



Hazard Mitigation & Resilience Plan

- **Updated Every 5 years**
- **Eligibility for BRIC and Post-Disaster Mitigation Funding**
- **Create Public Support for Recovery and Risk Reduction Initiatives**
- **Vision for the Development of the Territory – Risk Reduction, Resilience and Sustainability**



Most HMPs Focus on Things (but can infrastructure save?)

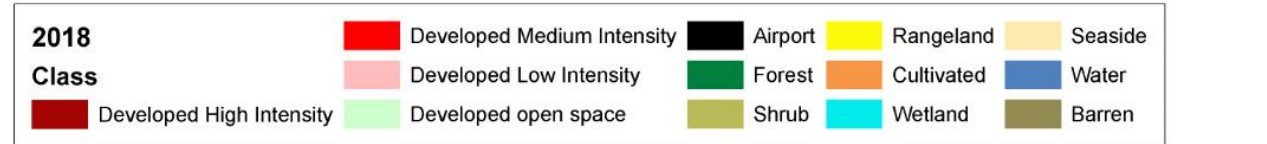
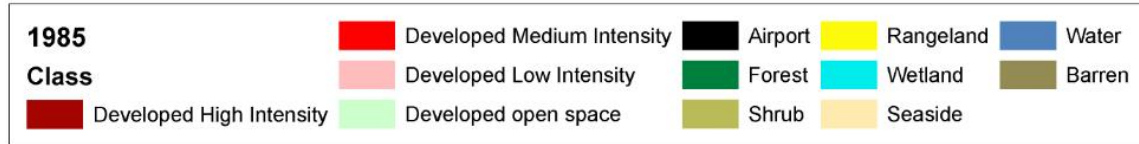
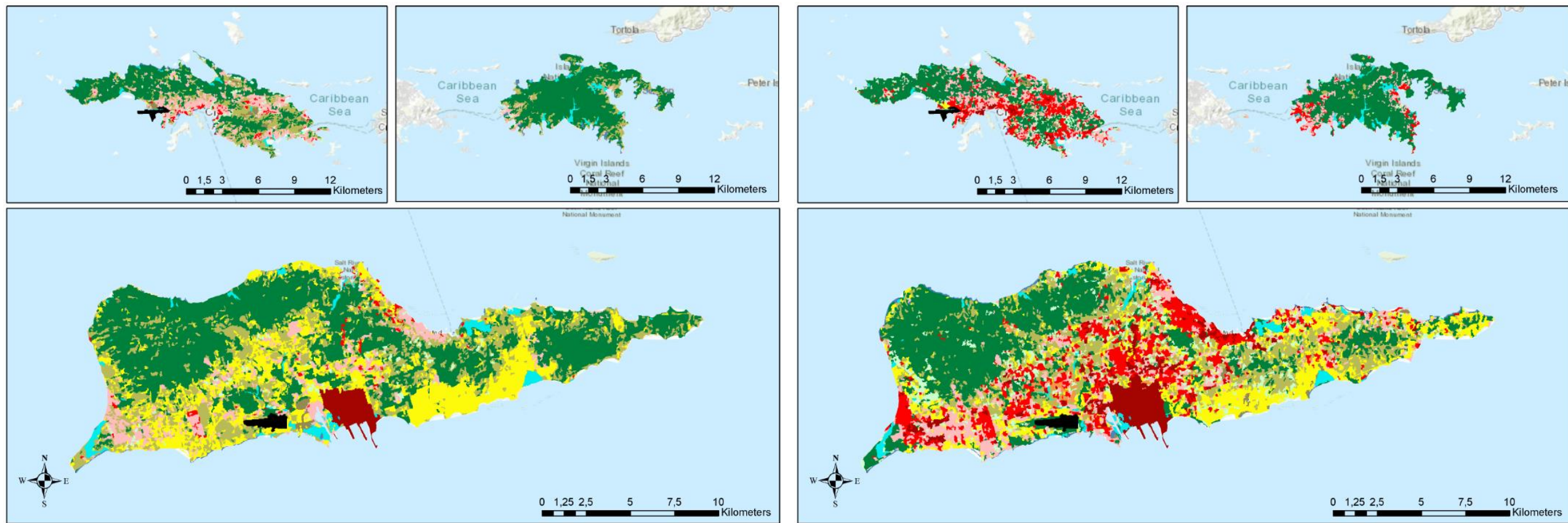


Traditional Approach

Planning and Hazard Mitigation Don't Talk

1985

2018



Land Use Practices Put People at Risk

- More than 25% of buildings are in flood and tsunami zone
- More than 45% of government, public safety & health buildings are in flood and tsunami zone
- More than 40% buildings are in extremely high wind zones
- All buildings are in earthquake zone



Social Infrastructure is Vital for Risk Reduction

- We are agile and able to live through many disruptions
- We are compassionate and help each other during hardships
- We tend to hide difficulties and hardships from each other
- Social networks can sometimes feel exclusive and have blind spots
- Non-Profits are not utilized for all the talent they have to offer

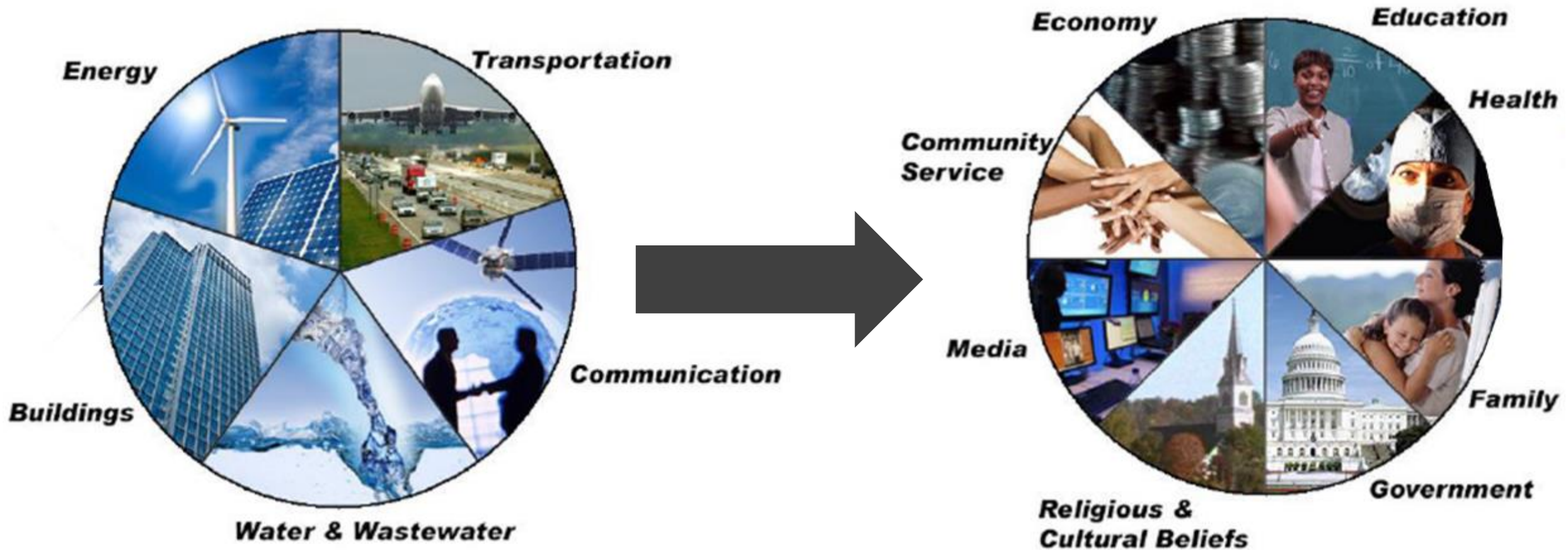


Natural Infrastructure is Degrading – To Our Loss

- Natural systems are the foundation of our economy
- Natural systems can be life-saving during and after disasters
- Quality, and health of natural systems is under threat
- Development is encroaching on and degrading systems
- We are slowly losing this part of our cultural identity



Infrastructure Critical for Society Function (but not an end in and of itself)

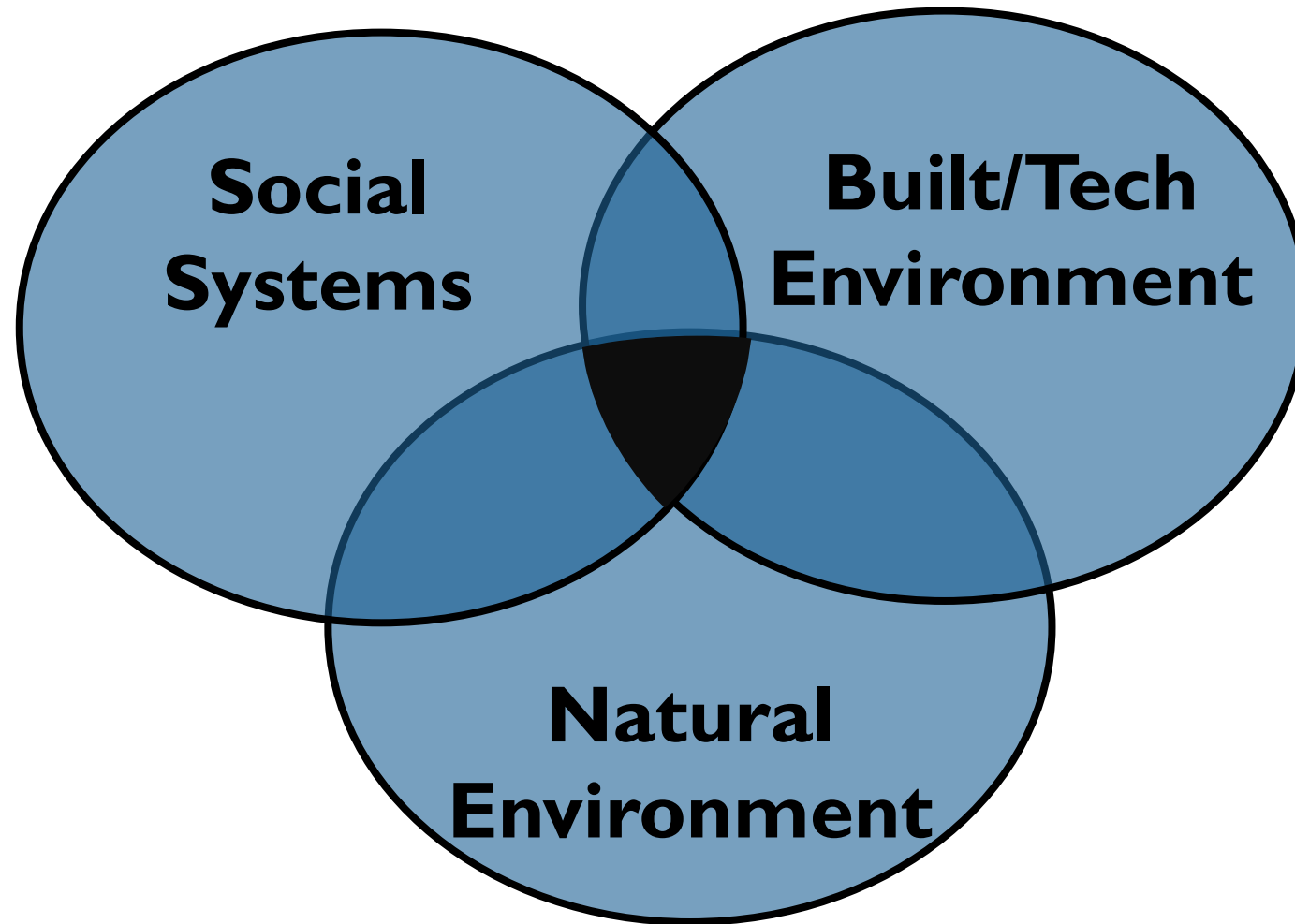


Resilience Is What We Do Not What We Have



- Where is the risk? (Resilience is Place-based)
- What is the risk? (Resilience to What?)
- What is at risk?
- Is the Economy resilient?

Risk Reduction and Resilience Requires Comprehensive View of SET Systems



Stakeholder Engagement

Steering Committee

Capacity/Capability Assessment

Community Engagement

Assessment & Analyses

Hazard, Sector & Environmental Profiles

Risk Assessment

Sustainability Analysis

Process

Mitigation Strategies/ Planning Framework

Sustainability/Resilience/Policy Recommendations

Hazard Mitigation Plan

Outputs

Thanks!



The VI is Losing People, but Builds More Infrastructure





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