U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Resilient Coastal Communities R&D

Simon Gore, Technology Manager

Ocean Renewable Energy Conference 9.15.22

Outline

Review technology goals of Resilient Coastal Communities

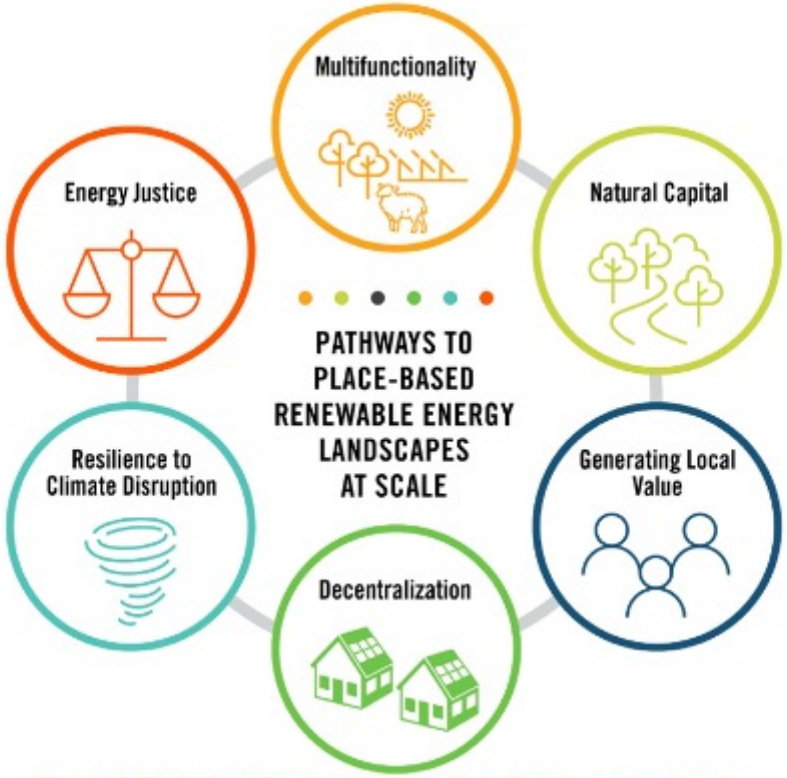
Place-based energy systems and community-driven design

How is this approach working in a few communities

Microgrids

Technology Optimization in Remote Communities

- Focusing on technology pathways and design strategies for remote and resilient communities.
- **Resilience** is a core design and technology goal for marine energy systems
- Focus on *learning by doing* and practical challenges of making technologies work for the end-users (i.e. focusing on reliability, robust designs, operational complexity, energy challenges in those communities)
- Understanding choices will have generational impact is vital alongside achieving decarbonization goals
- ***Community driven design and engagement***



The clean energy transition is more than achieving cost effective projects and economies of scale**, it has local value and a public mission**

Understanding place-based approaches, especially considering the speed and scale of the energy transition, will be critical to future renewable energy deployment

Read the White Paper: https://www.pnnl.gov/projects/renewable-energy-landscapes

Community-Centered Design Paradigm

Community feedback into design, communities as "co-designers"

A true systems engineering perspective would functionally account for end-users and communities – the energy transition is preparing communities for the future not just the present

Some notable examples from design and planning fields, such as innovative, community-centered adaptation planning of Rebuild By Design Competition

Credit: Rebuild By Design, Yale-Arcadis

National Sea Grant Office Collaboration

In 2021, a cross-agency RFP was released to advance research on the effects of ocean renewable energy on coastal communities in the Northeast

Building out a longer-term focus on energy innovation in the blue economy and maritime communities – enhancing energy capacity and expertise at Sea Grant

Regional Consortium models is one way to implement scaled approaches to place-based research and community-centered design

Eastport – Community Microgrid and Local Resilience

ORPC, the Island Institute, NREL / PNNL, Versant Power, and community stakeholders engaged in planning the integration of tidal energy technology and a local microgrid

Analyze scenarios for electrification and energy efficiency

Public engagement on the workings of microgrids and the benefits of energy storage

Picture Credit: Islands Institute (Tom Groening)

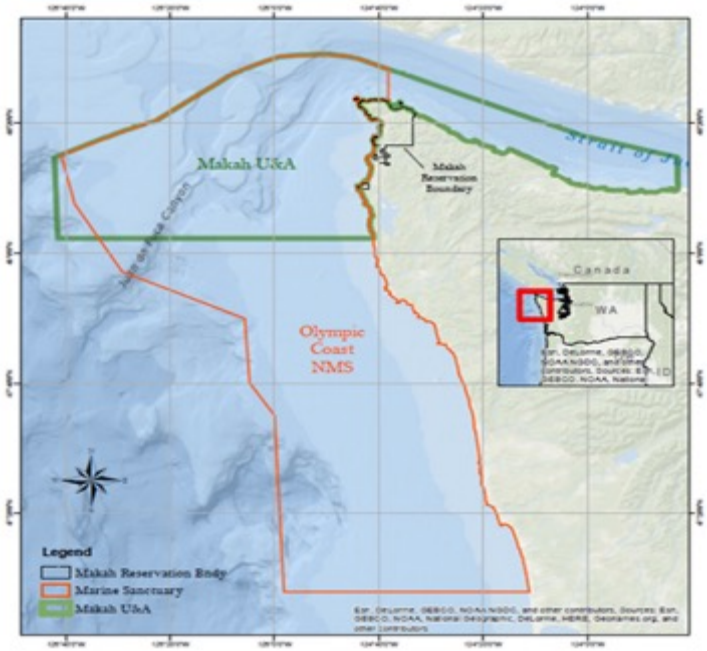
Igiugig

Looking at power loss and frequency fluctuations in current transmission

Better understanding of how various energy transition projects will fit together and impact community energy generation and costs

Energy supply that meets the needs of new infrastructure`

Neah Bay / Makah Tribe – Energy independence and climate resilience

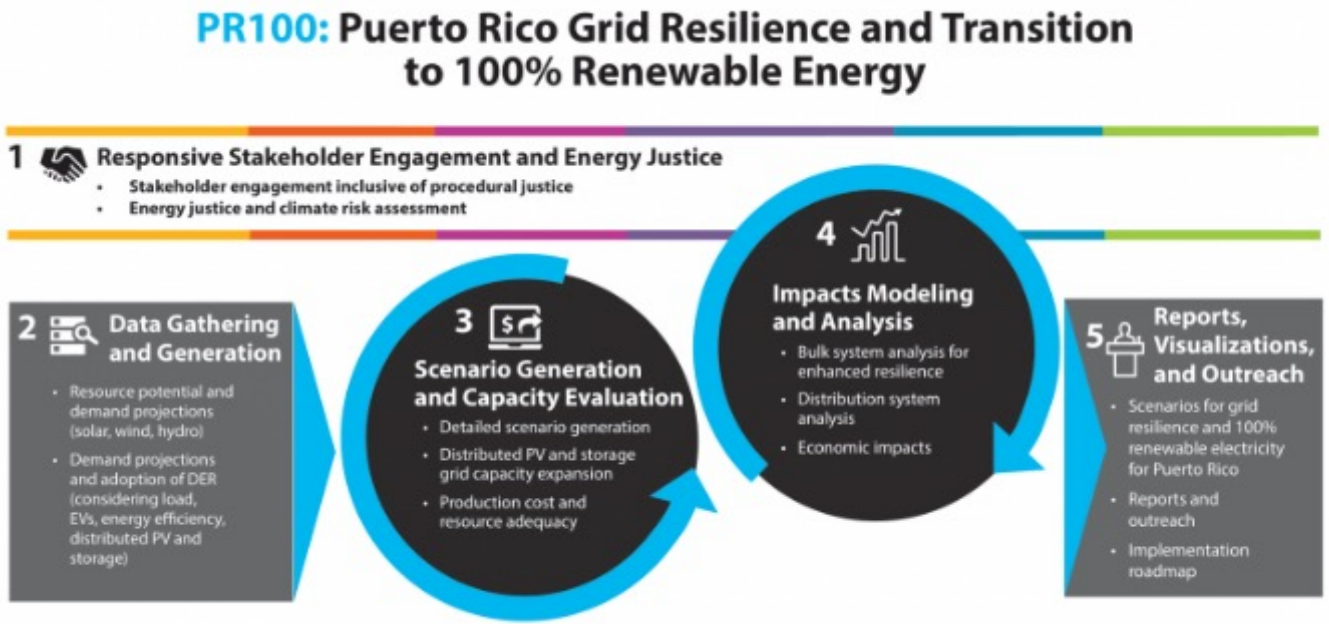


Strategic renewable energy plan including integrating energy into relocation planning and hazard mitigation

Tribal community participates in energy decision-making and understanding process

Manage a more independent and resilient energy system

Puerto Rico 100% Renewable Study (PR100)



Identify PBE demands and opportunities for wave power

Coastal Resilience (breakwater WECs, shoreline protection, microgrids, critical grid services)

Focus on adaptation could potentially outline future opportunities and growth

Microgrids Research

- Building out approaches for the integration of microgrids and marine energy devices.
- Scope spans analytical/modeling research, to new microgrid designs, to the implementation of microgrids directly in relevant remote and coastal communities.
- Goal is to decrease time to future deployments, guide the formulation of new standards/best practices, and reduce technical complexity for end-user operations and maintenance.
- Microgrids as a key technical and social tool in the electrification of remote communities

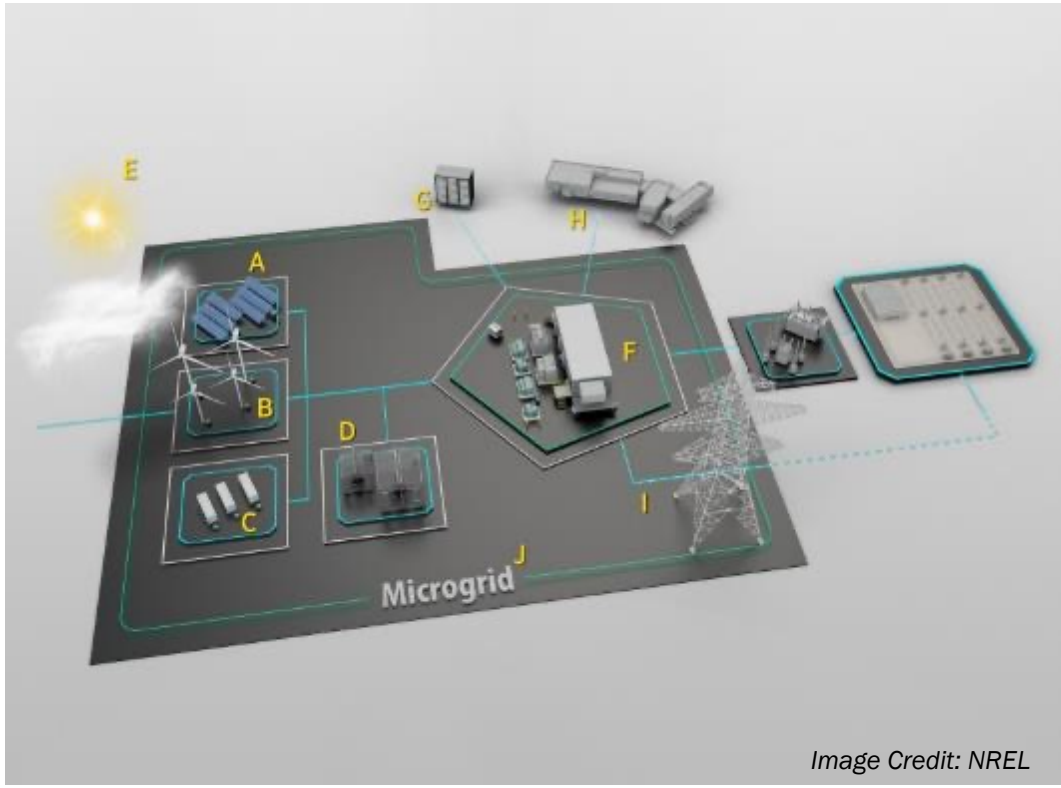


Image Credit: NREL

Resilient Coastal Communities

Energy development in remote communities is both a technical and social challenge – WPTO's approach tries to meet this challenge directly

Developing **ocean energy solutions**, where communities make their own energy choices

Working with communities could foster greater enthusiasm for **energy transitions and climate solutions**

Thank you!

simon.gore@ee.oe.gov