Resilience in ETI and ETIPP

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Vulnerable communities, unique challenges

Many remote, island, and islanded communities seek to transform their energy systems and shore up their vulnerabilities.

Remote
Flooding and erosion pose imminent threats to critical infrastructure in 30+ Alaska villages.

Island
Maine islanders face electric bills 4X national average due to aging infrastructure, few scalable options.

Islanded
The coastal-Washington Tahola village (Quinault Indian Nation) re-located due to climate change and natural disaster vulnerabilities.

Overcoming these challenges and reducing risk requires ramping up resilience—often with limited resources and capacity.
Create & Sustain Clean Energy Leadership

• Champions of clean energy economy
  – Leverage long-standing partnerships Hawaii, USVI, et al.
  – Cultivate channel partners (RMI, ETIPP)
  – Solve novel technical and policy questions (Labs)

• Community-wide engagement
  – Promote equitable access to process & benefits
  – Recognize that projects FAIL without this engagement (e.g., RUS)
  – Distribute lessons learned
DOE & National Lab Analysis Capabilities

Fuels/Interdependencies
• LNG Infrastructure
• Telecom Infrastructure
• Solar Resource and Supply Curves

Bulk Power System
• Investment Support Tools
• Capacity Expansion Modeling (AURORA)
• Production Cost Modeling (FESTIV)
• System Stability Modeling (Epfast)
• Dynamic Modeling (MAFRIT)

Transmission
• Protection and R/T Info
• Risk-Based Contingency Analysis
• Grid Asset Benefit-Cost Evaluations

Distribution & Edge
• System Advisory Model & PVWatts
• DER Interconnection Standards
• DER Feeder Hosting Methodology
• GIS Resiliency Improvement Tool

Lead Lab Key:
• ANL
• NREL
• ORNL
• PNNL
• SNL
Example: Solar Development Potential

Puerto Rico
Photovoltaic Development Potential – Total LCOE

This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy. Bilby & Roberts, 2019 November 8.
Burden to Access All Critical Services in one of the Cost-Effective Portfolios (SNL)

Burden estimate accounts for:
- Cost of no mitigation
- Cost of DER / MG
- Design basis threat of storm, flood & earthquake
- Wide basket of critical services (medical, fire, police, water, fuel, comms, etc.)
Microgrids Are Key Resilience Strategy (SNL)

- DER & MG portfolio docks the tail of event impacts
- Assures energy supply to life-saving/sustaining services
- 159 sites for ~$1100mn, hybrid NG/diesel & PV, BESS
- MG interconnection rules not established, can build from IEEE 2030.7
- NREL reviewed DER interconnection processes
Partnership Approach
Energy Transitions Initiative Partnership Project (ETIPP)

ETIPP provides tailored, holistic, technology-neutral technical assistance, strategy, and solutions based on ETI’s proven framework.

- **Community priorities**: Remote, island, and islanded community energy and infrastructure challenges, values, and goals

- **Partnership approach**: Deep energy-sector experience, expertise of the national labs + local, trusted stakeholder organizations

- **Energy assessment and planning**: Provide resources and on-the-ground support

- **Resilient energy systems**: Knowledge sharing → lessons learned, use cases → future application

High-impact, replicable energy transitions rapidly scalable to any geographic region or type of community.
Partnership approach

Communities (8-12) Unique challenges, values, goals

Regional Partners (5) Local, trusted, community-based
- Stakeholder engagement and outreach
- Translate technical content
- Share learnings, support use-case development

National Labs (4) Deep energy-sector experience, expertise
- Technology-neutral technical assistance
- Identify and advance strategic, tailored solutions
- Address challenges, build capacity, and accelerate sharing of best practices and innovations

U.S. DOE Offices (4) Funding, support, expertise
- Support energy assessment, planning, and operations to achieve energy-resilient communities
- Foster cross-technology collaboration, planning, and solutions

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Current ETIPP Communities

- Wainwright, Alaska
- Dillingham, Alaska
- Ouzinkie, Alaska
- Alaska Longline Fishermen’s Association, Sitka, Alaska
- Sitka, Alaska
- Kauai, Hawaii
- Honolulu, Hawaii
- Nags Head, North Carolina
- Ocracoke Island, North Carolina
- Eastport, Maine
- Islesboro, Maine
Designing Impactful Place-Based Work

4 Key Questions

1. How do place-based programs select places and subject matter, conceptually and in practice?
2. How do we align DOE mission and priorities with local need?
3. How do we efficiently coordinate inside HQ?
4. How can we improve the process of building a PB program?
   - Functions, mechanisms, program models, audiences
Thank you!