



# ENERGY TRANSITIONS INITIATIVE

U.S. Department of Energy

Partnership Project

## Eastport Energy Resilience Opportunities

**Suzanne MacDonald**

National Renewable Energy Laboratory

**Becki Meadows**

National Renewable Energy Laboratory

**Natalie Mims Frick**

Lawrence Berkeley National Laboratory

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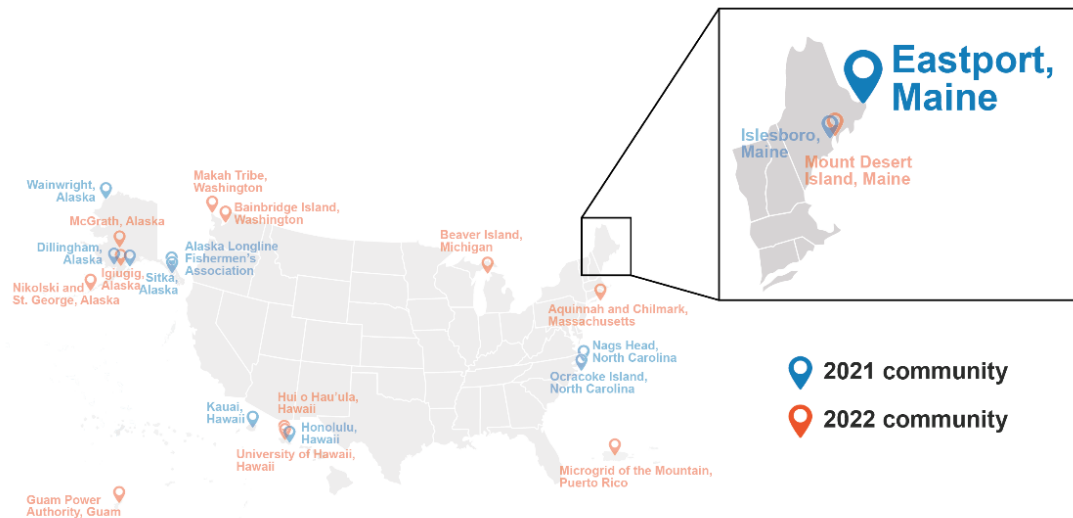
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# **Energy Transitions Initiative Partnership Project (ETIPP) and Eastport Energy Overview**

# ETIPP Background

- In 2021, Eastport was selected for a national program to receive free support from the U.S. Department of Energy.
- The Energy Transitions Initiative Partnership Project (ETIPP) helps island and remote communities address energy-related priorities.



Island and remote communities participating in Energy Transitions Initiative Partnership Program (ETIPP). *Image from the National Renewable Energy Laboratory (NREL).*

# Eastport ETIPP Focus

## The Eastport ETIPP project objectives were to:

- Inform efforts to develop a regional microgrid.
- Learn more about the potential of the regional microgrid to provide back-up power.
- Coordinate with local energy efficiency and electrification efforts.
- Provide educational resources about the proposed microgrid.



**City of Eastport**  
Community lead



**Island Institute**  
Regional partner



**Versant Power**  
Electric utility



**Ocean Renewable Power Company (ORPC)**  
Tidal power and microgrid developer



**National Renewable Energy Laboratory (NREL)**  
Technical assistance provider

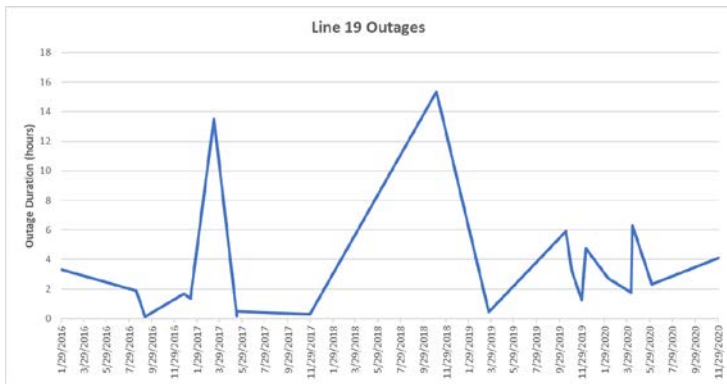


**Lawrence Berkeley National Laboratory (LBNL)**  
Technical assistance provider

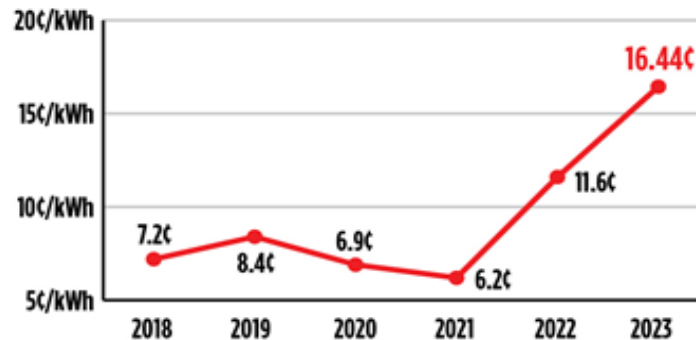
# Eastport's Energy Challenges

- Volatile/increasing energy prices.
- Underutilized incentives to lower energy costs.
- Disruptive power outages.

## Length of Power Outages in Eastport (2016-2020)



## Versant Power Residential Electricity Supply Rates (2018-2023)



SOURCE: Maine Public Utilities Commission

STAFF GRAPHIC | JAKE LAWS

Versant electric rates increased more than 40% from 2022–2023, after an 88% increase the previous year. *Source: Murphy, Edward. 2022. "Rate hike will bump up average Versant Power electric bill by \$24 a month." Portland Press Herald, Nov. 15, 2022. <https://www.pressherald.com/2022/11/15/electricity-rate-hike-will-bump-up-average-versant-power-bill-by-24-a-month/>.*

From 2016–2020, Eastport experienced an annual average of 5 power outages that lasted 3.5 hours on average.

*Source: Versant Power*



# Eastport's Energy Opportunities

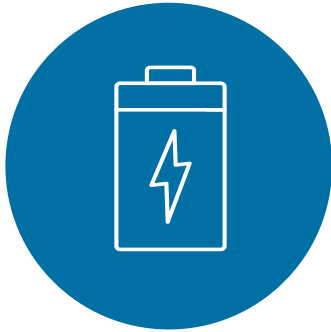
- Local tidal power resource is one of the strongest in the country, [according to NREL research](#).
- State and federal agencies are increasingly focused on energy issues in rural communities.
- Maine recently provided a Community Resilience Partnership grant to help reduce energy costs for Eastport homes.



*Photo from Jack Sullivan, Island Institute.*

# Local Energy Priorities

The city, with the support of an Island Fellow, is working to find more affordable, reliable energy sources by focusing on:



Resilient  
power systems



Energy efficient  
homes



Local economic  
opportunities

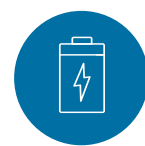


Community  
engagement

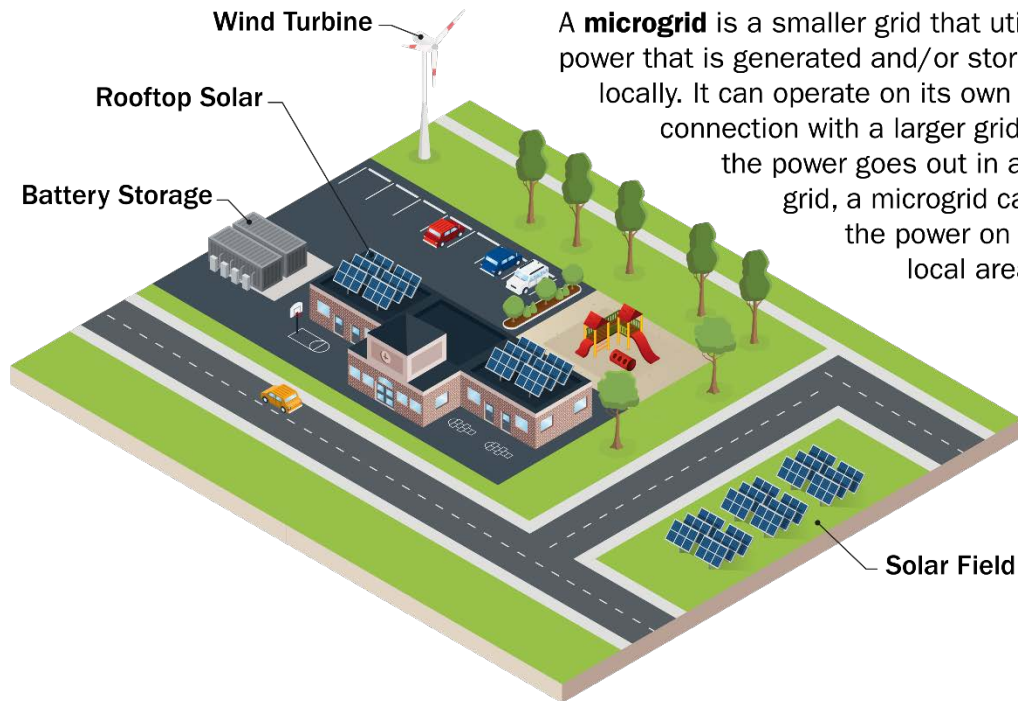


# What is Being Proposed?

# Resilient Power System



- ETIPP analyzed ways to ensure Eastport has a power system that can withstand or quickly recover from storms or other disruptions.
- To ensure the community has access to back up power in the event of any outages, ETIPP considered two different microgrid scenarios:
  1. Regional microgrid
  2. Community owned microgrid at the elementary school.



# Scenario 1: Regional Microgrid



- When disconnected from the central grid, the microgrid would provide back up power to the entire city of Eastport.
- The project would be developed with ratepayer or grant funding and owned and operated by the utility to support community resilience and potentially provide other grid services, such as demand management.
- Generation and storage resources may be utility-owned and/or be contracted to private developers.

## Battery Energy Storage System

- Considering 4 megawatt-hours of storage to cover total load in Eastport for ~3 hours.
- Ownership undetermined—ORPC and Versant considering joint ownership.

## Renewable Energy Generation Options

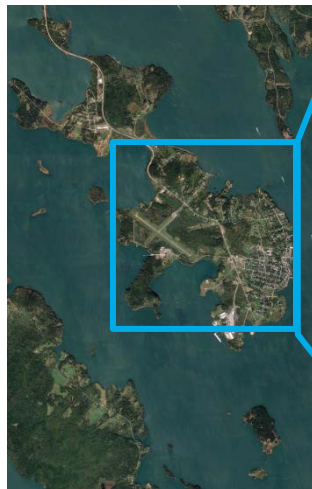
- Tidal Turbine
  - Owned by ORPC, selling power to Versant.
  - 2024-2026: Array of smaller turbines.
  - 2026: Transition to larger single tidal turbine.
- Solar Arrays
  - Developer-owned projects selling power to Versant.
- Other (not evaluated by ETIPP)
  - Could include land-based or offshore wind energy, or other renewable energy technologies

# Regional Microgrid Components



## Eastport Regional Microgrid Project

- 1 Eastport Substation and Battery Energy Storage System
- 2 Tidal Turbines (smaller)
- 3 Tidal Turbine (larger)
- 4 Shorestation TBD
- 5 Solar Farm(s) TBD



# Regional Microgrid: Benefits and Challenges

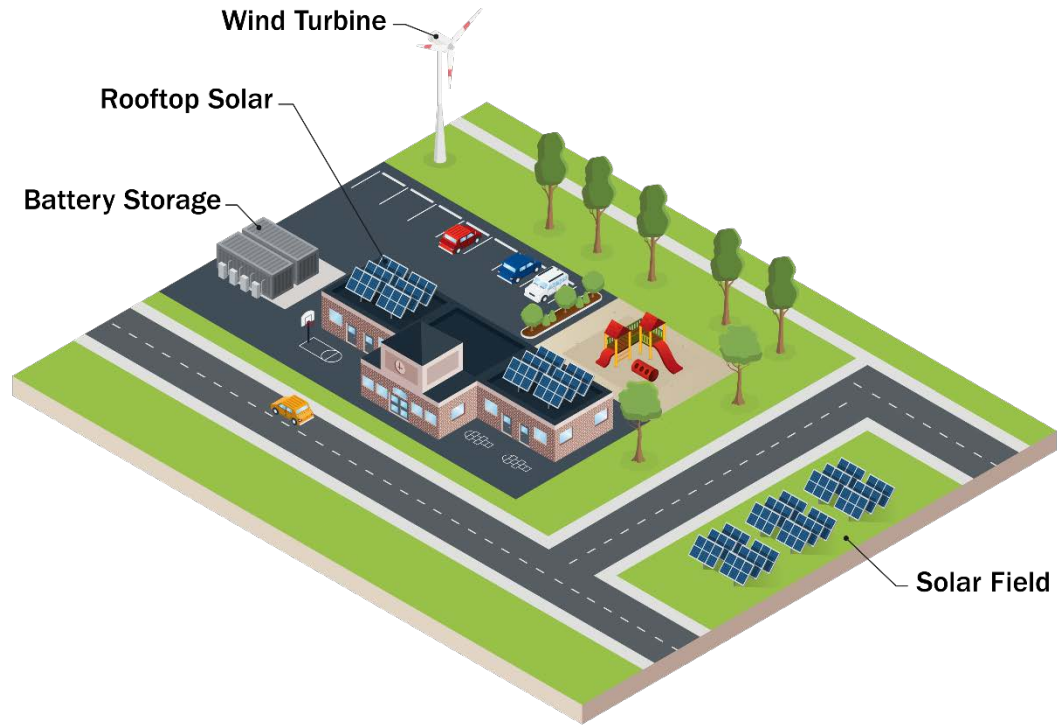


	Regional Microgrid (Tidal/PV and Storage)	
	Benefits	Challenges
<b>Cost</b>	Cost of the project would likely be incorporated into Versant’s operations, which are spread across all their customers in Maine. Any increase to electric rates is expected to be very small and likely unnoticeable. Grants may reduce the cost of the project.	Exact impact to electric rates will not be known until Versant and/or the developer enter discussions with the Maine Public Utilities Commission.
<b>Resiliency</b>	Provides back up power to the entire town for up to ~3 hours.	
<b>Grid Benefits</b>	<ul style="list-style-type: none"> <li>- Reduced carbon emissions.</li> <li>- Ability to connect and disconnect to the grid may help lower costs to Versant and customers.</li> </ul>	
<b>Local Economic Opportunity</b>	Local business participation, workforce training, and educational opportunities associated with tidal power.	
<b>Deployment</b>	Many grants and incentives were available for renewable energy and battery storage projects as of June 2023.	Lack of clear conditions for project approval, who will own the battery, and how the system will operate when it is not connected to the larger grid (i.e., islanded mode).

# Scenario 2: Community-owned Microgrid at the Elementary School



- A smaller microgrid, including solar and storage, at the elementary school to provide a public gathering place for up to five days during extreme weather events
- It could be owned and operated by the school/city or a third-party microgrid developer.
- The microgrid would provide back up power to only the elementary school when disconnected from the central grid.



# Elementary School Microgrid: Benefits and Challenges



Elementary School Microgrid (PV and Storage)		
	Benefits	Challenges
<b>Cost</b>	A combination of diesel and solar could reduce costs by 20% and cut emissions by ~45%.	Utilizing battery energy storage for back up power is significantly more expensive than using diesel generators for back up power (if grant funding is not utilized).
<b>Resiliency</b>	Opportunity to provide longer duration back up power to critical infrastructure or public gathering place.	
<b>Grid Benefits</b>	Reduced carbon emissions.	
<b>Local Economic Opportunity</b>		Fewer economic development opportunities than the regional microgrid.
<b>Deployment</b>	Many grants and incentives currently available for renewable energy and battery storage projects	<ul style="list-style-type: none"> <li>- Will require leadership within community to move a project forward, including finding customers to participate in the project as well as funding.</li> <li>- State net metering policy may become less favorable for development in the coming years</li> </ul>

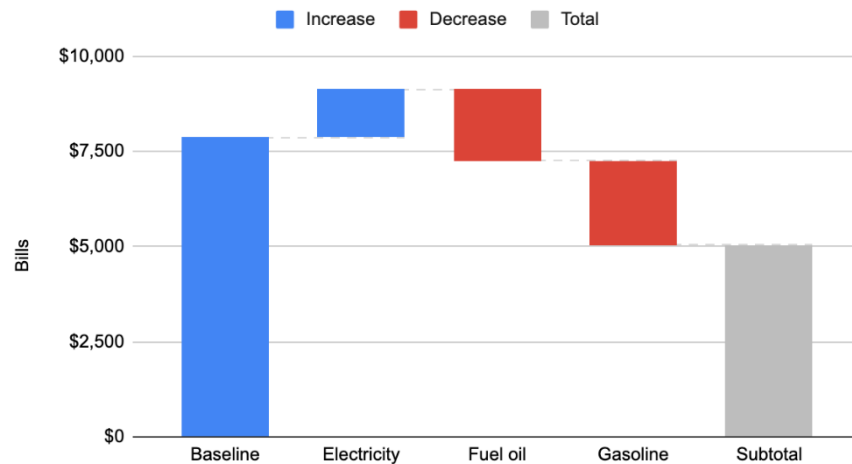


# Energy Efficient Homes



- Data shows very few homes and businesses in Eastport have taken advantage of Efficiency Maine programs, which help cover the cost of energy saving projects and equipment for Mainers of all income levels.
  - Less than 6% of Eastport residents have benefitted from this statewide program.
- ETIPP modeled the potential for energy savings in an average Eastport home through:
  - Weatherization (air sealing and insulation)
  - Lighting
  - Heat pumps
  - Electric vehicles.
- To help make energy-saving projects easier and more affordable, the city is currently working with WindowDressers to build window inserts and facilitate weatherization projects.

## Anticipated Impact to Annual Energy Bills from Installing One Heat Pump in an Eastport Home



Heat pumps can provide both heat and air conditioning. While they would likely increase a home's electric bills, they would also reduce home heating (fuel) oil bills, leading to an overall decrease in home energy bills.

*Source: Margaret Pigman, Lawrence Berkeley National Lab*

# How Can These Projects Help Me?

# Economic Opportunity: Household



ETIPP considered the potential economic benefits for Eastport residents:

- **Regional microgrid project** could reduce the length and financial impact of power outages.
- **Energy efficiency projects** could lower energy bills by more than \$3,000 per year while also making homes more comfortable and easier for older residents to age in place.

## Potential Household Energy Savings

Energy Efficiency Investment	Cost After Efficiency Maine Incentive*	Estimated Annual Savings*
Heat Pump Water Heater	\$0	\$260–\$450
Lighting	\$30	\$60–\$70
Weatherization	\$1,400	\$340–\$500
Heat Pump (first)	\$2,400	\$200–\$590
Electric Vehicle	\$19,000	\$1,050–\$1,700

\*Assumes homeowner meets requirements for income-eligible incentives. ETIPP also calculated savings for non-income eligible residents using lower incentive levels.

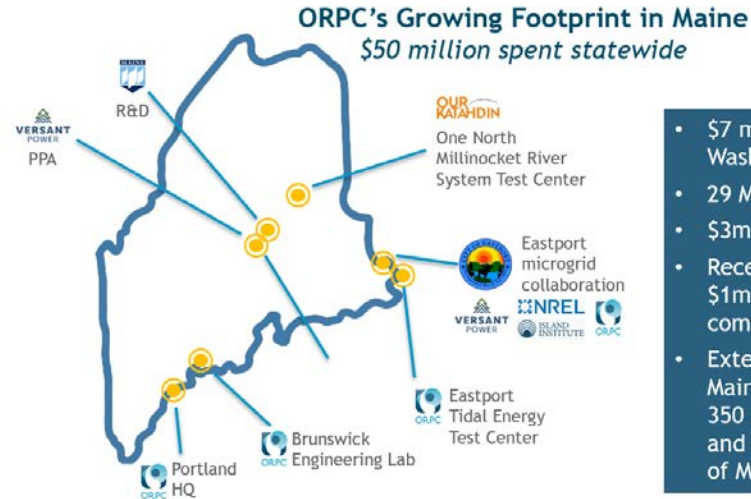
Source: PNNL

# Economic Opportunity: Community



ETIPP considered workforce needs and economic development opportunities:

- **Weatherization:** There were no certified weatherization contractors within 50 miles of Eastport as of June 2023. To weatherize more homes and use Efficiency Maine incentives, local contractors need to become certified or contractors from away will need to travel to Eastport.
- **Regional microgrid:** A microgrid would create work for local companies and possible job opportunities, especially if it includes a tidal-power component.
- **Housing:** Eastport has limited workforce housing, and relocating workers to Eastport may further increase housing costs.



- \$7 million spent in Washington County
- 29 Maine employees
- \$3m annual ME payroll
- Recent contracts of nearly \$1m awarded to Maine companies
- Extensive history with Maine supply chain - over 350 partners, contractors and suppliers used from 14 of Maine's 16 counties

ORPC's tidal power activities across the state of Maine serve as an example of the type of economic development that can occur through clean energy projects. ORPC employs staff in Eastport and utilizes the services of local companies.

Source: ORPC

# When Will This Happen?

# Regional Microgrid: Possible Next Steps



	2022	2023	2024	2024	2026
<b>ENERGY STORAGE AND MICROGRID PLANNING</b>	ETIPP: data analysis, modeling, suggested design, business models, regulatory outreach, guidance.	-Funding identified and received. -Regional partnership meetings begin, roles established. -Regulatory engagement begins.	-Additional partners identified. -Integration plan developed. -Additional funding identified. -Procurement and installation.	Initial commissioning.	Operation, monitoring, adjusting.
<b>ORPC TIDAL ENERGY DEPLOYMENT: COBSCOOK BAY</b>	- Federal Energy Regulatory Commission decommissioning completed. - U.S. Army Corps permitting for continued testing. - Subsystems field testing.	- Subsystems field testing. - Full-scale smaller system testing.	Continued product testing	Larger system testing.	
<b>ORPC TIDAL ENERGY DEPLOYMENT: WESTERN PASSAGE</b>	Submit preliminary permit application and receive permit.	Continue data gathering in support of preliminary permit.	Submit pilot license application and transition smaller system testing to Western Passage.	Continue Western Passage full-scale smaller system testing and receive pilot license.	Integration of megawatt-scale tidal devices.

*Note: ORPC timelines were provided in spring 2023 and are subject to change.*

# What Will it Cost?



# What Would Different Options Cost?



Regional Microgrid	Elementary School Microgrid	Energy Efficient Homes
<ul style="list-style-type: none"> <li>Exact impact to electric rates will not be known until Versant and/or the developer enter discussions with the Maine Public Utilities Commission.</li> <li>Any increase to electric rates is expected to be very small and likely unnoticeable.</li> <li>Grants may reduce the cost of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Utilizing battery energy storage for back up power is significantly more expensive than using diesel generators for back up power.</li> <li>Grants may reduce the cost of battery energy storage.</li> <li>A combination of diesel and solar could reduce costs by 20% and cut emissions by ~45%.</li> </ul>	<ul style="list-style-type: none"> <li>Varies by project/ equipment, but can range from \$0 (income-eligible heat pump water heaters) to \$19,000 (electric vehicle) after Efficiency Maine incentives.</li> <li>Rebates are available for all Maine residents and businesses, though they vary by income level.</li> <li>Groups may be able to negotiate lower prices.</li> </ul>

# How Can I Get Involved?

# Community Engagement



Next steps for these projects will depend on willingness of local committees, residents, and partner organizations to lead portions of the work, particularly after the Island Fellow placement is completed in July 2023.

Potential Projects	Helpful Skills
<ul style="list-style-type: none"><li>• Organizing more window insert builds.</li><li>• Coordinating weatherization contractors to come to Eastport.</li><li>• Reaching out to local contractors to help them learn about weatherization certification.</li><li>• Furthering microgrid opportunities.</li></ul> <p><b>Contact the city manager to get involved!</b> <a href="mailto:citymanager@eastport-me.gov">citymanager@eastport-me.gov</a> (207) 853-2300</p>	<ul style="list-style-type: none"><li>• Organizing homeowners or businesses to participate in weatherization programs.</li><li>• Organizing broader community meetings about energy issues.</li><li>• Engaging with microgrid partners and/or Efficiency Maine.</li><li>• Providing local perspectives to entities from outside of Eastport.</li><li>• Grant writing to support local energy projects.</li></ul>



# Thank You

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