CITY OF
BAINBRIDGE ISLAND

Climate Change Advisory Committee
Regular Meeting
January 17, 2024
5:30 PM
Council Conference Room
280 Madison Avenue N
+ Zoom Webinar

The Climate Change Advisory Committee will hold this meeting
in person and using a virtual, Zoom webinar platform

Members of the public will be able to attend at City Hall
or by calling in to the Zoom webinar

Please click the link below to join the webinar:
https://bainbridgewa.zoom.us/j/91390380790
Or Telephone: 1-253-215-8782
Webinar ID: 913 9038 0790

**AGENDA**

5:30 Call meeting to Order/Roll Call/Accept of Modify Agenda/Conflict of Interest Disclosure

5:35 Public Comment

5:40 ETIPP building resilience with battery + solar storage on the island (ETIPP Team – see attached)

6:30 Climate Officer Updates (Autumn Salamack)
- Climate friendly tree/planting materials
- Heat pump pilot program proposals
- Update on EV charger grant application

6:50 Updates
- Dashboard (Subcommittee – see attached)
- March 23rd Home Electrification Expo (Kevin/Mike)

7:30 Adjourn

**Materials**
1. ETIPP slides
2. Dashboard

ENERGY TRANSITIONS INITIATIVE

U.S. Department of Energy

**Partnership Project**

# Bainbridge Island

January 17th, 2024

*Presentation to Climate Change Advisory Committee*

## Resilience



Pacific Northwest NATIONAL LABORATORY

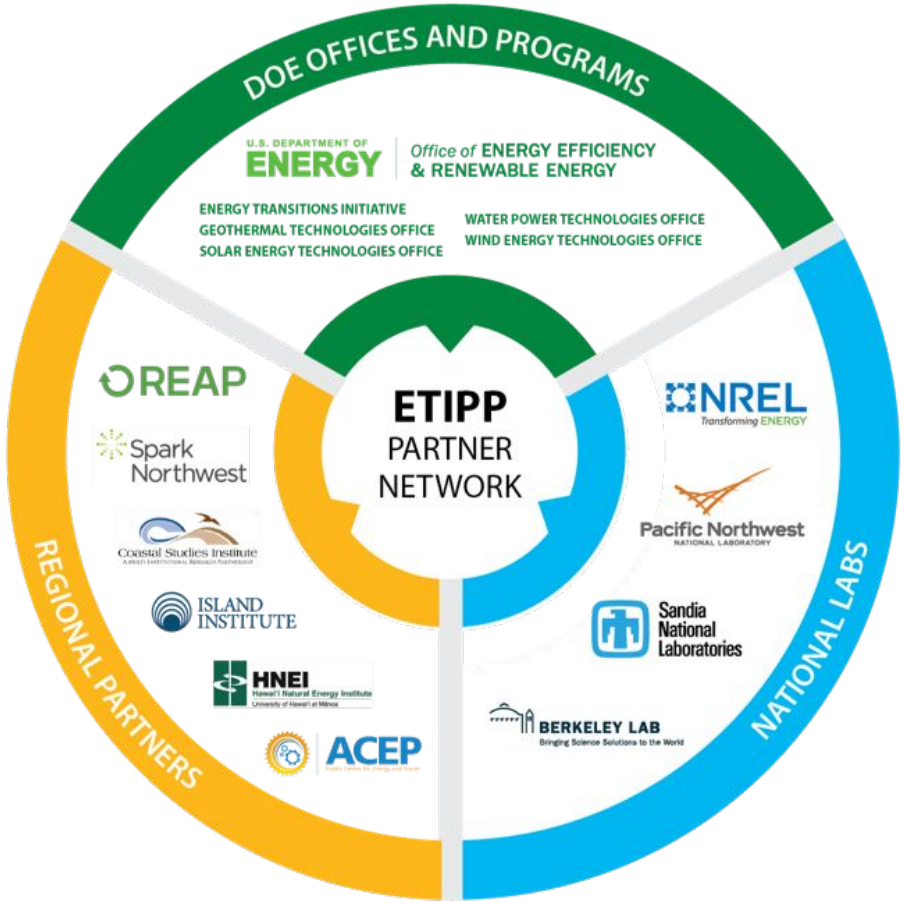
Spark Northwest

NREL NATIONAL RENEWABLE ENERGY LABORATORY

# City of Bainbridge Island Goals

- **100% Renewable Energy by 2040**
- **Increased Energy Resilience for Emergencies and Climate**

The ETIPP technical assistance will help Bainbridge Island meet these goals by analyzing pathways to 100% renewable energy and exploring and developing options for increasing energy resilience in the face of natural hazards.



# Resilience

DOE defines **energy resilience** as: “the ability … to withstand and rapidly recover from power outages and continue operating with electricity, heating, cooling, ventilation, and other energy-dependent services.” (https://www.energy.gov/eere/energy-resilience)

In contrast, DOE defines **reliability** as “the ability of a power system to withstand instability, uncontrolled events, cascading failures, or unanticipated loss of system components.” (https://www.energy.gov/eere/energy-reliability)

Reliability improvements focus on day-to-day power, while resilience improvements focus on big disruptions and emergencies, not necessarily improving day-to-day reliability.

# Resilience

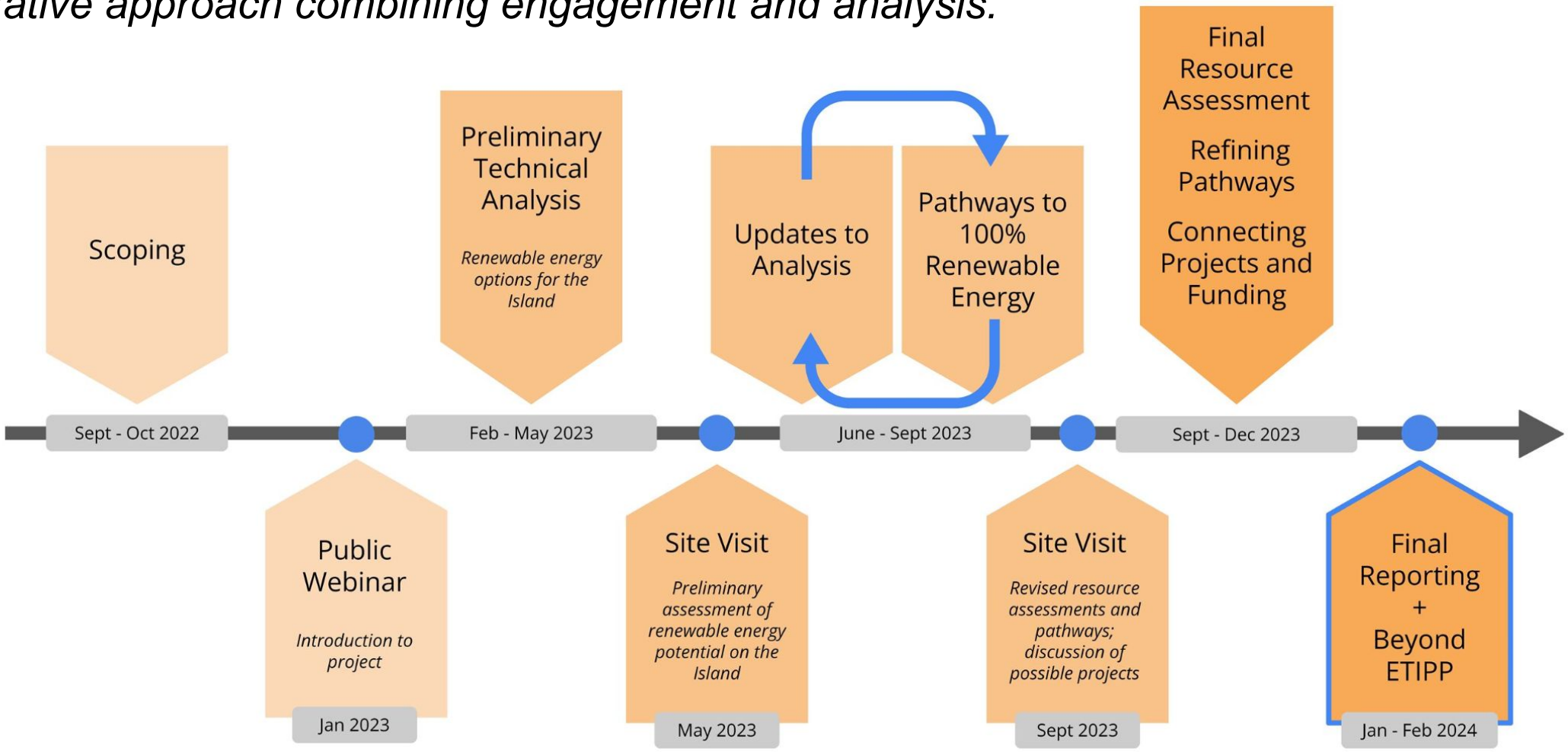
- Bainbridge Island has longer and more frequent outages than other PSE customers in Kitsap County, often due to tree-related events
  - primarily a reliability issue

- Resilience goals feature strongly in the Climate Action Plan, especially around emergency or disaster response to natural hazards
  - energy self-sufficiency for emergency preparedness as an island
  - energy infrastructure reliability in a changing climate
  - solar and storage at community disaster hubs

*Photos from May 31 ETIPP team site visit*

# Process and Timeline

*Iterative approach combining engagement and analysis.*



# Engaged Partners in ETIPP

- Bainbridge Island School District
- Bainbridge Prepares
- Bainbridge Island Fire Department
- Bainbridge Island Parks & Recreation
- Climate Change Advisory Committee
- Kitsap County Sewer District #7
- Puget Sound Energy
- Utility Advisory Committee
- Washington State Ferries
- Washington State Department of Transportation

More information is available on the City of Bainbridge Island ETIPP Website: https://www.bainbridgewa.gov/1431/2023-ETIPP-Renewable-Energy-Program

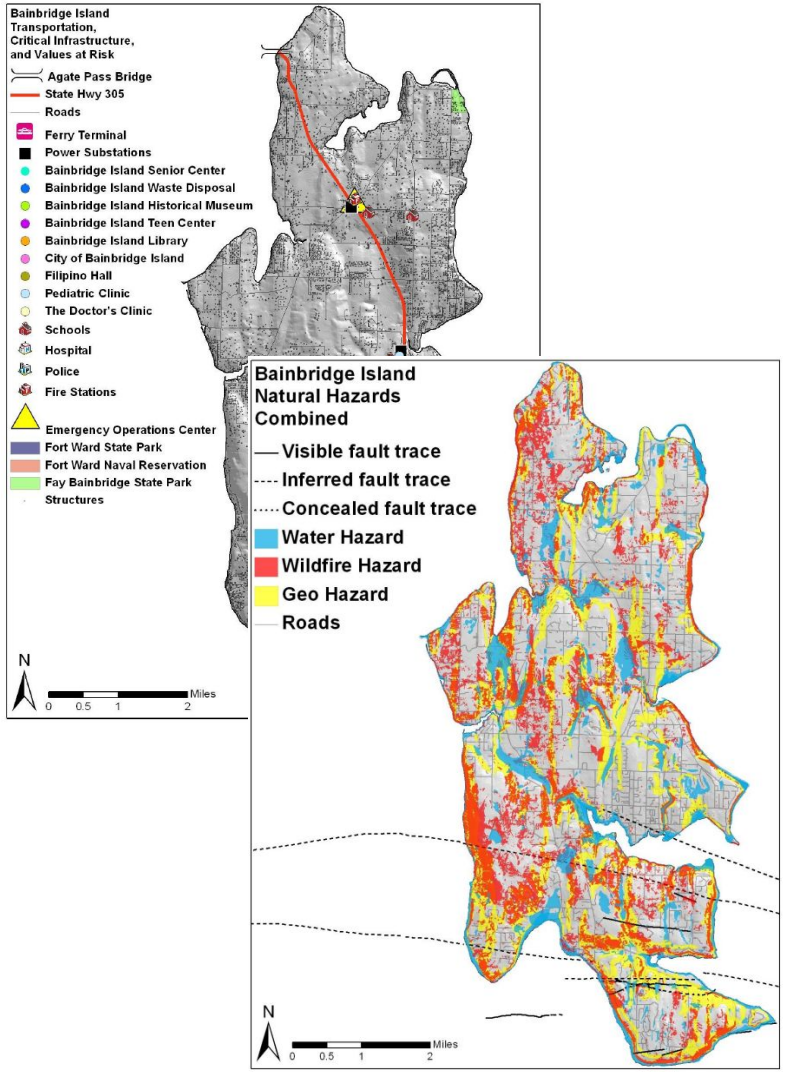
# Improving Resilience:
# Critical Energy Infrastructure and Vulnerabilities Analysis

ENERGY TRANSITIONS INITIATIVE
PARTNERSHIP PROJECT

OFFICE OF STRATEGIC PROGRAMS | SOLAR ENERGY TECHNOLOGIES OFFICE | WATER POWER TECHNOLOGIES OFFICE | OFFICE OF ELECTRICITY

# Approach

1. Identify critical energy infrastructure locations and characterize energy needs
2. Spatial overlap with hazards
3. Assess risk
4. Identify priority sites
5. Make recommendations




*2012 BI Hazard Identification and Vulnerability Analysis*

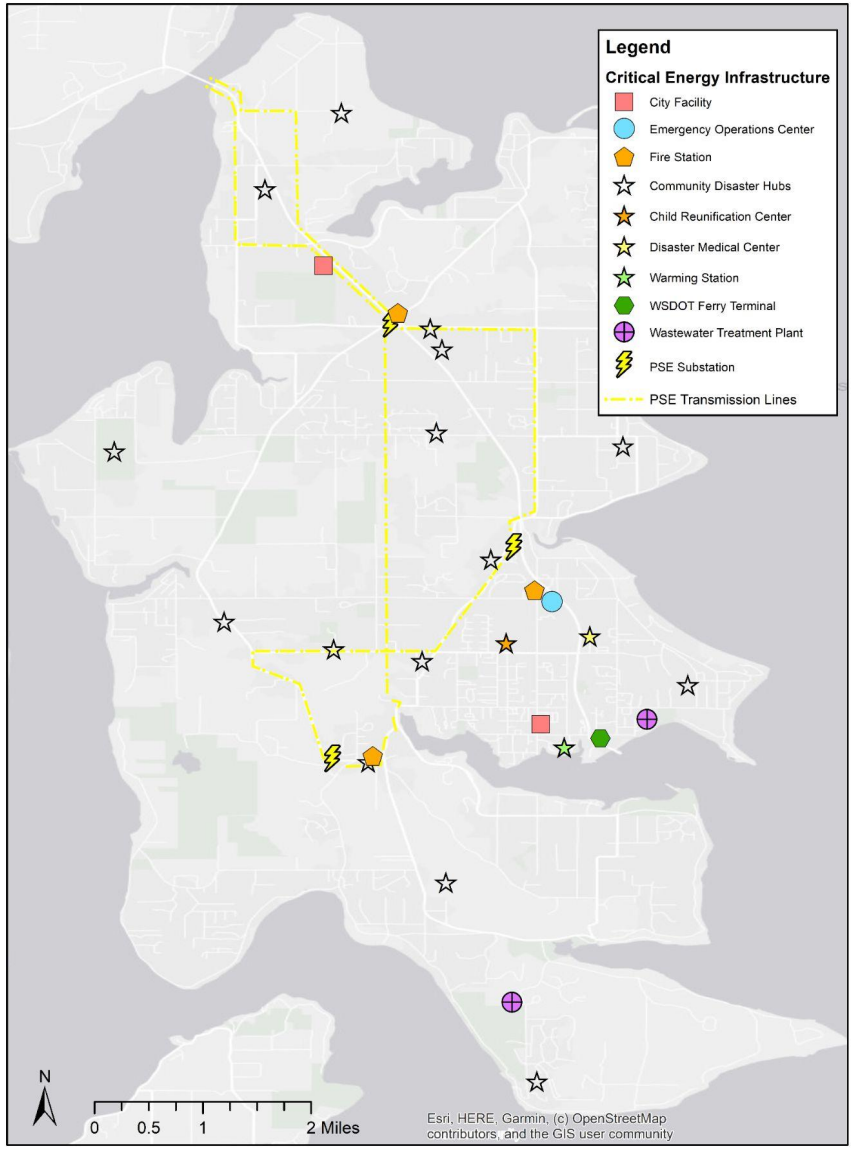
# List of Critical Energy Infrastructure

***Critical energy infrastructure*** *is defined as systems or facilities that provide a necessary energy function, and are essential to have operational for normal, day-to-day activities as well as in an emergency or natural disaster.*

- PSE Substations and Transmission Lines
- Community Disaster Hubs
- Ted Spearman Justice Center (new police/court building and Emergency Operations Center)
- Public Works O&M Yard (including charging stations for City fleet EVs)
- Winslow Wastewater Treatment Plant
- Kitsap County Sewer District #7 Wastewater Treatment Plant
- Winslow Ferry Terminal
- City Hall
- Fire Stations 21, 22, 23

**Total: 33 locations**

# Characterizing Critical Energy Infrastructure




- Annual consumption (from past data or estimated)
- Estimate daily emergency consumption, based on 50% of normal building power usage is required

## Sample Locations and Energy Needs
## (for Emergency Operations)

**Senior Center**

Single story, 6,545 square feet. Power currently provided by PSE, 400 Amps 120/240V 1 phase 3 wire. 2 electrical panels connected to the existing propane backup generator. 5kW PV system was installed on roof in 2014. Serves as warming and cooling station and disaster hub. ~75,000 kWh annual consumption in 2018.

*Estimate:* 103 kWh/day for emergency operations.

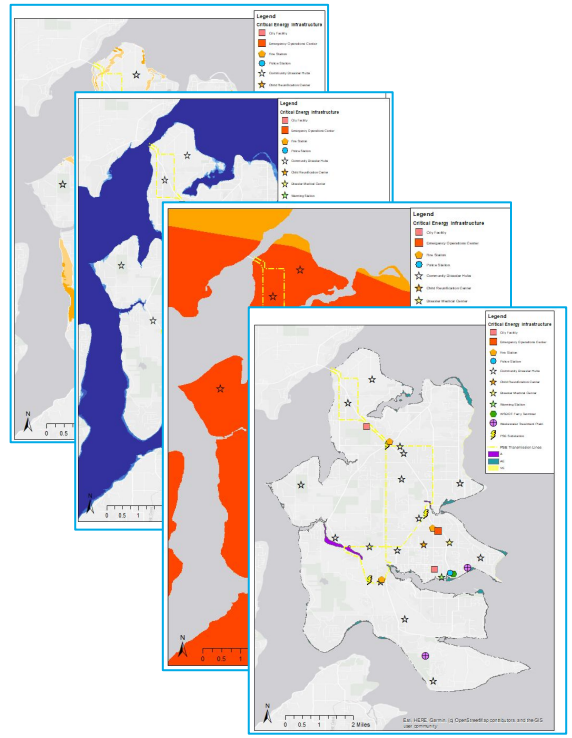
**Winslow Wastewater Treatment Plant**

Treats 150 million gallons of wastewater per year. All operations required 24/7 and currently supported by an automatically operated 500kW diesel generator located onsite as well as additional generators throughout infrastructure system. A Wastewater Treatment Facilities Operation and Maintenance Manual (updated in 2020) exists with plans for many hazards. ~780,000 kWh annual consumption in 2019.

*Estimate:* minimum 1,068 kWh/day for emergency operations, likely closer to 2,136 kWh/day.

# Identifying and Mapping Hazards

- Severe storm
- Flood
- Sea level rise
- Tsunami
- Earthquake
- Erosion, landslide
- Wildfire
- Extreme temperatures
- Terrorism, vandalism

*Information from previous studies + compiled current GIS layers*

# Assessing Risk

Chance of hazard occurring at location *(High, Moderate, Low)*

Susceptibility of energy infrastructure to harm/damage from occurrence *(High, Moderate, Low)*

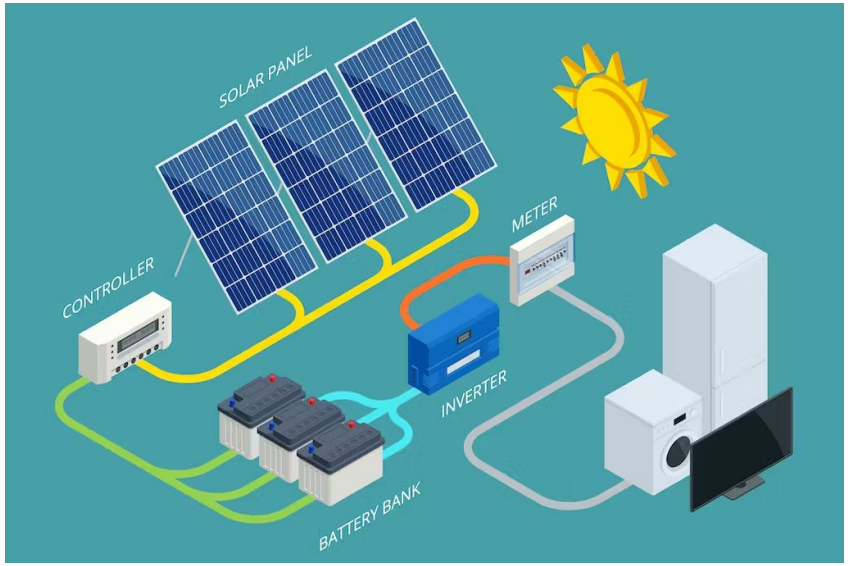
Severity of harm/damage *(High, Moderate, Low)*

Probability
Vulnerability
Consequence

| Location | Hazard(s) | Probability | Vulnerability | Consequence | Risk |
|---|---|---|---|---|---|
| Winslow Wastewater Treatment Plant | Flood | High - 1% annual | Low - 13 emergency generators | High | Moderate |
| | Sea Level Rise | High - partially inundated with 1ft rise by 2060 | High - flooding mitigated with generators, but long term submersion is not operationally feasible | High | High |
| | Earthquake | High | High - severe shaking intensity, damage predicted by WA DNR | High | High |
| | … | … | … | … | … |
| Senior Center | Extreme Temperatures | Moderate | Low - extreme temps on their own don't cause power outages, but timing is critical | High | Moderate |
| | Wildfire | Low | Moderate | Moderate | Moderate |
| | … | … | … | … | … |

# Typical Resilience Recommendations

- Undergrounding of transmission or distribution lines
- Installation of earthquake straps or retrofits
- Purchase of backup diesel or propane generator(s)
- Relocation of key facilities
- Programs to reduce peak demand
- Adding solar and/or battery storage
- Development of building or campus-scale microgrids

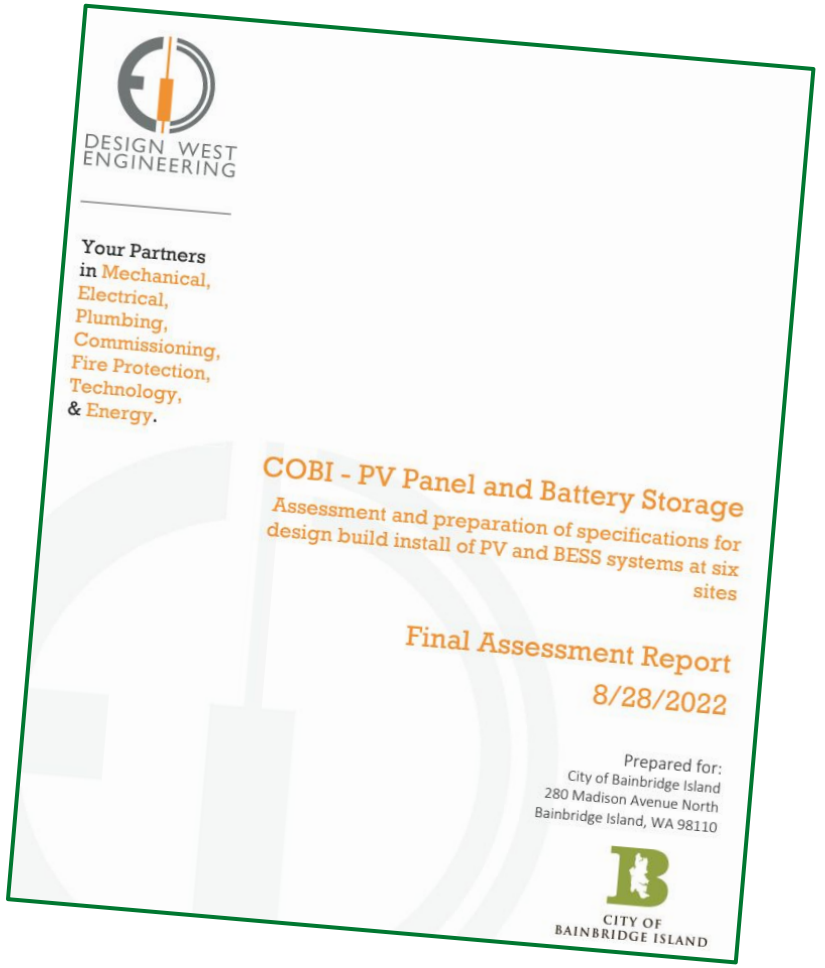



# Past PV and Storage Analysis

## Design West (2022)

Assessed 6 locations that are considered critical energy infrastructure for feasibility of additional PV installations, battery storage, and microgrid controls.

- Senior center → Additional PV only
- Recreation center → New rooftop PV, BESS in basketball court building
- Bloedel Reserve → New carport and rooftop PV, BESS at maintenance shed
- Battle Point Park → Not recommended due to infrastructure
- High School → Not recommended due to roof type
- Hyla Middle School → New PV and BESS (Yellow Building)



# More about Microgrids

**Definition**: small, campus-, small neighborhood- or building-scale (not full island or regional, as most outages occur on-island)

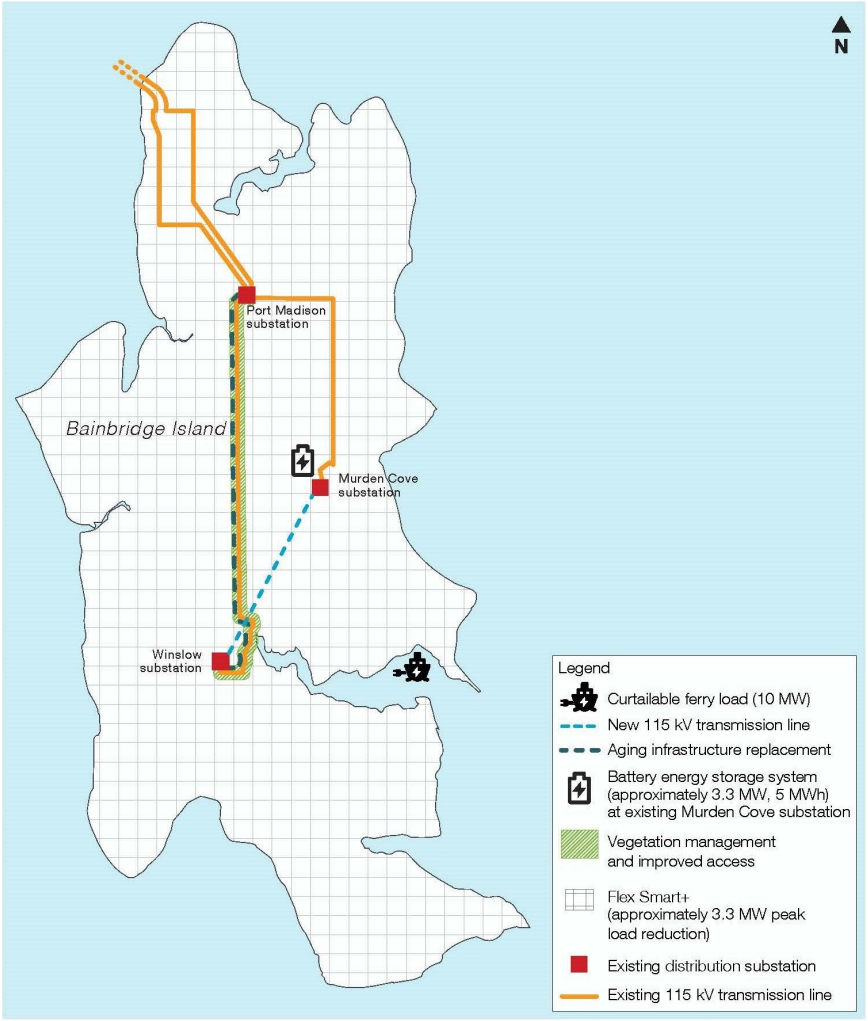
Typically include energy generation (renewables or fossil fuels), battery storage, controller to balance connected loads, backup generation, and ability to disconnect from the grid.

# Microgrid Analysis

- For sites that have been identified in critical infrastructure and vulnerability analysis that could increase resilience with a microgrid:
  - A high level solar assessment will be conducted for the sites to determine the area available for rooftop / ground-mount / carport solar.
  - NREL's REopt tool will be used to estimate the combination of solar, energy storage, and backup generation required to survive a specified grid outage (3 days, 1 week, 2 weeks), given the amount of available space for solar.
- At the very least, this analysis would require annual electricity consumption for the building / site. Ideally, hourly electricity consumption would used.

# Future Outlook: PSE's Battery

- PSE is planning on installing a 3.3 MW battery energy storage system (BESS) in existing Murden Cove Substation Site, scheduled for 2025/2026. The BESS will deliver energy for a short time when demand for power is high, reducing peak demand while allowing customers to keep using electricity as normal
- Future work could investigate connecting the BESS to critical infrastructure to provide backup power during an outage.
- We are acknowledging potential resilience applications but are not conducting analysis utilizing the battery.




NOTE: Locations of potential infrastructure to be determined.
Map elements are not to scale and locations are approximate.

PUGET SOUND ENERGY 08/19

https://psebainbridge.com/battery-energy-storage-system-bess/

# Next Steps for Resilience

- ✓ Finish energy characterizations
- ✓ Identify high risk locations
- Identify priority resilience investments for relevant hazards
  - Considering microgrid analysis
  - Identifying additional specific analyses needed
- Cross checking with recently implemented or planned improvements
- Incorporating feedback from COBI, CCAC
- Documenting in report and providing available GIS layers

**Timeline:** Resilience report, Pathways report, and GIS file will be delivered to COBI for comments mid-February 2024 and finalized by the end of March 2024.

# Summary

- **Various natural hazards exist on Bainbridge Island that need to be considered in planning for resilience and siting new renewables.**
- **Risk is assessed considering probability of hazards, vulnerability at locations, and consequences of occurrence.**
- **A preliminary list of the most high risk critical energy infrastructure on Bainbridge Island has been identified (and will be shared in full report once validated).**
- **Resilience actions to address these risks will be identified for specific locations (and will be shared in full report).**
  - COBI has the most influence on city facilities, public buildings, and community disaster hubs
  - PSE has been working on reliability and capacity upgrades to their own system infrastructure
- **Future analyses will also be identified.**

ENERGY TRANSITIONS INITIATIVE
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Partnership Project

Bainbridge Island

# Questions / Discussion

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# BI CAP Dashboard (1/9/24)

Goal: Foster public transparency by developing clear, concise, and easy to use information that enables the Community to evaluate the progress in meeting the goals of the BI Climate Action Plan.

## Criteria for Selecting Goals/Metrics for Dashboard

1. Relevance: Is the goal/metric relevant to evaluating progress in achieving the goals of CAP?
2. Decision Making: Would the goal/metric assist in decision making?
3. Quality of Data: Is the data of high quality (e.g., QA/QC has been conducted)?
4. Understandable: Is the goal/metric easy to understand?
5. Cost: Is there a cost for obtaining the data for the goal/metric?
6. Staff Effort: What is the level of effort for staff to track and update the goal/metric?

## Questions

1. What goals in the table below should be added for consideration?
2. What is the ideal number of goals/metrics to display on dashboard (e.g., 5-6)?
3. Should we have a goal/metric for each of the major sections of the CAP on the Dashboard (Energy, Buildings, Transportation, Waste, Natural Envionment, and Public Engagement)?
4. Do we engage the public in determining which goals/metrics to use in the Dashboard and how would we do that?
5. What platform would we use, and would we need to contract out the development of the Dashboard?

## Possible CAP Goals/Metrics for Dashboard

| Goal/Metric | Criteria to Select Goals to Include on Dashboard (1-5 scale 5 better) | | | | | |
|---|---|---|---|---|---|---|
| | Relevance | Decision Making | Quality of Data | Understandable | Cost | Staff Effort |
| Overall | | | | | | |
| Reduce GHG gas emissions by 90% by 2045 compared to 2014 levels with interim milestones of 25% reduction by 2025 and 60% by 2035 compared to 2014 levels. | | | | | | |
| GHG emissions per capita (no goal in CAP) | | | | | | |
| Energy | | | | | | |

| Goal/Metric | Criteria to Select Goals to Include on Dashboard (1-5 scale 5 better) | | | | | |
|---|---|---|---|---|---|---|
| | Relevance | Decision Making | Quality of Data | Understandable | Cost | Staff Effort |
| By 2040, all of Bainbridge Island's sources of electricity are carbon-free. | | | | | | |
| By 2023, half of the Bainbridge Prepares disaster hubs have installed 6-20kW solar arrays and storage for resilience | | | | | | |
| % Energy from Renewables (no goal in CAP) | | | | | | |
| Buildings | | | | | | |
| By 2025, COBI will complete an analysis, conduct public outreach activities, and identify those properties at highest risk from sea level rise impacts over the next 50 years. | | | | | | |
| By 2021, COBI has adopted green building standards and practices for all new municipal, residential, commercial, and industrial buildings, including affordable housing and all renovations and additions of a certain size. | | | | | | |
| Percent of high performance/green buildings (no goal in CAP) | | | | | | |
| Percent of buildings with solar or heat pumps (no goal in CAP) | | | | | | |
| Percent of building wit high density development (no goal in CAP) | | | | | | |
| Transportation | | | | | | |
| By 2030, reduce VMT per capita by 25% (currently 3,000 VMT/capita), and by 50% by 2045 | | | | | | |
| By 2030, increase the mode share of active transportation (biking and walking) to 25%, and to 50% by 2045. | | | | | | |

| Goal/Metric | Criteria to Select Goals to Include on Dashboard (1-5 scale 5 better) | | | | | |
|---|---|---|---|---|---|---|
| | Relevance | Decision Making | Quality of Data | Understandable | Cost | Staff Effort |
| By 2030, increase the mode share of public transit to 5% (currently 2%) and to 10% by 2045. | | | | | | |
| By 2030, transition COBI's fleet to 75% electric vehicles and the remainder to biofuels. | | | | | | |
| By 2045, 80% of registered vehicles on Bainbridge Island will be either electric vehicles or plug-in hybrid electric vehicles. | | | | | | |
| Number of people teleworking (no goal CAP, from Fehrs and Peers Study) | | | | | | |
| Number of people with electric bikes (no goal in CAP from Fehrs and Peers Study). | | | | | | |
| Natural Environment | | | | | | |
| By 2023, COBI will adopt a Groundwater Management Plan that accounts for climate change in its projections, policies, and guidance. | | | | | | |
| Waste | | | | | | |
| By 2025, COBI develops a requirement for the diversion of all food waste from the landfill. | | | | | | |
| By 2030, Bainbridge has a closed-loop system for its green and agricultural waste, such that organic materials are recycled and reused on Island to the maximum extent practicable. | | | | | | |
| Community Engagement | | | | | | |
| | | | | | | |

Comparison of Different Cities Dashboards

| Metric | DC | Issaquah | Boulder | San Jose | Redmond | Fairfax |
|---|---|---|---|---|---|---|
| Overall | | | | | | |
| GHG Emissions Reduction by Source/Sector/City/Community | Yes | Yes | Yes | Yes | Yes | Yes |
| GHG Emissions per capita | | | Yes | | | |
| Drivers of GHG Emissions Reductions | Yes | | | | | |
| Land Use/Density | Yes | | Yes | Yes | Developing | |
| Energy/Buildings | | | | | | |
| Energy Consumption | Yes | Yes | | Yes | Yes | Yes |
| High Performance/Green Building | Yes | | Yes | | | Yes |
| Renewables as % Energy Consumption | Yes | | Yes | Yes | | |
| Energy Efficiency | | | | | | Yes |
| Solar | | | | Yes | | |
| Natural Gas/Propane use | | | | | Yes | |
| Transportation | | | | | | |
| EV Ownership | Yes | | | Yes | Developing | Yes |
| EV Charging Stations | Yes | | Yes | | Developing | |
| Mode Share | | Yes | | | Developing | |
| Walking and biking | | | Yes | Yes | Developing | |
| Public Transit | | | | Yes | Developing | |
| Vehicles Mile Traveled | Yes | | | | Developing | Yes |
| Telework | Yes | | | | Developing | |
| Homes and Jobs near transit | | | | Yes | Developing | |
| Waste/Natural Environmental | | | | | | |
| Recycling Rate | Yes | | | | | Yes |
| Waste Diverted from Landfill | Yes | Yes | Yes | | Yes | Yes |
| % Tree Canopy | | Yes | Yes | | Yes | |
| Water Use | | | | Yes | | |

| Metric | DC | Issaquah | Boulder | San Jose | Redmond | Fairfax |
|---|---|---|---|---|---|---|
| Adaptation/Resilience | | | | | | |
| Emergency Services | | Yes | | | | |
| Buildings and Flooding | | | | | | Yes |
| Vulnerability to Infrastructure | | | | | | Yes |
| Cooling Centers | | | | | | Yes |
| Community Engagement | | | | | | |
| | | | | | | |