



**Hawaiian
Electric**

Wildfire Safety Briefing

Informational briefing to Senate Committees on Commerce and Consumer Protection (CPN), Public Safety and Intergovernmental and Military Affairs (PSM), and Energy, Economic Development, and Tourism (EET)

November 8, 2024

Key takeaways

- Wildfires are a societal and economic threat requiring many lines of defense: Utilities, first responders, landowners, government, public policy, individuals
- Hawaiian Electric will spend ~\$120M on wildfire safety this year and has reduced risk of ignition from its equipment by an estimated 60%
- Our Wildfire Safety Strategy currently under development for submission to the PUC aims to balance risk with cost and a long-term goal to reduce ignition risk by 80%
- The company/shareholders are taking responsibility for their share of the Maui litigation settlement – customers don't pay



Four key elements of our wildfire safety strategy



Foundational Work

Company-specific risk maps

Inspections

Vegetation management

Sparkless fuses

Lightning arresters



Operational Changes

Fast trip & block reclose

Relay upgrades

Public Safety Power Shutoff (PSPS)



Situational Awareness

Video cameras with AI

Weather stations

Fault current indicators



Grid Hardening

Wood pole replacements

Replacing copper with aluminum conductors

Covered conductor

Strategic undergrounding

~\$120 million budgeted for wildfire mitigation work in 2024

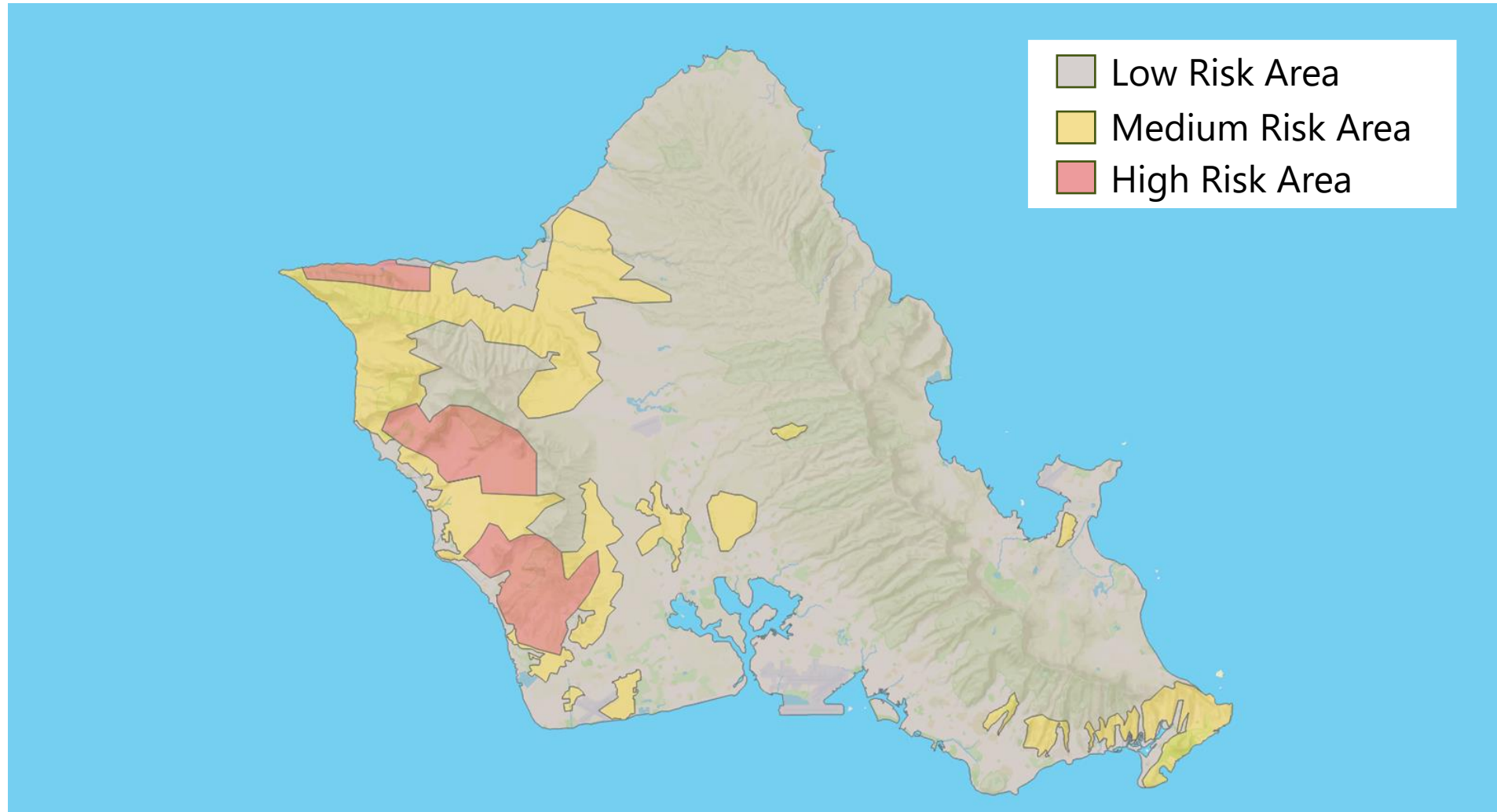


We are spending ~ \$120M in 2024 on wildfire mitigation work

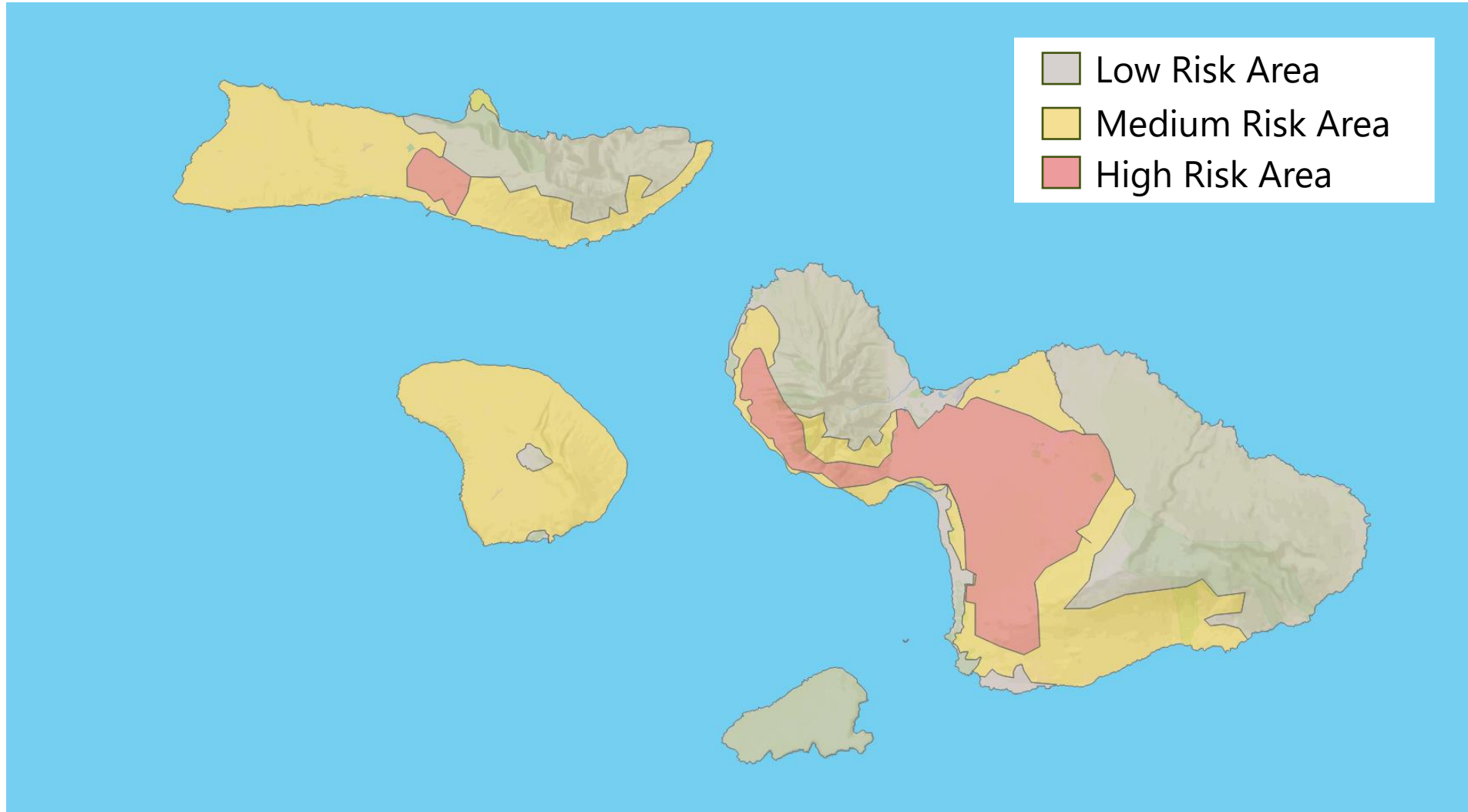
| Category | Initiative | 2024 Spend |
|------------------------------|--|------------|
| Foundational Work | Detailed Inspections of Distribution & Transmission Circuits | \$10.3 M |
| | Vegetation Management | \$6.3 M |
| | Fire-safe Fuses | \$8.6M |
| | New Lightning Arresters | \$2.3 M |
| Operational Changes | Substation Relay Settings Changes (Fast Trip) | \$0.8 M |
| | Distribution Relay Upgrades for Fast Trip | \$2.8 M |
| Situational Awareness | Single-phase Fault Current Indicators | \$3.1 M |
| | 360° High-definition Video Cameras w/ AI | \$2.7 M |
| | Weather Stations | \$1.1M |
| Hardening | Wood Pole Replacements & Upgrades | \$61.9 M |
| | Aluminum Reconductor Circuit Miles | \$12.5 M |
| | Smart Reclosers for PSPS circuits | \$1.3 M |
| | Pole testing | \$0.6M |



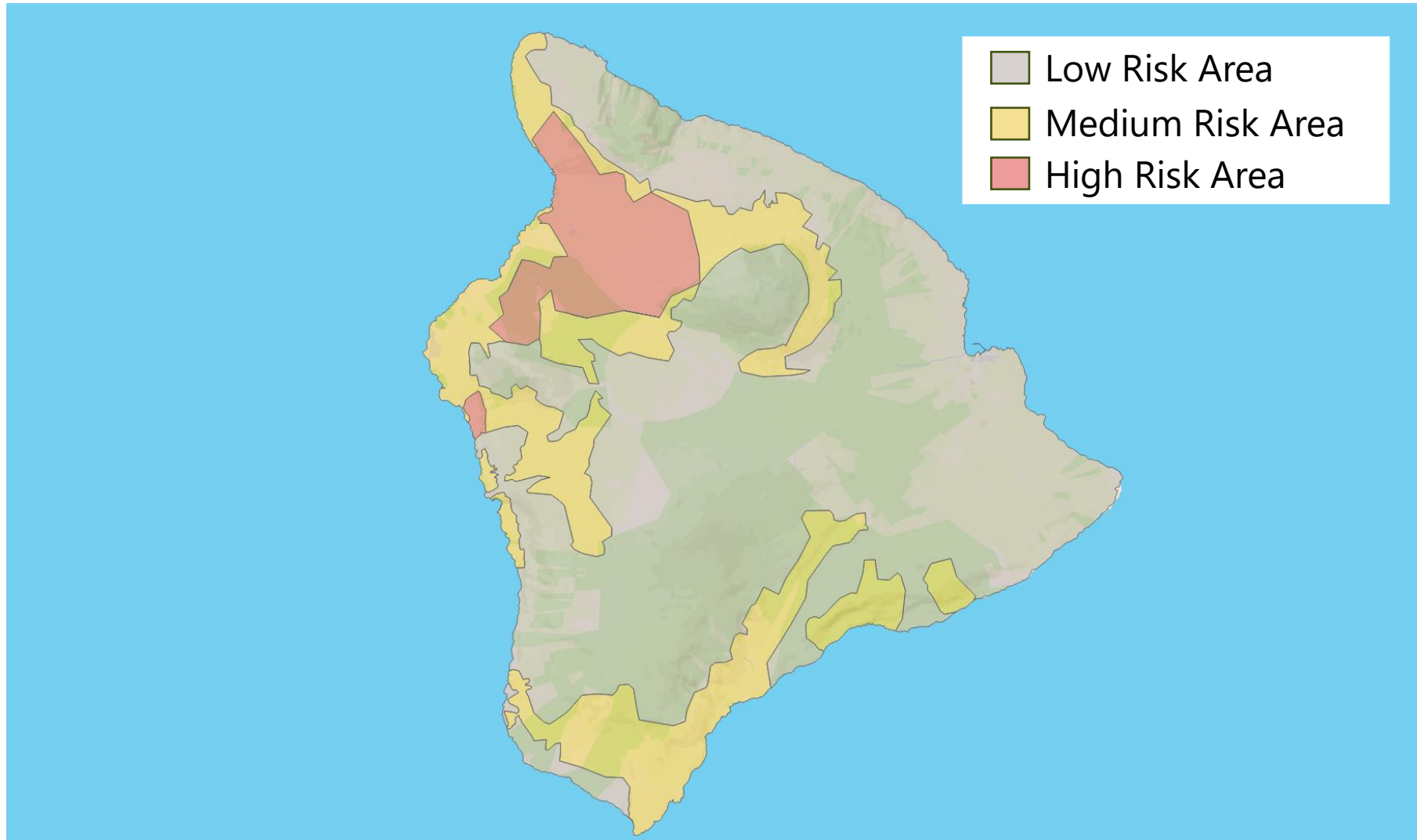
Wildfire risk maps based on utility equipment ignition potential



Wildfire risk maps based on utility equipment ignition potential



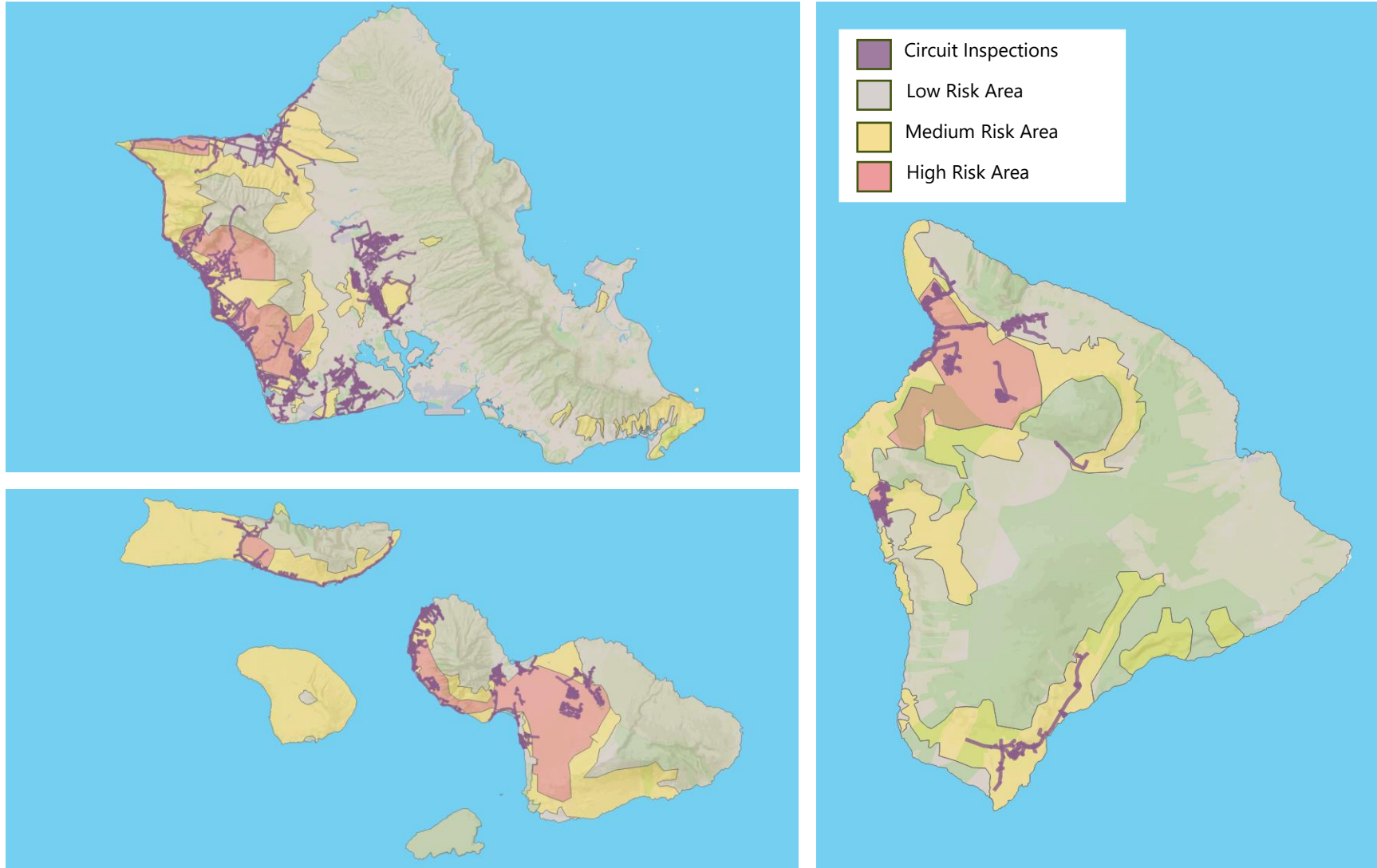
Wildfire risk maps based on utility equipment ignition potential



Inspections in high-risk areas prioritize mitigation, hardening work



Circuit inspections in higher risk areas first step in resilience work



Vegetation Management



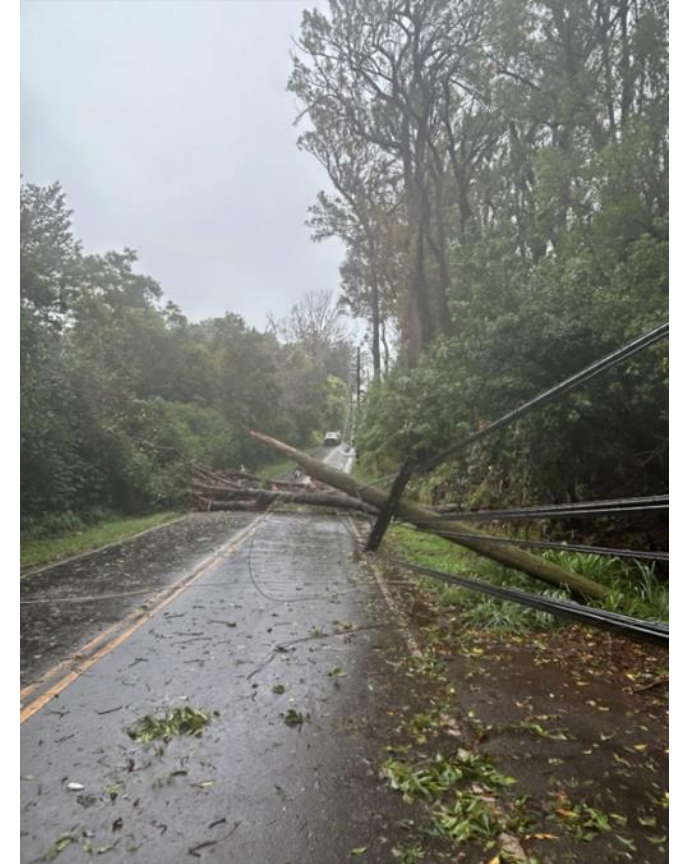
WILDFIRE SAFETY



Vegetation major safety, reliability issue



- Number 1 cause of outages during wind events
- Spent \$100M over the last 4 years
- Enhanced vegetation trimming effective in reducing wildfire ignitions and outages
- Partnerships (state, county, utilities, landowners) needed
- We can only trim within our easements and ROWs
- County and state rules do not give private utilities the right to trim on private property



Fire-safe Fuses and Lightning Arresters



Fire-Safe Fuses



| | 2023-24 | 2025 | 2026 | 2027 | 2025-2027 |
|------------------------------------|---------------|----------------|---------------|-------------|----------------|
| Incremental Fire-Safe Fuses | 3,534 | 7,791 | 1,380 | 0 | 9,171 |
| O'ahu | 1,000 | 2,629 | 0 | 0 | 2,629 |
| Maui County | 1,652 | 2,622 | 470 | 0 | 3,093 |
| Hawai'i Island | 882 | 2,540 | 910 | 0 | 3,450 |
| Costs | \$8.6M | \$36.2M | \$7.5M | \$0M | \$43.7M |

¹ All figures are budgetary estimates and subject to change based on the results of wildfire risk models, field visits, and input from key stakeholders

² Excludes 6 additional video camera station installations planned for Nov/Dec 2024 (O'ahu-3, Maui County-2, Hawai'i Island-1)



Lightning Arresters



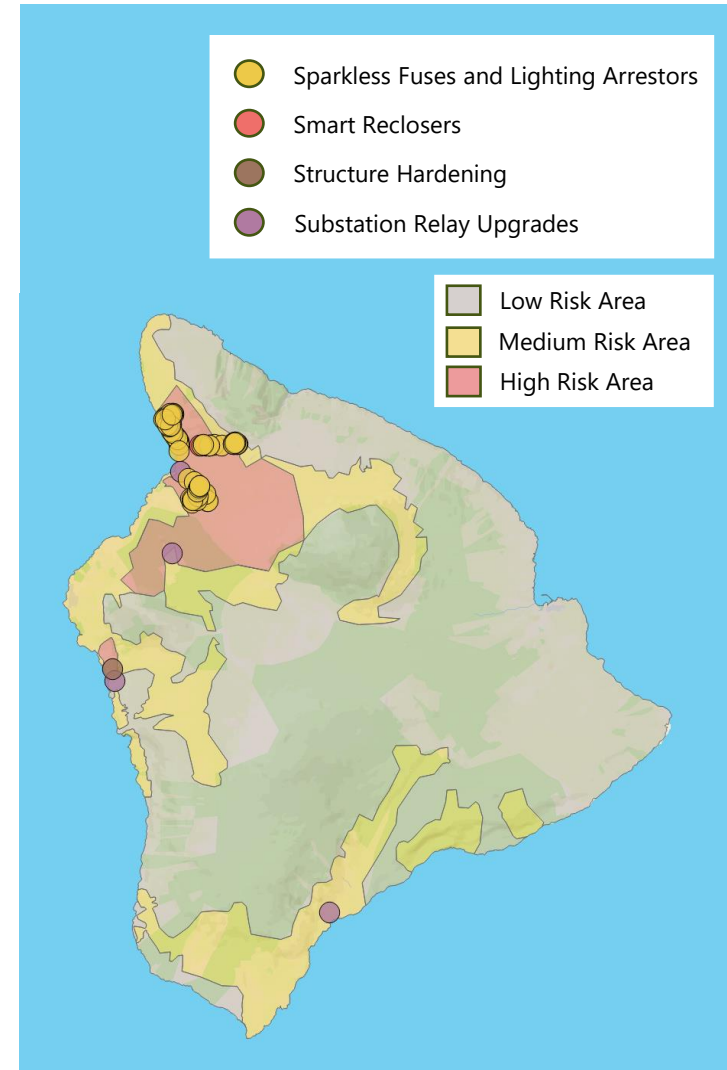
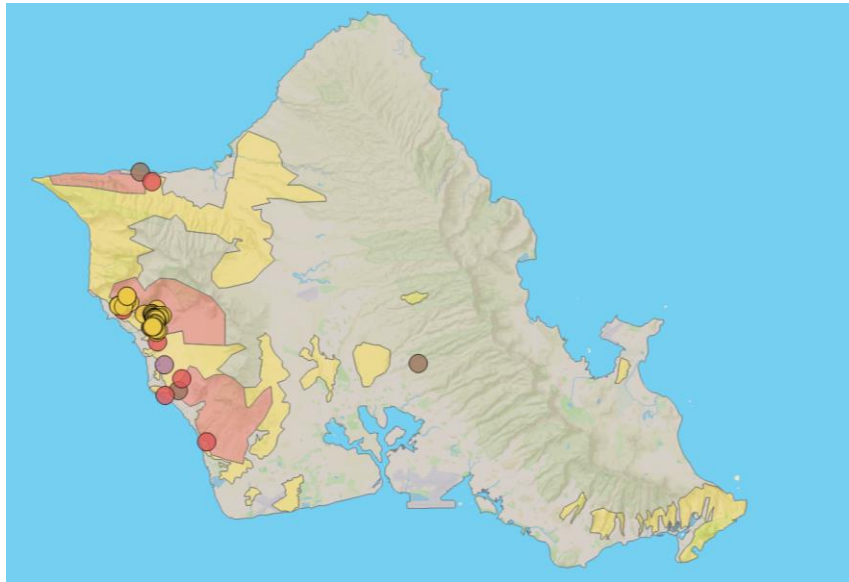
| | 2023-24 | 2025 | 2026 | 2027 | 2025-2027 |
|--|---------------|---------------|---------------|------------|---------------|
| Incremental Lightning Arresters | 1,071 | 1,477 | 22 | - | 1,499 |
| O'ahu | 482 | 500 | 0 | - | 50 |
| Maui County | 341 | 658 | 11 | - | 669 |
| Hawai'i Island | 248 | 565 | 11 | - | 576 |
| Costs | \$2.3M | \$7.2M | \$0.2M | \$M | \$7.4M |

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² Excludes 6 additional video camera station installations planned for Nov/Dec 2024 (O'ahu-3, Maui County-2, Hawai'i Island-1)



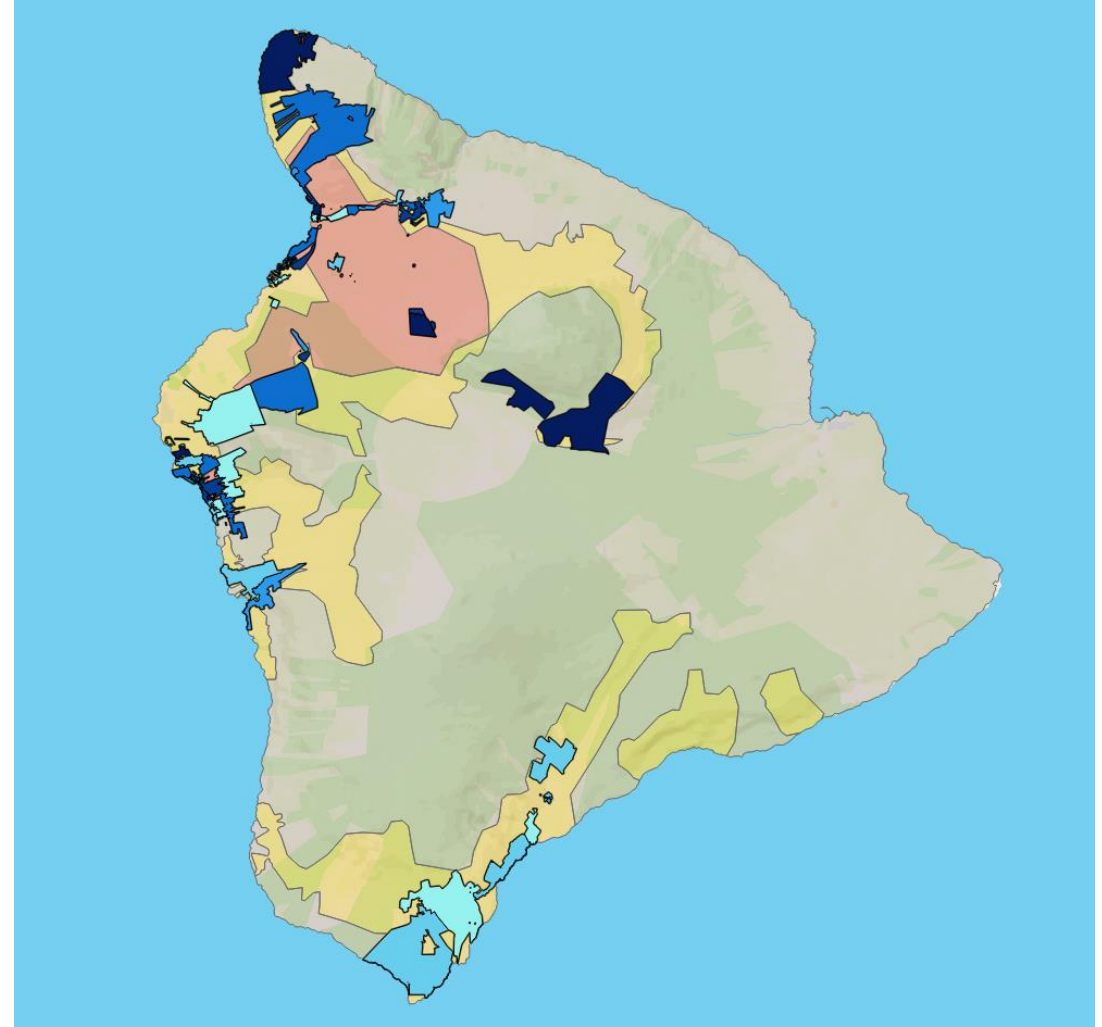
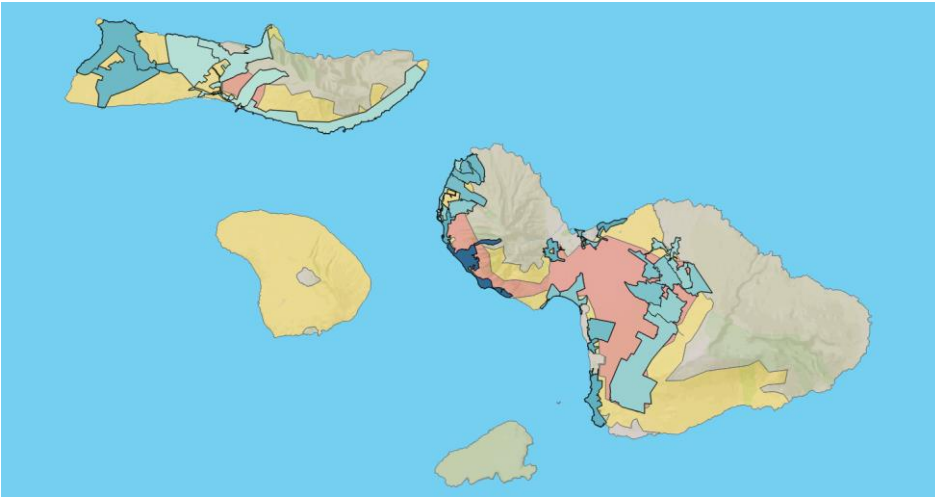
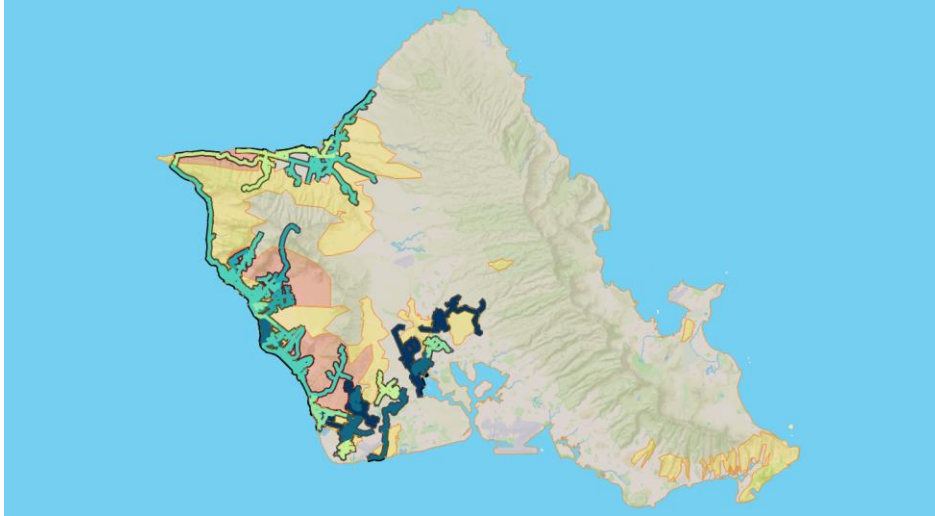
Additional firesafe equipment and upgrades in high-risk areas



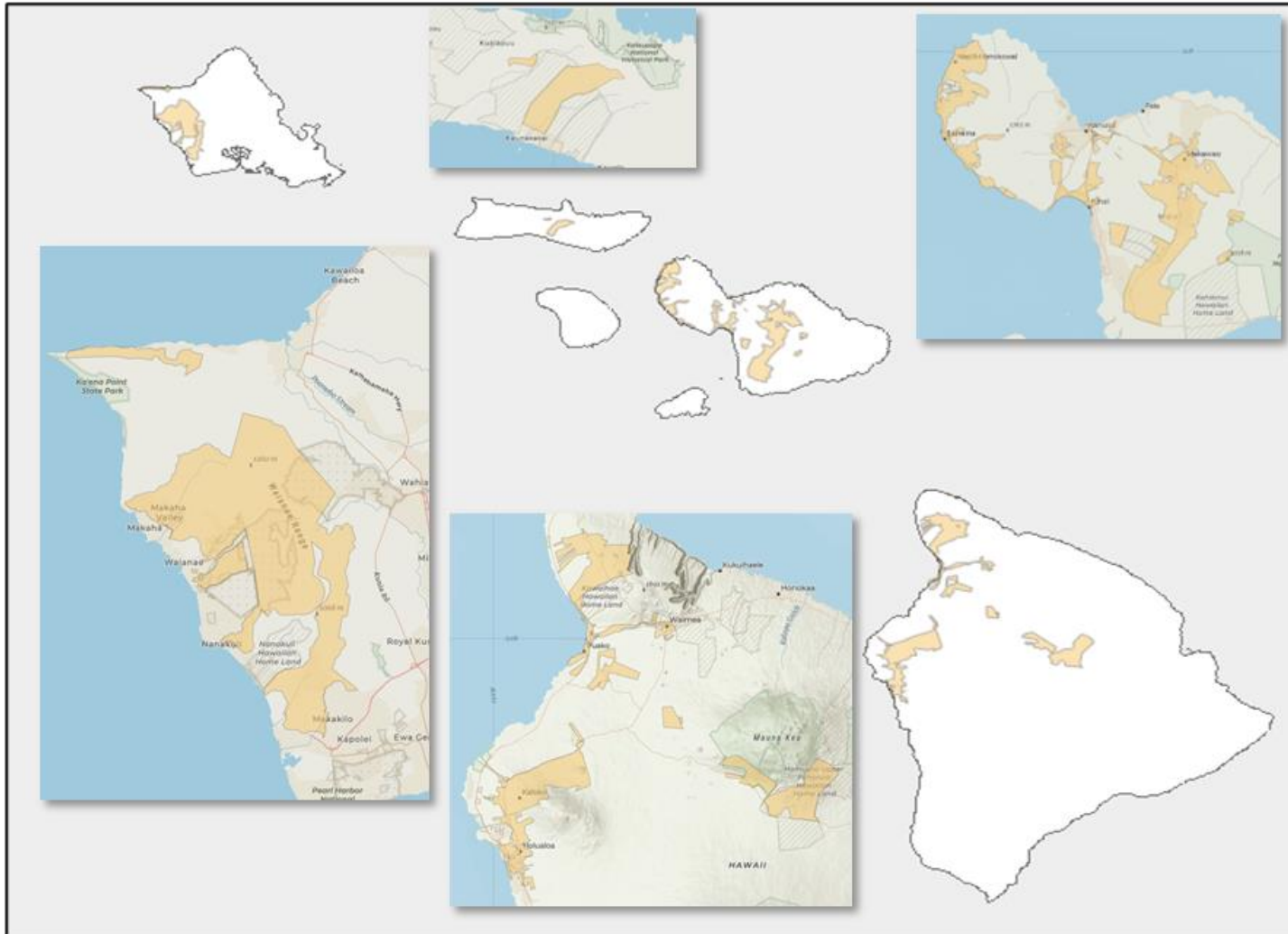
Fast Trip & Block Reclose



Fast trip & block reclose



Public Safety Power Shutoff Program operational since July 1



- Developed in coordination with state and county emergency agencies
- Over 60 community meetings across three counties held
- PSPS program includes the addition of cameras and weather stations to operationalize program
- Continuous improvement based on past activations and stakeholder feedback.



The 53 deployed weather stations provide real-time wind and humidity data to support our PSPS program

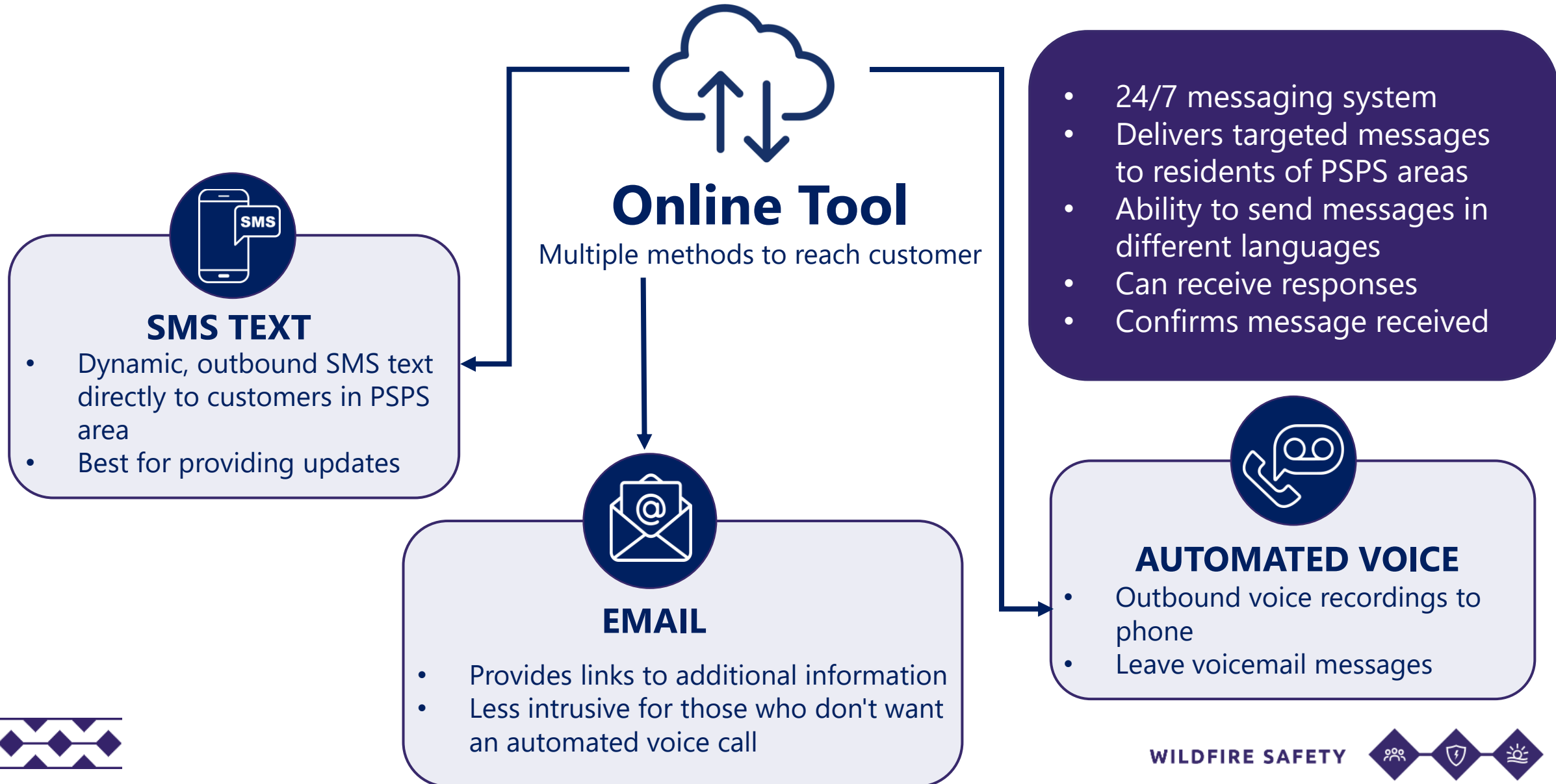


Illustrative (simplified) example of October 16th PSPS watch weather dashboard

| Circuit | Wind Gust (mph) | Humidity (%RH) | PSPS criteria met |
|-----------------|-----------------|----------------|-------------------|
| Kaheawa 2 | 51.67 | 60.34 | no |
| Kaheawa 1 | 51.67 | 60.34 | no |
| MPP-Lahainaluna | 51.67 | 60.34 | no |
| MPP-Kaheawa 1 | 51.67 | 60.34 | no |
| MPP-Kaheawa 2 | 51.67 | 60.34 | no |
| Waena-Pukalani | 41.36 | 44.47 | no |
| Waena-Kealahou | 41.36 | 44.47 | no |

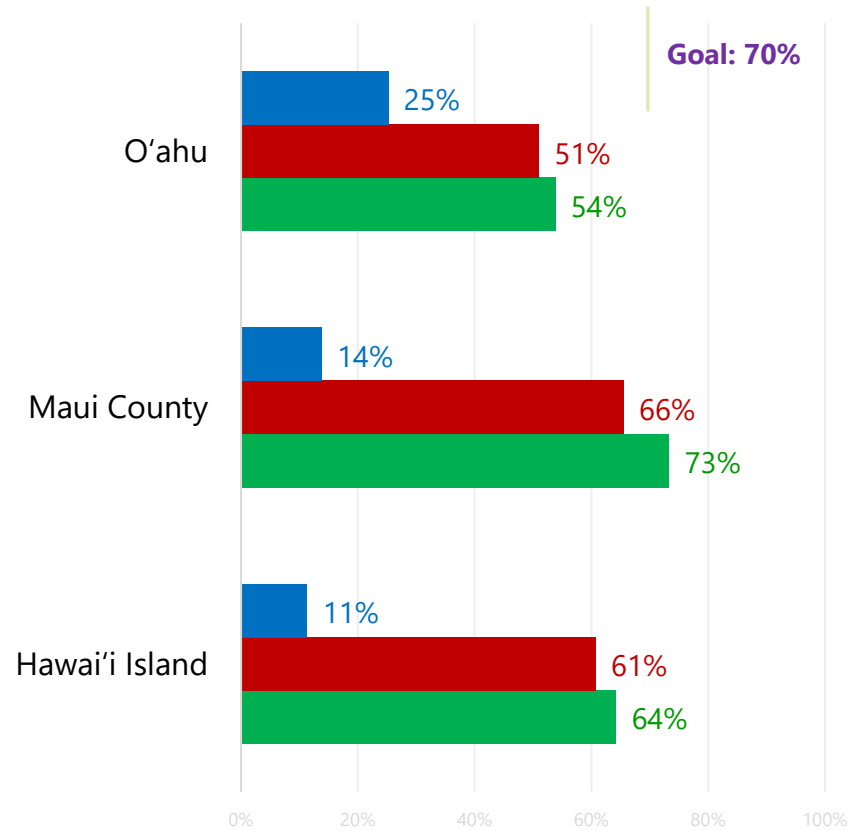


New Message Broadcast tool for PSPS notification



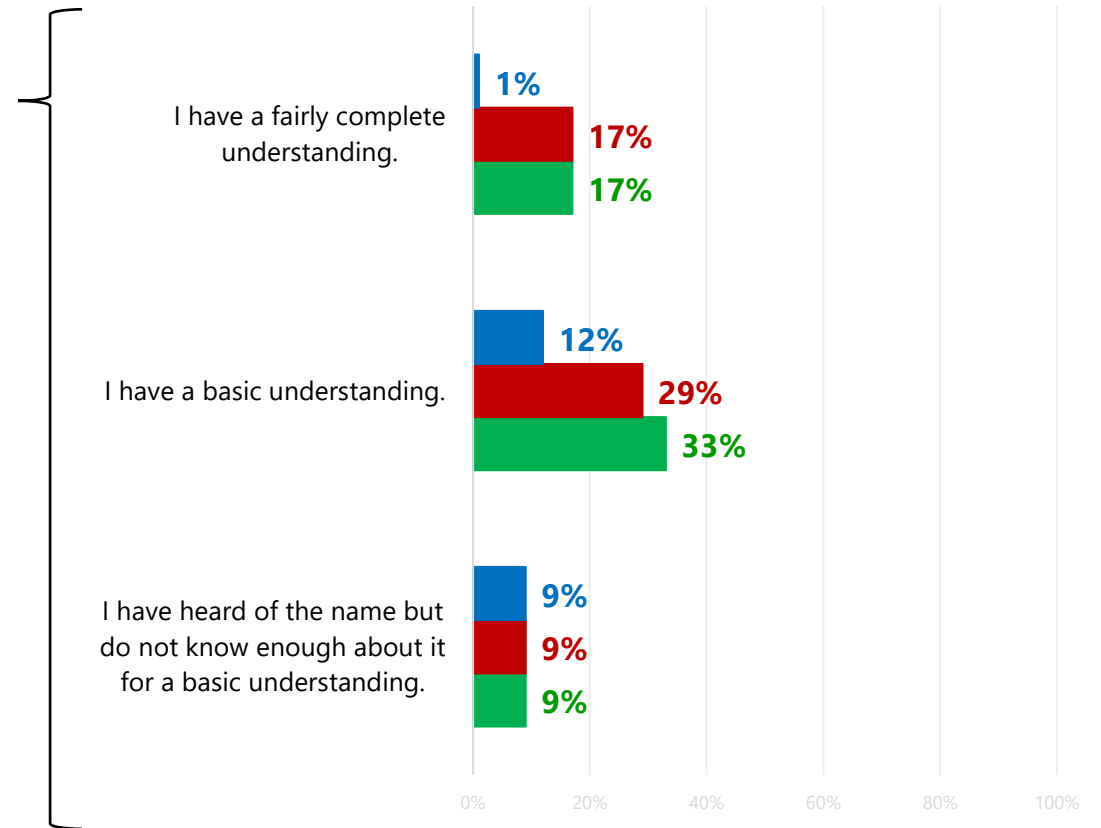
In 5 months, PSPS awareness has significantly increased; Communication work continues to expand level of public's understanding

Awareness of PSPS



May 2024
July 2024
October 2024

Level of Understanding



Sources: May 2024 baseline – Hawaiian Electric's Energy Panel Hawai'i (n=942)
July 2024 tracking – Escalent's Residential Benchmark (n=585)
October 1-14, 2024 tracking – Escalent's Residential Benchmark preliminary (n=274)

WILDFIRE SAFETY



Video Cameras with AI



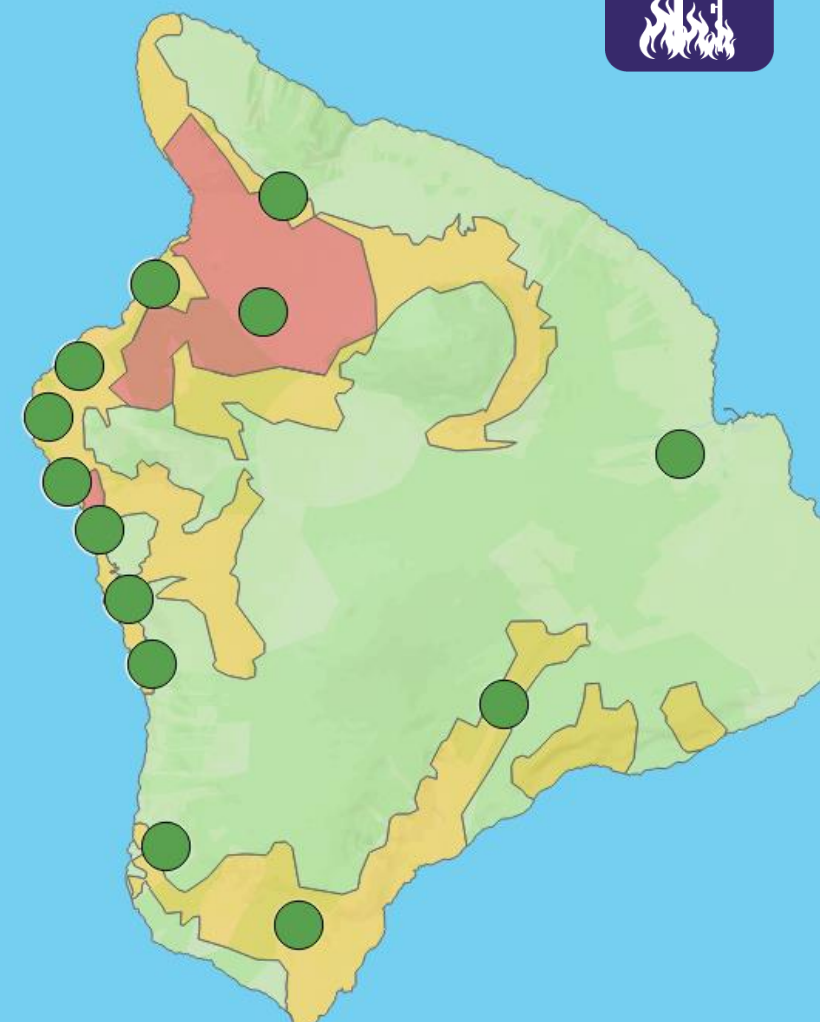
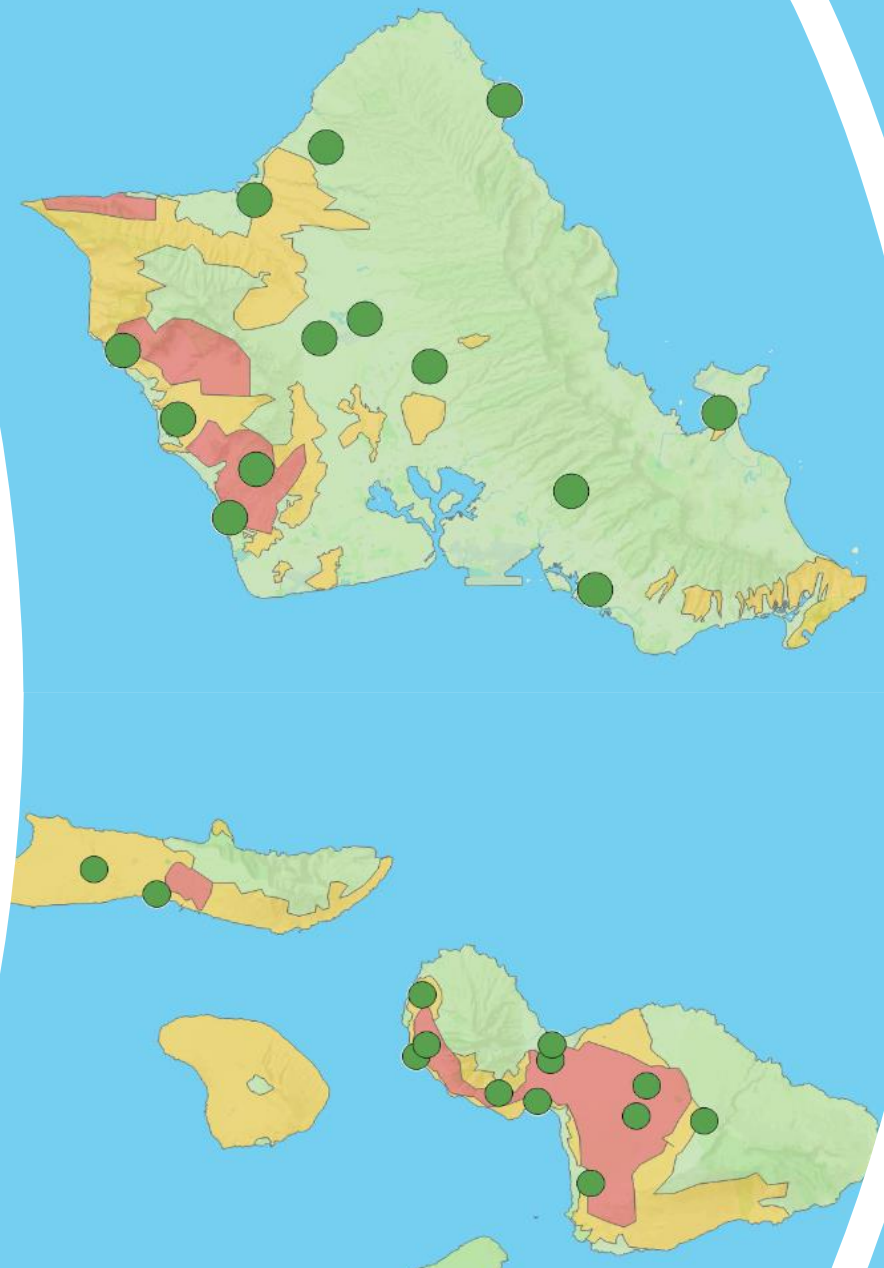
An ALERTWest anomaly has been detected approximately 1 miles NE of Kihei, Maui County, Hawaii.






Best Estimate Location**: 20.7705, -156.447872



**Video camera
deployments
provide early
detection of
ignitions of all
sources and
provides utility
operations real-
time situational
awareness**



-  Video Camera
-  Medium Risk Area
-  High Risk Area



"This system is a transformative asset for our islands, offering critical real-time data that protects lives, property, and natural resources." - Fire Chief Kazuo Todd, Hawaii County

Video Cameras – Live Feed (Click on image for live feed)



ALERTWest Lahainaluna 1 Search cameras All Cameras Active Cameras Menu Login

11/5/2024 16:15:05 HST

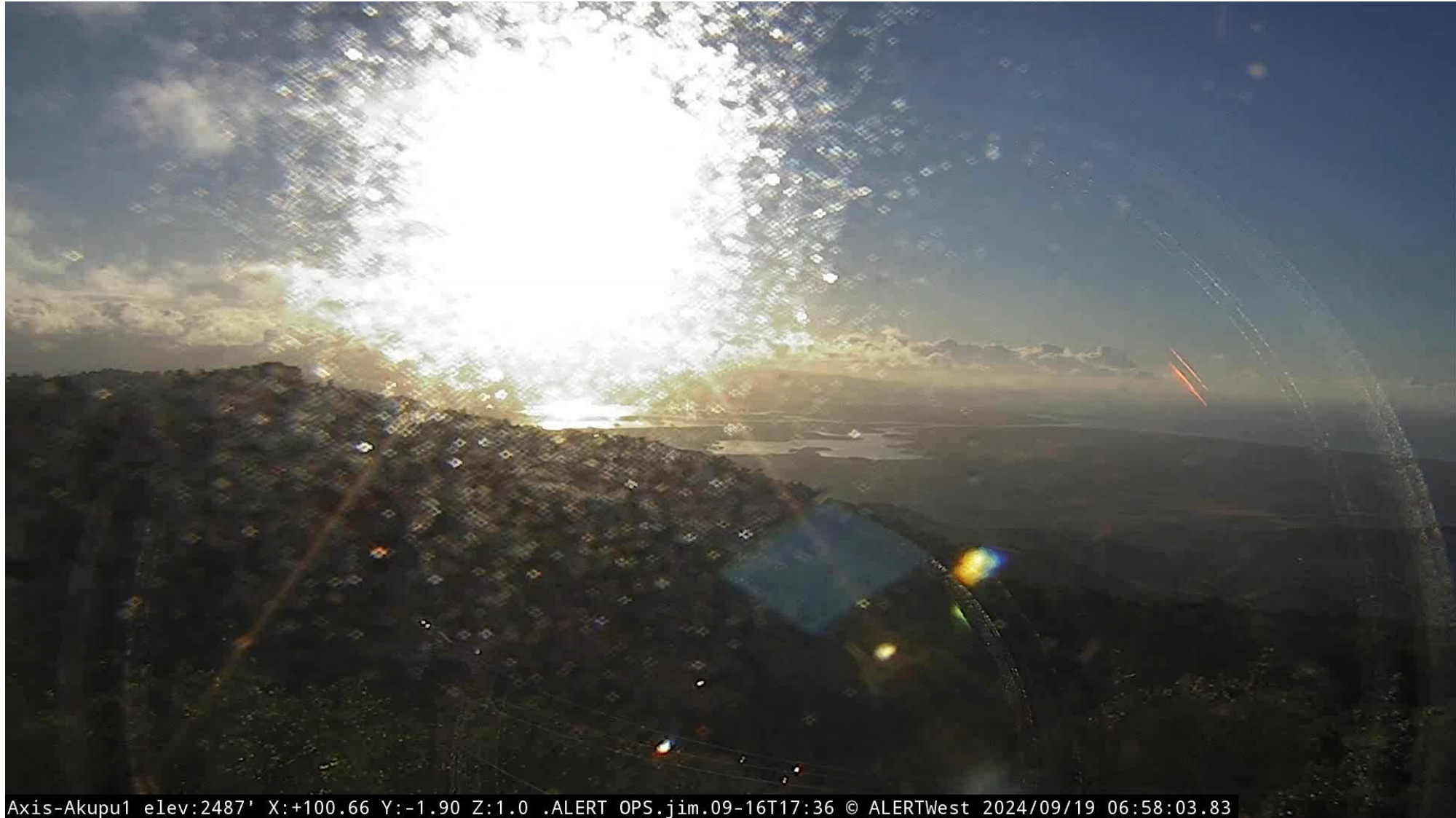
This camera is part of: ALERTWest

11/05/2024 16:15:07 HST 44s ago

5:47:49



Timelapse of ALERTWest-detected anomaly and HFD Response



Axis-Akupu1 elev:2487' X:+100.66 Y:-1.90 Z:1.0 .ALERT OPS.jim.09-16T17:36 © ALERTWest 2024/09/19 06:58:03.83



WILDFIRE SAFETY



Video Camera Stations¹

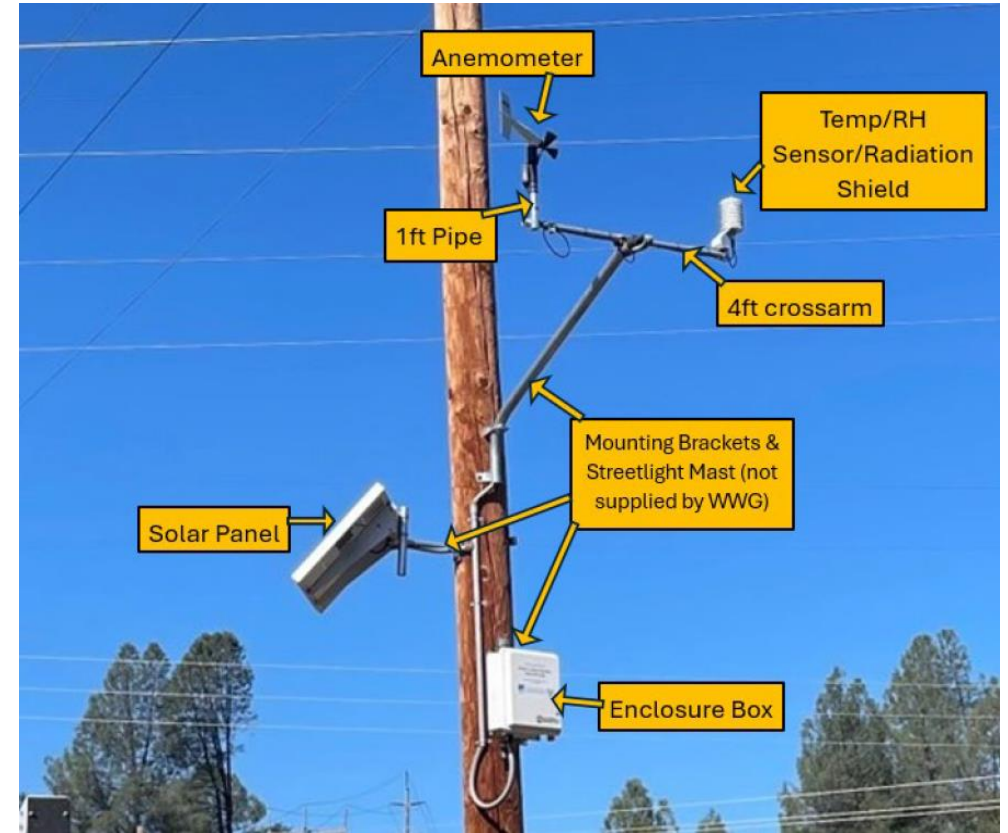


| | 2023-24 | 2025 | 2026 | 2027 | 2025-2027 |
|--|---------------|---------------|------|------|-------------|
| Incremental Video Camera Stations | 46 | 32 | - | - | 32 |
| O'ahu | 16 | 8 | - | - | 8 |
| Maui County | 16 | 11 | - | - | 11 |
| Hawai'i Island | 14 | 13 | - | - | 13 |
| Costs | \$2.7M | \$3.0M | - | - | \$3M |

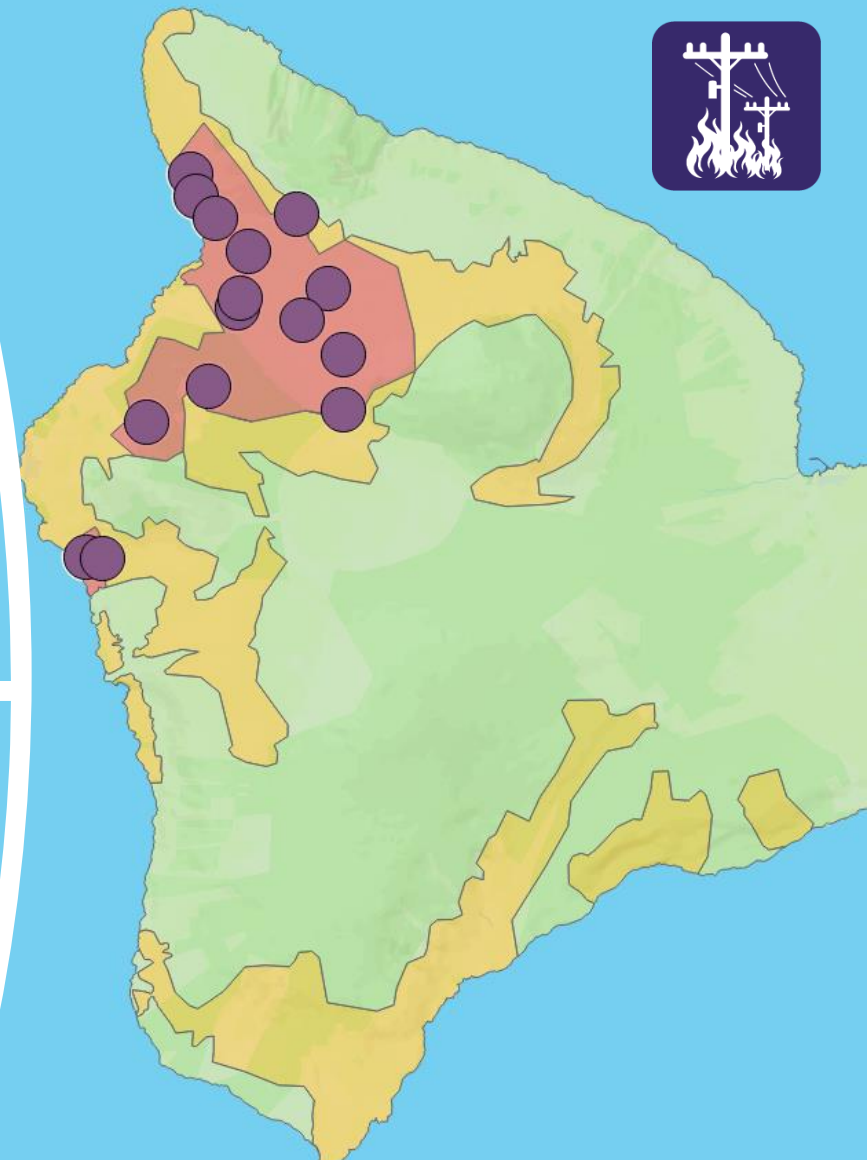
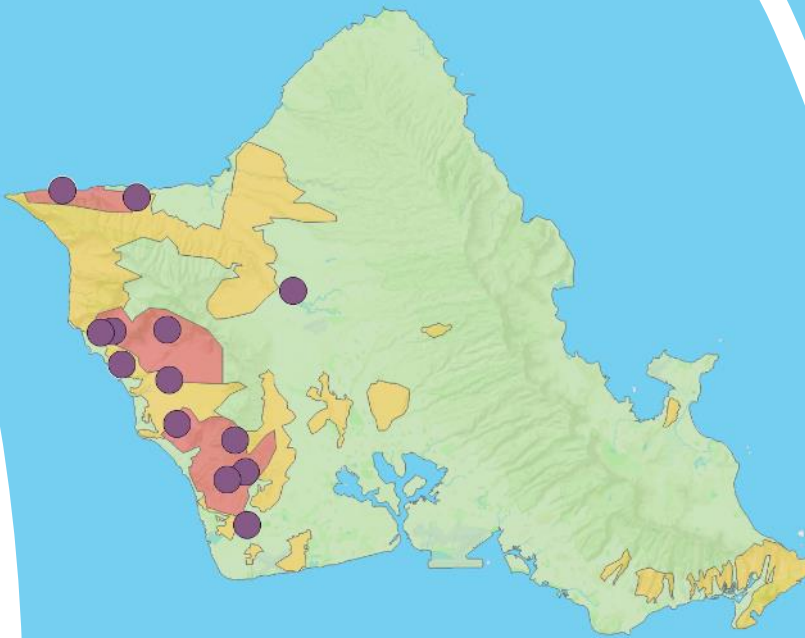
¹ All figures are budgetary estimates and subject to change based on the results of wildfire risk models, field visits, and input from key stakeholders



Weather Stations



Weather station deployments aid in PSPS and other operational actions

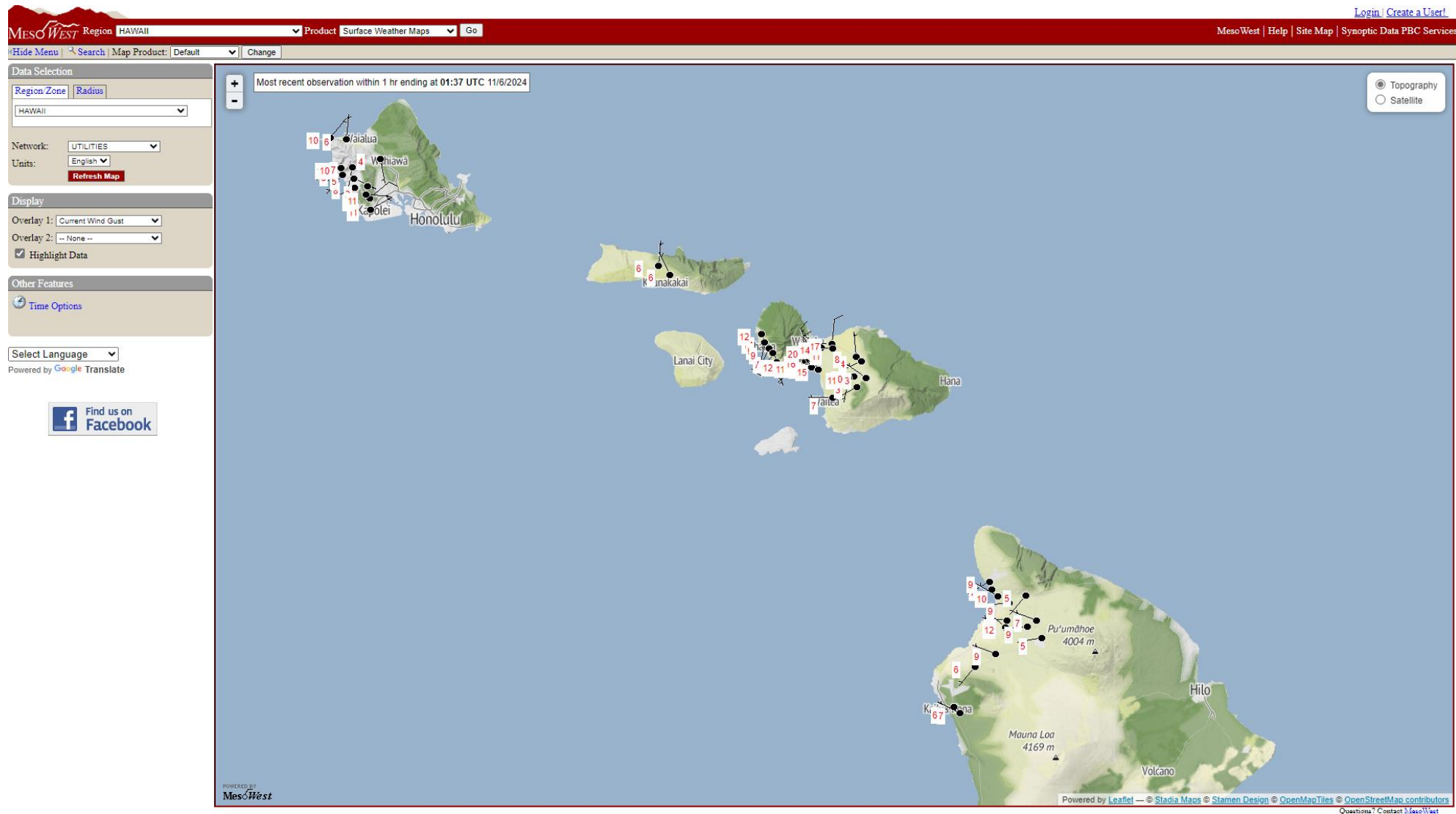


- Weather Station
- Medium Risk Areas
- High Risk Areas

"The weather stations that Hawaiian Electric has deployed was a dream come true for them in their use to better forecast weather for the entire State" Derek Wroe, NWS



Data Sharing (Click on image for live feed)



Weather Stations¹

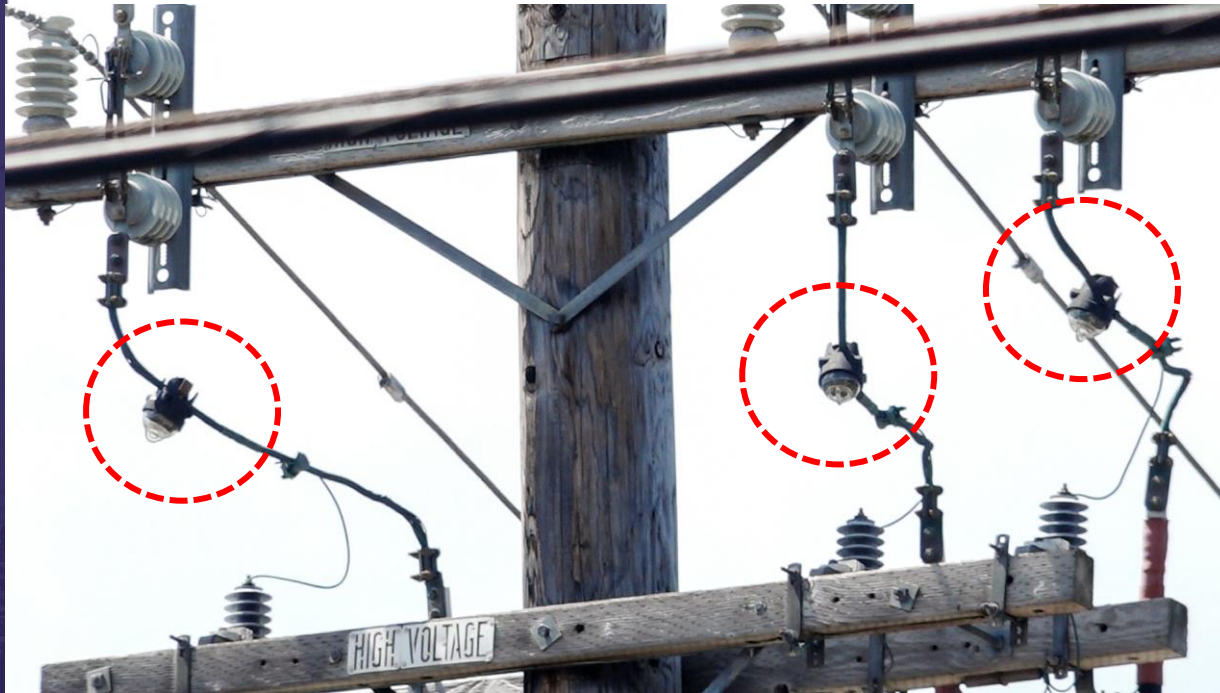


| | 2023-24 | 2025 | 2026 | 2027 | 2025-2027 |
|-------------------------------------|---------------|---------------|---------------|---------------|---------------|
| Incremental Weather Stations | 53 | 75 | 75 | 100 | 250 |
| O'ahu | 13 | 19 | 19 | 25 | 63 |
| Maui County | 25 | 35 | 35 | 47 | 117 |
| Hawai'i Island | 15 | 21 | 21 | 28 | 70 |
| Costs | \$1.1M | \$2.7M | \$2.7M | \$3.6M | \$9.0M |

¹ All figures are budgetary estimates and subject to change based on the results of wildfire risk models, field visits, and input from key stakeholders



Fault Current Indicators – detect the direction in which a fault has occurred and shorten response times



Fault Current Indicators



| | 2023-24 | 2025 | 2026 | 2027 | 2025-2027 |
|-------------------------|---------------|---------------|---------------|-------------|----------------|
| Incremental FCIs | 4,514 | 5,000 | 2,898 | 0 | 7,898 |
| O'ahu | 1,740 | 1,125 | 0 | 0 | 1,125 |
| Maui County | 686 | 2,011 | 833 | 0 | 2,844 |
| Hawai'i Island | 1,119 | 1,864 | 2,065 | 0 | 3,929 |
| Costs | \$4.1M | \$6.1M | \$5.9M | \$0M | \$12.0M |

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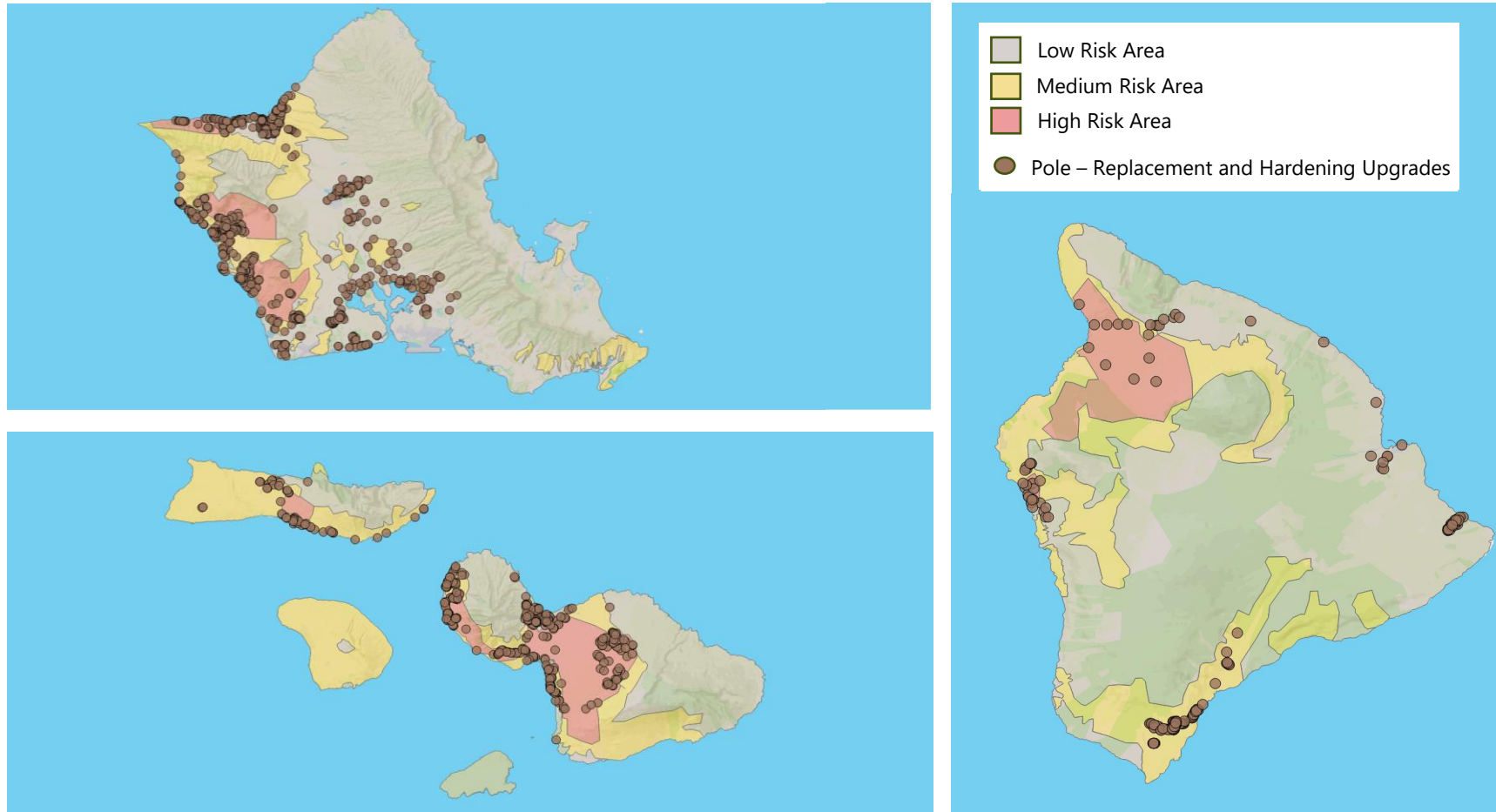
Upgrade of poles to stronger designs, both wood and steel



WILDFIRE SAFETY



Over 2,000 stronger poles with hardware upgrades have been installed in high risk areas



Pole Replacement (#Poles & Upgrades)



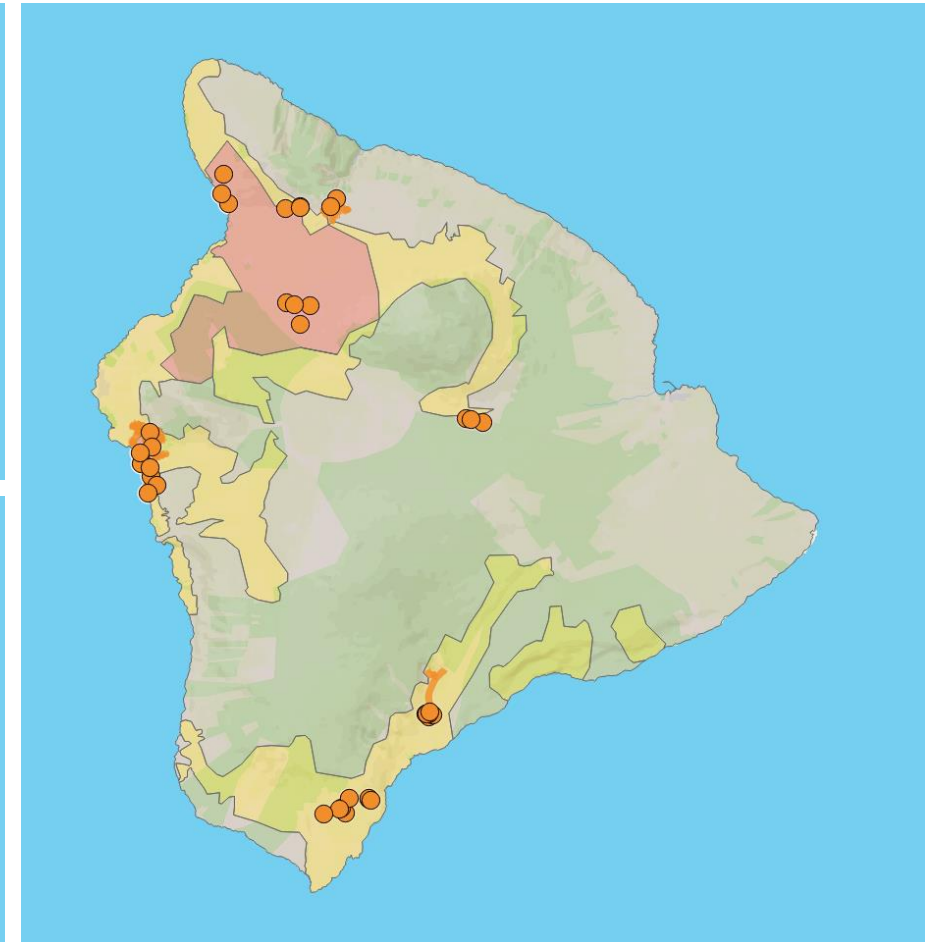
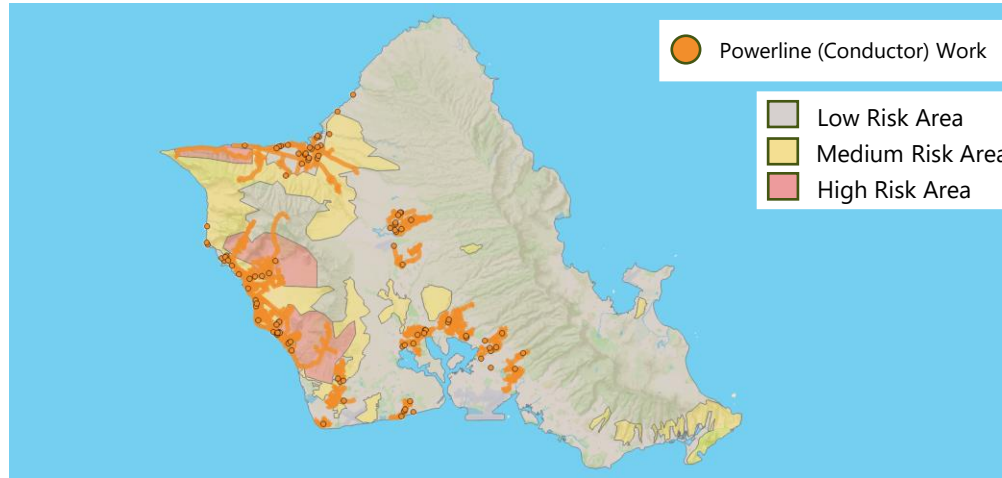
| | 2023-24 | 2025 | 2026 | 2027 | 2025-2027 |
|--------------------------------------|----------------|----------------|---------------|------------|----------------|
| Incremental Pole Replacements | 2,202 | 1,793 | 320 | TBD | 2,113 |
| O'ahu | 942 | 483 | 0 | TBD | 483 |
| Maui County | 533 | 782 | 160 | TBD | 942 |
| Hawai'i Island | 301 | 528 | 160 | TBD | 688 |
| Costs | \$62.6M | \$53.5M | \$5.4M | TBD | \$58.9M |



¹ All figures are budgetary estimates and subject to change based on the results of wildfire risk models, field visits, and input from key stakeholders



Over 16 miles of conductors have been replaced with larger, more resilient materials



Conductor replacements



| | 2023-24 | 2025 | 2026 | 2027 | 2025-2027 |
|---|----------------|----------------|---------------|-------------|----------------|
| Incremental Conductor Replacements (miles) | 33 | 23.6 | 3.7* | * | 26.6 |
| O'ahu | 11.4 | 3.4 | 0 | 0 | 1.8 |
| Maui County | 16.6 | 17 | 2.5 | 0 | 54.2 |
| Hawai'i Island | 5.0 | 2.2 | 1.2 | 0 | 11.5 |
| Costs | \$13.2M | \$12.6M | \$2.7M | \$0M | \$15.3M |

*Covered conductor miles is included in the next table & may overlap in miles



Maybe move






Use of more resilient materials and covered conductors over traditional bare conductors can significantly reduce ignitions and improve reliability



Draft O'ahu Covered Conductor Deployments



 Covered Conductor

~150 miles Covered Conductor

Note: These are high level visualizations of risk model output.
NOT meant to be precise.



Draft Maui County Covered Conductor Deployments



 Covered Conductor

~250 miles Covered Conductor

Note: These are high level visualizations of risk model output. **NOT** meant to be precise.



Draft Hawai'i Covered Conductor Deployments



 Covered Conductor

~400 miles Covered Conductor

Note: These are high level visualizations of risk model output.
NOT meant to be precise.



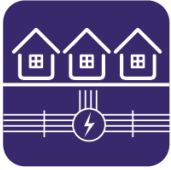
Covered Conductor installation



| | 2023-24 | 2025 | 2026 | 2027 | 2025-2027 |
|--|---------|------|-----------------|-----------------|-----------------|
| Incremental Covered Conductor (miles) | - | - | 54 | 54 | 108 |
| O'ahu | - | - | 5 | 5 | 10 |
| Maui County | - | - | 22 | 22 | 44 |
| Hawai'i Island | - | - | 27 | 27 | 54 |
| Costs | - | - | \$100.7M | \$100.7M | \$201.4M |

¹ All figures are budgetary estimates and subject to change based on the results of wildfire risk models, field visits, and input from key stakeholders





Undergrounding among safety strategies

- 51% of company distribution lines are underground
- Working with Lahaina residents – we know this is what they want. We are pursuing grants and innovative funding strategies to minimize cost impact. Need county rebuilding plans first.
- \$11M per mile vs \$1M/mile for overhead
- In some areas, less expensive tactics like covered conductor can be just as effective
- Permitting and environmental/cultural issues add significantly to timeline



Core Concept 2: Wildfire risk can be reduced

There is a lot we can do to reduce wildfire occurrence, fire spread, & severity



Reduce ignitions



Manage land & reduce fuel



Make homes & towns safer & ignition-resistant

Core Concept 4: Everyone plays a role

Everyone has a role in adapting to wildfire



**Land
Stewards**

Residents

**Policy-makers
& Community
Leaders**

**Emergency
responders**

**Planners
Developers
Utilities**

Wai'anae school firebreak project

- Removed invasive grass on DHHL land behind school, will replant with native species, overseen by nonprofit
- \$150,000 project 50/50 funding match from feds
- Similar community benefits projects being developed on all islands
- Details on project at <https://www.youtube.com/watch?v=ocmHW2h8Ki4>





Home > Safety & Outages > Wildfire Safety > Wildfire Safety Working Group Documents

Power Outages +
 Storm Center +
 Wildfire Safety -
 Public Safety Power Shutoff
 Electrical Safety +
 Indoor Safety +
 Outdoor Safety +

Wildfire Safety Working Group Documents

Wildfire Safety Working Group (WFS WG), is made up of broad cross section of industries and governmental agencies that have an interest in wildfire safety. The goal of the WFSWG is to support the development of Hawaiian Electric's Wildfire Safety Strategy (WSS), to inform and engage stakeholders on various aspects of the Company's strategy, and to afford stakeholders and partners opportunities to provide their knowledge, feedback and input to the strategy.

Wildfire Safety WG Timeline

- Wildfire Safety Symposium April 10-11
- Mitigation Strategies and Priorities August 14
- Metric and Performance Tracking September 5 (Previously Sept 4)
- Submit WSS to the PUC December
- Risk Map July 31
- Future Operational Strategies and PSPS Enhancements August 21
- Putting It All Together Oct/Nov

Meeting Documents

September 5, 2024

Discussed the scope and content of the WSS and proposed performance metrics to track the WSS.

- [Presentation Slides \(PDF\)](#)
- [Meeting Notes \(PDF\)](#)
- [Draft Wildfire Safety Strategy Content \(PDF\)](#)

August 21, 2024

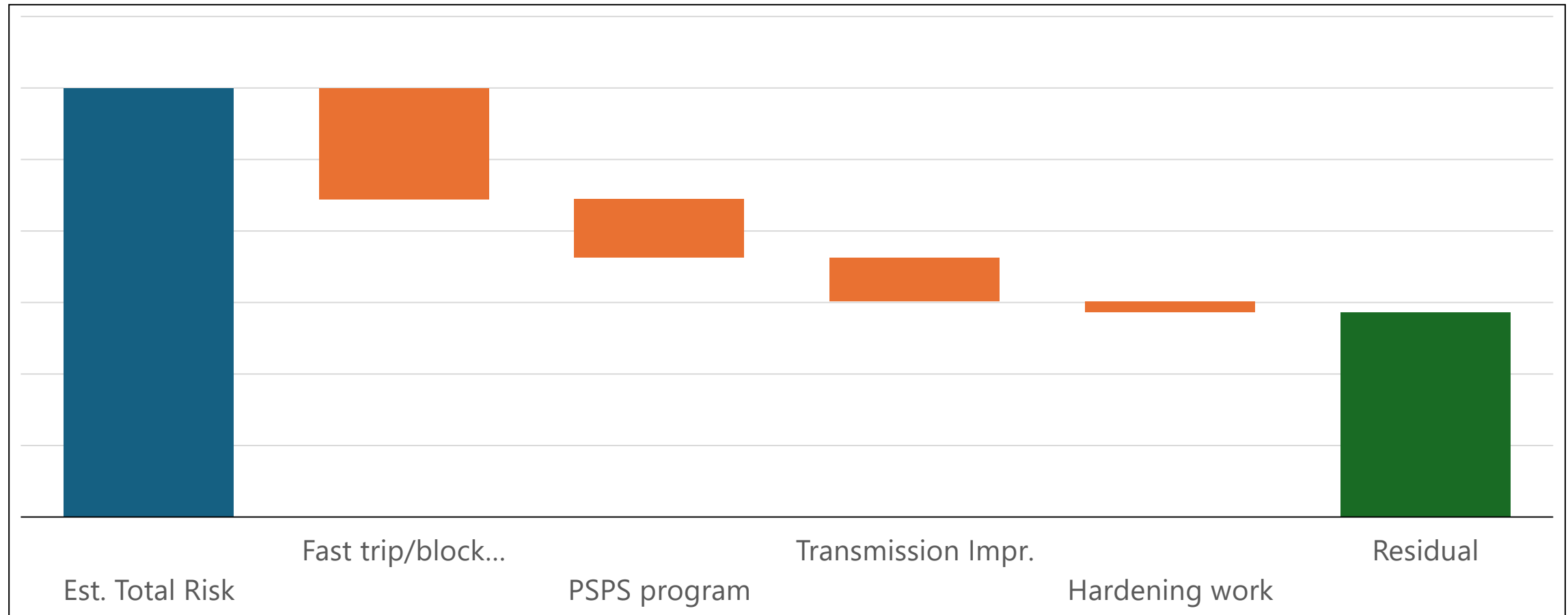
Discussed operational strategies and PSPS enhancements. The National Weather Service presented on wildfire and red flag warning history in Hawaii.

- [Presentation Slides \(PDF\)](#)



2025-2027 Wildfire Safety Strategy

Preliminary risk modeling indicates that wildfire mitigation work performed to date has reduced by ~60%

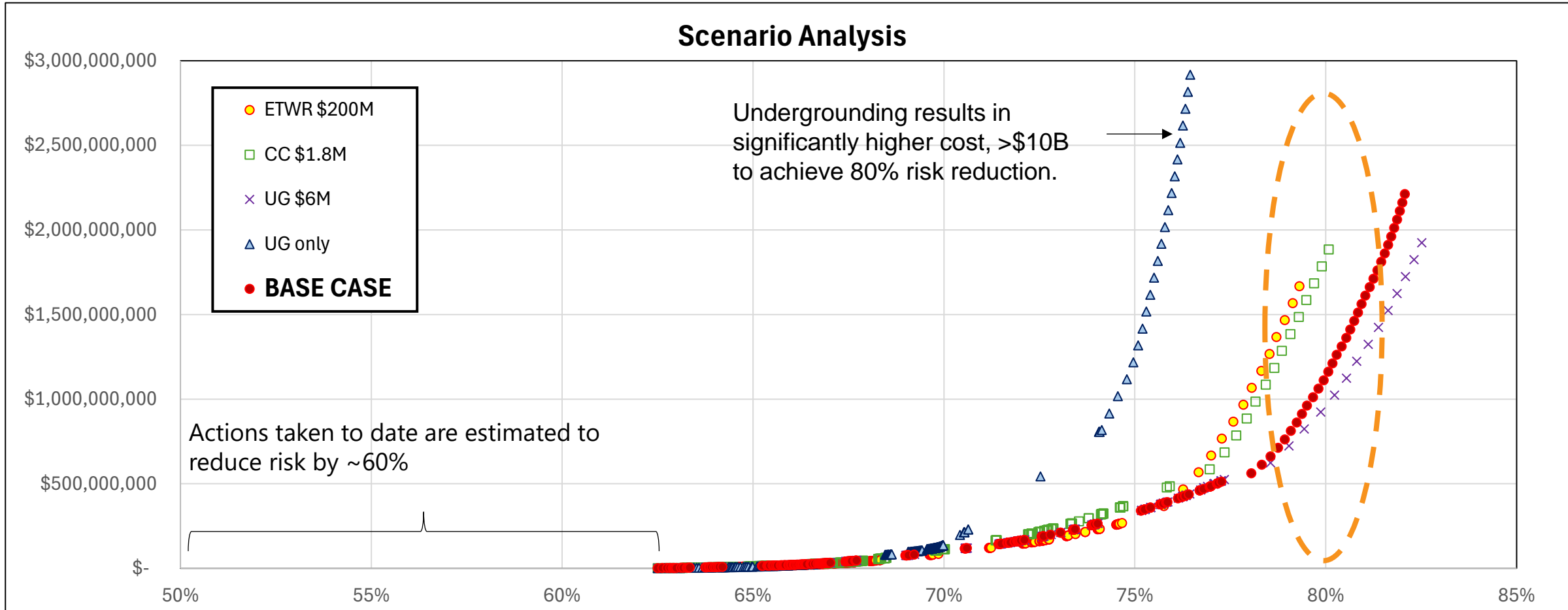


Note: Chart based upon initial results from the risk model. Final values will vary but is expected to be directionally consistent with these initial results.

WILDFIRE SAFETY



Preliminary risk modeling targets a goal of overall risk reduction of ~80%



Note: chart based upon initial results from the risk model. Final values will vary but is expected to be directionally consistent with these initial results.



We are aggressively pursuing federal grants and other sources of funding to reduce customer impacts and accelerate work

| Title of Opportunity | Application Title | Awarding Agency | Status | Federal Match | Cost Share | Total | Cost Share |
|--|--------------------|-----------------|------------------------------|----------------------|----------------------|------------------------|------------|
| GRIP 1 Topic 1 - Grid Resilience (grid hardening) | IIJA GRIP, Round 1 | DOE | Awarded | \$95,313,716 | \$95,313,718 | \$190,627,434 | 50% |
| GRIP 1 Topic 2 - Grid Flex (Grid Mod Phase II) | IIJA GRIP, Round 1 | DOE | Not Selected | \$50,000,000 | \$54,443,273 | \$104,443,273 | 52% |
| GRIP 2 Topic 1 - Grid Resilience (wildfire focus) | IIJA GRIP, Round 2 | DOE | Not Selected | \$100,000,000 | \$100,000,000 | \$200,000,000 | 50% |
| GRIP 2 Topic 2 - Grid Modernization | IIJA GRIP, Round 2 | DOE | Not Selected | \$100,000,000 | \$105,000,000 | \$205,000,000 | 51% |
| GRIP 2 Topic 3 -State-wide Grid innovation (HECO and KIUC subapplicants) | IIJA GRIP, Round 2 | DOE | Not Selected | \$250,124,367 | \$250,124,387 | \$499,999,955 | 50% |
| Ko'olaupoko Critical Customer Hubs (3) | BRIC | FEMA | Submitted to FEMA | \$8,329,318 | \$3,569,707 | \$11,899,025 | 30% |
| West Maui (Lahaina) Critical Customer Hubs | BRIC | FEMA | Not Selected | \$3,808,500 | \$1,269,500 | \$5,078,000 | 25% |
| Lahaina Critical Customer Hubs (2) | HMGP | FEMA | Preparing Application | \$3,808,500 | \$1,269,500 | \$5,078,000 | 25% |
| Wildfire Risk Model | HMGP | FEMA | Preparing Application | \$750,000 | \$250,000 | \$1,000,000 | 25% |
| Deployable batteries for PSPS areas | HMGP | FEMA | Not Selected | \$15,000,000 | \$5,000,000 | \$20,000,000 | 25% |
| AI for Vegetation Management | HMGP | FEMA | Not Selected | \$7,575,000 | \$2,525,000 | \$10,100,000 | 25% |
| North Kohala Microgrid | HMGP | FEMA | Not Selected | \$22,500,000 | \$7,500,000 | \$30,000,000 | 25% |
| Hazard tree removal - Maui | HMGP | FEMA | Not Selected | \$2,250,000 | \$750,000 | \$3,000,000 | 25% |
| Total | | | | \$659,459,401 | \$627,015,085 | \$1,286,225,687 | |

Maui litigation settlement summary

- Company will pay \$1.99B as its share of \$4B global settlement; final settlement agreement between individual plaintiffs and defendants made public this week.
- Company share includes \$75M contribution to One 'Ohana Fund for claims for wrongful death and serious physical injury
- No customer bill impact – company and shareholders will pay the settlement
- First of four payments will come from \$550M stock sale in September and will be paid in late 2025. Company is pursuing options for financing remaining payments.
- Hawai'i Supreme Court expected to rule in early 2025 on key questions relating to insurers' challenge to individual plaintiffs' claim to settlement money





**Hawaiian
Electric**

Questions?

