



Summary of 2025-27 Wildfire Safety Strategy

December 12, 2024

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Agenda

Recap of Last Meeting

Wildfire Safety Strategy (WSS) Review

Next Steps

Recap of Last Meeting

Recap of Last Working Group Meeting

Purpose

- Review and seek feedback on proposed performance metrics
- Review scope of WSS Report

Summary

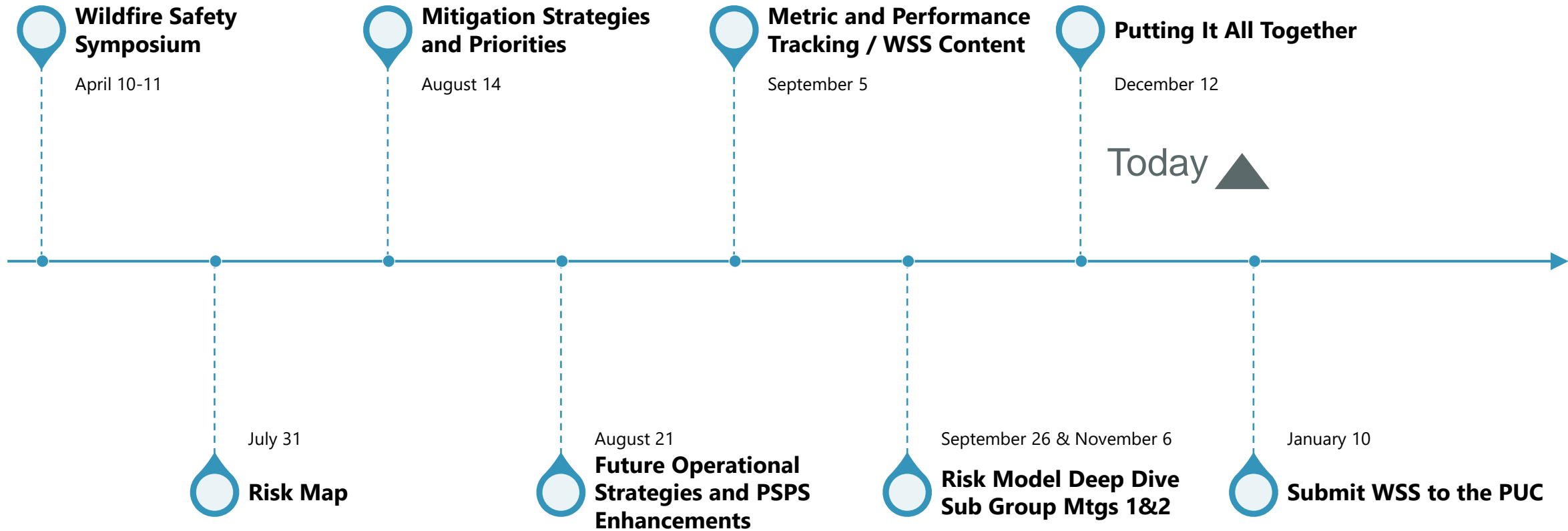
- Reviewed and provided outline of the WSS and its contents
- Defining of metrics to track implementation of activities as planned in WSS
- Measure effectiveness of implemented activities using previously identified baselines, such as reduction in the number of outages, ignitions, and frequency/duration of PSPS events
- Hawaiian Electric is working to identify an effective ignition tracking process to more effectively track risk reduction of wildfire from implemented mitigation strategies

WG Webpage – Meeting

Materials and Notes Available:

<https://www.hawaiianelectric.com/safety-and-outages/wildfire-safety/wildfire-safety-working-group-documents>

Wildfire Safety Working Group Timeline



Review of WSS

Purpose



Provide a summary of the 2025-2027 Wildfire Safety Strategy Report to be filed with the Public Utilities Commission on January 10, 2025



Seek feedback and address questions for incorporation in the report



Wildfire Safety Strategy Report Sections

1. Introduction
2. Wildfire Risk Mapping
3. Risk Modeling and Mitigation Assessment
4. Enhanced Wildfire Safety Strategy
5. Data Collection and Performance Indicators
6. Projected Costs



Introduction

Introduction

Hawaiian Electric has been working on wildfire safety and risk reduction for several years with a focus on risk reduction. 2025-2027 builds on existing efforts. Summary of Wildfire Safety Initiatives (2019–2024):

Wildfire Risk Mapping

Developed utility-specific, multi-tiered wildfire risk maps to assist with prioritizing capital and operational mitigations.

Wildfire Risk Modeling

Developed a wildfire risk model to quantitatively analyze wildfire risk and inform mitigation planning.

Situational Awareness

- Deployed 53 weather monitoring stations in higher wildfire risk areas
- Deployed 44 AI-enhanced cameras
- Established procedures to deploy spotters during elevated risk periods

Operational Mitigations

- Developed a PSPS program and associated risk maps for the 2024 wildfire season
- Deployed Enhanced Fast Trip (EFT) technology
- Established special restoration procedures for circuits in wildfire risk areas

System Hardening

Replaced 771 power poles and 6.7 miles of conductor in 2024.

Vegetation Management Program

Initiated hazard tree inspection and abatement program in high wildfire risk areas

WSS Website

Deployed a special purpose website to disseminate wildfire mitigation program information

Community outreach and engagement

Implemented a wide range of outreach strategies tailored to individual islands to connect with community members, listen to concerns, gather input, collect emergency contact information and share wildfire safety information and resources.

Wildfire Safety Symposium and Wildfire Safety Working Group

- Hosted a Wildfire Safety Symposium to bring together wildfire safety experts from utilities, agencies, research institutes and the state
- Subsequent Working Group meetings were held to discuss wildfire risk maps, mitigation strategies and priorities, operational strategies, PSPS enhancements and key performance indicators.

Wildfire Risk Maps

Detailed Tier Methodology

High risk area:

- Combine with knowledge of trade wind direction, and presence of Hawaiian Electric infrastructure to determine highest risk areas
- Contiguous areas of “red” vegetation, AND
 - Electric infrastructure nearby or directly NE, AND
 - Community in area or directly W or SW

Medium risk area:

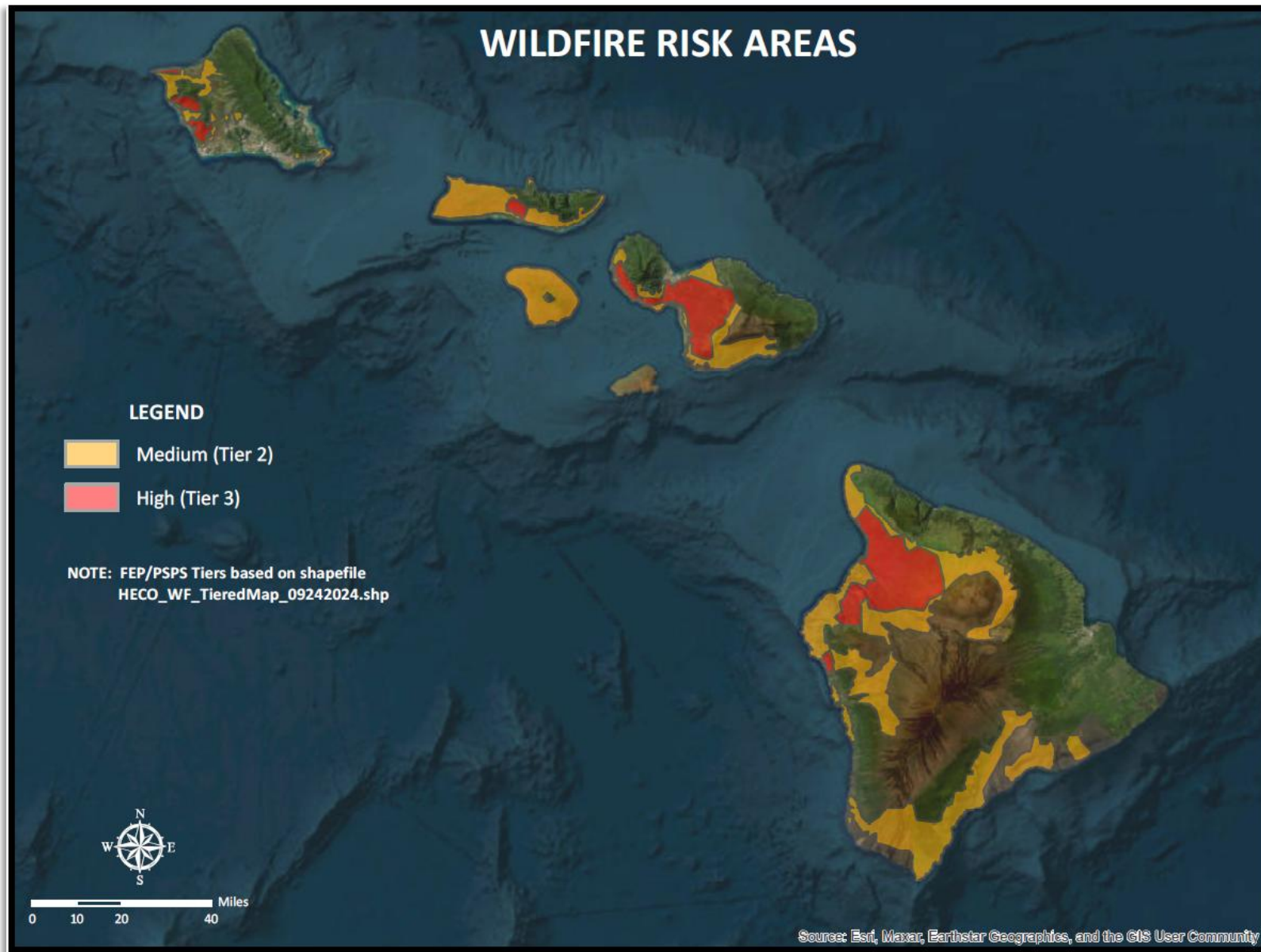
- Regardless of wind direction or presence of community
- Contiguous areas of “red” vegetation (those area not met in Tier 3 above)
- Contiguous areas of “orange” vegetation that have fire history

Low risk area:

- Everything else

“Red” Vegetation – The vegetation type(s) where over 10% of that vegetation type had burned since 1999.

“Orange” Vegetation – The vegetation type(s) where over 5% of that vegetation type had burned since 1999.



Risk Modeling and Mitigation Assessment

Risk Model and Mitigation Assessment Process

Identification of a portfolio of operational and infrastructure solutions that provides the lowest cost solution to achieve an overall risk reduction target

Estimating the likelihood of an ignition for each circuit based on historical outage and ignition data

Estimating the potential consequence of a fire leveraging historical data and fire spread modeling

Measuring risk at each circuit (likelihood x consequence)

Accounting for risk reduction from implemented mitigations

Estimating risk reduction of new mitigations and execution cost

Calculating RSE (benefit or risk reduction divided by cost)

Prioritize based on RSE values and other considerations

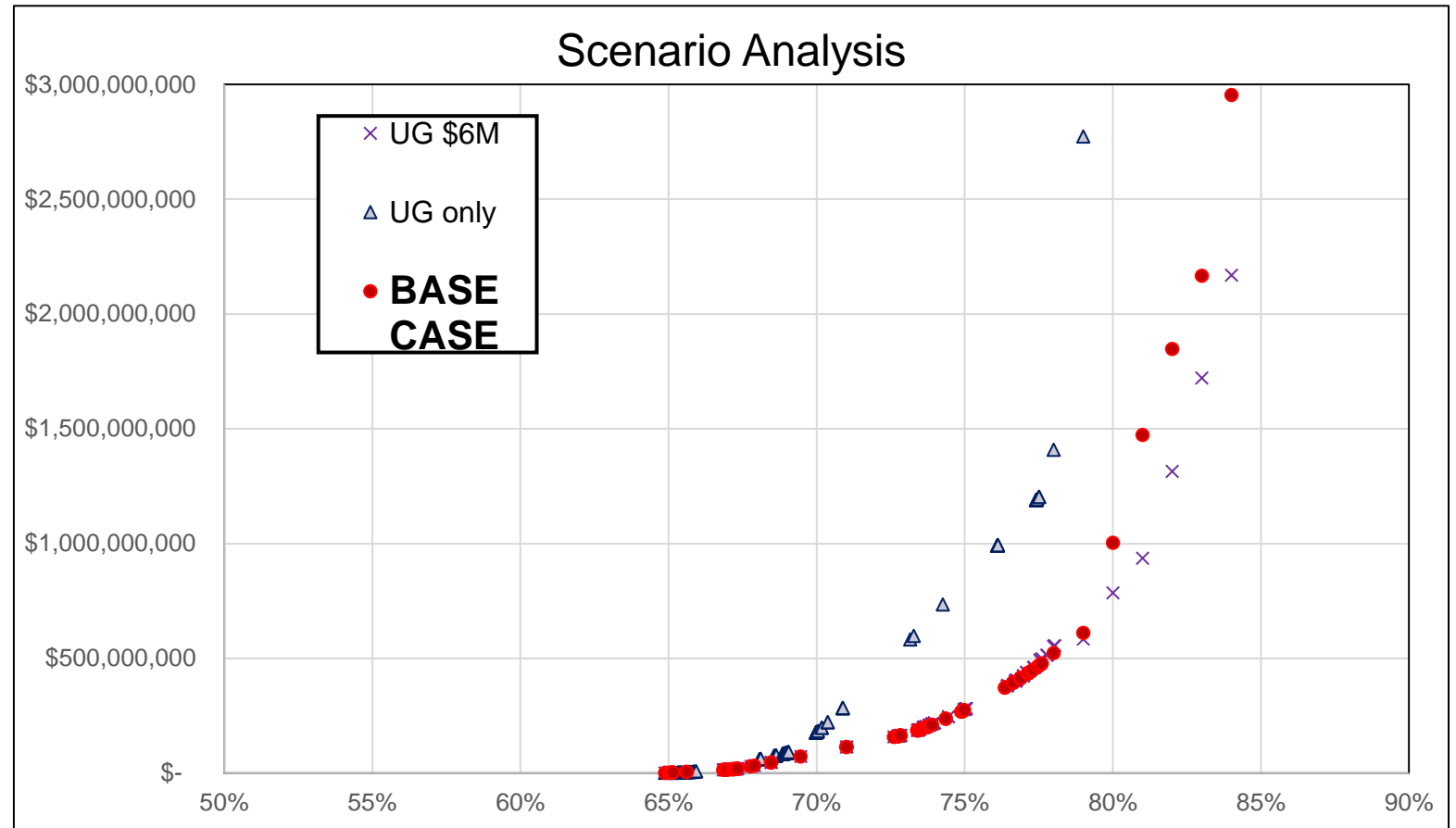
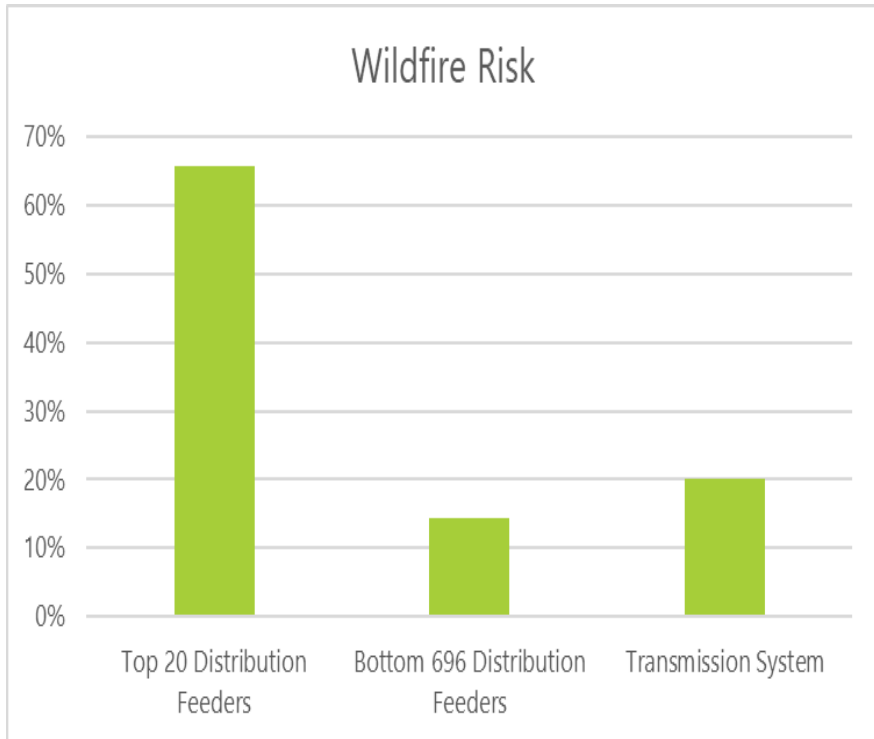
Combinations of Mitigations Assessed:
Enhanced Fast trip, PSPS, covered conductor and underground

Qualitative Prioritization Model Attributes

In addition to quantitatively assessing wildfire risk, the following attributes are being utilized to prioritize investments:

1. Egress – High / Low
2. Social Vulnerability – High / Medium / Low
3. Critical Habitat – High / Low
4. Critical Facility Density – High / Medium / Low
5. Reliability Benefit – High / Medium / Low
6. PSPS Reduction Impact – High / Medium / Low

Majority of risk in the Top 20 distribution feeders



Enhanced Wildfire Safety Strategy

Four Pillars Framework

Four Pillars were identified to form the basis of the enhancements to wildfire safety strategy (WSS) within Hawaiian Electric



1. Harden the Grid



2. Expand and Improve Situational Awareness



3. Improving Operational Practices



4. Strengthening Stakeholder and Community Partnership

Harden the Grid (System Hardening Program)

Projected Scope	2025-2027 Goals
Covered Conductor (New)	76 circuit miles
Targeted Undergrounding (New)	Up to 2 miles
Expulsion Fuse Replacements (Continuing)	16,543 fuses
Arrester Replacements (Continuing)	2,047 arresters
Cellon and Poly-Filled Pole Replacements (Continuing - with higher priority given to poles in high and medium fire risk areas)	648 poles
Transmission/Sub-transmission Line Hardening (New)	19 circuit miles
Ingress/Egress Risk Mitigation (Continuing as part of Resilience Program)	110 poles

In-progress distribution line small wire replacement projects will be completed as planned in 2024 and 2025. The 2025-2027 WSS will focus on Covered Conductor and Targeted Undergrounding projects going forward.

Targeted Undergrounding

- **Commit to use T&D resilience program and DOE grant to underground up to 2 miles**
- **Assess cost, scope and construction alternatives will be evaluated to consider which options are most cost-beneficial for potential undergrounding projects. For example, Hawaiian Electric plans to evaluate options such as:**

Scope alternatives, such as:

- **Undergrounding primary lines only:** This option entails undergrounding only the distribution primary lines, while secondary and service lines remain overhead.
- **Undergrounding all primary, secondary, and service lines:** This option is the most comprehensive, but also the most costly and complex, as it involves undergrounding customer-owned facilities and impacts customer property and therefore requires customer and landowner agreements.
- **Hybrid options:** Options may include, for example, undergrounding all primary lines, as well as secondary lines that run parallel to the primary lines. Options such as this would be designed to minimize impacts to customer property and would leave customer service poles and lines overhead.

Construction alternatives, such as:

- **Conventional undergrounding:** This option involves completely undergrounding facilities by digging trenches and placing cable in conduit below ground.
- **Ground-Level Distribution Systems (GLDS):** This is a method currently being piloted at Pacific Gas & Electric (PG&E) that involves covering power lines with a protective enclosure either at ground level or partially below ground in shallow trenches.
- **Above ground cable options:** Other alternatives may include placing cable above ground, such as installing cable in conduit mounted on low-lying above-ground structures.

Based on the results of these studies in 2025, Hawaiian Electric may then propose to modify the 2025–2027 WSS plans to begin additional undergrounding projects within the 2025–2027 timeframe (i.e., in the next annual update of the WSS). Given the typically longer duration of undergrounding projects, it is anticipated that most undergrounding projects initiated through this process will not begin construction until after the 2025–2027 WSS timeframe.

Expand and Improve Situational Awareness

Expansion and improvement are proposed in the following areas:

1. Environmental monitoring and data collection systems
2. Enhanced Meteorology Capabilities - Operational Risk Model
3. Weather Station and Camera Deployment Strategy
4. Watch Office
5. Spotters (Continue)

Projected Scope	2025–2027 Goals
Watch Office (Enhanced)	Build watch office staff and meteorological capability, training and office space
Weather Stations (Expanded)	Install up to 250 weather stations based on further risk and weather assessments
Cameras (Expanded)	Obtain 100% viewshed of all high and medium risk transmission and distribution spans
Wildfire Risk Model for Operations and Forecasting (Expanded)	Acquire forecasting tools to inform operational decisions on fast trip, reclose block and PSPS
Fuel Sampling Program (New)	Inform and update risk models with state of vegetation and fuels

Vegetation Management Program

Hawaiian Electric's wildfire vegetation management program consists of the following major activities in high risk (tier 3) and medium risk (tier 2) locations as informed by the wildfire risk model ranking of circuits:

1. Vegetation management wildfire hazard tree identification and mitigation
2. Defensible space around higher-risk facilities
3. QA/QC of inspection and removals
4. Vegetation management wildfire corridor maintenance
5. Vegetation management wildfire employee and contractor training (annual refresher)

Vegetation Management Program

Vegetation Management Wildfire Routine Maintenance Activity

Inspection cycle is 12-18 months

Vegetation Management Wildfire Mid-Cycle Inspection Program

The main goal of this program is to identify and mitigate trees that:

- show signs of insect/disease infestations
- are dead or declining
- have been subjected to recent grade changes
- have exposed or damaged roots
- are structurally unsound, or
- may not maintain required radial clearances or fail prior to the next maintenance cycle

Vegetation Management Wildfire Facility Clearance

Facility Clearance is an activity designed to establish a woody vegetation-free zone around assets to reduce ignition potential in high-risk areas and identified medium risk locations.

Vegetation Management Wildfire Quality Assurance/Quality Control

Vegetation management Quality Assurance (“QA”) and Quality Control (“QC”) activities foster accountability and help ensure conformance to Hawaiian Electric’s standards.

Asset Inspection Programs

T&D Wildfire Asset Inspection Program components:

1. Assets in high-risk areas (tier 3) will have a ground or aerial inspection (via helicopter or drones) **annually** and assets in medium risk areas (tier 2) inspected on a **3-year cycle**
2. Assets in low-risk areas (tier 1) will be inspected on a 5-year cycle
3. For intrusive pole inspections, assets will be inspected on a 10-year cycle regardless of risk location
4. Infrared inspections will be conducted as needed regardless of asset location
5. Transmission assets will also be inspected using LiDAR technology regardless of location
6. Work orders or “maintenance tags” will be created for any identified defects - Increasing inspections will likely lead to a higher volume of work orders, so it is important that maintenance activities be prioritized and tracked
7. Completed work orders will be subject to QA/QC processes to confirm conformance with company standards

Maintenance Priority for Inspection Remediation/Corrective Action

Maintenance Priority Ranking	Description	Required Response Time
A	Failed component with or without service interruption.	Immediate; standby required
Hot B	Failure imminent. Component is damaged or no longer suitable for intended use. Failure or interruption of service is imminent.	Within 72 hours
B	Evidence of significant wear, corrosion, or damage.	Within 3 months
C	Evidence of moderate to minimal wear, corrosion, or damage.	Within 12 months
D	Minor wear, corrosion, or damage	Within 5 years

Enhanced Fast Trip Settings

Enhanced Fast Trip setting build on the existing Fast Trip and Reclose Blocking settings program by:

1. Expanding application to all circuits serving and passing through high (tier 3) and medium (tier 2) risk areas
2. Supporting enabling and disabling settings remotely based on local conditions
3. Installing line reclosers and isolating switches near the fire risk area boundaries to improve EFT effectiveness and limit the adverse reliability impacts for customers outside the fire risk areas

Projected Scope	2025-2027 Goals
Enhanced Fast Trip Circuits Enabled (Expanded to all high and medium fire risk areas)	26 Circuits
Circuit Breaker Relay Upgrades	18 Upgrades
Substation SCADA Upgrades (Expanded to all high and medium fire risk areas)	12 Upgrades
Remote-Control Line Recloser Installations (Expanded functionality and targeting from current program and reduced customer reliability impact over time)	117 Line Reclosers
Sectionalizing Switch Installations	43 Switches
Fault Current Indicators	9,739 Non-Communicating 100 Smart

Public Safety Power Shutoff (PSPS) Program

PSPS enhancements proposed in the WSS are as follows:

01 Incorporation of enhanced situation awareness and granular weather forecasts

02 Sectionalization and switch reclosure additions

03 System improvements for notifications .

04 Customer care programs (batteries, etc.)

05 Customer resource centers

Potential expansion of the current PSPS scope may be driven by the Risk Model but no specific expansion has been identified at this time

Grid Modernization

Provide the enabling platform for wildfire risk reduction efforts
Supports enhanced fast trip, PSPS, smart sensors, and sectionalizing equipment

Projected Scope	2025-2027 Goals
Smart Reclosers	117
Motor operated switches	43
SCADA to Substations	12
ADMS	N/A
OT Cybersecurity monitoring	N/A
PLTE Expansion of RAN	N/A

Strengthen Stakeholder and Community Partnerships

High-level overview of Hawaiian Electric's approach to engaging communities and stakeholders:

- Community outreach and engagement
- Cross-sector collaboration
- Ongoing engagement efforts and next steps
 - Developing innovative ways to reach those who are unable to attend community events or meetings
 - Continuing to strengthen relationships with key partners and join them at events and meetings
 - Expanding its network of partners who can advise and collaborate with Hawaiian Electric to keep communities safe
 - Continuing to emphasize the importance of emergency preparedness throughout the year
 - Utilizing the U.S. Department of Energy's Grid Resilience Innovation Partnerships funds to empower organizations to continue their wildfire mitigation work and/or identify projects within the community to advance wildfire safety efforts

Data Collection and Performance Indicators

Metric Types

Performance indicators are proposed in the form of two types of metrics:

Performance Metrics

Outcome-based measures that assess the overall effectiveness of Hawaiian Electric's WSS program in reducing wildfire risk

Progress Metrics

Progress-based measures that track Hawaiian Electric's 2025-2027 wildfire risk mitigation targets

Targets proposed to be established for the results at the end of the 2025-2027 period rather than annual targets to allow for adjustments to reflect additional knowledge gained as programs evolve

Performance Metrics

Proposed Performance Metrics

Number of Reportable Ignitions

Number of Wire-down Events

Number of Non-planned Outages

Frequency of PSPS Events

Duration of PSPS Events

Number of Circuits De-energized

Total Customers Impacted by PSPS

Notification Success Rate (24-48 hrs)

Proposed Progress Metrics (Under Review)

Enhanced Fast Trip

Vegetation Management – Routine Maintenance

Distribution Asset Inspections

Transmission Asset Inspections

Expulsion Fuse Replacements

Arrester Replacements

Transmission/Sub-transmission Line Hardening (New)

Cellon-Treated and Poly-Filled Pole Replacements

Covered Conductor

Targeted Undergrounding

HF Cameras Installed; % Coverage of HFRA

Weather Stations Installed

Projected Costs

Projected Costs

DRAFT (work in progress)

WSS INITIATIVE	2025 DOLLARS	2026 DOLLARS	2027 DOLLARS
Expand situational awareness	\$9,600,000	\$8,700,000	\$9,700,000
Strengthen stakeholder and community partnerships	\$2,500,000	\$2,600,000	\$2,600,000
Wildfire risk analytics	\$3,300,000	\$3,100,000	\$3,400,000
Grant Funding	(\$21,400,000)	(\$15,400,000)	(\$15,500,000)
Improve operational practices	\$37,700,000	\$25,600,000	\$30,400,000
Wildfire Management and Governance	\$1,000,000	\$1,500,000	\$1,500,000
Grid hardening	\$102,000,000	\$82,700,000	\$92,600,000
Modernizing the grid for resilience	\$5,100,000	\$43,200,000	\$41,500,000
Grand Total	\$139,800,000	\$152,000,000	\$166,200,000

Next Steps

- File WSS by January 10, 2025
- Request Approval or Acceptance of WSS
- The Company also plans to subsequently file EPRM applications to seek cost recovery for incremental wildfire costs related to the WSS
- The Company also plans to file a revised EPRM application for Grid Modernization phase 2 to support the implementation of the WSS

Thank you!

