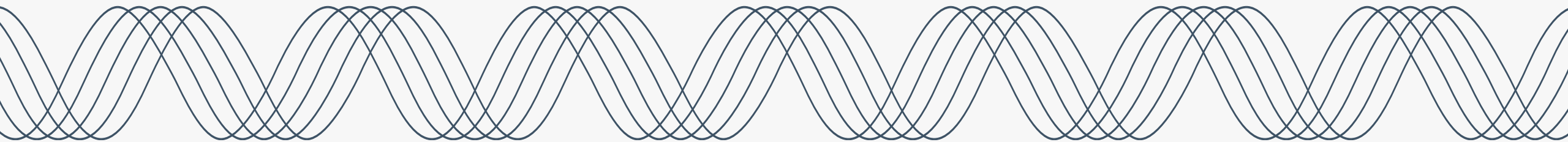




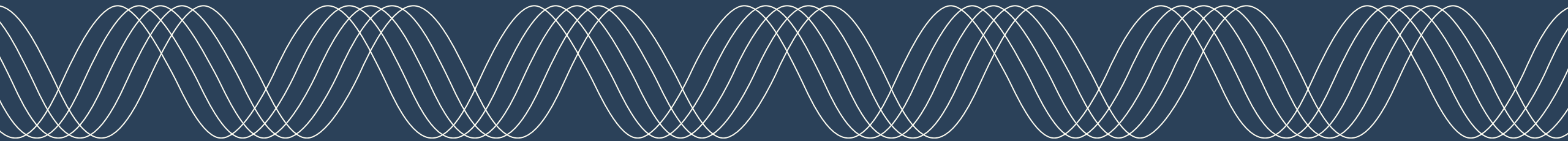
OPUC WMP Workshop Portland General Electric



Bill Messner | Dan Nunez

Points we will cover

- Overview discussion of PGE's 2023 WMP
- Independent Evaluator (IE) feedback and plan incorporation
- 2022 lessons learned and influence in 2023
- Review system hardening and resiliency in High Fire Risk Zones



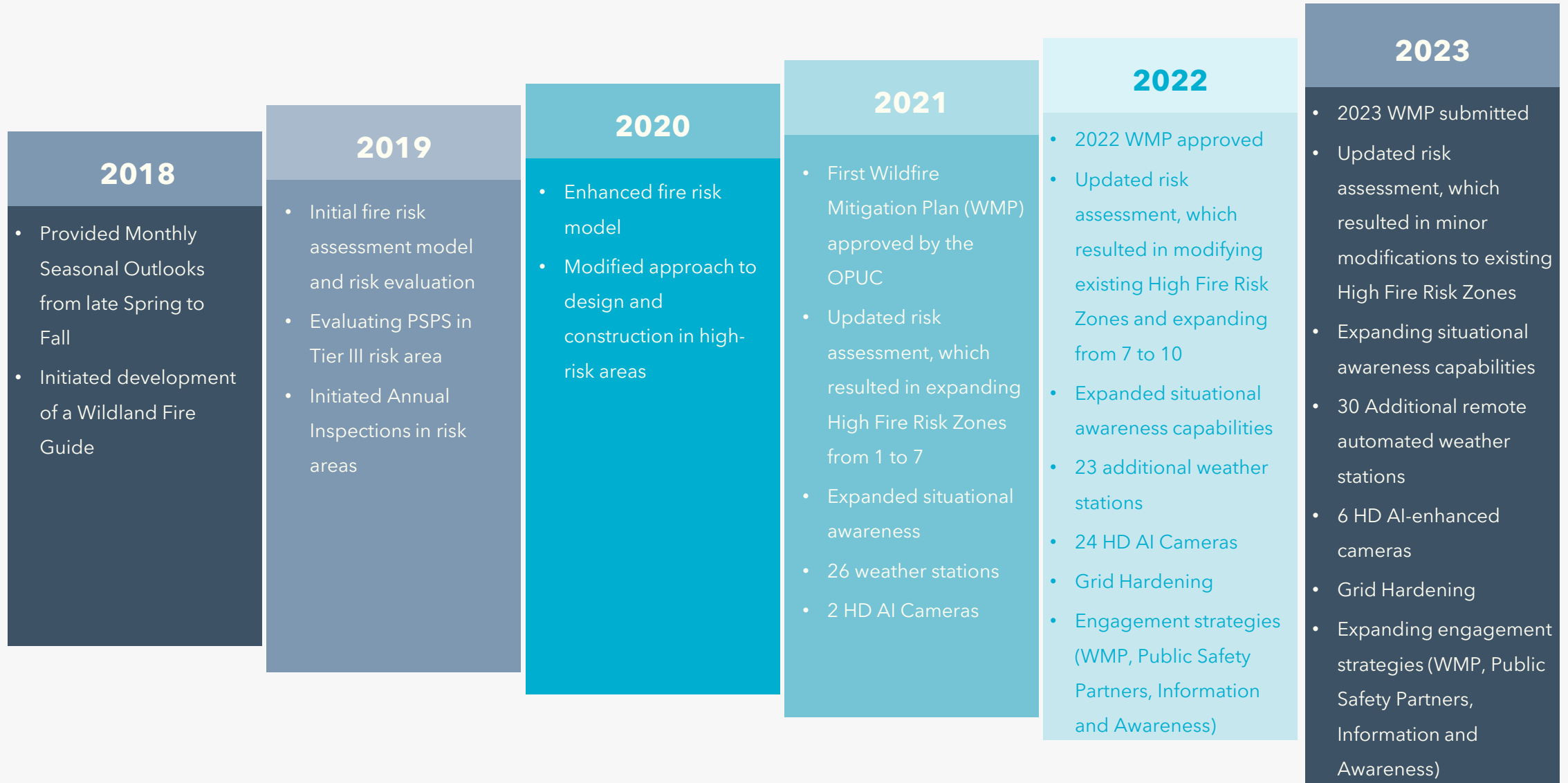


Purpose of PGE's Wildfire Mitigation Plan (WMP)

- Prioritize public and employee safety
- Reduce the risk of wildfire ignitions from PGE assets
- Guide PGE's Fire Season operations
- Identify and prioritize wildfire system hardening and resiliency activities
- Communicate and collaborate effectively with Public Safety Partners, stakeholders, and customers
- Implement PSPS events with efficiency, when necessary, and with broad public awareness



PGE's Wildfire Mitigation Journey

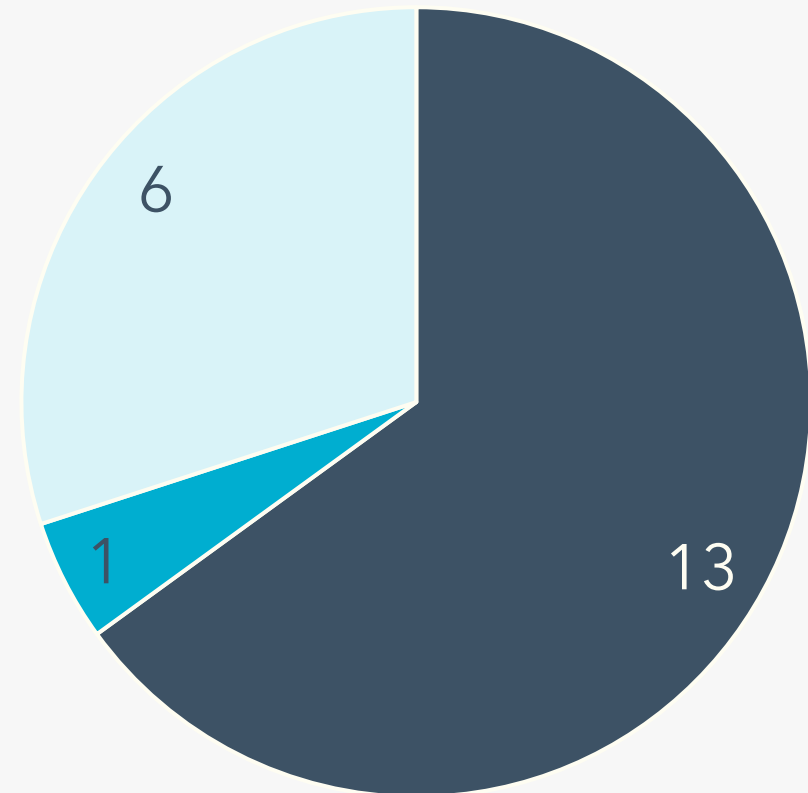


2022 WMP Bureau Veritas and OPUC Recommendations

'Conclusion' section of Staff's Report recommending approval of PGE's 2022 WMP:

"Staff commends PGE for the thought and effort that went into this Plan. This is the first formal plan PGE has submitted to the Commission and while all plans can be improved, this Plan demonstrates the Company is fully engaged and committed to implementing solutions that will meet the expectations of the Commission, ratepayers, utility infrastructure, the public, and the environment all Oregonians treasure."

20 recommendations provided

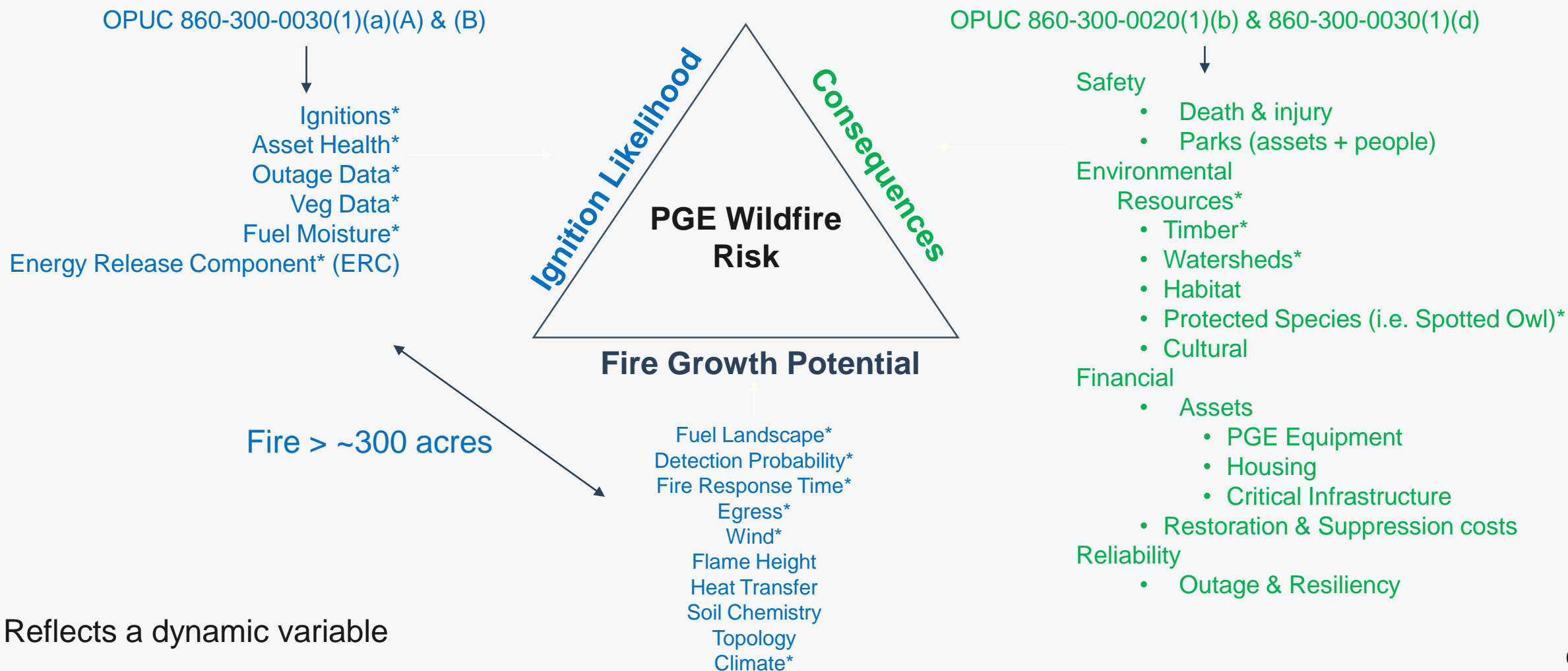


■ Incorporated ■ Partially Incorporated ■ Considered

WILDFIRE RISK METHODOLOGY



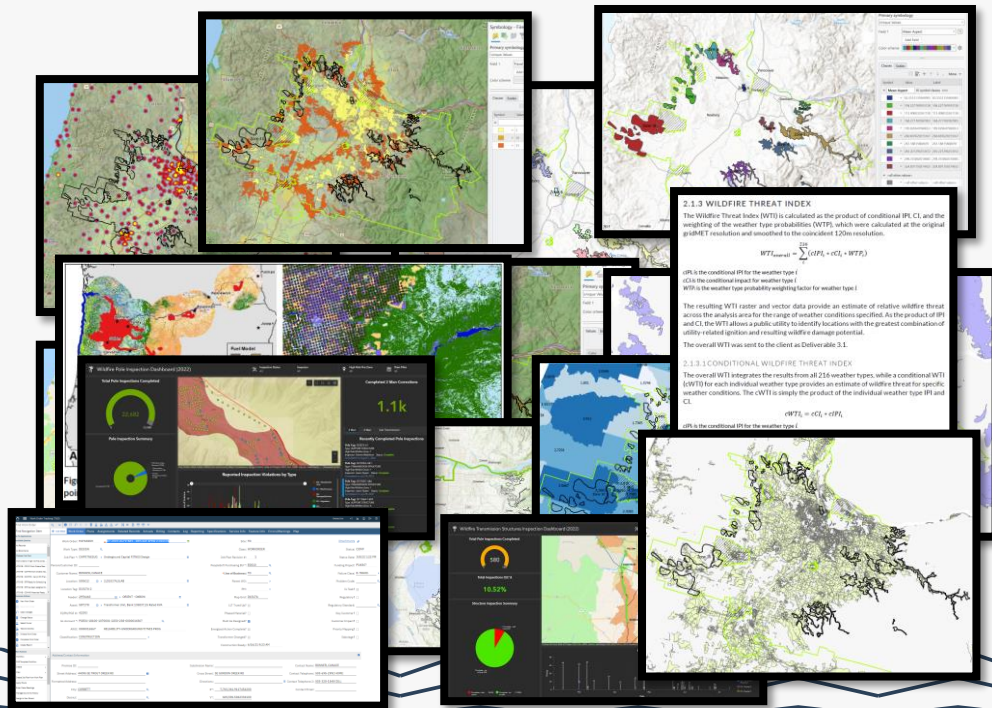
Key takeaway: HFRZ determination is considering static and dynamic variables as required by rule (blue). Operational and Investment decisions are informed when coupled with consequences (green).



Factors considered in High Fire Risk Zone designation

HFRZs are the areas where there is the highest risk, both in likelihood and consequence, of PGE equipment causing an ignition

More than 2 dozen data sets are assessed to determine these areas



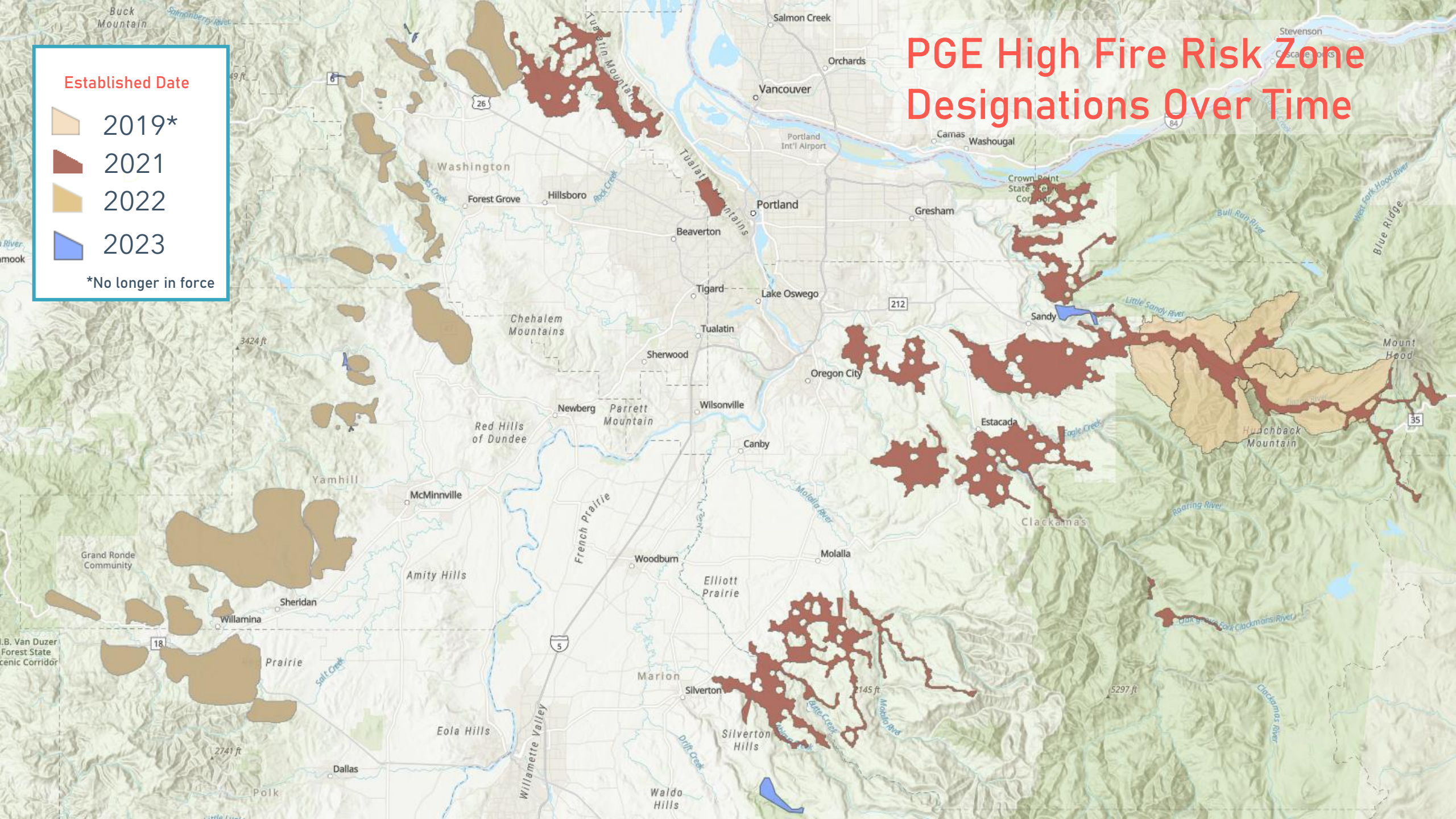
- Service territory & PGE structures
- Existing structure type & load
- Assessments from nationally recognized experts
- Consultations with local fire chiefs
- Current asset health
- Population & meter density
- Terrain slope & aspect
- Road/egress access & condition
- USDA's WF Risk to Communities
- Drinking water & watersheds
- CDC's social vulnerability indices
- Fire station proximity & access
- Critical habitats
- WU boundaries
- Cultural & scenic landmarks
- Meteorology benchmarks
- Outage history
- Comparative metrics

PGE High Fire Risk Zone Designations Over Time

Established Date

- 2019*
- 2021
- 2022
- 2023

*No longer in force



Vegetation Management

Advanced Wildfire Risk Reduction: 2022 + 2023

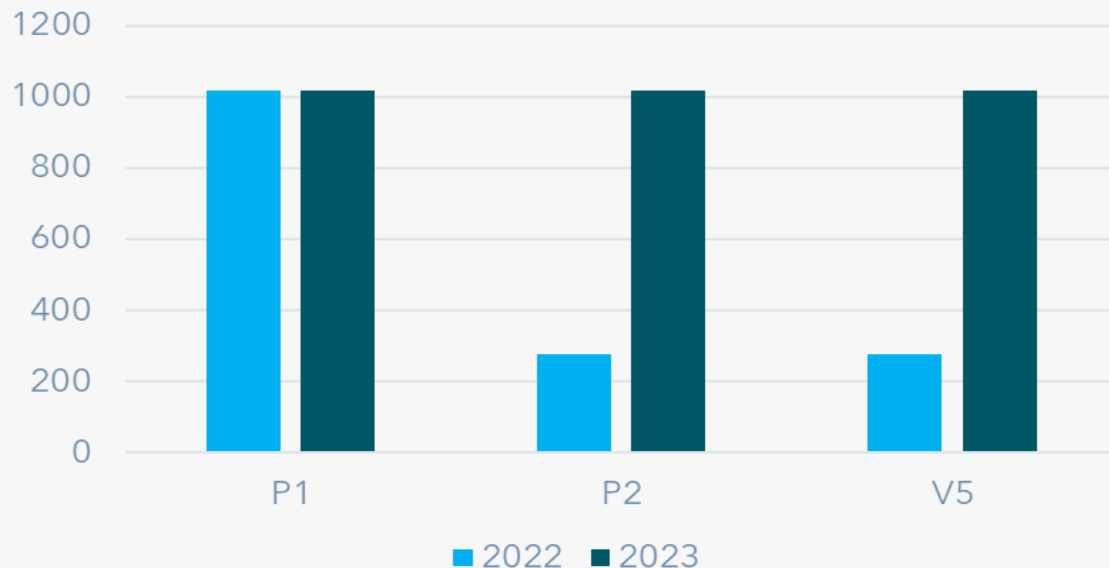
2022 AWRR Activities

- P1 inspection and mitigation by July 1, 2022, of all HFRZ overhead line mileage
- PGE planned and completed enhanced inspection of 275-line miles of P2 scoping in HFRZ 1,4,5 (full AWRR scope - mitigation of P1, P2, and vegetation growth within 5 feet of conductor (V5))

2023 AWRR Further Development

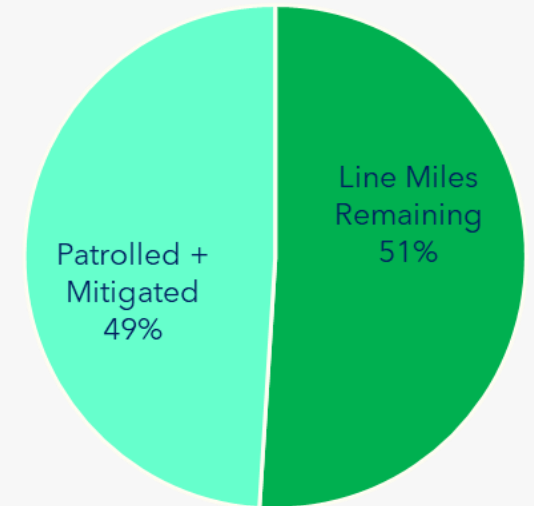
- Appointed a Manager and three PGE Senior Foresters dedicated to the AWRR program - 4th Quarter of 2022
- Developed AWRR BMPs to be released in 2023
- Integrated all work layout and auditing into the Field Maps program. This allows us to gather, organize, and analyze pertinent data to make strategic vegetation management decisions
- Implemented a plan to patrol and mitigate all identified trees within the 10 PGE HFRZs. Increased annual patrol coverage from Zones 1, 4, & 5 in 2022 to include all 10 PGE HFRZs

**Line Miles Planned for Patrol:
2022 & 2023**



Ongoing 2023 Activities:

- Patrol + mitigate all identified vegetation to meet PGE clearance specifications and state clearance requirements in all PGE HFRZs (V5)
- Patrol 1016.43 LM for P1 trees
- Patrol + mitigate identified P2 trees in all PGE HFRZs. *Currently 111 P1/P2 & over 12k V5 identified trees have been mitigated*



**AWRR V5 Patrol + Mitigation:
2023 Current Progress**

Ignition Prevention Inspections

Changes reflected in the 2023 WMP

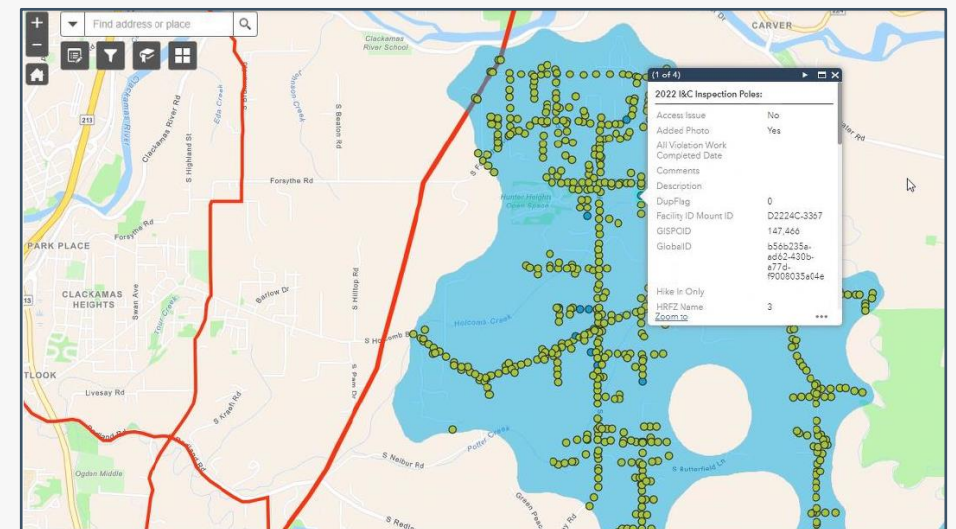
- Incorporates Division 024 rules and requirements adopted through AR 638
- Includes detail on Ignition Prevention Inspection Procedures, Standards, Program Oversight, and Timing

Status of Year 2023 Ignition Prevention Inspections

- PGE provided notice to Operators of changes to PGE HFRZs on December 23, 2022 (OAR 860-024-0011(2)(b))
- PGE conducts Ignition Prevention Inspections on an annual basis, this year's inspections are approx. 70% complete
- In addition to PGE corrections, notices of violations have been sent to other Operators within 15 days of discovery (OAR 860-024-0018(6))

Year 2023 Goals

- Inspection Quantities - approx. 26,000 poles/structures (HFRZs 1-10 + PGE Generation and Transmission Assets Outside Service Territory)
- Complete inspections on or before July 31, 2023



Operating Protocols

1

Device Settings



Normal



Fire Season



Red Flag Warning

2

Fire Season Work Practices

- Fire Trailer
- Fire Season Suppression Tools and Equipment
- Fire Season Tailboard Supplement
- Red Flag Warning

3

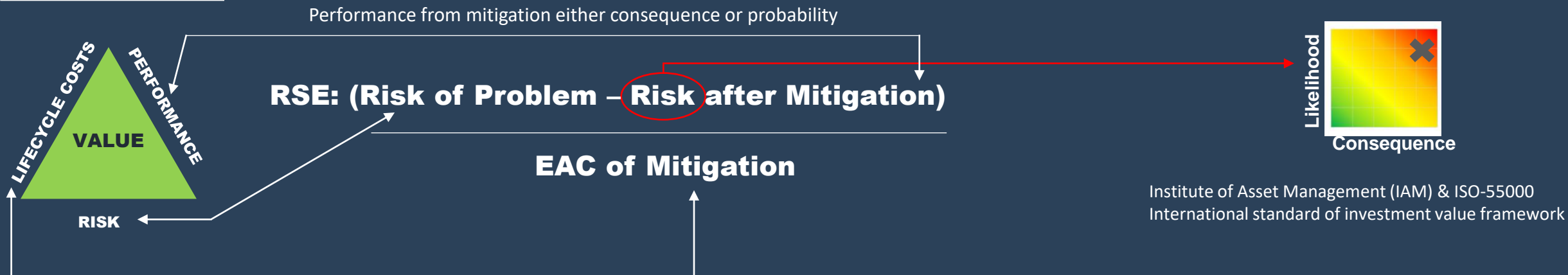
Employee and Supplier Training

- Fuels, weather and topography impact on wildfire ignition and spread
- Fire weather zone forecasts
- Suppression tools and equipment
- Basic suppression tactics
- Lookouts, communications, escape routes, and safety zones

WILDFIRE RISK INFORMED DECISION MAKING IN ACTION

Key takeaway: Wildfire risk is informing highest value investments using IAM framework

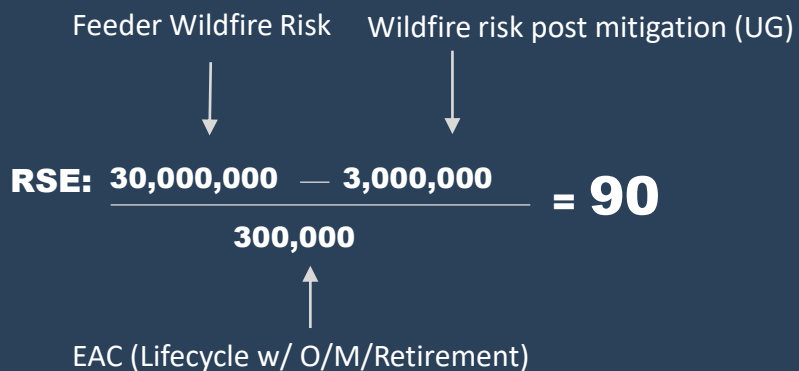
MODEL DEFINITION



RSE: Risk Spend Efficiency = risk reduction per dollar of investment to quantify value across all risk dimensions i.e. safety/environmental etc.

EAC = Equivalent annual lifecycle cost (O/M + retirement) at discount rate of capital and expected life.

MODEL USE CASE (illustration)



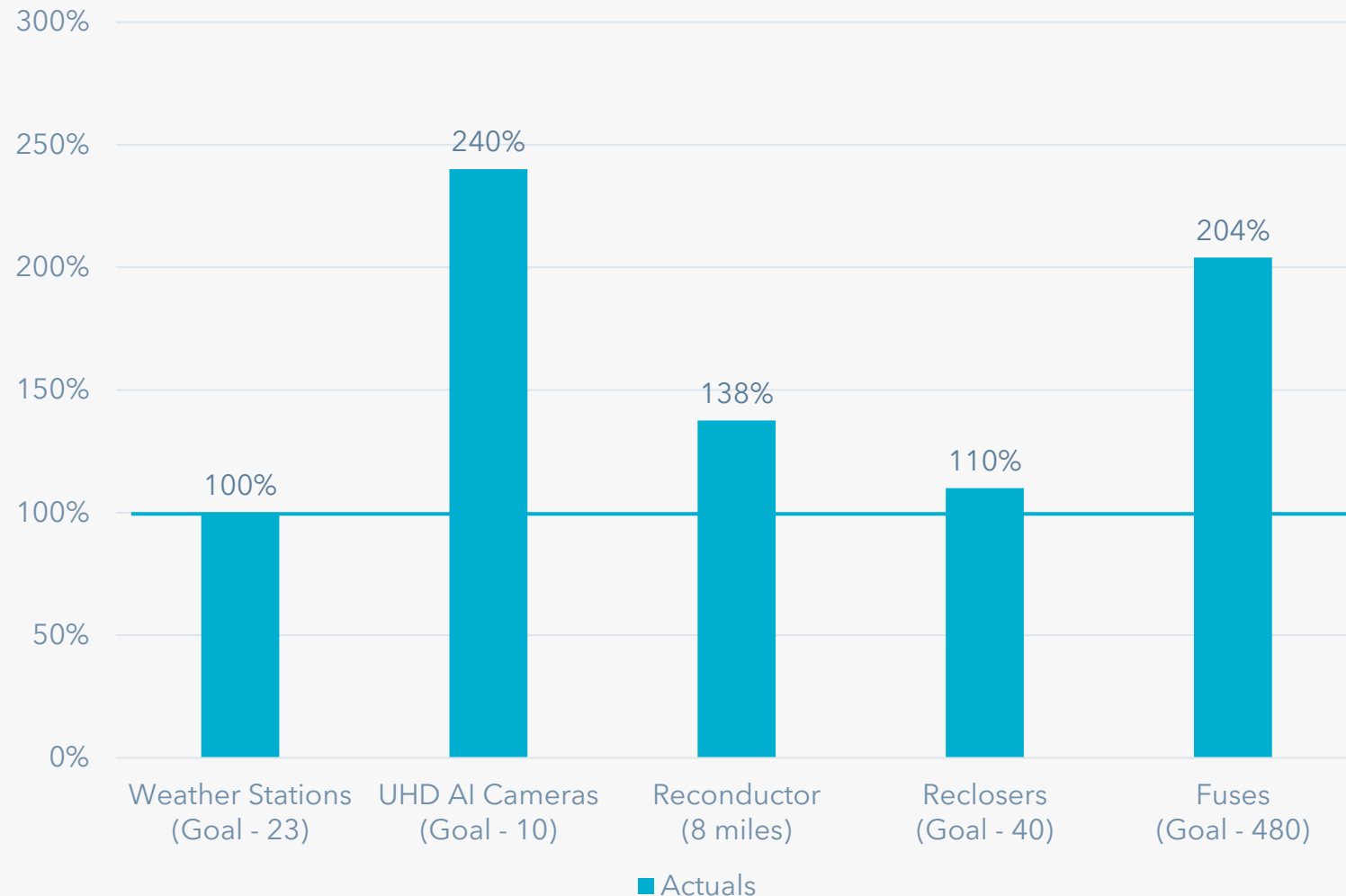
	Undergrounding	Tree Wire	ACSR	PSPS	Camera + Viper	No action
RSE	90	56	28	1.5	15	-200

Best value mitigation for that asset **at that location**

Capital Investments



2022 Performance



2023 Plan

Situational Awareness/Programmatic

Investment	Qty
Weather Stations	30
AI-Equipped HD Cameras	6
Reclosers	50
Fire-Safe Fuses	600
Early Fault Detection (EFD)	1 feeder

Resiliency

Investment	Miles
Underground (4 feeders)	30
Reconductor (1 feeder)	15
TOTAL	45

Enhancing Situational Awareness

Early Fault Detection System

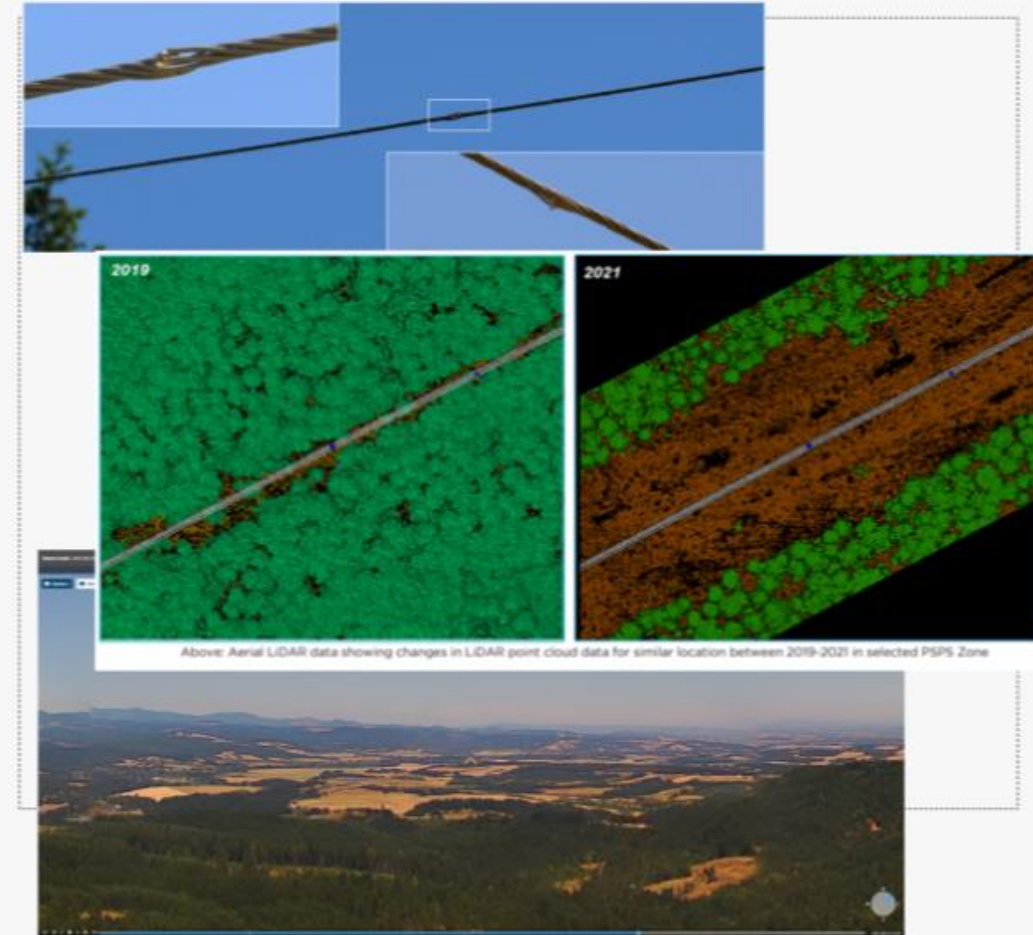
Detects radio frequency signals on the distribution system that are present when equipment on the circuit begins to fail, but has not escalated to an arcing fault

Artificial Intelligence Cameras

Detects ignitions and triangulates their location within 100m accuracy to fire agencies in real-time

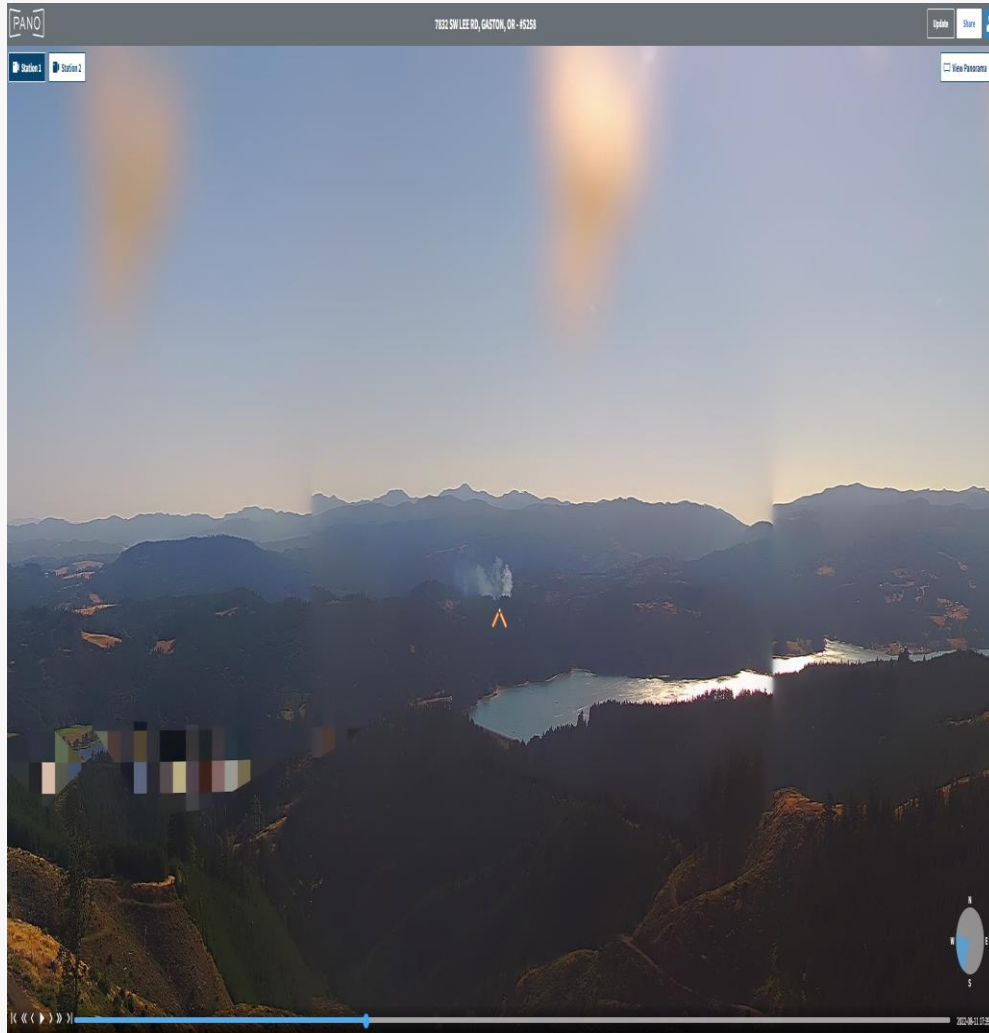
Wildfire/Asset Management Technology and Processes

Using drive by and aerial inspection data including hyper-spectral imagery/Lidar to perform both-as-built records and inform design

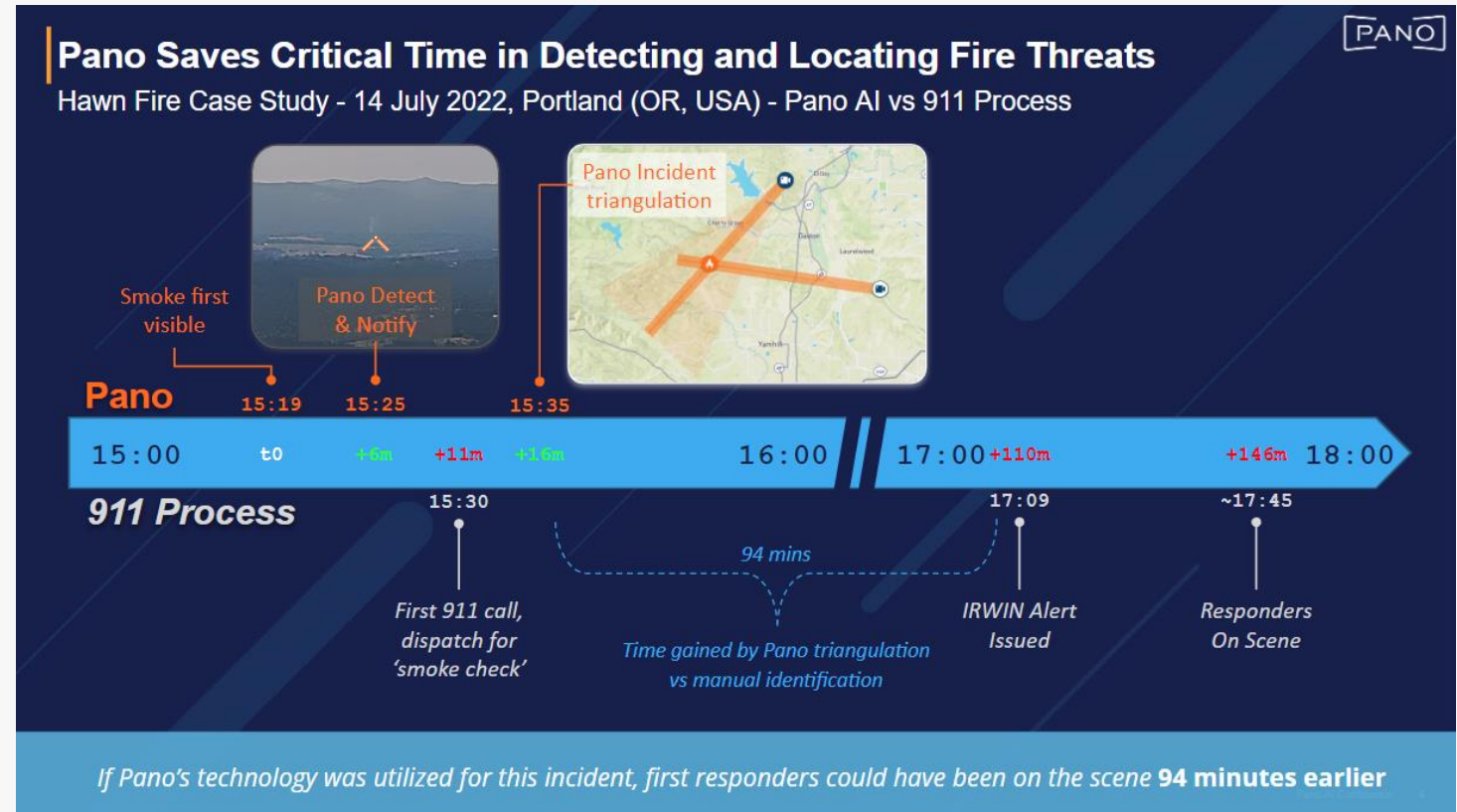


From top to bottom: a damaged conductor flagged by early fault detection sensors; LIDAR data of vegetation density/health; a fire detected by AI cameras

World leading ignition detection

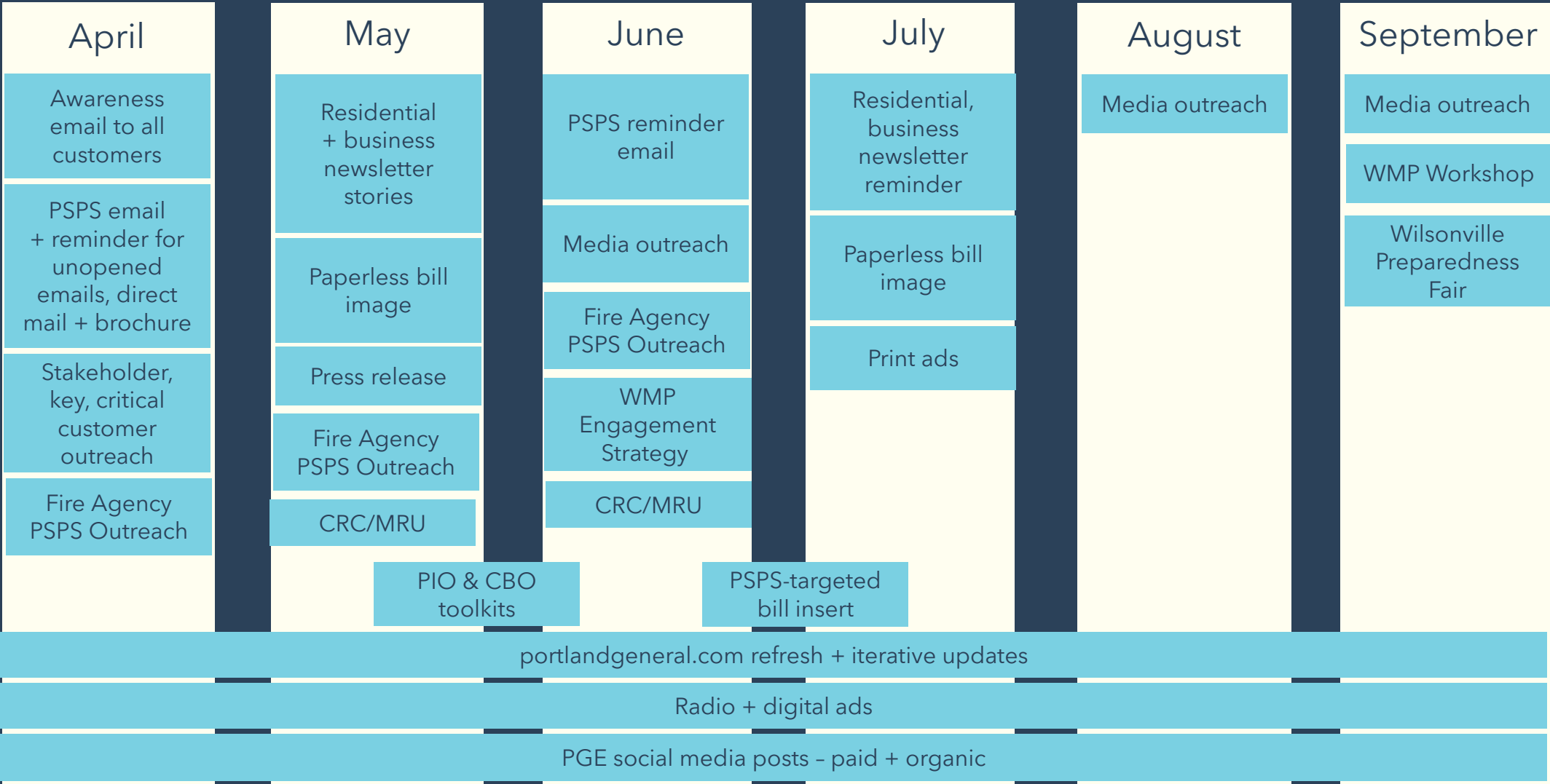


Hawn fire 7.14.22 zone 9



Case study of ignition timing vs historical

Communicating preparedness





Public Safety Partner Coordination Strategy

Prior to Fire Season

- PGE will include wildfire preparedness topics in one of the all-hazards quarterly summits with Public Safety Partners
- PGE will host at least one annual pre-Fire Season tabletop exercise with Public Safety Partners

During Fire Season

- PGE informs Public Safety Partners of in-season operational changes to the PGE system
- Should a fire threaten PGE infrastructure, a company representative will coordinate with agencies and/or Incident Management Team (IMT)
- PGE notifies Public Safety Partners if an incident requires the activation of the PGE CIMT
- After wildfire incidents, PSPS events or PGE-led tabletop or functional exercises, PGE will conduct an After Action Review (AAR) process

After Fire Season

- PGE solicits feedback from Public Safety Partners about the program and opportunities for improvement

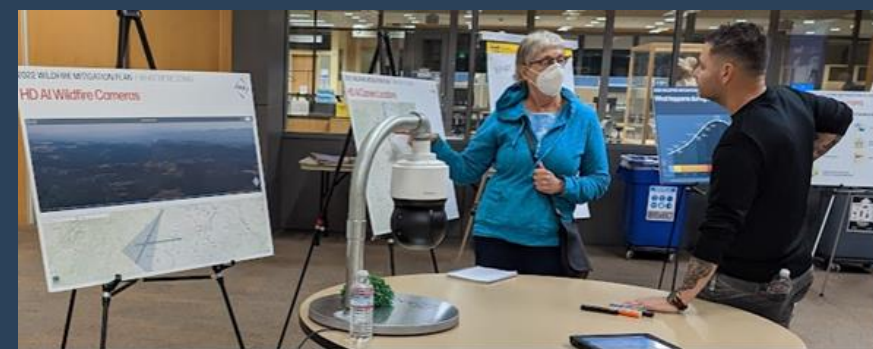
WMP Engagement Strategy

2022 Lessons Learned

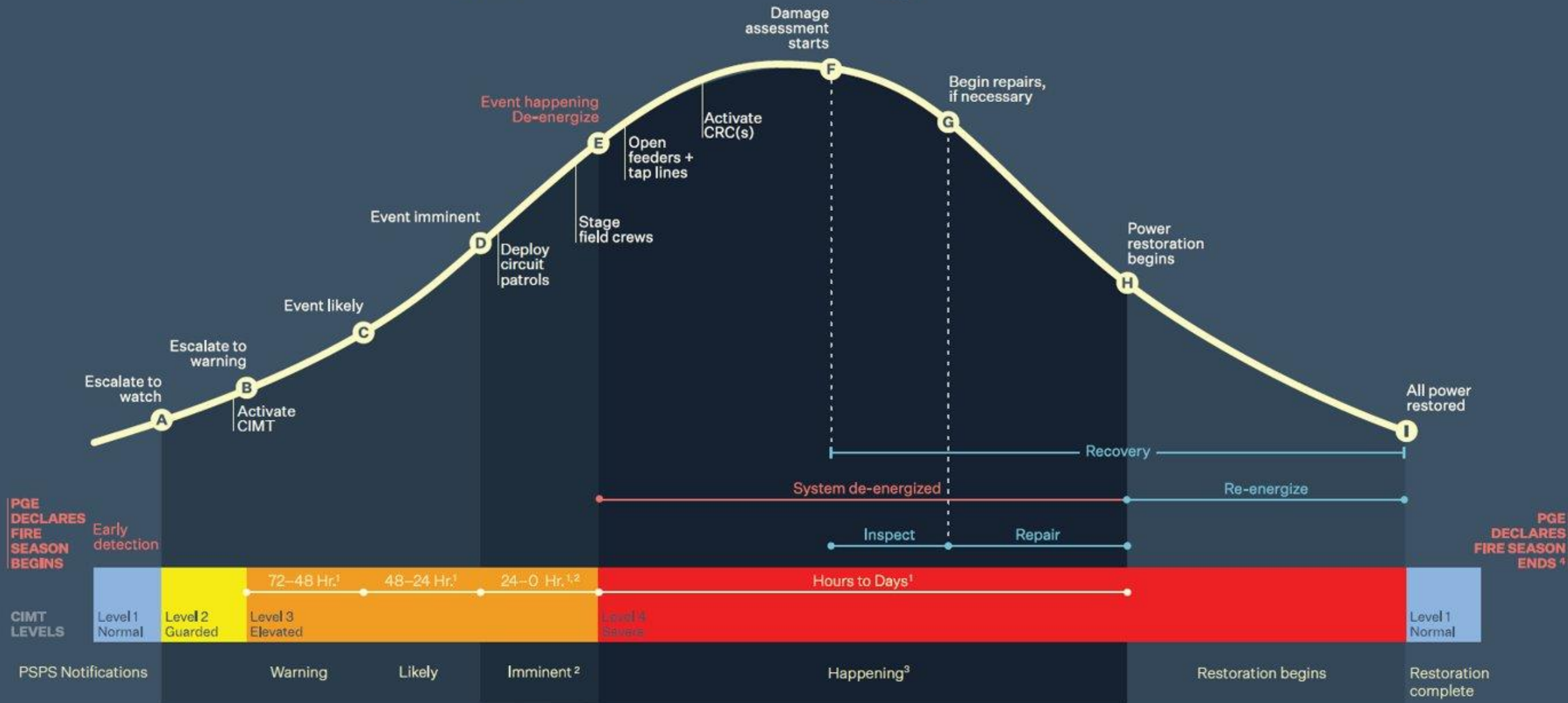
- Timing of sessions, and location of in-person sessions, is critical
- Issues and concerns were broader than utility wildfire mitigation

2023 Plan

- Increase quantity of in-person sessions
- In-person sessions will be within, or adjacent to, PSPS areas
- Hold sessions as early as June 2023
- A wider range of stakeholders, both internal and external, will be invited to participate in each event
 - Create a more community-centric and holistic experience for customers

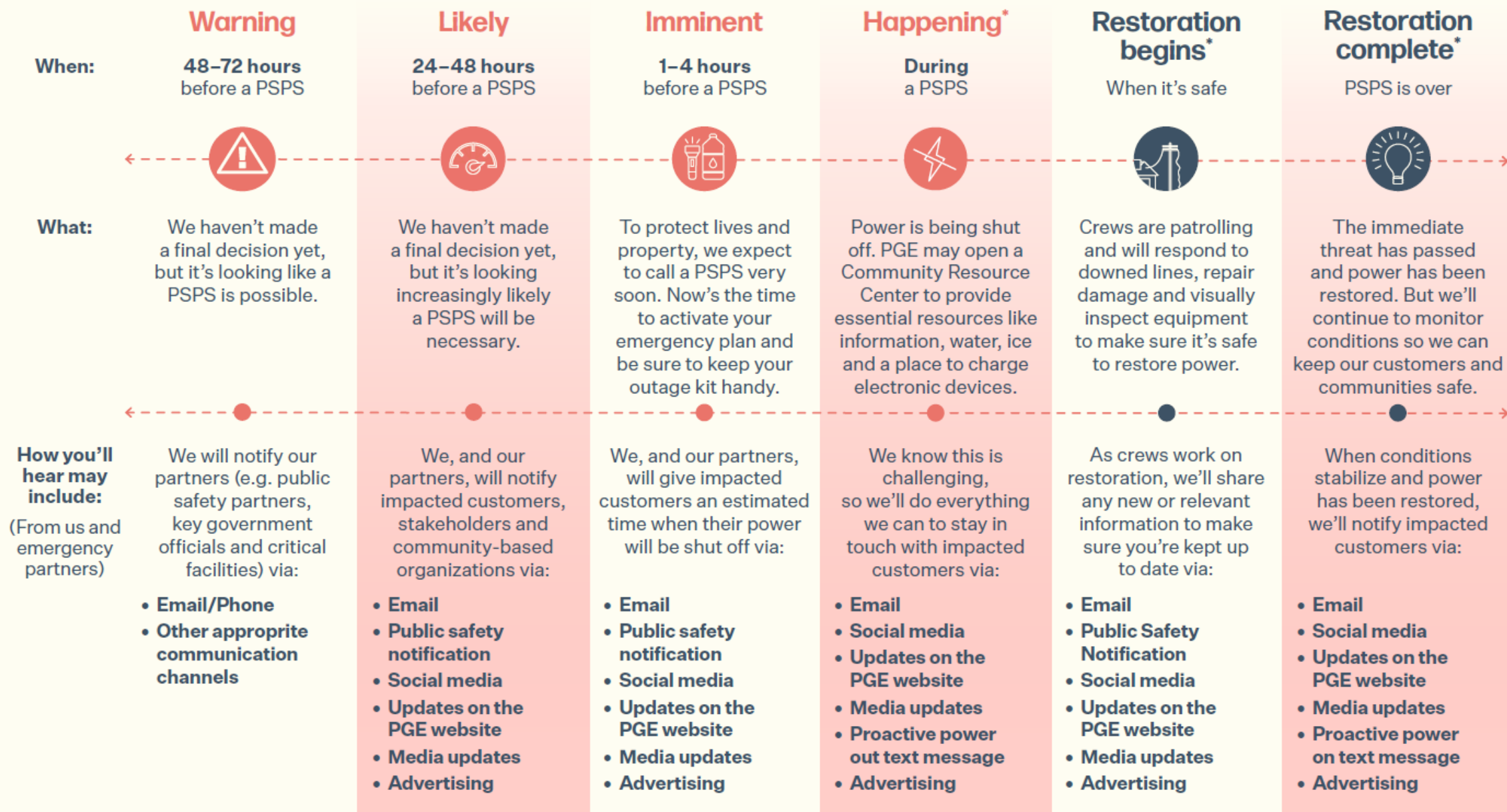


What happens during a PSPS event



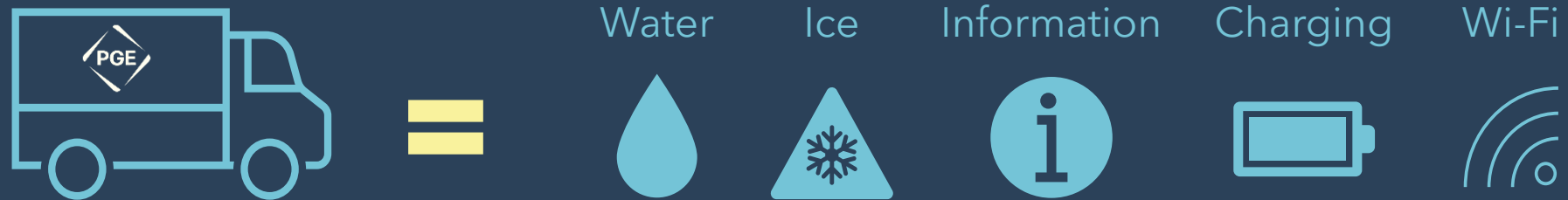
1. Actual timeline dependent on severity of factors. 2. In this phase we communicate status to all customers, per compliance, 1-4 hours prior to the outage. 3. In this phase PGE will provide status updates at least every 24 hours. 4. PGE will submit an Annual OPUC Report no later than December 31st.

PSPS notifications to partners, customers and other stakeholders



*PGE will provide status updates at least every 24 hours

Recharge Relief Activation Strategy



WHAT IS RECHARGE RELIEF?

- Nimble Mobile Readiness Units (MRUs) deployed within hours of a Public Safety Power Shut-off serving impacted communities
- PGE branded trailer providing support and information, staffed by experienced emergency management professionals, and adaptable to everchanging weather conditions, variety of terrains, and spaces

HOW DOES IT WORK?

- A Recharge Relief MRU will be at a predetermined location as a Public Safety Power Shut-off is activated
- Recharge Relief MRUs are approachable by walk-up, have tables and chairs under an awning, and drinkable water for consumption all while customers charge and get the information they need

WHERE IS IT LOCATED?

- PGE's goal is for Recharge Relief MRUs to be in or near active PSPS zones where vulnerable customers need us most
- A diversity, equity, and inclusion lens was used to determine where to locate and we're making sure the places we choose are fully accessible, on or near main roads, and likely known locations within the community
- Locations will be shared with impacted consumers when the PSPS is activated, on PGE's wildfire PSPS page
- Some PSPS areas may need to share a Recharge Relief MRU depending on availability and staffing

Proposed Project: Portable Battery Pilot

Budget: \$100,000

Objective: Increase resilience for
vulnerable customers affected by PSPS



- Small scale study to provide portable batteries to med cert customers affected by PSPS
 - Note: These are not grid tied batteries, which would be about 10x the cost to provide.
- PGE will study the procurement, distribution, and customer experience
- Initial intent is to provide backup for medical devices, but possible expansion could include devices for keeping medication cold
- Extensive research was conducted prior to proposing this pilot
 - In-depth interviews with adults living with disabilities, caregivers, and community service providers
 - Quantitative survey research of adults with disabilities and caregivers
 - Secondary research of peer utilities in California, interviews with battery manufacturers, and technical studies by EPRI



September 2022 PSPS Event Lessons Learned

- Host a Public Safety Partner workshop to allow external stakeholders to advise and support clarification of cross-jurisdictional coordination responsibilities for alerts and warnings
- Evaluate alongside Public Safety Partners the use of Wireless Emergency Alerts for PSPS events and define policies and agreements to facilitate its successful deployment and reduce “overspray” confusion for notification recipients
- Build a county partnership model to support Public Safety Partner-hosted locations with water and ice donations
- Hold a work session with Public Safety Partners, including ESF-12, to share information about CRCs, locations, information sharing, and other incident support services for community members
- Develop centralized dashboards, status hubs, and granular data feeds readily accessible to all stakeholders, with emphasis on dashboards targeted to all PGE employees, Public Safety Partners, and customers
- Evaluate a method to further parse GIS data to identify the current stage of the PSPS event for each PSPS Area

Active Participation in National and International Forums

- Energy Emergency Management Team (EEMT)
- International Wildfire Risk Mitigation Consortium (IWRMC)
- Electric Power Research Institute (EPRI)
- Oregon Joint Use Association (OJUA)
- Western Energy Institute (WEI)
- Edison Energy Institute (EEI)
- U.S. Department of Energy (DOE)
- Regional Disaster Preparedness Organization (RDPO)
- Oregon Wildfire Detection Camera Interoperability Committee



Thank you