Oregon Energy Security Plan: Energy Systems Risk Assessment

Tribal Public Health Emergency Preparedness Conference

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OREGON DEPARTMENT OF ENERGY

About the Agency

LEADING OREGON TO A SAFE, EQUITABLE, CLEAN, AND SUSTAINABLE ENERGY FUTURE

Our Mission

The Oregon Department of Energy (ODOE) helps Oregonians make informed decisions and maintain a resilient and affordable energy system. We advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.

What We Do

On behalf of Oregonians across the state, ODOE achieves its mission by providing:

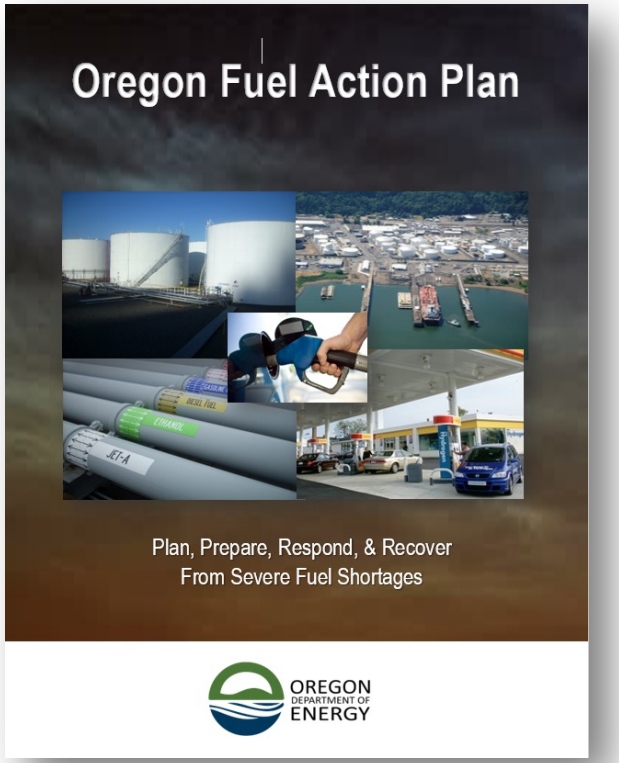
- A Central Repository of Energy Data, Information, and Analysis
- A Venue for Problem-Solving Oregon's Energy Challenges
- Energy Education and Technical Assistance
- Regulation and Oversight
- Energy Programs and Activities

About the Agency

NUCLEAR SAFETY AND EMERGENCY PREPAREDNESS DIVISION

ESF 10: Hazardous Materials - Nuclear

ESF 12: Energy - Liquid Fuels



ESF 12: Energy - Security

State Energy Security Plans

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Required Contents of State Energy Security Plans

1. Address all energy resources and regulated and unregulated energy providers
2. Provide state energy profile to include an assessment of energy production, transmission, distribution, and end-use
3. Address potential hazards to the electricity, liquid fuels, and natural gas sectors *(physical and cybersecurity threats and vulnerabilities)*
4. Provide risk assessment of energy infrastructure and cross-sector interdependencies
5. Provide risk mitigation approach to enhance reliability and end-use resilience
6. Address Multi-state regional coordination, planning, and response

INFRASTRUCTURE INVESTMENT & JOBS ACT

Senate Bill 1567

Sponsored by Senators DEMBROW, MANNING JR, FREDERICK, Representatives DEXTER, EVANS, GRAYBER, PHAM; Senators ARMITAGE, GELSER BLOUIN, GORSEK, JAMA, LAWRENCE SPENCE, PATTERSON, STEINER HAYWARD, TAYLOR, WAGNER, Representatives ALONSO LEON, CAMPOS, GOMBERG, HELM, HOLVEY, HUDSON, NATHANSON, NELSON, NOSSE, POWER, REARDON, REYNOLDS, RUIZ, SANCHEZ, SCHOUTEN, WITT (Presession filed.)

Completed State Energy Security Plans – September 30, 2024

What is the Energy Security goal?

To ensure a reliable and resilient supply of energy at an affordable price – through efforts to identify, assess, and mitigate risks to energy infrastructure and to plan for, respond to, and recover from events that disrupt energy supply

Energy Security Plan Development

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STRATEGY

Bring together all relevant energy information into a single plan that evaluates Oregon's energy security status and provides a roadmap to improving energy security and resilience over time

Oregon Energy Security Plan: Fuel Resilience

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SB 1567 – Recommend Strategy to Increase geographic diversity of fuel storage in Oregon

Senate Bill 1567

Sponsored by Senators DEMBROW, MANNING JR, FREDERICK, Representatives DEXTER, EVANS, GRAYBER, PHAM; Senators ARMITAGE, GELSER BLOUIN, GORSEK, JAMA, LAWRENCE SPENCE, PATTERSON, STEINER HAYWARD, TAYLOR, WAGNER, Representatives ALONSO LEON, CAMPOS, GOMBERG, HELM, HOLVEY, HUDSON, NATHANSON, NELSON, NOSSE, POWER, REARDON, REYNOLDS, RUIZ, SANCHEZ, SCHOUTEN, WITT (Presession filed.)

- Prioritize most vulnerable and isolated communities to Cascadia impacts
- Assess viability of expanding storage capacities at public facilities
- Assess viability of partnering with private-sector companies that support state response-recovery efforts to expand storage capacities at existing fuel sites
- Evaluate seismic resilience of existing fuel storage facilities considered for expansion
- Identify-mitigate barriers to implement geographically distributed fuel network


State Motor Pool


ODOT Maintenance Yard


City of Corvallis Public Works

Increasing Fuel Capacity

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ASSESS FUEL STORAGE CAPACITY IN OREGON

- In Progress – Engaging state agencies, local governments, and Tribes on possible locations to increase fuel storage

2024 Baseline Licensed Fuel Capacity

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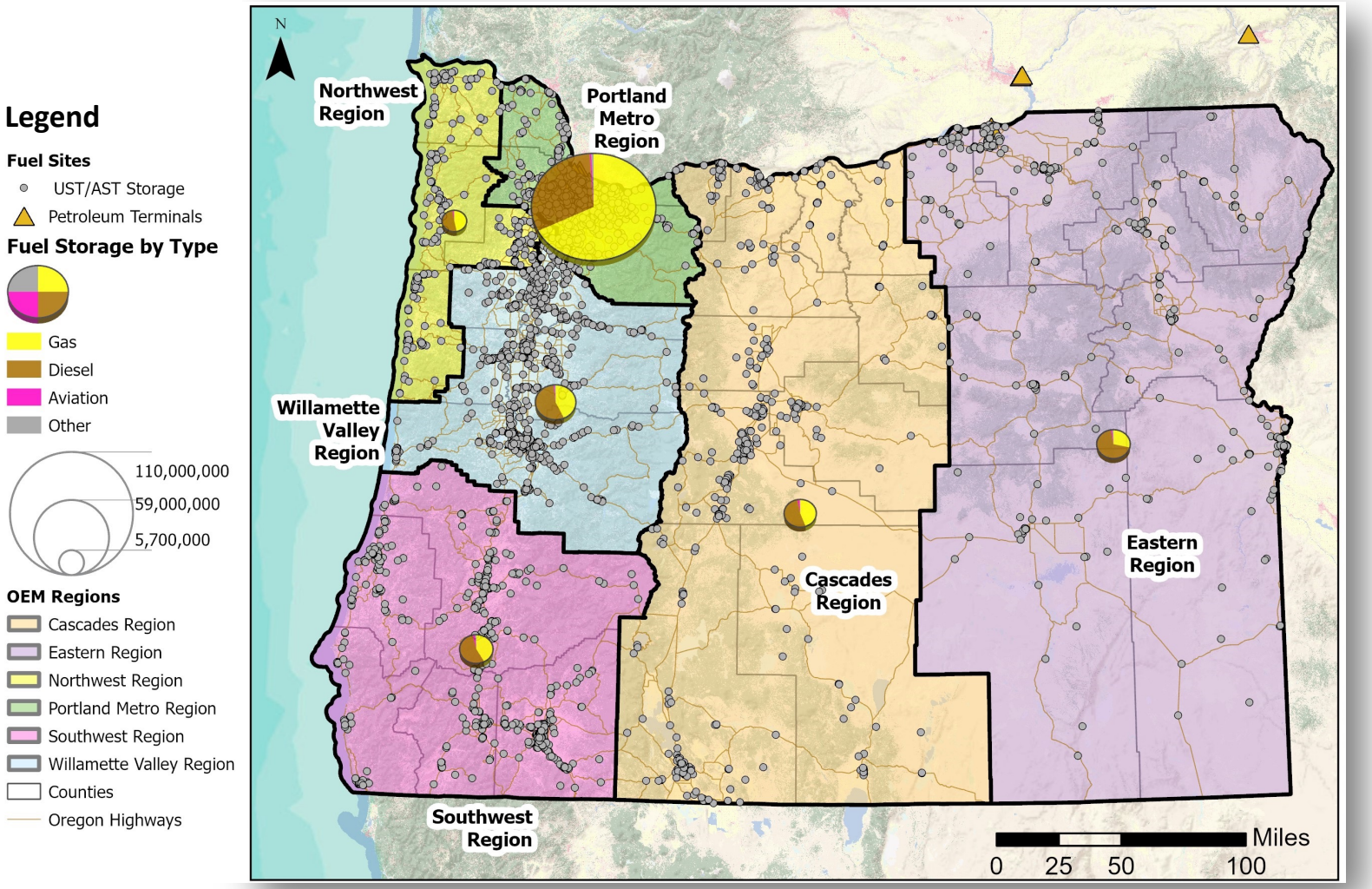
Baseline Total Fuel Storage By Fuel Type and Region

TOTAL: Est. 414,170,000 gallons in 8,800 tanks

- Gasoline: 216,420,000 gallons
- Diesel: 192,740,000 gallons
- Jet Fuel: 3,430,000 gallons
- Other: 1,580,000 gallons

Estimates do not include terminal storage capacity



2024 Public Sector Licensed Fuel Capacity

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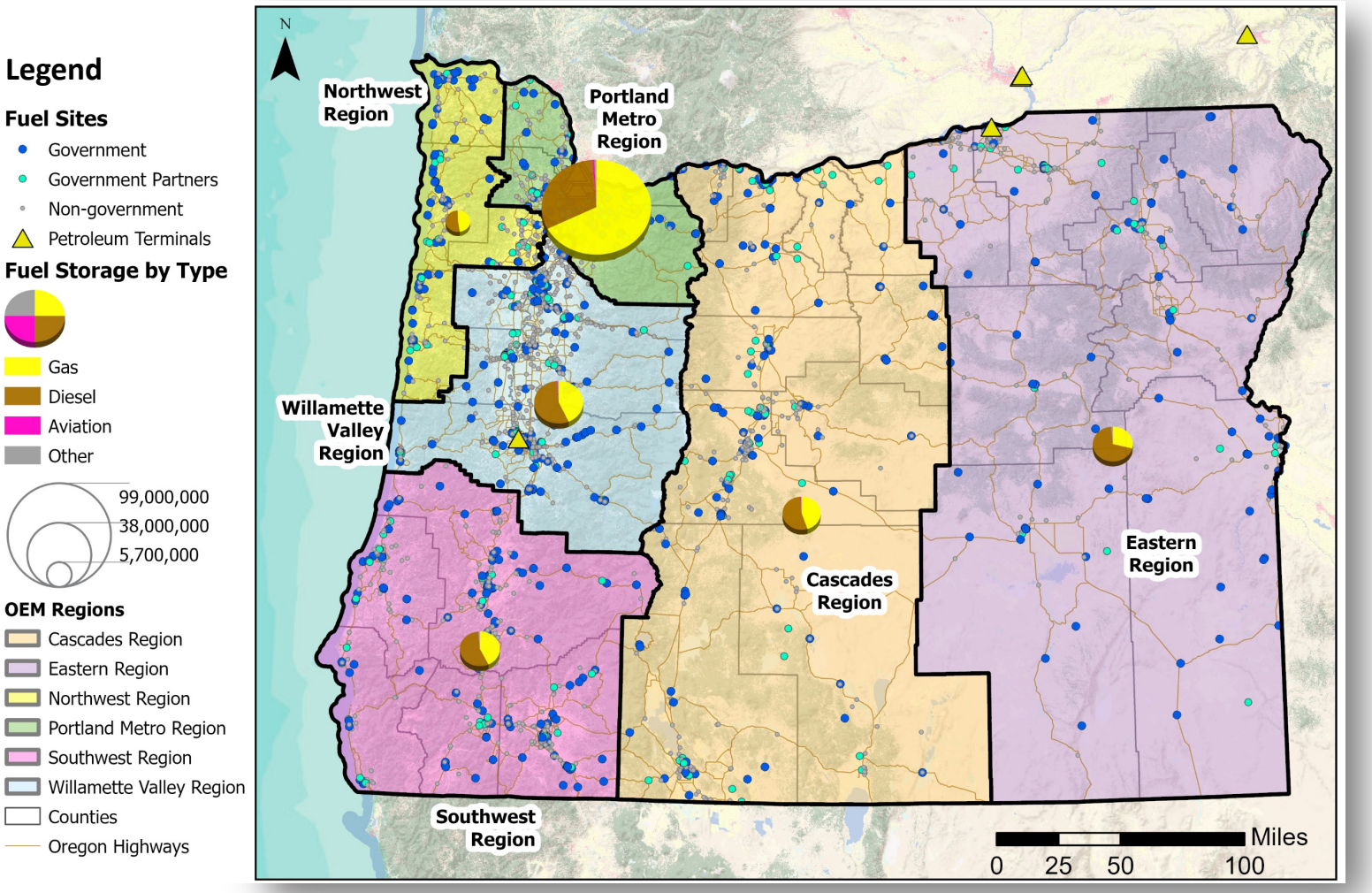
Baseline Total Fuel Storage By Fuel Type and Region

TOTAL: Est. 6,477,000 gallons in 1,060 tanks

- Gasoline: 1,673,000 gallons
- Diesel: 4,138,000 gallons
- Jet Fuel: 663,000 gallons
- Other: 403,000 gallons

Estimates do not include terminal storage capacity



2024 Public Fuel Capacity post CSZ

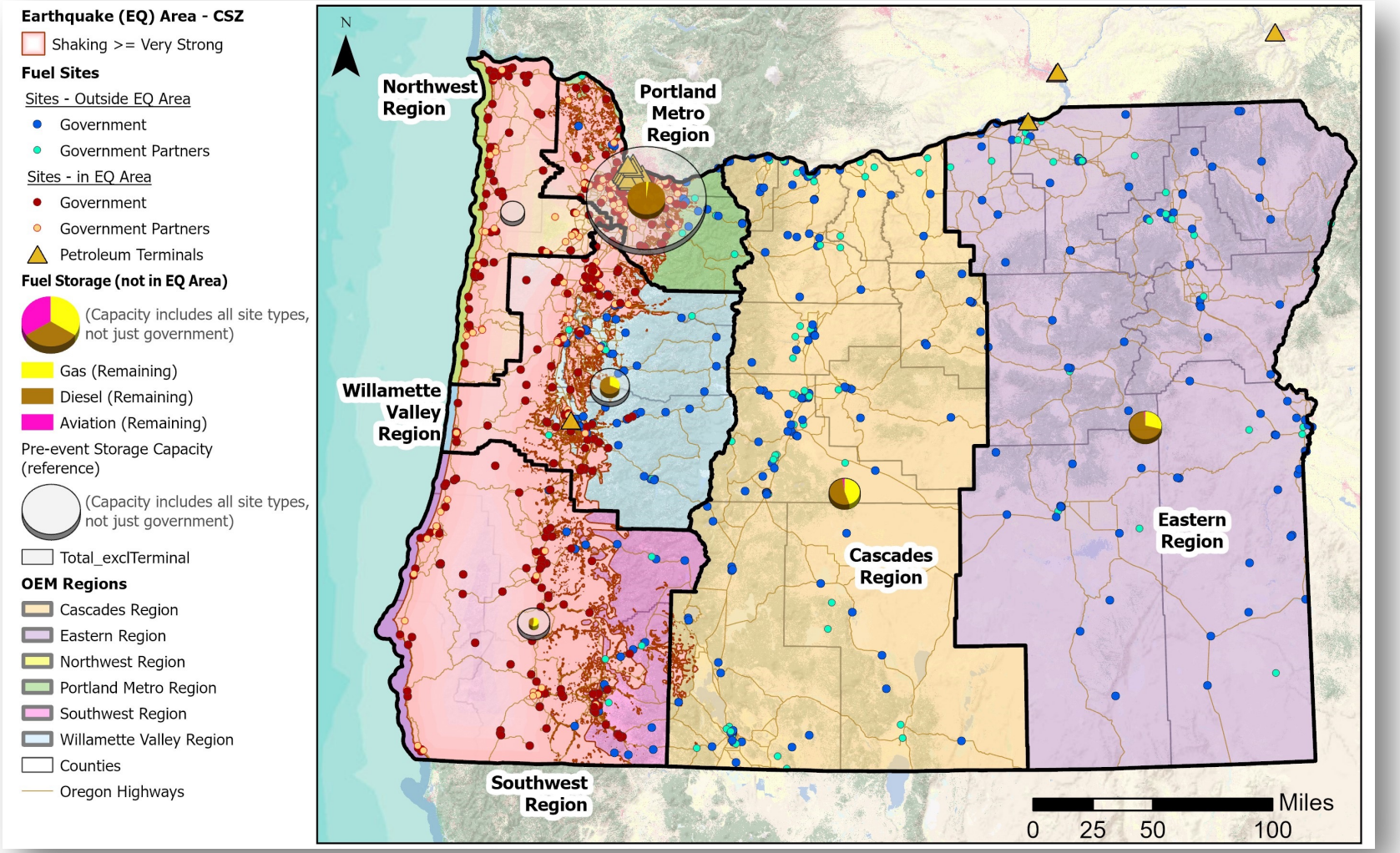
Post-CSZ Event Fuel Sites and Storage By Fuel Type and Region

Future Tribal Collaboration

- Fuel points of Distribution for Tribal Nations
- Potential inclusion of fuel storage layer owned by Tribal Nations in state fuel map - situational awareness

Future ODOE Work

- Finalize screening criteria for optimal fuel expansion
- Outreach to communities



Methods Overview

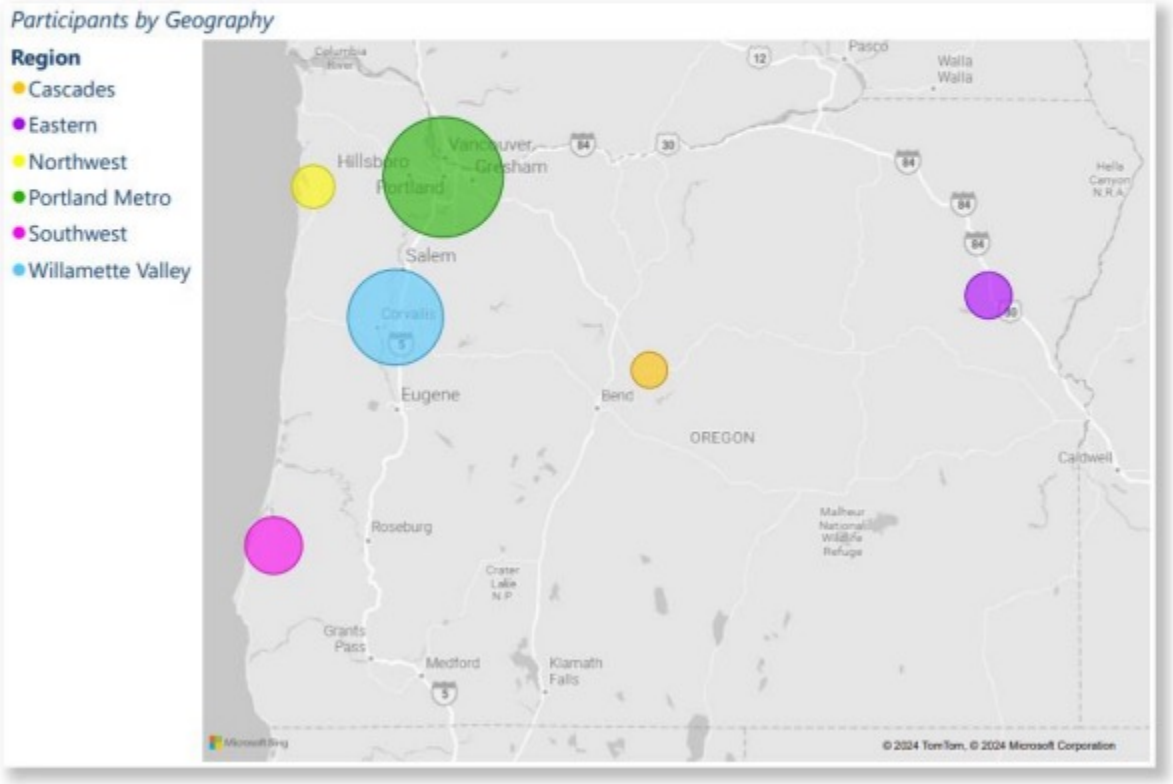
Stakeholder Engagement

Participants

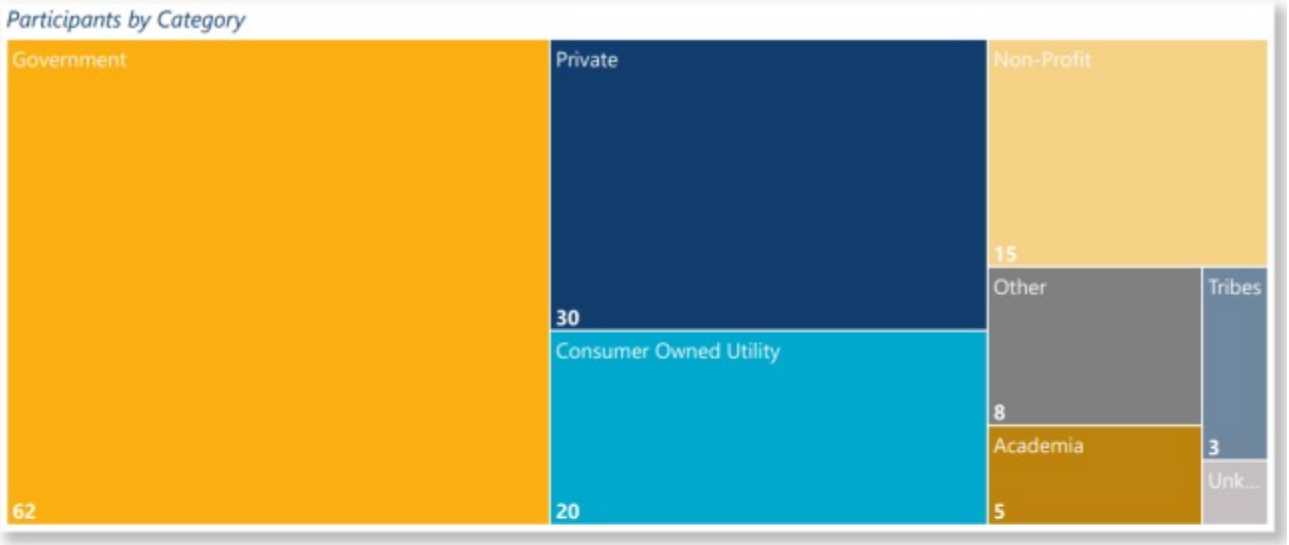
144

Cumulative Regional Participants

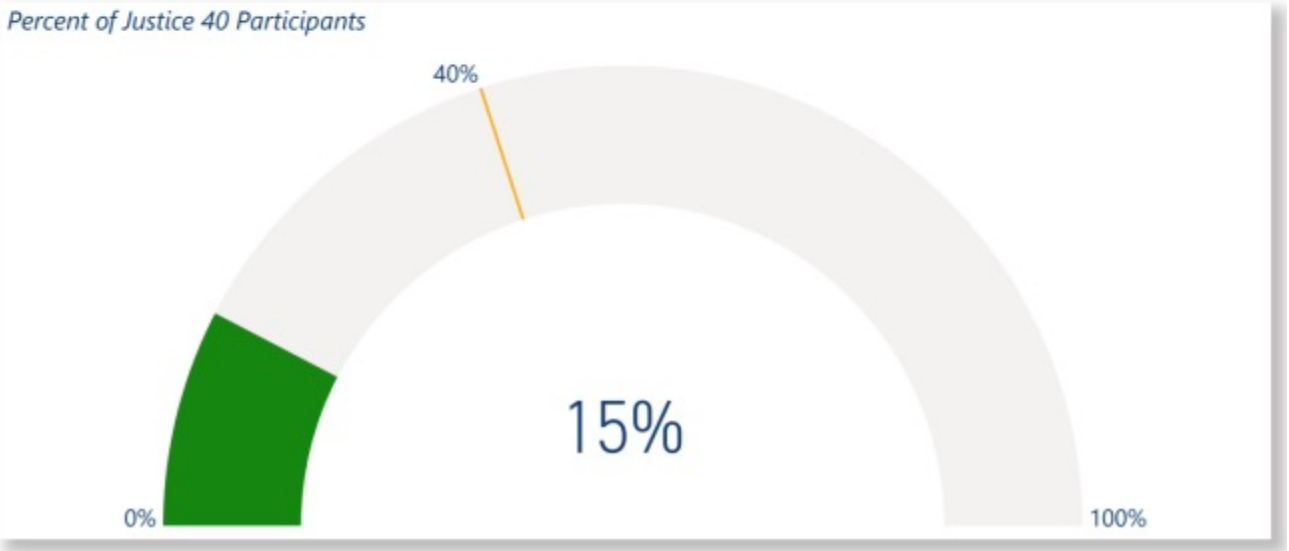
Participants by Geography



Participants by Category



Percent of Justice 40 Participants

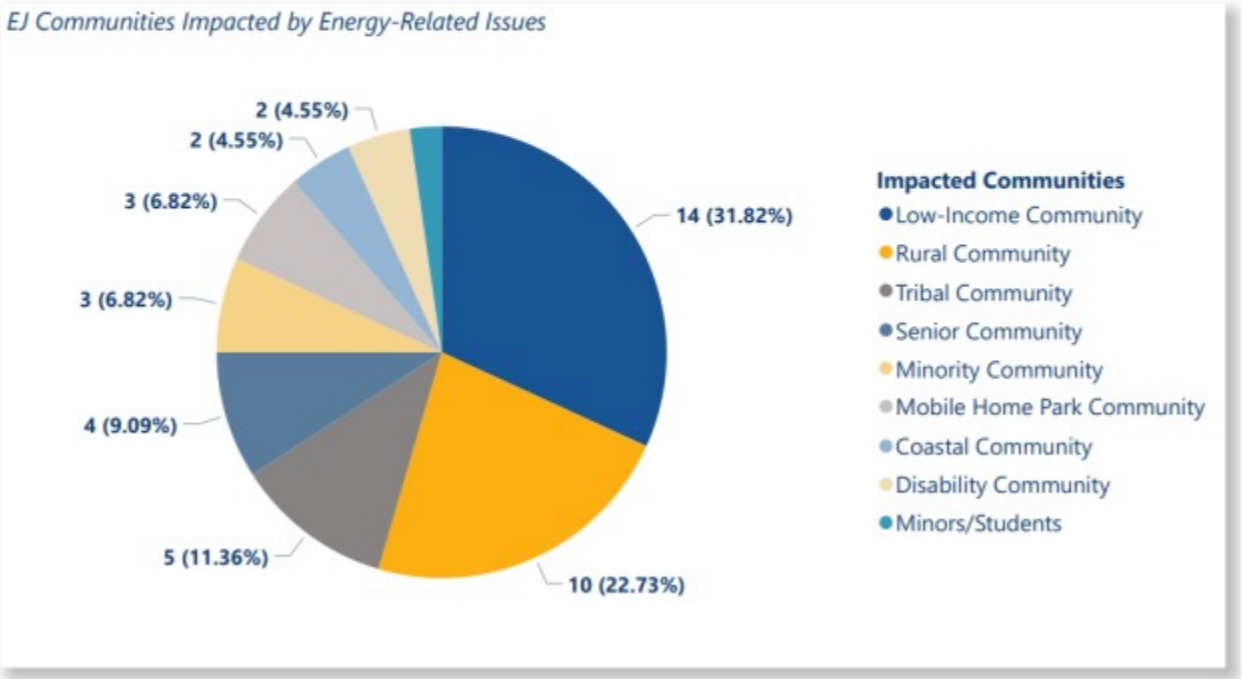


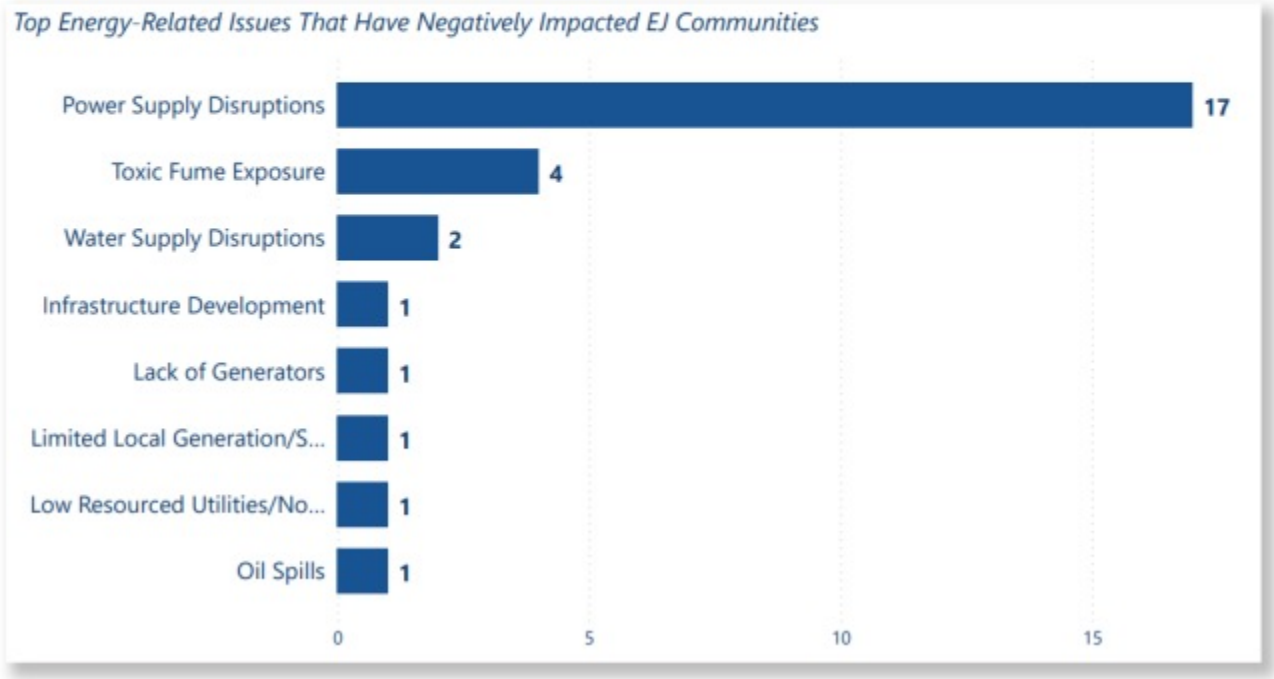
Stakeholder Engagement

Preparedness

38

No. Respondents with Energy-Related EJ Concerns



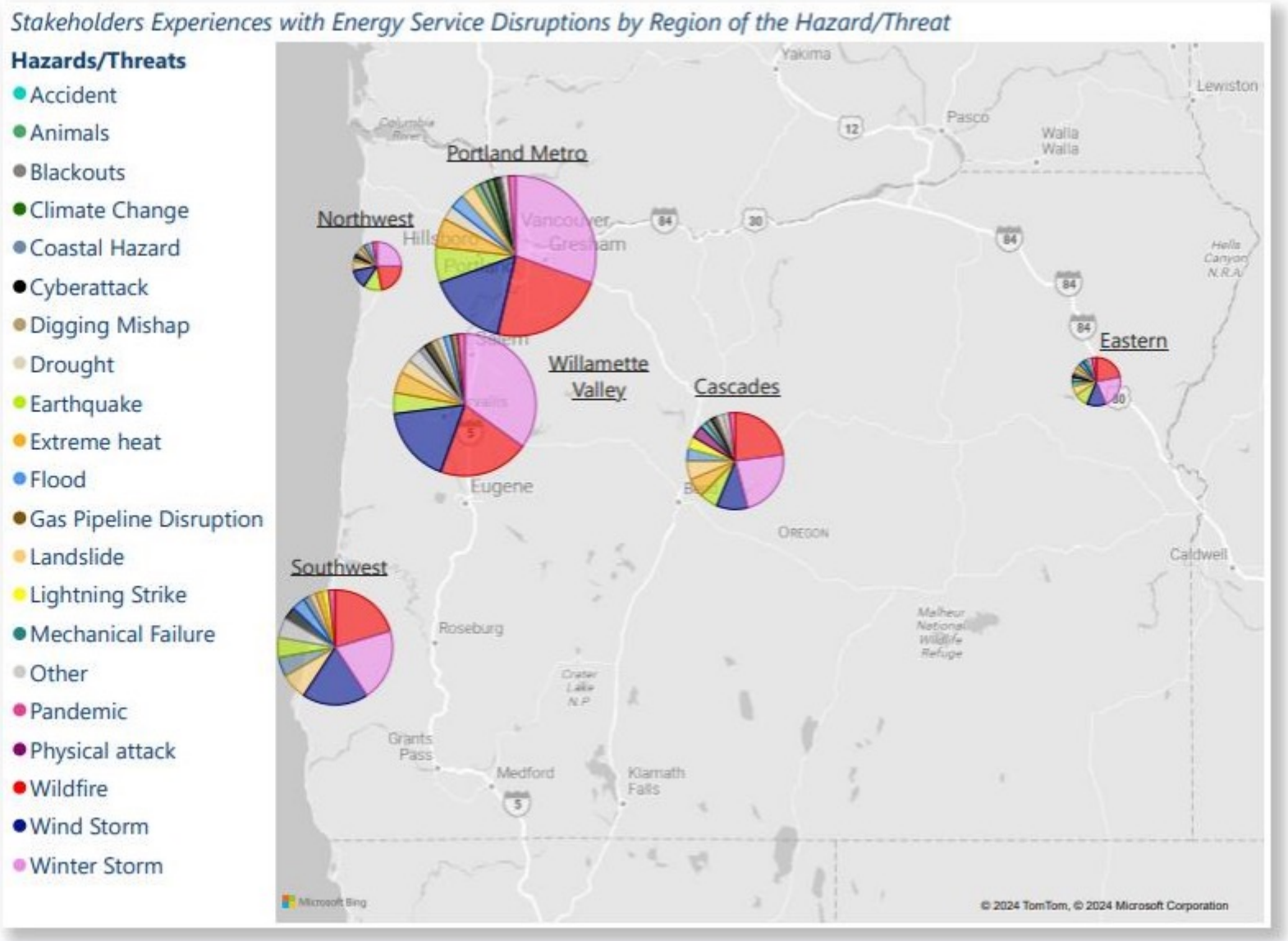


Stakeholder Engagement

Threats

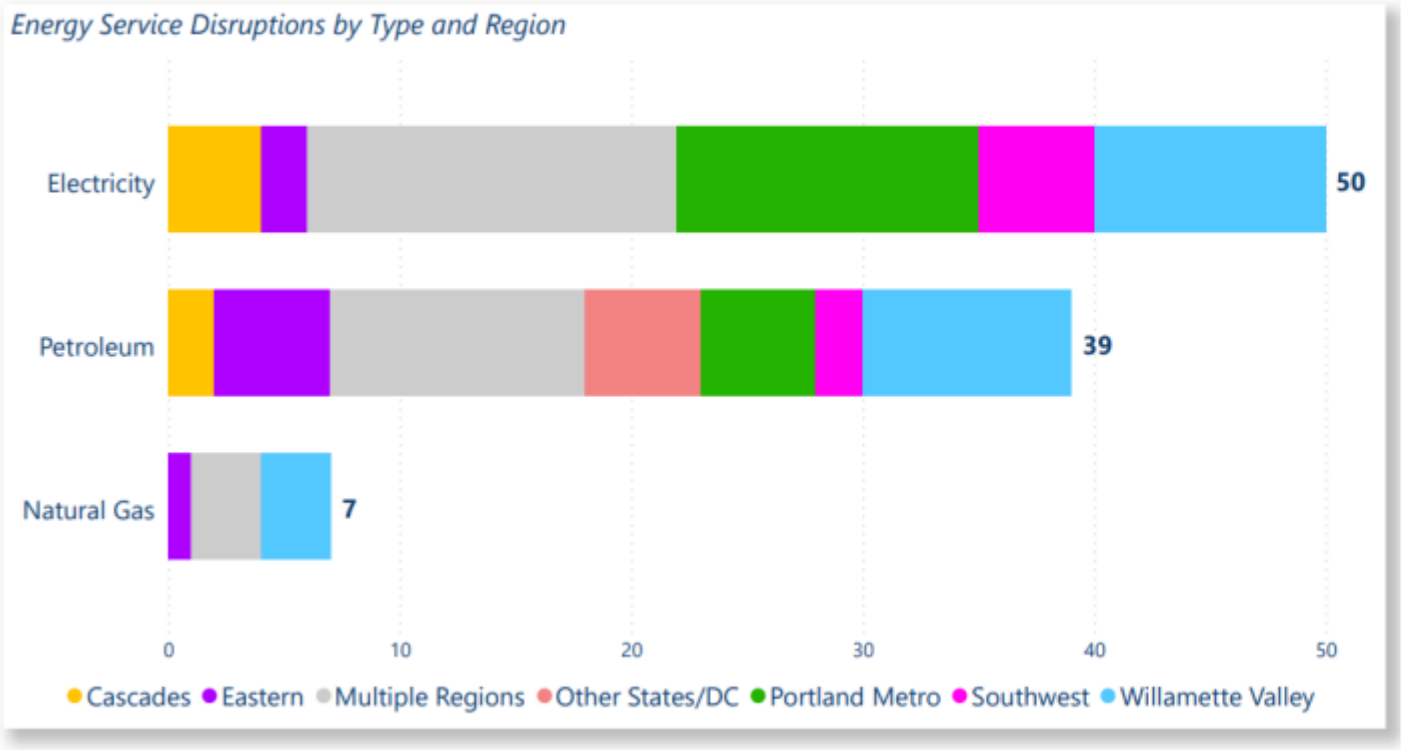
59

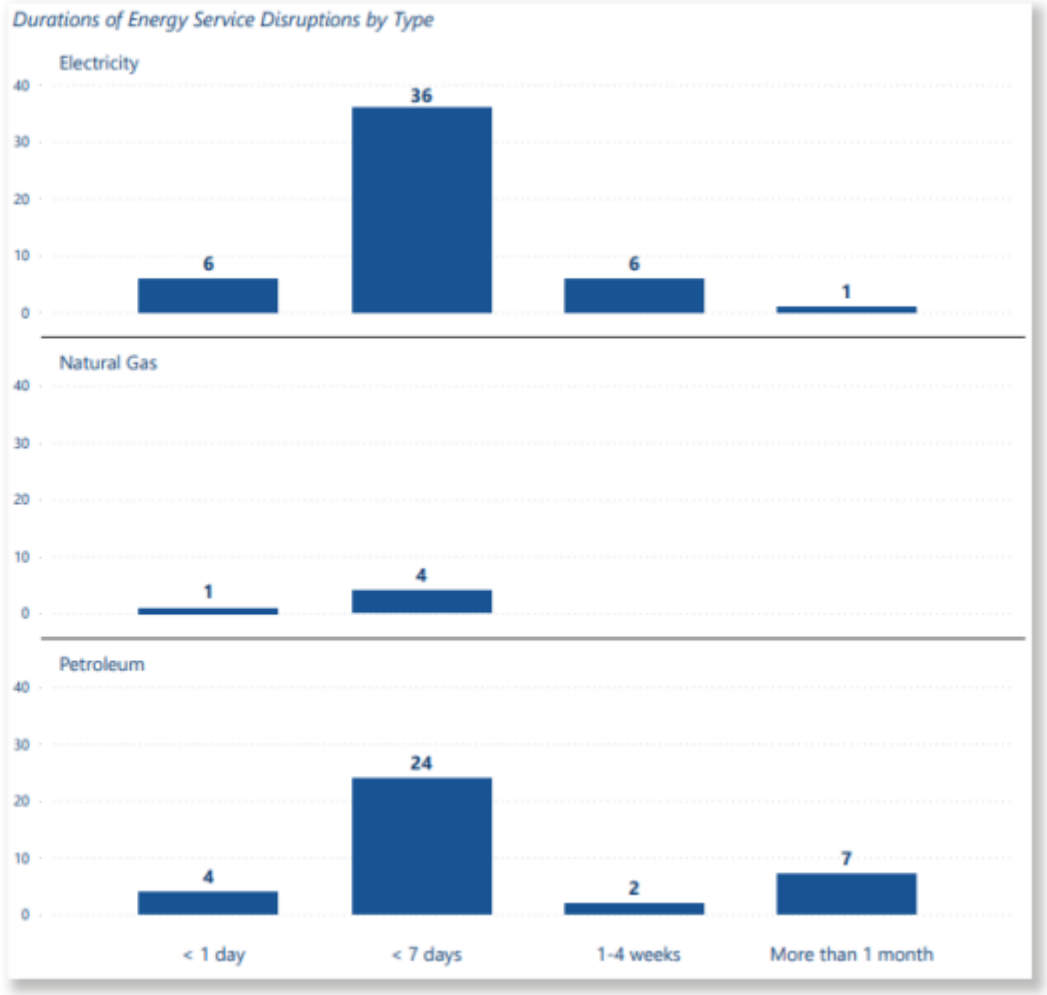
No. Stakeholders that Experienced Energy Service Disruptions



Stakeholder Engagement

Impacts





Risk Assessment

Threats Analyzed

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Natural Hazards

- Cascadia Subduction Zone Earthquake (9.0) and Tsunami (**CSZ**; includes Landslides & Liquefaction)
- **Drought**
- **Flood** (100-year)
- **Lightning**
- **Wildfire**
- **Wind Storm**
- **Winter Storm**

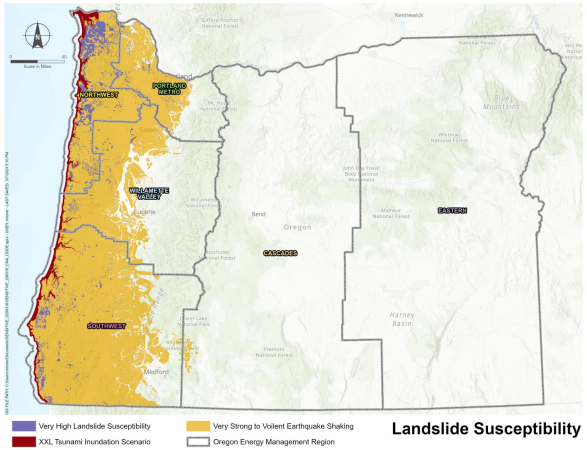
Human-Caused Threats

(intentional attacks on energy systems)

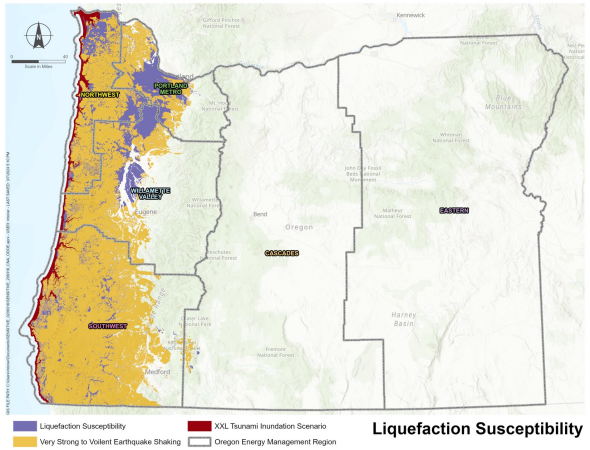
- **Cyberattacks**
- **Physical Attacks**

Risk Assessment

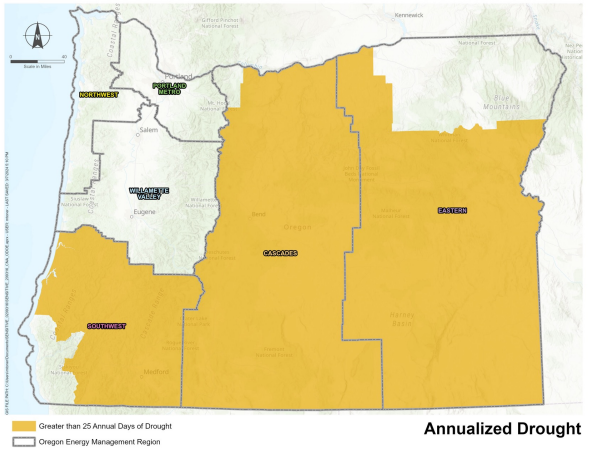
Natural Hazard Zones



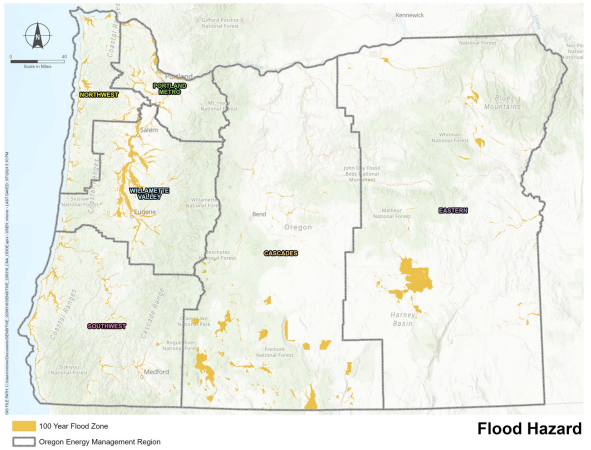
Landslide Susceptibility



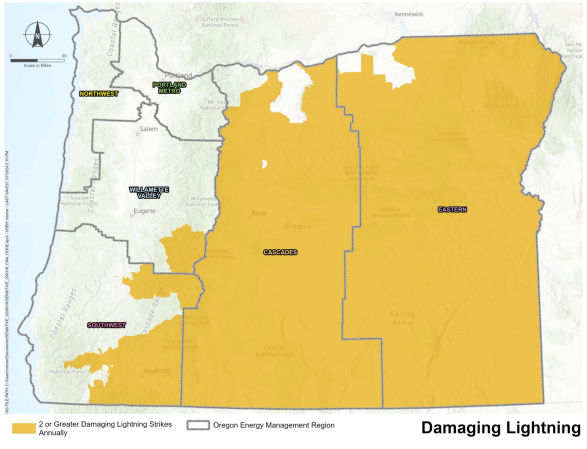
Liquefaction Susceptibility



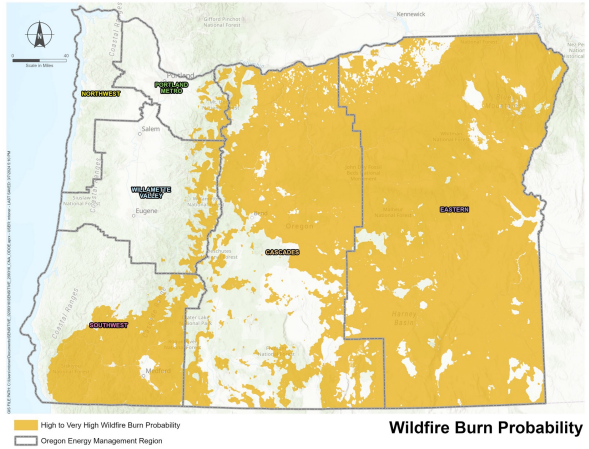
Annualized Drought



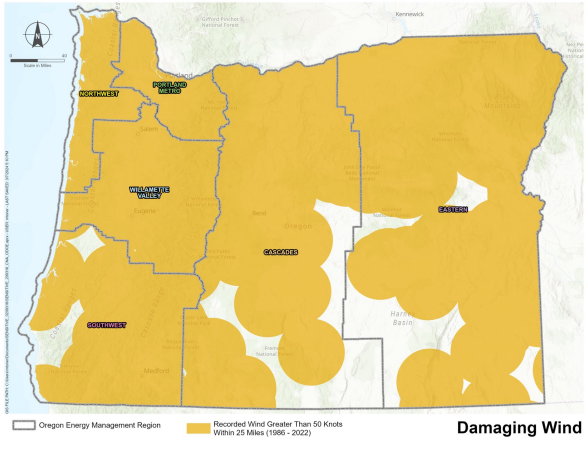
Flood Hazard



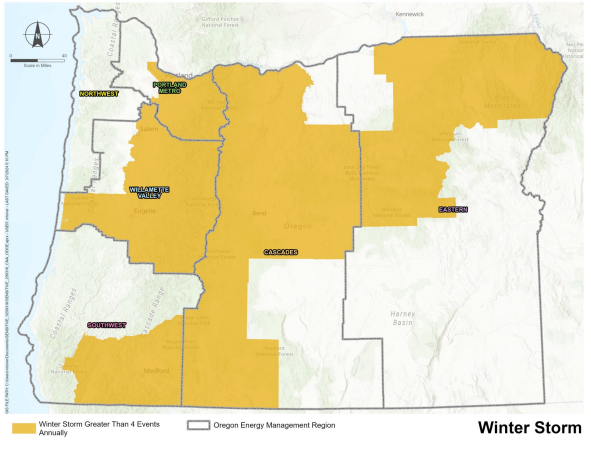
Damaging Lightning



Wildfire Burn Probability



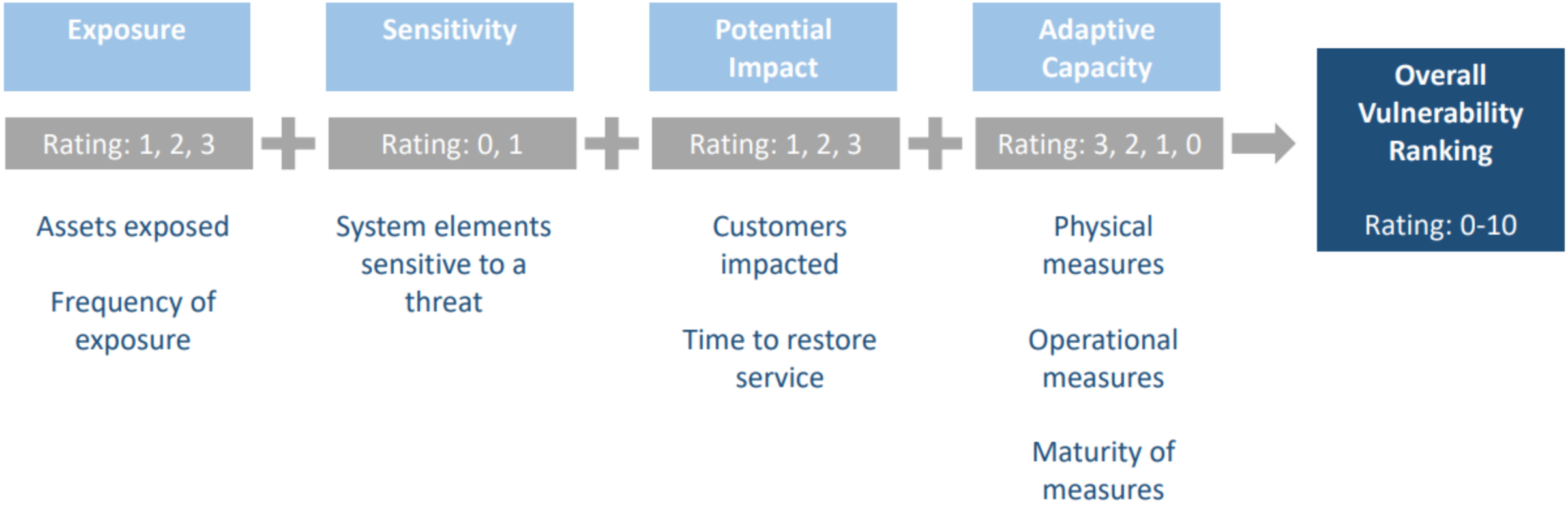
Damaging Wind



Winter Storm

Risk Assessment

Example



Adaptive Capacity – Physical/Cyber attacks

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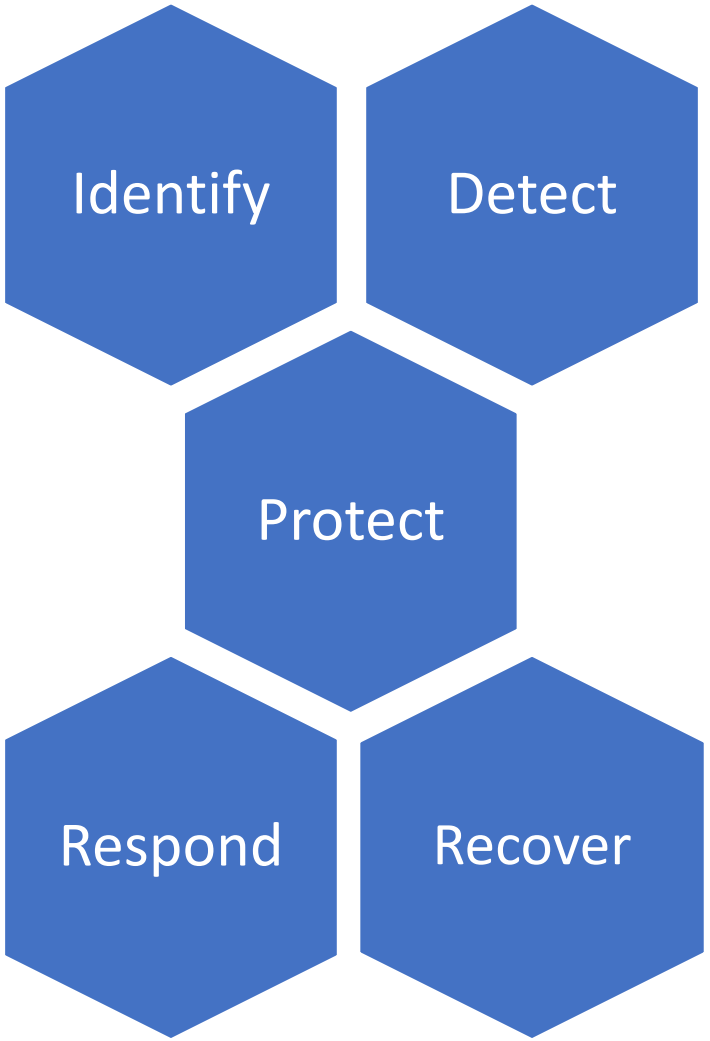
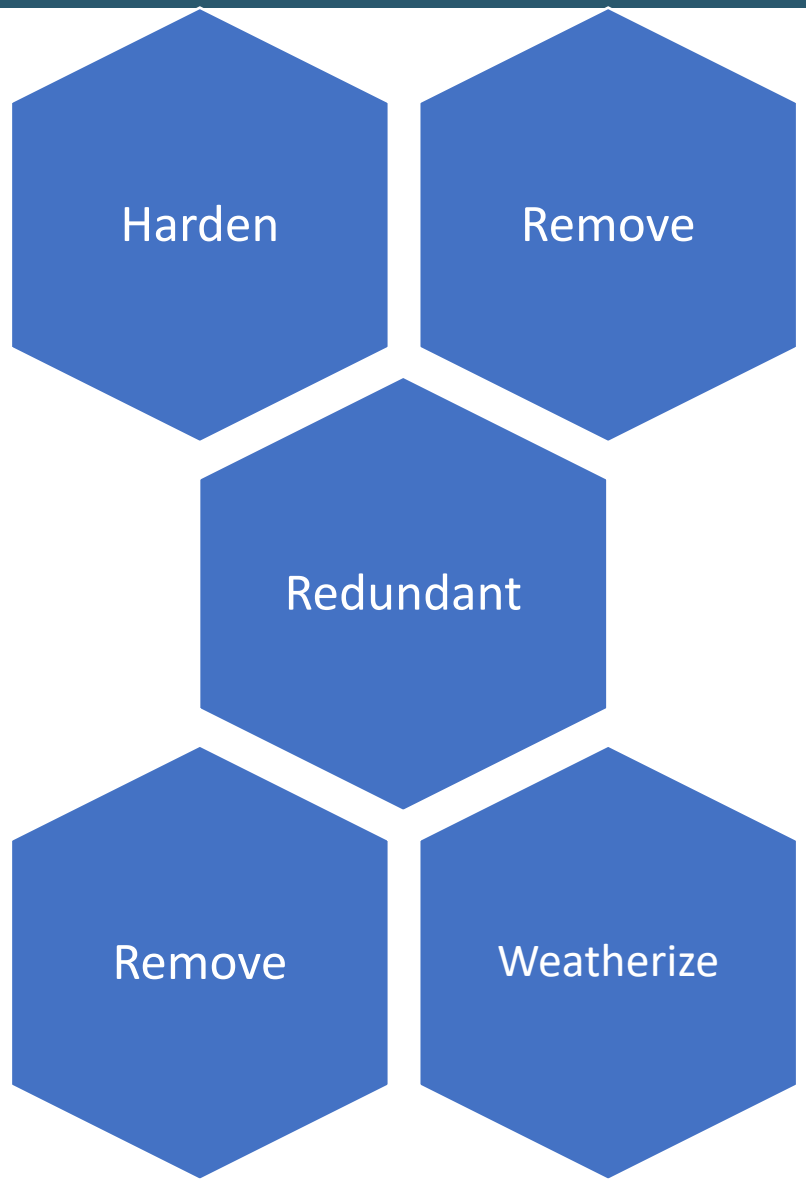


Adaptive Capacity – Natural hazards



COOP
Continuity of Operations Plan

EOP
Emergency Operation Plan

ERP
Emergency Response Plan

ISP
Integrity Safety Plan

SitAw
Situational Awareness

Risk Assessment

Example

Exposure	Sensitivity	Potential Impact	Adaptive Capacity	Overall Vulnerability Ranking
Rating: 1, 2, 3	Rating: 0, 1	Rating: 1, 2, 3	Rating: 3, 2, 1, 0	Rating: 0-10
High	High	High	Very High	
3	1	3	0	Moderate: 7

Overall Vulnerability Ranking Categories

Low: ≤ 5

Moderate: 6 – 8

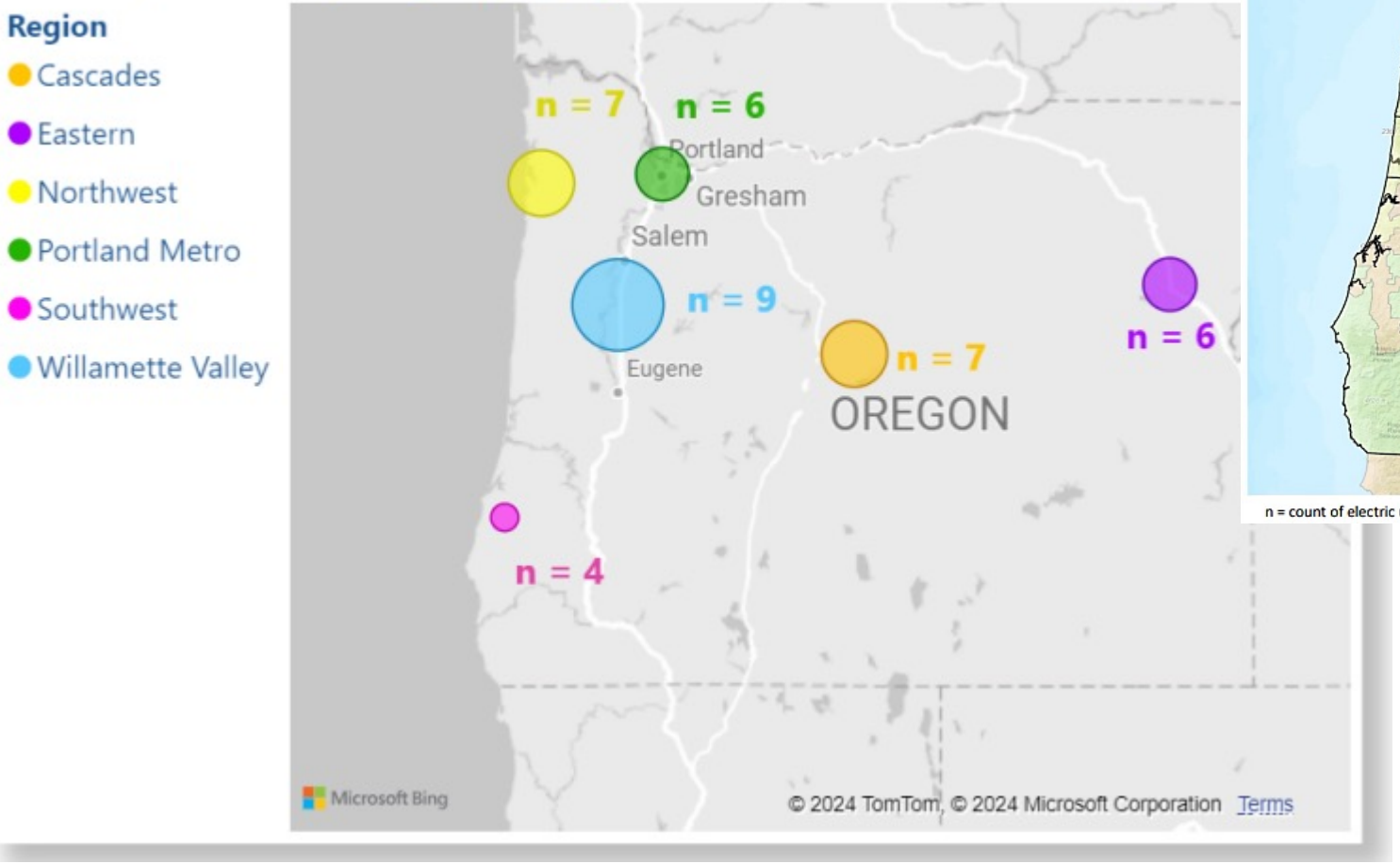
High: ≥ 9

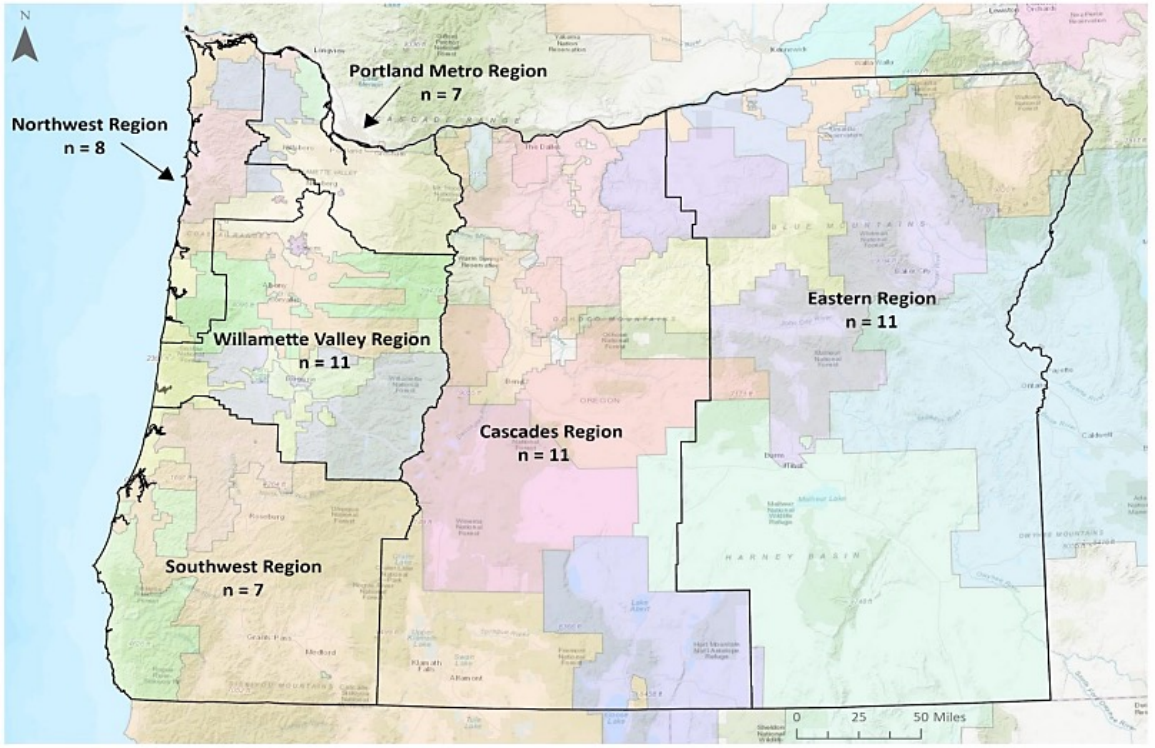
Preliminary Results

Electricity
Risk Assessment

20 Electricity Risk Assessment Survey Respondents

No. Respondents by Geography (region served and asset locations)





n = count of electric utilities serving each OEM region (COUs, IOUs, Municipal, PUDs).

41 total utilities

Many serve multiple regions

Electricity

Infrastructure – Customers

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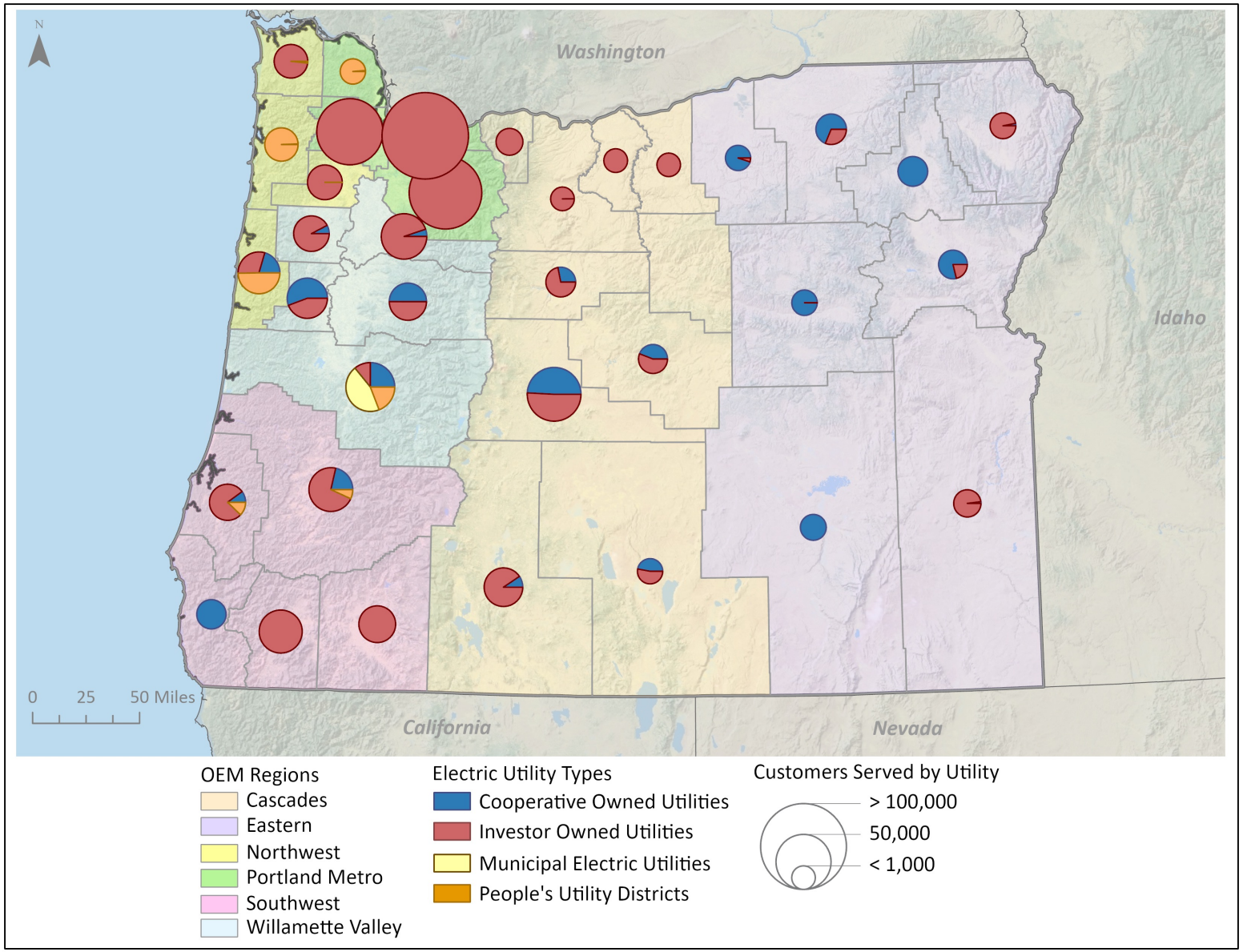
41 Total Utilities

3 Investor Owned Utilities

38 Other Utilities



OEM: Oregon Department of Emergency Management

Electricity

Risk Assessment – Vulnerability Ranking

Overall Vulnerability Ranking

- Low (≤ 5)
- Moderate (6-8)
- High (≥ 9)

	Cascades	Eastern	Northwest	Portland Metro	Southwest	Willamette Valley
CSZ	4	5	5	5	6	4
Cyberattack	3	**2**	3	**2**	3	4
Drought	3	4	2	6	3	3
Flood	3	3	3	4	3	4
Lightning	5	4	2	4	3	3
Physical Attack	4	**2**	3	**2**	4	4
Wildfire	6	5	4	6	4	6
Wind Storm	6	6	5	6	6	6
Winter Storm	7	6	5	5	5	7

Underlined and bolded values indicates at least one response was unknown.

CSZ: Cascadia Subduction Zone Earthquake and Tsunami

Natural Gas
Risk Assessment

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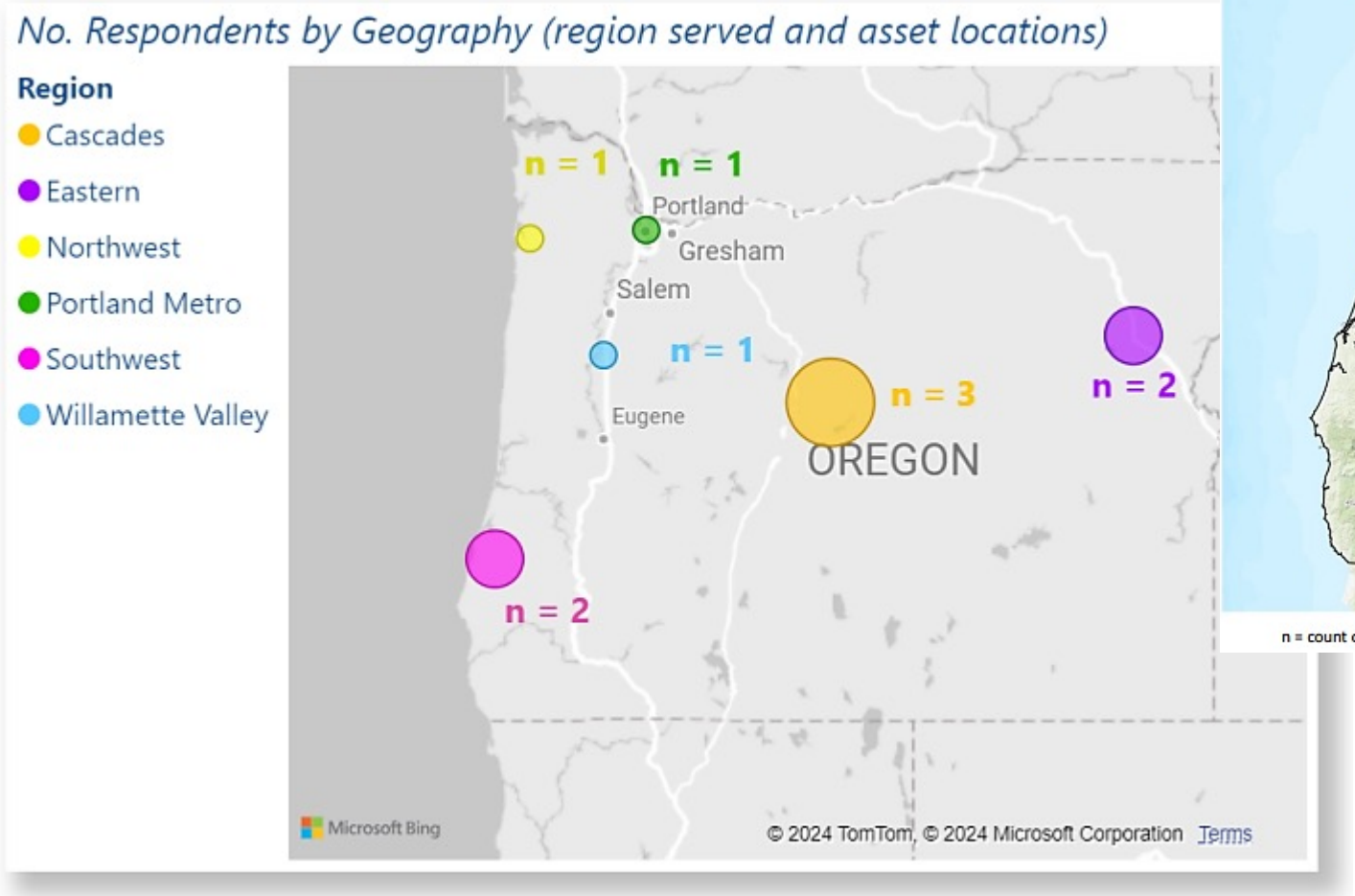
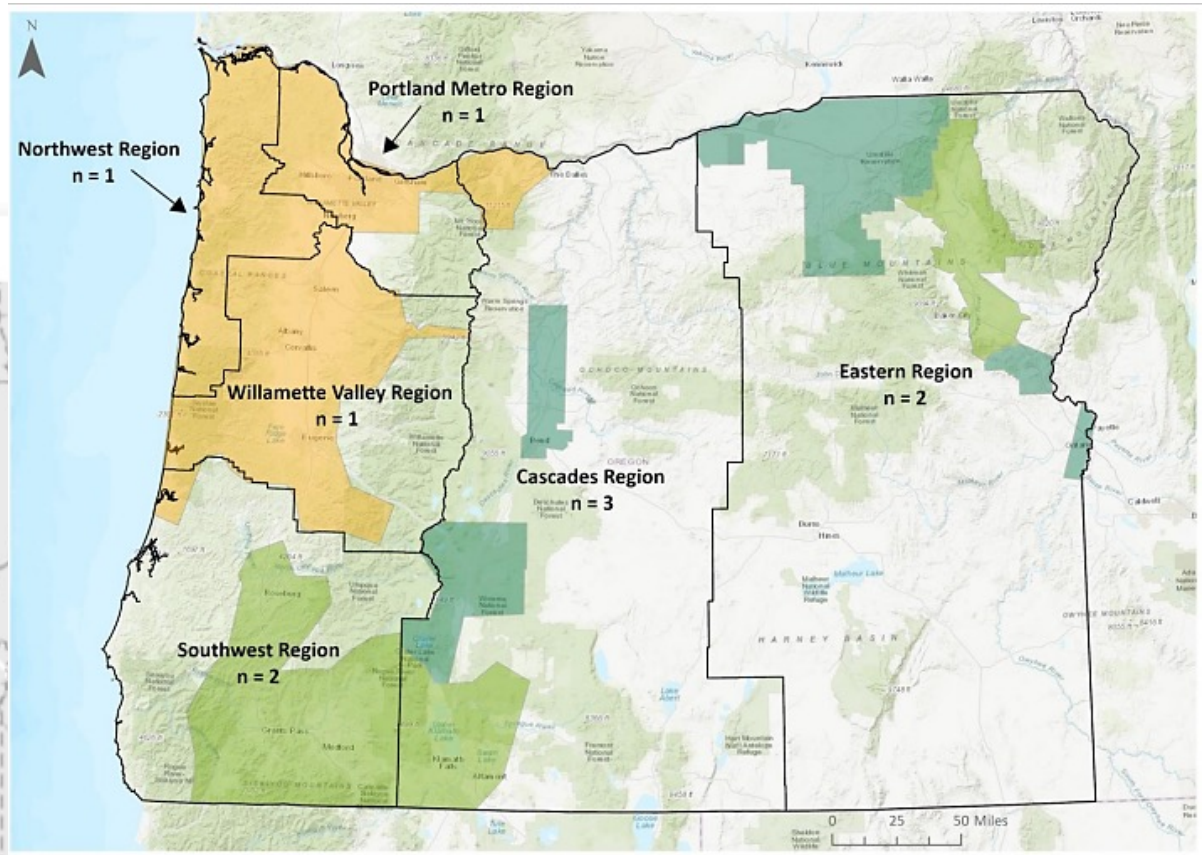
3 Natural Gas Risk Assessment Survey Respondents





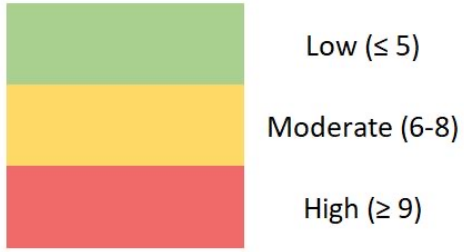
n = count of natural gas operators in each OEM region (green: Avista Utilities; teal: Cascade Natural Gas; orange: Northwest Natural Gas).

3 total utilities

All serve multiple regions

Natural Gas

Risk Assessment – Vulnerability Ranking



	Cascades	Eastern	Northwest	Portland Metro	Southwest	Willamette Valley
CSZ	6	6	6	6	6	6
Cyberattack	2	3	2	2	3	2
Drought	N/A	N/A	N/A	N/A	N/A	N/A
Flood	4	4	4	4	4	4
Lightning	5	5	4	4	5	4
Physical Attack	4	4	7	7	4	6
Wildfire	5	5	5	5	6	5
Wind Storm	6	5	6	6	6	6
Winter Storm	4	4	4	4	4	4

N/A = no responses

CSZ: Cascadia Subduction Zone Earthquake and Tsunami

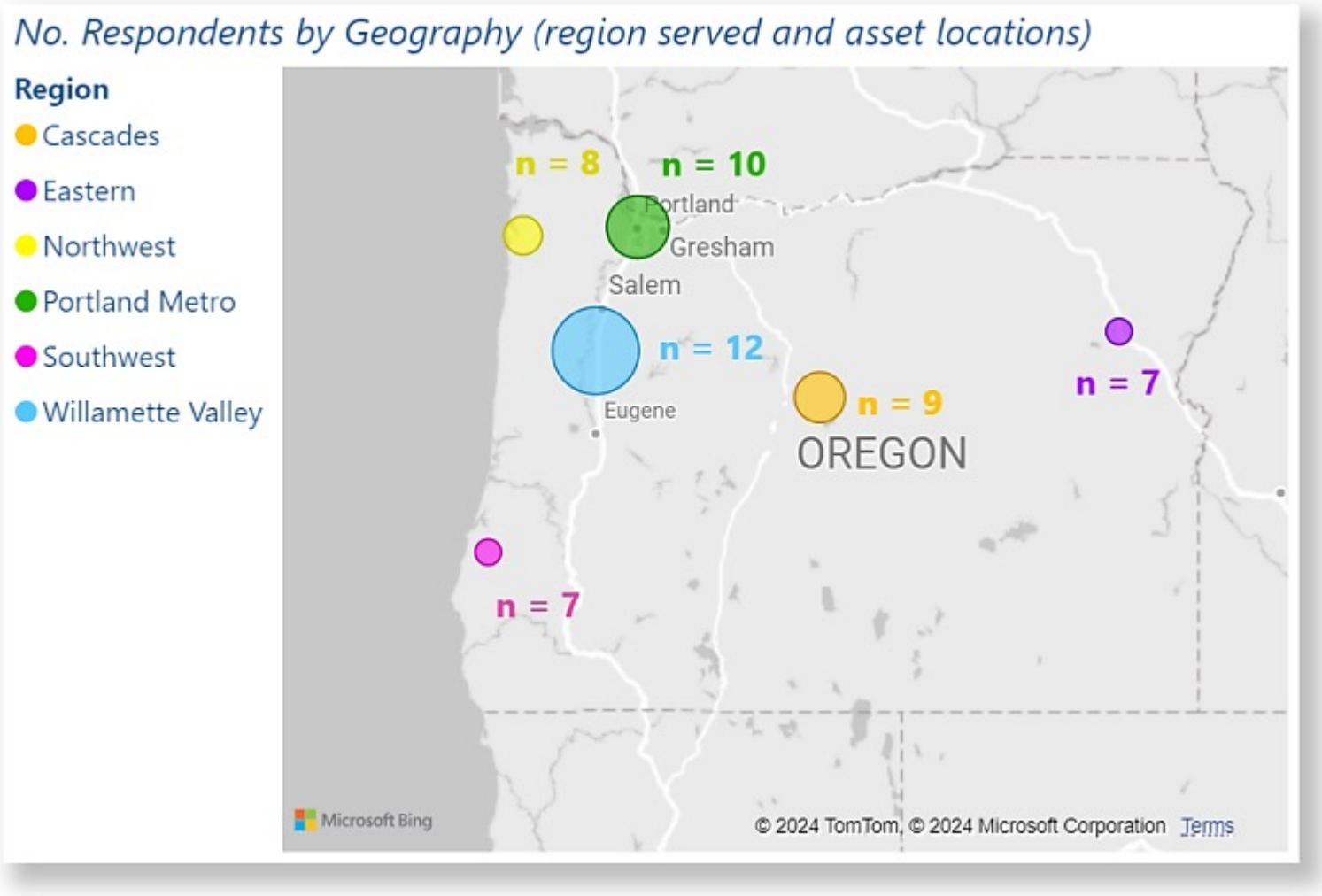
Liquid Fuels

Risk Assessment

13 Liquid Fuels

Risk Assessment

Survey Respondents



Liquid Fuels

Risk Assessment – Vulnerability Ranking

Overall Vulnerability Ranking

- Low (≤ 5)
- Moderate (6-8)
- High (≥ 9)

	Cascades	Eastern	Northwest	Portland Metro	Southwest	Willamette Valley
CSZ	5	6	7	7	7	7
Cyberattack	5	4	5	5	5	5
Drought	6	6	4	4	6	4
Flood	4	5	4	4	4	4
Lightning	7	8	6	6	7	6
Physical Attack	**3**	**3**	**3**	5	**3**	**3**
Wildfire	7	7	6	6	6	6
Wind Storm	7	8	7	7	7	7
Winter Storm	8	8	6	8	7	8

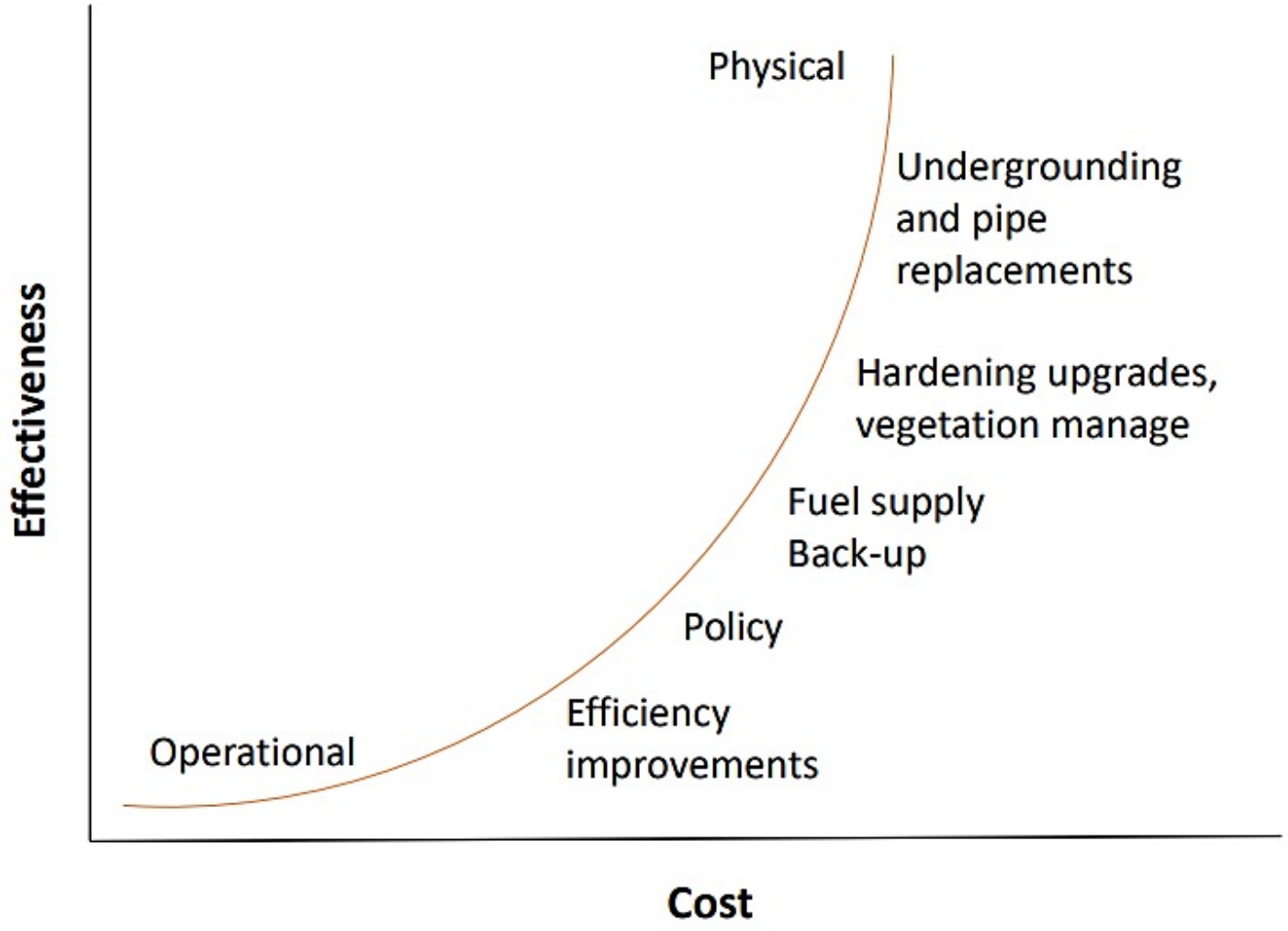
Underlined and bolded values indicates at least one response was unknown.

CSZ: Cascadia Subduction Zone Earthquake and Tsunami

Risk Mitigation Measures

Risk Mitigation Measures

Cost and Effectiveness



- **Most costly:** Physical measures have high impact, high cost
- **Least costly:** Operational measures and efficiency improvements
- **Policy changes** are impactful but take time to implement

Leddy et al. 2023; Park et al. 2016.; Sanstad et al. 2023;. Zamuda et al. 2019.

Regional Meetings

Prioritizing Risk Mitigation Measure by Region

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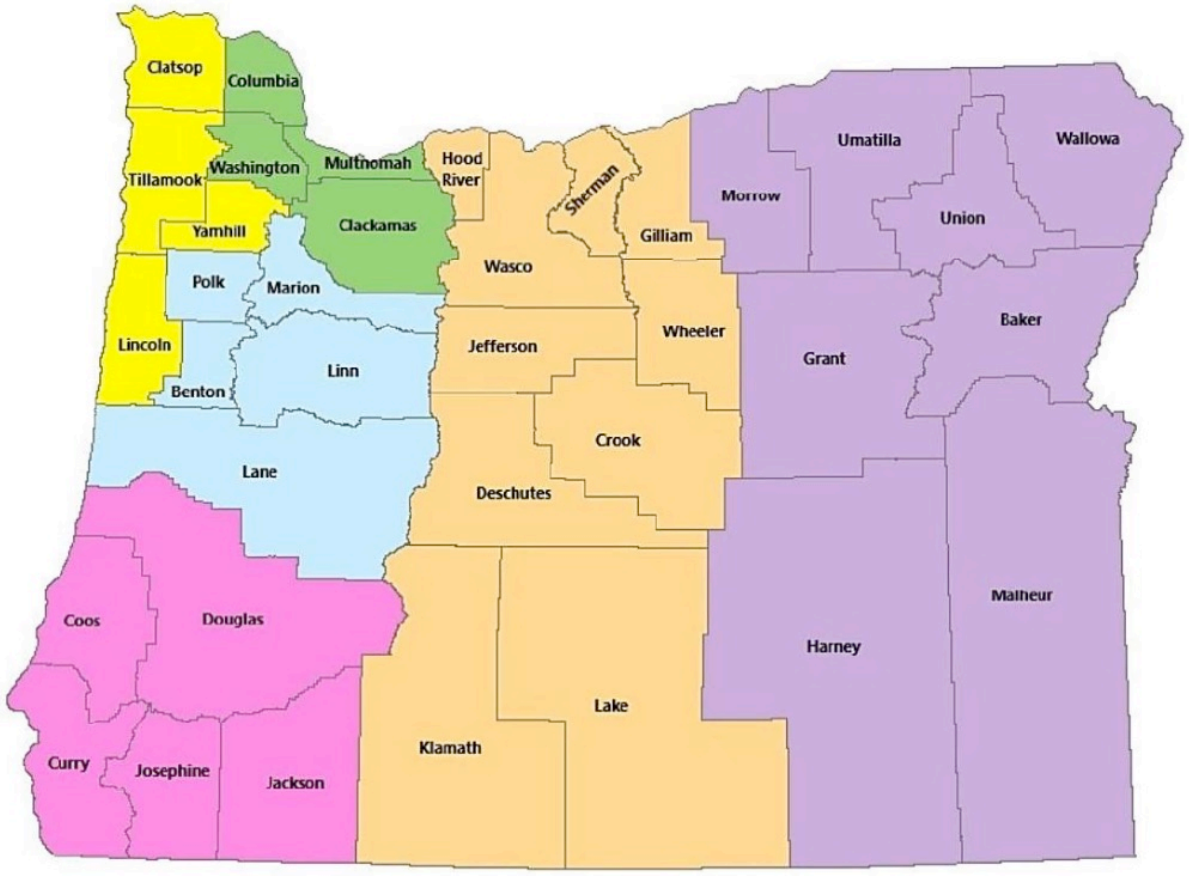

Roadshow Schedule	Date
Northwest Region – Tillamook	May 14
Portland Metropolitan Region – Portland	May 15
Eastern Region – Pendleton	May 16
Tribal Governments – Pendleton ***Oregon Tribal Preparedness Coalition***	**May 16**
Cascades Region – Bend	May 21
Willamette Valley Region – Salem	May 22
Southwest Region – Medford	May 23

Risk Mitigation Measures

All Systems – Physical Measures

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- **Drones** – develop drone inspection capabilities (and procedures)
- **Hardening** – harden and upgrade components
- **Monitoring** – establish automated and remote monitoring systems
- **Redundancy** – Identify alternate facility sites (ie. backup operations centers)
- **Redundancy** – Increase backup generator capacity
- **Redundancy** – Reduce isolation of critical facilities (ie. backup access routes, backup communication systems)

- **Removal** - remove assets out of hazard zone
- **System Segmentation** – subdivide energy systems to more efficiently isolate damaged areas
- **Undergrounding** – replace overhead with underground cables
- **Vegetation management** – manage vegetation to minimize impacts of natural hazards
- **Weatherization** – weatherize energy system assets
- **Protect** – improve maturity of measures related to the Protect category for human-caused threats

Risk Mitigation Measures

All Systems – Physical Measures

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- **AARs** – generate incident After Action Reviews
- **AI** – integrate artificial intelligence into operational plans/monitoring
- **Audits** - audit resilience strategies and recommend improvement plans
- **Inventories** – maintain inventories of equipment and inter-operability/mutual aid
- **MOUs** – develop Memorandums of Understanding with government
- **Planning** – develop scenario-driven emergency response plans including back-up communications and employee preparedness
- **Projections** – Improve forecasting and situational awareness abilities

- **Reduce demand** – develop peak Demand Reduction Programs
- **Redundancy** – have secondary key suppliers in place
- **Risk Maps** - maintain baseline risk maps to inform long term investments and programs
- **Studies** – Comprehensive, site-specific risks to inform Capital Improvement Plans (CIPs) and Asset Management Plans (AMPs)
- **Studies** – Lifeline service delivery systems disaster resilience
- **Studies** – Supply chain resilience for continuity planning
- **Training** – conduct regular training and exercises
- **Maturity** – improve maturity of measures across all categories for human-caused threats

Next Steps

Remaining Work

TASKS	TIMELINE
Draft Initial ESP for USDOE review and input – Draft ESP met 5.5 of 6 federal requirements	9-30-23 Done
Stakeholder and Tribal Engagement Kickoff Meeting	10-16-23 Done
Energy systems data collection – surveys, interviews, coordination calls, and virtual meetings	Feb - Mar 2024 Done
Energy systems risk assessment conducted	Apr 2024 Done
ESP Roadshow – Hybrid meetings in each region to seek input on energy system threats-hazards and to prioritize mitigation strategies by region	May 14-23, 2024 Results Pending
 Engage state agencies, local governments, and Tribes to develop list of fuel sites for storage expansion consideration	Jun-Jul 2024 In Progress
Finalize ESP for submission to USDOE, Oregon legislators, Tribes, and stakeholders	9-30-24
Ongoing annual ESP evaluation and submission to USDOE - every other year for Oregon legislators	9-30-25 *(and beyond)*

Track ESP Project Progress

ODOE website: https://tinyurl.com/OESP-info

energy.security@energy.Oregon.gov

Scan QR code:

Questions?

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