



The Burn Rate: How Wildfire Impacts Energy Affordability Part One

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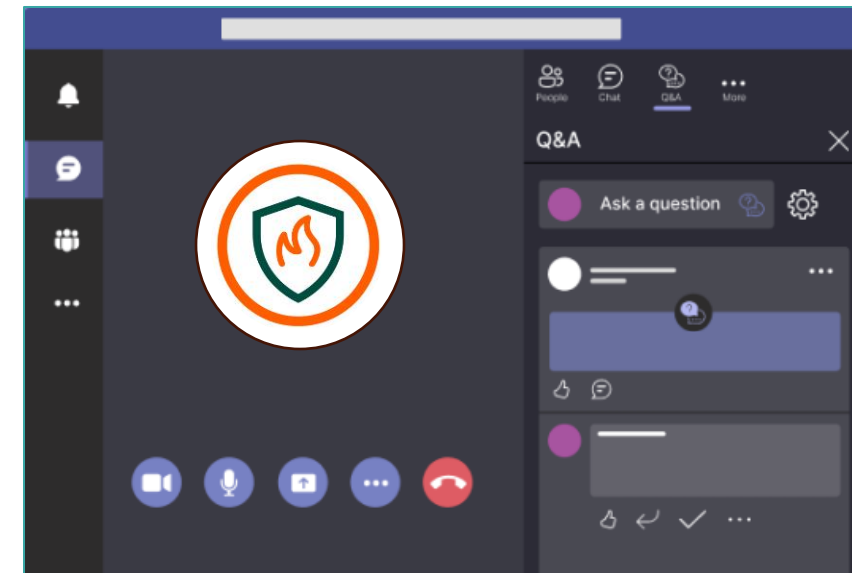


**WILDFIRE RISK
& RESILIENCE**
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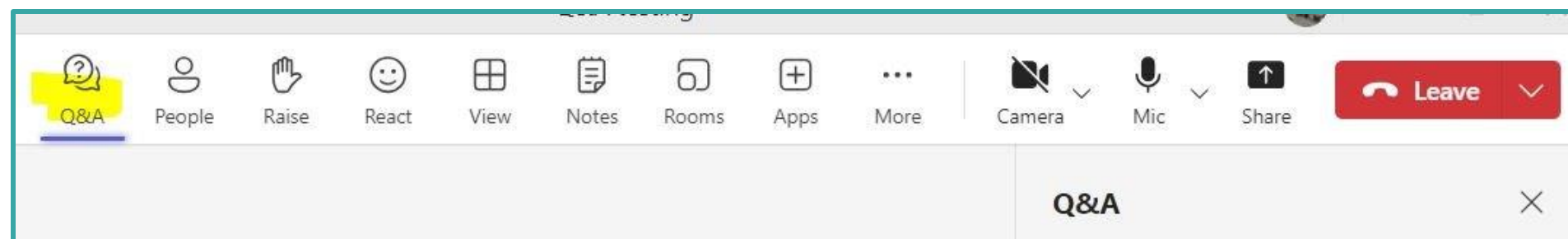
Session Guidelines



- This session will be recorded.
- All participants will remain muted during the presentation.
- Please share your questions using the Q&A tab or by emailing us at wildfire@pnnl.gov.
- Presenters will answer in the Q&A system or reserve questions for discussion at the end of the webinar.



[Learn More About How To Use Microsoft Teams Q&A](#)



This is the first in a three-part series

PART ONE: FRAME THE PROBLEM

Thursday, June 4
11:00 am–12:00 pm PT

PNNL will provide an overview of direct and indirect utility costs from wildfire, their scale, and how the costs are showing up in utility rates.

PART TWO: EXPLORE SOLUTIONS

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PART THREE: INDUSTRY THOUGHT LEADERS

Thursday, June 18
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PNNL will convene industry thought leaders in a discussion of the impacts of wildfire on utility business models and opportunities to increase energy affordability while mitigating risk.

The recording from Part One, and the associated analysis will be available at:

[Wildfire Risk and Changing Utility Business Models | PNNL](#)



Register for Part Two



Register for Part Three



Agenda for today

Part One of this three-part webinar covers:

1. Utility wildfire mitigation as a new and growing cost for electric utilities and customers
2. Direct costs of utility wildfire mitigation, and how they vary by types of expenses, program area, risk reduction, and utility type
3. Indirect costs of utility wildfire mitigation, such as insurance, cost of capital, and other bedrock costs of electric service
4. Drivers of indirect costs, such as risk of ignition of a wildfire and resulting liability
5. How the direct and indirect costs of wildfire translate into utility rates



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Wildfire poses reliability risks for electric utilities nationwide

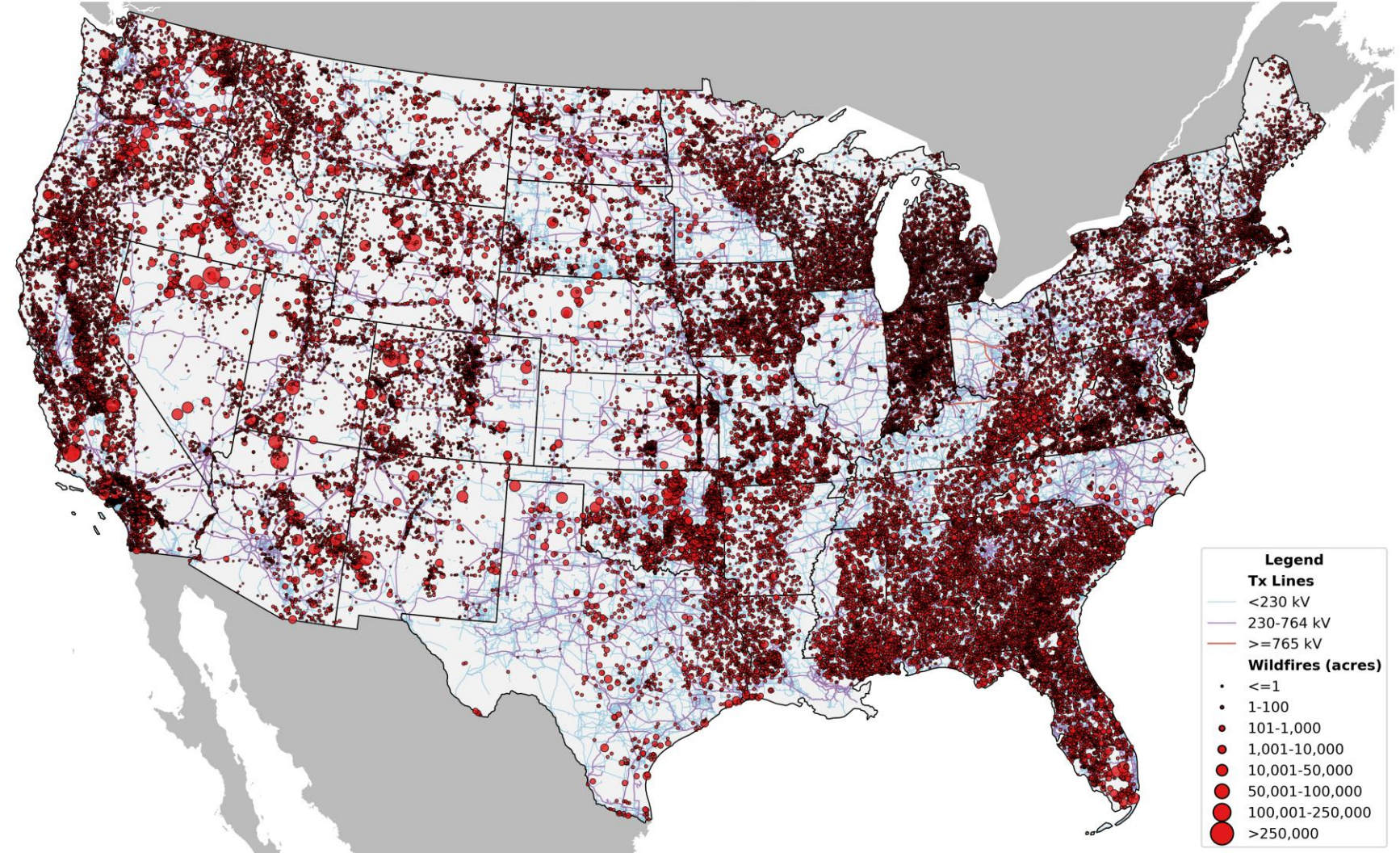
2025

| | |
|--|--------------------|
| Fires | 97,722 |
| Acres | 4,272,252 |
| Ignitions within 10 miles of transmission | 93,923 (95.77%) |
| Proportion of total acres burned within 10 miles of transmission lines | 70% |

2026 (January-May)

| | |
|---|-------------------|
| Fires | 18,038 |
| Acres | 2,591,684 |
| Ignitions within 10 miles of transmission | 17,304 (95.9%) |
| Proportion of total acres burned within 10 mi of Tx | 59% |

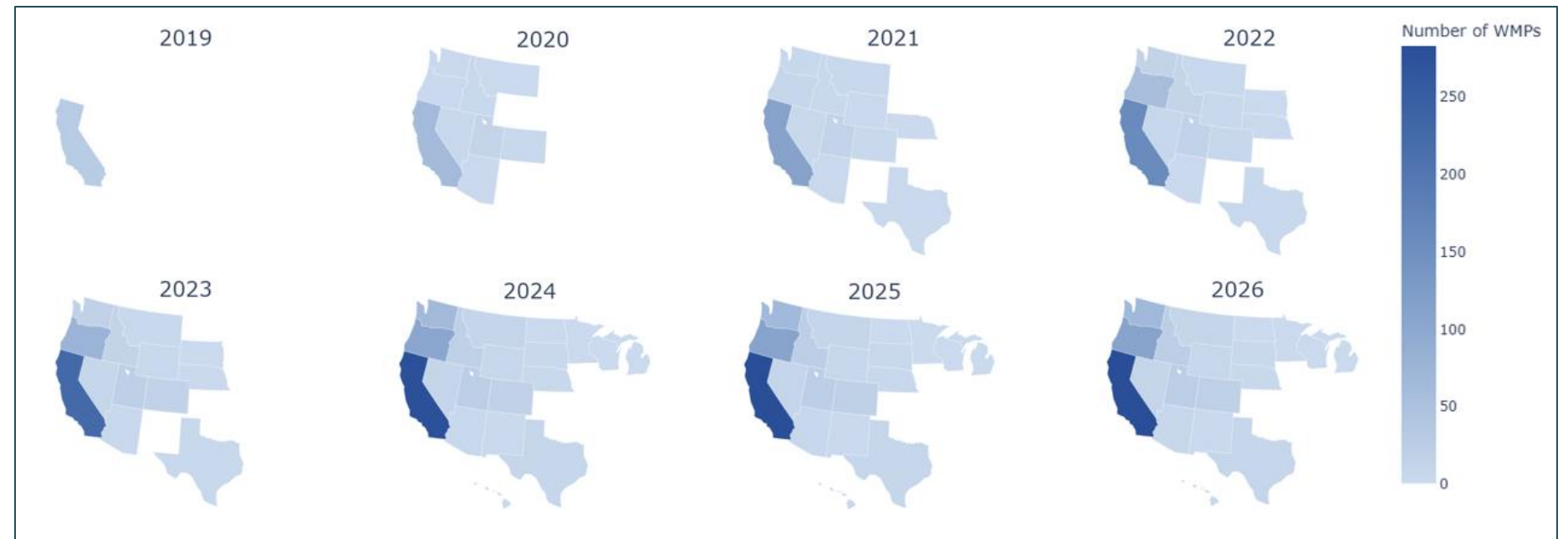
2025 CONUS Wildfire Incidents by Size (Acres) - INFORM



Source: NIFC InFORM; data filters and map by PNNL; prescribed burns excluded.
Note: Certain states (e.g., IL, NC) are underrepresented in 2025 InFORM data.

Why wildfire is different than other hazards

- Ignition
- Asymmetrical risk
- Geographic shifts
- State leadership
- Costs

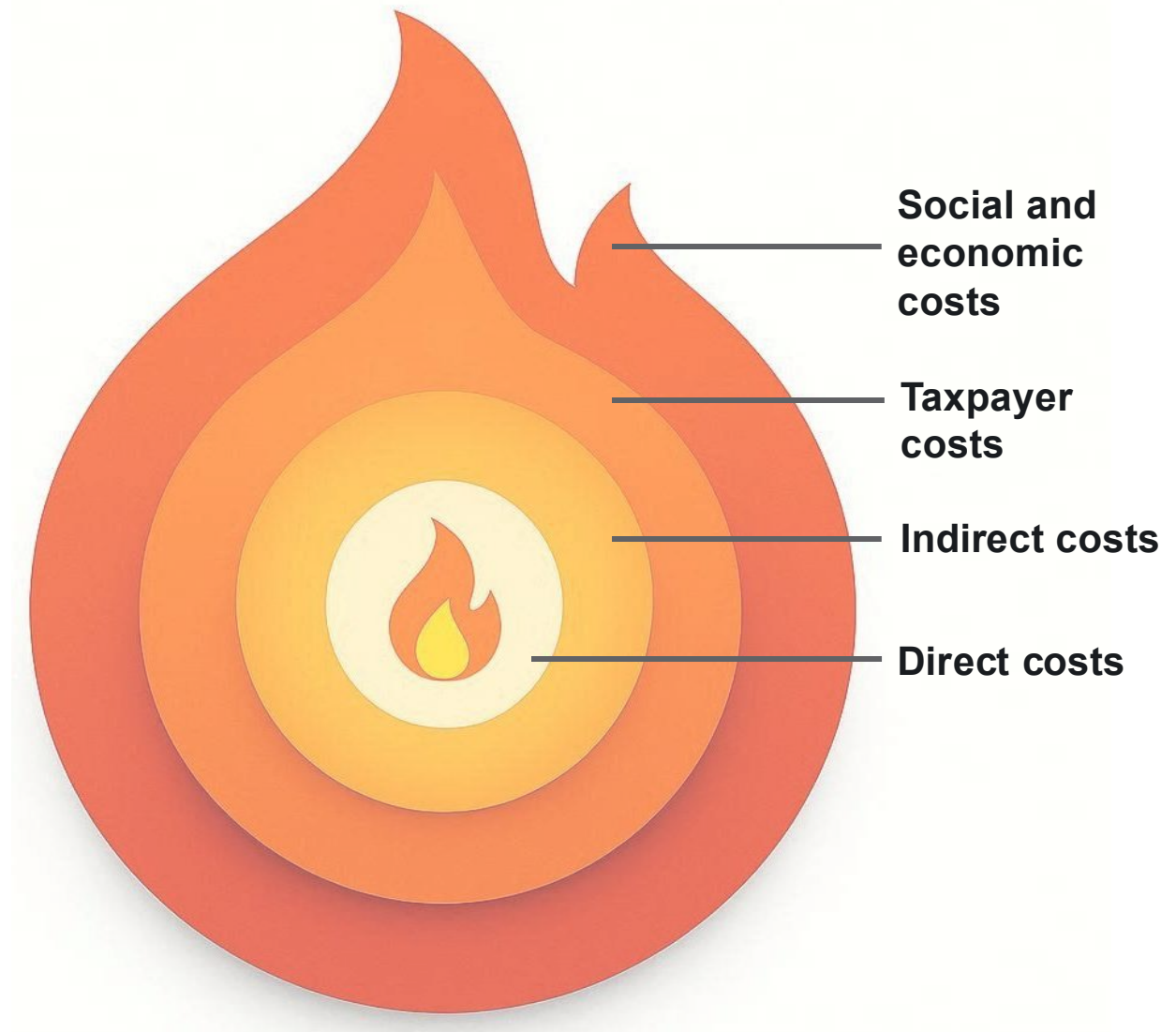


Cumulative Wildfire Mitigation Plans by state, by year.
[PNNL Utility Wildfire Mitigation Plan Database](#)

Trend in utility wildfire mitigation plans is west to east.

Direct and indirect wildfire costs are increasing electricity customer rates

- Direct investments and costs for wildfire mitigation are typically represented in a utility's Wildfire Mitigation Plan (WMP).
- Wildfire risk leads to increased direct costs, but also indirect costs for electric utilities and ratepayers, as well as taxpayer and social/economic costs.
- By PNNL analysis, among utilities with explicit wildfire mitigation charges, impacts vary by customer class, at **~0.11¢–0.60¢/kWh**, with an average near **0.30¢/kWh**.



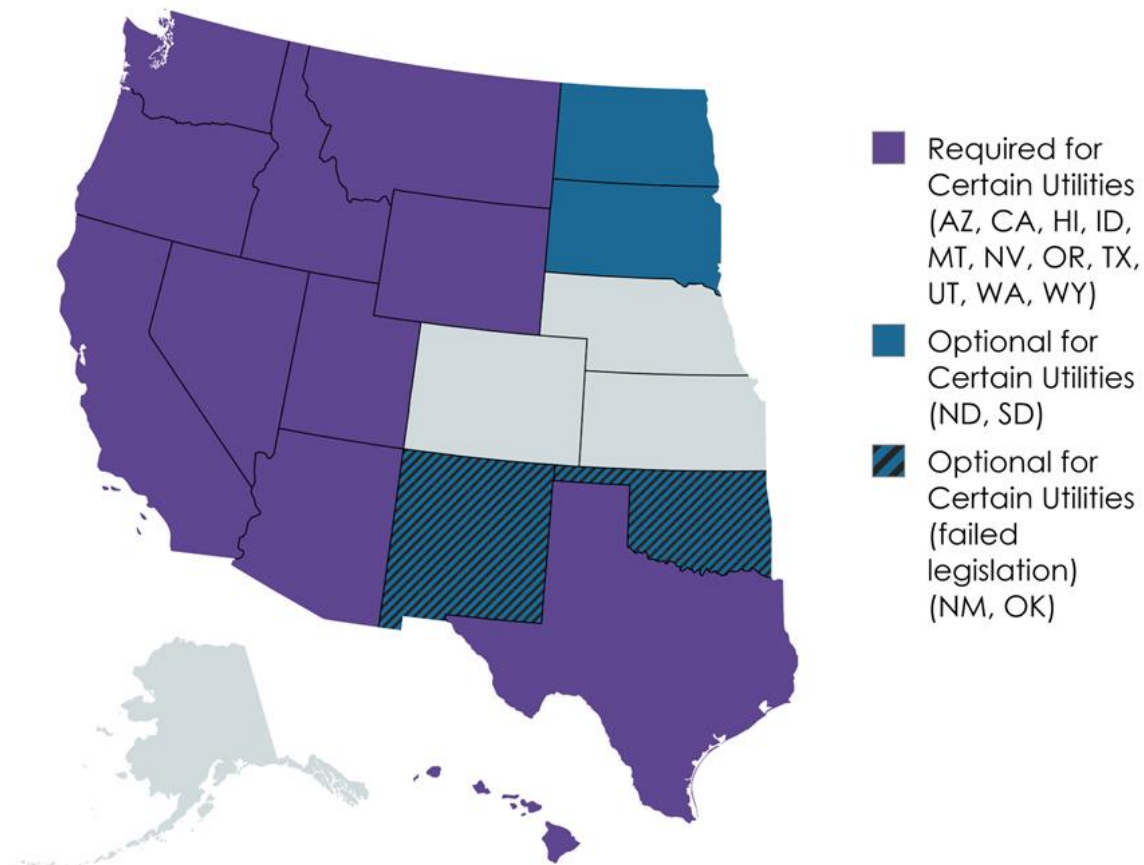
For detailed information see: [PNNL, Cost Recovery Mechanisms for Utility Wildfire Mitigation, 2026](#).

1

Overview of Direct Costs

Wildfire Mitigation Plans (WMPs)

Wildfire Mitigation Plan Requirements by State



- Wildfire Mitigation Plans are intended to be the **primary document that describes utility risk and planned investment in risk mitigation, including:**
 - Capital improvements like undergrounding and pole and conductor upgrades
 - Operational improvements like vegetation management and situational awareness
- WMPs are submitted to regulators (state utility commissions or other governing body, e.g. public utility boards).
 - Regulators (or other designated reviewers) review and acknowledge documents through a public proceeding that allows for public input.
- Approval provides a pathway for rate recovery.
 - States use varying rate recovery mechanisms.

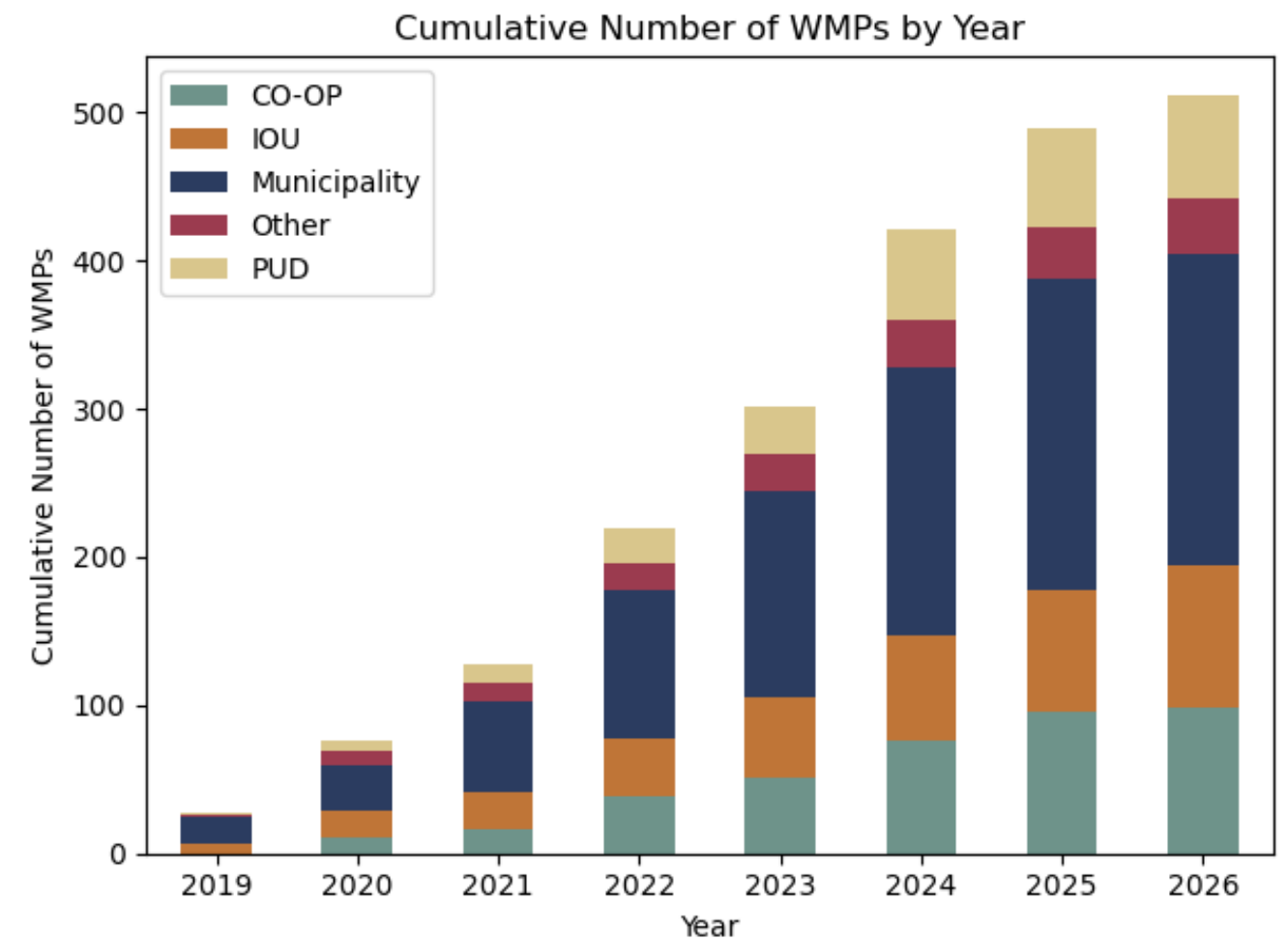
Wildfire mitigation plans are increasingly common

- WMPs are being prepared by **all utility ownership types, including merchant facilities.**
- Regular documentation of wildfire mitigation through WMPs may become a more widespread norm due to **business pressures.**
- Implementation of an approved WMP can also **support utility credit ratings** ([S&P Global 2024](#), [Fitch 2023](#)).

[Access the PNNL Utility Wildfire Mitigation Plan Database: wildfire.pnnl.gov/mitigationPlans](https://wildfire.pnnl.gov/mitigationPlans)

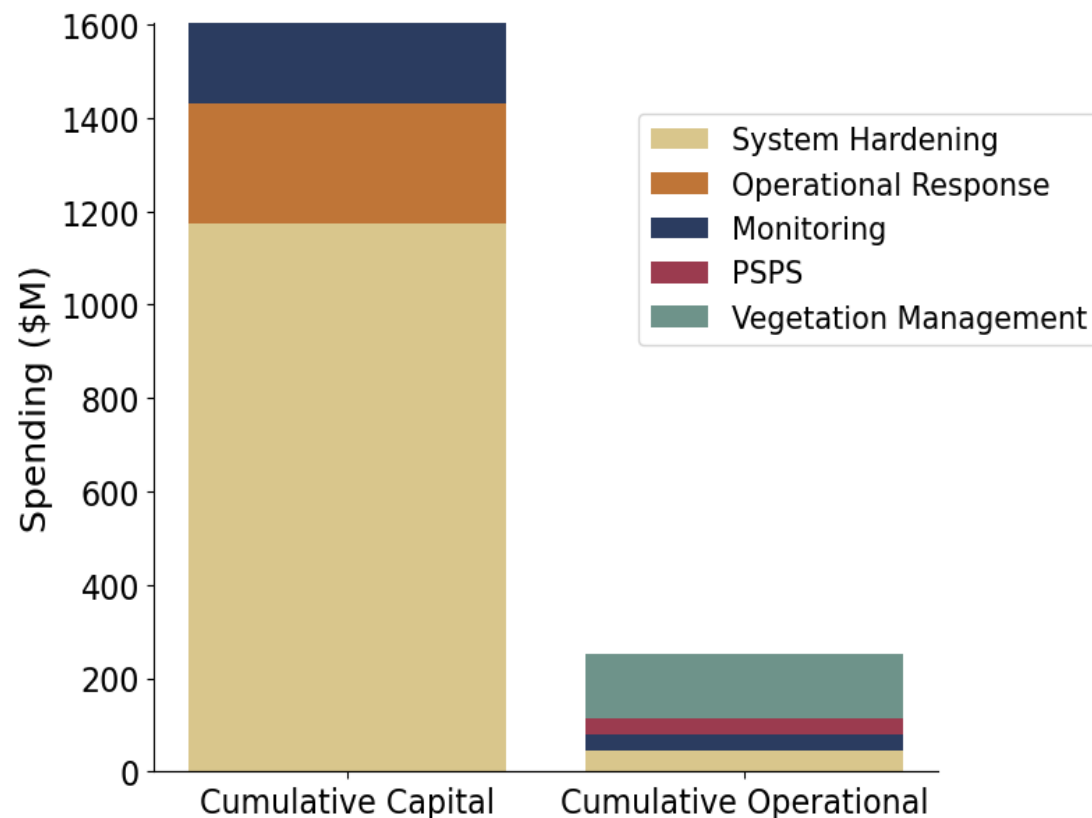


Count of WMPs catalogued in the PNNL database



Wildfire mitigation spending can take many forms

Most wildfire mitigation costs are capital spending. For example: Xcel Energy's 2025-2027 Colorado WMP includes \$1.6 billion in capital expenditures and \$250 million in operations and maintenance.



Total spending for 2025-2027: \$1.9 billion. Data from [Xcel Energy 2024b](#)

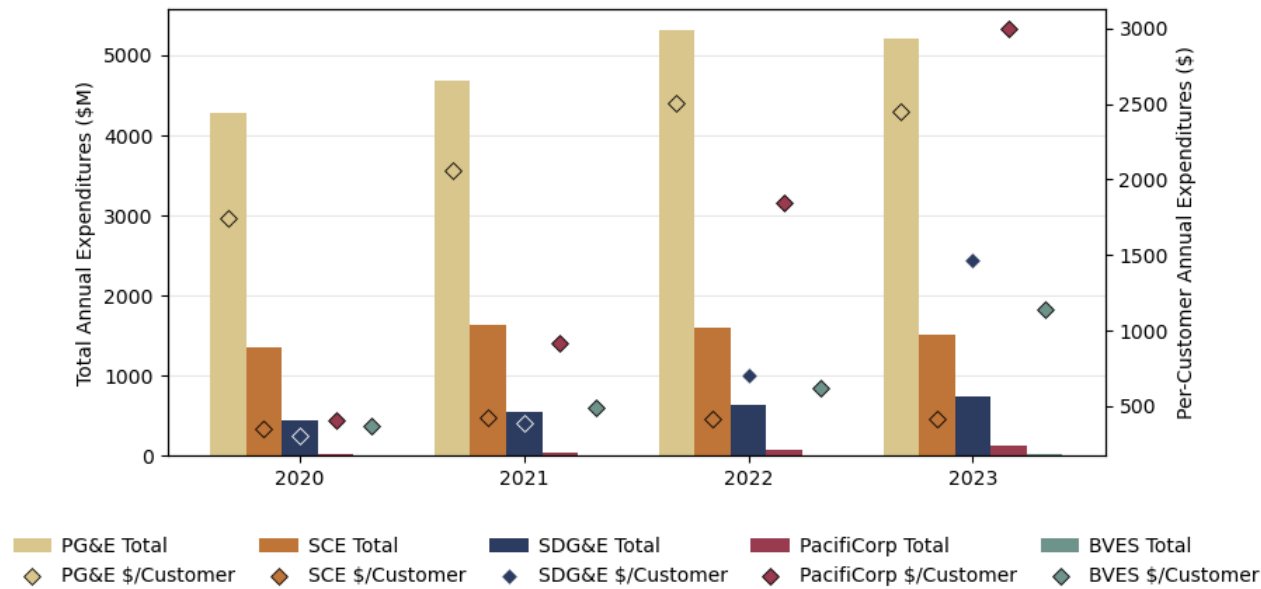
Example spending categories:

- **Grid Design and System Hardening:** Pole replacement and reinforcements, installation of automation equipment and covered conductor installations.
- **Vegetation Management:** Inspection schedules, application of herbicides, pruning, tree removal procedures, and more advanced methods.
- **Wildfire Condition Monitoring:** Situational awareness (aerial surveillance data) and forecasting modeling to predict wildfire conditions.
- **Operational Response:** Tracking wildfires, immediate reactive de-energizing, new technologies.
- **Public Safety Power Shutoff (PSPS) and related enhancements:** Selective de-energization of power lines to avoid igniting wildfire.

For more: [PNNL Utility Wildfire Mitigation Plan Database](#)
(Analysis view)

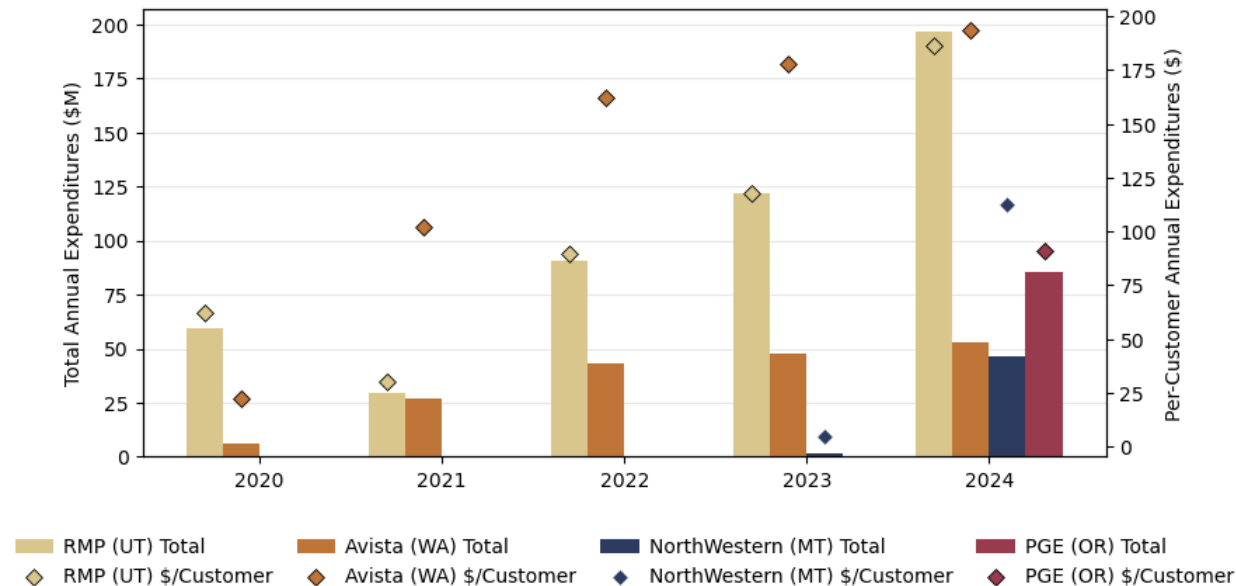
Analysis of Western utilities shows total wildfire mitigation direct expenditures

Total Wildfire Mitigation Expenditures: California IOUs



- Average annual wildfire mitigation spending per surveyed utility is about **\$1.87 billion**.
 - This average is driven upward primarily by three California utilities.
 - Excluding California, average annual spending per reviewed utility is approximately **\$85 million**.
- Wildfire mitigation spending in other states is lower than California – but increasing rapidly.
 - IOUs outside California saw greater year-over-year spending growth during 2020-2023.
 - Berkshire Hathaway Energy (operates PacifiCorp and other utilities in multiple states) estimates wildfire mitigation capital spending will increase from \$188 million in 2022 to \$797 million in 2027, a **~33%** compound annual growth rate.

Total Wildfire Mitigation Expenditures: IOUs Outside California



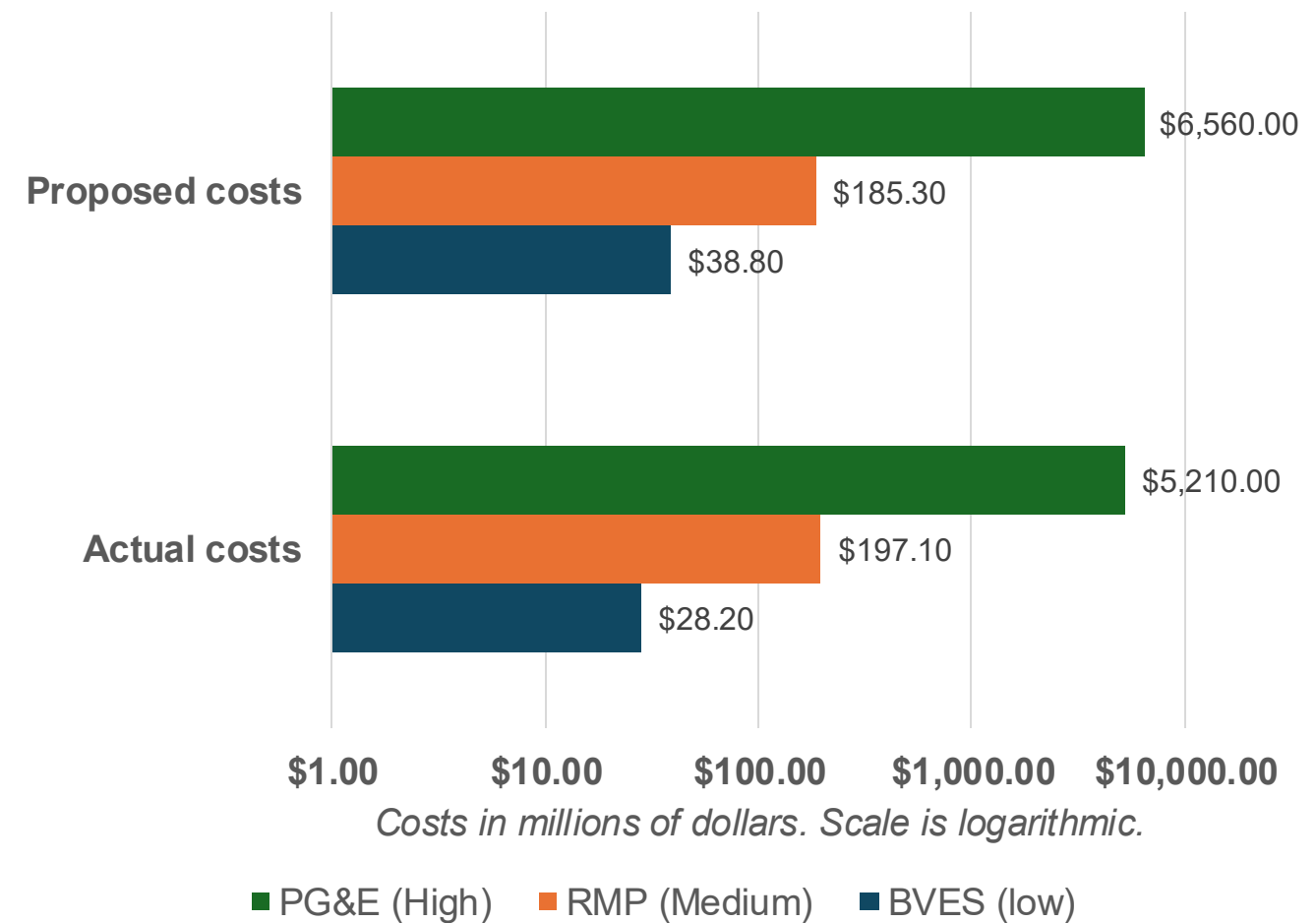
For a detailed cost breakout see: [PNNL, Cost Recovery Mechanisms for Utility Wildfire Mitigation, 2026](#).

Direct costs from wildfire mitigation summary

Of the 10 utilities in 7 states that were surveyed:

- The proposed direct costs of wildfire mitigation spending by a single utility ranged from \$38 million (for a small utility) to \$6.5 billion (for a very large utility) in a single year.
- The majority of these direct costs are capital expenditures, which are included in the rate base.
 - Capital spending was **55-86%** of total wildfire mitigation spending for the four surveyed utilities that reported this split.
- As more wildfire mitigation plans with forecasted and recorded costs are available, PNNL will expand the survey with more data.
- Comprehensive future analysis should include public utilities.

Proposed vs. Actual Wildfire Mitigation Costs



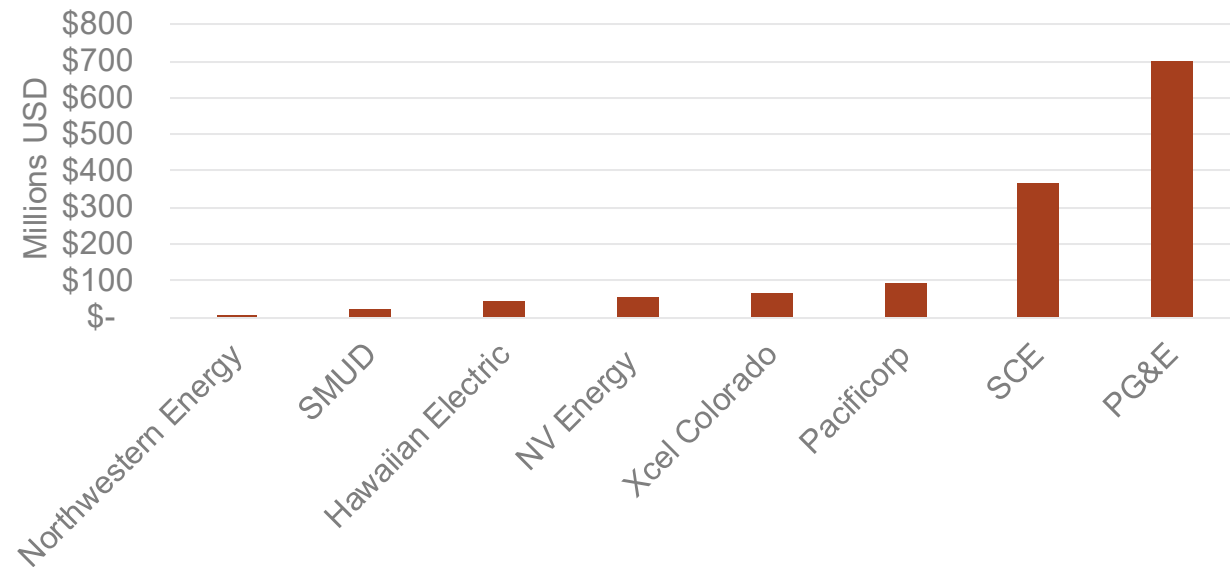
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2

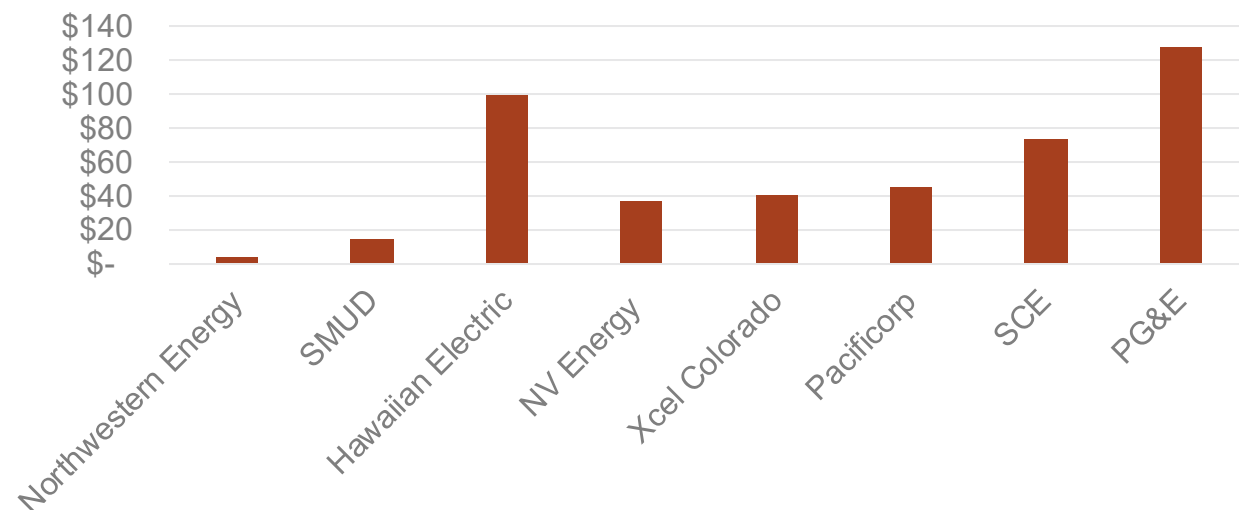
Overview of Indirect Costs

Utility insurance rates are increasing due to wildfire

Reported Increases In Insurance Premiums

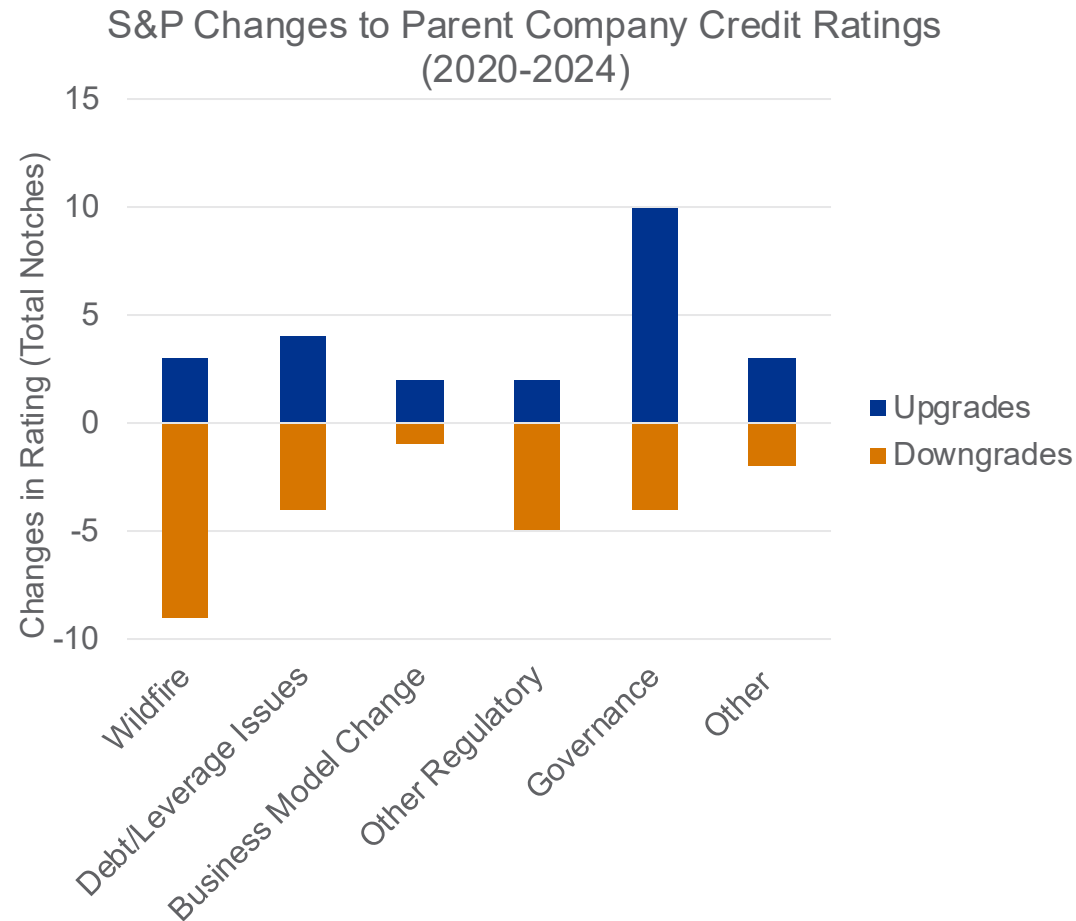


Reported Increases in Insurance Premiums per Customer



- Western utilities have reported **dramatic increases in liability insurance premiums** along with lower coverage limits and reduced availability.
 - Some utilities have reported liability premiums increasing nearly 20-fold over a handful of years.
 - Others report an inability to obtain insurance at all.
- On a per customer basis, **these translate to as much as \$128 per customer account** (over one to multiple years).
- Even companies in states with more lenient liability standards report increases in cost.
- Policymakers and companies are exploring alternative insurance mechanisms to reduce costs.

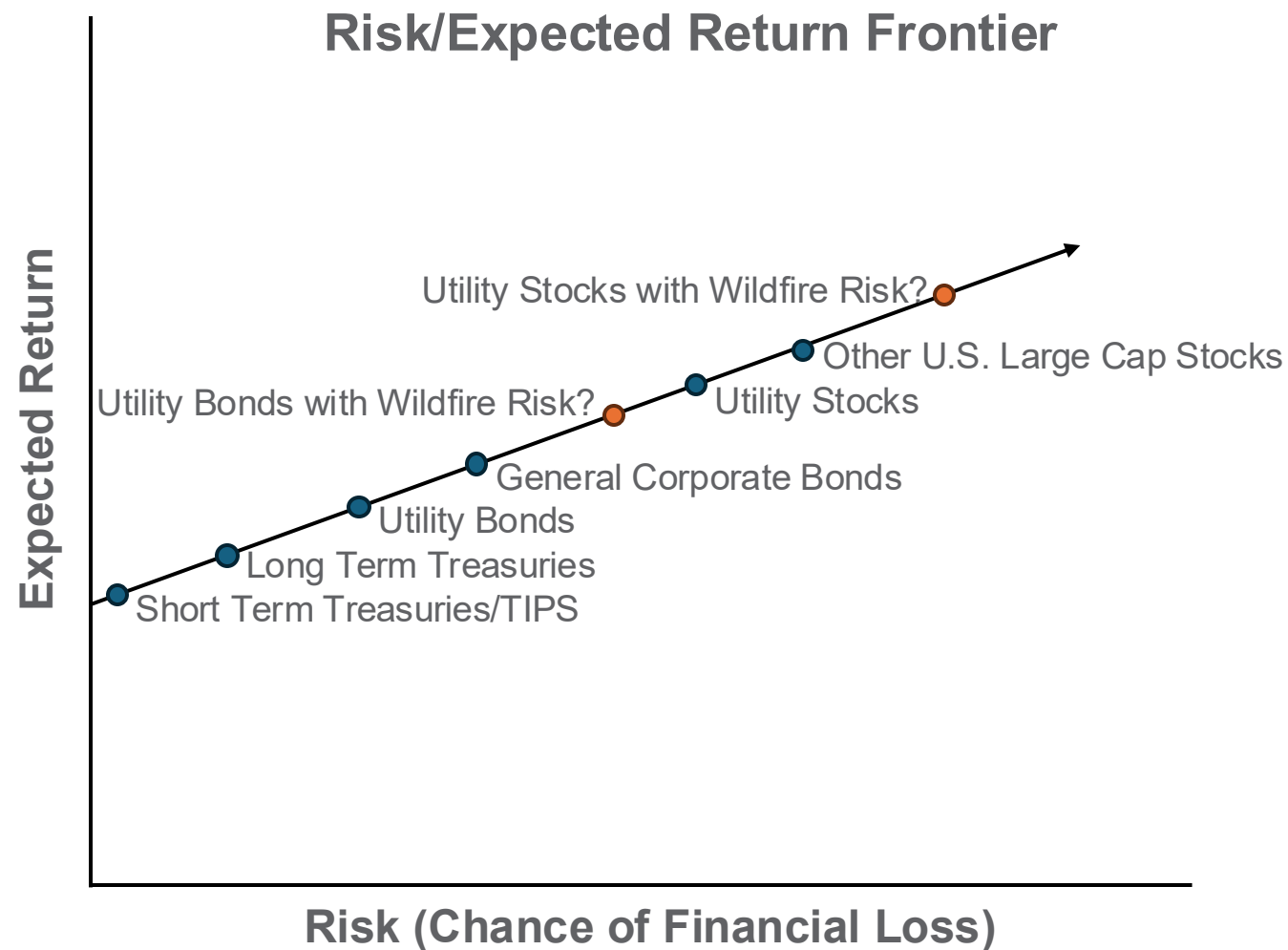
Wildfire risks can lead to utility credit rating downgrades



Source: EEI, Credit Ratings Summary (2020-2025)
Note: notch refers to a single level change in credit score

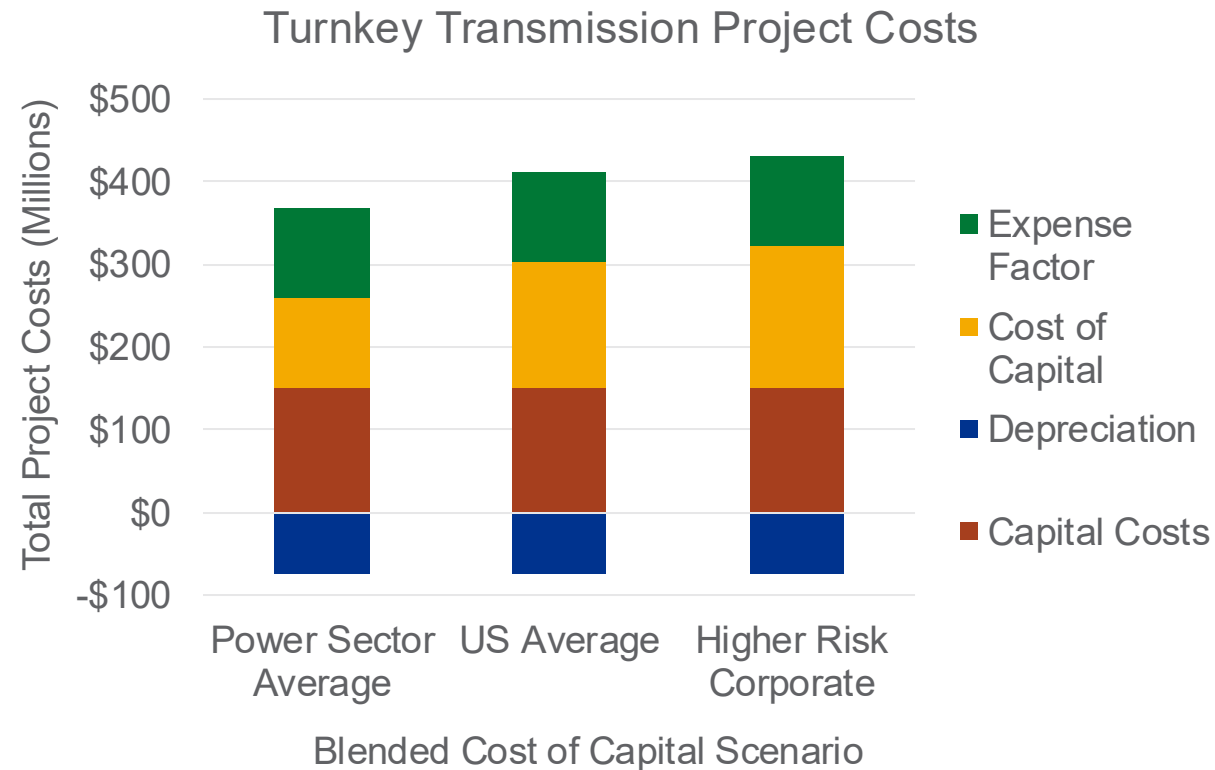
- **Credit rating actions can affect investor-owned utilities, municipal utilities, and cooperatives.** The industry average credit rating for investor-owned utilities is BBB+, generally considered to be “investment grade” and corresponding with consistent returns on investment and a relatively low cost of capital ([Edison Electric Institute 2024](#)).
- **Wildfire-related losses and liabilities can materially affect a utility’s ability to meet financial commitments** and can therefore result in a credit rating downgrade or negative outlook. From 2020 through 2023, credit rating downgrades of North American regulated utilities outpaced upgrades by more than 3-to-1, in part due to increasing physical risk like wildfire ([S&P Global 2024](#)).
- A credit rating downgrade due to wildfire risk can **compound a utility’s financial stress** by increasing the cost of borrowing and reducing access to capital ([Kousky et al. 2019](#)).
- A rating action for a subsidiary can also affect the parent company and other subsidiaries ([S&P Global 2023](#)).
- Credit rating **downgrades to utilities can occur relatively quickly** after a wildfire, even before determination of liability.
- There are also examples of **agencies raising utility credit rates by addressing wildfire risk** through WMPs, or by settling outstanding wildfire cases.

Will wildfire risk affect utility financial returns?



- There are broad relationships between the return of an asset and its underlying risk.
- Investors will demand a greater rate of return as their risk of loss increases.
- **The electric utility sector has historically been marked by low risk and (lower) returns.** This has allowed utilities to finance infrastructure build out at a relatively low rate.
- **Wildfire may be increasing risk and therefore required returns for utilities,** making infrastructure build more costly and potentially investors will need even higher or faster returns.

Clear impact on project costs from variation in cost of capital



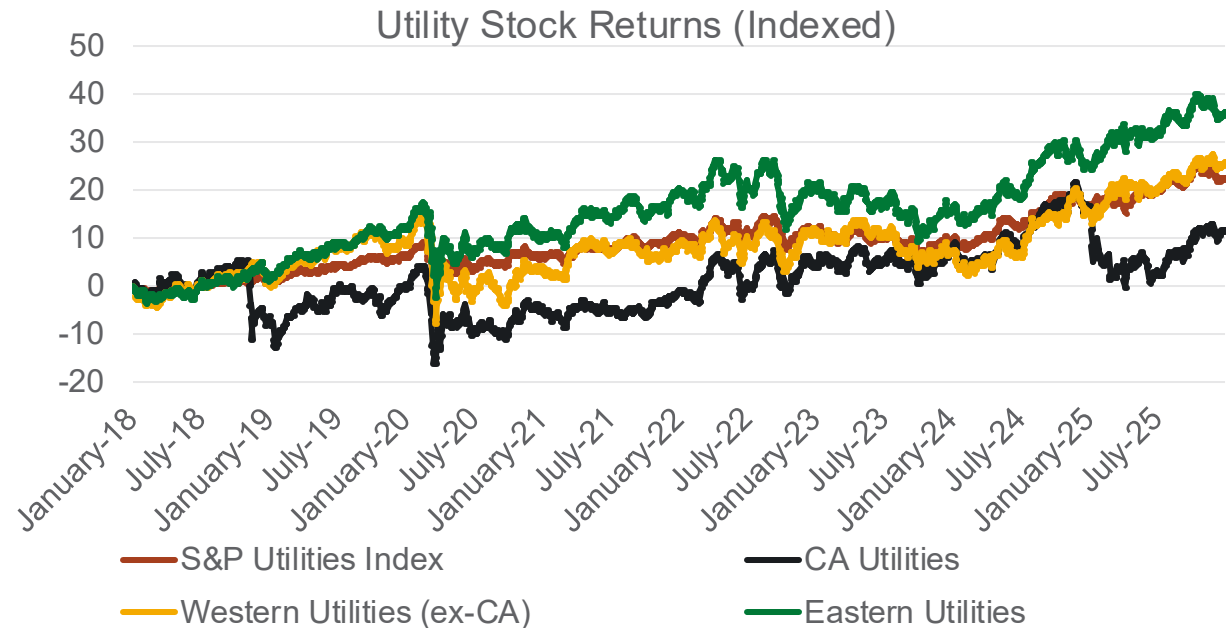
| Sector | Average Blended Cost of Capital |
|------------------------|---------------------------------|
| Power | 5.01% |
| US Average | 6.96% |
| Higher Risk Corporate* | 7.8% |

*75th Percentile Cost of Capital for US Industry Sectors

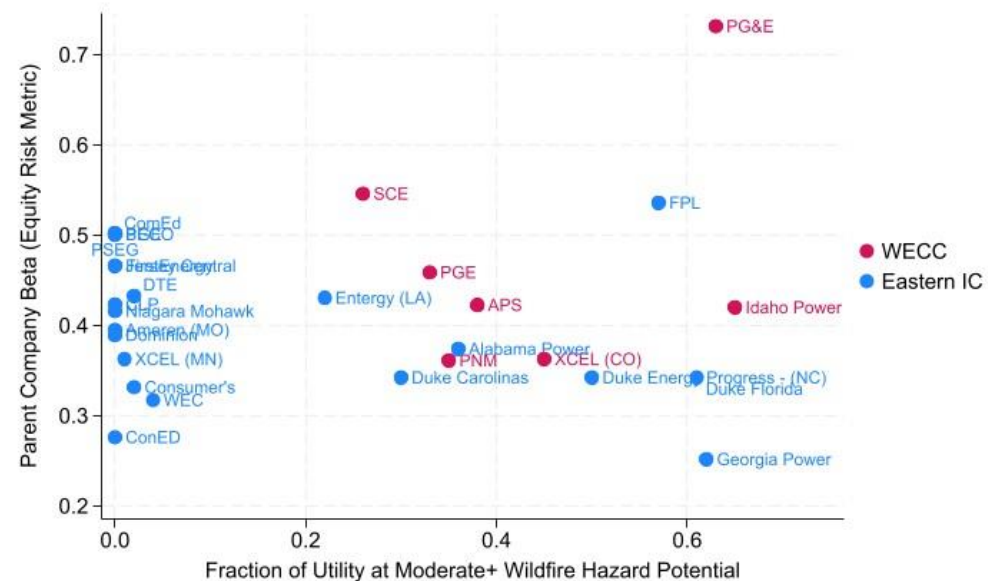
Source: [Damodaran 2026](#)

- **Cost of capital has a significant impact on the cost of infrastructure build.**
- This chart shows the total turnkey costs (including depreciation) of a 50-mile transmission project in the Midwest.
 - If costs of capital were to increase from utility sector average blended cost of capital to US industry average, turnkey project costs would increase by **\$43 million, a 15% increase.**
 - If utilities become riskier than the US average costs would rise by **\$61 million, a 21% increase.**
- **Utilities recover cost of capital through their return on equity, which is recovered through ratepayers.**
 - Cost of capital is a floor for return on equity, actual impacts to affordability will vary based on the rate of return approved by regulators.
- Spread over entire rate bases, increases to required ROR could result in annual bill increases of **\$50 - \$60.**

Wildfire and equity returns



Simple average of company return based on geography. Parent companies with utilities that span WECC and Eastern IC are excluded. Includes component companies of the S&P 500 utilities index.



- **PNNL found statistically significant differences in risk profiles between large electric utilities in the U.S. West and the U.S. East.**
 - Initial analysis shows utilities in the WECC carry 25% risk premium to utilities in the East.
 - Risk premiums for utilities in general rose by ~20% in 2019, 2021, 2022, and 2023.
- Preliminary analysis also finds a statistically significant relationship between increasing number of fires, and investor risk perception of utilities.
- PNNL also examined **how utility equity returns vary in most wildfire prone areas.** We find sharp divergences in returns between eastern and western utilities.
- **Western utilities outside of California had substantially lower returns than eastern utilities from 2020-2024.** California utilities saw sharply negative returns, with considerable volatility. Large dips following the Camp and Palisades fires are visible.
- Other factors like utility business model will also impact returns.

Wildfire indirect cost summary

- **Utilities are facing higher insurance costs and less availability.**
 - For utilities reporting increases in premiums, additional insurance costs range from \$4 to \$128 per customer per year.
 - New policy and financial mechanisms may be needed to limit customer rate impacts.
- **Wildfire is changing the risk profile of certain electric utilities.**
 - Increased risk profiles generally result in higher costs of borrowing and equity.
 - There is evidence to support the idea that utilities in the Western Electricity Coordinating Council (WECC) service area are viewed as riskier than those in the east by investors.
- **Financing costs impact customers through regulated rates of return.**
 - Rates of return are heavily influenced by, but are not equivalent, to the cost of capital.
 - Based on historical spend rates, increasing the cost of capital by ~200 basis points could increase typical customer bills by \$50-\$60/year. Higher risk scenarios indicate bill impacts could exceed \$75/year, with 2020 levels of infrastructure spending.

A potential cost driver: state laws on liability standards for wildfire vary

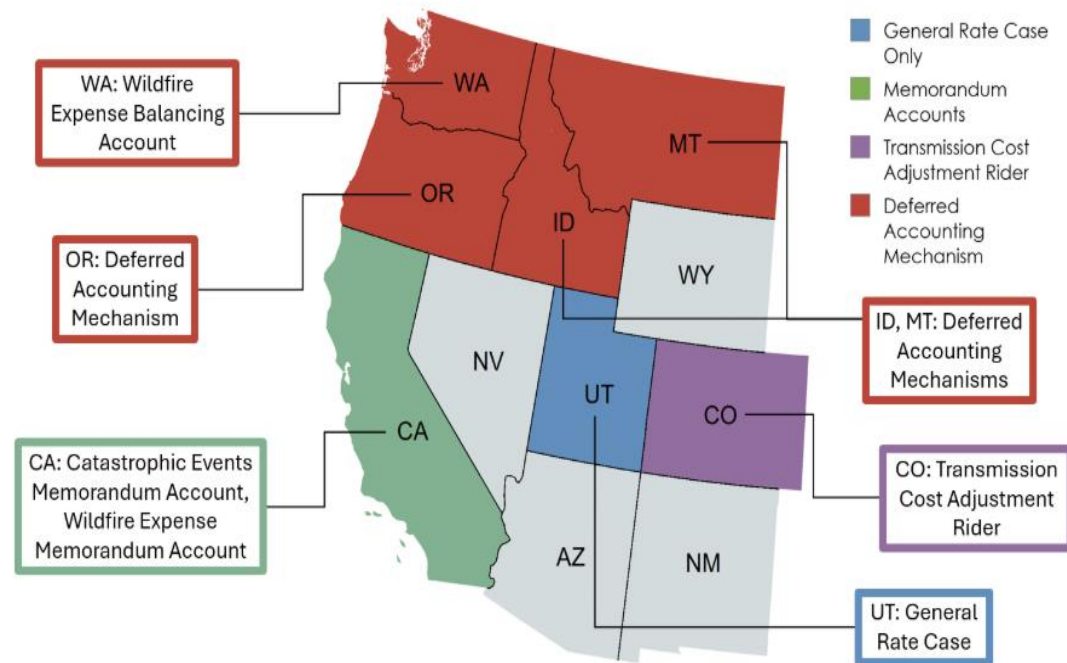
- **Liability standards:**
 - Establishing liability of a utility for a wildfire is typically based in either state negligence law or state strict liability law.
 - In states with strict liability law, such as California, it is more likely that utilities will be held liable for damages that result from utility ignited wildfires, and therefore risk can be higher.
- **Impact on indirect costs:**
 - Indirect costs can be heavily influenced by differences in state liability standards.
 - Some wildfire liability costs can be recovered from ratepayers.
 - Liability standards also impact other indirect costs, such as insurance cost and availability.
 - A state's liability approach can impact insurers' perception of risk.

3

How Direct and Indirect Costs Appear in Rates

States vary in how they track wildfire costs, making simple cost comparisons impossible

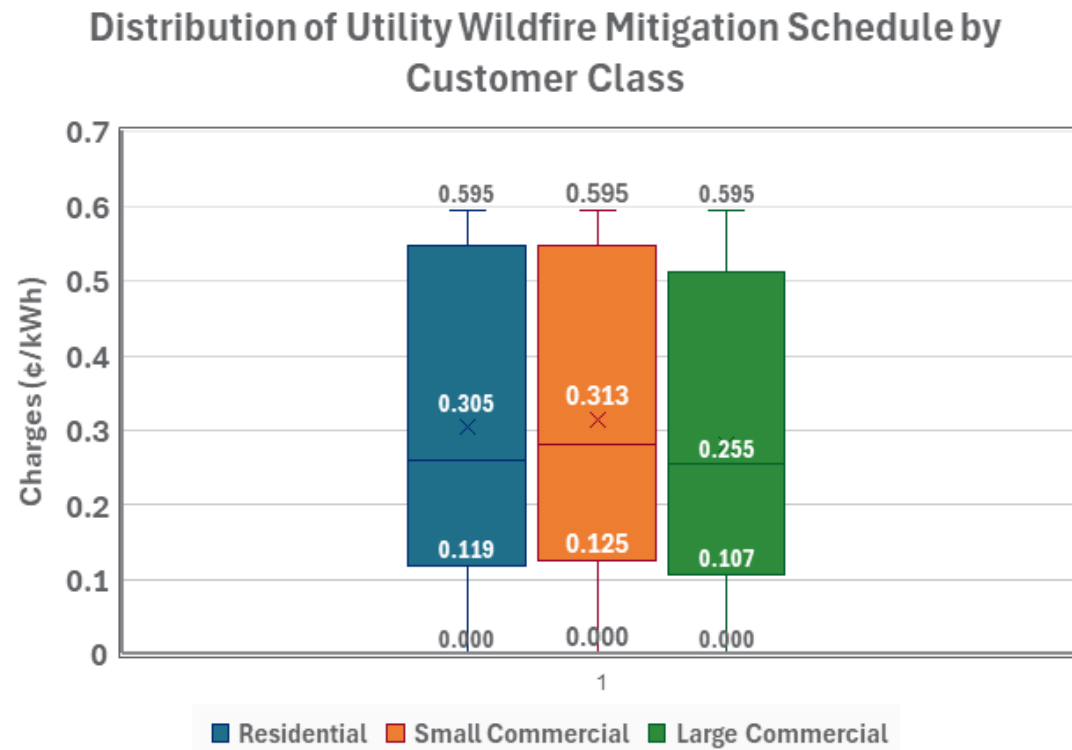
Tracking Type Used by Regulated Utilities by State



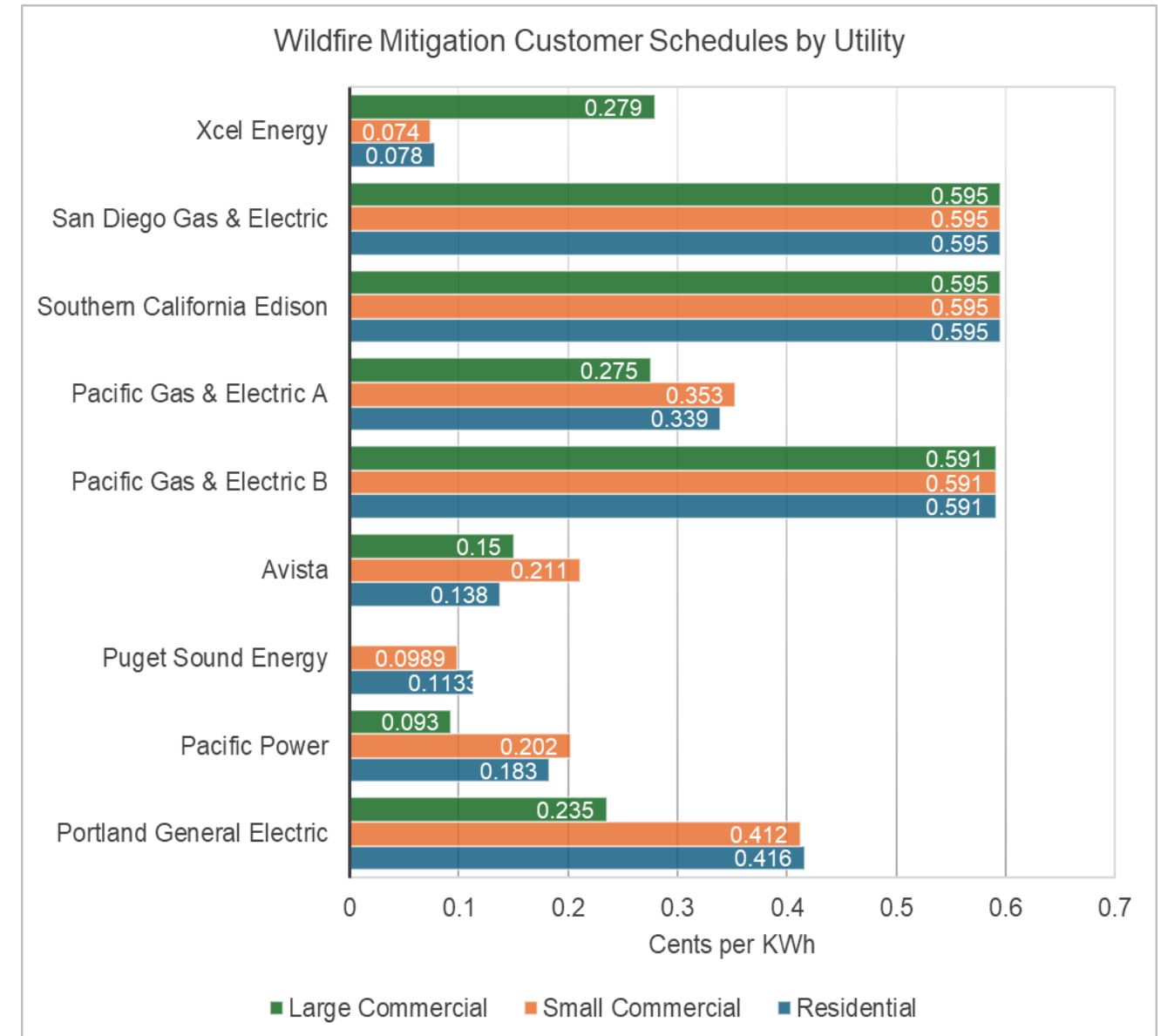
For detailed information see: [PNNL, Cost Recovery Mechanisms for Utility Wildfire Mitigation, 2026](#).

- Mechanisms used to track costs vary and as a result it can be difficult to access and compare costs across states.
- Mechanisms can include:
 - General Rate Case
 - Explicit Tariffs and Schedules
 - Deferred Accounting and Balancing Accounts
 - Memo Accounts
 - Transmission Cost Adjustment Riders

Wildfire mitigation rate impacts occur differently across customer classes



Where utilities publish explicit schedules for wildfire mitigation costs, data shows that small commercial and residential customers pay higher charges on average than large commercial customers, but the allocation varies by utility.



For detailed information see: [PNNL, Cost Recovery Mechanisms for Utility Wildfire Mitigation, 2026](#).

Wildfire rate impact summary

Direct costs:

- Wildfire mitigation costs are not yet a driver for increasing electricity rates for most states, but the ratepayer impact is still measurable, and they are a driver in two states.
- Among utilities with explicit wildfire mitigation charges, impacts vary by customer class.

There are several **additional costs** that impact rates:

- Indirect costs such as increased insurance and cost of capital
- Whether states require ratepayer contributions to wildfire damage funds
- Exposure to potential future costs from wildfire damage to infrastructure or other liabilities.

Estimated monthly cost of wildfire on households with average electricity use

| Cost Type | Low Range Estimate | High Range Estimate |
|-----------------------------------|--------------------|---------------------|
| Mitigation | *\$.99 | *\$5.40 |
| Increased Insurance Premiums | \$.33 | \$10.66 |
| Increased Cost of Capital | ~\$3.00* | ~\$5.00* |
| Total non-CA IOU Customer: | \$4.32 | \$21.06 |
| Wildfire Fund (CA IOUs only) | **\$2.50 | *\$5.35 |
| Total CA IOU Customers: | \$6.82 | \$26.41 |

*Based on a national average of 900 kWh/ month per residential household

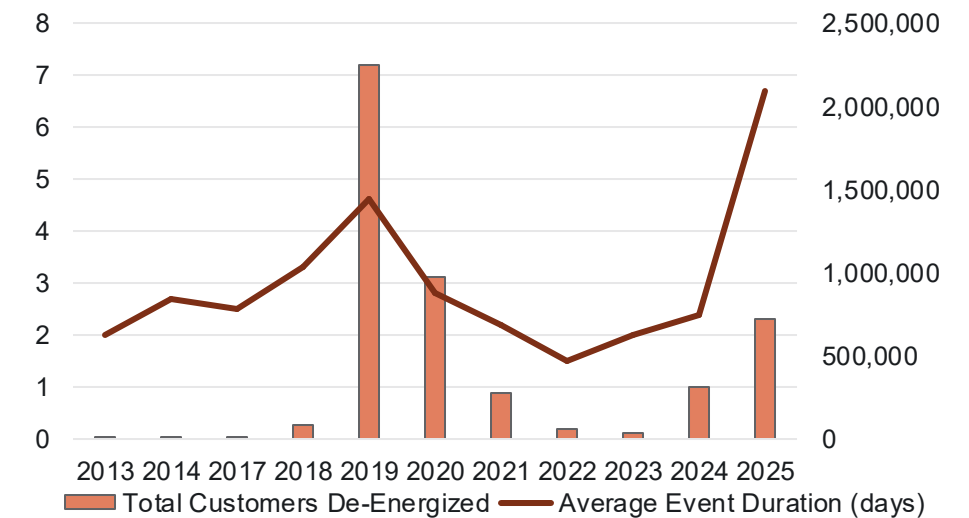
** Based on a CA estimate of 420 kWh/ month per residential household

Insurance premium and capital costs are extrapolated based on highly variable information

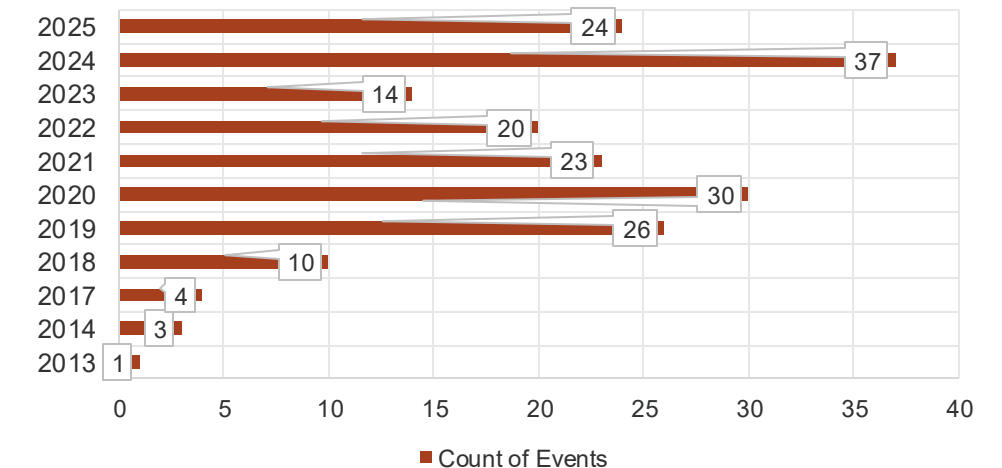
Proactive Public Safety Power Shutoff (PSPS) has social and economic costs beyond rate impacts

- **As a mitigation approach, PSPS involves tradeoffs.** While PSPS reduces wildfire ignition risk, turning off power burdens customers with the economic and social costs of sudden and potentially long outages.
- **PSPS has economic costs, and its use has expanded since its inception, evolving from isolated early events into a more routinized wildfire mitigation tool used by a growing number of utilities.**
- **At least 192 PSPS events occurred between 2013 and 2025, with the vast majority (165) by California IOUs.**

Annual PSPS Event Customers Impacted



Annual PSPS Event Count



[PSPS Known Events Tracker - PNNL-SA-220252.xlsx](#)

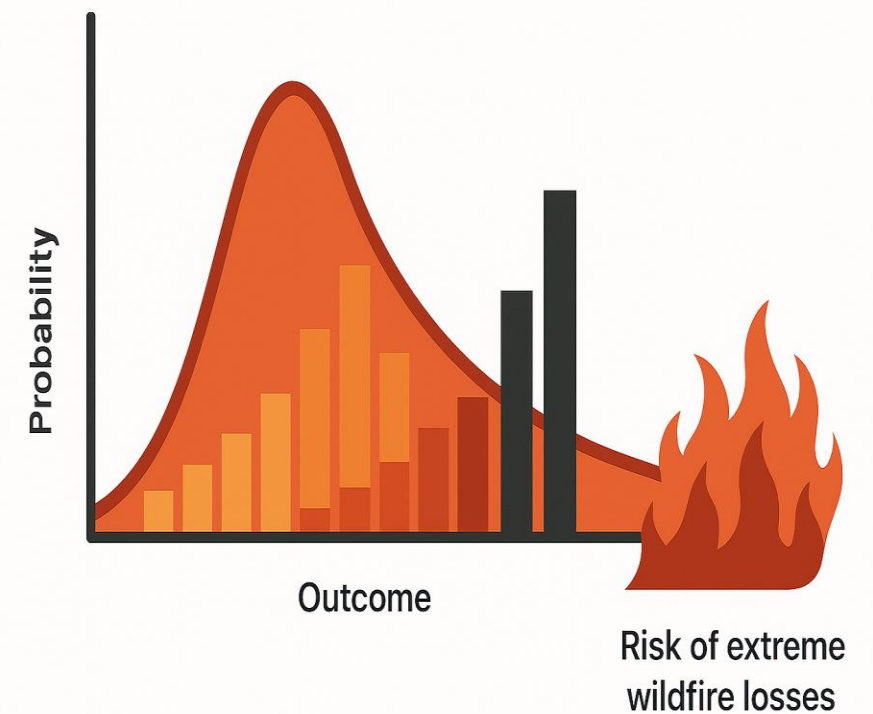
Tension in regulatory authorization

- **Regulators of investor-owned utilities generally allow prudently-incurred costs to be recovered in customer rates.**
 - The California Public Utilities Commission allowed customer recovery of \$27 billion in utility wildfire-related costs from 2019-2023, representing ~7-13% of the average residential customer's monthly electricity bill in 2023 ([California Public Utilities Commission 2024a](#)).
- **Whether or not regulators allow cost recovery for wildfire expenses, customer rates can still be affected due to either unmitigated risk or increases in the utility's cost of borrowing.**
- Some investor-owned utilities are **requesting higher regulated returns on equity** to reflect increased risk from wildfire.
- As affordability concerns mount, regulators face increasing pressure to deny utilities **the full value of the requested increase.**
 - In Oregon, the regulator cited “evidence of mounting financial pressure on customers” as a reason for not increasing the allowed utility return on equity ([Oregon Public Utility Commission 2024](#))

There are tradeoff dynamics in who pays utility wildfire costs

- Allowance of recovery for wildfire costs directly impacts customers, but limits on cost recovery and return on investment may compromise utilities' ability to increase spending on wildfire mitigation and other objectives.
- In the event of a wildfire and resulting lawsuits, additional cost dynamics and tradeoffs occur, especially with regard to findings of negligence ([ID SB 1183 2025](#), [MT HB 490 2025](#), [SD SB 36 2026](#), [TX HB 145 2025](#)).
- **Additional dynamics:**
 - Expanding ratepayer value from wildfire mitigation investments
 - Risk mitigation design and cumulative effects
 - Restoration of market forces and shared risk

Visualization of probability versus risk



Summary

In Part One of this three-part webinar, we covered the cost landscape:

1. Utility wildfire mitigation as a new and growing cost for electric utilities and customers,
2. Direct costs of utility wildfire mitigation, and how they vary by types of expenses, program area, risk reduction, and utility type,
3. Indirect costs of utility wildfire mitigation, such as insurance, cost of capital, and other bedrock costs of electric service,
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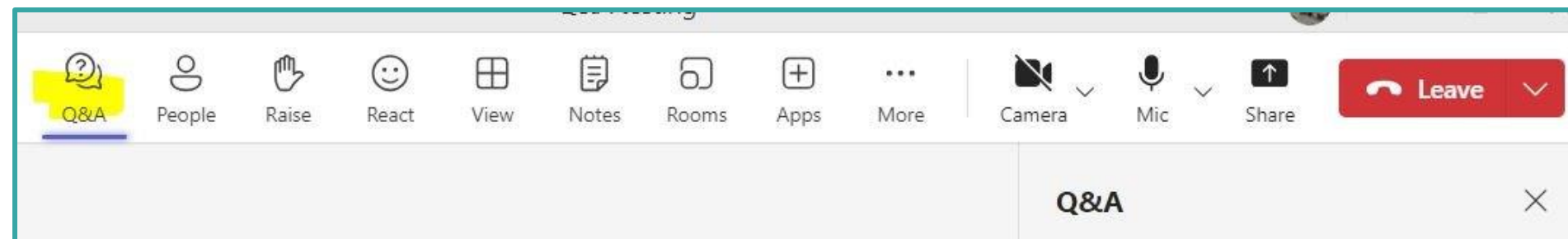
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[Wildfire Risk and Changing Utility Business Models | PNNL](#)

A full PNNL resource list is available at:
[Resource Library | PNNL](#)

Please share your questions using the Q&A tab or by emailing us at wildfire@pnnl.gov.



Contact:

wildfire@pnnl.gov

<https://wildfire.pnnl.gov>

<https://www.pnnl.gov/projects/wildfire-risk-resilience/changing-utility-business-models>

Webinar Two is June 11

In Part Two of this series, we provide potential cost reduction strategies that mitigate wildfire risk while increasing affordability and customer value for the same investment.

Topics:

- State policy solutions
- Direct mitigation strategies for affordability
 - Multi-benefit technologies
 - Leverage existing utility programs
- Tools to manage financial risk

PART TWO: EXPLORE SOLUTIONS

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Please join us for
Part Two

[Wildfire Risk and Changing Utility Business Models | PNNL](#)



Register for
Part Two



Webinar Three is June 18

In Part Three, PNNL will facilitate industry and research leaders for a discussion about finance and risk trends and future directions for utilities managing wildfire risk.



Ali Arabnya

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Bob Mudge

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Michael Wara

Senior Research Scholar
Stanford University

PART THREE: INDUSTRY THOUGHT LEADERS

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Facilitated by
Rebecca O'Neil, Research
Principal, Pacific Northwest
National Laboratory

Thank you

Cite as:

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Contact:

wildfire@pnnl.gov

<https://wildfire.pnnl.gov>

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