Wildfire Financial Risks for Utilities: Proactive Management, Regulatory Policy, and Strategy Recommendations

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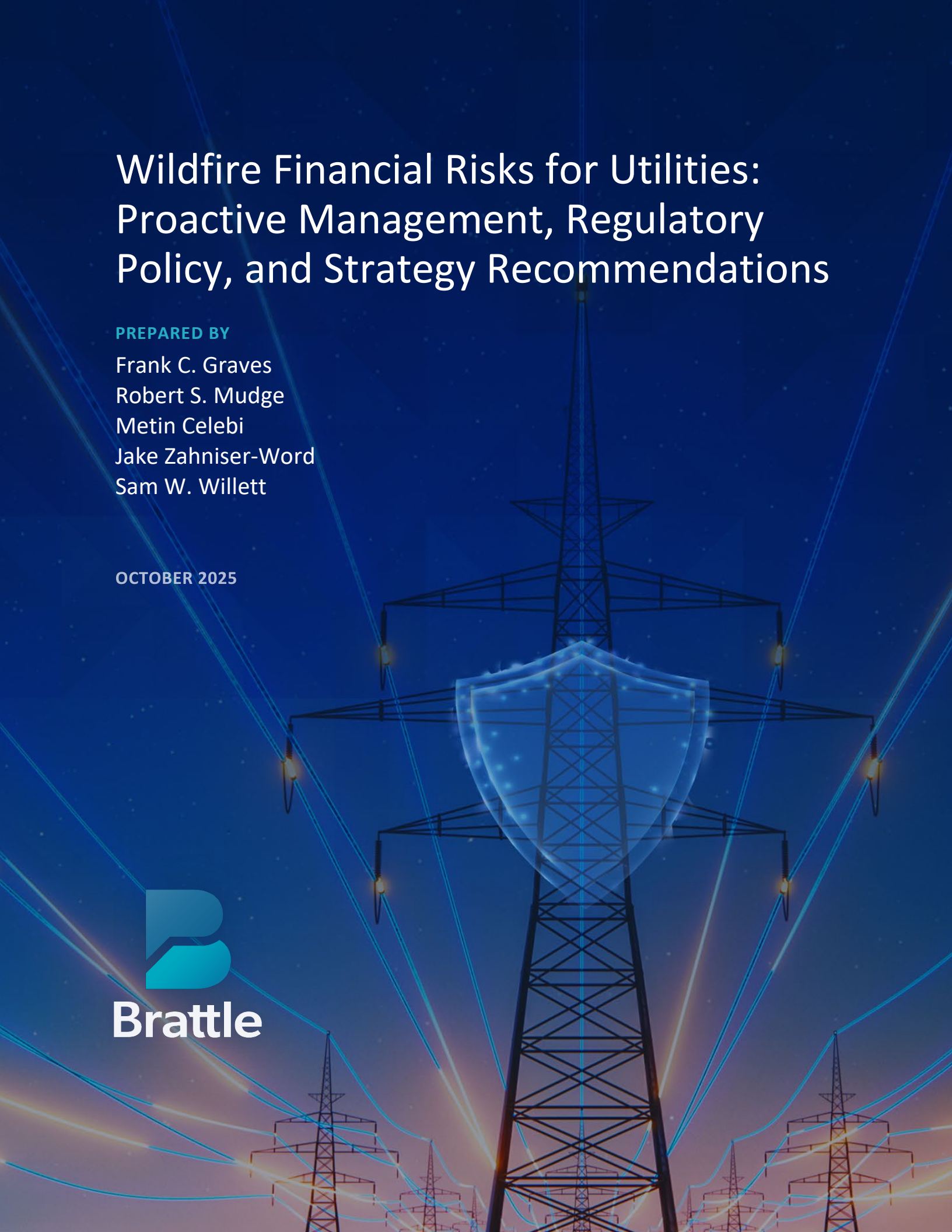

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CONTENTS

I. Introduction 1

II. Background on IOU Wildfire Liability 4

A. The Growing Threat of Wildfires 4

B. Cost-Benefit Analysis and Residual Risk 7

III. Managing Liability Claims Against IOUs 11

A. Legal vs. Regulatory Authorities 11

B. Regulatory – *Ex Post* Financial Buffers 14

C. Regulatory – *Ex Ante* Regulatory Agreements 14

IV. Recommendations: Proactive Steps IOUs Can Take 16

A. Actuarial Analysis 16

B. Wildfire Mitigation Planning 17

C. Value at Risk 18

D. Loss Protection Design 19

E. *Ex Ante* Agreement on Access and Funding 22

F. Optimization of Loss Protection 24

V. Conclusion 25

Appendix: Asymmetric Risk for Investor-Owned Utilities 27

Unregulated Firms vs. IOUs 27

Corporate Bonds vs. IOU Equity 28

Conventional Cost of Capital Measures 28

A Cost of Service (Not Capital) Problem 30

End Notes 32

I. Introduction

Regulated investor-owned utilities (IOUs) are facing increased threats to their operations and financial resiliency due to extreme weather events that result in third-party damage claims and prudence challenges. The recent catastrophic wildfires affecting Los Angeles and surrounding areas, which drove a $10 billion loss in the market value of Edison International within days of ignition, are just the most recent example of this phenomenon.[1]

In other recent past fires, third-party wildfire loss claims have aggregated in the tens of billions of dollars for the California IOUs – Pacific Gas & Electric (PGE), Southern California Edison (SCE), and San Diego Gas & Electric (SDGE) – since 2007, and more recently in Colorado, Oregon, Hawaii, and Texas.[2] These claims have threatened to materially erode those IOUs' financial resiliency, and indeed, in the case of PG&E, led to its bankruptcy in 2019.

One potentially counterintuitive feature common to wildfire and other climate-induced extreme risks is that they are not compensated in returns on capital customarily measured or allowed for regulated IOUs. This is because these risks are idiosyncratic (i.e., irregular, localized, and not market-driven) and asymmetric, in the sense that they only involve downside outcomes. In addition, by design, there are extremely limited opportunities for regulated IOUs under cost-of-service pricing to offset them with earnings in excess of their allowed returns. Instead, in a risk-reward sense, the utilities break even when such events do not occur, and they fall below cost of service recovery if the events do occur and costs are disallowed. (See also the Appendix.)

This lack of compensation represents a critical breakdown in the "regulatory compact" under which private investors provide funding and bear risk for regulated IOUs with a statutory obligation to serve the energy requirements of customers in their service areas.[3,4] The need and mechanism for those investors to earn compensatory returns is enshrined in the US Supreme Court's *Hope* and *Bluefield* rulings[5] and decades of precedent.

The scale and prevalence of recent wildfire damage claims place the difficulties of maintaining this balance of interests in stark relief. If no provision is made to reasonably protect IOUs from uncompensated wildfire losses, shareholders cannot expect to earn their allowed returns, and thus, they are denied the benefit of the regulatory bargain per *Hope* and *Bluefield*. That, in turn, degrades their ability to provide normal utility service or mitigate fire risks.

That said, it is not so easy to rectify this loss exposure. In particular, attempts to administratively determine a compensatory, supplemental risk premium as part of the return on equity are fraught with extreme measurement and moral hazard difficulties that make this approach of limited use, other than for illustration.[6] More tenable solutions lie in recognizing that this problem is best understood not as a cost-of-capital risk, but instead as a cost-of-service risk involving extreme – if rare – events, akin to large shocks in the costs of fuel under a polar vortex. Further, it is not reasonable to expect that available mitigation techniques can fully eliminate wildfire risk. Thus, there will always be residual wildfire risk even if IOUs take prudent mitigation steps.

This white paper is intended to 1) provide a current snapshot of the dynamic IOU wildfire liability landscape, including its evolving legal and regulatory standards, and 2) highlight proactive steps IOUs, regulators, and stakeholders can take to mitigate this risk.

Norms for allocating wildfire risks and costs are evolving in a complex landscape of overlapping legal, regulatory, and legislative authorities, with ambiguity about where each begins and ends across different jurisdictions. This has left IOUs vulnerable to a variety of misperceptions that make cost recovery contentious. In particular, it is commonly – but incorrectly – believed that allowed returns on capital compensate for all foreseeable risks, including wildfire liability risk; that wildfire mitigation can reasonably be expected to eliminate all risk or that residual risk and fire outcomes per se demonstrate poor mitigation; and that legal liability for fire damages should be equated to regulatory imprudence.[7] These misperceptions have led some stakeholders to claim that loss protection costs and realized IOU liabilities should be subject to regulatory disallowance or some degree of sharing between customers and shareholders.[8]

To address these misconceptions and to create a process aligned with the regulatory compact, we draw from our experience with recent wildfire regulatory proceedings and the resulting precedents to identify best practices and to suggest an integrated business strategy/regulatory policy that manages risk equitably. Specifically, we recommend that IOUs, regulators, and stakeholders jointly develop programs that integrate and balance the following:

1. **Actuarial Analysis:** Sizing the dollar impact of wildfire threats over future time horizons in probabilistic terms;
2. **Wildfire Mitigation:** Development (and regulatory approval) of wildfire mitigation plans and identification of residual risk;
3. **Value at Risk (VaR):** Determination of probabilistic loss thresholds beyond which any particular IOU would incur more costs than it can sustain;

4. **Loss Protection Design:** Design of loss protection mechanisms, potentially including self-insurance in lieu of commercial insurance and special reserves for limiting extreme losses to address VaR goals;
5. **Loss Protection Access and Funding:** *Ex ante* agreement on 1) access to the loss protection mechanisms (e.g., presumptive prudence via effective compliance with agreed wildfire mitigation plans), and 2) funding, drawdowns, and replenishment of the loss protection mechanisms (treated as costs of service); and
6. **Optimization:** Pooling and allocation of loss protection coverage on a regional or national basis to gain diversification and economies of scale and/or refinancing with securitization for cost efficiency and rate smoothing.

This "package deal" of recommendations, when constructed and administered as a whole, comports with the private/public bargain struck in the regulatory compact. Regulatory agreement on all the steps is necessary for the reasons noted above – wildfire liability risk is not compensated in allowed IOU returns, and it is not feasible or cost-effective to eliminate entirely, thus leaving residual risk. Consensus must be achieved on the probability of risk, acceptable approaches to mitigation, sustainable VaR thresholds, and reasonable levels of authorized loss protection.

Importantly, these elements cannot meaningfully be addressed other than as an integrated whole. Wildfire liability exposure must be addressed via a sequence of related actions, some before the fact as well as after. None of these actions is sufficient to solve the problem alone, and each affects the others in terms of efficacy and cost. Criteria must be jointly specified and agreed upon well in advance of crises.

The result should be that – absent regulatory findings of imprudence – extreme losses (*ex post*), as well as other costs incurred to avoid them (*ex ante),* should be viewed as prudently incurred costs of service that are fully recoverable from customers.[9] These loss protection mechanisms are not designed for the benefit of shareholders.

For instance, IOUs do not gain any special profits or returns on mitigation expenditures.[10] Instead, they are designed to preserve the integrity of the regulatory compact, which ultimately protects the customer while leaving the investor with a risk-balanced ability to meet its obligations. This approach further respects the need for, but also the practical limitations of, fire risk management programs that cannot fully eliminate the problem, while protecting the financial stability of IOUs as is needed for their obligation to serve the public.

II. Background on IOU Wildfire Liability

A. The Growing Threat of Wildfires

Major wildfire risk zones have been identified in geographies as diverse as Europe, Australia, Canada, and the US.[11] Particularly in western North America, wildfire risk has recently become a chronic and catastrophic issue – i.e., more frequent, larger, and more consequential. For example, recent analysis of human-caused wildfires in the West by the National Interagency Fire Center shows an approximately five-fold increase in acres burned annually from 2001 to 2024.[12] Recent wildfires have had devastating consequences for electric IOUs in California and Hawaii, as well as Oregon, Colorado, Idaho, Washington, and Texas.[13]

The increasing frequency and severity of wildfires have correlated with the growing severity of other climate-related disasters, such as hurricanes and severe cold-weather storms, that – like fires – have become more likely and more extreme due to climate change. Despite obvious differences from fires, these other extreme weather disasters share some public perceptions about risk with fires, which makes many of the ideas recommended for fires herein also useful for those events. (See also **BOX 1 – GENERAL IOU DISRUPTIONS FROM EXTREME EVENTS.**)

Intuitively, wildfire risk can be both widespread and increasingly severe as it largely stems from the compounding effects of climate change interacting with residential and commercial growth in locations already prone to ignition – areas known as the wildland-urban interface (WUI).[14] Conditions such as high temperatures and low precipitation have been linked to extended fire seasons, which alone increase wildfire risks. This is often exacerbated by dry and damaged tree and ground cover and by increasingly volatile weather conditions, such as high wind events, which have caused a near inability to predict the behavior of individual fires.[15]

The cost of wildfires has grown in conjunction with – and in addition to – their physical impact, as damage awards per fire or per victim have increased on top of more frequent fire occurrences. Globally, the pace of reported economic losses from wildfires has more than doubled since 2015 relative to the prior 15 years.[16] This step-change is even more pronounced for the US, where, comparing the same time periods, economic losses have increased five-fold, and in some years amounted to many tens of billions of dollars.[17]

As one consequence, IOUs have encountered difficulty in obtaining wildfire liability insurance at a reasonable cost, if at all. This trend was observed as early as 2017 in California, when SCE was already noting a "diminishing general liability and wildfire insurance market in California for investor-owned IOUs, to the extent even available."[18]

BOX 1 – GENERAL IOU DISRUPTIONS FROM EXTREME EVENTS

For IOUs, wildfires are probably the most glaring and extreme example of the problem of preparing for, reacting to, and recovering costs of rare, extreme risks. However, these same problems can arise for other "black swan" events affecting IOUs, potentially leading to power system reliability problems, abnormal and dangerous equipment failures, cyber-disruptions, and the like. By way of example, the National Oceanic and Atmospheric Administration (NOAA) has compiled dollar costs associated with climate disruptions (including wildfires), summarized graphically for 1980–2024 below. Notably, wildfire costs have formed only a small part, about 5%, of overall climate disaster costs over the period measured by NOAA.

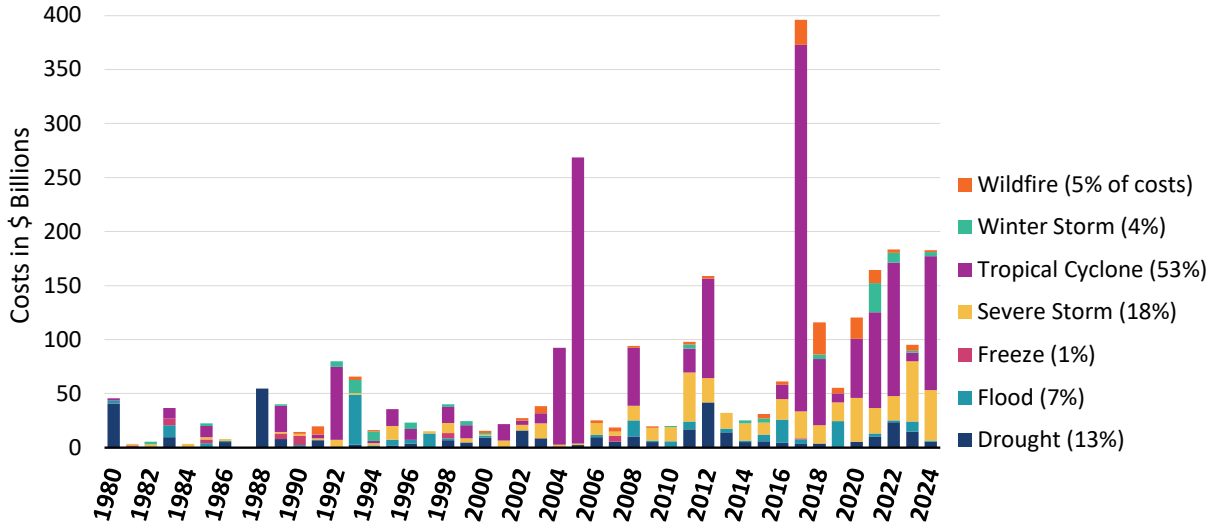
Of course, the non-wildfire threats may not be as readily linked to perceived IOU causation, but they can still involve huge liabilities for which cost recovery can be very contentious if an IOU's risk preparations are found to be inadequate.

A similar package of related risk management approaches can help deal with any of these – i.e., a risk exposure analysis that positions the problem in the context of other issues, agreed mitigation plans, loss protection where available, and *ex post* prudence for prior adherence to the mitigation and loss protection plan.

Some shared features of these hazards are that:

1. They are intrinsically hard to predict, so it is difficult to know how much to spend or how best to reduce their risk.
2. It is possible to mitigate or reduce the chance of such an event occurring, but it is very hard to control the scope of impact (or damages) should one occur.
3. They are virtually impossible to eliminate at any acceptable cost.
4. Their occurrence triggers strong customer anger and elicits calls for punitive financial treatment of the IOU.

UNITED STATES BILLION DOLLAR CLIMATE DISASTER EVENTS 1980–2024



Source: Adapted from Billion-Dollar Weather and Climate Disasters | Time Series | Summary Stats | Time Series | National Centers for Environmental Information (NCEI)

In the course of its 2023 general rate case (GRC) process, PG&E reported that "there has been a significant decrease in the number of insurers offering wildfire coverage to California IOUs,"[19] with anemic insurance company responses to wildfire insurance solicitations (16 offers to 73 inquiries in 2021).[20] By then, PG&E was facing wildfire liability insurance premiums as high as $0.80 per dollar of coverage, with SCE at $0.43 per dollar of coverage. This led the California Public Utilities Commission (CPUC) to grant both PG&E and SCE authority to adopt customer-funded self-insurance in recent GRCs.[21]

This rise in wildfire (and climate-event) insurance costs has spread outside of California.[22] Other western IOUs, even some without extreme fire events in the past, are seeing insurance quotes with high cost-to-coverage ratios, leading them also to consider self-insurance.

The rising costs of wildfire liability insurance appear to reflect both increased funding pressure on the insurance industry from growing claims and the industry's difficulties in measuring and diversifying the growing frequency and costs of fire events – particularly given their general correlation with other climate-related risks. As a result, an IOU's cost of insurance may rise dramatically even if it has not experienced a wildfire disaster within its own service territory.

Concurrently, affected parties and insurers have mounted liability claims against IOUs in connection with catastrophic wildfires. As indicated in **FIGURE 1** below, such claims have aggregated many billions of dollars and were associated with PG&E's bankruptcy in 2019.

FIGURE 1: MAJOR WILDFIRE LIABILITY SETTLEMENTS, VERDICTS, AND PENDING CLAIMS INVOLVING IOUS[23]

Event Date	Event Name	Defendant	Plaintiff	Decision Date	Amount ($M)
Settlements					
2007	Witch, Guejito, and Rice Fires	SDG&E	Various	Through 2015	2,400
2017–2018	Thomas/ Montecito/ Woolsey	SCE	Various	Through 2024	9,500
2017–2019	Camp et al.	PG&E	Subrogation Trust	2019	11,000
			Fire Victim Trust	2019	13,500
2020	Archie Creek (Labor Day)	PacifiCorp	Timber Cos./ Others	2023	549
2022	McKinney	PacifiCorp		2022–2024	110
2023	Maui (Lahaina et al.)	HECO	Various	2024	2,000
Verdicts					
2020	Santiam et al. (Labor Day)	PacifiCorp	James et al. (Class)	2023	Pending
Claims					
2021	Marshall	Xcel	Various	Pending	~2,000 (est.)
2025	Eaton	SCE	Various	Pending	~9,000 (est.)

Source: Brattle research of SEC filings and news articles, see endnote 23.

B. Cost-Benefit Analysis and Residual Risk

In response to these threats, IOUs have, of course, stepped up their pre-emptive, physical mitigation to reduce the risk. Some IOUs in the western US are re-evaluating their risk management protocols and cost recovery mechanisms to be more comprehensive and proactive to this kind of problem, including:

- Compiling better actuarial statistics on apparent risk across geographies and over long periods (even if very difficult to do with any precision),[24] which allows them to prioritize mitigation as well as to compare the price of risk in offered insurance to their estimated loss exposure.
- Developing *ex ante* agreements with regulators and intervenors that establish that risk mitigation plans are aggressive enough, yet do not spend too much money, in an effort to validate their prudence in cost recovery proceedings if/when disasters occur.[25]

This type of pre-emptive risk mitigation and cost-benefit analysis is ideally carried out for each type of risk that an IOU would encounter at the same time. This list could include cybersecurity, system infrastructure safety, fires, earthquake recovery, extreme storm hardening, large-scale outage risk, and more. Parallel analyses of these risks allow for comparison of costs and benefits across extreme risk events and balancing of their mitigation efforts.

For example, the California IOUs submit reports pursuant to the CPUC's Risk Assessment and Mitigation Phase (RAMP), in which each IOU evaluates the exposure, consequences, and mitigation possibilities for several types of risks. These assessments are intended to inform system-wide operating and capital budgets in anticipation of GRCs.[26]

This evaluation is inherently challenging, as the types of damages differ across various risk types (e.g., wildfires vs. cyber threats). However, to some extent, the risks can be monetized – or at least ranked – in terms of common dimensions, such as expected amount of energy delivery disruption, frequency of occurrence, worst-case financial impacts, personnel and customer safety or survival risk, interaction with other critical systems, and tendency to include property damage, etc. Additionally, their mitigation options can be ranked in terms of the time frame and extent of the system for which improved protection can be achieved by each.[27]

This parallel risk analysis allows an elementary comparison across risks for a degree of equivalent response planning using techniques such as a risk-spend efficiency (RSE) analysis, which measures risk reduction per dollar spent on mitigation.[28] An integrated approach of this

type lends credibility to the plans for each of the underlying risks – e.g., by demonstrating that there was not an imbalance in investment or effort devoted to some of them at the expense of others.[29] Equivalently, it justifies budgets for each that are smaller than might be chosen if managing a single, given risk were the only responsibility.

Even with the best of IOU-sponsored fire mitigation plans, it is impossible (and too expensive even if it were possible in principle) to fully eliminate wildfire risks in a large region. This is true for several reasons:

- *Extreme weather poses an unpredictable threat* and amplifies the uncertainty range of consequences and damages of a given wildfire, even if the mitigation plans reduce the risk of a fire outbreak. Such unpredictability means that the challenges are a moving target, and factors outside the control of the IOU will significantly determine the extent of the outcome of consequences and damages of wildfires.[30]
- *Wildfire mitigation comprises a massive (and shifting) geographic challenge,* so it is not possible to pinpoint precisely where the wildfires will start in the future. One cannot anticipate and eliminate wildfire events by preemptive measures at a specific location that, in hindsight, may emerge under some weather conditions as critical among many possible locations. All potential areas need to be targeted and treated progressively, and ideally in order of declining risk – though determining that order is itself a diagnostic that takes time to develop and implement.[31]
- *Other entities share in mitigation responsibilities* across multiple agencies (both private and public) and many individuals, with IOU mitigation plans forming just one of many relevant factors.[32] Some of what would inform or shape utility plans may depend on other agencies as to what they monitor, report, or predict.[33]
- *Competing priorities of maintaining service quality and managing rate increases* mean that expected benefits of additional expenditures on wildfire mitigation plans must be balanced against customer benefits that are available (or needed) from spending that money on other programs (reliability, resiliency, etc.) or from just plain holding down rate increases. IOU expenditures for wildfire mitigation have been identified among the greatest contributors to increased electricity rates in California.[34]
- *Law of diminishing marginal returns,* or the tendency of economic activities to be directed at the most valuable activities first and then to see declining value per dollar of subsequent efforts. Since the types of activities in fire mitigation plans for a given total budget will (or should) be selected based on the greatest possible cost-effective impact in mitigating the wildfire risks, an expansion or continuation of the total budget will gradually pursue activities that tend to have smaller and smaller incremental benefits.[35] These declining marginal benefits ultimately justify putting a limit on how much improvement to pursue. *In*

> *general, all forms of risk reduction become dramatically more expensive per increment of mitigation as the remaining expected risks decline*.[36]

In light of the above challenges, IOUs – in conjunction with their customers and regulators – must chart a multi-year path for mitigation that is both balanced and acceptable, while recognizing that it will necessarily fall short of fully eliminating all wildfire risks. This requires careful review of mitigation effectiveness at various levels of effort. However, there is no single "right" or best answer that an IOU can determine on its own for how much to prevent, how much to insure, or whether to adopt a more incremental 'wait and see' approach.[37] This optimal point balance is ultimately a matter of stakeholder preferences – specifically, how and when customers and regulators choose to bear the risk, which cannot be eliminated entirely. If less emphasis is placed on one form of risk management, greater reliance on another may be necessary.

The process is one of negotiation as well as analysis. Key trade-offs must be evaluated between fire mitigation, service quality and reliability, rate increases, insurability, and potential future exposure. Importantly, the consensus cost/benefit solution is essentially (and appropriately) assured of stopping short of attempting to solve the whole problem rapidly or even fully. As a natural consequence, there *will* be residual risk, which has been elected or accepted jointly by stakeholders and regulators.[38]

In practice, IOU wildfire mitigation can be thought of as falling into two broad categories: 1) pre-emptive spending-intensive activity with material direct costs (grid hardening such as undergrounding distribution lines, insulating conductors, and vegetation management), and 2) real-time operational activity, such as Public Safety Power Shutoffs (PSPS) and Enhanced Powerline Safety Settings (EPSS, or "Fast-Trip" settings), the costs of which come more from lost load).[39] Both types come with difficult trade-offs.

Regulators set limits on each type of mitigation based on cost/benefit assessments (and negotiations), but again with the inevitable result that residual risk still exists after the agreed-upon mitigation (and loss protection) activities are identified and funded. For example, in connection with potential undergrounding, the CPUC limited its approved spending levels in PG&E's last GRC plan in 2023. The CPUC noted that "[w]hile it is not possible to eliminate all risk, parties disagree about the appropriate balance of risk reduction and costs, while considering feasibility, including permitting and construction timelines."[40]

The CPUC elaborated:

> "[R]isk reduction alone is not a sufficient metric to judge the prudency of the proposed mitigations. Risk Spend Efficiency (RSE) values, which are a ratio of risk reduction and costs, must be considered, in addition to other factors, such as costs, feasibility of construction, timeline for completion, and impact on telecommunications companies. The ratepayers' ability to pay for safety or risk reduction is not unlimited; as with all safety measures, the Commission must consider the cost and impact on affordability."[41]

Separately, for PSPS, the CPUC has stated:

> "While PSPS events can reduce wildfire risk, they also leave customers and essential facilities without power, which brings its own risks and hardships. These hardships are particularly acute for vulnerable communities and individuals. Because of the adverse consequences of PSPS events, CPUC requires IOUs to use PSPS only as a measure of last resort and established guidelines for its implementation."[42]

Thus, IOUs are faced with difficult judgment calls in implementing PSPS that can leave them vulnerable to liability claims, whether they choose to implement PSPS or not.[43] *A priori* agreement on the threshold conditions for using PSPS is the only defense against being criticized for this practice.

One paradoxical consequence of thorough risk assessment and mitigation planning is that there will always be some not-yet-completed or not-approved mitigation that could appear, in hindsight, to have been what would have prevented a fire. Given the extreme and understandable rancor that follows a large fire with perceived IOU involvement, there is great vulnerability to a finding of fault and liability for damages, even when the IOU has taken measures to mitigate such risk that may have previously been deemed appropriate.

After the fact, those actions may seem insufficient even if the precise targeting of efforts was not previously knowable. To address this risk, the inherent exposure to risks deemed cost-inefficient to mitigate should be made fully transparent – and acknowledged by regulators – before adverse events occur. (That exposure also underscores the tension between legal liability and prudence, as discussed in Section IV.)

III. Managing Liability Claims Against IOUs

Managing wildfire liability claims against IOUs confronts courts and regulators with challenges that may both overlap and conflict across their jurisdictions, ultimately requiring legislative guidance. This remains an evolving landscape, with varying regimes developing in the most affected states.

In keeping with its history of facing the most acute IOU wildfire liabilities to date, California is the most developed in this regard. As a framework for thinking about the allocation of IOU wildfire liability generally, **BOX 2 – CALIFORNIA APPROACHES TO IOU WILDFIRE LIABILITY** describes how California currently addresses IOU wildfire liability costs.[44]

A. Legal vs. Regulatory Authorities

California is noteworthy for keeping the legal and regulatory processes for wildfire liabilities separate. This is driven by California's "inverse condemnation" standard, which, like other forms of strict liability, "makes IOUs pay for property damages from fires started by their equipment, regardless of whether they were negligent."[45] Strict liability, by nature, does not generally account for the consensus cost/benefit solutions crafted by IOUs and regulators, nor for assessments of prudence.[46]

In jurisdictions outside California where strict liability does not apply and negligence standards come more into play, benchmarks for assessing negligence are still elusive. One legal analysis concludes that a standard framework for assessing negligence in damages claims "assumes…that courts are in a position to compare, *ex post*, the risks of accidents and the costs of avoiding them."[47] The standard framework referenced therein is the "Learned Hand formula," which is widely relied upon to define negligence in damages litigation. It posits that a defendant should only be held liable if the cost of probable loss exceeds the cost of mitigation.[48] In practice, however, "juries may be forced to make rough judgments about reasonableness, intuiting rather than measuring the factors in the Learned Hand formula."[49]

In an IOU wildfire liability case, neither a judge nor a jury can be expected to be aware of, understand, or have the time or tools to weigh all the factors that define prudent and cost-effective mitigation (such as competing demands for capital spending on non-wildfire imperatives, or complex analyses recognizing the statistical nature of parallel risk problems, budget constraints, and so on). And, as noted above, even the most careful of such planning evaluations plus their mitigation-plan performance fulfillment in operations will leave residual risk that IOUs and their regulators will have agreed upon – i.e., there will necessarily be some

chance of fires arising from utility equipment that was deemed too remote or costly to target relative to other needs. Thus, legal liability should not be presumed to equate to regulatory imprudence.

In apparent recognition of this, wildfire-affected states have increasingly incorporated regulatory standards into their legal codes, creating liability shields – presumptions of reasonability – for IOUs that demonstrate compliance with wildfire mitigation plans. Recent legislation giving effect to such shields is summarized in **FIGURE 2**.

FIGURE 2: RECENT STATUTES ADOPTING REGULATORY PRUDENCE STANDARDS

State	Legislation	Status	PSC-Approved Wildfire Mitigation Plan	IOU Liability Shield with Compliant Wildfire Mitigation Plan
AZ	HB 2201	Enacted 2025	No	Yes
CA	SB 901	Enacted 2019	Yes	No (strict negligence)
ID	SB 1183	Enacted 2025	Yes	Yes
MT	HB 490	Enacted 2025	Yes	Yes
ND	SB 2339	Enacted 2025	Optional	Yes
OR	ORS 757.963 and HB 3666	Pending	Yes	Yes
TX	HB 145	Enacted 2025	Yes	Yes
UT	HB 66 (2020); SB 224 (2024)	Enacted 2020; 2024	Yes	Yes
WA	HB 1522	Enacted 2025	Yes	No
WY	HB 0192	Enacted 2025	Yes	Yes

Source: Brattle review of bill texts.

Notably, legislative developments to clarify and stabilize the fire outcome risk environment have accelerated over the past year. The nine states other than California shown in Figure 2 have, with near uniformity, established or proposed state public service commission (PSC)-approved wildfire mitigation plans as affirmative defenses against wildfire liability claims.[50] This may reflect an emerging consensus that regulatory standards of prudence should be relied upon in legal determinations of liability.

Separately, in anticipation of the event where IOUs may be found liable, a subgroup of the states in **FIGURE 2** has established or proposed qualitative and quantitative damage limitations on possible legal awards. Notably, Utah has enacted a limit on non-economic damages of $450,000 per person (short of wrongful death). Such damage limitations, while protective of IOUs, are not rooted in regulatory standards of prudence and have more the appearance of being applied on an *ad hoc* basis, state by state.

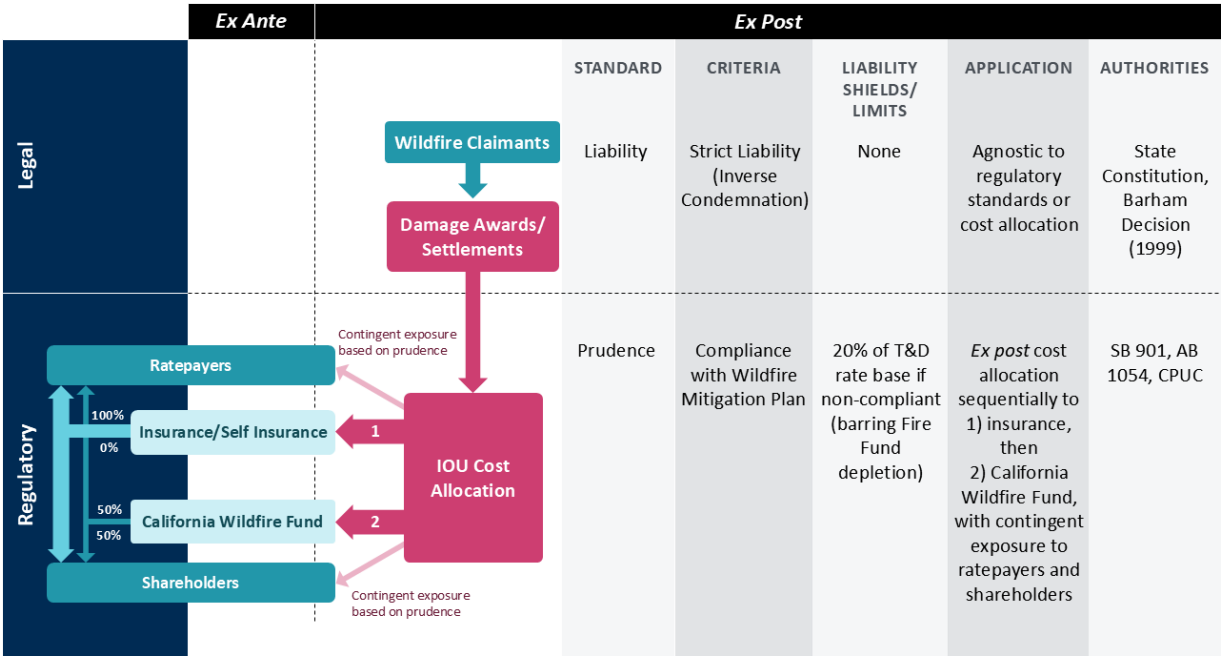
BOX 2 – CALIFORNIA APPROACHES TO IOU WILDFIRE LIABILITY

Following PG&E's bankruptcy filing in 2019, the California state legislature passed Assembly Bill 1054 (AB 1054) to address future IOU wildfire risk by, among other things, establishing an extreme loss reserve: the "California Wildfire Fund." AB 1054 established standards by which the CPUC could determine whether an IOU had acted prudently and was therefore eligible to recover wildfire costs through the fund.

Prudent IOU conduct was codified in the form of specific wildfire mitigation programs and protocols needed to obtain a "safety certification," which formed the main criterion for access to loss protection from the fund. Importantly, as part of qualifying for a safety certification, an IOU's implementation of its wildfire mitigation plan "is evaluated based on actions taken by an IOU, not the outcome of those actions."

The figure below shows how IOU wildfire liability costs are allocated in California, but could be adapted to describe/ guide other jurisdictions as well.

Concern about the resiliency of the AB 1054 fund has reached a point at which Governor Newsom has circulated draft legislation to establish an $18 billion "Continuation Fund" to augment the existing AB 1054 fund. In its draft form, it would call for contribution percentages and protocols from ratepayers and utility shareholders similar (though not identical) to AB 1054.



Sources and Notes:

- CA Assembly Bill 1054. Previously, California Senate Bill 901 in 2018 had created a separate framework for socializing wildfire-related costs based on "the maximum amount the corporation can pay without harming ratepayers or materially impacting its ability to provide adequate and safe service." See Section 27 of CA Senate Bill 901.
- Specifically, while covered for liquidity purposes, California IOUs face long-term exposure up to 20% of their transmission and distribution rate base if non-compliant (barring fund depletion).
- See Safety Certification FAQ | Office of Energy Infrastructure Safety: https://energysafety.ca.gov/what-wedo/electrical-infrastructure-safety/wildfire-mitigation-and-safety/safety-certifications/safety-certification-faqs/.

B. Regulatory – *Ex Post* Financial Buffers

While any particular verdict or settlement may or may not be informed by the regulatory bargain, it is incumbent upon regulators to separately and independently evaluate any resulting IOU liabilities for purposes of allocating costs.

A key regulatory imperative for IOU cost recovery is preserving the financial stability of a public utility entity, given its obligation to continuously provide an essential service. This makes it a correlated imperative to fund any large damages payments beyond the reach of insurance (which is becoming increasingly limited in its feasible ability to cover extreme possible outcomes) in the most efficient way possible – e.g., through pre-funded reserves. These pre-funding measures can offset the need for costly emergency borrowing upon the imposition of a verdict or settlement. These regulatory cost approval principles were reflected in the creation of the California Wildfire Fund in 2019, with $21 billion set aside for the state's three IOUs, as discussed further in Box 2 – California Approaches to Wildfire Liability.

In varying configurations, other states are assembling similar reserves. In 2024, Utah Senate Bill 224 allowed large-scale Utah electric IOUs to establish a Utah fire fund proportioned similarly to the California Wildfire Fund (e.g., up to 50% of revenue requirements). Amounts in the Utah fund are available to offset third-party wildfire liabilities (either settlements of damage claims or damages awarded in "finally adjudicated" claims) that are beyond the IOU's insurance coverage limits.[51]

In 2025, the Oregon legislature was also considering a bill – HB 3917 – to allocate $800 million for a fund that would cover 80% of allowed property damage and non-economic damages below $100,000 per person. The Oregon bill differed significantly from California and Utah in both compensating claimants directly and in limiting claims to compensation obtained from the fund as a legal matter.[52] The three states would have been similar, however, in referencing prudence standards as criteria for IOUs to obtain full relief from the funds.[53] However, for prudence to be a viable criterion in such situations, it must not be *ad hoc*, driven by the peculiarities of the fire events in question. Instead, it must be based on *a priori* standards that are objectively measurable before any fires occur.

C. Regulatory – *Ex Ante* Regulatory Agreements

As a practical matter, any *ex post* financial protocols for cost recovery or use of funds also need to have certain parameters defined in advance of the catastrophic event. Specifically, such *ex*

ante agreements need to address the rules for access to any loss reserves as well as the processes for funding and, if necessary, replenishing the mechanisms.

This does not imply extending a blank check to utilities for ratepayer-based recovery of any and all damages, but it does mean that there should be a high and distinct bar for disallowances that is not merely inferred from legal settlements, verdicts, or other court rulings. Instead, IOU prudence should be evaluated in the context of the aforementioned trade-offs across multiple public utility objectives and constraints, along with appreciating the inevitability that there will be open, residual risk even when the IOU has done everything that was expected of it.

In California, IOUs must obtain a "safety certification" based on their wildfire mitigation plans in order to access full loss protection coverage (beyond liquidity) from the California Wildfire Fund.[54] The *quid pro quo* for cost recovery is that IOU managers have demonstrated prudence by diligently pursuing a well-defined wildfire mitigation plan accepted by customers and regulators.[55] Importantly, IOUs are "graded on effort, not on outcomes,"[56] recognizing that the best IOUs can hope to do is gradually reduce the risk of outbreaks – they cannot control the consequences. Thus, the presumption of prudence is with IOUs that have followed their own, agreed wildfire mitigation plans.

As for funding the mechanisms, it has been customary for regulators to treat wildfire liability insurance costs as a standard operating cost of service entirely recoverable from ratepayers. This was reflected in the context of increasing wildfire liability insurance being purchased by SCE in 2020, where the CPUC noted that it had "consistently authorized rate recovery of wildfire liability insurance premium costs as a standard cost of service and [had] never accepted intervenor arguments that incurred liability premium costs should be disallowed, in whole or in part, to shareholders."[57] In 2023, the CPUC additionally treated the cost of self-insurance for California IOUs as a cost of service.[58]

This treatment was extended beyond customary funding of insurance premiums in Utah, where Senate Bill 224 stipulates that "[a] Utah fire fund shall consist [*inter alia*] of a reasonable and prudent fire surcharge that a large-scale electric IOU may charge to the large-scale electric IOU *customers*, as approved by the commission in a rate case"[59] (emphasis added). However, by contrast, the California Wildfire Fund was funded 50% by ratepayers and 50% by shareholders in 2019 (an allocation possibly colored by political considerations amid findings of PG&E's fault that year in connection with wildfires).[60]

Notably, with insurance premiums rising, this sharing concept has started to extend to ordinary purchases of wildfire liability insurance to unprecedented levels. For example, PacifiCorp recently suffered an 86% disallowance on requested premiums for wildfire liability insurance in

its Utah rate case.[61] Regardless of the basis for the Utah decision, the tendency to expect sharing likely reflects a political predisposition more than a reasoned economic practice. The utilities do not profit from their insurance, and it is a mistake to construe it as a mechanism to protect the Return on Equity (RoE) of shareholders. As noted in the Appendix, fire risk is not compensated in the measured or allowed RoEs, and shareholders do not profit from holding fire insurance. It is a means of smoothing the cost of service over time, not a means of protecting shareholders. Hence, cost splitting is ill-conceived.

IV. Recommendations: Proactive Steps IOUs Can Take

The foregoing indicates many of the interacting operational, regulatory, and legal complexities of coping with fire mitigation and response. There is no silver bullet approach to remedying all of this; in fact, the sheer complexity of the problem calls for a multifaceted solution that deals with many aspects in a coordinated manner.

To that end, we recommend that IOUs develop a proactive approach to achieving a "package deal" that comports with both efficient, practical fire preparations and sustainability under the regulatory compact, as outlined below. It is essential that these elements are not construed as a cafeteria plan for picking and choosing piecemeal improvements to make in current fire planning or cost recovery protocols. The elements of this package should be integrated and are co-dependent, with the legitimacy and efficacy of one depending on the acceptance of the others.

A. Actuarial Analysis

Actuarial risk assessments are needed over different time frames (short and long, annual, and cumulative) and possibly geographies or risk regions in order to understand potential wildfire exposure. These are needed both to frame cost/benefit analyses associated with mitigation plans as well as to properly design loss protection programs. Cost allocations and pooling/optimization strategies will also be informed by these risk quantification analyses (and vice versa).

The key difficulty here is that the risks of greatest concern are "black swan" events that should occur very rarely but might be catastrophic. Such events are not easily captured statistically, so they should be studied over a range of possibilities (alternative risk distributions), recognizing that recent past patterns about the frequency or severity of events, or their litigation

consequences, may not be predictive if the sample is small and/or the situation is getting worse.[62]

A customary approach to evaluating black swan risks is to create probability distributions for IOU wildfire liabilities based on a blend of experience in relevant geographies, apparent trends in fire conditions, the value and extent of exposed property, and legal precedents for damage awards. Forward-looking probability distributions can be developed to supplement historical trends with projected changes in key drivers of wildfire risk and damages, such as projections for long-term drought, changes in the wildland/urban interface (WUI), and impacts of recent and planned wildfire mitigation plans, among others. The result would be a schedule of "exceedance probabilities" corresponding to dollar exposures at different likelihoods of occurrence, or even scenarios for several such distributions.

Such analyses are necessarily multidisciplinary, combining physical wildfire risk modeling, IOU system expertise, and regional demographics. A proxy for this analysis could be based on a given IOU's actual in-territory history. While this may not be especially predictive, it can be helpful to demonstrate how the problem may be changing over time, or how it could differ if regarded as particular to one local (prior-exposed) region rather than more widespread.

State policies for limiting liability can also be incorporated in actuarial studies to see how much they reduce the expected and extreme possible costs. The goal is to have a formal model of the risk projected over time, under different beliefs about risk drivers, in order to test how much benefit is plausible from mitigation and loss protection.

B. Wildfire Mitigation Planning

Wildfire mitigation planning has been required in California since 2019, and more recently for other states exposed to wildfires. It involves creating cost/benefit tests or at least cost-effectiveness rankings for the various types and schedules of mitigation that can be performed to determine their priority and desirable pace, along with the associated budgets.

Clarity in what these plans entail and how they will be monitored and implemented is critical to using them coherently. IOUs should establish robust plans that can withstand regulatory scrutiny and establish brightline monitorable and reportable criteria for prudent behavior. Agreed mitigation plans should be specified in terms that can later define and demonstrate *ex ante* prudence via observable measures, including budgets, specific targets, and activity priorities, as well as measuring sticks for reporting on implementation.

Perhaps the most important feature of the plans should be explicit agreement with regulators and intervenors that it is budgetarily and technically infeasible to eliminate all the risk. As a result, even under approved plans, leaving some probability of damaging fires will remain – an exposure that is implicitly "acceptable" to state regulators and ratepayers because they are not prepared to allow the IOU to spend more on preventive efforts.

In all likelihood, reaching this agreement would require some degree of group workshop collaboration with stakeholders to ensure shared and realistic understandings of what is possible at what cost and at what speed. A range of budgets and levels of effort will likely need to be compared.

Again, the IOU alone cannot identify the "correct" amount of effort to put into fire mitigation. More effort means more immediate costs, but doing so creates less of a need for downstream insurance or residual fire event cost recovery. It is a question of when and how to face these problems most equitably.

C. Value at Risk

This step addresses how much loss protection (of any kind) is needed in order to keep an IOU from experiencing untenable financial and operating stress, given residual risk levels under projections of the proposed mitigation plan. This equates to identifying the value-at-risk (VaR) levels beyond which the company would incur more costs than it can sustain (i.e., beyond which it could not obtain reasonable, or any, financing and would have to reduce valuable, ordinary service operations else become nonviable), as well as deciding how improbable that exposure needs to be made in order to be acceptable.

As is the case with wildfire mitigation planning, there is no intrinsically right or necessary amount of risk to tolerate or to cover with insurance or extreme loss reserves. If available in a competitive market, insurance products are priced at their actuarially expected value for the loss reductions they cover. That is, they do not reduce statistically expected costs; rather, they spread them over time, with the benefit of diversification available to insurance companies.

Therefore, the choice of how much risk to tolerate (acceptable VaR) is not intrinsic to the cost of loss protection but rather depends on what financial and operational problems could be prevented by having different levels of loss protection. If the cost of those problems – including consequential losses – is greater at any given VaR level than the cost of insuring to reduce them, then the loss protection is attractive.

Determining that depends on assessing the limits to alternative financing (especially under duress, not what is feasible under normal conditions), as well as the consequences of inflexibility to defer other costs or to fund improvements of the system if a large, partially unfunded fire event were to occur. This assessment of additional adverse economic and operational consequences of an extreme loss event is an inherently subjective but necessary step to decide how much loss protection to procure or develop. One potential candidate for such a threshold would be the point at which the IOU's investment grade rating was threatened.

Note that this risk tolerance threshold is not going to be a single measurement. In particular, a company likely cannot take comfort in buying loss protection for just its statistically expected losses over the whole range of potential outcomes. Those expected losses may be quite modest, while the real, unacceptable problem is the rare chance of a huge loss, including any consequential or side effects in addition to direct costs. That is, once having established one or more VaR thresholds, sizing loss protection is a probabilistic exercise building from actuarial data to determine the probability that losses in excess of those VaR thresholds could occur with no more than a given (low) probability over various horizons of exposure (e.g., the coming year, five years, or perhaps longer).

Ideally, those exposure numbers can be driven down to a level that is substantially risk-reducing, albeit less than perfect or complete, with tranches of commercial or self-funded loss protection. As was the case for mitigation, the elimination of risk with loss protection will not be possible. The analysis should identify tolerably low probabilities of still incurring losses, while securing loss protection to drive the size of those potential losses down to the desired relatively small threshold levels. Whatever is determined could not be mitigated (fully prevented) and would be too expensive or remote in likelihood to insure, is residual risk that will require *ex post* cost recovery mechanisms.

D. Loss Protection Design

Assuming IOUs have addressed steps A–C, they will have the mathematical prerequisites for the design and funding of desired loss protection. It may well be that current actuarial studies (in combination with VaR tolerances) show that total coverage needs far exceed customary or available levels of commercial wildfire liability insurance for many IOUs.

Under those circumstances, it is useful to think of wildfire coverage in at least two layers: 1) a level of coverage for which commercial insurance has customarily been obtained or could

currently be obtained (or self-insurance in lieu thereof), and 2) a much larger reserve scaled and positioned to address extreme wildfire loss (a catastrophic wildfire fund, or "CAT Fund").

COMMERCIAL INSURANCE AND SELF-INSURANCE

IOUs are already facing dramatic increases in premiums for customary levels of wildfire liability insurance. Some are finding that the expected cost of statistically projected loss exposure *up to past normal commercial coverage limits* is less than current commercial insurance premiums. That is, the available price of commercial insurance may exceed actuarially expected losses.

This was the conclusion drawn by the CPUC in approving wildfire liability self-insurance for the California IOUs in 2023 and 2024.[63] IOUs in other jurisdictions may be asked by their regulators to examine self-insurance to optimize ratepayer costs. Such expected loss costs versus insurance price comparisons may justify self-insurance – and where regulators have found this to be the case, self-insurance funding has been allowed as a cost of service – but note that choosing self-insurance over commercial insurance has both pros and cons.

On the pro side, there could be the aforementioned expected cost savings, but any such findings should be interpreted cautiously as there are three possible explanations for that situation: either insurance company premium "buffers" have become excessive, or it sees and is valuing more risk than the IOU or it is pricing for a VaR condition of its own that entails more risk aversion than expected value pricing (i.e., commercial markets may be capacity constrained). These are not readily distinguished, but they obviously have different implications. We offer them as a point of caution, given the complexity and data limitations of forecasting exposure to black swan events. That is, the IOU would, on average, save money in the near term by self-funding when the actuarial statistics are favorable, but it might incur more risk than its analysis reveals.

Importantly, if no wildfire events occur for a while, self-insurance allows the IOU and its customers to keep the amounts set aside for its funding, while these would have been lost if paid as annual premiums to an insurance company. Since self-insurance would be covering events up to the corresponding commercial insurance limit, there is a meaningful chance the IOU would retain and accrue some self-insurance funds over time (i.e., they may not be claimed by events for quite a while).

On the con side, recall that self-insurance covers only as much as it has funded at the time of any event. If the IOU is building its self-insurance funding over a few years, an early fire event could occur that exceeds the accrued balance, while a commercial policy might have covered the entire loss. When deciding, bear in mind that a single IOU is not diversified like an insurance company,

so just being ahead on average may not be financially safe enough. Self-insurance should be designed to provide full coverage commensurate with commercial insurance over time.

EXTREME LOSS PROTECTION (CAT FUND LAYER)

The more difficult problem for any IOU is how much to set aside for a truly huge but hopefully very unlikely catastrophe, using an additional layer of loss protection we refer to as the "CAT Fund" layer. The need and target size for a CAT Fund will be driven by the actuarial outlook for rare extreme losses, matched against the IOU and its stakeholders' desire to manage the financial impact of those outcomes. As noted above, recent experience suggests that worst-case losses could vastly exceed coverage customarily provided by commercial insurance or self-insurance. Indeed, it is not unusual to see actuarial loss exceedance distributions where there is a small probability of many billions of dollars of losses; as recent fire experience attests, it is quite possible.

A CAT Fund raises additional issues than arise for the prior layer of commercial and/ or self-insurance. For example, while self-insurance in lieu of commercial insurance can reasonably be funded in a single or very few years (as the CPUC has authorized for California IOUs), a CAT Fund of requisite (large) size almost certainly cannot. An IOU may not need or want it unless/until potential losses reach some very large threshold. This sizing and positioning decision will require assessing financial exposure (how big a loss can the IOU survive) as well as stakeholder tolerances for making several, continuing material contributions to the CAT Fund over time.

Since the IOU is funding what should be a rare event and is holding the monies in abeyance for use only in the extreme loss contingency, it should be expected that the funding will rarely be needed. As a result, a CAT Fund may not appear to be providing any benefit in years where there has been no fire to which it responds. CAT Fund reserves also need to be explicitly and exclusively set aside for just rare, viability-threatening events, rather than being simply a second account to tap into if more ordinary events start to marginally exceed commercial and/or self-insurance. This reservation for emergencies only assures that the CAT Fund can actually accrue a large balance.

Rate impacts can compete with the sizing of such a fund. For example, the fire fund authorized under Utah SB 224 provides that customer contributions do "not result in an increase over current rates: (1) for all customers, more than 4.95%; and (2) for an average residential customer, more than $3.70 a month."[64] A CAT Fund also raises the question of whether it can or should be replenished to replace drawdowns. The CAT Funds established under legislation (in

California and Utah) to date have left this an open question. (See also Section F. Optimization of Loss Protection Mechanisms, below).

Generally, IOUs will want to evaluate loss protection mechanisms via financial modeling that measures needs, ratepayer costs, and IOU financial health across multiple scenarios. In the current environment, we expect such modeling to show that a CAT Fund above and beyond customary levels of insurance coverage is indispensable for restricting possible bad-case outcomes to tolerable levels. But even a large CAT Fund is unlikely to cover all future worst-case outcomes. Sadly, it is possible to face tens of billions of dollars in adverse outcomes, well beyond anticipatory funding limits. Therefore, another step in the packaged deal remains – to get prior authorization for CAT Fund shortfall contingencies.

E. *Ex Ante* Agreement on Access and Funding

Having designed the loss protection mechanisms above, IOUs will need to establish pre-agreed (*ex ante*) protocols for access and funding. Those include:

ACCESS

Access refers to the ability to quickly and uncontroversially use loss protection mechanisms after a wildfire liability event. For self-insurance in lieu of commercial insurance, we would argue that its efficacy requires mimicking the effect of buying commercial insurance (i.e., access should not require regulatory prudence review). This is consistent with the precedent set by the self-insurance authorizations granted to California IOUs in 2023 and 2024.

For access to extreme loss (CAT Fund) reserves, prudence criteria are more appropriate *but should be pre-established with reference to compliance with agreed wildfire mitigation plans* derived from risk-spend efficiency and cost/benefit analysis. If pre-agreed prudence has been demonstrated, there should be no barriers to drawing down extreme loss funds for wildfire liabilities. (Even if damages arise from a legal finding against the IOU, if it has complied with its mitigation plans, then the richer criterion of prudence should prevail for purposes of cost allocation, regardless of IOU settlements or legal findings of liability.) Having that prior agreement not only protects shareholders but also assures much more timely claims payouts to customers and victims of fires.[65]

FUNDING

Funding refers to the *ex ante* costs of establishing loss protection mechanisms, including insurance premiums, self-insurance contributions, and payments into extreme loss reserves.

Insurance premiums are akin to hedges for the cost of gas or power. Much like hedges do not alter the expected costs of fuels, insurance does not change the expected losses; it simply spreads the expected cost over time in smaller, more uniform installments. For this reason, insurance premiums have customarily been treated as costs of service recoverable in rates. It is appropriate to extend this logic to contributions to self-insurance in lieu of commercial insurance, which are treated as costs of service pursuant to the self-insurance authorizations granted to California IOUs in 2023 and 2024.

There is less ready precedent for such treatment when it comes to funding (or using) extreme loss reserves like a CAT Fund. The concern is getting beyond the erroneous sentiment that extreme fire damages are necessarily a shareholder problem, not an operational one, and so extreme loss reserves are a bailout for shareholders. This view is understandable, since when large loss claims arise, they are shareholder-threatening. But their size does not justify regarding them as shareholder problems. Doing so would be ignoring that regulators and IOUs already routinely – if implicitly – agree to accept some degree of unmitigated, uninsured residual wildfire risk, particularly for the most extreme and rare events that everyone hopes will never materialize.

These tacit agreements should become explicit, recognizing that it has become intolerably expensive to try to fully reduce fire risks *ex ante* and that, when realized, putting these costs on current ratepayers may be untenable. A CAT Fund can help distribute this risk over time, both before and after it occurs, for better intergenerational equity in dealing with a long-lived problem.

The key notion is that even rare-event, extreme loss protection is itself a cost of service, derived from limitations on how to limit those risks (as part of a package with other mitigation costs recognized as ordinary costs of service). It is not something that is “on top of” the wildfire mitigation plan, with costs to be shared or split with customers. It is also not something that is created or held for shareholders’ benefit. The benefit is sustaining the financial integrity of the IOU. The IOU will not make money from self-insurance or its utilization. It is simply plugging a financial leak that arises reasonably, in light of agreed mitigation, the limited availability of affordable conventional insurance, and knowingly accepted residual risks.[66]

F. Optimization of Loss Protection

The loss protection mechanisms above can be enhanced in multiple ways. Two examples are pooling and securitization.

POOLING

Insurance companies are highly diversified across many settings, clients, and types of risks, so that they are only partially exposed to any big catastrophes and can expect to survive them long enough to have the premiums from other unaffected clients cover the claims. For this reason, they price services close to the expected value of the risks, not the extreme possible outcomes. By contrast, an IOU that is self-insuring in a completely undiversified manner is fully exposed to extreme, albeit unlikely, events. In terms of financial preparedness for extreme events, the cost of being "wrong" can be disastrous. For instance, planning for a $3 billion event once every five years but experiencing a $10 billion event after only two years would be financially ruinous. The fact that an IOU would be healthy enough over the long run with allowances for statistically expected costs is not sufficient for viability.

In general, when any entity must self-insure, it is necessary to be more conservative than the annualized risk would require. This is easily seen by looking at personally funded retirement planning: suppose you were to plan your annual savings based on a statistically expected average lifespan of 80 years, but you live to be 100 years old. That outcome, while perhaps attractive for non-financial reasons, would likely be a tragic failure in terms of financial planning. Accordingly, you must prepare for a "worst-case" scenario (a longer life) than is typical, so that you can deal comfortably with that eventuality. A diversified life-insurance company does not need to over-insure for your longest possible life, because with a large pool of customers, some will die before 80, and their assets will fund the ones who live beyond 80.

Similarly, wildfire loss protection mechanisms can be made more efficient with scale and diversification. Absent pooling, utilities need to obtain coverage for a high VaR, low-risk condition, not just the expected value. Combining pooling with other utilities, perhaps by creating regional and/or national mechanisms, reduces this burden.[67]

SECURITIZATION

IOUs may find that securitization can complement loss protection mechanisms. Securitization is a form of debt financing collateralized by the direct obligation of IOU customers via a non-bypassable charge unaffected by the underlying operation or finances of the IOU.

Securitizations thus typically attract high credit ratings with accompanying low costs of borrowing and long repayment horizons.[68]

Importantly, securitization is not a substitute for insurance or other loss protection mechanisms, nor is it trivial to arrange. Legislative authority is necessary since securitization commits current and future customers to repay the securitization debt beyond the normal authority of state utility commissions. A case-specific regulatory financing order is also usually required. Other than in planned restructurings, such authorization typically has been granted only after an event has caused a major unplanned cost (such as hurricane response) and after the damages from that event have been quantified. Thus, there could be a substantial lag between a large fire and the eventual authorization to recover some of its costs via securitization.

Notwithstanding these procedural requirements, securitization can be deployed as an efficient means of funding extreme wildfire liabilities once approved (as is the case under CA AB 1054). In theory, securitization could also be used to fully pre-fund an extreme loss reserve without increasing current customer rates or to replenish such a fund if drawn in the future. Another use of securitization could be to address losses beyond the reach of extreme loss funds (e.g., if/when a fully funded CAT Fund might be overwhelmed by a very unfortunate megafire, such as those that recently occurred in Los Angeles). In such a circumstance, securitization could displace what would otherwise be conventional debt to pay incremental liabilities, which could be very expensive or infeasible. Note that all of these would require some form of blanket *a priori* legislative authority at a minimum.

V. Conclusion

Faced with exogenous, climate-induced hazards, IOUs and their regulators must balance mitigation and loss protection spending against associated rate increases and competing service imperatives. Risk mitigation cost/benefit analysis is a highly technical public-policy trade-off that logically results in IOUs retaining some residual risk, implicitly agreed by all stakeholders (though that agreement needs to be made explicit).

Further, the cost/benefit analysis – and the magnitude of residual risk – remain moving targets as the effects of climate change evolve and (hopefully) become better understood. It is almost certainly the case that commercial insurance and/or self-insurance in lieu thereof cannot offset the residual risk. Extreme loss reserves may be required, and some residual uncovered risk will necessarily – and prudently – remain.

This inevitable residual risk exposure can place regulated IOUs in a Catch-22 if they have not arranged in advance for clear regulatory criteria for mitigation and loss protection planning, as well as ultimate cost recovery from customers. It is essentially guaranteed that, at some point, the best-laid plans will be exceeded by an extreme wildfire. If and when that occurs, it is also very likely that proximate IOUs will be initially blamed for insufficient or misdirected mitigation (simply because wildfires often originate in a small area from a seemingly minor cause that, in hindsight, appears easily avoidable) and that legal criticisms may be offered as supposedly *per se* proofs of imprudence. This exposure to blame arises in part simply because an IOU's mitigation efforts are limited by what regulators will let management spend, a reality that may not be reflected in public perception or standards of legal liability.

IOUs can take proactive steps to reduce this blame exposure and cost-disallowance risk to the benefit of ratepayers and shareholders. To do so, we strongly recommend that a package deal of terms and conditions be designed to eliminate hindsight risk by creating a (rebuttable) presumption of prudence for even bad outcomes, as long as the IOU has adhered to recommended steps in its mitigation and loss protection plan (see summary in **BOX 3 – A "PACKAGE DEAL" TO ADDRESS WILDFIRE LIABILITY RISK**).

BOX 3 – A "PACKAGE DEAL" TO ADDRESS WILDFIRE LIABILITY RISK

- Proactive IOU steps above are ideally addressed in sequence
- This is because insurance mechanisms must be assembled and sized to address measured threat
- Possible that there may be feedback between optimization and actuarial analysis, design of loss protection mechanisms, access, and funding
- Analysis should be repeated periodically to capture changing conditions

An approved mitigation plan will not just allow uncontested tapping into loss protection funds, but also the full recovery of uncovered costs since *exposure to such costs would be designed into the plan in the first place*. The package is a bundled deal in that no piece of it stands apart

from the others. Each part is designed in relation to the extent or limitations of the others; hence, they cannot be individually criticized or selectively applied. The result is an efficient plan that satisfies the regulatory compact of keeping the IOU financially whole to meet all its service obligations beyond just reducing fire risks.

Appendix: Asymmetric Risk for Investor-Owned Utilities

The type of rare, catastrophic risk arising from wildfires (or other occasional extreme disasters) is different from ordinary business risk, not just in size, frequency, or causes, but in the more fundamental sense that *it is not reflected in conventional cost of capital metrics.* The main reason for this is asymmetric risk: one-sided hazards that are both idiosyncratic and undiversifiable.

To actually diversify a risk away, it must be both idiosyncratic (i.e., not market-correlated) and the chance of downside has to be offset in your portfolio with chances of upside somewhere else. You cannot diversify away exposure to something that can only cause a loss, like wildfire liability. Even insurance companies do not diversify such risks away; they only dilute them and then agree to bear them in exchange for compensation. The loss exposures remain.

As a result, there are contentious issues of IOU cost recovery for wildfires, which arise from presuming that the measured cost of IOU equity already embeds disaster risk (it does not). These beliefs lead to the erroneous conclusion that wildfire risk for utilities requires no additional compensation or protection.

Unregulated Firms vs. IOUs

Asymmetric risk highlights a critical difference between an unregulated firm and an IOU in how they make money. Unregulated firms can choose when, where, how, and how much to invest, and if they make good (or lucky) choices, they can – at least temporarily – keep returns well in excess of their cost of capital; if they are unsuccessful, they can exit. In sharp contrast, regulated IOUs have neither the upside nor the discretion of private firms, as they operate under an obligation to serve with inflexible cost-of-service pricing.

Corporate Bonds vs. IOU Equity

The asymmetric risk facing an IOU equity investor is in some ways similar to that facing an investor in corporate bonds. Both have the opportunity to earn a stipulated return: the authorized ROE for an IOU and the coupon rate for a bond. Neither is guaranteed, and the upside is limited (though bonds can appreciate if interest rates fall after they are issued) while the downside risk is unbounded, albeit with low probability. For example, a corporate bond default can wipe out the entire value of the bond. Similarly, an IOU investment is exposed to adverse "black swan" events that, while rare by definition, have the potential to severely handicap or even bankrupt the company and similarly wipe out much of its value.

A key difference, however, is that while bondholders are compensated for one-sided default risk in bond coupons, IOU equity investors are not similarly compensated by allowed ROEs. The reason for this is that bond coupons are driven by market forces to *exceed* expected (or equivalently, required) returns (i.e., what bond investors can expect to earn in statistical terms after accounting for the possibility, however slim, of a default). By contrast, for IOUs, allowed ROEs are set by administrative regulatory processes, using conventional cost of capital measures, to *equal* expected returns under normal conditions. Thus, utilities have not received any prior ROE compensation for wildfire risks, even though markets are well aware of the problem of wildfires causing losses.

Conventional Cost of Capital Measures

One may ask how it is that conventional IOU cost of capital measures reveal statistically expected equity returns with no downside risk premium, or, put another way, why market forces do not drive required IOU equity returns higher to cover downside risks (in a manner analogous to corporate bonds) by driving down the price of such stocks to a lower level. The mechanisms that lead to this result may be easiest to understand in the context of the discounted cash flow (DCF) method, but they also affect the capital asset pricing model (CAPM), albeit in subtler ways.

DCF: The DCF method combines current stock price, dividends, and projected growth rates to yield an estimated cost of equity. If market analysts perceive significant future wildfire or similar risks, dividend forecasts can reasonably be expected to reflect them in a probabilistic sense. Importantly, in keeping with their asymmetric nature, perceived wildfire risks can only affect dividend forecasts in a downward direction. Mathematically, this eliminates any premium for asymmetric risk, since, for any given observed stock price, expected dividends used in a DCF calculation will already be reduced for wildfire risk, yielding a *lower* DCF-based ROE than they

otherwise would if the expected impact of wildfires were disregarded. Alternatively, this reduction in dividends might be expected to occur in the "g" term of the DCF model, if the dividend term is very short-term/current, but the longer term is impaired by the fire risk.

This dynamic can be illustrated in a simple numerical example. Figure A1 below compares parameters for 1) a proxy group of utilities not perceived by investors to be materially threatened by wildfire risk to 2) a "subject utility" that is perceived to face wildfire risk.

FIGURE A1 – DCF ROE: CONCENTRATED ASYMMETRIC WILDFIRE RISK

	Price/ Market Cap.	Market-Perceived Probability of Wildfire Event*	Dividend Forecast	Measured RoE
	$		$	%
Proxy Group With No Market-Perceived Wildfire Risk	1.00	0.00%	1.10	10.0%
Incremental Wildfire Risk for Otherwise Identical Subject Company**		2.00%	(0.02)	
"Subject Utility" with Market-Perceived Wildfire Risk	0.98	2.00%	1.08	10.0%

*Offsetting all equity value

**Asymmetric risk has only downside

Source: Brattle Group example.

Figure A1 posits that the DCF-derived ROE for the Proxy Group is 10%, based on a simplified dividend forecast not embedding wildfire risk (i.e., 1.10/ 1.00 -1 = 10.0%). For a subject utility that is perceived to face wildfire risk but otherwise identical to the proxy group, the dividend forecast will be adjusted down, here illustrated as corresponding to a 2% market-perceived probability of a wildfire event offsetting all equity value. The impact, based on the allowed return of 10% established for the proxy group, will be to reduce the subject utility's market value equity capitalization from 1.00 to 0.98. Thus, the expectation of fire risk reduces the value of the company because the risk reduces the level of expected future cash flows, without boosting the expected ROE (1.08/ 0.98 -1 = 10%).

Yet another way to think about this is that there is no basis for expecting a better-than-average performance from a risk-exposed company. That is, insurance loss exposure does not create offsetting value potential. For example, a house in a flood zone cannot expect to appreciate faster than other local housing prices simply because it faces more damage risk. It simply has a lower value. Similar value discounting also occurs for firms that face catastrophe risk, as their expected future cash flows are impaired, which also causes their stock price to fall. This combination turns out to also cause that risk concern to wash out of measurements of their measured (or required) cost of capital.

CAPM: CAPM measurements similarly fail to capture asymmetric risk, albeit in less immediately intuitive ways. That is, the CAPM "tends to rely on historical data to estimate the market risk premium, and historical data include bad outcomes as well as good ones. Thus, the empirical value of the market risk premium will tend to reflect the expected outcome, not some analogue to the 'promised' outcome [e.g., a corporate bond coupon]." (*Bente Villadsen, Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe (The Brattle Group), "Risk and Return for Regulated Industries," Academic Press, 2017, page 234.*)

As to what beta measures, the CAPM is an equilibrium model balancing risk and return in an unfettered financial market where investors are "mean-variance optimizers." By definition, many idiosyncratic risks are not compensated in such a model, because they are blended away in a diversified portfolio. Wildfire risk is idiosyncratic, but it does not get diversified away because it is entirely one-sided. It just represents deadweight loss for whatever portfolio has some exposure to it. This is because wildfire risk for any given security is neither correlated nor co-variant with the market. More intuitively, there is no reason to expect wildfires to be more likely when the market is up vs. down, or vice versa, the market will not be moving because of wildfires. Thus, the CAPM cannot be expected to reflect asymmetric risk.

In addition to its fundamental characteristics, the CAPM is even more remote from capturing asymmetric risk because MRPs and betas are normally measured using retrospective data. The past may not reflect much experience with the degree of expected future fire risk, and/or the proxy group may not have much of that risk compared to the firm in question. However, the same issues would apply on a forward-looking basis: forward-looking MRPs are based on the DCF method discussed above, and there is no reason that the expectation of future fires – uncorrelated with the market – would show up in forward-looking betas either.

A Cost of Service (Not Capital) Problem

None of this means that wildfire risk should not be of concern to utilities. It is unequivocal, indeed obvious, that despite a lack of appearance in ROE metrics, there are many ways that fires and fire risk impose strong, adverse impacts on utilities. One of the most obvious is the adverse impact on equity values and market capitalization. As shown above, even a large loss in market value can co-exist with an unchanged cost of equity.

The solution is to quit regarding the cost of equity as the locus of this problem. Instead, it is an operating cost problem that rarely but unfortunately rises to extreme and financially threatening proportions. A utility with an obligation to serve cannot remain viable if it faces liability from simply having to share some of those extraordinary losses, even when it has

prudently conducted the fire prevention, insurance, and response protocols that were approved for it. This may sound “fair” and attractive when such situations arise, but there has never been any corresponding sharing with shareholders of gains or savings in the past, when fires did not occur because cost of service prevents any such offsetting upsides.

Indeed, hazards such as wildfire risk have customarily been covered by insurance as a cost of service, not via any ROE premia. (And utilities did not make any profit from holding that insurance either.) As wildfire risks mount, insurance mechanisms or other innovations and clarified standards for mitigation planning and funding must evolve to meet the challenge, as has been proposed in the bulk of this paper. If prudently incurred losses are recoverable, the cost of capital will be whole per the regulatory compact under *Hope* and *Bluefield*.

End Notes

1 "Utility-Caused Wildfires Are Becoming a National Problem," *The New York Times*, March 22, 2024. Total damages from the Los Angeles wildfires have been estimated in excess of $250 billion. (See: "For the world's largest companies, climate physical risks have a $1.2 trillion annual price tag by the 2050s," S&P Global, March 9, 2025, and "L.A. County Sues Southern California Edison Over Eaton Fire," *The New York Times*, March 5, 2025.)

2 In Oregon, PacificCorp estimated probable losses related to the "Labor Day Fires" of over $2 billion in its 10-K filing for 2024, with extrapolation of recent jury awards indicating the total amount could be much higher. See, for example, "Warren Buffett's western utility facing untold billions in wildfire damages after the latest bombshell jury verdict came down," *Fortune*, March 6, 2024. https://fortune.com/2024/03/06/warren-buffett-berkshire-hathaway-pacificorp-jury-verdict-wildfires/. In Colorado and Texas, lawsuits have been filed in connection with Xcel Energy's pertaining to the 2020 Marshal Fire in Boulder, CO and alleged responsibility for the February 2024 Smokehouse Creek fire in Texas. And in Hawaii, Hawaiian Electric has been found responsible for the Lahaina Fire in 2023.

3 See McDermott, Karl, "Cost of Service Regulation In the Investor-Owned Electric Utility Industry: A History of Adaptation," June 2012, at vii and at 6: "The concept of the 'Regulatory Compact' recognized a set of mutual rights, obligations, and benefits forming, in effect, a relational contract between utilities and their customers ... The utility was obligated to supply service efficiently, but had the right to recover its costs, including an opportunity to earn a return/profit equal to its market-determined cost of debt and equity capital."

4 Regulated electric utilities are typically privately owned in the US because private ownership provides additional access to capital and allocates some risks to shareholders (as experienced by PG&E shareholders in the 2019 bankruptcy). Municipal and cooperative utilities can achieve cost efficiencies by retaining risks, but that also concentrates financial risk on customers.

5 *Federal Power Com'n v. Hope Natural Gas Co.,* 320 US 591 (1944) ("Hope") and *Bluefield Water Works & Improvement Co. v. Public Service Com'n of West Virginia*, 262 US 679 (1923) ("Bluefield"). These decisions established that investor-owned utilities must be allowed a fair opportunity to earn a return commensurate with the business risks of other comparable investments and sufficient to maintain financial soundness.

6 See also Frank C. Graves, Robert S. Mudge, and Mariko Geronimo, "California Megafires: Approaches for Risk Compensation and Financial Resiliency Against Extreme Events," October 1, 2018: "[I]t is generally not appropriate to [add a supplemental risk premium] for utilities because by providing compensation for an asymmetric risk that is within the control of the regulator to impose, the regulator may be tempted to later impose the loss on the utility, reasoning that the utility had already received compensation for the expected risk…Under these moral hazard conditions, adequate compensation for the risk of disallowance would have to be equal to the full amount of the investment that could be disallowed."

7 We do not hold ourselves out as experts on legal standards of negligence, but we do note that they vary significantly between states, with material implications for findings of liability. As discussed further below, legal findings as to negligence and liability may not be informative as to the prudence of IOU actions, which must instead be determined by regulators based on technical and public policy trade-off criteria that may exceed the scope of litigation review.

8 For example, recent proposals that IOU expenses for wildfire insurance or equivalent mechanisms to offset future risk be shared between ratepayers and shareholders are not amenable to rigorous analysis. Traditionally, IOU regulators have treated such expenses as recoverable costs of service.

9 Note that commercial wildfire insurance and self-funded reserves in lieu thereof have to date generally been treated as costs of service by regulators.

10 Prudently incurred mitigation capital expenditures that must be depreciated over time should earn an IOU's allowed rate of return.

11 Wildfire risk is growing around the world. While some areas (such as the western US, Canada, southern Europe, and Australia) have recent experiences with these risk trends, others (such as the eastern US, western South America, and

China) have developing climate and exposure drivers that may be early indications of growing risks. These risk zones are not only identified, but many of them are identified as having a "negative outlook" with respect to wildfire exposure. Bailey, Rob, and Jaclyn Yeo. *The Burning Issue: Managing Wildfire Risk*. Marsh & McLennan Companies, October 2019. https://www.marshmclennan.com/web-assets/insights/publications/2019/oct/THE%20BURNING%20ISSUE%20-%20MANAGING%20WILDFIRE%20RISK_web.pdf.

12 National Interagency Fire Center, "Human-caused wildfires," April 10, 2025. https://www.nifc.gov/fire-information/statistics/human-caused.

13 S&P Global Ratings, "A Storm is Brewing: Extreme Weather Events Pressure North American Utilities' Credit Quality," November 9, 2023. S&P notes that, within the past six years, it has downgraded more IOUs "by nearly 10 times" due to physical events (including wildfires and other storms) than it has in the previous 13 years. See also S&P Global: "Edison International And Subsidiary SoCalEdison Outlooks Revised To Negative From Stable On Potential Risk For WildFire Fund Depletion," February 23, 2025.

14 See US Fire Administration: "What is the WUI?"

15 Next-Generation Fire and Vegetation Modeling for a Hot and Dry Future, Federation of American Scientists, June 20, 2023: "Fewer than 2% of ignitions become large wildfires, but it is this 2% that cause most of the damage because they are burning under extreme conditions… Our current operational models for simulating wildfire and vegetation are incapable of reproducing the extreme fire behavior and rapid ecosystem change that we are now experiencing."

16 Aon, 2024 Weather, Climate and Catastrophe Insight.

17 National Oceanic and Atmospheric Administration – National Centers for Environmental Information US Billion-Dollar Weather and Climate Disasters, 2025. https://www.ncei.noaa.gov/access/billions/state-summary/US.

18 Letter from Russell G. Worden to Timothy J. Sullivan, "Letter of notification establishing a Z-Factor for costs associated with incremental wildfire-related liability insurance," December 29, 2017, pages 2–3.

19 PG&E 2023 General Rate Case Application, Exhibit 9, Chapter 3, p. 3–23.

20 *Id.*

21 See CPUC A.21-06-021 (Jan. 17, 2023), Decision approving settlement between PG&E, the Utility Reform Network, and the Public Advocates Office at the CPUC (PGE Decision); A.19-08-013, D.23-05-013 (May 19, 2023), Decision approving settlement between SCE, The Utility Reform Network, and the Public Advocates Office at the CPUC (SCE Decision).

22 S&P Global, "Wildfire insurance is hot at NARUC, and not just for California," March 1, 2024: "…insurance executives said that due to the frequency and severity of wildfires increasing outside California, more utilities are seeking insurance coverage for such occurrences, and those costs have soared."

23 Sources: Witch, Guejito, and Rice Fires: *California Wildfire Lawsuit*. "SDG&E Lawsuit Information: Witch-Guejito and Rice Fires." Accessed June 24, 2025. https://californiawildfirelawsuit.com/sdge-lawsuit-info/#:~:text=beyond%20its%20control.-,Witch%2DGuejito%20and%20Rice%20Fires,Preventing%20Future%20Fires.

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Camp et al.: PG&E Corporation. *Form 10-K: Annual Report for the Fiscal Year Ended December 31, 2019*. Filed February 18, 2020. US Securities and Exchange Commission. https://d18rn0p25nwr6d.cloudfront.net/CIK-0001004980/80cdad4f-e17f-4b81-8774-0370bbde5ff3.pdf.

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https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/about/wildfire_litigation/PacifiCorp_January_2025_Wildfires_Settlement_Form_8-K.pdf.

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Eaton: Verisk. "Verisk Estimates Industry Insured Losses for the Palisades and Eaton Fires Will Fall Between USD 28 Billion and USD 35 Billion." Newsroom, January 22, 2025. https://www.verisk.com/company/newsroom/verisk-estimates-industry-insured-losses-for-the-palisades-and-eaton-fires-will-fall-between-usd-28-billion-and-usd-35-billion/.verisk.com.

24 Joseph W. Mitchell, "Analysis of Utility Wildfire Risk Assessments and Mitigations in California," *Fire Safety Journal*, Volume 140, October 2023, 103879.

25 *Id.*

26 *See*, "Risk Assessment Mitigation Phase" from the CPUC: https://www.cpuc.ca.gov/about-cpuc/divisions/safety-policy-division/risk-assessment-and-safety-analytics/risk-assessment-mitigation-phase. Note that RAMP and wildfire mitigation plans form different types of regulatory filings at different internals, but they are highly interactive and complementary.

27 See, for example, Cody Warner, Duncan Callaway, and Meredith Fowlie, "Dynamic Grid Management Technologies Reduce Wildfire Adaptation Costs in the Electric Power Sector," *Energy Institute at Haas Working Paper 347R*, March 2025.

28 See, for example "Risk Spend Efficiency Assessment, Deliverable 2.1: IOU Baseline Assessment," report on behalf of the CPUC, February 15, 2022, cpuc.ca.gov/-/media/cpuc-website/divisions/safety-policy-division/reports/deliverable-21iou-baseline-assessmentrevised021722.pdf. Note that the CPUC and stakeholders are currently refining the Risk-Based Decision-Making Framework (RDF) which regulates the way California IOUs "assess and disclose risks that have safety, reliability, and financial consequences" pursuant to an Order Instituting Rulemaking (OIR; proceeding R.20.07.013; https://www.cpuc.ca.gov/about-cpuc/divisions/safety-policy-division/risk-assessment-and-safety-analytics/r-20-07-013). Among other things, we understand that Phase 3 of the proceeding substituted cost benefit ratios for risk spend efficiencies in 2024.

29 As discussed further below, this is the kind of balancing of needs that regulatory oversight can accomplish, which might not be considered as mitigating in a legal dispute over IOU liability.

30 Most models that predict wildfire risk, and therefore the benefits of mitigation activities, are based on historic weather data, which biases expected conditions away from those that are more likely to occur amid climate change-driven weather. See, for example, Joseph W. Mitchell, "Analysis of Utility Wildfire Risk Assessments and Mitigations in California," Fire Safety Journal, Volume 140, October 2023, 103879.

31 See also Mitchell. Performing mitigation on a particular location does not eliminate the risk of future wildfire events as the line that is undergrounded, or the vegetation that is cleared may not have caused the next ignition had it been left alone. That said, performing mitigation can lower the risk that a wildfire *could* occur and therefore benefits the collective service area of the IOU.

32 "ON FIRE: The Report of the Wildland Fire Mitigation and Management Commission," September 2023. https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-092023-508.pdf.

33 For example, the state of California designates Fire Hazard Severity Zones for planning purposes, aiming to identify zones that should be given thought for mitigation activities. California Office of the State Fire Marshal. *Fire Hazard Severity Zones*. Accessed June 24, 2025. https://osfm.fire.ca.gov/what-we-do/community-wildfire-preparedness-and-mitigation/fire-hazard-severity-zones.

34 See for example "Assessing California's Climate Policies—Residential Electricity Rates in California," The California Legislative Analyst's Office, January 2025, and "CPUC Response to Executive Order N-5-24," February 18, 2025,

https://www.cpuc.ca.gov/-/media/cpuc-website/industries-and-topics/reports/cpuc-response-to-executive-order-n-5-24.pdf.

35 For example, from an RSE perspective, the CPUC noted diminishing returns for mitigating the risk of overhead distribution lines in its Decision on Test Year 2023 General Rate Case for Pacific Gas and Electric Company, p. 269-270.

36 This is similar to why electric IOUs in the US typically implement a 1-in-10 years loss of load expectation (LOLE) threshold for determining planning reserve margins to maintain resource adequacy, instead of trying to eliminate all risk for reliability outage events. See also Johannes P. Pfeifenberger, Kathleen Spees, Kevin Carden, Nick Wintermantel, "Resource Adequacy Requirements: Reliability and Economic Implications," September 2013. https://www.ferc.gov/sites/default/files/2020-05/02-07-14-consultant-report.pdf.

37 Importantly, loss protection *is not intended to reduce the long run expected costs of disasters,* but instead has the buyer pay the expected (actuarial) cost of the problem steadily over time. For an IOU and its regulators, this makes the disaster mitigation and funding problem one of intergenerational equity considerations, not just risk-spend efficiency.

38 Cody Warner, Duncan Callaway, and Meredith Fowlie, "Dynamic Grid Management Technologies Reduce Wildfire Adaptation Costs in the Electric Power Sector," Energy Institute at Haas Working Paper 347R, March 2025.

39 *Id.* See also a recent Brookings/ Stanford-affiliated study: "Climate change and IOU wildfire risk: A proposal for a federal backstop," Michael Wara, Michael D. Mastrandrea, and Eric Macomber (May 2024).

40 CPUC Decision on Test Year 2023 General Rate Case for Pacific Gas and Electric Company, p. 256.

41 *Id.* Note that even RSE measures do not necessarily determine the gross amount to spend on mitigation. Instead, they simply ensure that risks are being treated relatively equally up to the budget limit.

42 California Public Utilities Commission, "Public Safety Power Shutoffs (PSPS)," California Public Utilities Commission, accessed June 18, 2025, https://www.cpuc.ca.gov/PSPS/.

43 The balance of the issue is demonstrated by claims brought against PacifiCorp and PG&E over events only a year apart. Claims were filed against PacifiCorp in connection with the 2020 Labor Day fires related to PacifiCorp's alleged non-implementation of PSPS, while claims against PG&E in 2019 were based on the lost load from PG&E's implementation of PSPS that year (while not challenging PG&E's PSPS protocols *per se*).

44 In the wake of major wildfires occurring in 2017 and 2018, California has developed through legislation an elaborate regulatory apparatus for allocating wildfire costs, summarized in Box 2 – California Approaches to IOU Wildfire Liability. While Box 2 reflects California policy for illustration, it raises issues applicable to wildfire liability damages in other jurisdictions.

45 "Allocating Utility Wildfire Costs: Options and Issues for Consideration," The California Legislative Analyst's Office, June 2019, page 5. See also Frank C. Graves, Robert S. Mudge, and Mariko Geronimo, "California Megafires: Approaches for Risk Compensation and Financial Resiliency Against Extreme Events," October 1, 2018.

46 See, for example, Levmore, Saul (2019), "Richard Posner, the Decline of the Common Law, and the Negligence Principle," *University of Chicago Law Review*: Vol. 86: Iss. 9, Article 6, Footnote 17. https://chicagounbound.uchicago.edu/uclrev/vol86/iss9/6. Some have argued that strict liability is untenable for regulated IOUs, which, unlike unregulated businesses, cannot manage their risk by declining to provide service. (See Hollows, Gregory G. "Torts of Electric Utilities: Can Strict Liability be Plugged In?" 11 Loy. L.A. L. Rev. 775 (1978). "Torts of Electric Utilities: Can Strict Liability be Plugged In" by Gregory G. Hollows. Note that this article was written before the first application of inverse condemnation to utilities in California with the Barham decision in 1999.)

47 Peter Z. Grossman, Reed W. Cearley, and Daniel H. Cole, "Uncertainty, Insurance and the Learned Hand Formula," *Law, Probability and Risk*, Volume 5, Issue 1, March 2006, Pages 1–18. https://doi.org/10.1093/lpr/mgl012.

48 *Id.*

49 *McCarty* v. *Pheasant Run, Inc.*, 826 F.2d 1554, 1557 (7th Cir. 1987), cited in Grossman et al.

50 Arizona's HB 2201, does not require PSC approval of wildfire mitigation plans, and Washington's legislation, HB 1522, does not establish the wildfire mitigation plan as an IOU defense.

51 Utah S.B. 224 "Energy Independence Amendments." https://le.utah.gov/~2024/bills/static/SB0224.html.

52 Per the text of OR HB 3917: "The fund does not provide an exclusive remedy for payment of eligible claims. However, a civil action may not be maintained against a public IOU participating in the fund for loss for which compensation is obtained from the fund by the claimant, regardless of whether the fund compensated the full or partial amount of the claim for loss."

53 Note that Utah SB 224 has significantly lower thresholds for the application of prudence standards and provides that "[t]he use of a Utah fire fund to pay a judgment relating to a fire claim is considered prudent and is not subject to challenge" (Section 54-24-302. Section 4(b)).

54 See Box 2 – California Approaches to IOU Wildfire Liability. Utah is less definitive on this point, requiring that challengers to disbursements from the Utah fire fund "prove imprudence." SB 224, Section 54-24-302. 4(b)(ii). (Note further that the Utah prudence requirement appears limited to funding of *settlements*, as opposed to *judgments*. Section 4(c) states that "[t]he use of a Utah fire fund to pay a judgment relating to a fire claim is considered prudent and is not subject to challenge.")

55 Compliance with a wildfire mitigation plan must be evaluated in recognition that there will be open, residual risk even when the IOU has done everything that was expected of it, where those expectations inherently meant that it could not do everything that was feasible (or perhaps everything that would have been economical on a stand-alone basis, absent the tradeoff against other IOU actions and customers' ability to pay).

56 For example, as part of qualifying for a safety certification needed to access the California Wildfire Fund, a utility's implementation of its wildfire mitigation plan "is evaluated based on actions taken by a utility, not the outcome of those actions." (Safety Certification FAQ | Office of Energy Infrastructure Safety, https://energysafety.ca.gov/what-wedo/electrical-infrastructure-safety/wildfire-mitigation-and-safety/safety-certifications/safety-certification-faqs/.)

57 Decision Approving Southern California Edison Company's Application for Authorization to Recover Costs Related to Wildfire Insurance Premiums Recorded in Its Wildfire Expense Memorandum Account, September 24, 2020, at 63.

58 California Public Utilities Commission. 2023. *Decision Modifying Decision 21-08-036 and Adopting Agreement Regarding Wildfire Liability Insurance*. Decision 23-05-013. May 18. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M509/K349/509349509.PDF: "The Agreement sets forth a framework and a structure that would have SCE rely entirely on self-insurance for wildfire liability insurance coverage during the period between July 1, 2023 and December 31, 2028 (Program Period)."

59 SB 224, Section 54-24-301. 3(a).

60 See for example California Gov. Newsom to sign $21B wildfire liability bill today | IOU Dive.

61 It is not clear, however, that this disallowance was based on any well-reasoned theory of IOU responsibility.

62 Statistical methods are mostly designed for estimating means and changes in means across distributions, rather than predicting the properties of the tails of the underlying distributions. Mean fire risk is important, but it is not the main problem, which instead is how large a problem might rarely occur. The past may have very few examples of extreme bad outcomes, such that extrapolating history may greatly misrepresent the extreme possibilities to be faced in the future. The latter requires Monte Carlo simulations of vast numbers of hypothetical scenarios in which rare events may play out, with structural models of the many causes of risk exposure.

63 Relatedly, Nevada Energy sought authorization for wildfire self-insurance in early 2025. See 2024 Wildfire Insurance Proceeding, Docket No. 25-01018.

64 SB 224, Section 54-24-301. 4(b).

65 As noted above, regulatory determinations of *ex ante* prudence have to date been a key criterion for access to loss protection from CAT Funds.

66 Part of making this case will rest on showing that, like unused self-insurance, unused CAT Fund reserves would be held for the benefit of ratepayers.

67 Other aspects of wildfire risk pooling were well articulated in a recent Brookings/Stanford-affiliated study: "Climate change and IOU wildfire risk: A proposal for a federal backstop," Michael Wara, Michael D. Mastrandrea, and Eric Macomber (May 2024).

68 Additionally, securitization may help in spreading the costs of coping with fires across many generations of ratepayers in a manner that assigns both some realized and some prospective costs approximately equally across customers over time. Put another way, risk can be diversified across a larger pool in cross-section, or over time as well. Given the large costs (and the very large uncertainty about what amount of risk reduction is ideal), it makes sense to spread the costs fairly widely. Prior agreement to be able to securitize helps make this redistribution over time more tractable.