



JUNE 2021

THOUGHT LEADERSHIP: WILDFIRES – BURNING MORE THAN JUST LANDSCAPES



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INTRODUCTION

Climate change and the risks that go with it have been front of mind for investors and regulators alike for several years. Time and again, we are told that climate change is a tangible investment risk that markets will have to grapple with over the coming years and decades, and investors should be taking this risk into consideration in portfolio construction decisions. This is reinforced by guidance from global financial regulators, who are increasingly considering climate change risks as relevant to their supervisory mandates.

But what does climate change risk actually mean to investors? Climate risk is broadly categorised as two distinct risks. The first is physical risk, which involves the damage to land, buildings and infrastructure caused by climate change, through the more frequent and severe weather events such as flooding, droughts and storms as well as the chronic impacts of shifting temperature patterns. The second is transition risk, namely the risks to businesses or assets of the global transition to a lower-carbon economy.

Climate risks have significant negative implications for economic growth, inflation and investment returns. It is possible that direct central bank intervention may be required in buying up heavily devalued and stranded assets to protect the financial system in a worst-case climate scenario. Climate change has a direct and already visible implication on the financial stability of insurance companies and banks for example.

However, much of the conversation around how climate risk will affect investors is forward-looking. Investors need to 'future proof' their portfolios against the **risk** of climate change. While we agree that this is true, it is important to note that climate

change is happening around us now and is already starting to impact investors' portfolios. Investors not only need to assess the risk of climate change in the future, but also the current reality of it.

In this month's article, we provide a specific, but very relevant example of how climate change is impacting investors' portfolios **today**. Wildfire activity in the state of California has increased dramatically over the past several decades, with 2020 marking the worst year on record. Over the course of the year, ferocious wildfires burned through more than four million acres, more than quadrupling the annual average from the preceding five years. California gets most of its annual rainfall throughout its fall and winter. Then, throughout most of the spring and summer months, the vegetation dries out, essentially turning the landscape into a tinder box. This is not a new phenomenon. What is changing is the climate, and the hotter and drier weather conditions are leading to more plentiful and ripe fuel sources.

In California, utilities are liable for wildfire damages caused by their equipment, even if not found negligent. In this article, we focus on two Californian utilities that were deemed responsible for causing deadly and destructive wildfires in 2017 and 2018. The financial and reputation impacts were severe, sending their share prices plummeting and one into bankruptcy. Even with a significant regulatory response following the fires, climate change has changed the investment case for this sector of the market. We consider this is just one example of many of how the changing climate is impacting investments – but investors need to be prepared for this to become the norm.



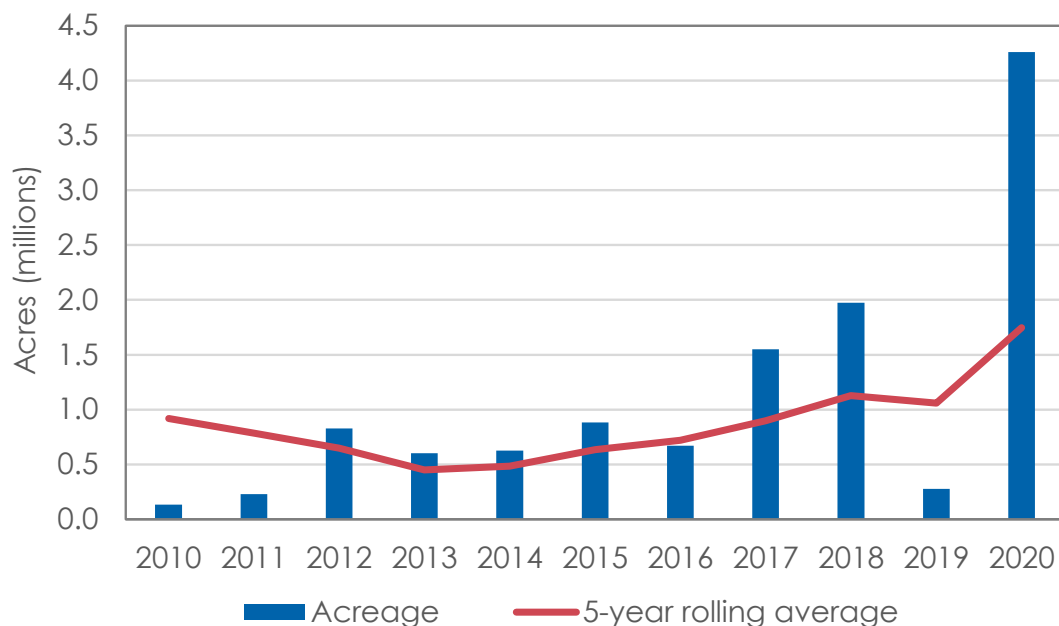
THE CALIFORNIAN WILDFIRE LANDSCAPE

Since the early 1970s, the extent of California's annual wildfires, measured in area burned, has increased fivefold.¹ The trend has primarily been due to an eightfold increase in the forest area deemed at-risk during the summertime, predominantly due to reduced fuel moisture, driven by human-induced warming. With increases in evaporative demand, reduced snowpack and reduced rainfall through spring and summer, wildfire risk is further heightened when combined with hot, dry temperatures during the summertime. Once ignition occurs, winds from the Great Basin, known as the Santa Ana winds in Southern California and the Diablo winds in the north, allow fire to spread at an increased rate.

Wildfires have become particularly topical in California over recent years due to increases in state-wide burned area, underscored by extreme wildfire activity in 2017 and 2018, and again in 2020, resulting in a substantial loss of life and property.

Chart 1 shows the material increase in the total number of acres burned by Californian wildfires from 2010 through to 2020.

Chart 1: Acres Burned by Wildfire in California



Source: California Department of Forestry and Fire Protection

¹ Advancing Earth and Space Science, 2019, <https://www.agu.org/>



The 2017 and 2018 Fire Seasons

In 2017, over 1.5 million acres were burned due to wildfire, materially higher than the five-year average.² In early 2018, the California Department of Forestry and Fire Protection (Cal Fire) issued the statement ‘*climate change has rendered the term “fire season” obsolete, as wildfires now burn on a year-round basis across California*’. By the end of that

same year, approximately two million acres burned due to wildfire, breaking state records in place at the time.³ Table 1 summarises the most notable fires in 2017 and 2018. Meanwhile, Chart 2 shows total wildfire losses, including insured losses, in the US between 2010 and 2019. Data was not available for the 2020 season at the time of writing.

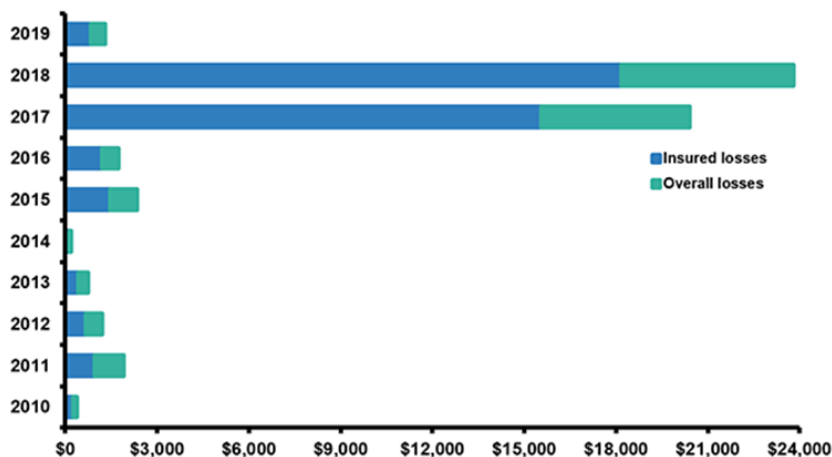
Table 1: Notable California Wildfires, 2017 - 2018

	Event	Location	Area Burned (Acres)	Structures Damaged	Fatalities	Insurance Loss Est. (US\$ billions)	Note ^(a)
2017	Tubbs Fire	Sonoma County	37,000	5,600	22	8.7	Second costliest in US history
	Atlas Fire	Napa County	52,000	120	6	3.0	Fifth costliest in US history
	Thomas Fire	Ventura County	282,000	1,063	1	2.3	Sixth costliest in US history
2018	Camp Fire	Butte County	153,000	18,800	85	10.0	Most destructive and deadly on CA record
	Mendocino Fire	Various counties	459,000	280	1	0.3	Largest area burned on CA record
	Carr Fire	Shasta County	230,000	1,614	8	1.3	Tenth costliest in US history
	Woolsey Fire	Ventura County	97,000	1,634	3	4.2	Third costliest in US history

(a) Ranking statistics are as at time of event.

Source: Insurance Information Institute, National Interagency Fire Centre

Chart 2: Wildfire Losses in the United States, 2010-2019 (US\$ Millions)^(a)



(a) Figures adjusted for inflation.

Source: Munich RE

² California Department of Forestry and Fire Protection, 2020

³ California Department of Forestry and Fire Protection, 2018

The 2020 Fire Season

California residents were again devastated by new record-setting wildfire activity in 2020, with 4.2 million acres burning across 9,917 events, resulting in 33 fatalities and 10,488 structures being destroyed.⁴ By comparison, from 2015 to 2019, the average annual number of acres burned was 1.1 million. This chalked up another bleak record, with the 2020 wildfire season going down as the worst in the state's history in terms of area burned. This was largely due to the expansive August Complex in the northern part of the state, which alone burned more than one million acres and became the state's first 'gigafire', being a blaze that burns at least a million acres of land, in modern history.

Wildfire Causes

It is estimated that around 90% of wildfires in the United States are human caused, including through

campfires left unattended, the burning of debris, downed power lines, negligently discarded cigarettes and intentional acts of arson. The remaining 10% are started by lightning or lava.⁵ Interestingly, in Australia, it is estimated that lightning is responsible for about half of all bushfire ignitions, with humans (both accidental and deliberate) responsible for the remainder.⁶

It has been proven that electricity transmission lines played a role in past wildfires, typically as a result of high winds, causing transmission lines to touch, contact surrounding trees or fail completely and become disjointed from latticing. In circumstances when the surrounding vegetation is tinder dry, the transmission lines can ignite the brush.

Figure 1 shows an example of the equipment which suffered damage due to winds, sparking the fire.

Figure 1: Powerline Transmission Latticing



Source: Cal Fire

⁴ California Department of Forestry and Fire Protection, 2021

⁵ US Department of Interior, 2018

⁶ Geoscience Australia, <https://www.ga.gov.au/scientific-topics/community-safety/bushfire>



Unique Californian Legal Context

Unlike all other US states, in California, electric utilities, including investor-owned utilities (IOUs) listed on the US stock exchange, are liable for wildfire damages caused by their equipment, even if not found negligent.⁷ This is referred to as ‘inverse condemnation’ under a ‘strict liability’ regime.

Property owners can seek compensation from the IOU for any damage if their equipment caused the fire. In legal terms, the property owner can bring an ‘inverse condemnation’ suit. This term applies in Californian law in the case of a government entity taking or damaging personal property in the provision of a public good and failing to compensate the owner. This provision of the Californian state constitution is designed to allow for the costs of a public service to be spread across all beneficiaries. Despite being privatised in the 1990s, Californian courts have classified IOUs as effectively government entities, on the basis that they have a state-granted monopoly and can raise rates to spread the costs associated with that service among all beneficiaries.

There are other mechanisms through which an IOU might pay damages, such as through tort lawsuits if the IOU is found to be negligent, and the payment of firefighting costs incurred by the state and federal firefighting agencies under California Health and Safety Code 13009. But the unique combination of inverse condemnation with strict liability is the mechanism that creates the largest liability for the utility. It means the IOU is effectively on the hook for all property damage, whether their equipment was well-maintained or not.

Once utility equipment is found to be the cause of fire damage, and the IOU's liability is established by the courts, it is then up to the Californian regulator, the California Public Utility Commission (CPUC), to determine how much of the liability the IOU can recoup through future rate increases.

The courts' classification of IOUs as effective government agencies allows inverse condemnation to be applied, on the basis that the IOU has the ability to recoup the costs. However, the CPUC may deny requests for cost recovery of wildfire damages if they determine that the IOU had not ‘*reasonably and prudently*’ managed its equipment. It is this disconnect, combined with the sheer size of the damages and the minimal insurance cover, that has sent Californian utilities into bankruptcy in recent years leading to material value destruction for investors, as we discuss in the following section.

⁷ With the possible exception of Alabama. Wharton Risk Center, 2018



UTILITIES PAYING THE PRICE

In this section, we focus on two utilities that were found liable for wildfire damages and shed light on the financial and reputational impacts this had. We also discuss the regulatory aftermath, including the establishment of the US\$21 billion California Wildfire Fund.

Pacific Gas & Electric

PG&E Corporation (NYSE: PCG, market capitalisation US\$20.8 billion) is a holding company that conducts its business through the Pacific Gas and Electric Company, a public, regulated utility operating in northern and central California.

PG&E is engaged in electricity generation, transmission and distribution services throughout its service territory, providing electricity and natural gas to residential, commercial, industrial and agricultural customers. The utility is regulated by the CPUC and Federal Energy Regulatory Commission (FERC). PG&E is headquartered in San Francisco, and as at 31 December 2020, serviced 5.5 million and 4.5 million electricity and natural distribution customers respectively.

Wildfire Involvement and Implications

Cal Fire conducted investigations into the largest fires of 2017 and 2018 and found that PG&E's equipment was responsible for starting the 2018 Camp Fire, the costliest wildfire on record at the time. A six-month investigation by Cal Fire found that the fire was ignited when winds gusting at 50 miles per hour caused a portion of an ageing steel lattice transmission tower owned by PG&E exposed to the elements high on a ridgetop to fail. As loose high-voltage lines whipped around striking

the metal tower, molten metal sprayed across tinder dry vegetation, igniting the brush.

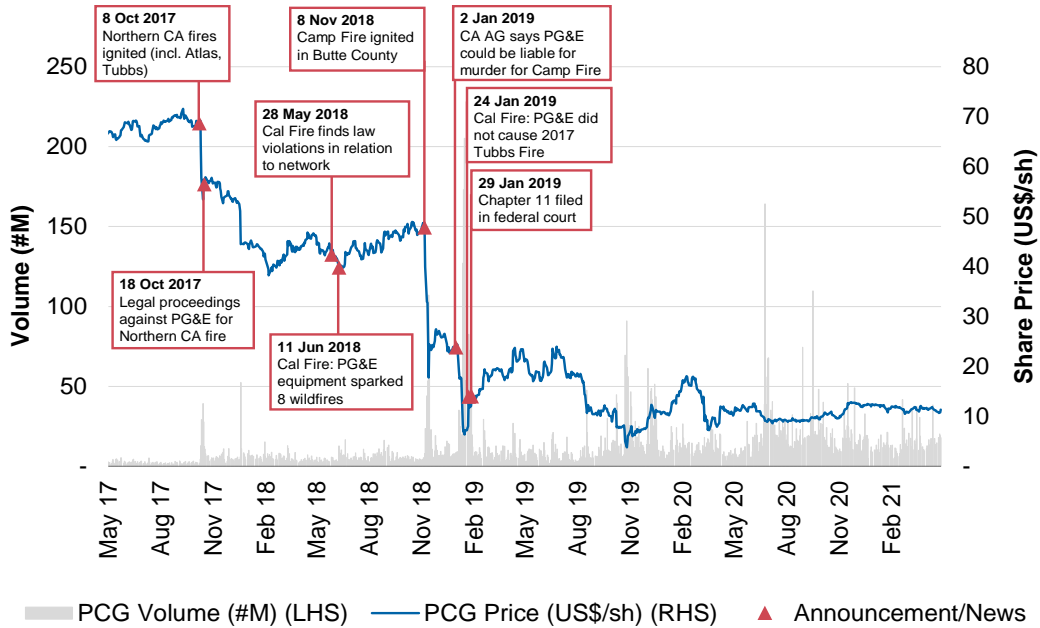
Claimants, including a trust representing more than 61,000 wildfire victims, asserted that potential liabilities could exceed US\$30 billion before taking into account potential punitive damages, fines and penalties, or damages with respect to future claims. Given PG&E only had US\$800 million of liability insurance in place, on 29 January 2019, PG&E filed for Chapter 11 bankruptcy, in an effort to obtain financial protection until a deal with regulators and the state could be negotiated.

A year and a half later, on 16 June 2020, PG&E secured court approval for a US\$59 billion restructuring package, involving the issuance of new debt and equity to fund liabilities, allowing the company to emerge from bankruptcy. The company funded the PG&E Fire Victim Trust, as part of the restructuring deal, that will oversee a US\$13.5 billion settlement with more than 70,000 victims, consisting of US\$6.75 billion in cash and the same amount in equity. So far, the company has funded US\$5.4 billion in cash and plans to fund an additional US\$1.35 billion in two instalments in 2021 and 2022. The trust now owns approximately 24% of the company's common stock, making it the largest shareholder on the company's register.

Chart 3 shows historical trading data for PG&E for the last four years, along with notable key events. Since ignition of the first relevant fire, the Northern California fires on 8 November 2017, PG&E's share price has declined 84% to date.



Chart 3: PG&E Share Price Performance & Notable Events



Source: Capital IQ, company filings, Whitehelm Capital

Post-Fire Actions

PG&E emerged from Chapter 11 on 1 July 2020 and has since enacted a variety of commitments to further enhancing safety and improving customer service in the long term. This includes enhanced regulatory and safety oversight and reformed executive compensation which will be more closely tied to safety performance and customer service.

The heightened regulatory oversight, combined with a new law (Senate Bill (SB) 350), is intended to keep PG&E accountable for equipment maintenance going forward. Though this option is seen as unlikely to eventuate, the law states that PG&E will be restructured as a state-run, non-profit utility if regulators deem a takeover as necessary.

PG&E settled various other matters to emerge from bankruptcy and satisfy new regulatory requirements.

- **Settling with counterparties in Chapter 11:** The company settled with its three primary classes of fire claimants in the bankruptcy for a total value of US\$25.5 billion.
- **Settling with bondholders:** PG&E reached an agreement which laid out the methodology

for treating pre-bankruptcy utility debt, while saving customers approximately US\$1.0 billion, helping to meet the requirement laid out by AB 1054 that the bankruptcy process be at least neutral to ratepayers.

- **Settling with Governor Gavin Newsom:** Among other agreements, the company will not reinstate the dividend for a three-year period, will not seek recovery for any of the US\$25.5 billion in wildfire payouts, and will pursue a rate neutral US\$7.5 billion securitisation transaction to pay down temporary utility debt and accelerate wildfire claim payments.
- **Plea Agreement:** PG&E pled guilty to 84 counts of involuntary manslaughter and one count of unlawfully starting a fire for its role in the 2018 Camp Fire. As part of the plea agreement, the company agreed to fund efforts to restore water access for residents impacted by the destruction of the Miocene canal.



Edison International

Edison International’s (NYSE:EIX, market capitalisation US\$21.6 billion) largest subsidiary is electric utility Southern California Edison (SCE) (100% of EIX net profit). Other smaller subsidiaries include Edison Energy, an energy services company with commercial and industrial customers. SCE is a regulated utility that supplies electricity to around 14 million people.

Wildfire Involvement and Implications

An SCE internal investigation and the Ventura County Fire Department both determined that SCE’s equipment likely sparked one of two ignition points for the Thomas Fire, which occurred in December 2017. It was found the fire was started by power lines coming into contact with each other during high winds. The Thomas Fire burned a total of 282,000 acres; destroying 1,063 structures and resulting in one fatality.

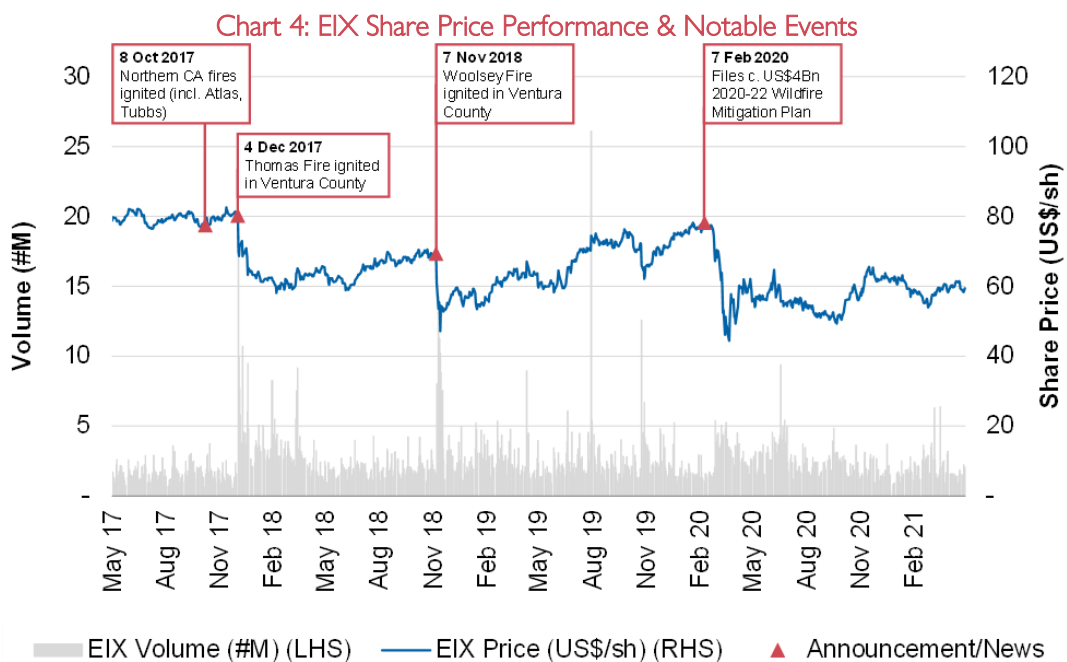
Over 20 indirect fatalities are also attributed to the fire due to its influence on the Montecito Mudslide in January 2018 when a series of mudflows struck Montecito in the area affected by the Thomas Fire the year before. In September 2020, a US\$1.16 billion settlement was reached with

various insurance companies that sued SCE in relation to the two events.

In addition to the Thomas Fire and Montecito Mudslide, SCE equipment, in a similar high wind scenario, was found to have caused the Woolsey Fire that burned 97,000 acres in Ventura and Los Angeles counties in November 2018. In January 2021, a US\$2.2 billion settlement was reached with various insurance companies that sued SCE following the Woolsey event.

In response to heightened wildfire activity, SCE is currently implementing various mitigation and prevention measures through to 2022. Among other measures, this includes: hardening the grid via the installation of new transmission lines and fast-acting fuses, enhancing operational practices, actioning Public Safety Power Shutoffs (blacking out certain sites/regions if risk factors, such as wind speed, are deemed a potential hazard) and partnering with community-based organisations and stakeholders to support local resilience.

Chart 4 shows historical trading data for Edison International for the last four years, along with notable key events. Since ignition of the first relevant fire, the company’s share price has declined 26% to date.



Source: Capital IQ, company filings, Whitehelm Capital



The Regulatory Aftermath and Future Liability

In response to the significant cost of the 2017 and 2018 wildfires, on 12 July 2019, Governor Newsom signed into law Assembly Bill (AB) 1054 and AB 111, known as the ‘2019 Wildfire Legislation’. This legislation enacted a broad set of reforms and programs related to utility-caused wildfires in the state.

The legislation included the establishment of the US\$21 billion California Wildfire Fund. Retail electricity rates are fixed under multi-year review periods, which means that IOUs cannot increase prices on their own to cover unexpected costs, such as those arising from wildfire liability. Instead, a utility must seek approval from the regulator to recover costs from ratepayers. As such, the purpose of the Wildfire Fund is to essentially act as a supplemental line of credit for IOUs beyond what is covered by their insurance to pay for adjudicated, third party claims arising from catastrophic wildfires ignited by utility equipment. IOU participation requires contributing to capitalising the fund, and undertaking certain other obligations specified in the law.

From the state’s perspective, the goal of the fund is to gain certainty of cash availability to pay out future and eligible wildfire liabilities to claimants by ringfencing IOU funds today. IOUs that elect to opt into the Fund benefit from a Wildfire Liability Cap but must balance allocating funds to the Wildfire Fund with normal everyday corporate activities, such as solvency requirements and the efficient allocation of capital.

An affected utility may submit to the CPUC an application to recover wildfire costs and expenses from its ratepayers, subject to having acted reasonably. The utilities must also maintain insurance separate from the fund. A utility will generally have to repay the Wildfire Fund at least some of the amounts advanced to pay claims.

The Wildfire Fund is split into two equal US\$10.5 billion portions, the Liquidity Fund and the Insurance Fund. The Liquidity Fund was established to provide participating IOUs with initial liquidity to pay out eligible wildfire claims within 45 days. This component of the fund allows the Wildfire Fund to cover US\$10.5 billion in eligible liabilities from future wildfires. It is treated as a revolving fund, to be replenished from utility reimbursements and future contributions as the Fund is used.

Elected participation in the Insurance Fund requires US\$10.5 billion in total IOU payments, which includes US\$7.5 billion of up-front contributions, and US\$300 million paid annually over 10 years. Utilities that opt in and make financial commitments receive the benefit of a Wildfire Liability Cap, set at 20% of an IOU’s electric T&D equity rate base, calculated on a three-year rolling basis. This essentially limits the amount IOU shareholders must pay for losses found to be imprudently incurred.

Both PG&E and Edison International have opted into the Wildfire Fund, and are thus provided material protections against future wildfire liabilities, as if they are not negligent and the regulator determines they acted prudently, it:

- limits liability risk (for PG&E currently, to a US\$2.7 billion cap on a rolling three-year basis);
- covers 10 years of expected wildfire insurance fund life at US\$21 billion of funding;
- creates cost recovery flexibility through the ability to examine asset management history at the local incident and consider contributing factors such as temperature, wind speed, humidity and soil moisture, among others.



LOOKING FORWARD

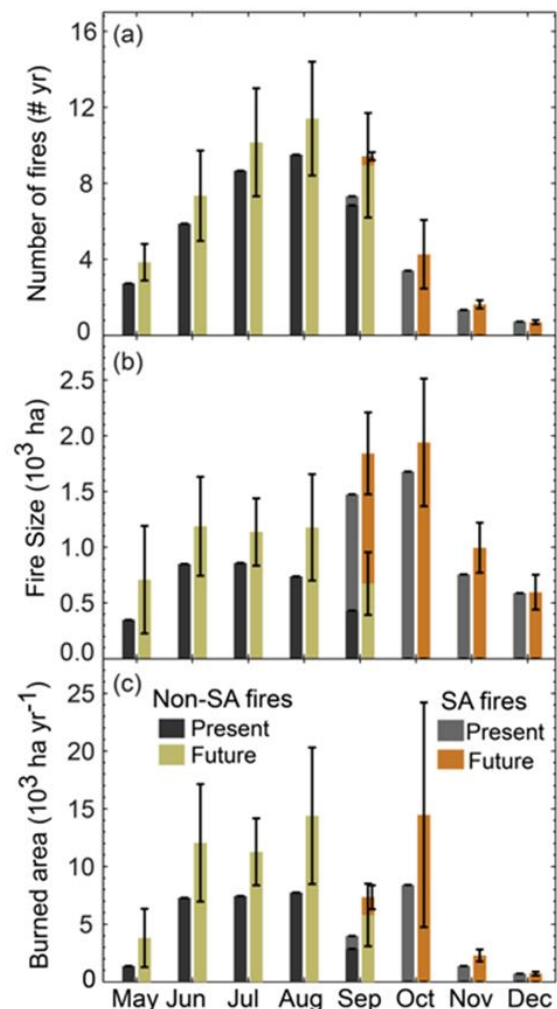
While the focus of the two examples provided is on wildfires that occurred in 2017 and 2018, the record-setting magnitude of the 2020 wildfire season illustrates that there is no respite expected on the horizon. Analysis conducted by Californian researchers projects climate change will make forests more susceptible to extreme wildfires in the future. By 2100, if greenhouse gas emissions continue to rise at current rates, it is anticipated that the frequency of extreme wildfires burning more than 25,000 acres will increase by around 50%, and the average area burned state-wide will increase by 77%. In the areas deemed to have the highest fire risk, wildfire insurance is estimated to see costs rise approximately 18% by 2055 and the fraction of property insured will decrease.

Chart 5 shows the response of Santa Ana and non-Santa Ana fires to climate change during the middle part of the 21st century. 'Present' represents data collected from 1980 to 2000, and 'Future' represents projections for 2040 to 2060.

In response, the state of California is boosting actions to curb greenhouse gas pollution faster than planned, acknowledging climate-driven threats are occurring faster and more frequently than previously expected. Changes include implementing new laws and policies, such as the Cap-and-Trade program, emissions reduction targets (40% below 1990 levels by 2030), banning the sale of new gas-fueled cars from 2036 and potentially preserving one-third of its lands and coastal waters to absorb greenhouse gases.

Governor Newsom has stated that climate change is raising the risk that a small fire will grow out of control and that the state should expect the fire risk to increase year-on-year. In April 2021, he legislated a US\$535 million package for firebreaks, forest health and strengthening homes to mitigate wildfire risk.

Chart 5: Response of Santa Ana and Non-Santa Ana Fires to Climate Change



Source: Yufang Jin et al



This article highlights the risks associated with investing in the Californian utility sector, which remain relevant despite the regulatory reform, which are summarised below.

Strict Liability and Inverse Condemnation

While mitigants have been put in place, ultimately the legal framework remains unchanged, and IOUs will still be liable for all damages caused if fires are started by their equipment.

Increasing Risks of Future Catastrophic Wildfires

With more frequent and extreme droughts and heatwaves, more destructive fires are expected to occur in California over the short, medium and long term. Despite increased mitigation measures being implemented by IOUs, we have seen by recent events that they are imperfect (the 2020 Zogg Fire, which burned 56,000 acres and was responsible for four deaths and 204 buildings being destroyed, was started by a tree slated for removal). As a last stand measure, IOUs are increasingly turning to more heavy-handed mitigation measures, such as Public Safety Power Shutoffs, which are rolling blackouts imposed by IOUs during high wildfire risk periods.

Additionally, the implementation of AB 1054 does not completely de-risk IOUs. Limited liability caps (e.g. US\$2.7 billion on a rolling three-year basis for PG&E) are only applicable if deemed so by CPUC, depending on prudence and holding a valid safety certificate. Continuing to satisfy regulatory hurdles to gain limited liability protections is expected to be challenging going forward given the high level of public and regulatory scrutiny and prior unlawful and/or negligent conduct of the IOUs in question. Both PG&E and SCE continue to face material public backlash and regulatory scrutiny, to varying degrees, regarding the granting of their safety certificates, which are valid for 12 months at a time. These challenges are expected to continue for the foreseeable future and together present material uncertainty and risk regarding either PG&E and/or securing valid safety certificates going forward.

Second, the Wildfire Fund is limited in size (US\$21 billion) and it is unclear whether this is enough to absorb the cost of future fires, or how long these funds will last for. Furthermore, there is no clarity on future funding of the Fund, as there are no top-up measures in place if IOUs are proven to be prudent.

Thirdly, reasonable IOU insurance coverage, which is required for participation in the Wildfire Fund, is proving to be increasingly costly to renew on an annual basis. This is particularly evident with PG&E, which following its bankruptcy, paid US\$750 million to secure US\$1.4 billion of liability coverage for the 12 months from July 2020, with only roughly half of that dedicated to potential fire claims. Similarly, SCE paid US\$450 million to secure US\$1 billion in fire insurance through to June 2021.

Poor ESG Credentials

As part of its guilty plea in relation to prior wildfires, gas accidents and falsifying records, PG&E is currently serving a five-year criminal probation sentence, which may exclude it from investors' portfolios for ESG reasons.

Risk of Nationalisation

As part of AB 1054, the state of California has the potential to nationalise, or takeover, PG&E and/or Edison International if broadly deemed suitable.



CONCLUSION

Any investor with a material allocation to the Californian IOUs discussed within this article would have taken a significant hit as the share price fell in response to both the fires and the subsequent liability ruling. The impact to both reputation and financial standing was significant. Even now, their share prices have not recovered, and these companies continue to bear the costs of their involvement in the fires.

Consistent with current warming trajectories, the magnitude, frequency and destructive force of future wildfires in California, and globally, is expected to increase. Combined with imperfect tools to mitigate such risks, we believe there is a high degree of downside risk and volatility associated with investing in Californian IOUs.

While we consider this deep dive into the increasing severity of Californian wildfires and its impact on IOUs important in its own right, recognising the broader themes is paramount.

So much of the discussion around climate change in the way it relates to investment strategy and portfolio construction is around 'future-proofing' portfolios in light of the *risk* of climate change. But the example detailed in this article illustrates that investors need to be mindful of their current portfolio positioning in light of the reality of the current impacts of climate change.

Transition and physical climate risk should be cemented as key evaluation metrics for current and future investments. This is particularly relevant for direct investments, given their long-term holding periods and illiquidity. Insurance has been one of the fastest industries to incorporate climate risk into their pricing models and thus has resulted in some assets around the world now being

deemed uninsurable. This fact should create uneasiness in all direct infrastructure and property investors because it underlines the fact that climate risk will result in once viable companies becoming stranded assets – and it is happening more quickly than many anticipate.

Investors who are on the front foot, incorporating climate risks into their financial models now, will have access to more accurate valuations, all else equal. Investment and divestment decisions informed by the incorporation of climate risks may protect the future value of investment portfolios. There is currently a high level of uncertainty to the extent to which global action on climate change is successful in limiting the increase in temperatures. This leaves most long-term climate forecast scenarios on the table, including worst case scenarios.

Climate risk is no longer deemed to be an ideological concept, but a real and present risk to the current and future value of almost all investments. Investors such as superannuation and pension funds should consider climate risks as part of their fiduciary duty and a failure to act could potentially result in personal financial liability through future litigation. Financial regulators not only recognise climate risk but are moving towards incorporating it into prudential requirements. The time to take climate risk seriously is most certainly now.

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