The California Wildfires

IMPLEMENTING SB 901'S CUSTOMER HARM THRESHOLD ▪ DECEMBER 2018

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This is an independent report on the California wildfires and the implementation of the cost-recovery provisions of Senate Bill (SB) 901. This report was prepared by a combined team of experts from the Analysis Group and M.J. Bradley & Associates without funding support from any client. The analyses and conclusions reflect the judgments of the authors alone.

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This is a technical paper about utility regulatory policy and proceedings, financial metrics, and climate change policy. But for thousands of Californians, the wildfires of 2017 and 2018 took all of their possessions, and far too often, claimed the lives of family members and loved ones and leveled their communities. Firefighters gave their lives fighting back the fires; some lost their homes as they worked to protect their communities. This report doesn't do justice to the human toll of the wildfires. We acknowledge this at the outset, and hope that effective strategies and measures can be devised to avoid the loss of life, injury and destruction that was experienced these past several years.

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Executive Summary

California has long been vulnerable to wildfire and its impacts, but the recent fires that have ravaged the state have been some of the most destructive and deadly since record keeping began.[1] In 2017, wildfires claimed more than 40 lives in California and caused widespread damage. The 2018 wildfires have been even more devastating, with unprecedented loss of lives, property, and natural resources. Recovery has hardly begun for countless households, businesses and communities throughout the state.

This whitepaper offers a framework and a call to action for the California Public Utility Commission (CPUC) to resolve the difficult issues associated with the allocation of costs from the fires in a timely fashion.

California's Catastrophic Wildfires and the State's Wildfire Policy

The two most destructive fires in California's history took place in Northern California in the past two years. Most recently, the Camp Fire in Butte County burned 153,336 acres, destroyed nearly 19,000 structures, and claimed at least 86 lives during a two-and-a-half-week period in November 2018.[2] The Tubbs Fire burned parts of Napa and Sonoma Counties in October 2017, and burned more than 36,800 acres, destroyed 5,636 structures, and led to 22 deaths.[3] These fires occurred in the electric service territory of the state's largest electric utility company, Pacific Gas & Electric Company (PG&E). Both fires continue to be under investigation.

As observed last year by noted expert on utility regulation, Peter Bradford:

> When electric utility equipment contributes to deadly and damaging wildfires, California law makes the utility pay all the damages, even if the damages were not the utility's fault and even if the utility was not a major cause of the damage. In this era of ever more harmful climate-driven fires, this unique California approach poses unintended risk to utility customers and to environmental goals.[4]

To address this issue and help advance the state's post-wildfire recovery effort, California's Legislature passed Senate Bill (SB) 901, which was signed into law by Governor Jerry Brown in September 2018.[5] Among many other provisions aimed at improving the state's wildfire prevention, preparedness and

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[1] California Department of Forestry and Fire Protection (CAL FIRE). "Incident Information." 15 Feb 2011, http://cdfdata.fire.ca.gov/incidents/incidents_statsevents.

[2] The Camp Fire started on November 8th and was 100 percent contained on November 25th. It destroyed 13,972 residences, 528 commercial buildings, and 4,293 other buildings. CAL FIRE. "Camp Fire Incident Information." 2 Dec 2018, accessed 25 Nov, 2018, http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=2277. *CAL FIRE*. "Top 20 Most Destructive California Wildfires." Accessed 23 Nov 2018, http://www.fire.ca.gov/communications/downloads/fact_sheets/Top20_Destruction.pdf. As of November 25, 2018, there were still 249 people unaccounted for. *Reuters.* "Number of Missing In California's Deadly Camp Fire Falls Below 250." 25 Nov 2018, https://www.huffingtonpost.com/entry/california-camp-fire-missing_us_5bfaac72e4b0eb6d930f6590.

[3] CAL FIRE. "Top 20 Most Destructive California Wildfires" Accessed 23 Nov 2018, http://www.fire.ca.gov/communications/downloads/fact_sheets/Top20_Destruction.pdf.

[4] Bradford, Peter. "Making PG&E pay more than its fair share of fire damage could backfire on the state." *The Sacramento Bee*. 31 May 2018, http://www.sacbee.com/opinion/california-forum/article212316269.htm.

[5] California Senate Bill 901 (2018). "Wildfires." https://leginfo.legislature.ca.gov/faces/billStatusClient.xhtml?bill_id=201720180SB901.

response, SB 901 includes a section that addresses how utilities may cover costs associated with the catastrophic wildfires that occurred in 2017.

Section 27 of SB 901 amends Section 451.2 of California's Public Utilities Code to direct the CPUC to determine the appropriate cost recovery for catastrophic fires. When determining how to assign costs associated with the 2017 wildfires to a utility and to its customers, SB 901 instructs the CPUC to: (a) consider the utility's financial status; (b) determine the maximum amount the utility can pay "without harming ratepayers or materially impacting its ability to provide adequate and safe service;" and (c) ensure that any costs assigned to the utility (rather than its customers) do not exceed that amount.[6] In essence, the law requires the CPUC to determine a maximum amount, or a cut-off threshold, for the total costs that can be assigned to the utility and its shareholders while still enabling the utility to serve its customers. This is what we call the "Customer Harm Threshold." Any remaining costs would be recovered through customer electric rates with the review and approval of the CPUC.

Resolving the Customer Harm Threshold

Timely recovery from California's massive wildfires depends, in part, on timely resolution of this "Customer Harm Threshold" by the CPUC. There are several reasons why timely action by the CPUC to assess and establish the Customer Harm Threshold for the 2017 Northern California wildfires will benefit Californians, and all the reasons relate directly to PG&E's public-service missions.

1. **First, addressing victims' claims: Resolving the Customer Harm Threshold will help enable PG&E to raise the capital needed to pay victims' claims in a timely fashion while continuing to serve its customers.**

   - Because California's "inverse condemnation" policy assigns to utilities the responsibility to pay for life and property "taken" by wildfires where utility property was involved in the fire (and without regard to whether the utility was negligent), then part of the utility's public-service mission is to provide that back-stop compensation/insurance function. The CPUC will need to determine the Customer Harm Threshold associated with PG&E's provision of that public service. This will define the maximum amount of money that PG&E will be required to provide as compensation for the costs of the 2017 wildfires.

   - Until this maximum cost exposure is resolved by the CPUC, (1) investors and lenders will find it risky to provide funds to PG&E, (2) PG&E will have to pay higher costs for borrowing or investing money, and (3) the ongoing uncertainty may ultimately limit the funds that PG&E can raise for any purpose, including for paying the claims of the victims of the 2017 wildfires. Delaying resolution of the Customer Harm Threshold could lead to higher costs of capital and higher electric rates for customers. Although SB 901 did not explicitly address cost recovery for any catastrophic fires, like the Camp Fire, in 2018, its extraordinary costs further exacerbate PG&E's financial challenges and render timely resolution of PG&E's 2017 cost exposure even more critical to the company's ability to access capital markets for victims and customers alike. The unprecedented magnitude of costs associated with the 2017 and 2018 wildfires, combined with uncertainty about PG&E's liability and cost recovery, is leading investors and lenders to view PG&E as a high-risk enterprise. Timely

[6] SB 901, which was enacted in September 2018—roughly a month and a half before multiple destructive wildfires (including the Camp Fire) started in Northern and Southern California on November 8th—did not address cost recovery for catastrophic fires occurring in California during 2018, although it did address costs of fires occurring in 2017 and in 2019 and beyond. *See* Cal. PUC §§ 451.1 and 451.2, added per SB 901 Sec. 26 and 27.

resolution of PG&E's maximum financial exposure to 2017 wildfire-related costs would improve PG&E's ability to address its public service mission of paying claims related to the fires.

2. **Second, ensuring safe and adequate electric and natural gas service to PG&E's customers: Resolving the Customer Harm Threshold will help to enable PG&E to raise the capital needed to provide safe and reliable electric and gas service to customers.**

   - Timely resolution of the Customer Harm Threshold will help PG&E to raise the capital it needs for simply operating and maintaining and modernizing its utility systems for the benefit of its customers. It is well understood that utility service is highly capital intensive. This core component of PG&E's public-service mission depends on the company's ability to routinely raise significant funds from investors and lenders. PG&E's exposure to uncertain levels of liability for the 2017 wildfires—not to mention the catastrophic fires that occurred in 2018—has significantly undermined its financial health and its ability to raise external capital at reasonable costs. Timely action by the CPUC to establish the Customer Harm Threshold for at least the 2017 fires will send an important signal to capital markets, to the benefit of PG&E's customers.

3. **Third, supporting California's clean-energy goals: Timely resolution of the Customer Harm Threshold will put PG&E in the best position to continue supporting California's ambitious climate goals.**

   - Key pillars of California's climate strategy include: (1) increasing the use of renewable and other zero-carbon energy resources for the production of electricity; (2) reducing petroleum use in cars and trucks; and (3) dramatically increasing the efficiency of existing buildings. In short, the plan is to switch to carbon-free electricity and electrify as many end-uses as possible, while continuing to invest in efficiency (including buildings, appliances, and other energy-consuming equipment). Electric utility companies have a central role to play in all of these efforts as they pursue innovative approaches to meet California's clean energy goals. In effect, this role constitutes a third aspect of PG&E's public-service mission. A drawn-out process to establish the Customer Harm Threshold will hurt PG&E's ability to raise capital at acceptable costs and to make the investments required by California's transition to a clean energy economy. Making progress in reducing greenhouse gas emissions in California, the world's fifth-largest economy, sends an important signal in the global effort to address the threat of climate change, which is widely regarded as a major contributing factor in the size and scope of the recent wildfires.

Time is money: The faster that California regulators can determine PG&E's maximum exposure to as many of the wildfire-related costs as possible, the sooner that victim compensation can move forward, and the sooner that PG&E can return to financial health, providing cost-effective electricity service to customers and helping California pursue its clean energy goals.

The Critical Role of the CPUC

The CPUC can facilitate the recovery process by expediting its review and establishment of the Customer Harm Threshold. This will benefit victims, affected communities, PG&E customers, and insurance markets.

How could the CPUC address the Customer Harm Threshold in a timely way? California's regulators could promptly open an investigation to examine the maximum exposure facing PG&E and its shareholders as a result of the 2017 wildfires. In a more traditional sequencing of regulatory questions, the CPUC might start its investigation of wildfire cost recovery by examining all of the costs themselves and determining which ones are "just and reasonable," and only thereafter begin to explore the question of who pays those costs

(i.e., only then begin to assess the Customer Harm Threshold question). This traditional regulatory approach could leave PG&E's cost exposure unresolved for many years. For the duration of that long period of uncertainty, PG&E could be constrained in its ability to access the capital it needs to pay victim's claims and invest in the state's clean energy goals. That scenario could also lead to a much higher cost of capital for PG&E and its customers.

A more streamlined approach would involve the CPUC adopting, as soon as possible, a conceptual framework and procedural schedule that would: (1) define customer harm; (2) establish indicators (metrics) of financial health for PG&E; (3) analyze the implications of those metrics for the maximum amount that PG&E "can pay without harming ratepayers or materially impacting its ability to provide adequate and safe service"; (4) establish the Customer Harm Threshold; and (5) enable PG&E to proceed to obtain a financing order from the CPUC for the recovery of costs allocated to customers. The procedural schedule should reflect the need to ensure proper due-process considerations with participation by interested and affected parties and to establish the robust record on which the CPUC will need to make its decision. That said, the procedural schedule should also recognize that costs will mount if the Customer Harm Threshold is not resolved in an expedited manner, undermining PG&E's ability to meet its public-service missions. Finally, the schedule should synchronize, to the extent feasible, with other CPUC proceedings that will also fundamentally affect the PG&E's financial health: PG&E's upcoming General Rate Case and Cost-of-Capital case, both of which will be filed in the coming months (with CPUC decisions expected in early 2020).[7] All else equal, resolution of the Customer Harm Threshold prior to the closing of the evidentiary records in these other cases will help to mitigate the impacts of uncertainty on PG&E's cost of capital and in turn on customers' rates. This would also position the CPUC to proceed to finance its costs, to propose financing mechanisms for the collection of costs assigned to customers, and to begin to address the latest wildfires.

Streamlined Approach to Address Wildfire Cost Allocation

1. Define customer harm
2. Establish indicators of financial health
3. Apply the indicators to establish the maximum amount that PG&E can pay
4. Establish the Customer Harm Threshold
5. Proceed to a financing order to allow for the recovery of costs allocated to customers.

After determining PG&E's maximum financial exposure to the 2017 wildfires, the CPUC could then proceed to examine which catastrophic wildfire-related costs are prudent and therefore just and reasonable. Consistent with long-standing regulatory principles, the latter determinations should take into account

[7] PG&E Corporation. "Third Quarter Earnings Call." 5 Nov 2018, http://s1.q4cdn.com/880135780/files/doc_financials/2018/11/Presentation-and-Complete-Earnings-Exhibits-(1).pdf.

whether PG&E's actions were prudent based on what was reasonably known and knowable at the time the fires occurred and whether the company's practices met the standards and requirements that existed at the time. The prudency investigation should consider the full range of factors that turned a fire into a catastrophic wildfire event, including the long-standing drought conditions in California, land-use patterns, and forestry practices.

Certainly, these recommendations for the sequencing of the CPUC's consideration of financial issues related to the wildfires are not intended to suggest that the CPUC should not proceed to examine other critically important issues already on its agenda with respect to PG&E's safety plans and operations, as well as corporate governance, structure and management considerations. We presume that those issues are appropriately high on the CPUC's agenda and will continue to be a focus of the agency.

Organization of the Whitepaper

This whitepaper examines all these issues in more detail. The report provides context for the wildfires in terms of: relevant impacts of climate change that are emerging in California; details on the Northern California wildfires; the state's policy for addressing greenhouse gas emissions that affect climate change; the role that electric utilities play in supporting California's transition to a low-carbon economy; and the role of utilities in covering the costs associated with wildfires where a utility's equipment was involved in the fire.

The report identifies key metrics to gauge the financial health of a utility company. It compares PG&E's current financial condition, in light of its exposure to extraordinary wildfire costs, against standard financial metrics for utilities that are currently considered healthy by credit rating agencies.

The report then examines the Customer Harm question in more detail, with information about the legislation that authorizes the CPUC to resolve cost-recovery issues related to the catastrophic wildfires. The report addresses the various constituencies that stand to benefit from a timely resolution of the Customer Harm Threshold by the CPUC. That discussion describes how and why a utility needs to access capital markets to carry out its normal responsibilities to provide safe, reliable and affordable energy, as well as to compensate victims of the wildfires. Given the special role of California's utilities in meeting the state's climate-protection goals, the report also explores the investments that utility companies, like PG&E, will be making to transition to a low-carbon energy system and the need to be able to raise capital to make these investments.

The whitepaper then highlights the timelines associated with a business-as-usual regulatory timeline for resolving the Customer Harm Threshold, and how that approach would complicate other important ratemaking proceedings that will occur in parallel and which could benefit from a resolution of that issue.

The whitepaper concludes with recommendations for a structure that the CPUC could use to organize and conduct its review of the Customer Harm Threshold in a timely fashion. This discussion also addresses the types of signals that are important for California regulators to send to help PG&E return to financial health, and the helpful insights from prior financial tests used in the San Bruno and PG&E bankruptcy proceedings.

There will be difficult decisions ahead for the CPUC, and much is at stake in resolving these issues. We hope this whitepaper can help to establish a framework for the Commission to embark on this process.

Background: California's Changing Climate, the Northern California Wildfires of 2017 and 2018, and Key Climate and Wildfire Policies

Before turning to SB 901 and the Customer Harm Threshold, this section provides a brief background of the context in which this policy arose. This includes the projected impacts of climate change as well as the impacts already occurring: namely, the major wildfires that burned in 2017 and 2018, causing widespread destruction across Northern and Southern California (with a focus here on those fires occurring in the PG&E service area.) This section then also explores the steps California is taking to mitigate and adapt to the worst of these climate change risks, including the critical role that electric utilities play in these activities.

Climate Change and Selected Impacts on California

According to California's Fourth Climate Change Assessment (2018), "California is one of the most 'climate-challenged' regions of North America….Currently, temperatures are warming, heat waves are more frequent, and precipitation has become increasingly variable. California has experienced a succession of dry spells, and with warmer conditions the impacts of these droughts have increased…"[8]

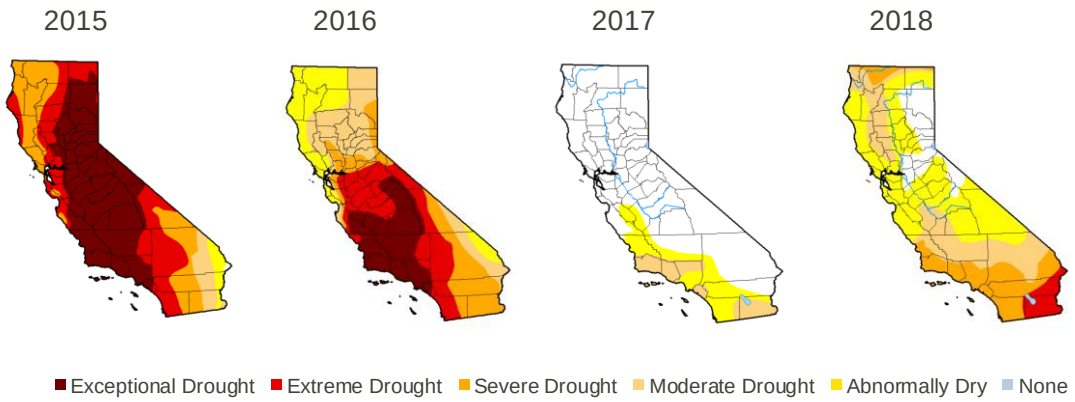
Given California's large size, the state has been experiencing a wide-range of climate-related impacts, which will affect public health, infrastructure, livelihoods, and local economies (such as tourism and agriculture, both critical for the state). These include:

- changes to precipitation patterns, including earlier peak runoff in major rivers and loss of snow pack and glaciers in the Sierra Nevada as well as volatility (e.g., alternative severe dry and wet years);
- drought, further exacerbating precipitation pattern change and a possible "harbinger of projected dry spells in future decades;" and
- increased heat across the state.[9]

Indeed, California has experienced extreme drought conditions in recent years, which has affected many parts of the state's ecosystems and economy. As shown in Figure 1, drought conditions have been "exceptional", "extreme" and "severe" in many parts of the state during the past decade. The period from 2014 through 2016 was particularly dry. The California Climate Assessment indicates that average temperatures and drought conditions are expected to continue to increase, even if greenhouse gas emissions are reduced at a moderate rate.[10]

[8] Bedsworth, Louise, Dan Cayan, Guido Franco, Leah Fisher, and Sonya Ziaja. "Statewide Summary Report. California's Fourth Climate Change Assessment." 2018, (hereafter, "California Climate Assessment"). (Citations to the scientific literature are omitted from the excerpted text.)
[9] Id.
[10] Bedsworth, Louise, Dan Cayan, Guido Franco, Leah Fisher, and Sonya Ziaja. "Statewide Summary Report. California's Fourth Climate Change Assessment Summary Brochure" 2018, (hereafter, "California Climate Assessment Summary Brochure"), pp 4-5. (Citations to the scientific literature are omitted from the excerpted text.)

Figure 1 California Drought Conditions: 2015 - 2018



Source: US Drought Monitor. "Map Archive." https://droughtmonitor.unl.edu/Maps/MapArchive.aspx.

Specifically, with respect to the interactions between the impacts of climate change and wildfires in the state, the California Climate Assessment examined the historical record, scientific studies and modeled projections of future impacts. The report found that:

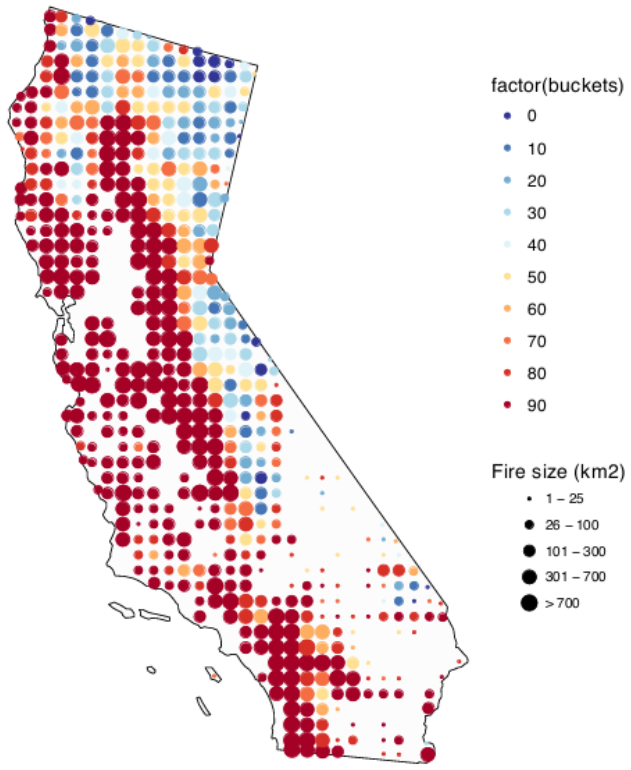
> The presence and characteristics of wildfires are determined by biophysical factors (e.g., temperature, moisture, wind, vegetation) and anthropogenic factors (e.g., ignitions, development at the wildland-urban interface, wildfire suppression activities, and infrastructure)…A changing climate combined with anthropogenic factors has already contributed to more frequent and severe forest wildfires in the western U.S. as a whole…[11]
>
> In recent years, the area burned by wildfires has increased in parallel with increasing air temperatures…Wildfires have also been occurring at higher elevations in the Sierra Nevada mountains…, a trend which is expected to continue under future climate change. Climate change will likely modify the vegetation in California, affecting the characteristics of fires on the land…Land use and development patterns also play an important role in future fire activity.[12]

[11] California Climate Assessment, p. 28.
[12] Id., p. 19.

The California Climate Assessment goes on to detail that approximately 85 percent of all fire ignitions in California are the result of human activities, while the rest are due to lightning. These two drivers show significant regional variation (Figure 2). Most ignitions result in small fires, with relatively little damage. However, studies have found that the rapid growth of the U.S. wildland-urban interface is increasing wildfire risks. As Figure 2 shows, the number of fires resulting from human ignition is much higher in more populated regions of the state (e.g., Sierra Nevada foothills and coastal ranges) than in less populated areas.[13]

Further, the report states that human impacts on fire patterns in the state have been "varied and substantial", modifying the role that fire has historically played in California's ecosystems. These include timber harvests, changing ignition patterns, fire suppression, land development. In whole, "climate affects fire regimes in two fundamental ways: altering vegetation growth rates (which affects fuel accumulation rates), or through changes in fire season length and severity (which affects fuel flammability and fire weather)."[14]

Figure 2 Number of Wildfires in California: 1992-2012



Note: The size of the dots represents the number of fires, and the colors show the proportion due to human activities.
Source: California Climate Assessment, p. 28.

The California Climate Assessment notes further that:

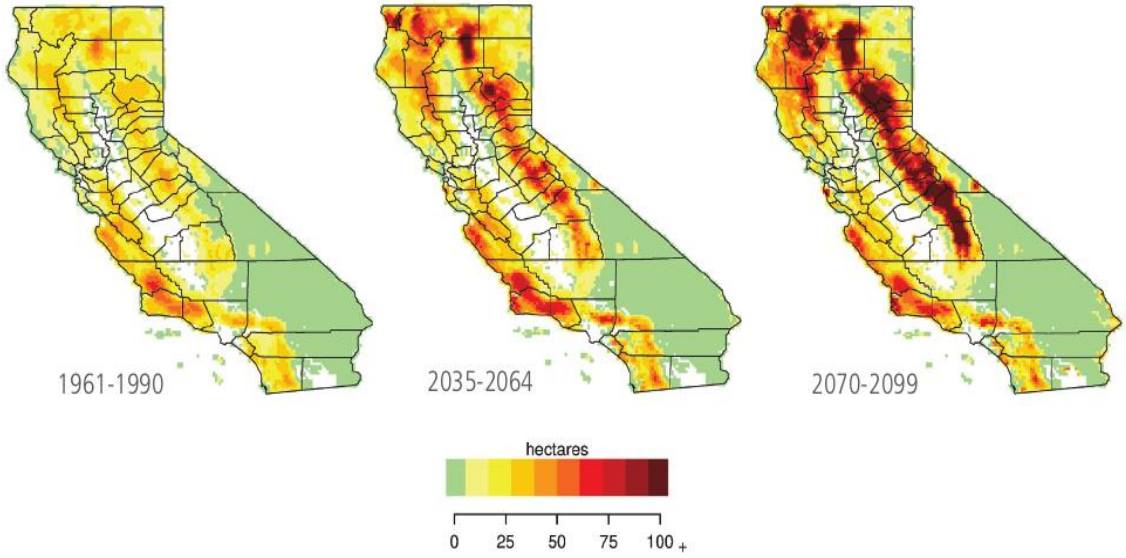
> the massive death of 129 million trees from a combination of the recent drought, an associated bark beetle outbreak, and an unhealthy forest due to decades of fire suppression and resulting overgrowth compounds the uncertainties about changes in wildfire risk under climate change.[15]
>
> Increasing acreage burned by wildfire is associated with increasing air temperatures. One Fourth Assessment model suggests large wildfires (greater than 25,000 acres) could become 50% more frequent by the end of century if emissions are not reduced. The model

[13] Id., p. 28.
[14] Id., p. 63.
[15] Id., p. 30.

produces more years with extremely high areas burned, even compared to the historically destructive wildfires of 2017 and 2018.[16]

Figure 3 indicates the results of modeling conducted by the co-authors of the California Climate Assessment. "This image shows the modeled area burned by wildfires from current time (modeled as 1961-1990), for mid-century (2035-2064), and for late century (2070-2099). By the end of the century, California could experience wildfires that burn up to a maximum of 178% more acres per year than current averages."[17]

Figure 3 Acreage Burned by Wildfires in California: Historic and Projected



Source: California Climate Assessment Summary Brochure, p. 6

Climate Change in Action: 2017 and 2018 Wildfires

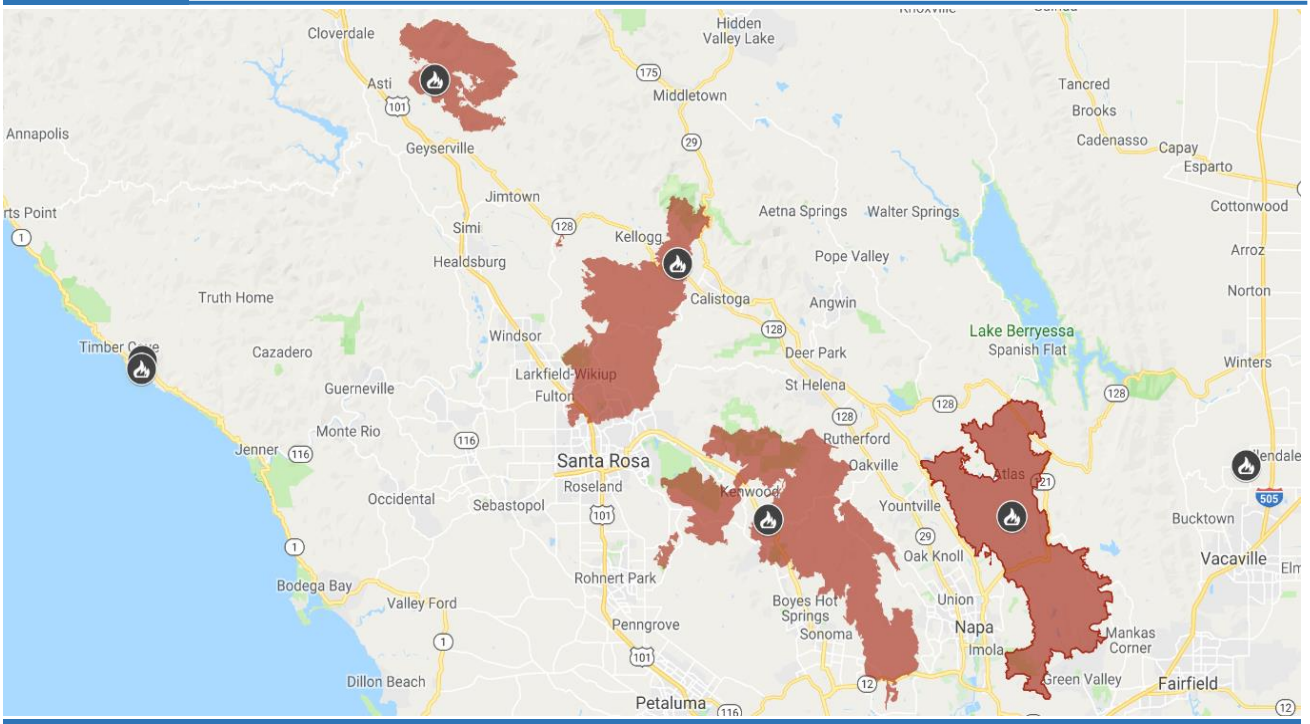
California has already begun experiencing the effects of climate change, from long-term drought to higher temperatures to changing precipitation patterns. Some of the most dramatic events have been the wildfires that have gripped the country from late 2017 to this past fire season.

The 2017 Wildfires

Starting on the evening of October 8th, 2017, a series of fires ignited in several Northern California counties. The October wildfire events eventually totaled 170 fires covering over 245,000 acres. Labelled the "2017 Fire Siege" by CAL FIRE, these wildfires affected parts of Napa, Sonoma, Butte, Nevada, Mendocino, Yuba, Lake, and Humboldt counties (see map). These fires were devastating in their impacts.

[16] Id., p. 30.
[17] California Climate Assessment Summary Brochure, p. 6.

Figure 4 The October 2017 Fire Siege in Northern California



Some of these fires are still under investigation. CAL FIRE has, however, already determined that at least 16 of those 2017 fires involved parts of PG&E's electrical system. These wildfires—including the Cascade, La Porte, Lobo, McCourtney, Honey, Redwood, Sulphur, Cherokee, 37, Blue, Noorbom, Adobe, Partrick, Pythian, Nuns, Pocket, and Atlas Fires—account for 22 lives lost, nearly 200,000 acres of affected land, and more than 3,000 buildings destroyed, including homes and commercial buildings and other structures.

Source: CAL FIRE and Google Maps. "California Statewide Fire Map – 2017 Fire Map Archive." http://fire.ca.gov/general/firemaps; CAL FIRE. "Cal Fire Investigators Determine Cause of Four Wildfires in Butte and Nevada Counties." 25 May 2018, http://calfire.ca.gov/communications/downloads/newsreleases/2018/2017_WildfireSiege_Cause%20v2%20AB%20(002).pdf; CAL FIRE. "CAL FIRE Investigators Determine Causes of 12 Wildfires in Mendocino, Humboldt, Butte, Sonoma, Lake, and Napa Counties." 8 Jun 2018, http://calfire.ca.gov/communications/downloads/newsreleases/2018/2017_WildfireSiege_Cause.pdf . Gabbert, Bill. "PG&E equipment blamed for another of last year's Northern California fires." 9 Oct 2018, https://wildfiretoday.com/2018/10/09/pge-equipment-blamed-for-another-of-last-years-northern-california-fires/ .

The 2018 Wildfires

Some of the worst fires in California's history took place in 2018. All of these fires are still under investigation. In July of 2018, two of the state's largest wildfires—the "Mendocino Complex" Fire and the Carr Fire—together destroyed over 688,000 acres in six counties,[18] damaging an area roughly equivalent to the combined acreage of San Francisco, Sacramento, San Jose, Fresno, Oakland, Stockton, and Los Angeles.[19] Figure 5 shows the scale of these July Northern California wildfires superimposed over a map of the Bay Area.

Although not as large in terms of land area, the Camp Fire, which started on November 8th and burned until November 25th, was the most destructive and deadly in California's history[20] and was the nation's deadliest fire in the past 100 years.[21] The Camp Fire spread extremely quickly, covering much of its ultimate impact zone on the first few days of the fire. On Figure 5, areas that are colored in a shade of blue were burned on November 8th, the first day of the fire, with other

Figure 5 Size of the Mendocino Complex Fire Relative to the San Francisco Bay Area

Source: Graff, Amy. "Mendocino wildfire explodes into raging monster nearly the size of Los Angeles." SFGate. 7 Aug 2018, https://www.sfgate.com/california-wildfires/article/Mendocino-Complex-Fire-wildfires-California-calfir-13135314.php.

[18] The affected counties are: Colusa, Glenn, Lake, and Mendocino Counties for the Mendocino Complex Fire, and Trinity and Shasta Counties for the Carr Fire. CAL FIRE. "Top 20 Most Destructive California Wildfires." 23 Nov 2018, http://www.fire.ca.gov/communications/downloads/fact_sheets/Top20_Destruction.pdf.

[19] CAL FIRE. "Top 20 Most Destructive California Wildfires." Accessed 23 Nov 2018, http://www.fire.ca.gov/communications/downloads/fact_sheets/Top20_Destruction.pdf; "List of largest California cities by land." Wikipedia. https://en.wikipedia.org/wiki/List_of_largest_California_cities_by_land_area.

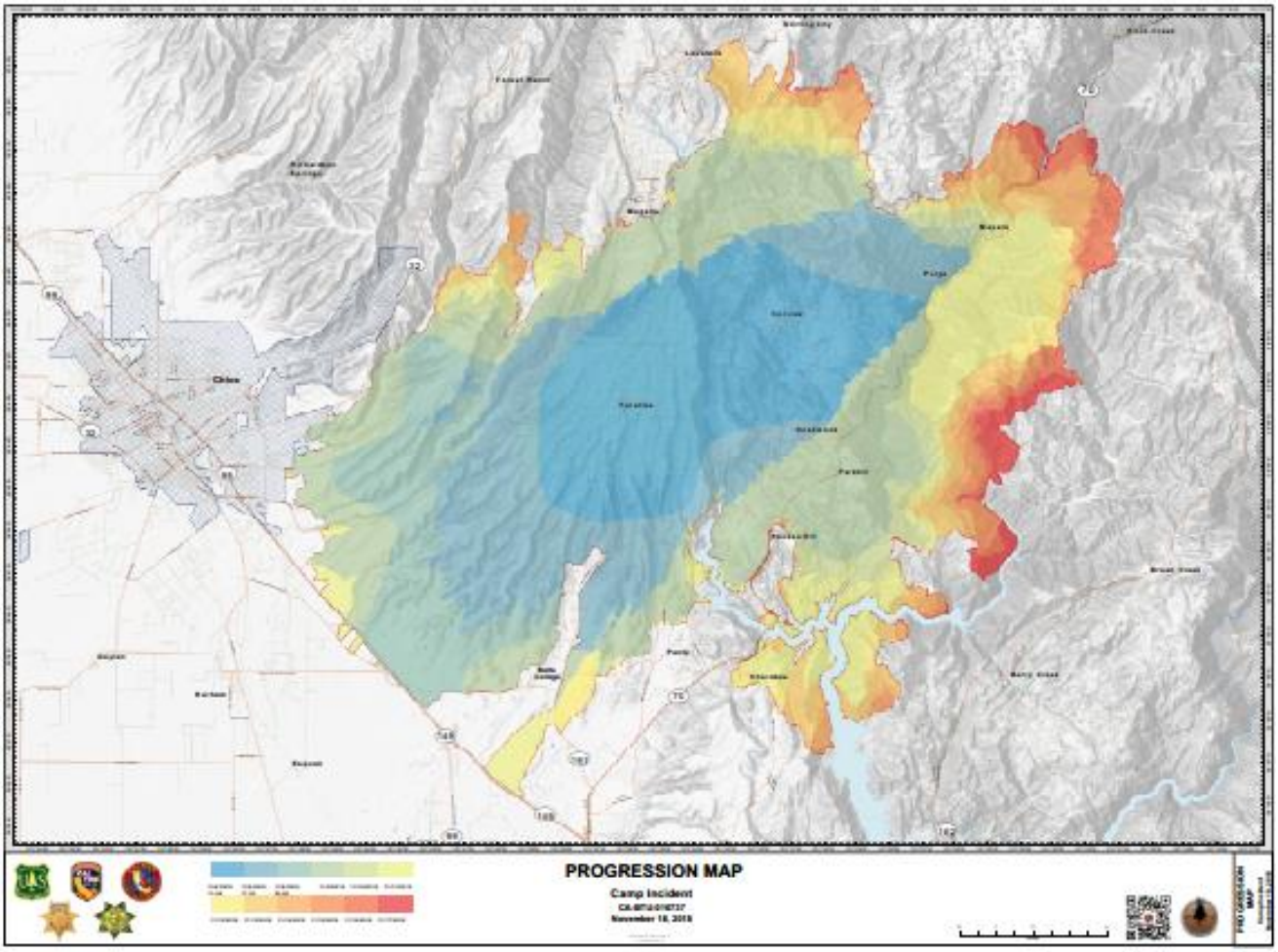
[20] CAL FIRE. "Top 20 Most Destructive California Wildfires." Accessed 23 Nov 2018, http://calfire.ca.gov/communications/downloads/fact_sheets/Top20_Deadliest.pdf.

[21] PBS. "America's Most Devastating Wildfires." http://www.pbs.org/wgbh/americanexperience/features/burn-worst-fires/.

areas showing how the fire progressed thereafter (with gray areas indicating places that burned on November 9th and 10th, yellow areas indicating where the fire burned on November 11th and 12th, and orange and red areas showing where the fire moved from then until its eventual containment).

Over its 17 days, the Camp Fire destroyed the Northern California communities of Paradise and Concow, among other areas, led to at least 86 deaths, with additional injuries to firefighters and civilians, and destroyed over 14,000 structures, most of which were homes.[22] Figure 6 shows the area impacted by the wildfire, in Butte County near Chico, California. As of November 19, 2018, one insurance analyst estimated the damages from the Camp Fire to be in the range of $7.5 to $10 billion.[23]

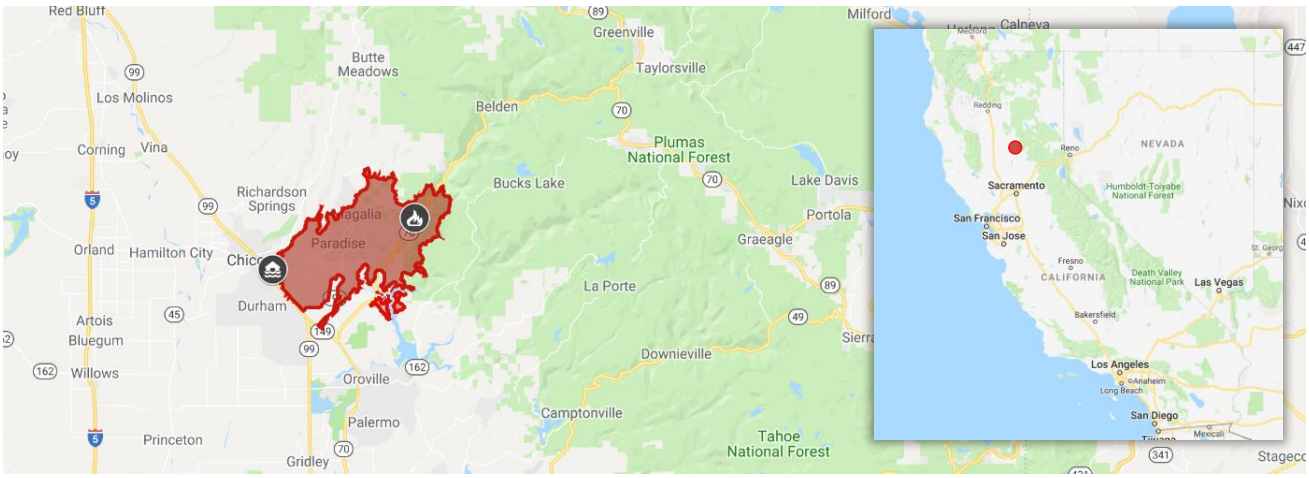
Figure 6 Camp Fire Progression Map (November 8-18, 2018)



Source: CAL FIRE. http://cdfdata.fire.ca.gov/pub/cdf/images/incidentfile2277_4286.pdf.

[22] CAL FIRE. "Camp Fire Incident Information." Accessed 25 Nov, 2018, http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=2277.
[23] Insurance Journal. "Latest Estimates of Insured Losses from California Wildfires at $9B to $13B." 19 Nov 2018, https://www.insurancejournal.com/news/west/2018/11/19/509677.htm.

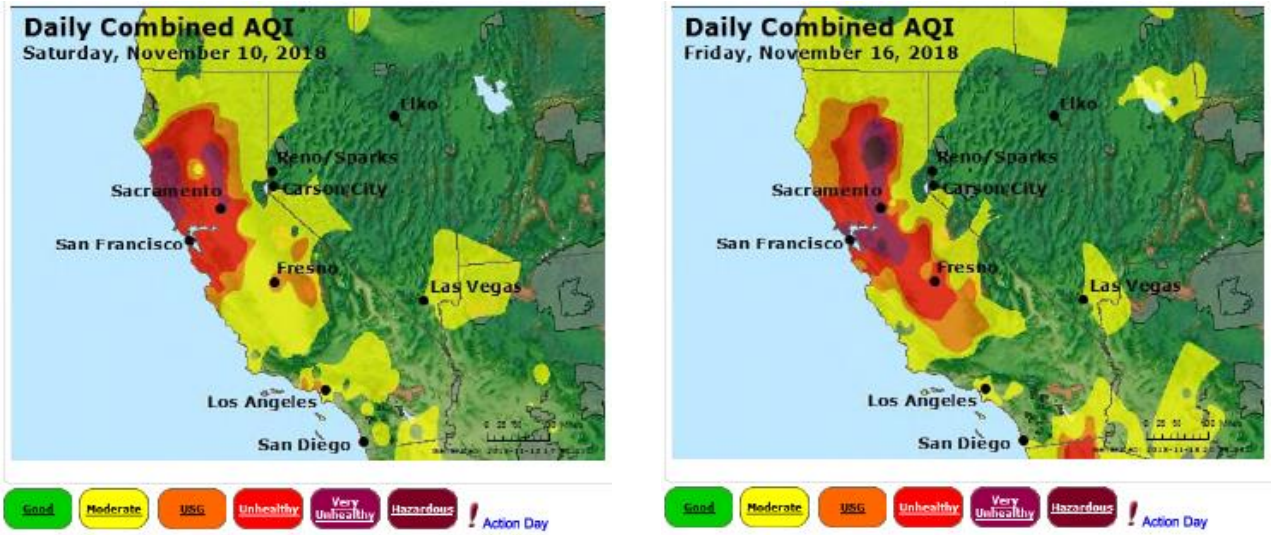
Figure 7 Location of the Camp Fire: November 2018



Source: CAL FIRE and Google Maps. "California Statewide Fire Map – 2018 Statewide Incidents Map." http://fire.ca.gov/general/firemaps .

Notably, air quality in Northern California was greatly and adversely affected by the Camp Fire. Press accounts on November 19th indicated that Northern "California's air exceeded world health standards by 60 times last week…[and] particulates in the air reached as high as 1,500 micrograms per cubic meter. The threshold set by the World Health Organization is 25…On Monday [the 19th], Sacramento's air was listed as unhealthy and particulates reached a level of 135.4 micrograms per cubic meter….San Francisco has a reading of 55 with San Jose at 76.1 and Stockton at 152."[24] Figure 8 shows the extent of the unhealthy air quality readings on November 10th (on the left) and November 16th (on the right).

Figure 8 Daily Air Quality Index for California: November 10th and November 16th, 2018



[24] Sullivan Brian. "'Insane' California Air Topped World Health Standards by 60 Times." *Bloomberg*. 19 Nov 2018, https://www.bloomberg.com/news/articles/2018-11-19/-insane-california-air-topped-world-health-standard-by-60-times.

California Policies to Reduce Climate Pollution

California policymakers have adopted many policies with the goal of reducing and responding to wildfires and other climate change risks. Some of these relate to adapting to the changing conditions that affect so many aspects of the state's economy, social systems, and natural resources. California is focusing increasingly on enhancing the resilience of its infrastructure, its communities and its natural systems to achieve three key goals:

> Built infrastructure systems can withstand changing conditions and shocks, including changes in climate conditions, while continuing to provide critical services.
>
> People and communities can respond to changing average conditions, shocks, and stresses in a manner that minimizes risks to public health, safety, and the economy; and maximizes equity and protection of the most vulnerable so that they do not simply survive climate-related events, but thrive despite and after these events.
>
> Natural systems adjust and maintain desirable ecosystem characteristics in the face of change.[25]

Additionally, California lawmakers have established ambitious targets to reduce greenhouse gas emissions from the state's economy, and have required ongoing investments in renewable energy, clean vehicles and the infrastructure that supports them, energy efficiency in buildings and appliances, and other climate protection measures that will transform energy use in California.

Some of California's key climate policy laws include:

- The Global Warming Solutions Act (Assembly Bill 32 (AB 32), Núñez, Chapter 488, Statues of 2006), which set a target of reducing statewide greenhouse gas emissions to 1990 levels by 2020, and directs state regulators to maintain and continue the emissions reductions beyond 2020.[26] Under AB 32, California has established a cap-and-trade program to control greenhouse gas emissions in the state. Data released by the California Air Resources Board in 2017 show that the state had met its 2020 goal in 2016.[27]
- Senate Bill 32 (Pavley, Chapter 249, Statutes of 2016), which was signed into law ten years after the Global Warming Solutions Act and requires the State Air Resources Board to "ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030."[28]

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[25] California Climate Assessment, p. 68, referring to the definition of "resilience" adopted in California's Executive Order B-30-15 Guidance.

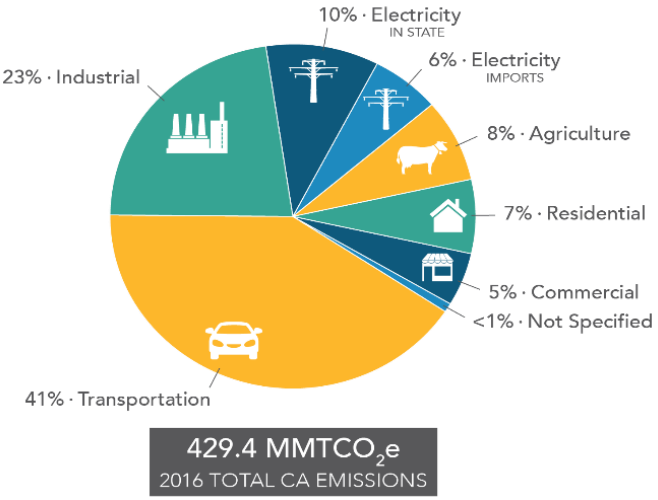
[26] "By January 1, 2008, the state board shall, after one or more public workshops, with public notice, and an opportunity for all interested parties to comment, determine what the statewide greenhouse gas emissions level was in 1990, and approve in a public hearing, a statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020…It is the intent of the Legislature that the statewide greenhouse gas emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020." Cal. HSC § 25.5 Part 3 (as added by SB 32), https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC&sectionNum=38550.

[27] Barboza, T. and Julian H. Lange. "California hit its climate goal early — but its biggest source of pollution keeps rising." *Los Angeles Times*. 23 Jul 2018, https://www.latimes.com/local/lanow/la-me-adv-california-climate-pollution-20180722-story.html.

[28] California, Senate Bill 32 (2016). "California Global Warming Solutions Act of 2006: emissions limit." Legislative Council's Digest. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32

Other California laws have established specific measures to achieve these emission reduction targets. For example, the Clean Energy and Pollution Reduction Act of 2015 (SB 350) found that "[r]educing emissions of greenhouse gases to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050 will require widespread transportation electrification."[29]

Figure 9 Greenhouse Gas Emissions in California (2016)



Source: California Air Resources Board

Unlike other states where electricity production is a major contributor of carbon pollution, transportation is the leading source of greenhouse gas emissions in California, as shown in Figure 9.[30] Among other things, SB 350 directs electric utility companies to develop programs to accelerate transportation electrification. California's goal is to have five million zero emission vehicles (ZEV) on the road by 2030, supported by 250,000 charging stations and 200 hydrogen fueling stations statewide by 2025.[31]

SB 350 also requires that 33 percent of electricity sold in the state in 2020 come from qualifying renewable energy sources, with an increase to 50 percent by the end of 2030. As of 2017, California relies on renewable power for 32 percent of its electricity.[32] SB 100, passed in 2018, raised this target to 60 percent by 2030 and established a requirement for 100 percent "carbon-free" electricity by 2045. As of 2016, electricity is responsible for about 16 percent of California's total greenhouse gas emissions.

The Role of Utility Companies in Meeting California's Climate and Clean-Energy Goals

As noted above, the key pillars of California's climate strategy include: (1) increasing the use of renewable energy resources for the production of electricity; (2) reducing petroleum use in cars and trucks; and (3) dramatically increasing the efficiency of existing buildings. In short, the plan is to switch to carbon-free electricity and electrify as many end-uses as possible, while continuing to

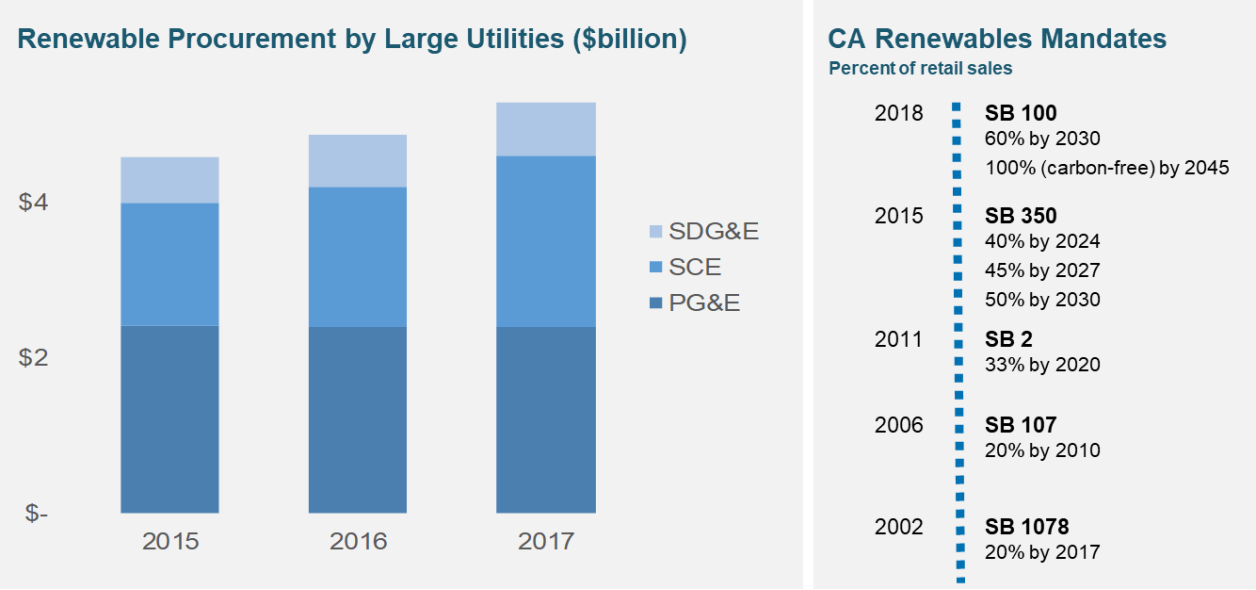
[29] California. Senate Bill 350 (2015). "Clean Energy and Pollution Reduction Act of 2015." https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350.
[30] California Air Resources Board. "2018 Edition, California Greenhouse Gas Emissions for 2000 to 2016: Trends of Emissions and Other Indicators." 11 July 2018, https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf.
[31] California. Executive Order B-48-18. 26 Jan 2018, https://www.gov.ca.gov/2018/01/26/governor-brown-takes-action-to-increase-zero-emission-vehicles-fund-new-climate-investments/.
[32] California Energy Commission. "Renewables: Tracking Progress (Highlights)." Aug 2018. https://www.energy.ca.gov/renewables/tracking_progress/documents/renewable_highlights.pdf.

invest in energy efficiency.[33] Electric utility companies have a central role to play in all of these efforts, as they pursue innovative approaches and key investment strategies to help meet California's clean energy goals.

Utility companies enter into contracts with renewable energy developers to comply with the state renewable mandates. Figure 10 summarizes the changes in the California renewable mandates, which have steadily increased with the ultimate goal of having 100 percent of retail electricity sales coming from carbon-free resources in under three decades from now. Generally, utility companies offer competitive solicitations for renewable energy contracts and enter into contracts with project developers. Developers rely on these contracts to recover the capital needed to develop new renewable facilities. Renewable energy procurement by the state's three largest utilities exceeded $5 billion in 2017 (see Figure 10).[34]

Utility companies also help enable customers to add solar facilities on their own premises, and offer customers opportunities to purchase solar energy without installing a system at their home.[35] Under new requirements, California policy also now directs utility companies to procure significant amounts of energy storage capacity to help manage the electric grid as more renewables are added to the system.[36]

Figure 10 Investor-Owned Utility Procurement of Renewable Energy Resources: 2015-2017



Source: California Public Utilities Commission. "RPS 2018 Padilla Report to the Legislature on Costs and Savings for the RPS in 2017 (Pursuant to Public Utilities Code Section 913.3)." May 1, 2018.

[33] "California Climate Change." https://www.climatechange.ca.gov/.
[34] Cal. PUC "RPS 2018 Padilla Report to the Legislature on Costs and Savings for the RPS in 2017" (Pursuant to PUC § 913.3). 1 May 2018.
[35] PG&E launched its Solar Choice program in 2016, allowing customers who were not otherwise planning to install rooftop solar panels to purchase solar power from projects in Northern and Central California. See: https://www.pge.com/en_US/residential/solar-and-vehicles/options/solar/solar-choice/solar-choice.page.
[36] California Assembly Bill 2514 (2010). "Energy Storage Systems." https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100AB2514.

Utility companies are helping to build out the state's electric-vehicle charging network, including helping to seamlessly integrate the growing number of electric vehicles into the electric grid. PG&E, for example, began in early 2018 investing $130 million over three years in light-duty electric-vehicle charging equipment[37] and has been approved to invest an additional $266 million in fast charging and medium- and heavy-duty vehicle infrastructure investments, including school buses and fleets.[38] Utility companies also offer incentives to purchase electric vehicles. PG&E is offering $800 rebates to owners of electric vehicle that can be used to install charging equipment at their homes.[39] And utility companies have been converting their own vehicle fleets to electricity. California utility companies have also been offering rate plans that are specific to electric vehicles.

California has long been a leader in encouraging the adoption of energy-efficiency measures.[40] Utilities administer many of these energy-efficiency programs with oversight by the CPUC, which establishes key policies and guidelines, sets program goals, and approves spending levels. Utilities and third-party contractors implement the state's efficiency programs. Utility efficiency programs are funded in part by a small charge on utility customers' bills, encouraged by regulators and stakeholders alike in light of the net consumer benefits produced by such programs. SB 350 calls on state agencies and utilities to work together to double cumulative efficiency savings by 2030.

Utility companies have also been engaged in adapting their business operations to the effects of climate change and supporting the communities they serve in parallel efforts. For example, PG&E runs the "Better Together Resilient Communities" grant program provides funding to customers who live in vulnerable areas to implement innovative climate adaptation solutions.[41] Utilities across the state have also been evaluating the risks of climate change and investing in their systems to enhance resiliency. This has included, for example, working to reduce the risk of wildfires by cutting back vegetation from their power lines and cutting the millions of dead trees left by years of extreme drought conditions and widespread bark beetle infestation. In 2017, PG&E invested nearly $450 million in vegetation management in light of these conditions.

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[37] California Public Utilities Commission. "Decision Directing Pacific Gas and Electric Company to Establish an Electric Vehicle Infrastructure and Education Program." http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M171/K539/171539218.PDF

[38] PG&E. "New PG&E Pilot Projects Will Expand Electric Transportation in California." 25 Jan 2018. https://www.pge.com/en/about/newsroom/newsdetails/index.page?title=20180125_new_pge_pilot_projects_will_expand_electric_transportation_in_california.

[39] The Clean Fuel Rebate will increase from $500 to $800 in 2019. PG&E. "Clean Fuel Rebate for Fueling Electric Vehicles." https://www.pge.com/en_US/residential/solar-and-vehicles/options/clean-vehicles/electric/clean-fuel-rebate-for-electric-vehicles.page?WT.mc_id=Vanity_cleanfuelrebate-ev.

[40] ACEEE. "2018 State Energy Efficiency Scorecard." 4 October 2018. https://aceee.org/state-policy/scorecard.

[41] PG&E. "PG&E Awards $200,000 in Grants to Support Local Climate Change Resilience Planning." 6 September 2017. https://www.pge.com/en/about/newsroom/newsdetails/index.page?title=20170906_pge_awards_200000_in_grants_to_support_local_climate_change_resilience_planning.

California's Policies Related to Costs Associated with Wildfire Damages

As the effects of climate change, including wildfires, increase across the state, policymakers have been faced with difficult decisions on how to continue to create incentives for and increase adaptation and mitigation measures while also funding the significant costs of recovery for climate change disasters and changing day-to-day conditions. Electric utilities, as critical players in both climate-change mitigation efforts and nearly all economic activity across the state, are central to these conversations.

A key policy in play in response specifically to the recent wildfires is "inverse condemnation." Under California's Constitution,[42] the owner of private property that is taken or damaged for a public use (including a public work or improvement) is entitled to "just compensation." This has been interpreted in California to mean that if a utility's facilities are involved with "taking" or "damaging" private property (as a result of a wildfire, for example), then the owner of that property is entitled to compensation. This policy is premised on the notion that the utility's facilities serve the larger community, and if those facilities lead to a taking of private property, then the larger community should pay. As explained by California's court of appeals,

> Article I, section 19 (formerly §14) of the California Constitution has been interpreted by our Supreme Court to mean that "any actual physical injury to real property proximately caused by [a public] improvement as deliberately designed and constructed is compensable . whether foreseeable or not."…. An inverse condemnation action is an eminent domain action initiated by one whose property was taken for public use, as opposed to by the condemning public agency. As such, the principles of eminent domain law apply to inverse condemnation proceedings….[G]enerally, condemning private property for the transmission of electrical power is a public use and inverse condemnation will apply….*The fundamental policy underlying the concept of inverse condemnation is to spread among the benefiting community any burden disproportionately borne by a member of that community, to establish a public undertaking for the benefit of all*…[43] (emphasis added)

In addition, in the wake of the catastrophic wildfires occurring in recent years, and in 2017 in particular, California lawmakers adopted a new law, SB 901, which was signed into law by Governor Brown on September 21, 2018. While SB 901 did not revise or modify the standard of inverse condemnation or clarify its application to private or public utilities, it makes extensive changes to California's Health and Safety Code, Public Resources Code, and Public Utilities Code relating to avoiding, mitigating, and recovering from wildfires. In addition to addressing important issues related to forest and fuels management, wildfire resilience, and risk-reduction efforts, SB 901 also establishes wildfire risk-mitigation planning requirements for all utilities and directives related to

[42] Cal. Constitution, art. 1, § 19. https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=CONS&sectionNum=SEC.%2019.&article=.

[43] Cal. Court of Appeal, Fourth District, Division 2, *Barham et al., v. Southern California Edison Company*, No. E021243, Decided: 30 Aug 1999, https://caselaw.findlaw.com/ca-court-of-appeal/1223894.html. (citations to the cases are omitted from the excerpted text).

the recovery of investor-owned utilities' costs associated with the 2017 wildfire season and fires occurring in 2019 and beyond.

SB 901 assigns significant decision-making responsibility to the CPUC to determine the just and reasonable amounts that utilities under its jurisdiction are able to collect from customers to recover from wildfires in 2017 and 2019 and beyond, to determine whether those utilities' previous actions and plans to mitigate and respond to wildfires are prudent and sufficient, and to identify the maximum amount of wildfire-related costs that the utility may absorb while continuing to provide adequate and safe service without harming customers.

Financial Health of Utilities: Importance, Definitions, and Impacts of the Wildfires

The financial health of a utility company is fundamental to meeting its obligation to serve customers. This section explores key metrics for gauging utility financial health and, in applying those metrics to PG&E in a post-wildfire environment, exposes the fragile financial position of the utility that may be important to mitigate, in part, through proactive CPUC action.

Why Financial Health is Important for Utilities and Their Customers

Given their core ratemaking role, regulators of investor-owned utilities have long understood that exercising this regulatory responsibility fundamentally requires a balancing the interests of consumers (i.e., to assure that the rates they pay are just and reasonable) with the interests of shareholders (i.e., to set rates to provide for the financial integrity of the utility).

The interests of the two entities—customers and utilities/shareholders—are actually aligned. A healthy utility has the ability to borrow at lower interest costs, something that is critically important not only for a firm in a capital-intensive industry like energy-service delivery, but also for keeping customers' rates as low as possible for the portion of rates that go toward enabling the utility to repay its lenders and equity investors for use of their capital.

Just as a homeowner with poor credit has to pay higher rates to borrow money, a utility with poor credit ratings will similarly face higher interest rates and other premiums to access capital. For a utility, those lower rates for accessing loans and shareholder equity translate into lower revenue requirements, which in turn mean lower rates than would otherwise be the case.

Unlike a homeowner, however, a utility needs to access capital markets on a routine basis, for large amounts of money. This funding is necessary to maintain the utility's system safely and securely under normal circumstances, to support investment needs associated with the transition to a lower-carbon economy, and, episodically, to address unexpected events (like storms and wildfires) that are changing requirements for what it means to be a resilient service provider.

And, unlike an unregulated private company, with no obligation to serve, an investor-owned utility has an ongoing obligation to provide adequate service at reasonable rates. The financial health of a utility company is fundamental to meeting this obligation.

Utility Regulatory Policy and Law

The principle that a financially healthy utility can better serve its customers is grounded in long-standing utility regulatory policy and law. Setting rates based on a "fair rate of return" to cover the utility's cost of capital enables the utility to meet its obligation to provide service to customers. Two landmark decisions of the U.S. Supreme Court provide the underlying legal principles of a fair rate of return: (1) *Bluefield Water Work & Improvement Co. v Public Service Commission of West Virginia* (262 U.S. 679, 1923); and (2) *Federal Power Commission v. Hope Natural Gas Company* (320 U.S. 391, 1944). The cases are simply referred to as *Bluefield* (1923) and *Hope* (1944).

The *Bluefield* case set the standard by which reasonable rates are judged:
"A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties…The return should be reasonable, sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise money necessary for the proper discharge of its public duties."

Since the *Bluefield* decision, national capital markets have developed and little is made of the portion referring to the "same general part of the country" any more. The key words of the *Bluefield* decision are that the rates should be adequate to assure confidence in the financial soundness of the utility and to maintain and support its credit and to enable the utility to raise necessary capital.

The *Hope* decision expands on the principles set forth in *Bluefield*:
"From the investor or company point of view it is important that there be enough revenue not only for operating expense but also for the capital costs of the business. These include service on the debt and dividends on the stock…By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and attract capital."[44]

[44] Bonbright, J., A. Danielsen, and D. Kamerschen, *Principles of Public Utility Rates, Public Utilities Reports, Inc.*, Second Edition, 1988, p. 315-316 (hereafter referred to as "Bonbright et al.") (citations omitted).

Research in this space has distinguished five key criteria on which a fair return should be predicated: "(1) attracting capital, (2) encouraging efficient managerial practice, (3) promoting consumer rationing[45], (4) ensuring fairness to investors, and (5) providing a reasonably stable and predictable rate level to ratepayers."[46]

> Capital-attraction criterion: Among these five criteria a high place, perhaps even first place, must be given to that of capital-attracting efficiency. Judged by this test alone, choice [among the criteria] should rest with whatever principles of rate control are best designed to permit well managed, soundly financed public utility companies to attract needed capital.[47]
>
> Fairness to Investors Criterion: All four of the criteria of a fair return so far suggested might be classified as criteria designed primarily in the interest of the consuming public. But the very term fair return implies a standard of equity to investors not necessarily governed by consideration of consumer self-interest…..[M]ost public utility companies, in order to render good service, must be able repeatedly to attract new capital from investors who are free to commit their funds to any alternative investments including the purchase of stock in unregulated corporate enterprises. Market acceptability may thus be thought to become, at one and the same time, the test of fairness and of corporate financial need. [48]

In today's sophisticated capital markets, investors and lenders have myriad options for where they place their capital. If they view a particular utility as a risky investment, they will demand a higher cost for debt and equity capital. And a utility may find it difficult to continue to access capital markets at all.

What Financially Healthy Utilities Look Like

Traditionally in the utility industry, the regulators and managers of investor-owned utilities have relied on several basic components of ratemaking and utility finance to put utilities in a position to provide reliable, low-cost services into the future. These are: (1) sufficiency of the revenue requirement to cover just and reasonable costs; (2) an allowed return on investment to enable the utility to pay lenders and equity suppliers of capital at reasonable cost, including through a dividend policy supportive of the utility's capital needs; (3) a capital structure that reasonably balances debt and equity; and (4) an expectation that the utility will make capital investments necessary and consistent with its public service obligations. Financial health for the utility enables the utility to provide adequate service at reasonable cost on an ongoing basis.

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[45] Because this concept is fairly technical, Bonbright *et al*. explain the "consumer-rationing standard" this way: "each rate should be designed to encourage all consumption for which ratepayers are ready to pay avoidable, marginal costs, and so as to deter any consumption for which ratepayers are not prepared to pay these cost." Bonbright *et al*., p. 205.
[46] Bonbright *et al*., pp. 203.
[47] Bonbright *et al*., pp. 203-204.
[48] Id., pp, 208-209. On page 199, Bonbright *et al*. also observe that "constitutional restrictions against the power of government to fix prices that would impair the profit-making opportunities of individual or corporate owners of private property. While these owners were held subject to rate regulation if engaged in a business "affected with the public interest," they were also held entitled to protection against regulation so stringent as to violate the injections of the Fifth and Fourteenth Amendments against the taking of property "without just compensation…"

What would a healthy utility look like? Although there is no universally accepted definition of what it means to be a financially healthy utility, there are attributes of financial health and metrics for comparing the relative financial conditions of utility companies. Such attributes and metrics, combined with significant, publicly available information on utilities' financial and operational circumstances, can help to shed light on the issue. As explained years ago by analysts at the U.S. General Accounting Office:

> Recognizing that various degrees of health are possible and any final determination is a matter of judgment, we nevertheless found a number of characteristics fundamental to good financial health. These include the ability to:
>
> - survive adversity,
> - attract capital, and
> - maintain solvency and profitability.
>
> In essence, the electric utility industry's overall health relates to its ability to meet adversities in financial markets, raise debt and equity funds, and earn a return that investors find acceptable in carrying out its operations.[49]

Metrics Relating to Utilities' Financial Performance

Financial analysts, rating agencies, lenders, investors, utility financial managers, and utility regulators use a variety of metrics to evaluate and communicate information about a company's financial health, risk and opportunity.

A financially healthy utility that is in a position to raise significant sums of capital at affordable costs requires a strong credit rating, stable and predictable returns, payment of dividends to shareholders, and stable or growing market value (in terms of stock price and market capitalization value of the firm). These and other metrics shed light on more or less favorable conditions for the utility's outlook.

Some of the more common metrics are listed in Table 1. These different metrics allow potential lenders and investors to understand a utility company's financial conditions, not just at a point in time, but also relative to itself over time and to other utilities and other non-utility investment opportunities. Each metric conveys a different insight into the company's circumstances. Some are directed more to lenders while others are aimed principally at investors in equity markets. They provide information about a company's efficiency in attracting and using resources, its profitability, and its ability to repay its obligations to lenders. Appendix B includes more information about of each of the metrics.

[49] U.S. General Accounting Office. "Report to the Chairman, Subcommittee on Energy Conservation and Power, House Committee on Energy and Commerce: Analysis of the Financial Health of the Electric Utility Industry." 11 Jun 1984, https://www.gao.gov/assets/150/141892.pdf, p. 6.

Table 1 Common Financial Metrics for Characterizing Investor-Owned Utility Companies

Metric	Brief Description of the Metric	Comment
Credit Rating	A measure of an independent rating agency's assessment of the ability of the entity to attract debt-financed capital and its ability to repay creditors for their loans. Low alphabetical ratings (e.g., AAA by S&P, Moody's, or Fitch) indicate a company with good credit-worthiness and having the ability to access debt at relatively low cost.	The ratings agencies examine the creditworthiness of utilities against different types of risk. For example, S&P uses these two categories: ▪ financial risk (based on traditional financial metrics, including ability to repay debt), and ▪ business risk (including market dynamics, as well as the regulatory climate and political support). Credit rating adjustments (e.g., downgrade or upgrade) may reflect market perceptions about a particular issuer issue which, combined with other factors, may lead to a change in the price of that security.[50]
Cost of Debt	An indicator of how much interest the firm has been charged to take out loans or issue bonds.	Utility regulators are familiar with this metric and typically understand that a utility with a credit rating that has been downgraded since prior issuances would expect to face higher interest rates in the future.
Cost of Equity	An indicator of the rate of return that the utility pays to its shareholders to compensate them for the use of (and risk associated with) their capital.	Utility regulators are familiar with this metric, as it is a fundamental component of the cost-of-capital calculation that they use to establish the utility's allowed rate of return on rate base. That said, in capital markets, the cost of equity is not the allowed rate of return, but is rather the *actual* rate of return achieved by a company.
Cost of Capital	A measure of the minimum return that debt issuers and equity investors together require to provide capital to the company.	The higher the risk a utility faces in repaying debt and equity, the higher costs that lenders and equity suppliers of capital will charge that utility to access capital. In such markets, the cost of capital reflects actual costs of equity and debt capital.
Return on Rate Base	A measure of the utility's allowed return on rate base that is approved by regulators and built into rates charged to consumers	This metric is unique to regulated investor-owned utilities whose rates are set based on traditional ratemaking principles and where the regulators determine the appropriate cost of capital in setting rates.
Debt-to-Equity Ratio	An indicator of a company's financial leverage, based on a comparison of the firm's total liabilities relative to the value of equity provided by stockholders. (This is, in essence, an indicator of the firm's capital structure.)	Capital-intensive industries like utility companies tend to have relatively high D/E ratios, compared to companies in many other industries. Therefore, analysts tend to compare the D/E ratios across utility companies to determine whether a particular firm is particularly highly leveraged. A high D/E ratio might indicate whether a utility's debt burden is putting the company at risk of failing to repay its commitments.
Borrowing Spread	A measure of the cost of a utility's borrowings relative to a "safe" bond (e.g., Treasury note).	This is an indicator of the market's view of the relative risk associated with lending money (or issuing bonds) to the company.
Dividend Payout Ratio or Yields	Indicators of the extent to which shareholders realize actual returns in a time period through the payment of dividends (compared to the total net income of the company).	Two related concepts: • The Dividend Payout Ratio is the ratio of the total dollar value of dividends paid to shareholders divided by the net income (or earnings) of the company in the same time period. The amount not paid to shareholders is retained by the company to pay off debt or to reinvest in the business. • The Dividend Yield reflects the ratio of the dividend payment per share to the company's stock price per share. This metric provides an indication of the utility's performance in returning profits to shareholders through cash payments rather than through reinvestment.
Stock Price and Market Cap	Measures of how investors value a share of the firm's ownership at any point in time, over time, and in comparison to other stocks.	At any point in time, the price reflects investors' views of the value of the company, with the price per share of common stock times number of shares issued into the market providing the basic calculation of the company's market capitalization (or value).
Price-to-Book Ratio	A measure of investors' views of a firm's potential to earn a rate of return that exceeds the book value of the company.	This metric is calculated as the price of a share of common stock divided by the book value of a share in the company. It is an indicator of the market's view of the financial health of a company, and reflects investors' expectations about future returns relative to the historic cost value of the company.
Price-to-Earning Ratio	An indicator of the relative attractiveness of a firm's stock price compared to its earnings.	The P/E ratio (or, the earnings multiplier.) is calculated by dividing the current market price of the stock by the company's earning per share (EPS). It reflects the amount an investor is willing to pay to get a dollar of earnings.

[50] S&P Global. "Guide to Credit Rating Essentials." 2018, https://www.spratings.com/documents/20184/774196/Guide_to_Credit_Rating_Essentials_Digital.pdf, p. 20.

Metrics Reflecting the Relative Financial Health of Utilities

Using metrics such the ones described above, it is possible to compare the performance of a particular utility against a set of peers and determine how well or poorly it is doing financially within the industry.

For example, an analysis (and regulatory determination) of a utility's financial health could take into account a number of metrics that reflect the company's ability to raise capital at reasonable rates. Relative to other utilities in a peer group:

- What is the company's credit rating? Does that rating allow the utility to access capital from lenders that only provide debt to high-quality investment grade entities?
- How costly it is for the utility to borrow funds relative to extremely safe bond issuers? Is the utility's bond borrowing spread high relative to other peers?
- What is the utility's dividend policy and payout ratio or yield? Do other utilities offer more attractive dividend payments?
- Does the utility's price-to-earnings ratio provide a favorable investor outlook about the company's overall future financial health?
- Are the company's debt and associated financial liabilities high relative to the value of its equity?
- Is the utility able to access capital from large institutional investors, such as pension funds, or increasingly only from investors with an appetite for high-risk (and costly) investments?

Although those particular metrics need not be the definitive ones to use, such an analysis would provide insights into the utility's health compared to its peers, and the peers' performance on these various financial metrics could provide targets for where the utility should be in order to be viewed as financially healthy.

A healthy financial outlook for a utility would provide predictable returns (including dividend payments to shareholders), improved credit quality, and the ability to access debt and equity capital markets at reasonable cost.

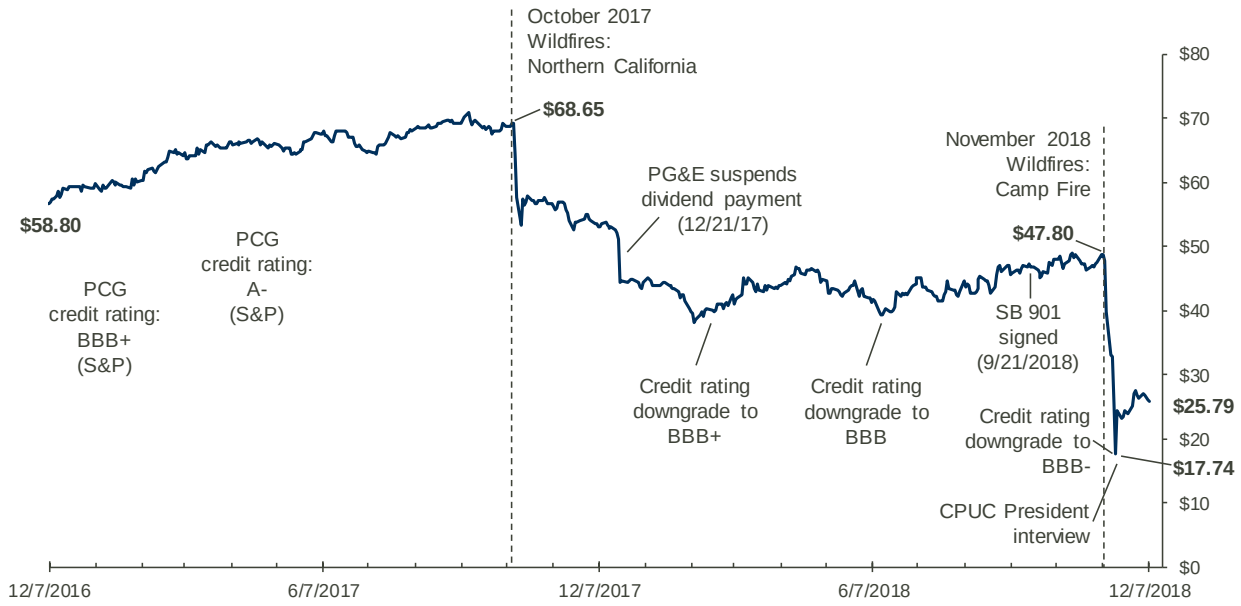
PG&E's Current Financial Condition Relative to Other Electric Utilities in the Post-Wildfire Environment

As described previously, PG&E's investors and management are currently facing an extremely stressed financial situation. Given its unknown liability for the 2017 catastrophic wildfires (covered by SB 901) as well as the 2018 catastrophic Camp Fire (not explicitly covered by SB 901), capital markets are finding the company extremely risky.

Credit Rating Ratings and Stock Prices: For example, PG&E had made substantial progress as of early 2018 in rebuilding its credit rating and financial health over the past 15 years since the company filed for Chapter 11 protection in April 2001 and then emerged from bankruptcy at the end of 2003, and then again attempted to improve its operational, safety and financial performance in the aftermath of the September 2010 natural-gas pipeline explosion in San Bruno. As shown in Figure 11, at the eve of the 2017 Fire Siege, PG&E's (PCG's) credit rating from S&P, for example,

had been upgraded from 'BBB+' (i.e., adequate capacity to meet financial commitments, but more subject to adverse economic conditions) to 'A-' (i.e., strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances). As of the third quarter of 2017, PG&E had made progress in addressing the conditions that contributed to a credit-rating downgrade after the San Bruno accident.

Figure 11 PG&E Corporation (PCG) Stock Price and Timing of Wildfire and Financial Events



Source: Yahoo Finance. "Daily closing price of PCG stock" (adjusted close price adjusted for both dividends and splits). Accessed 3 Dec 2018, https://finance.yahoo.com/quote/PCG/history?period1=1417064400&period2=1543294800&interval=1d&filter=history&frequency=1d .

But after the devastating 2017 Fire Siege, with findings from CAL FIRE that PG&E's equipment had been involved in 16 of the wildfires,[51] PG&E's credit rating was downgraded twice in the first half of 2018. Then further, with the devastating and deadly Camp Fire of November 2018, PG&E's potential financial exposure continued to mount, its stock price dropped by over 60 percent and its credit rating was again downgrade. As of this writing, PG&E has the lowest investment-grade credit rating (e.g., S&P's 'BBB-' rating). On November 15th, 2018, when S&P downgraded the company's credit rating, S&P said that the downgrade:

> reflects the rising risks that PG&E may face from the devastating Camp Fire. While the cause of the Camp Fire is still under investigation, these developments have again elevated contingent risks, pending investigation to determine if the utility's equipment is the cause. This wildfire…has raised additional uncertainties regarding regulatory

[51] CAL FIRE. "Cal Fire Investigators Determine Cause of Four Wildfires in Butte and Nevada Counties." 25 May 2018, http://calfire.ca.gov/communications/downloads/newsreleases/2018/2017_WildfireSiege_Cause%20v2%20AB%20(002).pdf; CAL FIRE. "CAL FIRE Investigators Determine Causes of 12 Wildfires in Mendocino, Humboldt, Butte, Sonoma, Lake, and Napa Counties." 8 Jun 2018, http://calfire.ca.gov/communications/downloads/newsreleases/2018/2017_WildfireSiege_Cause.pdf .

> remedies associated with 2018 wildfires, and as a result capital markets access has been impaired. While we view the company's decision to fully borrow on its revolving credit facilities as prudent given the risks that PG&E is facing, additional clarity on the extent of the financial exposure and available regulatory mitigants will be crucial to restore the company's capital markets access necessary for prudent operational and financial management. Under our base case, we expect that the California Public Utilities Commission (CPUC) will use its authority and new tools under SB 901 to support the company's credit quality, but also recognize that political pressure from public outrage over the wildfires may hamper the CPUC's efforts. Further increasing risk is the company's difficult operational decisions regarding the de-energization of power lines. There is often criticism if a line is de-energized and a wildfire does not materialize. This is exacerbated if a wildfire occurs and the power lines are not de-energized.
>
> These tough decisions will only make it increasingly difficult for the company to effectively operate the electricity grid without raising political pressure. Based on these uncertainties we reassessed the comparable rating analysis modifier to negative from neutral to account for these risks.
>
> Under our base case, we expect that the company will continue to take steps to reduce reliance on external funding in the capital markets. This includes the continued suspension of its stock dividends and some reduction of capital spending so that the company can maintain neutral to positive discretionary cash flow. Furthermore, we expect the CPUC will seek to take the necessary steps to implement SB 901 in a manner that supports an investment-grade rating.[52]

Compared to other investor-owned utilities, PG&E's credit ratings over the post-2017 Fire Siege period stand out in terms of their poor quality. Appendix C lists the Q3 2018 S&P credit ratings for virtually all of the major investor-owned utilities that are either entirely regulated ("R") and mostly regulated ("MR")[53] utility companies. As of the third quarter of the year—and prior to the latest November 2018 downgrade of PG&E's credit rating—PG&E was near the bottom of the list and now sits with a handful of utilities with a rating that is just above speculative grade (i.e., BBB-).

Dividend Performance: As of the 3rd quarter of 2018 (i.e., before the Camp Fire), PG&E (PCG) was the only investor-owned utility in the country that has suspended its dividends. As shown in Appendix D, PG&E ranked at the very bottom of all U.S. investor-owned utilities in terms of the companies' dividend performance, expressed either in terms of dividend yield or dividend payout-ratio. For example, the utility with the highest dividend performances in Q3 2018 was Entergy (with a dividend yield of 4.4 percent, and a dividend payout ratio of 109 percent); by contrast, PG&E had a dividend yield of 0.0 percent, and a dividend payout ratio of 30 percent, behind 40 other investor-owned utilities.[54] (See Appendix D.)

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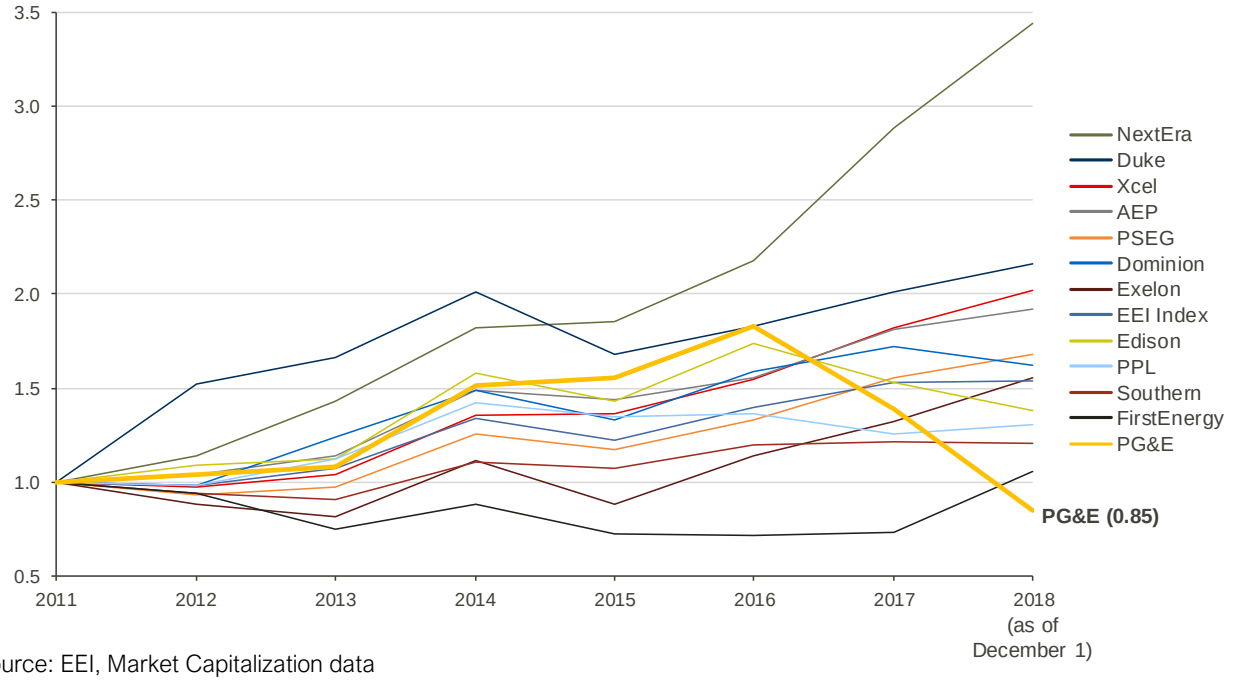
[52] S&P Global Ratings, "PG&E Corp. And Subsidiary Downgraded To 'BBB-" And Placed On CreditWatch Negative on Increased Wildfire Risks." 15 Nov 2018.
[53] "Regulated" reflects investor-owned companies with at least 80 percent of their assets under rate regulation; "mostly regulated" companies are ones with less than 80 percent of their assets under rate regulation.
[54] S&P Global Intelligence,

Profitability: In the post-2017 wildfire period, PG&E's earnings per share have remained relatively stable: $3.76 in 2016, $3.68 in 2017, and an estimated $3.76 as of December 2018.[55] But this has been accompanied by significant degradation in lender and investor confidence, as reflected in PG&E's stock price and credit ratings (see above), and market value (see below).

Market Value (Market Cap): The declines in stock prices that PG&E has witnessed in the past months since the 2017 Fire Siege, have led PG&E's market cap to decline significantly, unlike other investor-owned utilities as a group and unlike some of the best-performing companies. Figure 12 shows PG&E's stock-price trends since 2012, compared to the performance of all investor-owned utilities (as reflected in the "EEI Index" line on Figure 12) and to the stock price trends of several utilities with both high market cap and strong credit ratings. (Figure 12 shows data as of the beginning of December 2018, and indicates the negative effect of the 2017 fires on investors' confidence in the company.)

Figure 12 Investor Owned Electric Utilities' Change in Market Value Since 2011 (Focus: High Market Cap and Strong Credit Ratings as of Q3 2018)



Source: EEI, Market Capitalization data http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/QtrlyFinancialUpdates/Pages/default.aspx and Bank of American Merrill Lynch, Power, Utility & Renewables Update, "Summarizing our coverage universe in Pictures & Tables," December 3, 2018, https://research1.ml.com/Archive/11941980.pdf?w=stierney%40analysisgroup.com&q=ZKmjsgKfaCB8Qf3FbGVlew&__gda__=1544297625_3d0f5ba8da78117ad20e3485e4a02ca8

[55] Bank of America Merrill Lynch, "PG&E Corporation: CPUC Commentary Supportive of Healthy Utilities," November 16, 2018, https://research1.ml.com/Archive/11938174.pdf?w=stierney%40analysisgroup.com&q=oO9OPV-NUWwK-L8kRGy!pg&__gda__=1544388599_e9d0e4850042ffab211dd21284bfcb27. Bank of America Merrill Lynch, Power, Utility & Renewables Update, "Summarizing our coverage universe in Pictures & Tables," December 3, 2018, https://research1.ml.com/Archive/11941980.pdf?w=stierney%40analysisgroup.com&q=ZKmjsgKfaCB8Qf3FbGVlew&__gda__=1544297625_3d0f5ba8da78117ad20e3485e4a02ca8].

Market Value (Price-to-Earnings): Compared to estimates of the utility's P/E performance in the year prior to the 2017 Northern California wildfires—with UBS anticipating a P/E ratio for PCG of 15.4 for 2017 and 14.8 for 2018 as of early 2018[56]—the company's actual P/E ratio declined to 11.1 in 2017 and is estimated to be 12.0 in 2018.[57]

PG&E's Overall Financial Conditions Relative to Healthy Utility Companies: In the post-wildfire period since October 2017, PG&E's financial conditions have significantly deteriorated, not only relative to the progress the utility had been making in improving its conditions in recent years but also compared to other financially healthy utilities. As of the end of September 2017, PG&E had a relatively strong credit rating ("A-"), high market value (market capitalization), and was paying dividends (as shown in Table AA). But only 14 months later, PG&E ranked at the bottom of these utilities in market cap, stock price, price/earnings multiples, earnings per share, credit rating, and dividend payout ratio. With a credit rating in the lowest rung of the investment-grade latter (at 'BBB-'), and with these other weak financial metrics, it will be challenging, costly and risky for PG&E to access the capital market it needs to raise funds for its various public service obligations.

Table 2 Financial metrics for PG&E, compared to vertically integrated, investor-owned utilities with ranking high on market size (value), credit rating, and dividend payouts

Utility Company	Ticker	Mkt Cap ($ MM)	Stock Price ($/share)	P/E Multiple (est. 2018)	Earnings/Share ($ est., 2018)	Credit Rating	Dividend Payout Ratio
PG&E. end Q3 2017 (before 2017 Fire Siege)	PCG	34,794	68.09	-	-	A-	Paying dividends
Duke Energy	DUK	63,414	88.94	18.8x	4.73	A-	4.10%
Southern Company	SO	47,948	47.28	15.5x	3.05	A-	5.20%
American Electric Power	AEP	38,342	77.76	19.7x	3.94	A-	3.40%
Xcel Energy	XEL	27,068	52.66	21.1x	2.49	A-	2.90%
PG&E Corp	PCG	14,087	27.16	7.2x	3.76	BBB-	0.00%
Edison Int'l	EIX	18,646	57.23	14.5x	3.96	BBB+	4.20%
PPL Corp	PPL	22,221	30.88	13.0x	2.37	A-	5.50%
FirstEnergy Corp.	FE	19,573	38.27	15.0x	2.55	BBB	3.80%
Evergy, Inc.	EVRG	15,660	59.44	23.2x	2.56	A-	3.30%
Ameren Corp	AEE	16,870	69.13	20.3x	3.41	BBB+	2.70%
Entergy Corp	ETR	15,801	87.23	12.5x	6.98	BBB+	4.20%
CMS Energy	CMS	14,733	52.00	22.1x	2.35	BBB+	2.80%
Alliant Energy	LNT	10,752	45.57	21.3x	2.14	A-	3.00%
Pinnacle West	PNW	10,036	89.54	20.1x	4.45	A-	0.80%
PG&E: lowest rank among companies as of 12-3-2018?	-	No	**Yes**	**Yes**	No	**Yes**	**Yes**

Source: Bank of American Merrill Lynch, Power, Utility & Renewables Update, "Summarizing our coverage universe in Pictures & Tables," December 3, 2018, https://research1.ml.com/Archive/11941980.pdf?w=stierney%40analysisgroup.com&q=ZKmjsgKfaCB8Qf3FbGVlew&__gda__=1544297625_3d0f5ba8da78117ad20e3485e4a02ca8.

[56] UBS, "PG&E Corporation: Still a Full Plate for 2016," February 19, 2016, https://neo.ubs.com/shared/d1l6ECd25f/.
[57] Bank of America Merrill Lynch, "PG&E Corporation: Sizing the latest charge: Uncertainty reigns," June 21, 2018, https://research1.ml.com/Archive/11941980.pdf?w=stierney%40analysisgroup.com&q=KeRtyCYXKJxJNnLH0fR39Q&__gda__=1544390368_3e2da13fde8a21e2fdef03775169b9d0.

Note that in its December 3, 2018 evaluation of the financial outlook for PG&E, in terms of earnings per share and the P/E multiplier, Bank of America Merrill Lynch stated that it factored in "a $6bn liability, netting out $800mn of insurance, to estimate what is reflected on shares off a 4.0x discount on the base utility reflecting ongoing regulatory risks related to utility operations. In addition, we factor in a $15bn liability for 2018 fires, netting out $1,400mn of insurance proceeds, assuming shareholders are responsible for claims. Risks to our price objective are adverse regulatory outcomes, additional charges related to legacy legal issues, unforeseen natural disasters, such as the California wild fires, interest rate risk, the coming Cost of Capital review post 2019, reversal of state policy goals which would affect projected capital spend and ability to access capital markets."[58]

[58] Bank of America Merrill Lynch, Power, Utility & Renewables Update, "Summarizing our coverage universe in Pictures & Tables," December 3, 2018, https://research1.ml.com/Archive/11941980.pdf?w=stierney%40analysisgroup.com&q=ZKmjsgKfaCB8Qf3FbGVlew&__gda__=1544297625_3d0f5ba8da78117ad20e3485e4a02ca8

The Customer Harm Threshold for Utilities' Recovery of Catastrophic Wildfire Costs

As discussed in detail above, the financial health of PG&E has been significantly weakened by ongoing uncertainty around wildfire recovery. However, the CPUC has an opportunity under SB 901 to resolve some of this uncertainty while continuing to hold PG&E, and other utilities, accountable for maintaining and operating a safe electric system. This section details the role assigned to the CPUC under SB 901 and the ways in which timely action by the CPUC can benefit wildfire victims, utility customers, clean energy investment, insurance markets, and shareholders alike.

California's SB 901 Provisions Relating to Utility Recovery of Catastrophic Wildfire Costs

With respect to the state's utility companies, among other provisions SB 901 enacts changes to the California Public Utilities Code (P.U. Code) 451.1, authorizing investor-owned electric utilities[59] to apply for the recovery of costs associated with the 2017 catastrophic wildfires in instances where their equipment was involved in some way related to fires. The utilities' applications may include the costs associated with the replacement of electrical equipment, compensation for victims of the fire, and increased vegetation management.

In determining whether costs are "just and reasonable," SB 901 directs the CPUC to consider the financial status of the utility company (P.U. Code 451.2). Specifically, the CPUC must conduct a financial stress test for the utility, to determine the maximum amount the utility company can pay "without harming ratepayers or materially impacting its ability to provide adequate and safe service." In effect, this is the "Customer Harm Threshold."

SB 901 anticipates that the utility may need to absorb costs associated with the wildfires that include both "just and reasonable" and other costs. But SB 901 also recognizes that there is a maximum amount of total wildfire-related costs that the utility and its shareholders may absorb without harming customers. Without SB 901, if the CPUC were to disallow the recovery of costs through customer rates, those costs would be borne by the utility company and its shareholders, and if a company's total financial liabilities associated with catastrophic wildfires were to exceed the company's resources, it might be forced to file for Chapter 11 bankruptcy protection. SB 901 seeks to avoid this outcome by allowing for recovery in customers' rates of a portion of wildfire-related costs the utility incurred as a result of the catastrophic wildfires of 2017.

In this context, the President of the CPUC has issued a statement indicating that the CPUC will initiate a rulemaking shortly to implement P.U. Code 451.1 and 451.2 in order to adopt a

[59] An investor-owned utility (IOU), like PG&E, Southern California Edison, and San Diego Gas & Electric, is a publicly traded, private company owned by shareholders and investors, and regulated by the CPUC. IOUs rely on financing from stockholders (investors), the sale of bonds, and borrowing from banks to help finance their operations and investments. Investor owned utility rates are established by the CPUC as to allow the utility to recover its cost and earn a reasonable return for investors.

methodology for interpreting this provision that will be applied in subsequent applications for cost recovery.[60]

The Case for Timely Resolution of the Customer Harm Threshold

Consistent with the spirit of SB 901's timeframe for the CPUC's consideration of a utility's request for cost recovery for 2017 wildfires, there are sound reasons why the CPUC should act as expeditiously as possible to make findings about utilities' (e.g., PG&E's) wildfire-related cost obligations given the magnitude of its potential financial exposure related to the 2017 catastrophic fires in Northern California (not to mention those from 2018).

As a deliberative agency, the CPUC will open a formal docket to consider two core questions: the level of catastrophic wildfire-related expenses that are prudent and, therefore, consistent with just and reasonable rates; and the maximum amount of total fire-related expenses that may be allocated to PG&E rather than to its customers.

As discussed in detail above, a financially healthy utility is critical to achieving PG&E's many public-service responsibilities. PG&E needs this ability to deliver on its normal responsibilities to provide safe and reliable energy, as well to support payment of fire-related claims and to continue to procure renewable energy, invest in energy storage projects, and ready the grid for a growing number of electric vehicles. Continued uncertainties regarding PG&E's financial exposure related to the 2017 wildfires will lead to higher borrowing costs and make it more difficult to attract lenders and equity investors to meet the company's multiple public-service obligations, including paying victims for what they have lost as a result of the wildfires.

Given these capital needs, combined with PG&E's extraordinary financial risks related to fire-related liabilities, many stakeholders stand to benefit from timely resolution of the Customer Harm Threshold by the CPUC. These diverse stakeholders include wildfire victims, PG&E customers, clean energy companies, PG&E shareholders and investors, and California's insurance market. Each is discussed in turn.

Wildfire Victims

Many parts of California are still in the process of recovering from the 2017 wildfires. The damage to personal property was extensive. According to the California Department of Insurance, insurance claims alone exceeded $12 billion, the vast majority of which are located in PG&E's service area.[61] Uninsured losses are likely even higher. Financial markets are pricing in PG&E exposure to 2017 wildfire damages in the range of $17 – $20 billion.[62]

Funds available from PG&E under SB 901—i.e., from PG&E and from its customers—will be used in part to help wildfire victims recover their losses and begin rebuilding their lives. However, the timing and availability of funds for such payments depends upon the ability of PG&E to raise money in debt and equity markets. This, in turn, depends upon action by the CPUC to clarify PG&E's maximum financial liability for wildfire-related costs. A timely resolution of the Customer Harm

[60] Dumoulin-Smith, Julien. "PG&E Corporation: CPUC commentary supportive of healthy utilities; Maintain Buy rating." *Bank of America Merrill Lynch*. 16 Nov 2018.
[61] California Department of Insurance. "California statewide wildfire insurance claims nearly $12 billion." 31 Jan 2018, http://www.insurance.ca.gov/0400-news/0100-press-releases/2018/release013-18.cfm.
[62] Bellusci, Michael. "PG&E, Edison Plunge as Wall Street Weighs California Wildfire Risk." *Bloomberg*. 12 Nov 2018, https://www.bloomberg.com/news/articles/2018-11-12/pg-e-drops-as-analysts-seek-clarity-on-calif-wildfire-exposure.

Threshold should help to accelerate these payments. By contrast, continuing uncertainty surrounding PG&E's financial exposure exacerbates delays in the recovery process for victims.

PG&E Customers

PG&E has a continuing obligation to operate and maintain its system safely and efficiently, making infrastructure investments and operational changes that are needed to provide reliable electricity and gas service. Doing so also requires PG&E to be able to routinely access large sums of capital at reasonable costs. Customers depend upon PG&E meeting its core public-service obligations.

In addition to addressing routine issues on its system, PG&E's investments and operations have to be increasingly responsive to the changing climate conditions in its service territory. Like so many providers of public services, PG&E is taking steps to ensure that its system is resilient to a wide variety of operational risks, including the severe drought conditions, rising temperatures, and wildfire risks that have re-shaped the California landscape. PG&E will need to continue to fund repairs to its system and plan for future potential disasters.

For example, PG&E has dedicated significant funds to vegetation management and to cutting dead and dying trees, as shown in Table 3. These were investments to reduce power outages and wildfire risks. These activities will need to continue in order to continue adapting to the dry conditions in the state and the ongoing threat of wildfire and are integral to the provision of safe and reliable service.

Table 3 PG&E Transmission and Distribution System Investments

Investment Category	**2013-2017**
Vegetation Management – Transmission	$190 million
Vegetation Management (including tree mortality response) – Distribution System	$1.4 billion
Total for Vegetation Management	**$1.6 billion**

Source: PG&E Currents. "Facts About PG&E's Electric Vegetation Management Efforts". 31 Oct 2017

PG&E borrows large amounts of money on multiple occasions each year to make these and other investments in its system. California regulators can help ensure that these investments are made at lowest cost by addressing the Customer Harm Threshold as soon as possible and thereby clarify PG&E's financial liabilities. Without certainty on the Customer Harm Threshold, financial markets and lenders will continue to view PG&E as an investment risk and will price this risk into the costs they charge the company for borrowing money and for using investors' equity.

In large part due to its wildfire cost exposure for the 2017 fires, PG&E's credit rating was downgraded in the Spring of 2018.[63] Rating agencies have further downgraded PG&E's credit

[63] The "credit rating downgrades and Watch Negative reflect PG&E's potential exposure to large third-party liabilities associated with unprecedented 2017 wildfires across large swaths of the utility's service territory and seemingly absent legislative support for recovery of such costs. While the cause of the fires and magnitude of exposure is yet to be

rating in light of 2018 fires, with Moody's lowering PG&E's rating to 'Baa1' in September 2018, and further dropping its rating from 'Baa2' to 'Baa3,' the lowest investment-grade credit rating. Similarly, on November 16, 2018, Fitch downgraded PG&E's credit to 'BBB-,' its lowest investment-grade rating. As recently reported in *Bloomberg*:

> PG&E's grade reflects an exposure of about $10 billion to the 2017 wildfires, and uncertainty around 2018 liabilities, said Moody's, which also reduced the utility's Pacific Gas & Electric Co. subsidiary to Baa2….California's biggest utility said this week it exhausted its credit facilities to boost cash, a move that was widely seen to be in anticipation of a credit rating downgrade, and raising concerns it may have to eventually file for bankruptcy. A California Public Utilities Commission official told investors on a conference call that the agency doesn't want PG&E to go into bankruptcy, according to a person familiar with the matter. The Moody's downgrade affects $18 billion of corporate debt, according to the statement. If PG&E is held accountable for the Camp Fire under California's 'inverse condemnation' law, Moody's expects the company's liabilities will likely exceed PG&E's liquidity reserves and impact its ability to access the capital markets temporarily, the statement said.[64]

This has already affected the rates at which PG&E is able to borrow money. A timely resolution of these risks will help to improve PG&E's credit ratings and overall cost of capital, and could avoid having PG&E rates reflect the higher cost of capital associated with high financial risk exposure.

Clean Energy Investors and Suppliers

PG&E and other electric utilities across the State of California play a central role in helping the state achieve its clean energy- and climate-related goals. This includes direct investment, such as building out a modern electric distribution system to support a growing base of solar systems on customers' premises and the installation of charging stations for electric cars, trucks, and buses. Access to capital markets is key to deploying these investments.

The utility's role also involves spending billions of dollars each year in payments to third-party clean-energy providers on behalf of customers. PG&E's financial health has a large impact on these other parties as well, making it more or less risky and expensive for these counterparties to do business with PG&E and further extending harm across the clean energy industry.

In a letter sent to Governor Brown in May of 2018, for example, a coalition of renewable energy providers wrote that "[r]enewable energy generation and financially healthy [load-serving entities]

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determined, Fitch's rating case assumes $15 billion of third party liabilities will be absorbed by PG&E over 10 years, a scenario consistent with potential liability based on negligence claims if the court does not apply inverse condemnation liability. PG&E's and PCG's creditworthiness would be more seriously challenged if, as in past wildfire incidents, the utility is deemed liable under inverse condemnation." StreetInsider.com. "Fitch Downgrades PG&E Corp. (PCG) to 'BBB+'; Places on Rating Watch Negative." 26 Feb 2018, https://www.streetinsider.com/Credit+Ratings/Fitch+Downgrades+PG%26E+Corp.+%28PCG%29+to+BBB%2B%3B+Places+on+Rating+Watch+Negative/13864008.html; Seeking Alpha. "PG&E downgraded by S&P on wildfire risks." 22 Feb 2018, https://seekingalpha.com/news/3333418-pg-and-e-downgraded-s-and-p-wildfire-risks.

64 McNeely, Allison. "PG&E Credit Cut to Brink of Junk by Moody's on Wildfire Risk." Bloomberg. 15 Nov 2018. https://www.bloomberg.com/news/articles/2018-11-15/pg-e-credit-cut-to-brink-of-junk-by-moody-s-on-wildfire-risk.

are wholly interdependent..."[65] The current electricity market in California is structured such that renewable project developers' ability to secure funding to develop their projects is often dependent on acquiring a long-term power purchase agreement with a utility—in essence, using the security, balance sheet, and good credit rating of a utility as a counterparty to the contract and as guarantor to support revenue streams needed for those developers to repay their loans. Poorer credit ratings for the utility as power purchaser typically translate into higher credit costs and for other forms of security.

Threats to the utility's financial stability can therefore trickle down through the industry. If the utility's credit quality, as a purchaser of power from a third party, is risky, that risk can be transferred to parties in its supply chain. For example, in March 2018, the Topaz solar PV project, a 500-MW operating plant owned by Berkshire Hathaway Energy, was targeted for a potential credit rating downgrade due to investor concerns with its contract purchaser, PG&E.[66]

California's Insurance Market

Continuing uncertainty regarding cost recovery for catastrophic wildfires is also challenging for the insurance markets in California, which are still trying to adjust to the insurance risks attendant in California's changing climate.[67]

The insured losses associated with the 2017 wildfires have been unprecedented in the state's history. According to the California Department of Insurance, statewide total insured losses exceeded $11 billion in residential and commercial claims from the October and December 2017 wildfires.[68] The North Bay fires account for a large share of the losses.[69] Such a large concentration of claims can be difficult for insurers to manage. Recovery from the 2017 Northern California fires has been hampered by "insurers who are overwhelmed by demand and contractors who are overworked and overbooked."[70]

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[65] "Letter to Governor Gerry Brown and other government officials from the Independent Energy Producers Association, California Biomass Energy Alliance, Center for Energy Efficiency and Renewable Technologies, Solar Energy Industries Association, Large-scale Solar Association, American Wind Energy Association California Caucus, California Wind Energy Association, and the Geothermal Resources Council." 7 May 2018, https://www.calwea.org/sites/default/files/documents/Renewable%20Energy%20Trades%20Letter%20regarding%20Wildfires%20FINAL%205-7-18.pdf.

[66] Florio, Mike. "Industry Perspective: A Former Commissioner's Open Letter on Recovering From the California Wildfires." *Green Tech Media*. 26 Jun 2018. https://www.greentechmedia.com/articles/read/a-former-commissioners-open-letter-on-recovering-from-the-california-wildfi#gs.lvlK9NY.

[67] California Department of Insurance. "The Availability and Affordability of Coverage for Wildfire Loss in Residential Property Insurance in the Wildland-Urban Interface and Other High-Risk Areas of California: CDI Summary and Proposed Solutions." Dec 2017. http://www.insurance.ca.gov/0400-news/0100-press-releases/2018/upload/nr002-2018AvailabilityandAffordabilityofWildfireCoverage.pdf.

[68] California Department of Insurance. "California statewide wildfire insurance claims nearly $12 billion." 31 Jan 2018, http://www.insurance.ca.gov/0400-news/0100-press-releases/2018/release013-18.cfm.

[69] California Department of Insurance. "October wildfire claims top $9.4 billion statewide." 6 Dec 2017, http://www.insurance.ca.gov/0400-news/0100-press-releases/2017/release135-17.cfm.

[70] Gorman, Megan. "What California Wildfire Victims Should Know About Insurance And Loss Of Use." *Forbes*. 13 Nov 2018, https://www.forbes.com/sites/megangorman/2018/11/13/what-california-wildfire-victims-should-know-about-insurance-and-loss-of-use/#7ddd204b5423.

According to international provider Swiss RE, the disasters of 2017 were a "wake-up call" to insurance markets.[71] There are risks that insurance providers will begin to offer less coverage in some areas or raise prices to unmanageable extremes.[72]

While such issues are largely if not entirely outside the purview of the CPUC, insurance markets continue to closely watch the outcome of timely regulatory decisions that will lead to utilities' recover damages from utilities and their customers. A resolution can give markets longer lead to adjust and may avoid volatility that makes it harder for victims to recover.

PG&E Shareholders

Uncertainty surrounding cost recovery related to the 2017 (and 2018) wildfires has caused significant volatility and lost value for PG&E shareholders. Timely resolution of the Customer Harm Threshold will go a long way toward answering questions about shareholders' ultimate liability for catastrophic wildfire costs.

Before the October 2017 wildfires, the company's share price (PCG) was at a high of $69.73 on September 15th (see Figure 11). Within a week of the start of the October fires, PCG's stock price had dropped 23 percent (to $53.43 on October 16th). As the financial exposure and uncertainty over cost recovery continued through the winter of 2017 and 2018, PCG's stock price continued to decline. SB 901 provided an opportunity for addressing the financial risk, until the November Camp Fire's devastating impacts led PCG's share prices to a historic decline to $17.74 per share (63 percent drop between November 8th and November 15th), recovering some of its losses when CPUC President Picker provided assurances that it would take steps to ensure cost recovery would be done responsibly. Future volatility and significant investment risk for equity shareholders could be mitigated through timely action.

[71] Ojeisekhoba, Moses. "A wake-up call in uncertain times: Swiss Re." *Intelligent Insurer.* 16 Nov 2018. https://www.intelligentinsurer.com/contributed-article/a-wake-up-call-in-uncertain-times-swiss-re.
[72] Newberry, Laura. "As California fire disasters worsen, insurers are pulling out and stranding homeowners." *LA Times*. 31 Aug 2018. https://www.latimes.com/local/lanow/la-me-ln-wildfire-homeowners-insurance-20180830-story.html.

Business-As-Usual Regulatory Timeline

In a traditional sequencing of regulatory questions, the CPUC might start its investigation of cost recovery for catastrophic wildfires by examining all of the costs themselves, to determine which costs and expenses are "just and reasonable," and only thereafter explore the question of who pays those costs on top of any other disallowances (i.e., only then begin to assess the Customer Harm Threshold question). This traditional regulatory approach could leave PG&E's liability exposure unresolved for many years and greatly inhibit the company's ability to access the capital it needs to pay victim's claims and invest in the state's clean energy goals. That scenario could also lead to a much higher cost of capital for PG&E and its customers.

The "Normal" Regulatory Approach: Timing Implications

Although the CPUC's review of an electric utility's request for cost recovery of extraordinary wildfire costs under SB 901 will be a case of first impression, it is not hard to imagine that a CPUC docket to take up the regulatory issues might adopt the following approach: the CPUC would first undertake a "prudency" review to examine PG&E's fire-related expenses and to determine which ones are prudent and therefore consistent with just and reasonable rates, which ones would otherwise be disallowed and therefore assigned to PG&E to absorb. Thereafter, the CPUC would take up the Customer Harm Threshold question—the financial stress test to examine the maximum amount of fire-related expenses that may be allocated to PG&E rather than to its customers. Important due-process considerations would typically lead to lengthy regulatory proceedings to allow the parties to build the record on which the CPUC would render its opinion.

This approach would mean that the CPUC's investigation of the Customer Harm Threshold question would not begin for a considerable period of time. Such an approach would leave PG&E and the investment community in the position of not knowing the company's maximum financial exposure to catastrophic fire-related costs for several years. This, in turn, would leave capital markets wary of investing in PG&E or providing new debt issuances to the company for that long period of time.

At a minimum, this would continue, if not exacerbate, the current and on-going conditions in which PG&E finds it hard to access debt and equity markets to raise capital at reasonable cost. As discussed in detail above, the potential consequences include delay in PG&E's ability to fund its responsibility to compensate wildfire victims, to make investments and procurements of clean energy resources consistent with California's climate goals, and to undertake the investments and expenditures needed to provide safe, reliable and affordable service to customers.

Interactions with Other Regulatory Proceedings and Decisions

The proceeding under SB 901 will be neither a general rate case, to establish any changes in rates as a result of changes in the utility's revenue requirements, nor a cost-of-capital case, to determine the appropriate rate of return to allow in PG&E's rates. However, determination of the Customer Harm Threshold for PG&E's wildfire-related costs has important implications for these upcoming PG&E filings and CPUC determinations.

PG&E is expected to file its next General Rate Case in mid-December of 2018.[73] It is reasonable to assume that this proceeding will involve consideration of expenses and investments related not only to normal utility service but also to actions to address the effects of changing climate conditions, extraordinary wildfires conditions and responses, and investments in clean-energy activities. It is also reasonable to assume that such investments and expenditures will be affected by uncertainties in PG&E's financial circumstances, as well as the direct and indirect consequences of the utility's financially stressed conditions.

Furthermore, as part of the normal ratemaking process, PG&E is expected to file its cost-of-capital application in the Spring of 2019. This is the proceeding in which the CPUC will determine the appropriate cost-of-capital rate that will be incorporated into the accounting to determine total utility costs, and thus rates for the services that PG&E provides to consumers.

These two proceedings will have their own schedules, but PG&E has publicly presented a schedule that anticipates that the CPUC decision on the Cost of Capital proceeding could occur toward the end of 2019 or beginning of 2020, with the decision on the General Rate Case occurring some time during the second half of 2020. Uncertainty surrounding the Customer Harm Threshold throughout the pendency of the Cost of Capital case would likely lead to higher equity and debt costs than would otherwise occur if that maximum amount of liability to PG&E were known during the period when the record of that case were being built.

[73] PG&E Corporation. "Third Quarter Earnings Call." 5 Nov 2018, http://s1.q4cdn.com/880135780/files/doc_financials/2018/11/Presentation-and-Complete-Earnings-Exhibits-(1).pdf.

Recommendations for the CPUC to Address the Customer Harm Threshold Issue in a Timely Way

Signals that California Regulators and Other Policy Makers Could Send to Capital Markets to Help PG&E Regain Financial Health

In order to help to begin to restore lender and investor confidence in PG&E's financial outlook, the CPUC could send further signals to the capital markets that it intends to take timely action to clarify PG&E's maximum liability for just and reasonable costs associated with the 2017 wildfires. Like the verbal reassurances issued by the CPUC President in mid-2018 that he understood the value of preventing the bankruptcy of PG&E[74]—a statement which somewhat eased the downward spiral of PCG stock prices as of November 16, 2018—commencement of a proceeding to begin to consider the Customer Harm Threshold and with a procedural schedule allowing sufficient due process and timely resolution will send a signal to capital markets that regulators intend to clarify regulatory liability as soon as reasonably possible. This could be done in advance of, or in parallel to, CPUC consideration of what costs incurred by PG&E are just and reasonable.

This would go a long way toward helping to create a platform on which PG&E could take the steps it needs to do to carry out its public-service obligations to provide safe, reliable and affordable electric and gas service, while also providing back-stop insurance and compensation for losses incurred by victims of the 2017 catastrophic wildfires, and supporting California's urgent and important low-carbon energy agenda.

Although the focus of this discussion is on liabilities associated with the 2017 wildfires, because they are the subject of authorities established in SB 901, this focus should not be interpreted as indicating that resolving PG&E's maximum financial liability associated with the 2018 Camp Fire is not equally (if not more) important. The devastating and deadly Camp Fire has wreaked havoc and pain on so many lives, communities, institutions, and natural resources in Northern California. Addressing its financial impacts on PG&E (and other California utilities affected by wildfires in 2018) is critically important for the California legislature, the Governor and the CPUC to address as quickly and reasonably as possible.

What Would Resolving the Customer Harm Threshold in a Timely Way Look Like?

Resolving the Customer Harm Threshold would involve keeping the "time is money" consideration as a guidepost for the CPUC as it develops its procedural approach to resolving this issue.

Doing so could involve several steps undertaken by the CPUC with respect to PG&E's financial liability issues,[75] with inputs from stakeholders:

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[74] Rob Lenihan, "PG&E Stock Soars on Report California Regulator Doesn't Want Bankruptcy," The Street, November 17, 2017, https://www.thestreet.com/investing/pcg-soars-on-public-utility-commissioner-comment-14784313.

[75] This is not intended to suggest that the CPUC would not proceed to examine other critically important issues already on its agenda with respect to PG&E's safety plans and operations, and the company's corporate governance, structure and management considerations. We presume that those issues are high on the CPUC's agenda and will continue to be a focus of the agency's attention.

- *Deciding to focus first on resolving the Customer Harm Threshold, in order to mitigate the adverse effects on stakeholders of continuing uncertainty about PG&E's maximum financial liability for the catastrophic wildfires*. This would involve the CPUC's affirmative decision to take up the Customer Harm Threshold question on a procedural basis either ahead of or in parallel to the CPUC's investigation of the prudency of costs incurred by PG&E as a result of the catastrophic wildfires of 2017 (and 2018, if the CPUC were to decide that it has the authority and the bandwidth to consolidate its review of these issues). Taking this approach would not shortchange consideration of the prudency issues, but would rather identify the maximum amount of any such costs that could be allocated to PG&E and its shareholders, rather than its customers. These prudency issues could be accomplished on a separate schedule, including one whose final determinations could occur after resolution of the Customer Harm Threshold amount itself.
    - The prudency docket could take up issues related to such things as: the definition of "catastrophic wildfires," and the review of costs that were or were not associated with reasonable utility practice as of the time the wildfires took place versus those that occurred in light of negligence or inconsistency with prudent management approaches.
    - Further, the prudency docket could evaluate what it means for a utility to act prudently in the context of a catastrophic wildfire. This could evaluate the role of the utility's equipment, on the one hand, as well as a consideration of extenuating circumstances that turned a fire triggered by utility equipment into a catastrophic event with devastating, deadly and extraordinary damages and costs. For example: But for the occurrence of drought conditions, land-use and development patterns, vintage of buildings relative to fire-resistant building codes, forest-management practices, capacity of evacuation routes, performance of communications systems, and so forth, then there would not be a cause-and-effect relationship between the spark and the catastrophic loss of life, property, and natural resources, and the public health problems from poor air quality resulting from the fires.
- *Understanding the interactions among CPUC dockets related to PG&E's financial conditions, as an input to developing the procedural schedule for the Customer Harm Threshold docket*. First, the CPUC and parties should identify the other CPUC dockets that would stand to benefit from timely resolution of the Customer Harm Threshold. For PG&E, these might include two other principal dockets: (a) the General Rate Case, expected to be filed by PG&E by the end of 2018 and to be investigated by the CPUC over the course of the subsequent 18 months or so (i.e., through mid-2020); and (b) the Cost of Capital case, for which PG&E anticipates a decision as of the end of 2019 or the beginning of 2020. Because the lack of clarity regarding PG&E's financial exposure resulting from the 2017 wildfires (as wells as those in 2018) will adversely affect the company's cost of capital, identifying the amount of money represented by the Customer Harm Threshold before the close of the record in the Cost of Capital proceeding may keep PG&E's cost of capital lower than it would otherwise be. In turn, with that CPUC-approved cost of capital for PG&E reflecting resolution of the Customer Harm Threshold, the revenue requirement for issues affected by the cost of capital would be lower than it otherwise would be in the PG&E general rate case, enabling cost

savings to customers compared to less certain conditions in capital markets persisting throughout the current rate-setting process.

- *Establishing an overall timely procedural schedule for the Customer Harm Threshold.* Based on the insights obtained about the schedules of the other dockets, the CPUC should set the schedule to produce as efficiently as possible a robust and thorough record for the Customer Harm Threshold docket so that it could be completed in time to inform the records of the other dockets.

- *Developing a framework for conducting the Customer Harm Threshold question.* This would include a number of components, such as the appropriate questions to investigate, the types of information that could shed light on what financial health means for a utility, and the types of findings that will need to be made to establish a Customer Harm Threshold. Key topics that could be part of that framework might include:

    - *Defining several relevant concepts relating to how to interpret the statutory direction related to utility financial health and "customer harm."* If the CPUC must determine the maximum amount the utility company can pay "without harming ratepayers or materially impacting its ability to provide adequate and safe service," then part of the CPUC investigation should focus on what "customer harm" means, in such a way that it focuses on customers directly and in terms of the ability of the utility to provide adequate and safe service.

    - *Identifying indicators of financial health for utility companies.* The CPUC might use the type of approach that was previously relied upon by the agency in prior proceedings to identify the financial metrics that could inform regulatory decisions about ratemaking issues that tie to a utility's financial health—either in terms of restoring it and/or maintaining and improving it going forward.[76] The review could identify key financial performance metrics as well as the minimum threshold values for those metrics that are key to enabling the utility to access capital markets. Although not an explicit "cost-of-capital" review and determination, presumably this review could point to the financial performance characteristics of other utilities that are key to their ability to raise debt and equity capital at reasonable rates.

[76] This is roughly akin to the type of analysis of PG&E's financial conditions performed by Overland Consulting on behalf of the CPUC's Consumer Protection and Safety Division in the aftermath of the explosion of PG&E's natural gas pipeline facilities in San Bruno in September 2010. (Overland Consulting, "Financial Analysis of PG&E Corporation Submitted to California Public Utilities Commission's Consumer Protection and Safety Division." 21 Aug 2012. http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Safety/Natural_Gas_Pipeline/News/OverlandStudy.pdf) Overland focused on PG&E's ability to raise capital through equity markets. (Id., p. 1) Overland conducted a comparables analysis, in which it evaluated PG&E "relative to 49 electric and 11 natural gas companies using multiple valuation and financial metrics." (Id., p. 2.) Overland examined various financial metrics for PG&E relative to other investor-owned utility companies by using various metrics including: forward-price-to-earnings and price-to-book ratios (to evaluate the company's stock price relative to a measure of company value); debt-to-equity ratios (to evaluate the strength of companies' balances sheets); and dividend yield (to understand the cash component of the company's return on investment to shareholders. (Id., p 2.) Overland relied on these various analyses to make recommendations about the ability of PG&E to raise equity capital.

- Examples could include: improving PG&E's ability to borrow at reasonable rates by setting targets that would enable PG&E to return to its credit rating prior to the 2017 wildfires (i.e., 'A-' or at least 'BBB+') and to restore dividend payments.
- The criteria for credit quality could be tied to the qualitative and quantitative criteria evaluated by rating agencies to assess the creditworthiness of utility companies (i.e., financial risk (based on traditional financial metrics, including ability to repay debt)[77] and business risk (including market dynamics, as well as regulatory and political support, with the latter taking into account: ratemaking transparency, predictability and consistency; recoverability of all operating and capital costs in full; achievable incentives; balance of stakeholder and customer interest; timeliness of cost recovery; and regulatory independence and insulation from political intervention)).[78]

- *Building a record on utility financial metrics and performance consistent with "utility health" and "customer harm."* With financial metrics in hand, the CPUC could review the record on other utilities' and PG&E's performance to assess and make findings about how much wildfire-related costs the company can absorb in order to move toward financial health.
- *Identifying the dollar value of the Customer Harm Threshold on a timely basis.* Taking the record evidence into account, the CPUC would determine the appropriate financial metrics and then move to apply them in the proceeding so as to determine the maximum amount that PG&E could absorb in order to have the opportunity to restore itself to financial health and to avoid customer harm by providing safe and reliable service.
- *Then moving to a proceeding in which the CPUC would determine how to finance and/or otherwise recover those costs assigned to customers*.

Given the importance to so many stakeholders of resolving this issue in a timely way, it would also involve having the CPUC maintain focus on adhering to the efficient procedural schedule in a disciplined way. Doing so is critical to the ability of PG&E to put itself in a position to raise capital at reasonable cost so as to perform its many public service functions: (a) paying victims' claims related to catastrophic wildfires while (b) ensuring the provision of safe and adequate utility service to its customers and (c) supporting California's ambitious climate and clean-energy goals.

Time is money: The faster that California regulators can determine PG&E's maximum exposure to as many of the wildfire-related costs as possible, the sooner that victim compensation can move forward, and the sooner that PG&E can return to financial health, providing cost-effective electricity service to customers and helping California pursue its clean energy goals.

[77] For these financial risk analysis issues, S&P uses the same methodologies it uses for other corporations that are not regulated utilities. S&P Global. "Utilities Rating Criteria – Americas: Part II." https://www.standardandpoors.com/en_US/web/guest/article/-/view/type/HTML/id/2080139.
[78] See Appendix C for a discussion of credit ratings.

Appendix A: Credit Rating Agencies Scoring Systems

Credit Quality	S&P	Moody's	Fitch	Creditworthiness: Significance of the Rating*
Invest-ment Grade	AAA	Aaa	AAA	S&P: Highest rating. Extremely strong capacity to meet financial commitments. Moody's: Highest quality with minimal risk. Fitch: Highest credit quality, lowest expectation of default risk, exceptionally strong capacity for payment of financial commitments, highly unlikely to be adversely affected by foreseeable events.
	AA+	Aa1	AA+	S&P: Very strong capacity to meet financial commitments. Moody's: high quality and subject to very low credit risk. Fitch: High credit quality, very low default risk, very strong capacity for payment of financial commitments and not significantly vulnerable to foreseeable events.
	AA	Aa2	AA	
	AA−	Aa3	AA−	
	A+	A1	A+	S&P: Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances. Moody's: Upper-medium-grade and subject to low credit risk. Fitch: High credit quality, low default risk, strong capacity for payment of financial commitments (but may, nevertheless, be more vulnerable to adverse conditions).
	A	A2	A	
	A−	A3	A−	
	BBB+	Baa1	BBB+	S&P: Adequate capacity to meet financial commitments, but more subject to adverse economic conditions. Moody's Moderate credit risk, considered medium-grade and may possess speculative characteristics. Fitch: Good credit quality, currently low default risk, adequate capacity for payment of financial commitments (but adverse business or economic conditions are more likely to impair this)
	BBB	Baa2	BBB	
	BBB−	Baa3	BBB−	Considered lowest investment-grade credit rating.
Specu-lative Grade	BB+	Ba1	BB+	S&P: Considered highest speculative-grade by market participants, less vulnerable but faces major ongoing uncertainties to adverse business, financial and economic conditions. Moody's: Judged to have speculative elements and are subject to substantial credit risk. Fitch: Speculative, with elevated vulnerability to default risk, particularly in the event of adverse changes in business or economic conditions over time (however, business or financial flexibility exists that supports the servicing of financial commitments).
	BB	Ba2	BB	
	BB−	Ba3	BB−	
	B+	B1	B+	S&P: More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments. Moody's: speculative and subject to high credit risk. Fitch: Highly speculative, material default risk is present, limited remaining margin of safety, with financial commitments currently being met but is vulnerable to deterioration in the business and economic environment.
	B	B2	B	
	B−	B3	B−	
	CCC	Caa	CCC	S&P: Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments. Moody's: poor standing, and subject to very high credit risk. Fitch: Substantial credit risk; default is a real possibility.
	CC	Ca	CC	S&P: Highly vulnerable, default has not yet occurred, but expected to be a virtual certainty. Moody's: Highly speculative and are likely in, or very near, default, with some prospect of recovery of principal and interest. Fitch: Very high levels of credit risk, with default possible.
	C		C	S&P: Currently highly vulnerable to non-payment, and ultimate recovery is expected to be lower than that of higher rated obligations. Fitch: Near default.
	D	C	D	S&P: Payment default on a financial commitment or breach of an imputed promise, also used when a bankruptcy petition has been filed or similar action taken. Moody's: lowest-rated class of bonds and typically in default, with little prospect for recovery of principal and interest. Fitch: Default.

* S&P Global. "Guide to Credit Ratings: Essentials." https://www.spratings.com/documents/20184/774196/Guide_to_Credit_Rating_Essentials_Digital.pdf.

Sources: S&P Global. spratings.com/understanding-ratings; FitchRatings. “Rating Definitions.” https://www.fitchratings.com/site/definitions; Moody’s. “Rating Scale and Definitions.” https://www.moodys.com/sites/products/ProductAttachments/AP075378_1_1408_KI.pdf

Appendix B: Common Financial Metrics for Characterizing Aspects of Investor-Owned Utility Companies

Credit Rating: A measure of an independent rating agency's assessment of the ability of the entity to attract debt-financed capital and its ability to repay creditors for their loans.

- This is a critical, public, transparent measure of the financial conditions of a company,
- Three entities—S&P, Moody's and Fitch—provide ratings of the creditworthiness of companies: Although they use slightly different methodologies and ratings systems, the agencies use similar terminology to describe a company's credit outlook.
- Credit ratings are typically relevant for the purposes of obtaining capital through loans or issuances of bonds, but they also signal information to equity markets about a company's financial conditions.
- S&P has described the credit-rating tool this way:

  > Credit ratings are opinions about credit risk. Our ratings express the agency's opinion about the ability and willingness of an issuer, such as a corporation or state or city government, to meet its financial obligations in full and on time. Credit ratings can also speak to the credit quality of an individual debt issue, such as a corporate or municipal bond, and the relative likelihood that the issue may default…..
  >
  > While the forward looking opinions of rating agencies can be of use to investors and market participants who are making long- or short-term investment and business decisions, credit ratings are not a guarantee that an investment will pay out or that it will not default. Credit ratings do not indicate investment merit….. They speak to one aspect of an investment decision—credit quality—and, in some cases, may also address what investors can expect to recover in the event of default….
  >
  > Credit rating adjustments may play a role in how the market perceives a particular issuer or individual debt issue. Sometimes, for example, a downgrade by a rating agency may change the market's perception of the credit risk of a debt security which, combined with other factors, may lead to a change in the price of that security. [79]

- All three credit-rating agencies use an alphabetical scale to report on companies' creditworthiness, although the specific ratings are slightly different. Appendix A details the rating scales of Fitch, Moody's and S&P, with a description of the meaning of each rating. Because each of the three agencies differentiates between investment-grade ratings and speculative rates, Appendix A indicates the dividing line between those categories.
- Finally, the ratings agencies examine the creditworthiness of utilities against two categories of risk: financial risk (based on traditional financial metrics, including ability to repay debt) and business risk (including market dynamics, as well as regulatory and political support).
  - S&P, for example, assesses the following issues for a regulated utility's financial risk: accounting issues (with some adjustments for utility-specific issues) and cash/flow leverage

[79] S&P Global. "Guide to Credit Rating Essentials." 2018, https://www.spratings.com/documents/20184/774196/Guide_to_Credit_Rating_Essentials_Digital.pdf, p. 20.

considerations, and makes further adjustments for (a) diversification/portfolio effects, (b) capital structure, (c) liquidity, (d) financial policy, and (e) management and governance.[80]

- Further, S&P's assessment of business risk for regulated utilities includes the macroeconomic conditions in the market, and—significantly—the regulatory climate affecting the utility and its ability to recover its costs. The methodology examines the following criteria for business risk: (a) industry risk; (b) cyclicality; (c) competitive risk and growth, including barriers to entry, level and trends in industry profit margins, risk of product and service and technological substitution, and growth risk; (d) country risk; (e) competitive position, including "regulatory advantage," scale/scope/diversity, operating efficiency, and profitability.
- With regard to the "regulatory advantage" criterion, S&P takes into consideration: regulatory stability (e.g., ratemaking transparency, predictability and consistency), tariff-setting procedures and design (e.g., recoverability of all operating and capital costs in full, achievable incentives, balance of stakeholder and customer interests), financial stability (e.g., timeliness of cost recovery), and regulatory independence and insulation from political intervention "so that the regulator can efficiently protect the utility's credit profile even during a stressful event".
- With regard to "operating efficiency," S&P includes minimizing costs, increasing efficiencies, asset utilization, and "high safety record".

- Thus, credit ratings examine a multitude of issues that are subject to the utility's control and others that less controllable by the utility. The methodology combines these considerations but places a heavy weight on the regulatory environment and the utility's ability to recover its costs (including an adequate return on investment).

Cost of Debt: An indicator of how much interest a firm must pay to take out loans.

- The cost of debt typically reflects the weighted average interest rate charged for a utility's bonds and other forms of actual debt issuances already made by the utility. Utility regulators are familiar with this metric, as it is a fundamental component of the cost-of-capital calculation that establishes the utility's allowed rate of return.
- A utility with a credit rating that has been downgraded (or worsened) since price issuances would expect to face higher interest rates for future issuances. This would be relative to its current cost of debt, and compared to other companies with higher credit quality or relatively low-risk borrowings (such as U.S. Treasury bonds).
- From an investors' point of view, a relatively high interest rate for debt indicates that, all else equal, the firm will need to pay out more of its operating revenues in the form of interest payments.

*Cost of Equi*ty: An indicator of the rate of return that the utility pays to its shareholders to compensate them for the use of (and risk associated with) their capital.

- The cost of equity is a measure of the rate that a company's shareholders will require in the future in order to be willing to provide equity capital to the firm. Utility regulators are familiar with this metric, as it is a fundamental component of the cost-of-capital calculation that they use to establish the utility's allowed rate of return. That said, in capital markets, the cost of

[80] For these financial risk analysis issues, S&P uses the same methodologies it uses for other corporations that are not regulated utilities. S&P Global. "Utilities Rating Criteria – Americas: Part II." https://www.standardandpoors.com/en_US/web/guest/article/-/view/type/HTML/id/2080139.

equity is not the allowed rate of return, but is rather the *actual* rate of return achieved by a company.

- Along with credit ratings, the rate of return on equity is one of the more traditional indicators of a company's financial health. It is the basic measure of profitability and is computed by dividing the company's net income (i.e., after-tax earnings) by the amount of capital (equity) supplied by investors.

Cost of Capital: A measure of the minimum return that debt issuers and equity shareholders together require in order to provide capital to the company.

- In capital markets, the cost of capital reflects the weighted average, or blended, cost of debt and equity. The higher the risk a utility faces in repaying debt and equity, the higher costs that lenders and equity suppliers of capital will charge that utility to access capital. In such markets, the cost of capital reflects actual costs of equity and debt capital.
- In ratemaking proceedings for regulated utilities, this metric is typically used to refer to the regulators' allowed return on equity in conjunction with the cost of debt.

Return on Rate Base: A measure of the utility's allowed return on rate base that is approved by regulators and built into rates charged to consumers

- This metric is unique to regulated investor-owned utilities whose rates are set based on traditional ratemaking principles. Unlike the actual return that a company earns in the market, which reflects the cost of debt and the cost of equity, the return on rate base is similar to the cost of capital.

Debt-to-Equity Ratio: An indicator of a company's financial leverage, based on a comparison of the firm's total liabilities to the value of equity provided by stockholders. (This is, in essence, an indicator of the firm's capital structure.)

- The debt-to-equity (D/E) ratio reflects the relationship between the amount of funds a company has borrowed from lenders divided by the amount of equity provided by shareholders.
- Capital-intensive industries like utility companies tend to have relatively high D/E ratios, compared to companies in many other industries. Therefore, analysts tend to compare the D/E ratios across utility companies to determine whether a particular firm is particularly highly leveraged. Also, when reviewed in conjunction which changing conditions for a particular utility (such as might occur when an event tends to lower the stock price and market capitalization of a company), the revised D/E ratio might indicate whether the company's debt burden is putting the company at financial risk of failing to repay its commitments.

Bond Borrowing Spread: A measure of the cost of the risk of the utility's borrowings (and cost) relative to a "safe" bond (e.g., a Treasury bond).

- This is an indicator of the market's view of the relative risk associated with lending money (or issuing bonds) to the company.

Dividend Payout Ratio or Yields: Indicators of the extent to which shareholders realize actual returns in a time period through the payment of dividends (compared to the total net income of the company).

- The Dividend Payout Ratio is the ratio of the total amount of dividends paid out to shareholders relative to the net income (or earnings) of the company. The amount that is not paid to shareholders is retained by the company to pay off debt or to reinvest in core operations.
- The Dividend Yield reflects the ratio of the dividend payment per share to the company's stock price per share. (It is also calculated as the total annual dividend payments times the

market capitalization of the company, assuming a constant number of shares in the market.) This metric provides an indication of the utility's performance in returning profits to shareholders through cash payments rather than through reinvestment in the company.

Stock Price: A measure of how investors value a share of the firm's ownership at any point in time, over time, and in comparison to other stocks.

- At any point in time, the price reflects investors' views of the value of the company, with the price per share of common stock times number of shares issued into the market providing the basic calculation of the company's market capitalization (or value).

Price-to-Book Ratio: A measure of investors' views of a firm's potential to earn a rate of return that exceeds the book value of the company.

- This metric is calculated as the market price of a share of common stock divided by the book value of a share in the company. It is an indicator of the market's view of the financial health of a company, relative to itself over time and relative to other investments. If reflects investors' expectations about future returns relative to the historic cost value of the company.

Price-to-Earnings Ratio (*sometimes called the earnings multiplier*)*:* An indicator of the relative attractiveness of a firm's stock price compared to its earnings.

- This metric, commonly referred to as the P/E ratio, is calculated by dividing the current market price of the stock by the company's earnings per share (EPS). It reflects the amount an investor is willing to pay to get a dollar of earnings.

Investor Mix: An indicator of the extent to which investors with an appetite for risk (e.g., hedge funds) are investing in the firm.

Appendix C: S&P Credit Ratings Distribution for Regulated ("R") and Mostly Regulated ("MR") Investor-Owned Electric Utilities (2018 Q3)

Source: Edison Electric Institute ("EEI"), Credit Ratings, Q3 2018. http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/QtrlyFinancialUpdates/Pages/default.aspx.

Company	2018 Q3	Score	12/31/2017
Eversource Energy	A+	22	R
Berkshire Energy Holdings Company	A	21	MR
Alliant Energy Corporation	A-	20	R
American Electric Power Co., Inc.	A-	20	R
CenterPoint Energy, Inc.	A-	20	MR
Consolidated Edison, Inc.	A-	20	R
Duke Energy Corporation	A-	20	R
Evergy, Inc.	A-	20	R
NextEra Energy, Inc.	A-	20	MR
Pinnacle West Capital Corporation	A-	20	R
PPL Corporation	A-	20	R
Southern Company	A-	20	R
Vectren Corporation	A-	20	R
Wisconsin Energy Corporation	A-	20	R
Xcel Energy Inc.	A-	20	R
ALLETE, Inc.	BBB+	19	MR
Ameren Corporation	BBB+	19	R
AVANGRID, Inc.	BBB+	19	MR
Black Hills Corporation	BBB+	19	R
CMS Energy Corporation	BBB+	19	R
Dominion Energy, Inc.	BBB+	19	MR
DTE Energy Company	BBB+	19	MR
Edison International	BBB+	19	R
Entergy Corporation	BBB+	19	R
MDU Resources Group, Inc.	BBB+	19	MR
NiSource Inc.	BBB+	19	R
OGE Energy Corp.	BBB+	19	R
PNM Resources, Inc.	BBB+	19	R
Portland General Electric Company	BBB+	19	R
Public Service Enterprise Group Inc.	BBB+	19	MR
Sempra Energy	BBB+	19	MR
Unitil Corporation	BBB+	19	R
Avista Corporation	BBB	18	R
El Paso Electric Company	BBB	18	R
Exelon Corporation	BBB	18	MR
FirstEnergy Corp.	BBB	18	R
IDACORP, Inc.	BBB	18	R
IPALCO Enterprises, Inc.	BBB	18	R
NorthWestern Corporation	BBB	18	R
Otter Tail Corporation	BBB	18	R
PG&E Corporation	BBB	18	R
Cleco Corporation	BBB-	17	R
DPL Inc.	BBB-	17	R
Hawaiian Electric Industries, Inc.	BBB-	17	MR
Puget Energy, Inc.	BBB-	17	R
SCANA Corporation	BBB-	17	R

Appendix D: Dividends Summary: U.S. Investor-Owned Utilities as of Q3 2018 (ranked by Dividend Payout Ratio)

Company Name	Dividend Payout Ratio	Dividend Yield	Last Action			
			Direction	To	From	Announce Date
Entergy Corporation	109.0%	4.4%	↑	$ 3.56	$ 3.48	2017 Q4
FirstEnergy Corp.	107.6%	3.9%	↓	$ 1.44	$ 2.20	2014 Q1
NiSource Inc.	88.4%	3.1%	↑	$ 0.78	$ 0.70	2018 Q1
Avista Corporation	83.4%	2.9%	↑	$ 1.49	$ 1.43	2018 Q1
PPL Corporation	78.6%	5.6%	↑	$ 1.64	$ 1.58	2018 Q1
Hawaiian Electric Industries, Inc.	74.7%	3.5%	↑	$ 1.24	$ 1.22	1998 Q1
Evergy, Inc.	74.0%	3.4%	↑	$ 1.84	$ 1.60	2018 Q3
Dominion Energy, Inc.	71.6%	4.8%	↑	$ 3.34	$ 3.08	2018 Q1
Ameren Corporation	70.5%	2.9%	↑	$ 1.83	$ 1.76	2017 Q4
CMS Energy Corporation	69.1%	2.9%	↑	$ 1.43	$ 1.33	2018 Q1
Sempra Energy	68.8%	3.1%	↑	$ 3.58	$ 3.29	2018 Q1
PNM Resources, Inc.	68.6%	2.7%	↑	$ 1.06	$ 0.97	2017 Q4
ALLETE, Inc.	66.8%	3.0%	↑	$ 2.24	$ 2.14	2018 Q1
Duke Energy Corporation	66.5%	4.6%	↑	$ 3.71	$ 3.56	2018 Q3
Vectren Corporation	65.6%	2.5%	↑	$ 1.80	$ 1.68	2017 Q4
Unitil Corpora/tion	64.5%	2.9%	↑	$ 1.46	$ 1.44	2018 Q1
Otter Tail Corporation	64.3%	2.8%	↑	$ 1.34	$ 1.28	2018 Q1
Portland General Electric Co.	63.5%	3.2%	↑	$ 1.45	$ 1.36	2018 Q2
Southern Company	62.7%	5.5%	↑	$ 2.40	$ 2.32	2018 Q2
Pinnacle West Capital Corp	61.4%	3.5%	↑	$ 2.78	$ 2.62	2017 Q4
Eversource Energy	61.0%	3.3%	↑	$ 2.02	$ 1.90	2018 Q1
American Electric Power Co, Inc.	60.9%	3.5%	↑	$ 2.48	$ 2.36	2017 Q4
Alliant Energy Corporation	60.7%	3.1%	↑	$ 1.34	$ 1.26	2017 Q4
El Paso Electric Company	59.9%	2.5%	↑	$ 1.44	$ 1.34	2018 Q2
Xcel Energy Inc.	58.6%	3.2%	↑	$ 1.52	$ 1.44	2018 Q1
Edison International	57.7%	3.6%	↑	$ 2.42	$ 2.17	2017 Q4
NorthWestern Corporation	56.3%	3.8%	↑	$ 2.20	$ 2.10	2018 Q1
WEC Energy Group, Inc.	53.4%	3.3%	↑	$ 2.21	$ 2.08	2017 Q4
MDU Resources Group, Inc.	52.4%	3.1%	↑	$ 0.79	$ 0.77	2017 Q4
Consolidated Edison, Inc.	52.3%	3.8%	↑	$ 2.86	$ 2.76	2018 Q1
AVANGRID, Inc.	51.9%	3.7%	↑	$ 1.76	$ 1.73	2018 Q3
DTE Energy Company	51.9%	3.2%	↑	$ 3.53	$ 3.30	2017 Q4
IDACORP, Inc.	51.3%	2.5%	↑	$ 2.52	$ 2.36	2018 Q3
MGE Energy, Inc.	44.2%	2.1%	↑	$ 1.35	$ 1.29	2018 Q3
Public Service Enterprise Group	40.7%	3.4%	↑	$ 1.80	$ 1.72	2018 Q1
OGE Energy Corp.	40.3%	4.0%	↑	$ 1.46	$ 1.33	2018 Q3
SCANA Corporation	39.1%	1.3%	↓	$ 0.49	$ 2.45	2018 Q2
NextEra Energy, Inc.	38.7%	2.6%	↑	$ 4.44	$ 3.93	2018 Q1
Black Hills Corporation	34.7%	3.3%	↑	$ 1.90	$ 1.78	2017 Q4
Exelon Corporation	34.5%	3.2%	↑	$ 1.38	$ 1.31	2018 Q1
CenterPoint Energy, Inc.	30.3%	4.0%	↑	$ 1.11	$ 1.07	2017 Q4
PG&E Corporation	23.6%	0.0%	↓	$ -	$ 2.12	2017 Q4
Industry Average	**60.3%**	**3.4%**				