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California Fire and Power

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Once again, wildfires have caused catastrophic property losses in the late Californian summer, but loss of life is much lower than last year, possibly because of radical mitigation measures including the widespread use of deliberate blackouts to avoid ignition by power lines and related equipment.

Causes of Fire Ignition

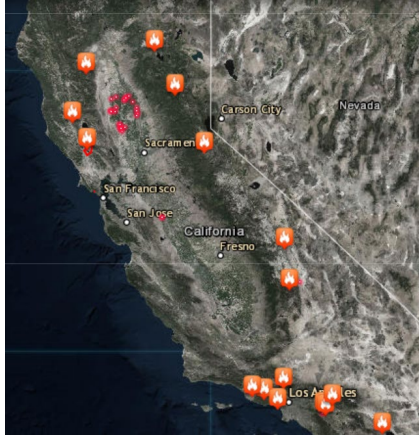
In the United States, about 84% of wildfires are caused by human activity or equipment, with the remaining 16% caused by lightning. 95% of the fires that the California Department of Forestry and Fire Protection (Cal Fire) responds to are caused by human activity.

The largest cause of wildfires is electric power lines and related equipment. Pacific Gas & Electric (PG&E) transmission lines caused the 2018 Camp fire in Northern California, which razed 90% of the town of Paradise, killed 86 people and destroyed more than 13,900 houses. This loss was the reason PG&E declared bankruptcy based on an estimated liability of \$30 billion for fires in 2017 and 2018 ([RF Briefing Note 372](#); see also [Briefing Note 375](#)). Sceptics have pointed out that, with stable revenue from electricity and gas subscribers, bankruptcy was declared to shield the company from its liabilities. California Governor Newsom implied on 1 November 2019 that the State may become involved in the restructuring of PG&E. Some of the largest fires in Southern California's history were also caused by power lines: Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E).

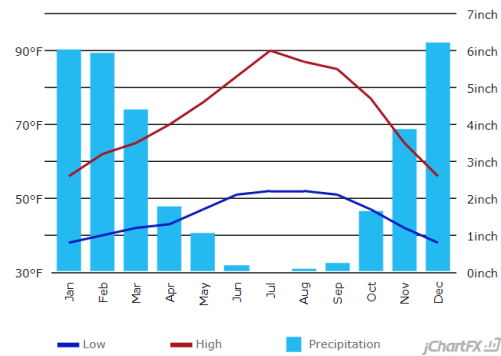
Other causes of fires are sparks from vehicles and other equipment. The Carr fire in Trinity and Shasta counties, which killed 8 and destroyed more than 1,600 structures, was caused by sparks from a wheel rim exposed by a flat tyre. Failure to fully extinguish the Berkeley–Oakland Hills fire in 1991 resulted in it blowing out of control, killing 25 people and destroying over 2,200 structures. Camp fires are another cause, and two small fires lit by a lost deer-hunting hiker in southern San Diego County resulted in 15 deaths and the loss of over 2,300 structures. Arson is a rare cause of large fires in California.

Changes in the Frequency and Size of Fires

All ten of the largest fires in California have occurred since 1991. This is attributable, in part, to the increased numbers of houses located in regions of high fire hazard. However, in the past few years the winter rains (from storms originating in the Gulf of Alaska), that used to begin in late September (Figure 1), have been delayed by a month or more, which may be attributable to climate change. This has extended the fire season into October and, this year, into early November. The headline in an opinion article in the New York Times (2019) warned that "It's the end of California as we know it" and declared that "at the heart of California's rot" is the "failure to live sustainably." The Atlantic (2019) wrote that "California is becoming unliveable."



Fires burning on 3rd November 2019 in California (Channel 4 TV)



Temperature and rainfall for Sonoma County, California. Source: LA Times and ChartFX.

Mobile Phone Outages

According to the San Francisco Examiner on 4 November 2019, “As the lights flickered out and wildfires flared, PG&E’s blackouts also cut off thousands of Californians from cell phone service, leaving them unable to get emergency alerts or call 911. It exposed a troubling gap in the state’s readiness for mass outages that could, according to PG&E, keep happening for a decade. And it’s left regulators scrambling to find a fix — though it will be difficult. Neither California nor the federal government requires cell phone towers to have backup power, even though network service is a critical part of modern life. Instead, maintaining service is left up to cell phone companies, which have generators lasting days at some sites but batteries which can survive just a few hours at others. When those run out, they must send trucks to refuel or install generators, at times when fires may cut off roads, blackouts darken traffic lights and their own outages hamper communication. Companies said their personnel worked around the clock to put in place hundreds of generators during PG&E’s unprecedented and fast-changing power outages, but in some cases they couldn’t access sites because of the location — on top of buildings or in fire evacuation zones. They’re pledging to prevent future problems. But regulators, politicians and emergency response agencies are pushing for stricter rules to protect public safety.”

Fire Mitigation by Electric Power Companies

Responding to the declaration of bankruptcy by PG&E in 2019 following the fires in 2018, the major public utilities have engaged in intentional blackouts, to varying degrees, as a means to reduce fire ignition. These measures range from:

- no blackouts (Los Angeles Department of Water and Power, which admits that a branch blown from a eucalyptus tree onto its power lines ignited the Getty Fire beside the iconic Getty Museum)
- tightly targeted blackouts (in San Diego by SDG&E)



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- less targeted blackouts (in Los Angeles by SCE) and
- large scale blackouts (in Northern California by PG&E instigating power outages for days and risked the health of people requiring power for medical support equipment)

The question of when to turn the power back on was highlighted by the outbreak of the Maria Fire 13 minutes after SCE turned the power back on in Ventura County on November 1. SCE is not yet conceding its fault but has announced that its electrical equipment will probably be found to be associated with the Woolsey fire of 8 November 2018, which burned more than 1,500 structures in Los Angeles and Ventura Counties and killed 3 people.

Financial Management of Fire Losses

In its quarterly earnings report, SCE disclosed that various fire and mudslide events could result in a liability of \$4.7 billion, of which \$1.8 billion will be borne by shareholders after insurance and other offsets. But in the company's third-quarter earnings call last week, Edison International President and Chief Executive Pedro J. Pizarro said it was adequately prepared for the blow, saying on 1st November 2019 that the company "understands this is a difficult time for the many people who are being impacted. The company's top priority is the safety of customers, employees and communities, which is why we continue to enhance our wildfire mitigation efforts through grid hardening, situational awareness and enhanced operational practices."

The protocols for shutting down power are outlined in SCE's 2019 Wildfire Management Plan. Incident management teams, that include meteorologists, base the decision on wind speeds, humidity and temperature, fuel moisture and fuel loading. Other less prescriptive considerations may include the potential effect on customers and communities, alternative ways to reroute power, the progress of the customer notification process and situational awareness from weather stations. The length of time customers are without power is one factor that may be considered in the decision to restore power. The plan states that, "The order in which circuits are re-energized will depend on many factors including, but not limited to, customer safety and well-being, consideration of affected essential services, damage to electrical and other infrastructure, and circuit design/topology." Before power is restored, field crews inspect the lines for "any condition that could potentially present a public safety hazard when re-energizing circuits."

The duration of a power outage can matter in small and large ways. Food may last only four hours in a closed refrigerator, while frozen food could last a day or two (depending on how full the freezer is) as long as the door stays shut most of the time. For those dependent on medical equipment requiring rechargeable batteries, time can be critical. SCE's plan says it maintains a list of those customers and contacts them individually before a shutdown. If unable to confirm the notification, field representatives go to the customer's house.

References

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