

The Harmful Effects of PG&E's Tree Removal Practices and Recommended Alternatives to Prevent Utility Wildfires

By Sierra Club California's Utility Wildfire Prevention Taskforce

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EXECUTIVE SUMMARY

Electric power safety must become the top priority for PG&E as it continues to cause ever more devastating wildfires, most recently the Dixie Fire. The science is available through technical advancements that would render wildfires from utility lines a thing of the past, including multi-function protection relays (computerized circuit breakers) that remotely shut down feeder circuits by detecting electrical faults that would spark and create wildfires and remotely provide the location for rapid repair. These are available from internationally respected engineering companies -- tested and shelf-ready for installation. PG&E's ill-managed attempt at using Reclosers to do a job they are not designed for is causing unnecessary outages, endangering affected residents and businesses unnecessarily. Additionally, now proving to be the best in mitigating wildfire ignition drivers, is a steel-core, triple-insulated conductor with a reliable lifetime of over four decades.

Instead of modernizing its antiquated infrastructure, PG&E has chosen to cut down even healthy, mature trees within its right-of-way (ROW), as well as millions of trees on private properties far from the ROW but within strike distance of the powerlines. This has gone to further extremes after wildfires. Property owners have the right to privacy and should receive

Notice and Consent, and compensation for damaged property. However, while guaranteed in Public Resource Code 4295.5(a)(b), there is no process for this: there is no permission request required, no owner oversight or required written descriptions of proposed work, no provision for alternative suggestions or expert testimony, no defined right to refuse, or provision for payment for damages. This needs to change. Additionally, there are multiple definitions for “Hazard/Damage” trees used by different agencies, different certified arborists, or utility-trained inspectors, that need to be replaced with one definition. Significantly, there is no California native-tree-species-education or experience requirements -- no less species’ specific fire response training -- for certified arborists. This results in destruction of healthy trees, especially post-wildfire, exacerbating climate change. Finally, for decades PG&E has lobbied for and influenced legislation and public opinion toward tree removal, building the mythology of its effectiveness so few question it, when the problem is not the trees—it is the antiquated equipment long-past its lifetime and PG&E’s failure to have comprehensively modernized thousands of miles of outdated, unsafe infrastructure, even in High Fire Threat Areas.

Solutions *are* available, being implemented, and providing cost-effective, reliable power while mitigating wildfires. PG&E should be held to these standards.

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ACRONYMS

BOF	Board of Forestry
CPUC	CA Public Utilities Commission
EVM	Enhanced Vegetation Management (program)
FPR	Forest Practice Rules
ISA	International Society of Arboriculture
LTO	Licensed Timber Operator
NOV	Notice of Violation
PG&E	Pacific Gas and Electric Company
RPF	Registered Professional Forester
ROW	Rights of Way
WMP	Wildfire Mitigation Plan
WSD	Wildfire Safety Division
WUI	Wildland-Urban Interface

INTRODUCTION

What started with carrier pigeons delivering brief and lightweight messages, to lanterns in Boston's Old North Church in 1775 signaling the British Army's direction of march, to stage coaches, carriers, and the pony express, led to the first telegraph wire demonstration in 1843 by Samuel Morse. Morse Code proved faster and more efficient and brought about the first telegraph wires on utility poles from Washington D.C. to Baltimore and back on May 24, 1844 (CPUC 2017). Since that time the US has been strung up from coast to coast, north to south, and messages are sent around the globe via electronics. There are three large private investor-owned utility companies in California: PG&E has 16 million people in its service area, Southern California Edison has 15 million, and San Diego Gas and Electric supplies power to about 3.6 million customers in San Diego County. There are numerous small private electricity companies, and the rest are publicly owned. All of these companies are under the umbrella of the California Public Utilities Commission (CPUC) which, among other duties, is responsible for regulating electricity rates.

Since the early days of stringing electrical wires in California, the technology has evolved. Yet utilities have not been consistently required to adopt technological improvements that are proven to prevent wildfires – to both improve safety and reliability, leaving thousands of miles of bare antiquated power lines threatening forest, farms and cities.

In California, single-strand copper wires were first strung on wooden poles in 1916 (First Electricity in Los Angeles). As per a CPUC 2017 General Rate Case Liberty Consulting Report [Liberty, 2013], there remain 22,000 circuit miles of single strand copper wires throughout the state. In the 1950's aluminum cable came into use. Like the copper wires, the aluminum cable was uninsulated and made in various sizes.

Small diameter, uninsulated aluminum cable is considered dangerous in coastal areas due to corrosion from salt and moisture. Nevertheless, it is the standard for utility cable and is used widely everywhere, including along California's coastlines. Near some state parks "tree wire," with a single layer of insulation, has been installed. Wire insulation that is resistant to UV light and to conductive heating has improved dramatically in the last two decades. *The current standard in the United States for insulated conductor cables is aluminum cable steel reinforced (ACSR) that is triple insulated with hydronic tubing made from polyethylene plastic (XLPE) and other modern materials and lasts for a minimum of 40 years of service.* PG&E has failed to adopt this standard, unlike Southern California Edison (SCE) and other Investor Owned Utilities (IOU's).

Computerized circuit breakers, called circuit protection relays, are available on the electrical engineering market. These devices automatically detect numerous different types of electrical faults and then rapidly interrupt (switch off) electrical current. This relatively recent form of circuit safety offers a dramatic improvement against wildfire ignition and electrocution. However, this safety improvement has been essentially ignored by the CPUC. The CPUC and its Wildfire Safety Division (WSD) incorrectly refer to this gear as "pre-commercial." Other very rapid reacting circuit safety systems are currently under testing and development. But again,

there is no pressure coming from the CPUC for utilities to use this new class of safety equipment.

In the past 20 years, climate change has also begun to manifest with consecutive drought-ridden years interspersed with occasional high-rain years. California faces severe drying of grasslands and forests with occasional large rain events that lead to floods and slumping of hillsides on fragile slopes. Anthropogenic-caused fires and unusual lightning storms are wreaking havoc in forested areas, grasslands, and chaparral in wildland-urban-interface (WUI) areas and even decimating whole or portions of towns. This problem is exacerbated by private utility companies not utilizing the latest wires for protection of public and private landscapes, causing further sparking and extended wildfires. In addition, while these same utility companies are sued for wrongful deaths and loss of homes and habitat, they have chosen to pay their stakeholders instead of updating their infrastructure. Instead of updating and protecting forests and other natural landscapes, they now seek to have exemptions beyond their rights of way (ROW) to cut down private property trees, including Old and Heritage Trees, they deem “Hazard/Danger trees” that may fall on their wires. Thus, private landowners lose land equity, scenic vistas, and are in many circumstances made to pay for the cleanup following the loss of their trees.

I. CIRCUIT SAFETY

Pacific Gas and Electric (PG&E) has over 124,000 miles of power lines in California, more than 18,000 miles of longer-distance transmission lines and more than 106,000 distribution lines. Utility distribution circuits, those connected directly through transformers to homes and small businesses, are the most abundant of all utility overhead wiring. Transmission circuits have much higher voltages, from 60,000 to 230,000 volts and higher. These transmission circuits cross natural landscapes, including forests, independent of streets and roads. They run to substations where the voltage is converted to distribution voltage. PG&E’s 124,000 miles of overhead distribution circuits, have been “run to failure” for decades. At least 7,000 miles or antiquated power lines are in High (Utility-Associated) Fire Threat Districts (HFTD’s) and should be totally modernized for safety and reliability.

Use of bare uninsulated wire is inherently dangerous for wildfires, especially in forests, chaparral, and grasslands. Any type of debris that falls across two of the standard three conductors (wire or cable) will cause a hot, possibly explosive, arc fault. This fault is a very hot bright flash of high voltage electricity similar to a welder's arc. At high voltages, electricity can travel across any material, both conductive and non-conductive, more easily than electricity can arc through the air. When this happens, a fault current is sent between two out-of-phase conductors. This type of fault regularly occurs during windstorms when power conductors swing close together in the wind. They can create a lightning bolt between them without touching, or actually touch. The problem also results from animals on power poles, from mylar party balloons landing on uninsulated jumper connections and main conductor cable/wire at power poles, and from general equipment failures. Small diameter uninsulated wires can burn though and either fall to earth hot energized, or drop fire igniting molten metal onto grasses and dry vegetation.

The fire safety of overhead power circuits can be divided into two issues. One is the tensile strength and insulation of the conductors. This includes the short sections of wire, cable, or conductive metal that bridge between main conductors, transformers and fuses at power poles. In this sense the issue of the primary conductors and the general design of power poles are directly linked. A Report [Liberty, 2013] commissioned by the CPUC indicated that PG&E retained in service about 22,000 circuit miles of obsolete 6-gauge (#6 AWG) bare copper wire (0.14 inches in diameter) as primary overhead conductor. This obsolete wire also sets the tensile strength standard for all distribution conductors in CPUC code. If one of these wires is going to break, the weaker the wire the more likely it will break in a storm and may fall arcing to the ground.

The second issue is circuit protection. "Protection" refers to devices that interrupt or shut down current flow in the event of electrical faults – in essence, computerized circuit breakers. A fault is defined as any problem that arises in an electric circuit. Common faults are over-current (or overload), conduction between phases due to equipment failures, lightning strikes, debris and tree branches that make contact and bridge between uninsulated conductors, and animals that get onto power poles with uninsulated connections. There are also less-common faults such as phase imbalance, failures of cable splices, circuit grounding faults, and others not as statistically important that don't occur as frequently.

The common types of circuit protection, long in use, are limited to overcurrent "burnout" fuses and reclosers. A recloser is an electromechanical thermal circuit breaker designed to automatically reclose or re-energize a circuit to test if the fault that caused the recloser to open has cleared or resolved. An example of this situation is a line slap where uninsulated cables swing together in high wind causing a transient fault. Reclosers are inherently dangerous devices that were adopted for convenience and not for safety. Their re-energizing exacerbated wildfire spread in the 2018 wildfires. Thus, reclosers are now required to be disabled from reclosing during fire seasons. Like fuses, reclosers can only react to overcurrent faults.

The advent of small robust computers has made possible an entire new class of circuit protection based upon the ability of computers to automatically detect and react to faults at very high speeds. Computers "watch" the circuit for specific waveform signatures that distinguish various electrical faults. Computers are necessary because power circuits are filled with complex wave form noise from all the activity occurring at every connection point in the circuit, such as motors turning on and off, small arc welders, electrical heaters, and other equipment in use at every location. Protection speed is a crucial safety issue for fire ignition and electrocutions. This dramatic safety improvement is the ability to detect and react to previously undetectable faults, as explained in the following paragraph.

When a single conductor (wire/cable) breaks and falls to earth without making contact with another conductor, this causes a "high impedance arc fault." This is a common occurrence with small, weak strength wire. This is also called the "wires down" hazard. The earth is a poor conductor of electricity, so these downed conductors do not trip (burn out or activate) utility

fuses or reclosers. Consequently, these deadly electrocution hazards and fire igniting downed wires remain hot and energized. This is a problem that no legacy, old design, equipment can protect against. These high impedance arc faults can continue arcing for hours, or even days, until the circuit is manually de-energized by a lineman who pulls open a fuse on the circuit after a 911 call. This was demonstrated clearly in wildfire ignitions that became devastating wildfires.

Outside of its substations, PG&E has no remote control. It cannot shut down a branch circuit without driving to that location and turning it off by hand. The utility's workers presumably are able to remotely shut down feeder circuits at substations. Schweitzer Engineering [SEL-751] and General Electric [Multilin F60] both manufacture multi-function protection relays to guard against this and additional circuit safety problems. These automatic devices have been available for at least 15 years and can be installed in substations or on power poles depending on their design. No California utility, that we know of, has begun a full installation of this readily available safety equipment because there is no direction from regulators to use it.

Utility engineering, or how electric power systems work, is a mystery to most people. This fact has resulted in a situation where safety innovation is delayed for purely financial reasons. To add to this mystery, PG&E is not forthcoming in providing access to the circuit maps showing where the different types of wire exist in California. Neither do they provide a timeframe for upgrading circuits—where and with what kinds of equipment. Transparency, along with updates on accomplishments were conditions put into PG&E's Wildfire Mitigation Plan (WMP) by the WSD. After declaring bankruptcy, PG&E is also seeking a \$1 billion rate increase, putting future tree removal costs on the backs of rate payers.

For a power utility to operate safely it must have the ability to rapidly shut down an electrical circuit experiencing any type of electrical fault. There is no technical reason why these improvements cannot be made to transmission circuits in addition to distribution circuits. California can accept no more delays to these technical advancements in utility wildfire safety.

II. INCURSION ONTO PRIVATE LANDS

Notice and outreach to owners of intended PG&E vegetation management onto the owner's property is lax at best. Often generic door hanger signs are left at the property owner's residence making reference to upcoming maintenance or safety work, and sometimes a brochure is mailed. It is common for owners to learn about PG&E planned tree work on their properties only after the work has been completed and their trees have been removed. This practice has been increased significantly since wildfires have become every-increasing in number and scope.

Misrepresentations and scare tactics are often used. PG&E commonly tells property owners that PG&E has the right to remove any tree tall enough to strike a power line, that the property owner has to give Consent and if the owner refuses, they could be held liable for damages resulting from an equipment-related fire. Only if the property owner resists and refuses to consent will a PG&E supervisor come inspect the trees. It was not uncommon for the

majority of trees that had been marked for removal by one of PG&E's arborist employees to have been taken off the list at this stage. Property owners who hire their own Certified Arborists or Registered Professional Foresters (RPFs) to inspect their trees have often found the vast majority of trees marked for removal have no defects that rise to the level of being Hazard/Danger trees, which are typically defined as, "Dead, Dying, or Diseased." PG&E is, however, becoming more aggressive, both with the trees it is marking for removal and its occasional hardball tactics to down trees, particularly in relation to their Enhanced Vegetation Management (EVM) [PG&E-EVM] and its continuing attempts to mitigate wildfires through EVM.

PG&E's criteria for marking trees to remove or top appears to be based primarily on the height of the tree and its distance from the power lines. PG&E tree-marking process begins with employees from companies such as ACRT Pacific [ACRT] and Mountain G Enterprises, Inc. [Spencer, 2019], who are focused on the use of a range finder to measure the height of the tree and its distance from a power line. These workers are equipped with "scorecards," which list deficiencies a tree could have, including but not limited to mistletoe, a scar, a lean, multiple leaders, root rot, or a snow loader. In 2019, these "scorecards" had a 1 to 10 scale to rate the severity of the ailment or defect. High scoring trees were marked for removal. In 2020 the scorecards transitioned to a simple "Yes" or "No," with a "Yes" being a recommendation for removal, affecting millions of trees.

PG&E's Vegetation Management leadership has been emboldened by AB 2911, which passed in 2018 and took effect in January 2019, modifying the California Public Resources Code by adding the following: (PRC 4295.5(a)) "...may traverse land as necessary, regardless of land ownership or express permission to traverse land from the landowner, after providing notice and an opportunity to be heard to the landowner, to prune trees to maintain clearances pursuant to Section 4293, and to abate, by pruning or removal, any hazardous, dead, rotten, diseased, or structurally defective live trees. The clearances obtained when the pruning is performed shall be at the full discretion of the person that owns, controls, operates, or maintains any electrical transmission or distribution line, but shall be no less than what is required in Section 4293..."

As stated above, PG&E continues to disregard providing timely notice. By failing to disclose, it denies property owners the right of an opportunity to be heard, although the law is usually interpreted as allowing for a fairly extensive review and appeal process, that process is not defined, so it is easily ignored. PG&E frequently fails to follow any review and appeal process unless pressured by a property owner. If a property owner demands the right to refuse, PG&E's procedure is for the Area Vegetation Manager to rule on their refusal. In many cases this Area Vegetation Manager is the same individual who either marked the trees in question or approved the marking. Therefore, we have a situation where one party to the dispute is unilaterally making the final determination, suggesting a conflict of interest. As is usually the situation, when contractors and their employees are the only contact, property owners have more often not been informed of their right, much less have an opportunity to pursue their right to refuse.

Both the CPUC and CalFIRE are reluctant to “micromanage” PG&E activities [Batjer, 2019]. Thus, the process lacks official oversight, and ignores property owners who seek an objective decisionmaker to review evidence, such as an independent certified arborist or Registered Professional Forester (RPF) report on the condition of the trees. Furthermore, certified arborists or RPFs may well be reluctant to “vouch” for the health of a tree once it has been marked by PG&E out of fear of liability should the tree fall, leaving the property owner to face an uphill and expensive battle to protect their property.

Frequently, intimidation by PG&E or its contractors hampers the owner’s ability to obtain objective advice. In an increasing number of cases, PG&E is dispatching tree crews to trim, top or remove trees on private property over the objections of the property owners, occasionally with law enforcement escorts. PG&E is also cutting power to properties when the owner has a gate or other obstruction and is refusing consent.

Additionally, while PG&E is making the most out of its expanded authority under the newly amended PRC 4295 to work or remove trees outside its easements on private property, it is not recognizing its responsibility per PRC, 4295.5(b), “Nothing in subdivision (a) shall exempt any person who owns, controls, operates, or maintains any electrical transmission or distribution line from liability for damages for the removal of vegetation that is not covered by any easement granted to him or her for the electrical transmission or distribution line.” However, again there is no defined process for property owners to collect on damages.

At this time, PG&E is actively lobbying to gain even more flexibility to remove trees at the expense of the environment and private property rights as specifically stated in this segment of its 2020 WMP, and the utility is succeeding. The utility has proposed that, “...if the legislature extended PRC Section 4295.5 to also authorize utility tree workers to trim or remove trees or clarified the definition of a “conversion” in the forest practice rules to clearly exclude maintenance of a utility right of way, it could significantly improve the ability to execute vegetation management work. Likewise, legislative action could restrict the discretionary terms attached to encroachment permits,” [PG&E-WMP, 2020]. PG&E’s lobbying has thus far succeeded: The first law change has occurred, AB 2911, and the second is in process in the Board of Forestry.

III. DEFINITION OF HAZARD/DANGER TREES

All trees will eventually fall. Some will fall harmlessly to the ground and return their material to the forest floor as nutrients. Hazard/Danger trees pose the risk of damage to something of value in a spatial and temporal setting. A large unstable dead tree leaning toward a power line within strike distance is an obvious and imminent hazard. A large healthy tree with only a slight lean is not an imminent hazard unless the lean is too great a sweep or it is poorly rooted. Determination of risk and the combination of likelihood and effect requires careful discernment to conserve the value of trees or to save the cost of removing them. Common sense tells us that Hazard/Danger trees are the exception, the accumulation of negative factors like age, disease and damage that destabilize a small fraction of trees in the forest at any

moment. “Hazard/Danger” is not the absence of perfection as reflected by inexperienced utility arborists and cloistered PG&E executives.

Current removal practices by PG&E are extreme, very costly to homeowners, State and National Forests, County land, and ratepayers. PG&E exhibits poor discernment, especially where wide swaths on private property are clear cut without regard to the hazardous or nonhazardous conditions of individual trees. This excessive cutting exposes trees to the potential of windthrow where previously protected by surrounding trees, the once interior trees are more likely to fall in high wind or rain events. These practices have been directly observed on the North Complex, the CZU Lightening Complex Fire, and reported generally throughout PG&E’s territory. PRC 4295.5 authorizes entrance onto private property, “to abate, by pruning or removal, any hazardous, dead, rotten, diseased, or structurally defective live trees,” but not any or all trees. PRC 4295.5 is not an extension of a deeded easement that allows removal of all vegetation for the purposes of constructing and maintaining PG&E’s equipment. Nor are all trees, slightly fire damaged or imperfect, a “reasonable and foreseeable” hazard [Porter, 2020]. Many trees are fire adapted and tree ring studies show that these trees have survived many fires in their long healthy lives.

Trees possess attributes that are valuable to a home, wildlife, and forests. Forests are valuable, especially today as they sequester carbon that would otherwise be in the atmosphere making our environment uninhabitable. Cutting trees to restore forest health should be a carefully managed selection process balancing species diversity and spatial distribution to improve and sustain robust carbon sequestration. PG&E’s tunnel vision of converting forests to wide linear brush or fire-sensitive grass fields does little for power line safety and increases the flammability of the greater landscape, including its flammable poles. Alive or dead, trees are a public resource whose value must be balanced against removal for purported power line safety.

Information presented in PG&E’s WMP shows that tree interactions with power lines are responsible for 25% of utility ignitions. Equipment failures are responsible for 37%, and bare wire creates other vulnerabilities that are responsible for 38% of utility ignitions [PG&E WMP, 2020]. Instead of this focus on tree destruction, PG&E, its customers, and shareholders would be better served by PG&E reconstructing its unsafe system with undergrounding or insulated conductors and failsafe circuit breakers. Throughout PG&E’s territory, it is common for its expulsive fuses, when working properly, to spray molten metal on the tinder dry fuel beds in forests and along city streets. A newly reconstructed system would last approximately 40 years, once and done, without requiring the wasteful destruction of private and public tree and shrubs resources that must be performed at least bi-annually under the current misguided paradigm.

IV. ARBORISTS’ ROLE

There are several related issues to consider regarding the arborists’ role in identification of Hazard/Danger trees. First, as of November 18, 2020, PG&E and its Licensed Timber Operators (LTOs) were presented with three rigorous and disturbing Notices of Violations (NOVs) (see Attachments A, B1, and B2), with further violations pending, by CalFIRE San

Mateo/Santa Cruz County Forest Practice Inspector, Richard Sampson. Since November 10th, PG&E is reinterpreting the Forest Practice Rules (FPRs), saying the utility is not harvesting to sell so it doesn't need an Exemption Permit, even though it has regularly applied for such Permits in 2018, 2019, and 2020 – affecting 20,000 acres in Santa Cruz County alone.

Property owners state that it looks like PG&E's lawyers are paid to stall so the tree-clearing process can continue unabated. Property owners know the massive clearing, the disturbance of fire-seared soil, the impacts on waterways, and the complete lack of adequate prevention measures ensure a threat to life, and severely exacerbated erosion, including mud and debris flows. These impacts will cause further damage to properties and threaten homes downhill, below the fire lines. Trees need to remain in the forest to help forest restoration stability and recruitment, including protection of threatened and endangered wildlife species and their habitat in currently untouched areas. PG&E has claimed it is using arborists to identify trees to be removed. The extensive clearcutting shows that individual trees are not being evaluated for their potential to thrive.

Second, PG&E has applied to the CPUC for approval of a \$1 billion rate increase, putting future tree removal costs on the backs of the rate payers. Only a portion of those funds should be spent on vegetation management, and those funds should be limited to CPUC requirements such as the 4-foot radial trim around the wires. The remainder of the funds should go towards updating infrastructure.

Third, PG&E lobbied for unreasonable regulation changes in the Public Resources Code and Forest Practice Rules. The utility was successful in having its sought-after changes passed by legislation (AB 2011) and signed into law in September, 2018, thus creating PRC 4295.5. To support these added regulation changes further, Forestry Rule revisions are under consideration, specifically rewriting the THP Utility Exemption Permit. The draft THP Utility Exemption Permit language would meet PG&E's goals to have control over tree removal both inside the ROW and on private property. The Board of Forestry (BOF) revision process is projected to continue to be completed sometime in the spring, 2021.

PG&E is continuing to implement its EVM, which has magnified tree removals exponentially, and even more since 2019 when a decision was made to take down every tree within striking distance. Few, if any, property owners understand how the Legislature, the CPUC, and PG&E rationalized this invasion onto private property, and they consider it an example of PG&E exercising eminent domain and their trees being cut down as a "taking." Under current 2019 additions to PRC 4295.5, several changes are having great impact and should be amended. These changes include the following: 1) Trees must be considered Hazard/Danger trees. However, the definition for Hazard/Danger trees has been so loosely defined as to be applicable to virtually any tree. 2) Notifying property owners and giving them "an opportunity to be heard" (PRC 4295.5(a)) before removing trees on private property is required. However, there is no process to provide notification. So, property owners have no way to stop PG&E from removing trees, except for PRC 4295.5(b), which provides for PG&E to pay damages. However, here again, there is no process for property owners to pursue

damages. 3) PG&E claims it has Certified Arborists identifying trees for removal. PG&E, alone, determines whether the trees are Hazard/Danger trees. Many property owners report never having been contacted at all and find their trees downed or gone. PG&E continues to train arborists it hires to follow the utility's criteria for Hazard/Danger trees.

Currently, tree evaluation to determine which are Hazard/Danger trees is performed by either PG&E arborists or contractor-hired arborists. Generally, arborists have some sort of experience or training leading to "certification," but there are no specific requirements in California regulations describing a "Certified Arborist." The closest requirements are found in the California Division of Occupational Safety and Health [Cal/OSHA], which basically require tree workers to have "documented safety instruction." This makes the requirement of having a Certified Arborist nonspecific, leaving it to other regulatory agencies to establish required standards.

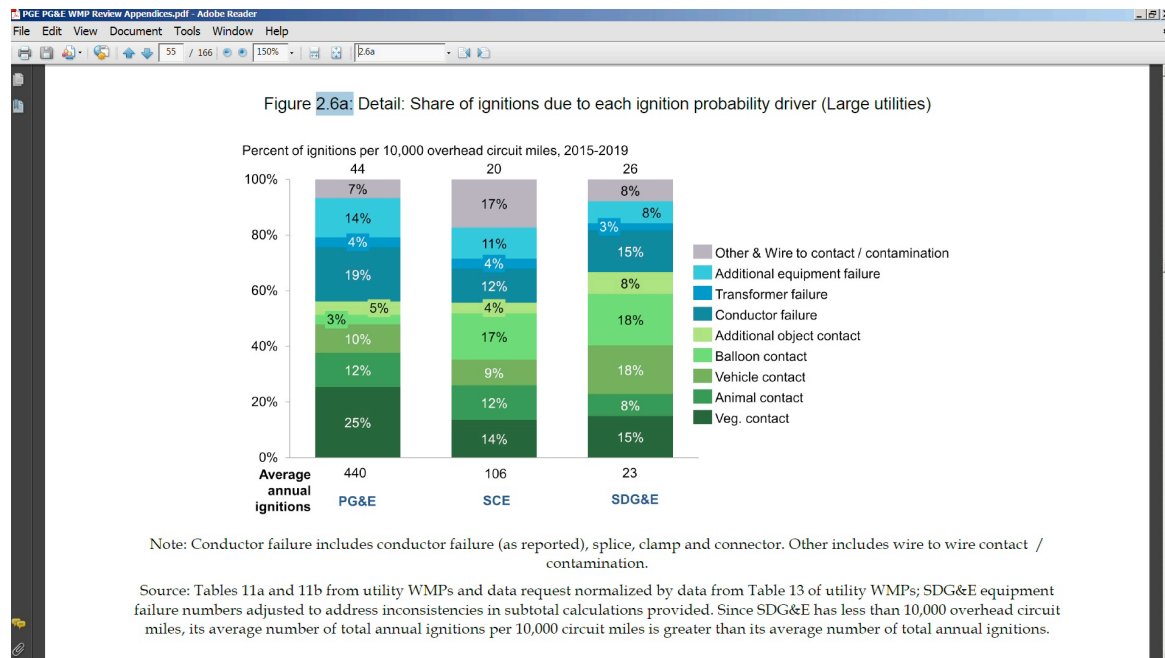
PG&E holds significant power over the certification of arborists by the International Society of Arboriculture (ISA), the best-known provider of classes and testing for individuals to achieve certification. The last ISA President was a PG&E employee; currently the President is with Davey Tree. Many of the classes and supplemental courses are structured and taught by PG&E. There are several certification programs offered by the ISA. All these programs require three years of on-the-job experience, and/or a "degree in the field of arboriculture, horticulture, landscape architecture, or forestry from a regionally accredited educational institute." Finally, a potential arborist must pass one of ISA's 200-question exams to be certified. A "Utility Arborist" specialty is an option. To support the applicant, ISA offers a packet of 25 online courses to prepare for the exam. Once certification has been approved, it is valid for three years, and additional courses must be taken to maintain certification [ISA, 2020].

The ISA Certification Program demands rigorous requirements, providing the potential for skilled evaluation. However, there is no guarantee that the student will learn specifics regarding California native tree species. *Significantly, the program does not provide any Risk Assessment Course that addresses fire-damaged trees* [Lashonna, 2020]. Tree species reactions to fire are a crucial component for training and experience when dealing with the ever-increasing number of fire-affected trees, and should be a requirement for utility arborists doing California fire and post-fire inspections.

It is clear, especially since the many lightning complex fires beginning in August of 2020, that PG&E and other agencies must go outside California for arborists. From conversations between multiple private property owners and PG&E/contractor arborists in the CZU fire area, arborists have been recruited from Nebraska, Tennessee, Texas, and elsewhere. Those arborists had received PG&E training and Hazard/Danger tree "guidelines," i.e., the previously named scorecard, for their current work. However, they had limited or no experience with California native fire-affected trees and their capability to survive fires.

PG&E stated in United States District Court to Federal Judge Wm. Alsup, that it will never be able to trim or remove enough trees because major trimming companies are backing

out due to insurance costs [New York Times, 2019]. It must be known that EVM will not succeed in reducing wildfire ignition because 75% of the problem, as noted in Figure 2.6a below, is with the antiquated infrastructure, not the trees.



V. MISLEADING INFLUENCE and PROFIT

For decades PG&E has endeavored to influence public opinion and affect legislation towards tree removal rather than upgrading utility infrastructure, thus building the mythology of blaming the problem on the trees. It gained acceptance as PG&E sought to limit its liability and expenses while paying its shareholders. This carried into the courtroom. Judge Alsup's tree removal mandate inadvertently results in reinforcing the misconception promulgated by PG&E. As a result, PG&E is highly motivated to cut down as many trees as possible both in and out of the ROW. This pressure directly affects what PG&E requires of its arborists and contractors, the protection of healthy mature trees, and infringement on private property rights.

PG&E gets paid for upgrading its lines in same way as for cutting down trees, being compensated at its costs plus 10% and more, all paid for by the ratepayers. Hiring tree workers/contractors is easily done, compared to finding skilled line workers, so it's easy to depend upon VM for ready income. In addition, VM is easier to manipulate for profit than modernizing the lines. (See pp 120-121 of The Grid-The Fraying Wires Between Americans and Our Energy Future by Gretchen Bakke, Ph.D. for examples of that.) In its analyses of PG&E's WMP, the Wildfire Safety Division criticized PG&E for conflating the actual costs of routine VM and EVM so that a reasonable comparison of EVM vs system hardening cost effectiveness cannot be readily made, leaving the CPUC and other regulators, state and local governments, and the public misinformed about those costs [WSD-Guidance Resolution]. The fact that this has been and is being permitted is the fault of the CPUC.

VI. SOLUTIONS

CIRCUIT SAFETY

Solutions to reduce or eliminate utility-associated wildfires include installation of steel reinforced core fully insulated aluminum cable (conductor), the use of spacer cables, and undergrounding. When undergrounding is contraindicated, improved conductors combined with computer operated circuit safety relays would solve California's utility wildfire problem. A priority in forest areas should be undergrounding electrical systems. The cost of these improvements is regularly used to justify delays in safety upgrading. This is a specious argument when faced with the scale of suffering, property losses, and loss of life, plus financial impacts to the public and the state caused by repeated utility ignited wildfires, and recently further exacerbated by Public Safety Power Shutdowns (PSPS) as a substitute for safe electrical supply circuits. This will substantially reduce the current enormous costs of EVM by eliminating its rationale for continuing to cut trees. It is also important that utilities adhere to CPUC requirements for consistent timely tree trimming around above-ground wires. In addition, PG&E needs to be transparent in providing local governments and the general public realistic timeframes of replacement updates.

INCURSION ONTO PRIVATE LANDS

The solution to infringements on private property rights, is that PG&E adhere to current laws. These laws state that PG&E and its contractors may not enter private property without Notice and Consent, and that removing trees from private property without Notice and Consent, per CPUC GO 95, the 5th Amendment to the Constitution, California state law, and numerous court cases is a "Taking," [U.S. Constitution], [CALIFORNIA CONSTITUTION], [CPUC § 130220.5], [Westgate Ltd., 1992]. In addition, case law requires PG&E to compensate property owners for damages when its actions result in loss to the value of that property [Krieger, 1981]. Thus, PRC Code 4295.5(a) and related enforcement regulations from other agencies, must be amended to incorporate Notice and Consent, before commencing any vegetation management. Entitled "hearing" from 4295.5(b) needs to be defined as to procedure, place, and responsible party. The Notice and Consent process should include: 1.) provide proper Notice requesting a visit to inspect the property; 2.) allow the property owner to oversee and be involved in the inspection; 3.) assure that the property owner is not pressured, harassed nor threatened; 4.) provide the property owner with a detailed written description of proposed work; 5.) include the right to provide alternative expert opinion to challenge PG&E's arborists or others designating what trees to cut and how severely, and what trees to remove as Hazard/Danger trees; 6.) allow negotiation to achieve agreement; and 7.) allow property owners' Right of Refusal.

DEFINITION OF HAZARD/DANGER TREES

The CPUC, PG&E, and CalFIRE refer to "Hazard" trees, and the BOF refers to "Danger" trees. One definition with one name for "Hazard/Danger trees" should be amended into PRC Code 4295.5(a) and related enforcement regulations from other agencies including but not limited to CPUC, BOF, CalFIRE and CDFW. A clause must be included in the new definition

stating that not all trees with defects or fire damage are necessarily Hazard/Damage Trees, with clarifying examples. This definition should clarify that trees not Hazard/Danger are important to retain as beneficial trees to protecting forests, providing listed species habitat, and enhancing the environment. The definition's scope shall be "reasonable and foreseeable," [CA Power Line Fire Prevention Field Guide, 2020] including "imminence within one year." Specific protection measures should be included to retain old growth trees and late seral second growth trees, with only limited trimming to retain their viability.

ARBORISTS

Minimum requirements for Certified Arborists, hired to determine Hazard/Danger trees, should include experience working with native California tree species with respect to fire and wind, and to understand each species' functions within their region. This should be amended into PRC 4295.5 and regulations of related enforcement agencies. The Board of Forestry must reject the draft revisions to the THP Utility Exemption Permit process that allows utilities to define Hazard/Danger trees and education and training requirements for arborists.

VII. CONCLUSION

After decades of infrastructure neglect, PG&E has received 6 federal felony convictions and 84 manslaughter convictions for failing to maintain safe and reliable gas and electrical systems. Faced with lawsuits, legislative action, and bankruptcy, PG&E still fails to confront the emergency nature of improving its antiquated infrastructure. There are five primary issues that cause this problem: lack of circuit safety, incursion onto private lands, a vague definition of Hazard/Danger trees, arborist non-qualifications, and misleading influence.

One way to directly improve PG&E's performance would be for the court to revise its tree-cutting mandate and replace it with a mandate to update the unsafe infrastructure. Court action would thereby expedite replacement of aboveground bare wire distribution lines with a combination of underground distribution lines, and aboveground triple insulated steel reinforced cable and advanced circuit protection, as the most effective and primary means of reducing utility-caused wildfires. Vegetation management should be secondary as it is temporary and results in environmental degradation. The infrastructure should be designed to be fail safe.

PG&E's EVM program is causing extensive environmental damage to public and private lands. This is exacerbated by PG&E's dependence on unqualified arborists using broad and misleading Hazard/Danger tree definitions. Their EVM is causing the loss of millions of healthy mature trees and loss of carbon sequestration. In addition, the people of California face increased erosion and risk of flooding, damage to property and communities, loss of wildlife habitat, increased fire risk from wind tunnel dispersed firebrands, flammable invasive plants, and hotter local microclimates.

Private property owners deserve to have regulations revised to include processes for notice prior to work, right to negotiate or refuse, and a system for collecting on damages. Arborists must be trained and/or experienced in working with California tree species in relation

to their responses to wind and fire. A single clear definition of Hazard/Danger trees needs to be established for arborists. The public deserves a safe and reliable system as stated in the CPUC mission.

SOLUTIONS FOUND (as of 2021)

PG&E focused on **Enhanced Vegetation Management** and **Public Safety Power Shutoffs** in its CPUC approved Wildfire Safety Plan, 2017, and Wildfire Mitigation Plan, 2019.

Southern California Edison (SCE) took another, more responsible approach –
Covered Conductor Wildfire Plan (CCWP) 2017-present and
Grid Safety and Resiliency Program (GSRP) 2018-present

After suffering disastrous wildfires in 2016-17, SCE publicly acknowledged that their distribution system was unsafe and unreliable - that it was vulnerable to many ignition drivers. (**Application of Southern California Edison Company (U 338-E) for Approval of Its Grid Safety and Resiliency Program**. A1809002, filed 9/10/18, pp 9-13.) So, SCE created an “end of life” to their antiquated strategy (also fixated on trees and soon adding Public Safety Power Shutoffs). SCE implemented a new Best Practices model based on infrastructure improvement. In contrast, PG&E’s failure to update and modernize demonstrates that they neglected to utilize effective Best Practices model decision making. The third largest Investor Owned Utility (IOU), San Diego Gas & Electric (SDG&E), has also implemented a covered conductor program to replace all bare wires. So has the tiny Bear Valley Electric Company serving Big Bear and its surroundings, among others. Understandably, SCE has thus been successful in:

- minimizing vegetation management,
- system maintenance and replacement,
- reducing costs-per-line-mile considerably,
- ensuring safety and reliability year-round,
- progressing significantly toward eliminating PSPS,
- **And then proving that covered conductor and system replacement is successful in mitigating wildfire (Wildfire Mitigation Plan Update, 2021).**

How did SCE decide on this plan? *SCE studied world-wide successes since the 1970’s in which covered conductor provided reliability improvement in every situation including the following: dense vegetation areas (Scandinavia, UK, New England), dense populations (Japan), animal protection (Thailand, Malaysia), reduction of “bushfires” (Australia).* (**Covered Conductor, Everything You Need to Know, Prepared by Apparatus and Standards Engineering Group of T&D Engineering**, October 8, 2018, for SCE and included in documentation presented to the CPUC by its Public Advocates Office, April 23, 2019 in a report on the Application of Southern California Edison Company for Approval of Its Grid Safety and Resiliency Program (GSRP).)

Thus SCE took action to

- ☐ undertake a careful and thorough risk/benefit study wherein it
- ☐ determined that replacing antiquated conductor of its distribution system was key to reducing wildfire,

☐ created an unparalleled model to modernize its infrastructure,
☐ researched and tested various types of wires and electronic circuit protection,(SCE Covered Conductor Workshop, February, 2019 Covered Conductor https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/Feb.%20th%20Workshop%20SCE%20Covered%20Conductor%20Presentation.pdf).

☐ **found that steel-core, triple-insulated conductor was the safest, most reliable economic and durable choice,**

☐ **compared the alternatives and found Covered Conductor has the greatest mitigation effectiveness per dollar spent and is 85% less than the cost of Underground Relocation,** and quickly

☐ began to completely replace its HFTD distribution system at a high annual rate, thus rapidly providing its customers with modernized, safe and reliable system with 5,000 miles to be replaced in three years (2021-23).

- Thereby reducing wildfire ignition drivers by 90%,
- guaranteeing wildfire mitigation and
- elimination of PSPS as improvements are made.

SCE's RAMP analysis showed that Covered Conductor had the greatest risk-spend efficiency (RSE) since it is 3.4x greater than Bare Conductor, 4x greater than Underground Relocation, and the Speed of Covered Conductor deployment is much faster.

In SCE's *Wildfire Mitigation Plan February 5, 2021 Update*, it provided clear proof that the covered conductor was effective in preventing wildfires. On Page 211, **SOUTHERN CALIFORNIA EDISON (SCE) WILDFIRE MITIGATION PLAN UPDATE, FEBRUARY 5, 2021** it states, "The [risk-spend efficiency] (RSE) for this initiative is among the highest of all WMP activities analyzed because covered conductor is effective at mitigating several types of ignition drivers, such as contact from object (CFO) and wire to wire contact, as well as reducing equipment failures associated with older distribution line equipment and hardware. Even when excluding operational considerations, such as time and feasibility to deploy, the alternative mitigations such as reconductoring with bare wire and undergrounding have RSE's lower than for covered conductor."

Note the contrast with PG&E's response to the devastating wildfires of 2016-17, and since.

- In 2017, PG&E's 500+ page *Wildfire Safety Plan (WSP)* was approved without CEQA review by the CPUC. It included the first version of **Enhanced Vegetation Management** or **EVM**, a massively destructive plan to denude the Right of Way (ROW) along Distribution Lines from ground to sky for 15' on both sides of the wires, followed up with herbicides, blindly removing previously protected healthy, mature trees without the metrics to prove it would help prevent wildfires caused by antiquated infrastructure.
- The WSP was implemented in 2018 in forests, rural areas and towns, hitting private roads and property in steep, highly-erosive HFTD's causing severe environmental

degradation. It also hit protected streams, and even downtown tree-lined streets causing massive protests and lawsuits -- and that, long after tens of thousands of healthy, mature trees were removed, stimulated changes in the EVM.

- Resulting revisions soon moved tree removals outside the ROW to take down trees *within striking distance of the wires* – affecting approximately 100 million trees. This was an absurd undertaking, costing billions of dollars and bound to fail. Strike tree removal has since been proven ineffective, as trees continue to impact unsafe power lines, causing ever more severe fires, culminating in the historically destructive Dixie Fire.

The other part of the 2017 Plan was to turn off power when winds blew. This became the infamous **Public Safety Power Shutoffs**, or **PSPS**, that were soon implemented with severely inadequate planning and communication, causing disastrous consequences, including deaths, billions of dollars of losses to businesses and communities and dangerous situations for the many thousands of affected households and businesses.

- Without improving infrastructure, PSPS, while inadequate, remains PG&E's only effective wildfire preventive measure, but is certain to be everlasting unless PG&E reforms its priorities.

The original *Wildfire Safety Plan* was not without strong criticism within the CPUC.

Unsurprisingly, filed reports by PG&E to the Commission on subject of fire, neglected to address basic analyses necessary for legitimate assessments of fire safety. This was pointed out by the Commission's own *Office of the Public Safety Advocate* that, in evaluating "wires down" events reported by PG&E, "it does not appear that PG&E evaluated the individual effectiveness of its mitigation programs to reduce wires down, including wires down that remain energized, or the other various root cause mitigation programs related to this risk." [Investigation 17-11-003] (Filed November 9, 2017)

- Despite the **Office of Safety Advocate's** November, 2017 warning that there were no metrics to prove EVM would work, it was approved by the CPUC in December, without CEQA review in spite of the massive, increased environmental impacts that the new EVM would have. Without CEQA review, no other ways to prevent wildfire were considered. *Dangerous infrastructure was still ignored.*
- Since then, after the CA Legislature required *Wildfire Mitigation Plans (WMP's)* for all electric utilities starting in 2019, PG&E has provided WMP's that were consistently criticized by the Wildfire Safety Division and Wildfire Safety Advisory Board as presenting inadequate and disingenuous data, while doubling in size each year.
 - While adding cameras, improvements to its smart meters, and other efforts to speed up response to wildfires rather than preventing them, and implementing complex technology to reduce the impacts of PSPS, the same focus on EVM and PSPS have continued to be its primary features.
- Only in its 2021 WMP Update in June, 2021, did PG&E begin to provide infrastructure improvements as a more equal mitigation. Unwisely, PG&E's plans are for piecemeal

improvements since *it's modeling treats each piece of infrastructure separately, thus preventing a comprehensive approach for vital modernization.*

- PG&E is only planning to harden 180 miles of distribution lines in HFTD's in 2021 – a ridiculously low amount considering the thousands of miles needing comprehensive modernization.
- **It has, in the recent 2021 Update, hit the restart button as it scrambles to plan for PG&E CEO Patricia K. Poppe's public relations promise to underground 10,000 miles of distribution lines to prevent wildfires, thus further slowing mitigating unsafe infrastructure.**
- This is a dangerous choice. It will prioritize undergrounding when it is not appropriate for much of the HFTD. In addition, undergrounding is far slower and far more expensive to implement than modernizing the Distribution Lines. It IS a meaningful option, however, and should be scientifically focused in appropriate areas.

In the meantime, with potentially decades of delay, PG&E admitted that EVM can only hope for a maximum of 35% success in reducing wildfires (PG&E's 2021-Wildfire-Safety-Plan-Revised-060321-1.pdf). Then, in response to Judge Alsup, [Case 3:14-cr-00175-WHA Document 1256 Filed 10/29/20](#) at page 16 of Exhibit E, PG&E states: *"In light of the meteorological information indicating the potential for catastrophic wildfire and the customer impacts from mitigating that fire risk through de-energization, PG&E considered whether alternatives to de-energizing, such as additional vegetation management and disabling automatic reclosers, could adequately reduce the risk of catastrophic wildfire to obviate the need for de-energization. PG&E determined that these measures alone did not reduce the risk of catastrophic wildfire in areas within the PSPS scope sufficiently to protect public safety."* One has to ask, then, why perform EVM when you know it is not going to work. The fail-safe solution is that of Southern California Edison...

In stark contrast to PG&E's painful, disastrous efforts, as stated above, Southern California Edison's (SCE) well-researched and designed **Wildfire Covered Conductor Program (WCCP) and Grid Safety Resiliency Program (GSRP)**, is proving successful. WCCP/GSRP has resulted in replacement of hundreds of distribution circuit miles, eliminating a dangerous, antiquated system and providing significant improvement in safety and reliability. SCE's data in its February, 2021 Wildfire Mitigation Plan Update includes clear proof that this modernization program provides protection from at least 90% of wildfire ignition drivers.

Even as it continues limited undergrounding in specific areas, SCE is expanding its distribution system modernization programs extensively – 965 miles in High Fire Risk Areas (HFRA's) in 2020 alone. Of great significance, SCE has found the expansion cost effective — not simply in protecting SCE from wildfire liabilities along with savings from reduced future maintenance and VM costs, but that the WCCP and GSRP are actually less expensive per mile than PG&E's EVM. The new distribution sections have proven both reliable and safe, so SCE is expanding to cover 5,000 miles in the 2021-2023 timeframe.

It is time to require that PG&E adopt SCE's wildfire mitigation solutions, now proven to prevent wildfire, ensure reliability, reduce long-term system maintenance and not requiring the failed EVM program or PSPS where it has been completed.

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ATTACHMENTS

Attachment A Notice of Violation, CalFire-Richard Sampson to PG&E, et al., 30 Oct 2020

Attachment B1 Notice of Violation, CalFire-Richard Sampson to PG&E, et al., 11 Nov 2020
Attachment B2 Notice of Violation, CalFire-Richard Sampson to PG&E, et al., 18 Nov 2020
Attachment C PRC 4295.5 Expanded History and Discussion

Addendum I to PG&E White Paper
WHITE PAPER DATED 11-23-20, ADDENDUM I DATED 1-20-21

Additional activities have taken place since the completion of the White Paper. Copies of these documents are attached.

Additional Notices of Violations (NOVs):

The Coastal Commission NOV to PG&E regarding the Santa Cruz mountains tree removal, Dated November 20, 2020 (Attachment D).

CalFIRE's fourth NOV to PG&E regarding CZU Lightning Fire utility work, dated November 30, 2020 (Attachment E).

The California Regional Water Quality Control Board NOV to PG&E regarding unauthorized discharges of waste to waters, dated December 15, 2020 (Attachment F).

Other Activities:

A letter was sent from CPUC President, Marybel Batjer, to PG&E on November 24, 2020 (Attachment G), stating that PG&E will be "held accountable" for failing to improve safety. The work of the Taskforce is having an impact. Chuck Roselle, an active member of the Sierra Club East Bay commented that he, "will not give this much credence until and unless the CPUC invokes the enhanced oversight and takeover process defined in Appendix A of the *Bankruptcy Proceeding Decision* (beginning on page 110)." We see this as a foot in the door opportunity – getting the CPUC to invoke enhanced oversight and to takeover processes.

The County of Santa Cruz Board of Supervisors (BOS) unanimously passed a Resolution (Attachment H) on December 8, 2020, directing the District Attorney, CalFIRE, The California Public Utility Commission (CPUC), and the California Department of Fish and Wildlife (CDFW) to investigate PG&E's violations, asking that they look at the situation and consider taking criminal or civil action. In addition, as part of the Resolution, the BOS is writing a Formal Complaint to the CPUC.

Copies of the Resolution and the 20 pages of violation back-up documents were sent in letters from the Santa Cruz BOS to Judge Alsup on December 15, 2020 (Attachment I), and Jennifer Hutchings, Probation officer of Judge Alsup at the U.S. District Court on December 17, 2020 (Attachment J).

The City of Santa Cruz sent a letter of complaint (Attachment K) to PG&E on January 6, 2021, notifying it and its vegetation management contractors that they are endangering City of Santa Cruz's water supply, and fuel conditions are worse than prior to their tree removal per City code.

The Utility Reform Network (TURN) sent a letter to the CPUC and Governor's office (Attachment L) on April 22, 2019, asking the CPUC to protect utility ratepayers. The letter includes financial information showing that PG&E is conflating costs, thus misleading ratepayers and agencies, primarily the CPUC, and Judge Alsup.

The Butte County District Attorney summarized the Camp Fire Investigation in *The Camp Fire Public Report* dated June 16, 2020 (Attachment M). From pages 48 to 54, the District Attorney reviews PG&E's finances regarding maintenance, repair, and replacement of transmission assets. The analysis demonstrates PG&E's preference to use antiquated infrastructure that was neglected and left to fail, "The evidence established that PG&E personnel were consistently looking for ways to charge expense budget projects to the capital budget" (page 51).

ATTACHMENTS

- Attachment D Notice of Violation, Coastal Commission to PG&E, 20, Nov 2020
- Attachment E Notice of Violation, CalFire-Richard Sampson to PG&E, et al., 30 Nov 2020
- Attachment F Notice of Violation, California Regional Water Quality Control Board to PG&E, 15 Dec 2020
- Attachment G Letter from CPUC President, Marybel Batjer, to PG&E, 24 Nov 2020
- Attachment H County of Santa Cruz Board of Supervisors Resolution, 8, Dec 2020
- Attachment I Letter from Santa Cruz Board of Supervisors to Judge Alsup, 15 Dec 2020
- Attachment J Letter from Santa Cruz Board of Supervisors to Jennifer Hutchings, Probation officer of Judge Alsup, 17 Dec 2020
- Attachment K Letter of Complaint from City of Santa Cruz to PG&E, 6 Jan 2021
- Attachment L Letter from Utility Reform Network (TURN) to CPUC and Governor 's office 22 Apr 2019
- Attachment M Butte County District Attorney, *The Camp Fire Public Report*, 16 Jun 2020

Addendum II to PG&E White Paper

WHITE PAPER DATED 11-23-20, ADDENDUM I DATED 1-20-21, ADDENDUM II DATED 3-30-21

COST BENEFIT ASSESSMENT OF PG&E'S EXPENDITURES FOR VEGETATION MANAGEMENT v. BENEFITS OF INFRASTRUCTURE IMPROVEMENTS

PREFACE

The massive system failures in Texas these last days, has awakened the nation to how our Utilities are vulnerable. From the Big Freeze we heard words such as "It is as bad as California".

Texas, also, has a history of Utility failures. Out of cold frozen nights, broken pipes and rotating power outages, comes the word that they didn't perform:

MODERNIZATION

And it applies to us. For over one hundred years, PG&E's treatment of thousand after thousands of miles of their distribution system has been in opposition to Modernization. Think about it, the greatest change of their primary solution to any Wildfire-Safety-Plan, has been more Vegetation Management. And over those miles and years, their modernization solution to fire ignition has been changing from a tree ax to a chainsaw.

Their bare lines exist, as a testimony to their lack of foresight.

In the enclosed paper, we will show that working on vegetation is no excuse for ignoring modernization of an antiquated system while achieving only a 5% reduction of causation of wildfire, which is not economically justified, and falls far short of making PG&E's circuits safer compared to other operators.

Southern California Edison's approach to a modern system is not only better and cheaper, but also significantly safer, and PG&E should, without doubt, follow SCE's lead and drop Enhanced Vegetation Management and install covered conductors which address almost 90% of known initiators.