Combating Wildfires and Power Outages with Clean Energy: A State Policy Roadmap

California policymakers have an opportunity to enact a set of clean energy policy measures that can work to combat future harm from wildfires and power outages.[1] These policies should be enacted between 2020 and 2030, and can help to achieve these overarching goals:

1) *Reduce the harm caused by Public Safety Power Shutoffs (PSPS) (by allowing many more Californians to generate their own clean backup power and reducing dependence on dirty, dangerous fossil backup generators)*
2) *Reduce the frequency of PSPS and fires caused by power infrastructure (by reducing climate emissions from the power sector, modernizing the grid, and better incenting utilities to prioritize safety)*
3) *Enhance California's ability to meet statewide clean energy and GHG reduction goals (by accelerating renewables procurement and decarbonization, modernizing the grid and transforming the IOU business model)*
4) *Make California utilities more adaptable to technological innovation and climate risk (by modernizing the grid including deploying resilient clean energy, deploying non-wires alternatives and transforming the IOU business model)*

Executive Summary

[1] This policy roadmap is not intended to comprehensively capture all the clean energy policy needs of the state; rather, it is focused on combating wildfires and power outages.

I. Accelerate Our Commitment to Renewables Integration and Decarbonization of the Economy

Some legislators have argued for rolling back the clean energy and GHG reduction goals enacted in SB 100 and elsewhere as California addresses wildfire issues. This would be short-sighted, expensive and counterproductive. As the fifth largest economy in the world, California's adoption of a 100% emissions-free electricity goal has already driven new investment into the State and into innovative clean energy solutions. Renewable energy resources like large scale solar + storage are in many cases cheaper to build than new gas-fired generation. In addition, the wildfires are strong evidence that we need to do more to mitigate future climate change, not less.

As part of the integrated planning process and amid increased concerns about near-term reliability by the California Public Utilities Commission and the California Independent System Operator, regulators are calling for the addition of 4,000 MW of incremental electricity generation capacity by the summer of 2023. This new capacity is needed to assure the orderly closure of currently operating fossil gas plants that have been slated for retirement. Clean hybrid resources like solar plus storage and automated demand response plus storage can maintain electric system reliability, and thousands of megawatts are available for development. If the state's load serving entities immediately begin procurement for clean hybrid resources, they can be online by the summer of 2021.

A. Pursue More Aggressive SB 100 Implementation through improved integrated resource planning carried out by the CPUC and the state's energy and environmental agencies. The first Joint Agencies SB 100 Report is due to the legislature by January 2021. This report should focus primarily on steps the state can take to maximize the development and integration of zero-carbon resources on the state grid by 2030 and further evaluate and pursue pathways to achieve complete decarbonization by 2045 or earlier. The Commission's IRP modeling shows that only its 30 million metric tons (MMT) scenario for long-term procurement will put the state on track to meet SB 100 goals. For this reason, the Commission should adopt the 30MMT scenario as the basis for its 2019-2020 IRP Reference System Plan.

B. Systematically Decrease the Use of Fossil Fuel Resources For Meeting System Resource Adequacy: Dependence on fossil gas plants, including once-through-cooling (OTC) power plants, should be limited to the minimum quantity of capacity needed and for the shortest length of time feasible.

1. The CPUC recently adopted interim counting rules for hybrid resources like solar plus storage in its current Resource Adequacy (RA) proceeding. The Commission should move quickly to establish permanent counting rules for hybrid projects upon which developers and LSEs can rely for participation in system and local RA solicitations.

2. Likewise, the CPUC should adopt rules and regulations to allow behind-the-meter solar plus storage to be fully counted toward meeting load-serving entities' RA obligations. Distributed clean energy resources can provide clean RA in the wholesale market during normal blue sky conditions, and provide backup power for the hosting customers during power outages. Adopting RA counting rules for behind-the meter resources would support the deployment of more paired solar and storage systems by allowing them to be compensated for the RA services they can provide.

3. Develop and execute a plan for the safe and orderly near-term retirement of the least efficient fossil gas power plants that do not provide needed local RA for maintaining reliability during grid contingencies.

C. Prioritize and Accelerate the Procurement of New Renewables, Storage and Demand Response Capacity: Procurement of clean resources should be maximized to meet 2021-2023 reliability needs and advance GHG reduction goals, while also reducing ratepayer costs.

1. It is vitally important that the CPUC act decisively and immediately to meet SB 100 goals. Modeling indicates we will have less than 25 years to grow renewable generation substantially in order to meet new state electrification loads. The Commission must adopt the 30MMT scenario as the basis for the 2019-20 IRP, which would require significant near-term renewable energy procurement. This not only puts the state on track to meet its climate targets, but also compels near-term procurement of wind and solar, which should be encouraged to take advantage of the expiring federal tax credits to keep electricity rates lower.

2. Ensure that sufficient transmission infrastructure exists to eliminate the use of fossil fuels in electricity production by 2045 or sooner. New IRP modeling shows that to eliminate the use of fossil fuels by 2045, California's electric system will require the near-term buildout of large quantities of both wholesale and distributed renewable energy resources. As part of integrated resource planning, California's energy agencies and transmission providers need to transparently plan for new transmission to bring cost-effective new renewable power to market. Non-wires solutions including large-scale energy storage should also be considered to optimize or avoid some of this transmission expansion.

II. Transform the IOU Business Model to Promote Deployment and Integration of Clean Distributed Energy Resources

The current utility regulatory and business model does not effectively address the risks associated with climate change, including increased wildfires. Instead, it incentivizes capital investments in infrastructure and often rewards utilities for increased energy throughput. Even California's long-term commitment to energy efficiency and decoupling of sales from revenues have not fundamentally altered the incentives for the utilities to increase the amount of rate-

based assets. At the same time, the natural monopoly on distribution system assets upon which the current regulatory model is based is shrinking as clean distributed resources like solar and batteries have become more cost-effective and widely deployed. New technologies offer affordable and scalable opportunities to mitigate climate risks, but those technological solutions are not fully deployed and used because of current regulatory practices and the utility business model.

Transitioning to a Distribution System Operator model would both lower the cost of delivering energy and enhance our response to climate change and wildfire risk, and should include provisions to retain a robust and highly skilled utility workforce. A transition to a DSO model, described below, should be paired with Performance-Based Regulation, also described below.

A. Transform Local Distribution Utilities into Distribution System Operators: Beginning with PG&E, restructure the top-down command and control distribution service system to an Open Access Distribution System Operator (OA-DSO) platform. Under this new structure, which is analogous to FERC's open-access rules for transmission service and wholesale markets managed by independent transmission system operators, the OA-DSO would: procure well-defined grid services from end-use customers and third-party distributed energy resources (DERs); create an open, participatory distribution planning process that optimizes the use of non-wires solutions; manage an efficient and non-discriminatory interconnection process that enables quick interconnection of DERs; operate transparent markets for grid services; coordinate with the California Independent System Operator (CAISO) for the provision of bulk energy services; and provide efficient and non-discriminatory access to data about the distribution system.

B. Use Performance-Based Regulation to Incentivize the Development of Cost-effective DERs: The existing cost-of-service regulatory approach incentivizes capital investment, rather than achieving public interest outcomes. With a new approach, utilities would be paid based on outcomes, allowing for the development of customer partnerships to achieve improved reliability and resilience. The utility regulatory structure should be modified to reward good performance and penalize failure to achieve agreed-upon measures of safety, reliability, electric system and economy- wide decarbonization, community resilience, customer empowerment and social equity. With well-designed incentive mechanisms, California's utilities should no longer have any reason to inhibit or suppress DERs and favor their own capital investments.

1. Penalize utilities financially if they do not meet agency-approved requirements like interconnection timelines for renewables, microgrids and DERs, or specific metrics like the System Average Interruption Duration Index (SAIDI) and the System Average Interruption Frequency Index (SAIFI).

2. Also decouple profits from capital expenditures, for example with a multi-year revenue cap that covers both operating and capital costs.

III. Support Grid Modernization, Including Rapid Deployment of Customer- and Community-sited Clean Microgrids

Grid Modernization is the set of strategic investments needed for the planning, operation, and expansion of the electric distribution system and for the creation of markets for services that can be provided by distributed energy resources. These investments are needed to accommodate two-way flows of energy and create a more efficient, reliable and intelligent grid that can optimize the use of clean energy resources. A modern, resilient grid must integrate portfolios of clean distributed energy resources, including solar, batteries, wind, efficiency measures, demand response and flexible load to provide the energy, system flexibility and contingency reserves that have historically been provided by fossil gas assets.

A. Dismantle Barriers to Installing Clean Distributed Energy: Given the urgent need to adapt to climate change and ensure public safety during planned power outages, California needs far more customer-sited solar + storage capacity. Barriers to rooftop solar block the pathway to more resilient clean energy. Grid access charges, excessive fixed customer charges, and other fees unfairly penalize DER customers and make it much more expensive to install clean energy at a time when we need more non-utility investment in the energy sector to achieve California's ambitious climate goals.

1. Prohibit the use of arbitrary fixed charges, punitive fees and demand charges for customer-sited clean energy. DER customers as a rule are no more costly to serve than other subgroups in their rate class.

2. Maintain fair utility bill credit for the excess clean energy that DER customers feed back onto the grid, and encourage them to store and use their excess renewable generation at times of peak grid need, via net metering and utility rate design.

3. Encourage streamlined interconnection for resilient clean energy, and plan for and utilize the enhanced functionality of IEEE-1547 enabled (grid-ready) devices, building on the Rule 21 Process.

B. Deploy Clean Microgrids at Scale and with a Focus on Equity: A microgrid is an interconnected set of electricity loads, generation and storage that can operate while connected to or disconnected from the larger grid, using a range of technologies including solar, storage, fuel cells, combined heat and power and onsite fossil fuel generation. Clean microgrids-- ranging from those located at a single customer site to those that serve multiple users or a whole community-- can advance our clean energy and GHG emissions goals, reduce dependence on long-line T&D, provide a much safer and more reliable response to power outages than conventional fossil backup generators, enhance the overall resilience of the grid and also provide value during "blue sky" operations. Their strategic deployment should be a major priority in the state's policy response to wildfires and power outages.

Clean energy advocacy groups and policymakers must work collaboratively with low-income communities and communities of color to develop and implement a comprehensive policy agenda for advancing equity in grid resiliency. These frontline communities are often impacted "first and worst" by dirty energy systems and climate change, so prioritizing appropriate solutions for the most vulnerable proactively makes our entire system safer and more resilient. In November 2019, the California Environmental Justice Alliance published "Principles for Energy Democracy" that lay out some essential overarching goals to orient toward for equity in clean energy and grid resiliency.[2] Pending further collaboration with equity-focused allies on specific policy priorities, below are some initial policy recommendations for advancing clean microgrids while prioritizing equity.

1. The Self Generation Incentive Program (SGIP) has promoted a variety of distributed energy technologies since 2001. In 2018, the Legislature extended SGIP through 2025, and in 2019, CPUC revamped the incentive structure to better help low-income customers and customers more vulnerable to PSPS. The CPUC must monitor demand for this new Equity Resiliency incentive within SGIP and increase funding swiftly as needed to keep up with demand. In doing so, the CPUC should ensure that substantial SGIP funding is targeted to low-income customers, critical facilities that serve low-income customers, and customers in high fire threat areas and areas more likely to have power outages.

2. Direct significant additional funding to support deployment of clean microgrids on community-serving sites that focus on low-income households, communities of color and areas more likely to have wildfires and/or power outages, to supplement the equity resiliency incentives available through the SGIP.

Place a special focus on installing clean microgrids to create "community resilience hubs," which are existing well-used community centers that have resilient clean energy and other resources to aid communities during outages and disasters. Conduct listening tours gathering community input about where best to locate these community resilience hubs, and ensure there are enough of them in areas vulnerable to outages to support those communities well.

Deploy more clean microgrids on tribal lands, which are often located in high fire threat districts and which support communities of color. Blue Lake Rancheria, located in Humboldt County, provided a model for success when the casino's clean microgrid supported the local community during power outages, including keeping a gas station running and housing medically vulnerable people in hotel rooms. Allocate funding and/or technical

[2] https://caleja.org/2019/11/power-to-the-people-energy-democracy-now/

assistance to tribal governments who want to move expeditiously to install a clean microgrid and access SGIP and other funds.

3. Create additional ongoing funding source(s) to aid local governments, including school districts, in installing clean microgrids on critical facilities, which protect the safety of community members of all incomes during power outages as well as earthquakes and other disasters. Since there are tens of thousands of critical facilities throughout the state, SGIP incentives (which are also available to the millions of homes and businesses that need battery storage) will not be able to fully fund resilient clean energy at all critical facilities with financial need.

Local governments not only need incentives to help buy down the upfront cost of resilient clean energy systems for critical facilities, but they also need technical assistance and other help determining which critical facilities are best suited for clean microgrids, putting together financing, issuing requests for offers and getting the projects installed and functioning. Since resilient clean energy can create revenue streams through energy savings during blue sky conditions, it is possible that revenue bonds could be used.

The California Infrastructure and Economic Development Bank (IBank) could provide a home for this fund. The IBank has broad authority to issue tax-exempt and taxable revenue bonds, provide financing to public agencies, provide credit enhancements, acquire or lease facilities, and leverage State and Federal funds. In 2015, IBank established the California Lending for Energy and Environmental Needs (CLEEN) Center to invest in clean energy and energy efficiency projects. While the CLEEN Center has financed over $1.4 billion for water infrastructure, it has supported only two clean energy projects in the past four years, totaling around $10 million in loans, neither directly connected to energy resilience.

4. Require critical facilities including cell phone towers, long-term care and assisted living facilities, dialysis centers and others without current backup requirements to install a minimum of 72 hours of backup power, and obligate them to consider clean technologies before choosing to use solely fossil backup generators.

5. Reform the “over the fence rule” that hampers the development of community microgrids. Revise Public Utilities Code Section 218(b) to allow non-utilities to own and operate distribution infrastructure that shares power between properties that are not immediately adjacent but are in close proximity (i.e., within a city block or across the street from each other). This change would allow cities and other entities more flexibility to own and operate microgrids serving several public facilities at once.

6. Revise outdated state energy agency rules to allow distributed resilient solar + storage to be fully counted toward load-serving entities' capacity, otherwise known as 'Resource Adequacy' obligations, as noted in Section I.B. above.

7. Once the above-noted innovative model for procurement of clean local resources for customer resiliency and Resource Adequacy is proven, consider legislation requiring other electricity providers throughout the state to conduct similar procurement.

C. Support Local Governments in Energy Resilience Planning: Cities and counties develop general plans and climate action/adaptation plans, typically with little consideration of the electricity grid and no involvement with the electric utility, unless they have a publicly-owned utility. Investor-owned utilities do not often engage meaningfully with local governments during distribution planning and integrated resource planning. Wildfires and PSPS are prompting new planning on both sides now, highlighting the urgent need for greater coordination. If local governments and utilities more consistently plan changes to the grid together, solutions could better meet local needs and provide more effective use of ratepayer dollars for reliability and resiliency.

The California Energy Commission, in partnership with the OPR Integrated Climate Adaptation and Resilience Program, should work to develop guidance and funding resources to support successful engagement of local government and utility stakeholders in energy sector resilience planning, also known as Advanced Community Energy planning. Guidance and resources should align with state priorities and goals, identify replicable examples, and leverage lessons learned from prior CEC support for innovative technologies.

D. Harden the Grid Strategically: In addition to prioritizing the greater deployment of DERs and non-wires alternatives, some additional utility investment in grid hardening to reduce fire risk is warranted. Such measures could include using non-wood poles that don't burn, wrapping wires to protect against short circuits, burying more lines, and installing rapid fault switches that shut off power before a broken wire hits the ground. Utilities can also use more precise digital controls to "sectionalize" the grid, allowing them to control and limit outages to specific areas. Greater situational awareness can come from distribution fault anticipation (DFA) technology, installing more weather stations that collect highly detailed information on wind, temperature, and dryness, and more video cameras, drones, and other airborne assets.

Given that retail rates are already high and rising further, state government should carefully assess spending on grid hardening from the perspectives of both risk assessment and cost effectiveness. Some communities may benefit from being permanently islanded from the larger grid through remote microgrids. Microgrids can be a very effective risk management tool that provide short and long term benefits to our grid and our communities.

IV. Other Policy Goals Can Tangentially Help Reduce Wildfires and Power Outages

A. **Electrify Vehicles:** This will drive down battery storage costs and allow vehicle batteries to be used as mobile resilient clean energy, increasing the overall flexibility and resilience of the grid. In addition, electric vehicles do not create exhaust heat or sparks that can ignite wildfires.

B. **Electrify Building Load**: Building Electrification (BE) may seem like an odd policy to promote as a way to combat wildfires. Individual buildings with electrified load may indeed have more at risk in the event of a wildfire-related PSPS, but overall BE enhances the electrical grid's resilience and is a key element of a comprehensive GHG reduction plan. First, a larger and more flexible system-wide load profile allows for the integration of more renewables like solar. So BE mitigates the long-term risk of continued fossil fuel dependence, and places utilities, even those based on an OA-DSO model, on a more sound financial footing. Second, the robust demand response that a fleet of electrified buildings can provide makes the grid more resilient and able to respond to shocks and disruptions like a PSPS. Finally, with the cost of batteries declining rapidly, electrified loads have a technical and economic solution to maintaining high levels of critical services both within and outside of a PSPS zone, or in the midst of any grid disturbance.

C. **Encourage Dense, Transit-Oriented Housing Development**: Providing electric service to remote, fire-prone areas is one of the most expensive elements of utility service. State policy should actively reduce the Wildland-Urban Interface by encouraging dense, transit-oriented housing development. Insurance costs, parcel rates, and other levers of public policy all must be aligned with climate risk to align patterns of development with smart clean energy policy.