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Holland & Knight References (11a of 11)

The attached document is 11A of 11 separate uploads that contain the references cited in Holland & Knight's DEIR Comment Letter. Due to size constraints 11B will follow shortly.

Additional submitted attachment is included below.

APPENDIX C.
City- and State-Led Actions to Address High Energy Burdens

C1. City-led actions to reduce high energy burdens

Metro area	Strategy/action	Year enacted	Description	Data source
Atlanta	Plan with energy burden strategy	2017	The Clean Energy plan includes energy burden as a key strategy for achieving the city's clean energy future.	City of Atlanta 2019
	Plan with energy burden goal	2017	The Resilience Strategy includes action to lift energy burden on 10% of Atlanta households.	City of Atlanta 2017
Cincinnati	Plan with energy burden goal	2018	The Green Cincinnati Plan set a goal to reduce household energy burdened by 10% compared to current levels.	City of Cincinnati 2018
	City-led program to reduce energy burdens	2020	The city partnered with Duke Energy Ohio to address the high energy burdens by launching a low-income multifamily energy efficiency pilot program called Warm Up Cincy.	City of Cincinnati 2020
Houston	Plan with energy burden strategy	2018	The Climate Action Plan includes a goal to promote weatherization programs to reduce residential energy consumption and focus on reducing energy burdens of low-income populations.	City of Houston 2020
Minneapolis	Plan with energy burden goal	2013	The Climate Action Plan states that the city will prioritize neighborhoods with high energy burdens for strategy implementation.	City of Minneapolis 2013
	Equity indicator	2013	Climate Action Plan reporting should also include equity indicators to measure whether energy burden reductions are equitable.	
New Orleans	Plan with energy burden goal	2017	The Climate Action Plan includes two strategies to reduce the high energy burdens of the city's residents.	City of New Orleans 2017
Oakland	Equity indicator	2018	Oakland includes energy cost burden as a metric in its 2018 Equity Indicators report.	City of Oakland 2018
Philadelphia	Plan with energy burden goal	2018	The Clean Energy Vision Plan set a goal to eliminate the energy burden for 33% of Philadelphians.	City of Philadelphia 2018
Pittsburgh	City-led program to reduce energy burdens	2019	As part of the Bloomberg Mayor's Challenge, the city created Switch PGH to address high burdens through a civic engagement tool.	City of Pittsburgh 2019
Saint Paul	Plan with energy burden goal	2017	The city set a goal to reduce resident energy burden within 10 years so that no household spends more than 4% of its income on energy bills.	City of Saint Paul 2017

See Appendix for data sources

C2. State-led actions to reduce high energy burden

State	Strategy/action	Year enacted	Description	Data source
Colorado	Demonstration project/pilot program	2018	The Energy Office awarded GRID Alternatives a $1.2 million grant to launch a project to reduce the energy burden of 300 low-income households through renewable energy and energy efficiency investments.	Cook and Shah 2018
New Jersey	State legislation	2020	The NJ Clean Energy Equity Act (S. 2484) aims to use solar, storage, and energy efficiency to bring low-income households and environmental justice communities within or below the state's average energy burden.	New Jersey Legislature 2020
New York	Governor-led executive order	2016	Governor Andrew M. Cuomo issued the Energy Affordability policy to work toward a goal of no New Yorker spending more than 6% of their household income on energy.	New York 2016
Oregon	Governor-led executive order	2018	In response to Governor Kate Brown's Executive Order 17-20, the Oregon Department of Energy, the Oregon Public Utility Commission, and the Oregon Housing and Community Services Department conducted an assessment and created a 10-year plan to reduce energy burdens in Oregon affordable housing.	OR DOE, OR PUC, and OHCS 2018
Pennsylvania	Public Utility Commission study	2019	The Pennsylvania PUC released a report that assessed home energy affordability for low-income customers in the state.	Pennsylvania Public Utility Commission 2019
	Public Utility Commission policy	2020	The Pennsylvania PUC set a new policy to direct utilities to ensure that low-income customers spend no more than 10% (6% for lowest-income customers) of their income on energy bills.	Pennsylvania Public Utility Commission 2019
Washington	Governor-led executive order	2019	As part of Governor Jay Inslee's Clean Energy Transformation Act, the Washington Department of Commerce assessed the energy burdens for low-income households and the energy assistance offered by electric utilities.	Washington State Department of Commerce 2020

APPENDIX D.
Low-Income Energy Efficiency Program Best Practices

This section contains short descriptions of some best practices for low-income energy efficiency programs: coordination, collaboration, and segmentation; funding and financing; effective measures and targeting; evaluation and quality control; and coordination of energy efficiency and renewable energy investments.

Coordination, collaboration, and segmentation

Community engagement and participatory planning can ensure that programs are designed to meet community needs and build trust. By involving the community in the planning process, energy efficiency programs create outcomes that best meet community needs, leverage community networks to achieve higher program participation, and improve visibility and support within the community for program implementers (e.g., a utility or local government). Participatory planning requires effort from program planners, who can follow a set of best practices for optimal success.[21] For example, Professor Tony Reames conducted a community engagement study of Kansas City, Missouri, to understand barriers that low-income households face in participating in weatherization. This stakeholder engagement led to the development of innovative strategies to overcome barriers, such as hiring an all-African American staff to help build trust within the local community.[22]

Statewide coordination models enable consistent low-income program delivery across utilities, WAP implementers, and local jurisdictions. Some states have one implementer for the state's low-income programs who ensures that similar program offerings are available to all customers in the state. States such as California, New Jersey, New York, Colorado, and Massachusetts offer statewide low-income program models that aim to coordinate resources from multiple sources through a single program. For example, California's Energy Saving Assistance Program is offered by all regulated investor-owned utilities across the state. Massachusetts is served by the Low-Income Energy Affordability Network (LEAN), which includes community action agencies, public and private housing owners, government organizations, and public utilities that all work together to provide low-income efficiency solutions in the state.

One-stop-shop program models minimize barriers and allow low-income households to access all available resources in one place. The models provide a single point of contact, universal intake applications, comprehensive technical assistance, and streamlined access to program resources.[23] One-stop-shop models should be replicated in various locations and combine each location's available offerings. Through its Energize Delaware program model, for example, the nonprofit Delaware Sustainable Energy Utility (DESEU) offers a one-stop-shop resource that focuses on a whole-building approach and consolidates available resources directed at both low-income customers and owners of affordable multifamily buildings.

Market segmentation designs programs to meet the specific needs of subsets of highly burdened households, such as people living in affordable multifamily buildings or manufactured housing. Low-income customers are a diverse segment with diverse energy needs. By segmenting customers by key demographic categories, program designers can then work to identify a specific customer segment's energy usage characteristics and program needs. This can lead to more impactful outreach, relationship building, program design, and results. For instance, Eversource partnered with Oracle Utilities–Opower to develop a first-of-kind approach to digitally characterizing and targeting customers that require assistance. This analytical approach can guide utilities in creating programs that are specific to a resident subset or area.[24]

Fuel-neutral programs allow energy efficiency measures to be completed simultaneously in a home regardless of the electric and/or natural gas utilities that service it. This is critical for addressing the high costs associated with delivered fuels (oil, propane) and for coordinating across electric and natural gas utilities. For example, New York's Clean Energy Fund, designed to deliver on the state's Reforming the Energy Vision (REV) commitments, implements energy efficiency initiatives on a fuel-neutral basis. By taking a fuel-neutral approach, New York State can increase energy efficiency at the lowest cost, enable greater greenhouse gas reductions, and stimulate local economic development.[25]

[21] Calvert, K., I. McVey, and A. Kantamneni. 2017. "Placing the 'Community' in Community Energy Planning. Prepared for *Guelph's Community Energy Initiative Task Force* by the Community Energy Knowledge-Action Partnership. DOI: 10.13140/RG.2.2.22817.30562. www.researchgate.net/publication/319141113_Placing_the_'Community'_in_Community_Energy_Planning.

[22] Reames, T. 2016. "A Community-Based Approach to Low-Income Residential Energy Efficiency Participation Barriers." *The International Journal of Justice and Sustainability* Vol 21. www.tandfonline.com/doi/abs/10.1080/13549839.2015.1136995.

[23] Energy Efficiency for All, *One-Stop Shops for the Multifamily Sector*. assets.ctfassets.net/ntcn17ss1ow9/30B8LUDt8GTegjPE8clalF/8c5e68405c9692afb9f11fe898b8653e/EEFA_OneStopShop_Fact_Sheet__2_.pdf.

[24] Lin, J., K.M. Rodgers, S. Kabaca, M. Frades, and D. Ware. 2020. "Energy Affordability in Practice: Oracle Utilities Opower's Business Intelligence to Meet Low and Moderate Income Need at Eversource." *The Electricity Journal*. 33 (9): 1–11. doi.org/10.1016/j.tej.2019.106687.

[25] NYSERDA. Reforming the Energy Vision: Clean Energy Fund, Frequently Asked Questions. www.nyserda.ny.gov/-/media/Files/About/Clean-Energy-Fund/clean-energy-fund-qa.pdf.

Funding and financing

Leveraging diverse funding sources allows programs to address health and safety issues and include greater investment and available measures. Funding for low-income energy efficiency programs often comes from electric and natural gas utility ratepayer dollars, federal WAP and LIHEAP funds, state and local funds, nonprofit resources, and other private funding sources. Leveraging funding from various sources can give program implementers greater flexibility, as some federal and utility funding sources limit the types of measures they fund. Leveraging diverse funding sources can lead to a more comprehensive program outcome that has the flexibility to address health and safety issues and incorporate more complex sets of energy efficiency investments.

Inclusive financing models, such as no-interest loans, loan guarantees, and the elimination of credit requirements, are designed to help low-income households overcome up-front cost barriers to accessing traditional private financing options. Inclusive financing options include Pay As You Save (PAYS) programs and on-bill tariff models, which allow low-income households to install energy efficiency investments that are paid off over time on the customer's bill.[26] In the low-income multifamily sector, limiting or eliminating up-front costs to building owners can help them undertake more substantial energy efficiency projects and overcome barriers related to the competition for scarce funding for capital projects. Low-interest financing and on-bill repayment can help owners spread out their energy efficiency project costs over time.

Align utility and housing finance programs to encourage energy efficiency upgrades in low-income multifamily buildings. Incorporating utility-customer funding in the current climate of affordable housing refinance and redevelopment can yield deeper, more comprehensive energy efficiency improvements. These extensive renovations may involve replacing outdated building systems, and utility-customer funds can be used to help cover the incremental cost of installing more-efficient equipment than would otherwise be required. For example, the Connecticut Green Bank coordinates closely with the state's energy efficiency initiatives led by the state agencies and local utilities to align incentives for affordable financing for both energy efficiency upgrades and rooftop solar installations. The Connecticut Green Bank's financing opportunities complement the available funding for energy efficiency upgrades from the Connecticut Housing Finance Authority and the Connecticut Department of Housing.[27]

Effective measures, messaging, and targeting

Include health and safety measures and healthier building materials to reduce deferral rates and improve indoor air quality, comfort, and long-term health outcomes for program participants. Programs often address health and safety concerns through leveraged funds. However, rather than disqualifying households due to building health and safety issues such as structural problems, mold, or asbestos, utilities and program implementers can combine funding streams to provide health and safety services. For example, the Bronx Healthy Buildings Program aims to reduce asthma-related hospital visits and address the social determinants of health through education, organizing, workforce development, and building upgrades. Energy audits, building inspections, and tenant organizing aim to identify needed repairs and opportunities for energy efficiency improvements.[28]

Prioritize deep energy-saving measures through a single program and/or engagement to achieve high levels of energy savings. Using trusted contractor networks to deliver programs that include savings-based incentives lets contractors focus on deep savings rather than limiting projects to simple direct-install measures. For example, Oncor's Targeted Weatherization Low-Income program first prioritizes deep energy-saving measures such as building-shell weatherization and air sealing, and then focuses on additional measures such as air-conditioning, refrigeration, and lighting.[29]

Integrate direct-installation and rebate programs to encourage more extensive improvements. For low-income single and multifamily projects, direct-installation programs that offer no-cost energy efficiency measures can provide an opportunity to connect with building owners, complete an on-site energy assessment, and encourage owners to take advantage of rebates for more extensive improvements such as HVAC upgrades, weatherization, common-area lighting retrofits, and other building-shell improvements.

Targeting high energy users and vulnerable households to generate the greatest energy savings and impact. By using utility data to identify households with the highest energy use, energy efficiency providers can achieve the greatest energy savings. Even so, energy use should be looked at in combination with other factors

[26] For more information on inclusive financing options, see SEE Action, 2017. *Energy Efficiency Financing for Low- and Moderate Income Households: Current State of the Market, Issues, and Opportunities.* emp.lbl.gov/sites/default/files/news/lmi-final0811.pdf.

[27] See ACEEE's 2018 report, *Our Powers Combined: Energy Efficiency and Solar in Affordable Multifamily Buildings*. aceee.org/research-report/u1804.

[28] buildhealthchallenge.org/communities/awardee-bronx-nyc/.

[29] Gilleo, A., S. Nowak, and A. Drehobl. 2017. *Making a Difference: Strategies for Successful Low-Income Energy Efficiency Programs.* Washington, DC: ACEEE. aceee.org/sites/default/files/publications/researchreports/u1713.pdf.

that lead to household energy vulnerability. Although high energy use can lead to high savings, households with lower energy use can still experience high energy burdens. Efficiency Vermont, for example, changed its program qualification to focus on low-income households with high energy burden rather than low-income households with high energy use. This let the program qualify more customers and target needs to the most vulnerable households.[30]

Incorporate new and emerging technologies in low-income programs. Expanding the technology scope of low-income energy efficiency programs to technologies they do not traditionally incorporate—such as solar PV, smart meters, energy storage, and electric vehicles—can significantly improve energy affordability and equitable access to these technologies for low-income households.[31] Unless we ensure that new technologies are available to low-income and underinvested communities, inequities in access to these technologies will continue to grow. Programs that incorporate these emerging technologies can address access barriers for low-income communities and ensure more equitable distribution of their benefits.

Effectively message programs in ways that provide clear value and actionable guidance. Effective messaging helps achieve high program participation and builds trust and understanding of program benefits. Investing in energy efficiency often takes time and resources for both single and multifamily building owners. Although programs typically focus on energy savings and energy cost reductions benefits, programs must also market the many nonenergy benefits that result from energy efficiency improvements. Further, they should include actionable guidance—that is, clear steps that residents and building owners can take to learn more about program services and enroll in the program.

Evaluation and quality control

Collect and share metrics on program outcomes, equity impacts, and other tracked data to hold implementers accountable to program requirements and goals. These metrics can include factors such as race and/or ethnicity, income status, property ownership, energy burden, and energy vulnerability. Often, program implementers publish demand-side management reports that include metrics on low-income program savings, spending, and customers served. Implementers can report additional equity factors such as energy burden data, demographic data, and participation distribution. For example, VEIC published the *State of Equity Measurement: A Review of Practices in the Clean Energy Industry*, a guide that offers an overview of energy industry metrics for measuring program equity.[32] These include metrics to define target populations, determine disparate impacts, and include representative voices in program design, implementation, evaluation, and oversight.

Conduct robust research and evaluation to assess achieved reductions in energy usage. Such evaluations help document and clarify program performance. Impact evaluations measure the direct and indirect benefits from programs, while process evaluations provide systematic assessments of how programs operate. By completing robust evaluations, program planners can determine how to best improve their programs for greater impact and efficiency, and better meet the needs of the target community.

Include quality control as a core element of the services to ensure that energy efficiency services are effective, and homes are left in a safe condition. Many program implementers incorporate ongoing training for contractors and quality control professionals, viewing this as critical to program success and devoting project funding to regular trainings. Some program administrators also include strict quality control requirements for all projects rather than for a sample, which helps incentivize contractors to perform high-quality work. For example, Ouachita Electric Cooperative's HELP PAY program, a tariff-based residential energy efficiency financing program, evaluates every project after completion and facilitates trainings for its contractors in quality control techniques to ensure that all contractors understand the assessment methodologies.[33]

Incorporate nonenergy benefits into testing. Without monetizing nonenergy benefits, utility-operated low-income energy efficiency programs cost more to implement per household—and are less cost effective by traditional measures—than utility-operated energy efficiency programs serving higher income groups. However, low-income energy programs deliver benefits beyond energy savings to low-income households that are not typically incorporated into traditional cost-effectiveness testing methods. The *National Standard Practice Manual* discusses how low-income program benefits can be considered at the societal level.[34] States can decide to adjust cost-effectiveness tests for

[30] Efficiency Vermont. 2020. *Targeted Communities Program Update*. www.efficiencyvermont.com/trade-partners/targeted-communities-program-update.

[31] Brown, M., A. Soni, M. Lapsa, and K. Southworth. 2020. *Low-Income Energy Affordability: Conclusions from a Literature Review*. ORNL/TM-2019/1150. info.ornl.gov/sites/publications/Files/Pub124723.pdf.

[32] Levin, E., E. Palchak, and R. Stephenson. 2019. *The State of Equity Measurement: A Review of Practices in the Clean Energy Industry*. Winooski, VT: VEIC. www.veic.org/Media/default/documents/resources/reports/equity_measurement_clean_energy_industry.pdf.

[33] Gilleo, A., S. Nowak, and A. Drehobl. 2017. *Making a Difference: Strategies for Successful Low-Income Energy Efficiency Programs*. Washington, DC: ACEEE. aceee.org/sites/default/files/publications/researchreports/u1713.pdf.

[34] National Efficiency Screening Project. 2017. *National Standard Practice Manual*. nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_May-2017_final.pdf. Page 58: Societal Low-Income Impacts.

low-income programs to incorporate these additional benefits. For example, Vermont uses the societal cost test as its primary test and incorporates a 15% adder for nonenergy benefits for low-income customers in its cost-effectiveness screening tool. Similarly, Colorado uses the total resource cost test and includes a 50% adder to account for the benefits from low-income programs.

Renewables and workforce

Integrate energy efficiency and solar program offerings to maximize participant benefits. To do this, combined renewable and energy efficiency programs should first invest in energy efficiency to reduce the home's overall energy needs, and then invest in renewable energy so that individual households can install the right size solar system or many households can access community solar options. For example, the Connecticut Green Bank collaborates with PosiGen, a private company, to deliver both solar and energy efficiency to low-income customers. The Green Bank helps PosiGen generate capital to provide 20-year solar leases combined with energy efficiency upgrades to program participants, leading to the most cost-effective investment.[35]

Support the development of a diverse and strong energy efficiency workforce that represents the local community. Ensure that training opportunities are linked to high-quality, well-paid, and stable careers in the energy efficiency and clean energy workforce sector. States and local governments, utilities, and other program implementers can focus on diversifying suppliers, increasing the worker pipeline by offering training for both contracting firms and students, and partnering with skills-training providers and state agencies—all while working to overcome barriers faced by historically excluded community members. Implementers can also co-deliver training for energy efficiency and renewable energy technologies. For example, the Chicago-based nonprofit Elevate Energy coordinates a Clean Energy Jobs Accelerator that trains individuals from economically excluded communities for careers in solar and energy efficiency.

[35] EDF (Environmental Defense Fund) and APPRISE (Applied Public Policy Research Institute for Study and Evaluation). 2018. Low-Income Energy Efficiency. New York. www.edf.org/sites/default/files/documents/liee_national_summary.pdf.

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REPORT U2006

California's Cities Lead the Way to a Gas-Free Future

By Matt Gough
June 2, 2021

A coalition of organizations supports San Jose going all-electric.
Photo courtesy of Mothers Out Front

UPDATED June 2: The city of Sacramento became the 46th city to commit to phase out gas in new buildings.

Cities and counties in California serve as guiding lights as the state navigates a transition from gas to clean-energy buildings. Motivated by the climate crisis, worsening air pollution, escalating gas rates, and safety risks from gas, a new cohort of local government leaders is emerging in California. Over 50 cities and counties across the state are considering policies to support all-electric new construction.

This blog summarizes the cities and counties that have already adopted gas-free buildings commitments or electrification building codes (i.e., "reach codes" that go beyond the statewide building code) and is regularly updated to reflect the latest wins in California. Ordinance language is also linked below.

To urge your city council members to be climate leaders and to create a gas-free future for our homes and buildings, please **sign this petition.**To get more involved in the campaign, please **sign up here for updates** on what is happening in your city.

So far, 46 cities (listed with the most recent city first) have adopted building codes to reduce their reliance on gas. More to come with your help! Stay tuned....

46. **Sacramento-** requires all new buildings under 3 stories to be all-electric by 2023 and extends the mandate to all new construction by 2026. Approved 6/1/2021.

45. **South San Francisco**- requires all new residential buildings to be all-electric. Approved 5/26/2021.

44. **Petaluma**- Requires all buildings to be all-electric and bans all new gas stations. Approved 5/3/2021.

43. **Daly City**- Required all-electric new residential and non-residential buildings with blanket exemptions for 100% affordable housing buildings, commercial kitchens, and laboratories. Approved 4/27/2021.

42. **San Carlos**- Requires newly constructed buildings and remodel projects that update more than 50% of the building to be all-electric with some exceptions. Approved 1/25/2021.

41. **Albany**- Encourages newly constructed residential and commercial buildings to be electric preferred and requires mixed fuel buildings to exceed the California Energy Code. Approved 12/9/2020.

40. **Oakland**- Requires all newly constructed buildings to be all-electric. Approved 12/1/2020.

39. **Ojai**- Requires all-electric new construction for buildings with some exceptions. Approved 10/27/2020.

38. **Sunnyvale**- Requires newly constructed residential and commercial buildings to be all-electric with an exemption for gas fuel cells. Restaurants may apply for an exemption. Approved 10/27/2020.

37. **Millbrae**- Requires all-electric residential and commercial buildings with exemptions for laboratories, restaurants and gas cooking/fireplaces. Approved 10/27/2020.

36. **Los Altos**- Requires all newly constructed buildings to be all-electric with exemptions for gas cooking/fireplaces in residential buildings with 9 units or less, laboratories and restaurants. Approved 10/27/2020.

35. **East Palo Alto**- Requires that new residential and commercial buildings be all-electric, with exceptions for affordable housing, and commercial kitchens. Approved 10/6/2020.

34. **Redwood City**- Adopted a reach code requiring all-electric new construction for commercial and residential buildings, with exceptions for multiple specific building types such as laboratories. Approved 8/24/2020.

33. **Piedmont**- Promotes all-electric new construction for low-rise residential buildings and incentives electrification for renovations of low-rise residences. Approved 7/20/2020.

32. **San Anselmo**- Promotes all electric housing by requiring higher energy efficiency requirements for mixed fuel projects and prewiring for al electric kitchens. Approved 4/14/2020.

31. **Burlingame**- Requires all electric new construction for projects with exemptions for single-family and commercial projects for gas cooking and fireplaces. Approved 7/6/2020.

30. **Santa Cruz**- Requires all electric new construction with exemptions for projects that are deemed to be in the public interest and for restaurant cooking. Approved 3/24/2020.

29. **Hayward**- All new residential buildings are required to be all-electric and nonresidential and high-rise residential buildings are electric preferred. Mixed-fuel buildings must install solar panels, and the energy budget must be 10 percent better than code. Approved 3/3/2020.

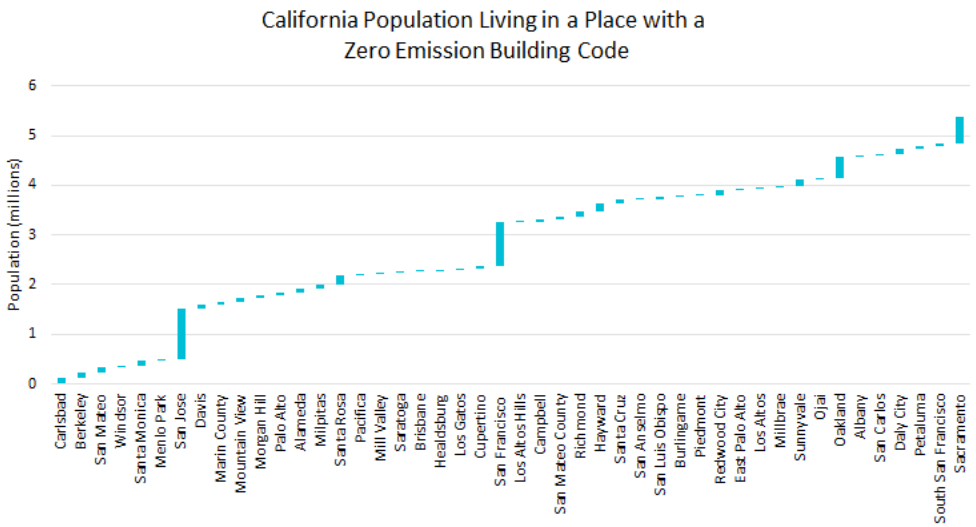
28. **Richmond**- Requires new residential buildings over three stories to have prewiring for electric readiness and to support all-electric clothes dryers and space and water heating. Allows gas to power stoves and fireplaces. Requires all buildings under three stories to build all-electric and install a minimum amount of on-site solar based on square footage. Approved 2/18/2020.

27. **San Mateo County**- Requires that no gas or propane plumbing is installed in new buildings, and that electricity be used as the energy source for water and space heating and cooking and clothes drying appliances. Approved 2/11/2020.

26. **Campbell**- Requires all-electric space and water heating in new residential buildings, accessory dwelling units, and major remodels. Approved 2/4/2020.

25. **Los Altos Hills**- Requires electric space and water heating in new low-rise residential buildings. Approved 1/16/2020.

24. **San Francisco** recently expanded on their building electrification ordinance, now requiring that all new construction be all electric starting June 1st 2021. Approved 12/17/2019.



23. **Cupertino**- Requires all buildings, including accessory dwelling units, to be all-electric. Also requires outdoor pools, spas, and barbeques to be included within the definition of an all-electric building. Approved 12/17/2019.

22. **Los Gatos**- Requires all newly constructed single-family and low-rise multifamily buildings to be all-electric. Approved 12/3/2019.

21. **Healdsburg**- Requires electrification for most appliances but grants an exemption for gas cooking and fireplaces. Approved 12/2/2019.

20. **Brisbane**- Requires all newly constructed single-family homes and low-rise multifamily buildings to be all-electric. Allows exemptions for cooking appliances but requires pre-wiring for electric readiness. Approved 11/21.2019.

19. **Saratoga**- Requires all newly constructed buildings to be all-electric. Approved 11/20/2019.

18. Mill Valley- Requires all newly constructed residential buildings to be all electric. Approved 11/18/2019.

17. Pacifica- Requires electrification for most appliances but grants an exemption for gas cooking and fireplaces in new residential buildings. Requires water and space heaters, cooking appliances, fireplaces, and clothes dryers to be all-electric for new nonresidential buildings. Public agencies providing emergency services and nonresidential kitchens are exempted. Approved 11/12/2019.

16. Santa Rosa- Requires all newly constructed low-rise residential buildings to be all-electric. Approved 11/12/2019.

15. Milpitas- Limits gas infrastructure for newly constructed buildings on city-owned property. Approved 11/5/2019.

14. Alameda- Limits gas infrastructure for new residential construction on city-owned property and as of May 18, they've expanded the code to require newly constructed buildings to be all electric with some exceptions. Approved 11/5/2019.

13. Palo Alto- Requires all newly constructed low-rise residential buildings to be all-electric, plus higher energy-efficiency standards and electrification readiness in mixed-fuel non-residential buildings. Will revisit all-electric requirement for non-residential new construction in 2021. Approved 11/4/2019.

12. Morgan Hill- Phases out gas hookups in all newly constructed residential buildings and most nonresidential buildings. Approved 10/23/2019.

11. Mountain View- Requires electrification for new residential and nonresidential buildings. Does not exempt gas stoves, fireplaces, or firepits in residential buildings. Approved 10/22/2019.

10. Marin County- Offered three compliance pathways for newly constructed buildings in unincorporated buildings: one for all-electric construction, one for limited mixed-fuel construction that has fewer efficiency requirements because it uses less gas but allows gas stoves, and one for mixed-fuel construction that requires the most strict compliance with Cal Green Tier 1 and electrification-readiness requirements. Approved 9/24/2019.

9. Davis- Requires higher energy-efficiency standards and electrification readiness in mixed-fuel buildings. Approved 9/24/2019.

8. San Jose- San Jose passed a natural gas prohibition for all new building types, with limited temporary exemptions, becoming the largest city in the nation to do so. Approved 9/17/2019.

7. Menlo Park- Requires all-electric new construction for residential buildings as well as new nonresidential buildings but allows an exemption for cooking appliances in low-rise residential buildings. Approved 9/10/2019.

6. Santa Monica- Requires additional energy-efficiency measures for new residential and nonresidential buildings that use gas. Approved 9/10/2019.

5. San Mateo- Requires new residential buildings and buildings with office-use to be all-electric. Adds additional requirements for rooftop solar and electric vehicle charging. Approved 8/27/2019.

4. San Luis Obispo- Requires additional energy efficiency and electrification readiness for all newly constructed buildings and adds a small fee for new mixed-fuel buildings based on expected gas consumption. Approval of updated code 6/16/2020.

3. Windsor- Mandates all-electric new construction for low-rise residential buildings, including single-family homes, multifamily homes with fewer than four stories, and detached accessory dwelling units (but attached ones are exempt). Approved 8/27/2019.

2. Berkeley- Phases out gas hookups in all newly constructed residential buildings and most nonresidential buildings. Approved 7/15/2019.

1.Carlsbad- Requires heat pump water heaters or solar thermal water heating in new residential buildings that have fewer than four stories. Approved 2/26/2019.

City and county leadership is essential not just for local climate action but also to convince the California Energy Commission to require or at least support all-electric new construction in the statewide building code (Title 24).

The CEC updates Title 24 every three years. The 2019 version of Title 24 went into effect January 1, 2020. The CEC is already working on the next iteration of Title 24, which will come out in 2022. All of this community and city support for more-ambitious building codes sends a strong signal to the CEC to align the statewide building code with climate science and require all-electric new construction. Californians deserve nothing less.

Matt Gough is a senior campaign representative for the Sierra Club's My Generation campaign.

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By Carlo De La Cruz

May 7, 2021

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UTILITY DIVE

DEEP DIVE

California's last nuclear plant is poised to shut down. What happens next?

A large amount of carbon-free energy will come offline once the Diablo Canyon power plant retires, raising questions around how the state will replace it.

Published March 23, 2021

Kavya Balaraman
Reporter

As California's last nuclear facility — the 2.2 GW Diablo Canyon power plant — approaches its scheduled retirement date, some energy experts worry that the state hasn't fully prepared for what comes next.

The Diablo Canyon plant is located on California's Central Coast and produces some 18,000 GWh of electricity annually — almost 10% of the state's energy portfolio. Since the closure of the San Onofre Nuclear Generating Station eight years ago, it has been the sole operational nuclear power facility in California. In 2018, regulators allowed Pacific Gas & Electric (PG&E) to close down the plant's two reactors when their licenses expire in 2024 and 2025. But as those dates draw nearer, experts are questioning what it will mean for California's reliability and greenhouse gas (GHG) emission goals.

"You have this huge amount of carbon-free resources that will be coming offline three to four years from now — which is in reality like tomorrow, when you're trying to develop other new resources,"

Jan Smutny-Jones, CEO of the Independent Energy Producers Association, said.

"So it's really significant that it's going away and the question then is, what do we replace it with?" he added.

A 'critical inflection point'

The Diablo Canyon nuclear plant came online in 1985 and has been the target of numerous protests over its lifespan, especially after the discovery of a nearby earthquake fault. But the plant has also played a key role in ensuring the reliability of California's electric grid.

When PG&E first filed for permission to retire the plant, the utility also outlined a plan to partially replace it with three tranches of carbon-free resources — a combination of 2,000 GWh of energy efficiency, 2,000 GWh of carbon-free energy, and a voluntary 55% renewables commitment.

The California Public Utilities Commission (CPUC), however, declined to authorize that plan, instead shifting the question of how to replace Diablo Canyon to the agency's integrated resource planning proceeding. The regulators said in a 2018 decision that they intended to ensure the plant's closure didn't lead to an increase of greenhouse gases, but "it is not clear based on the limited record in this proceeding what level of GHG-free procurement (if any) may be needed to offset the retirement of Diablo Canyon."

> **""It's [around] 2100 MW of power that is baseload — and so that is a particular challenge in terms of reliability, particularly since the state has had a policy of trying to move away from fossil fuels."**

> Dan Richard
> *Energy Consultant*

More recently — and especially in the wake of the rolling blackouts that occurred in California last August — some stakeholders are taking a closer look at how Diablo Canyon's retirement will affect electric reliability in the state. Last October, the California Independent System Operator (CAISO) warned in a filing that the system will hit a "critical inflection point" after the nuclear plant retires, with resource needs that are much higher than initially anticipated to ensure reliability.

"It's [around] 2,100 MW of power that is baseload — and so that is a particular challenge in terms of reliability, particularly since the state has had a policy of trying to move away from fossil fuels," Dan Richard, a solo energy consultant and former senior official at PG&E, explained.

CAISO has been modeling for a potential loss of Diablo Canyon since before its retirement was proposed, spokesperson Anne Gonzales said in an emailed statement. In its 2018-2019 transmission plan, the system operator recommended transmission upgrades to address reliability issues from the plant's closure — two dynamic reactive devices in the central and northern PG&E bulk system, both of which are currently being installed, Gonzales added.

California has a robust renewable energy portfolio, but that raises questions of effective capacity versus installed capacity, Richard said. Moreover, Diablo Canyon will be retired against the backdrop of the electrification of California's transportation system, which is likely to increase electricity demand.

> **"I think that unless we properly manage this, we run the risk of additional erosion of reliability, and potentially resulting in excessive cost as well."**
>
> Jan Smutny-Jones
> *CEO, Independent Energy Producers Association*

Without careful planning, California will be forced to rely on short-term procurements after the nuclear plant is shuttered, scrambling around to add a little power here and there, said Smutny-Jones. Meanwhile, a group of gas-fired plants that were initially supposed to go offline at the end of 2020, before being extended for reliability reasons, might have to stay online until there are adequate resources to replace them.

"There's a whole cottage industry of people who want to do nothing more than shut down gas plants as quickly as they can… in an effort to get to the 2045 goals as quickly as possible," Smutny-Jones added. "I think that unless we properly manage this, we run the risk of additional erosion of reliability, and potentially resulting in excessive cost as well."

CPUC looks to geothermal, long-duration storage

Last month, the CPUC issued a ruling to address potential reliability challenges in 2024 through 2026, due to a variety of factors including the retirement of Diablo Canyon and natural gas plants. In total, the agency recommended procuring 7,500 MW of resources from 2023 through 2025, and is contemplating partially meeting that need through 1 GW of geothermal energy and 1 GW of long-duration storage, with a minimum duration of eight hours.

Long-duration storage and geothermal resources can both help to produce energy more consistently around the clock, agreed Mark

Specht, an energy analyst with the Union of Concerned Scientists (UCS) — regulators seem to be looking out over the long term and recognizing that these are resources the system will need sooner or later.

"We may as well build sooner, especially given their very high grid reliability contributions," he added.

But bringing those resources online in the next four or five years could be a challenge, Specht said. And Richard is concerned that long-duration storage technologies — with the exception of pumped hydro, which faces its own siting and permitting challenges — are not sufficiently evolved yet.

Diablo Canyon's retirement could also jeopardize California's GHG emission goals. California enacted legislation in 2018 that requires state regulators to prevent the plant's closure from leading to an increase in emissions. But without enough planning, natural gas power plants could step in to fill the gap, leading to a potential 15.5 million metric tons of additional GHG emissions between now and the end of the decade, according to a report from UCS — roughly equivalent to the impact of 306,000 gasoline passenger vehicles during the same period.

"You saw that back in the 2014 timeframe, when the San Onofre Nuclear Generating Station went offline," Smutny-Jones said. "We had been reducing CO2 from California-based plants at a pretty steady downward line and then all of a sudden, it started bouncing upwards... it wouldn't be surprising to see a very similar pattern occur in 2025."

For nuclear advocates, the solution is clear: stop the plan to shut the Diablo Canyon power plant down, and maybe even build more nuclear plants in California. Retiring the plant is a risky move, given that California is vulnerable to earthquakes and the potential

for that capacity to be replaced with natural gas generation, according to Gene Nelson, government liaison at Californians for Green Nuclear Power.

"The idea that we should turn off a reliable, earthquake resistant nuclear power plant to serve narrow commercial interests is not in the public interest," Nelson said.

But others are skeptical that Diablo Canyon's scheduled retirement can be stopped.

"A lot of parties came together to reach a balanced settlement on the closure of the plant, so I think the momentum is certainly in that direction," Richard said. But stakeholders are somewhat split on the broader question of how nuclear power can fit into California's clean energy transition, so "I don't see any momentum for that right now, but I would not be surprised if that conversation does come to the table," he added.

> **"Just by choosing one of those lower targets, it drives more investment in clean energy earlier in the decade and helps mitigate any increase from emissions from Diablo Canyon shutting down."**
>
> Mark Specht
> *Energy Analyst, Union of Concerned Scientists*

Specht, however, says that ship has sailed. UCS' recent report concluded that the best way to replace the plant's generation is through a combination of diverse renewables and storage, and one way to go about this would be to set California on the path to a more aggressive emissions reduction target. Last year, the CPUC adopted a 46 million metric ton target for the state's electric sector

by the end of the decade, but also asked load-serving entities to consider further reducing emissions to 38 MMT.

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"Just by choosing one of those lower targets, it drives more investment in clean energy earlier in the decade and helps mitigate any increase from emissions from Diablo Canyon shutting down," Specht explained.

The location of the Diablo Canyon plant could also provide opportunities for resources to replace it. Since the facility is such a major generating asset, there are massive transmission configurations coming out of it, with feeder lines traveling north and south, said Michael Colvin, director of regulatory and legislative affairs at the Environmental Defense Fund.

As a result, it has served as a sort of major junction for moving power around the state. Once the facility retires, California will have additional headroom on those lines and could potentially site new generation, like offshore wind, nearby.

"It's a fairly central part of that service territory, so you can connect to some more transmission and have additional capacity without having to string new wire," Colvin said.

A shredded electric vehicle battery can yield recyclable metals, but it is often cheaper for batterymakers to use new materials. ARGONNE NATIONAL LABORATORY

Millions of electric cars are coming. What happens to all the dead batteries?

By **Ian Morse** | May. 20, 2021 , 12:44 PM

The battery pack of a Tesla Model S is a feat of intricate engineering. Thousands of cylindrical cells with components sourced from around the world transform lithium and electrons into enough energy to propel the car hundreds of kilometers, again and again, without tailpipe emissions. But when the battery comes to the end of its life, its green benefits fade. If it ends up in a landfill, its cells can release problematic toxins, including heavy metals. And recycling the battery can be a hazardous business, warns materials scientist Dana Thompson of the University of Leicester. Cut

ombust, and release toxic

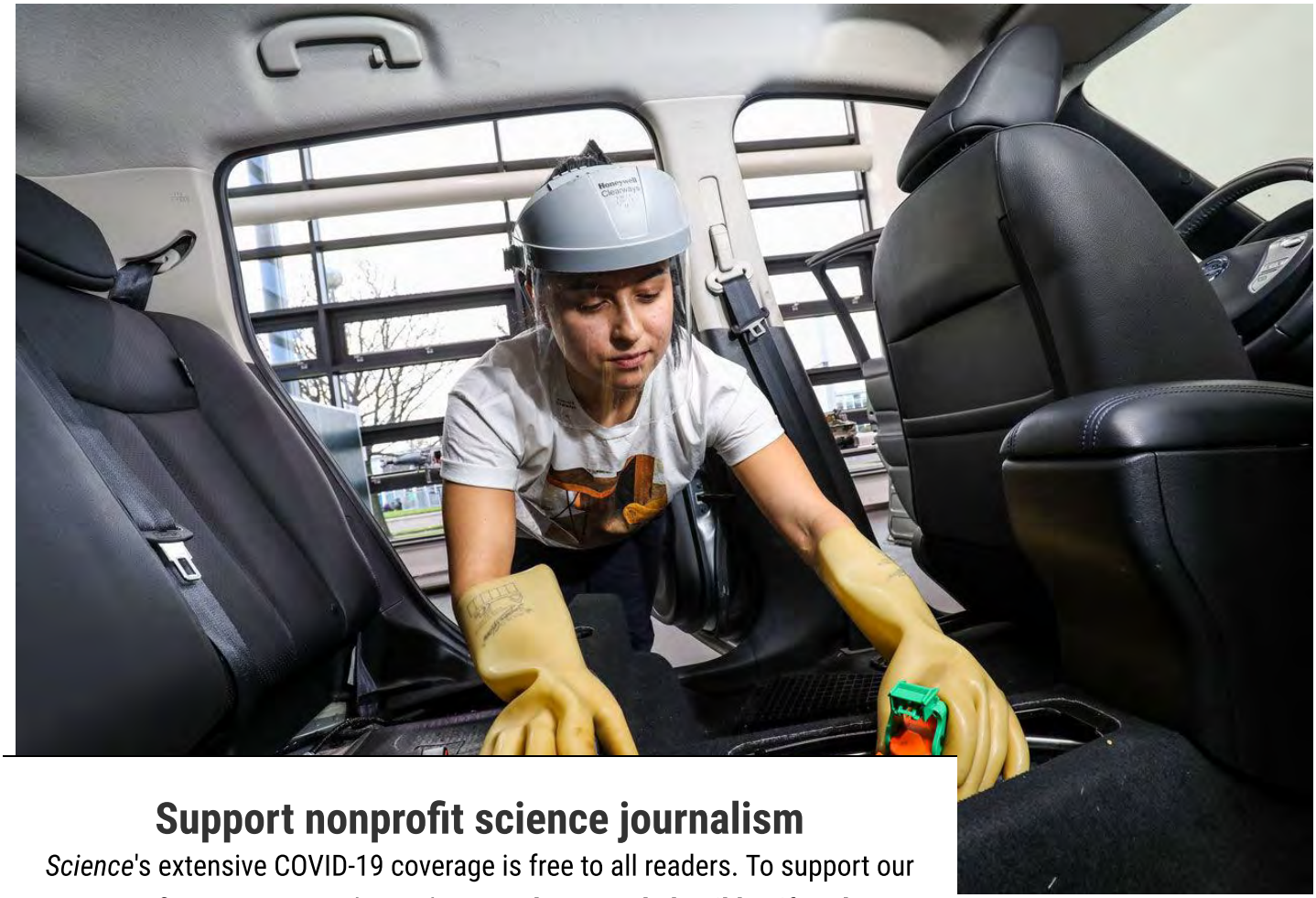
Thompson, who are trying
icle (EV) batteries that

batteries “are really not designed to be recycled,” says Thompson, a research fellow at the Faraday Institution, a research center focused on battery issues in the United Kingdom.

That wasn’t much of a problem when EVs were rare. But now the technology is taking off. Several carmakers have said they plan to phase out combustion engines within a few decades, and industry analysts predict at least 145 million EVs will be on the road by 2030, up from just 11 million last year. “People are starting to realize this is an issue,” Thompson says.

Governments are inching toward requiring some level of recycling. In 2018, China imposed new rules aimed at promoting the reuse of EV battery components. The European Union is expected to finalize its first requirements this year. In the United States, the federal government has yet to advance recycling mandates, but several states, including California—the nation’s largest car market—are exploring setting their own rules.

Complying won’t be easy. Batteries differ widely in chemistry and construction, which makes it difficult to create efficient recycling systems. And the cells are often held together with tough glues that make them difficult to take apart. That has contributed to an economic obstacle: It’s often cheaper for batterymakers to buy freshly mined metals than to use recycled materials.



s from spent car batteries.

ote, but also help governments boost their economic and national security by increasing supplies of key battery metals that are controlled by one or a few nations. “On the one side, [disposing of EV batteries] is a waste management problem. And on the other side, it’s an opportunity for producing a sustainable secondary stream of critical materials,” says Gavin Harper, a University of Birmingham researcher who studies EV policy issues.

To jump-start recycling, governments and industry are putting money into an array of research initiatives. The U.S. Department of Energy (DOE) has pumped some $15 million into a ReCell Center to coordinate studies by scientists in academia, industry, and at government laboratories. The United Kingdom has backed the ReLiB project, a multi-institution effort. As the EV industry ramps up, the need for progress is becoming urgent, says Linda Gaines, who works on battery recycling at DOE’s Argonne National Laboratory. “The sooner we can get everything moving,” she says, “the better.”

EV BATTERIES are constructed a bit like nested dolls. Typically, a main pack holds several modules, each of which is constructed from numerous smaller cells (see graphic, below). Inside each cell, lithium atoms move through an electrolyte between a graphite anode and a cathode sheet composed of a metal oxide. Batteries are usually defined by the metals in the cathode. There are three main types: nickel-cobalt-aluminum, iron-phosphate, and nickel-manganese-cobalt.

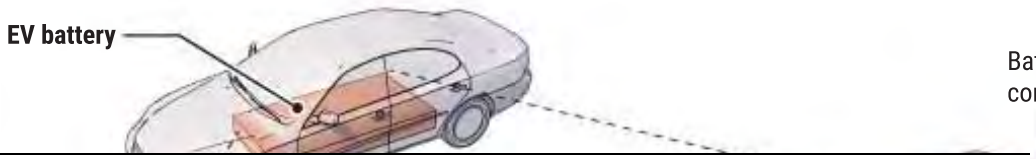
Now, recyclers primarily target metals in the cathode, such as cobalt and nickel, that fetch high prices. (Lithium and graphite are too cheap for recycling to be economical.) But because of the small quantities, the metals are like needles in a haystack: hard to find and recover.

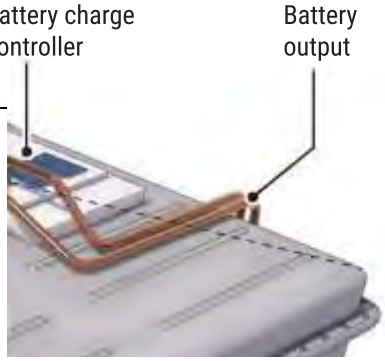
New life for spent cells

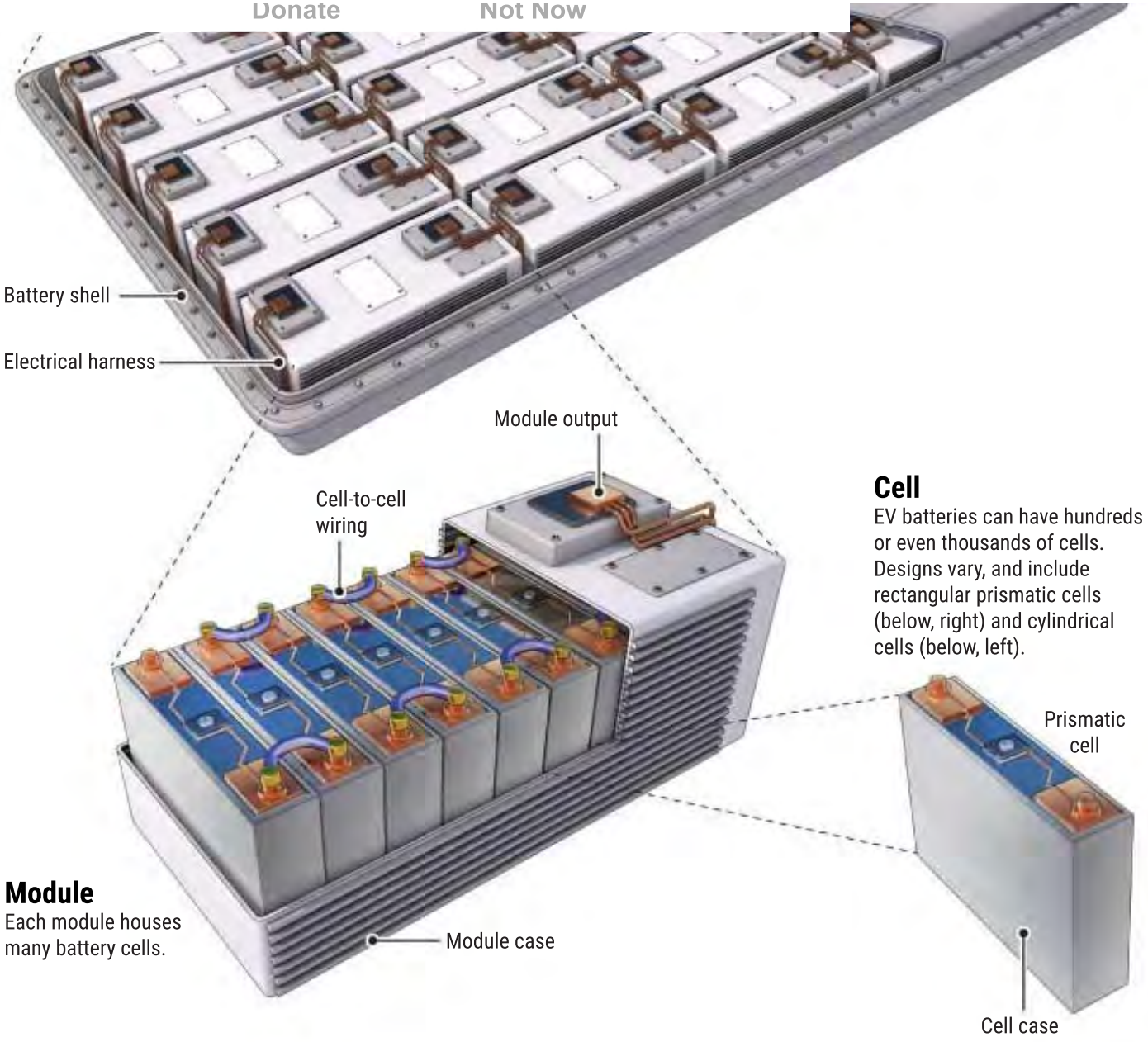
Scientists are working to ensure the electric vehicle (EV) batteries being sold today can be recycled in 2030 and beyond, when thousands of batteries will reach the end of their lives every day. EV batteries come in many designs, but generally share these components.

EV battery pack

Inside the pack, electrical components manage the charge and stability of dozens of modules.





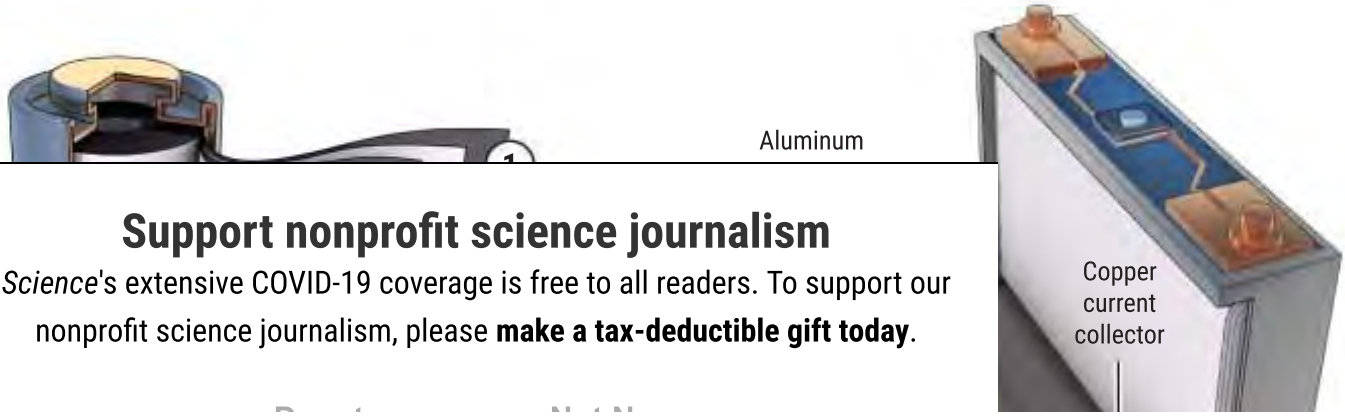


Module
Each module houses many battery cells.

Cell
EV batteries can have hundreds or even thousands of cells. Designs vary, and include rectangular prismatic cells (below, right) and cylindrical cells (below, left).

Cylindrical cell
A tough steel casing makes these cells difficult to open. Often durable glue combines thousands of cells into packs.

Cell components
Each cell houses the essential components of a battery. They release and store electricity as lithium atoms move between electrodes.



1 Cathode
The cathode typically holds the most valuable recyclable material, made up of many metals.

2 Anode
Negative electrodes are composed of graphite, carbon, or silicon-based components.

3 Electrolyte and separator
Lithium travels through a separator sheet soaked in electrolyte.

C. BICKEL/*SCIENCE*

To extract those needles, recyclers rely on two techniques, known as pyrometallurgy and hydrometallurgy. The more common is pyrometallurgy, in which recyclers first mechanically shred the cell and then burn it, leaving a charred mass of plastic, metals, and glues. At that point, they can use several methods to extract the metals, including further burning. “Pyromet is essentially treating the battery as if it were an ore” straight from a mine, Gaines says. Hydrometallurgy, in contrast, involves dunking battery materials in pools of acid, producing a metal-laden soup. Sometimes the two methods are combined.

Each has advantages and downsides. Pyrometallurgy, for example, doesn’t require the recycler to know the battery’s design or composition, or even whether it is completely discharged, in order to move ahead safely. But it is energy intensive. Hydrometallurgy can extract materials not easily obtained through burning, but it can involve chemicals that pose health risks. And recovering the desired elements from the chemical soup can be difficult, although researchers are experimenting with compounds that promise to dissolve certain battery metals but leave others in a solid form, making them easier to recover. For example, Thompson has identified one candidate, a mixture of acids and bases called a deep eutectic solvent, that dissolves everything but nickel.

Both processes produce extensive waste and emit greenhouse gases, studies have found. And the business model can be shaky: Most operations depend on selling recovered cobalt to stay in business, but batterymakers are trying to shift away from that relatively expensive metal. If that happens, recyclers could be left trying to sell piles of “dirt,” says materials scientist Rebecca Ciez of Purdue University.

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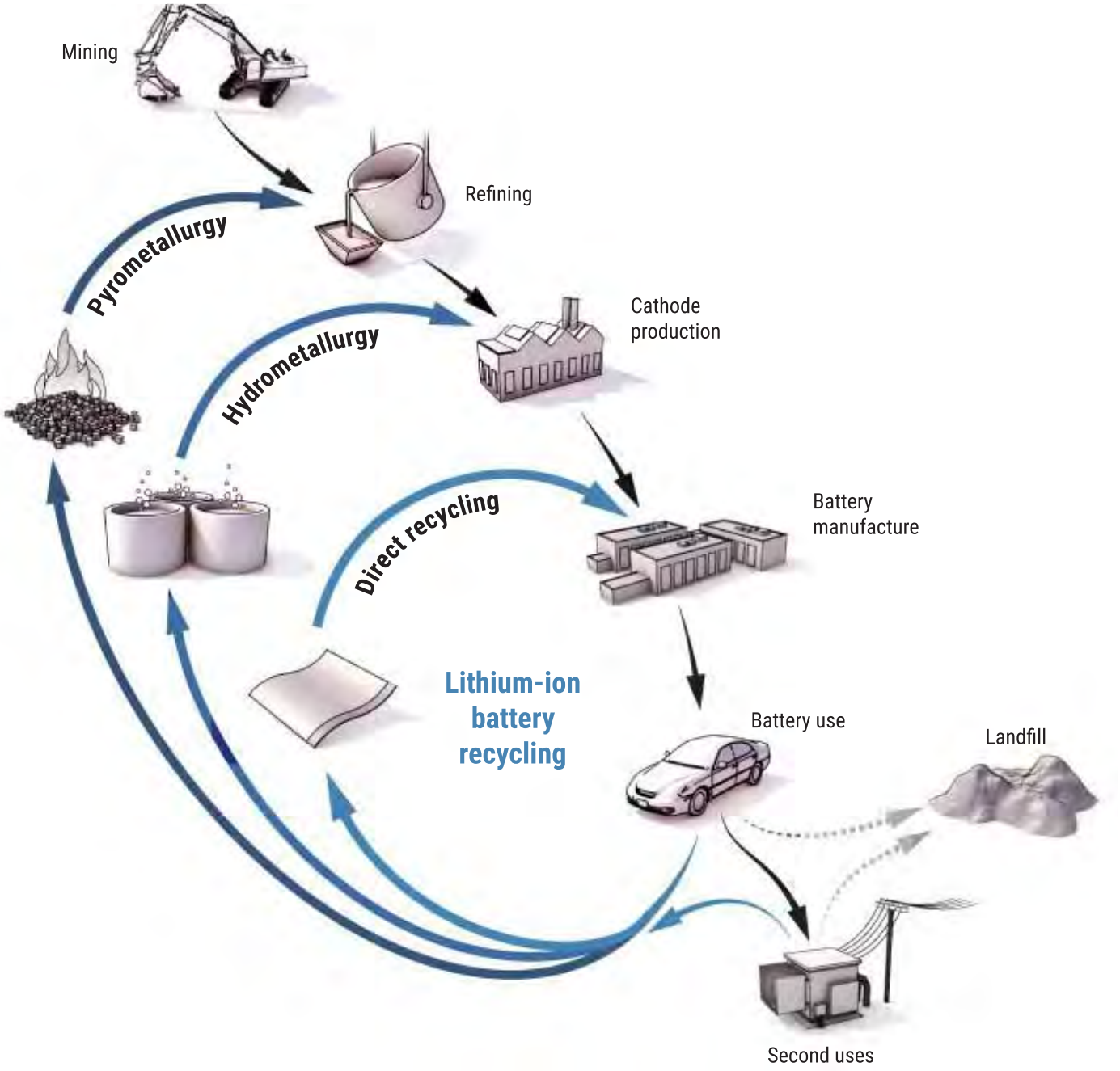

C. BICKEL/*SCIENCE*

THE IDEAL is direct recycling, which would keep the cathode mixture intact. That's attractive to batterymakers because recycled cathodes wouldn't require heavy processing, Gaines notes (although manufacturers might still have to revitalize cathodes by adding small amounts of lithium). "So if you're thinking circular economy, [direct recycling] is a smaller circle than pyromet or

hred battery cells. Then, nique to separate anode y powder.

yielded just tens of grams of cathode powders. But researchers at the U.S. National Renewable Energy Laboratory have built economic models showing the technique could, if scaled up under the right conditions, be viable in the future.

To realize direct recycling, however, batterymakers, recyclers, and researchers need to sort out a host of issues. One is making sure manufacturers label their batteries, so recyclers know what kind of cell they are dealing with—and whether the cathode metals have any value. Given the rapidly changing battery market, Gaines notes, cathodes manufactured today might not be able to find a future buyer. Recyclers would be “recovering a dinosaur. No one will want the product.”

A technician in Germany makes sure a burned lithium-ion battery is discharged before further recycling. WOLFGANG RATTAY/REUTERS

Another challenge is efficiently cracking open EV batteries. Nissan’s rectangular Leaf battery module can take 2 hours to dismantle. Tesla’s cells are unique not only for their cylindrical shape, but also

her.

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hat recyclers use to

ced restrictions on its use, and the U.S. Environmental Protection Agency determined last year that it poses an "unreasonable risk" to workers.

"In terms of economics, you've got to disassemble … [and] if you want to disassemble, then you've got to get rid of glues," says Andrew Abbott, a chemist at the University of Leicester and Thompson's adviser.

TO EASE THE PROCESS, Thompson and other researchers are urging EV- and batterymakers to start designing their products with recycling in mind. The ideal battery, Abbott says, would be like a Christmas cracker, a U.K. holiday gift that pops open when the recipient pulls at each end, revealing candy or a message. As an example, he points to the Blade Battery, a lithium ferrophosphate battery released last year by BYD, a Chinese EV-maker. Its pack does away with the module component, instead storing flat cells directly inside. The cells can be removed easily by hand, without fighting with wires and glues.

The Blade Battery emerged after China in 2018 began to make EV manufacturers responsible for ensuring batteries are recycled. The country now recycles more lithium-ion batteries than the rest of the world combined, using mostly pyro- and hydrometallurgical methods.

Nations moving to adopt similar policies face some thorny questions. One, Thompson says, is who should bear primary responsibility for making recycling happen. "Is it my responsibility because I bought [an EV] or is it the manufacturer's responsibility because they made it and they're selling it?"

In the European Union, one answer could come later this year, when officials release the continent's first rule. And next year a panel of experts created by the state of California is expected to weigh in with recommendations that could have a big influence over any U.S. policy.

Recycling researchers, meanwhile, say effective battery recycling will require more than just technological advances. The high cost of transporting combustible items long distances or across borders can discourage recycling. As a result, placing recycling centers in the right places could have a "massive impact," Harper says. "But there's going to be a real challenge in systems integration and bringing all these different bits of research together."

There's little time to waste, Abbott says. "What you don't want is 10 years' worth of production of a cell that is absolutely impossible to pull apart," he says. "It's not happening yet—but people are shouting and worried it will happen."

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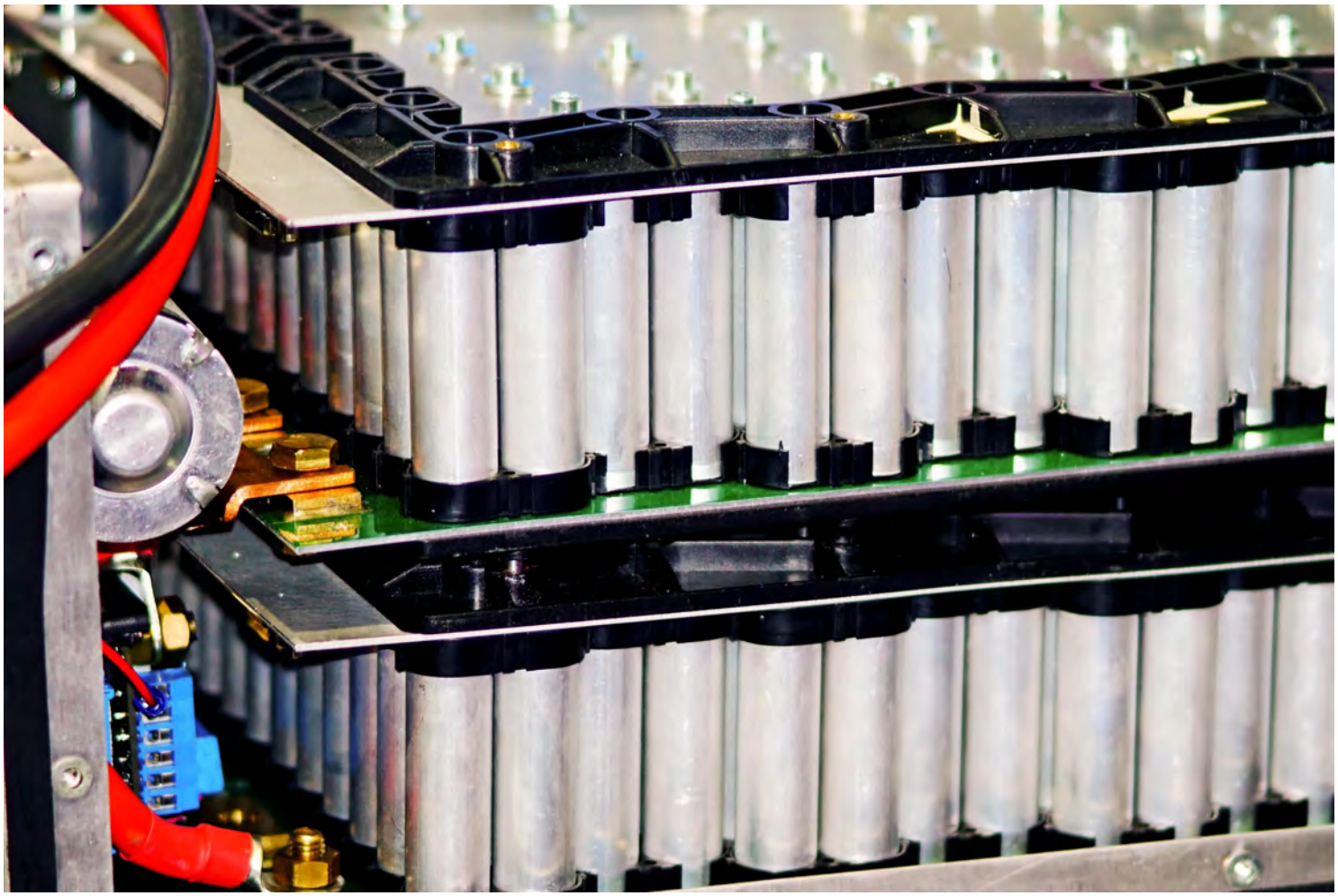
DANIEL OBERHAUS SCIENCE 11.30.2020 07:00 AM

The Race To Crack Battery Recycling—Before It's Too Late

Millions of EVs will soon hit the road, but the world isn't ready for their old batteries. A crop of startups wants to crack this billion-dollar problem.



PHOTOGRAPH: GETTY IMAGES

EVERY DAY, MILLIONS of lithium-ion batteries roll off the line at Tesla's Gigafactory in Sparks, Nevada. These cells, produced on site by Panasonic, are destined to be bundled together by the thousands in the battery packs of new Teslas.

But not all the batteries are cut out for a life on the road. Panasonic ships truckloads of cells that don't pass their qualification tests to a facility in Carson City, about a half hour's drive south. This is the home of Redwood Materials, a small company founded in 2017 with an ambition to become the anti-Gigafactory, a place where batteries are cooked down into raw materials that will serve as the grist for new cells.

Redwood is part of a wave of new startups racing to solve a problem that doesn't really exist yet: How to recycle the mountains of batteries from electric vehicles that are past their prime. Over the past decade, the world's lithium-ion production capacity has increased tenfold to meet the growing demand for EVs. Now vehicles from that first production wave are just beginning to reach the end of their lifespan. This marks the beginning of a tsunami of spent batteries, which will only get worse as more electric cars hit the road. The International Energy Agency predicts an 800 percent increase in the number of EVs over the next decade, each car packed with thousands of cells. The dirty secret of the EV revolution is that it created an e-waste timebomb—and cracking lithium-ion recycling is the only way to defuse it.

Redwood's CEO and founder J. B. Straubel understands the problem better than most. After all, he played a significant role in creating it. Straubel is cofounder and, until last year, was the CTO at Tesla, a company he joined when it was possible to count all of its employees on one hand. During his time there, the company grew from a scrappy startup peddling sports cars to the most valuable auto manufacturer on the planet. Along the way, Tesla also became one of the world's largest battery producers. But the way Straubel sees it, those batteries aren't *really* a problem. "The major opportunity is to think of this material for reuse and recovery," he says. "With all these batteries in circulation, it just seems super obvious that eventually we're going to build a remanufacturing ecosystem."

There are two main ways to deactivate lithium-ion batteries. The most common technique, called pyrometallurgy, involves burning them to remove unwanted organic materials and plastics. This method leaves the recycler with just a fraction of the original material—typically just the copper from current collectors and nickel or cobalt from the cathode. A common pyro method, called smelting, uses a furnace powered with fossil fuels, which isn't great for the environment, and it loses a lot of aluminum and lithium in the process. But it *is* simple, and smelting factories that currently exist to process ore from the mining industry are already able to handle batteries. Of the small fraction of lithium-ion batteries that are recycled in the US—just 5 percent of all spent cells—most of them end up in a smelting furnace.

The other approach is called hydrometallurgy. A common form of this technique, called leaching, involves soaking lithium-ion cells in strong acids to dissolve the metals into a solution. More materials, including lithium, can be recovered this way. But leaching comes with its own challenges. Recyclers must preprocess the cells to remove unwanted plastic casings and drain the charge on the battery, which increases cost and complexity. It's part of the reason why spent lithium-ion batteries have been treated as waste ever since the first commercial cells hit the market in the early 1990s. It was often several times cheaper to mine new material, especially lithium, than recover it with leaching.

Redwood uses a combination of pyrometallurgy and hydrometallurgy to recover these valuable materials. First, technicians wearing reflective silver heat suits cook the batteries in converters to separate the metals. Rather than using fossil fuels to burn the material, like in a conventional smelting process, Redwood's pyro technique uses residual energy in the batteries, such as the organics in the electrolyte, to drive the conversion process. The stuff that's left over is a metal alloy that is filtered through a hydrometallurgical process to recover individual compounds.

Straubel declined to go into the specifics of the company's recovery techniques, but he claims that it can recover between 95 and 98 percent of a battery's nickel, cobalt, copper, aluminum, and graphite, and more than 80 percent of its lithium. By the time a battery has made it through Redwood's recycling facility, it has been broken down into its basic ingredients —lithium carbonate, cobalt sulfate, and nickel sulfate—that are ready to be reintegrated into the battery manufacturing process. "We're going to build a remanufacturing ecosystem for all those batteries," says Straubel. "Material can get reused almost infinitely. There's no inherent degradation to the metal atoms."

Many of the challenges that come with lithium-ion recycling stem from the fact that the facilities that process them weren't designed specifically for cooking down batteries. But people at the vanguard of battery recycling expect that creating dedicated facilities will improve the industry's economics. "We're focused on a bespoke process that is specifically designed for lithium ion batteries because we're starting to see increased volumes," says Tim Johnston, the cofounder of Li-Cycle, a Canadian battery recycler. "Historically, batteries were viewed as waste, and we seek to turn that on its head by focusing on them as a resource."

COURTESY OF LI-CYCLE

Li-Cycle bills itself as the largest lithium-ion recycler in North America, and takes a different approach to recovery than Redwood. The company's process skips smelting entirely and refines the battery with leaching alone. First, they drop the batteries into a vat that simultaneously discharges and shreds them. Next, the cells travel through a staged chemical bath to unlock the metals trapped inside them. The process converts almost everything back into a usable raw material—the plastic from the battery's separator is turned into flakes, the current collectors are turned into copper and aluminum foils, the graphite from the anode is turned into a carbon concentrate, and the cathode materials like nickel, cobalt, and lithium are individually recovered for new batteries.

"We don't produce any meaningful amounts of waste," says Johnston. "We don't produce any meaningful amount of air emissions, we don't produce any waste water, and everything is done at a low temperature. The footprint is very small."

Arguably, the most significant innovation at Li-Cycle is not the chemical processes but the design of the recycling facilities themselves. Li-Cycle uses a "hub and spoke" approach, in which batteries are preprocessed at different sites in the US and Canada, each a modular factory that turns the cells into black mass. The spokes feed this inert material back to a central hub, where it is refined into usable battery-grade chemicals. Today, Li-Cycle operates spokes in Ontario and Rochester, and just received state permission to open its first commercial hub in New York in 2022.

COURTESY OF LI-CYCLE

The processing equipment at each spoke is packaged in shipping containers that can be sited close to battery production facilities or municipal collection sites to minimize the distance a battery has to travel once it's depleted. This system sidesteps one of the most significant hurdles for lithium-ion recycling, which is simply getting the waste where it needs to go. These batteries are federally designated as a Class 9 hazardous material, which means they're subjected to rigorous —and expensive—shipping restrictions to reduce the risk of fire or explosions during the journey.

Smelting and bleaching are the quickest ways to address the rapidly growing challenges with lithium-ion waste, but they may not be the best ones. Their end products are battery-grade materials, but these still require a lot of processing before they're ready to go back into a cell. A battery's cathode, for example, is nanoengineered to boost performance. So some battery experts are working on a process called direct recovery, which salvages cathode material without destroying its crystalline nanostructure. This would dramatically reduce the cost of reusing the material.

In 2019, the Department of Energy tapped Argonne National Laboratory to lead its ReCell Center, which is focused on improving lithium-ion recycling techniques. A key part of that goal is direct recycling. It's still early days for ReCell, but scientists at the center have hit on a few direct recycling processes that they hope will demonstrate the potential of this approach. They've already successfully recovered battery material with many of these techniques in the lab, but a benchtop demo is only a first step toward a method that will be economical at scale.

"The goal of the center is to come up with something that will convince industry to take this on," says Linda Gaines, the ReCell Center chief scientist and a transportation systems analyst at Argonne National Laboratory. "We need to answer all the questions about what this is going to look like when it's scaled up."

PHOTOGRAPH: MARK LOPEZ/ARGONNE NATIONAL LABORATORY

The challenge with direct recycling is that cells are not designed with material recovery in mind. Instead, they're manufactured to produce energy for a long time, and as cheaply as possible. Generally speaking, recycling isn't even an afterthought. And this makes them hard to unpack. Individual cells are complex systems that have several chemically-distinct components mixed—sometimes welded—together in a small volume. These become challenging to extract without the help of strong acids or extreme temperatures.

For now, Gaines and her colleagues are focused on figuring out how to salvage the structure of batteries that already exist. In the future, however, it's possible that batteries may be made to be recycled—but only if that's cost effective and doesn't affect performance. "Designing for recycling is a very important area, but you can't sacrifice performance at all, or nobody's going to want to do it," says Gaines. "The best way to attack that isn't obvious, and to be honest, there hasn't been a lot of really good work in that area."

Still, there are plenty of other changes that can be made to the way battery *systems* are manufactured to improve recycling efforts, says Carlton Cummins, the CTO of Aceleron. He cofounded the company in 2015 after he started looking into the afterlife of EVs and "realized that you can reuse most of the car except the battery," he says. "It wasn't designed for repair, reuse, or upgrade. The key focus at the time was to build it cheaply and quickly." As a result, the cells used in EV and stationary storage battery packs tend to have multiple welds per battery that connect dozens of batteries so they can be controlled as one unit. Cummins says this is a technique of convenience borrowed from the consumer electronics industry, but it makes automotive battery packs remarkably more difficult to disassemble for upgrades or recycling.

Aceleron's solution to the problem is deceptively simple. Cummins and his team designed a battery container that can be used for a variety of different cell types to link them without a welded connection. The company's battery platform, Circa, compresses the batteries in a hard shell case and uses a removable circuit to connect them. This means that if an individual cell fails, or the pack's owner wants to upgrade to a better battery, the cells can be swapped out by loosening some nuts and bolts. "The way batteries are designed today, everything is welded and glued together, and the assumption

is that at the end of usage it is disposed of," says Cummins. "We had to reinvent how you assemble batteries with something that is designed for reuse as well as recycling."

There are still a number of technical, political, and economic challenges that lithium-ion recyclers will have to meet, and success is not guaranteed. Cobalt, for example, is the most expensive material in most EV batteries, but battery manufacturers are chasing new cobalt-free chemistries. It's uncertain whether recyclers will still find material recovery worthwhile if this valuable mineral isn't in the mix to sell back to manufacturers. Still, the new generation of battery recyclers are betting that they can find a way to close the loop on the lithium-ion supply chain and make a buck while they do it. If they're right, they may turn black mass into a green revolution.

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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine Electric Utility De-Energization of Power Lines in Dangerous Conditions.	Rulemaking 18-12-005

DECISION ADOPTING DE-ENERGIZATION (PUBLIC SAFETY POWER SHUT-OFF) GUIDELINES (PHASE 1 GUIDELINES)

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DECISION ADOPTING DE-ENERGIZATION (PUBLIC SAFETY POWER SHUT-OFF) GUIDELINES (PHASE 1 GUIDELINES)

Summary

This decision adopts de-energization (Public Safety Power Shut-off) communication and notification guidelines for the electric investor-owned utilities along with updates to the requirements established in Resolution ESRB-8. The guidelines adopted in this decision are meant to expand upon those in Resolution ESRB-8. Resolution ESRB-8 and the guidelines adopted in this decision remain in effect unless and until superseded by a subsequent decision. This decision also presents the overarching de-energization strategy of the Commission.

The de-energization guidelines adopted in this decision are set forth in Appendix A. Appendix B presents a preliminary list of issues to be explored in Phase 2 of this rulemaking. Appendix C contains a glossary of terms and abbreviations used throughout this decision. Appendix D contains a copy of Resolution ESRB-8, and Appendix E includes a copy of San Diego Gas & Electric's November 11-16, 2018 de-energization report, issued on December 4, 2018.

This proceeding remains open.

1. Overview

Over the last decade, California has experienced increased, intense, and record-breaking wildfires in Northern and Southern California. These fires have resulted in devastating loss of life and damage to property and infrastructure. The California Public Utilities Commission (CPUC or Commission) has been one of three critical state agencies – along with the California Department of Forestry and Fire Protection (CAL FIRE) and the California Governor's Office of

Emergency Services (CalOES) – involved in assessing and addressing the impacts of wildfires.

After several years of drought, changing weather patterns, extreme high heat, ferocious winds, and low humidity, among other factors, the 2018 fire season in California was the most destructive on record. July 2018 was the hottest month on record in California.[1] In 2018, more than 8,000 fires burned close to 2 million acres.[2] These devastating fires resulted in billions of dollars in damage and numerous lives lost.

Electric utility infrastructure has historically been responsible for less than ten percent of reported wildfires;[3] however, fires attributed to power lines comprise roughly half of the most destructive fires in California history.[4] With the growing threat of wildfire, utilities will proactively cut power to lines that may fail in certain weather conditions in order to reduce the likelihood that their infrastructure could cause or contribute to a wildfire. This effort to reduce the risk of fires caused by electric infrastructure by temporarily turning off power to specific areas is called "de-energization" in this proceeding.[5]

The strategy to de-energize builds on new weather tracking and modeling technology that provides localized forecasts during increasingly powerful wind storms, along with statewide fire hazard maps identifying those areas of very

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[1] National Oceanic and Atmospheric Administration; https://www.noaa.gov/news/july-2018-was-11th-warmest-july-on-record-for-us.

[2] https://www.predictiveservices.nifc.gov/intelligence/2018_statssumm/fires_acres18.pdf.

[3] Cal FIRE; http://www.fire.ca.gov/fire_protection/fire_protection_fire_info_redbooks.

[4] Cal FIRE; http://fire.ca.gov/communications/downloads/fact_sheets/top20_destruction.pdf.

[5] De-energization is also known as a "proactive power shutoff" or "public safety power shutoff (PSPS)".

flammable dry woody and brush fuels due to years of drought. These new tools have been developed, tested, and improved over the course of several years in the San Diego area by the local electric utility, San Diego Gas & Electric Company (SDG&E). Over this period, weather monitoring and wind modeling have become more precise, and the areas that are proactively shut off from service have grown smaller and smaller due to more reliable information and changes to electric infrastructure that allow SDG&E to isolate smaller portions of their system for de-energization.

Added to tougher regulations for removing vegetation that can come into contact with electric power infrastructure, proactively de-energizing power lines can save lives. Increasing precision to allow de-energization of smaller areas of infrastructure is important because, aside from the inconvenience of lost power for individuals and businesses, public safety services such as street lights and signals, wells used for pumping water used for firefighting, police and fire facilities, telecommunications, and home medical devices may also be impacted or shut down when power is turned off.

The 2017 and 2018 wildfire season evidenced that the public needs better information – about fire conditions, about when those conditions occur, and how the public should prepare – regardless of whether de-energization is performed proactively or occurs as a result of another emergency. The focus needs to be more on the growing danger of fire and how to respond to conditions associated with wildfire risk, and not just on actions such as de-energization that utilities take to prevent their infrastructure from contributing to potential fires. When there is forewarning of high-fire threat conditions and the potential for ignition

from utility infrastructure or other sources exists,[6] emergency responders need to expect and be prepared for a potential loss of power.

The Commission's goal must be to ensure the public receives timely notice of proactive de-energization or de-energization resulting from another event. Achieving this goal necessitates shared responsibility among the electric investor-owned utilities, local, and state entities. Lessons learned from prior disasters throughout the State show that these entities should utilize Standardized Emergency Management System (SEMS). This will allow the utilities, emergency responders, and local governments to be seamlessly integrated when communicating de-energization notifications.

It is the Commission's vision that notification and communication will come primarily from the utilities with supplemental or secondary notification by local first responders. To make this possible, the Commission will need to ensure that the utilities integrate as much as possible with local emergency systems and frameworks and treat de-energization in a similar manner as any other emergency that results in loss of power, such as earthquakes, floods or non-utility caused fire events. The need for shared responsibility between the utilities, public safety partners, and local governments is critical. Therefore, the utilities should immediately begin working with CalOES to integrate their

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[6] In contrast to proactive de-energization, unplanned electric grid outages may occur as a result of many unforeseeable events. Examples of such events include vehicle collisions with poles and equipment, animal contact with energized power lines, lighting strikes and other weather that causes damage to equipment, vandalism, arson, and wildfires not caused by utility equipment. Often, unplanned outages occur during catastrophes, such as floods, severe winds or heat storms and such outages can impact essential services, including 911 and other emergency communications. Therefore, while this decision adopts advanced notification and education guidelines for proactive de-energization, emergency responders, operators of critical facilities, local governments, and electric customers, especially those in high fire threat districts, should be prepared for power outages that occur without advanced warning.

warning programs with the agencies and jurisdictions within California that are responsible for ensuring the public is notified effectively before, during, and after emergencies. To this end, the utilities should align messaging and outreach with the California Statewide Alert and Warning Guidelines recently issued by CalOES.[7]

Finally, critical to making a notification system work for de-energization events is significant investment by the state agencies, local governments, and utilities in a joint effort to educate the public on how to prepare for wildfire season and de-energization events. These statewide education campaigns should educate the public in advance of de-energization events regarding what is entailed during a de-energization event, what tools are available to the public during these events, what to do in an emergency, how to receive information alerts during a power shutoff, and who the public should expect to hear from and when. The utilities should also report back to the Commission through its required ESRB-8 filings, as updated by this decision, on what they learn after each de-energization event.

2. Background and Jurisdiction

In the wake of one of the most devastating wildfire seasons in California in history and in response to Senate Bill (SB) 901,[8] the Commission instituted this Order Instituting Rulemaking (OIR) to build on earlier rules on the de-energization of powerlines.[9] California Public Utilities Code Sections[10]

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[7] Incorporated into the record of Rulemaking (R.) 18-12-005 by written ruling on March 28, 2019.

[8] Stats. 2018, Ch. 626. SB 901 *available at* https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB901.

[9] R.18-12-005 at 1; SB 901.

(Pub. Util. Code §§) 451 and 399.2(a) give electric investor-owned utilities (IOUs, electric utilities, or utilities) authority to shut off electric service in order to protect public safety.[11] However, de-energization can leave communities and essential facilities without power, which brings its own risks and hardships, particularly for vulnerable communities and individuals.[12] This section outlines current de-energization policies adopted by the Commission and where this OIR fits among current legislative directives and other active wildfire mitigation proceedings pending before the Commission.

2.1. Decision 12-04-024

The Commission adopted de-energization rules and guidelines in Decision (D.) 12-04-024, which established requirements for reasonableness, notification, mitigation and reporting by SDG&E for its de-energization events.[13] D.12-04-024 reaffirms the Commission's finding in D.09-09-030 that SDG&E has authority under §§ 451 and 399.2(a) to shut off power in order to protect public safety when strong winds exceed the design basis for SDG&E's system.[14] D.12-04-024 goes a step beyond the 2009 decision, by ordering SDG&E to (1) take all appropriate and feasible steps to provide notice and mitigation to its customers whenever the utility shuts off power pursuant to §§ 451 and 399.2(a), and (2) reporting any de-energization events to the Commission's Safety and Enforcement Division (SED) within 12 hours after SDG&E shuts off power.[15]

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[10] Unless otherwise stated, all code section references are to the Public Utilities Code.

[11] R.18-12-005; Resolution ESRB-8 at 2.

[12] R.18-12-005 at 2.

[13] D.12-04-024 at 1.

[14] *Id.*

[15] *Id.* at Conclusions of Law 1 and 2.

While the Commission recognizes the impossible feat of anticipating every emergency situation resulting in proactive de-energization, the Commission held that SDG&E should provide as much notice as feasible before shutting off power so the affected providers of essential services (e.g., hospitals, prisons, public safety agencies, telecommunications utilities, and water districts) and customers who are especially vulnerable to power interruptions (e.g., customers who rely on medical-life support equipment) may implement their own emergency plans.[16] Since the adoption of D.12-04-024, Pacific Gas and Electric Company (PG&E) and Southern California Edison Company (SCE) have exercised their authority to de-energize power lines pursuant to §§ 451 and 399.2(a), but these electric utilities were not subject to the reasonableness, notification, mitigation and reporting requirements ordered in D.12-04-024 for SDG&E.[17]

2.2. Resolution ESRB-8

In 2017, California suffered the most destructive wildfire season on record, including 5 of the 20 most destructive wildland-urban interface fires in the state's history.[18] As a result of these fires, the President of the United States approved a major disaster declaration and the Governor of California proclaimed a State of Emergency. In light of the increased intensity of California wildfires and varying de-energization guidelines amongst all of California's electric IOUs, the Commission issued Resolution ESRB-8 on July 16, 2018. Resolution ESRB-8 extends D.12-04-024's reasonableness, public notification, mitigation and reporting requirements to all electric IOUs to ensure that public and local

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[16] *Id.* at 10.

[17] Resolution ESRB-8 at 2.

[18] *Id.*

officials are prepared for power shut off and aware of the electric IOUs' de-energization policies.[19] Resolution ESRB-8 goes a step beyond D.12-04-024 by strengthening the reporting and public outreach, notification and mitigation guidelines adopted in 2012.[20]

Resolution ESRB-8 strengthens reporting requirements by directing the electric IOUs to submit a report to the Director of SED within 10 business days after each de-energization event, as well as after high-threat events where the utility provided notifications to local government, agencies, and customers of possible de-energization actions but where de-energization did not occur.[21] At a minimum, the de-energization report must include: (1) who the electric utility contacted in the community prior to de-energization and whether the affected areas are classified as Zone 1, Tier 2, or Tier 3 per the definition in General Order 95, Rule 21.2-D[22]; (2) explanation of why notice could not be provided at least 2 hours prior to a de-energization event if such notice was not given; (3) the number of and a summary of the complaints received as a result of the de-energization events, including any claims filed against the utility because of de-energization; (4) a detailed description of the steps the utility used to restore power; and (5) the address and description of each community assistance location during a de-energization event.[23]

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[19] *Id.* at 5.

[20] *Id.* at 5 to 7.

[21] *Id.* at 5.

[22] Rule 21.1(D) defines High Fire-Threat Districts(s) (HFTD). Zone 1 is Tier 1 of the latest version of the United States Forest Service and CAL FIRE's joint map of Tree Mortality High Hazard Zones. Tiers 2 and 3 are designated as such in the Commission's Fire-Threat Map.

[23] Resolution ESRB-8 at 5.

Resolution ESRB-8 strengthened the public outreach, notification, and mitigation guidelines of D.12-04-024 by directing the IOUs to hold De-Energization Information Workshops with the public within 90 days from the date Resolution ESRB-8 was formally adopted. Resolution ESRB-8 ordered the IOUs to submit a report to the Director of SED outlining its public outreach, notification and mitigation plan, within 30 days of the effective date the resolution. Resolution ESRB-8 also orders the IOUs to retain documentation of community meetings and customer notifications for a minimum of one-year after a de-energization event. Finally, Resolution ESRB-8 requires the IOUs to assist critical facility customers to evaluate their need for backup power and notes that the IOUs may need to provide generators to critical facilities that are not well prepared for a disruption in service.[24]

2.3. Senate Bill 901

On September 21, 2018, the Governor approved SB 901. Among other things, SB 901 added new provisions to § 8386, requiring all California electric utilities to prepare and submit Wildfire Mitigation Plans (Plans) that describe the utilities' plans to prevent, combat, and respond to wildfires affecting their service territories.[25] Shortly after, the Commission opened R.18-10-007 as a vehicle for the review and implementation of the electric IOUs' Plans prior to commencement of the 2019 wildfire season.[26] R.18-10-007 notes that, although

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[24] *Id.* at 7.

[25] R.18-10-007 at 2.

[26] R.18-10-007 at 2 to 3.

SB 901 included other Commission-related provisions in addition to the Plans, those provisions would be addressed in other Commission proceedings.[27]

Pertinent to R.18-12-005, § 8386(c)(6) requires the Plans to include protocols for disabling reclosers and de-energizing portions of the electrical distribution system that consider the associated impacts on public safety, including impacts on critical first responders and on health and communication infrastructure.[28] Furthermore, § 8386(c)(7) requires the Plans to include appropriate and feasible procedures for notifying customers who may be impacted by the de-energizing of electrical lines. The procedures must consider the need to notify, as a priority, critical first responders, health care facilities and operators of telecommunications infrastructure.

Prior to R.18-10-007, the Commission initiated R.18-03-011 to address emergency disaster relief to California residents affected by a series of devastating wildfires in Northern and Southern California in 2017 and 2018.[29] Cross coordination among all of these rulemakings is necessary to ensure California is prepared for the 2019 and beyond wildfire seasons.

2.4. R.18-12-005 Purpose and Procedural Background

On December 19, 2018, the Commission opened R.18-12-005 to further examine de-energization policies and guidelines adopted in D.12-04-024 and Resolution ESRB-8.[30] Due to the important role that de-energization can play in

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[27] R.18-10-005 at 2, footnote 4.

[28] R.18-12-005 at 3.

[29] R.18-03-011 at 1 to 2.

[30] PG&E, SCE, SDG&E, Liberty Utilities/CalPeco Electric (Liberty), Bear Valley Electric Service, a division of Golden State Water Company (Bear Valley), and Pacific Power, a division of PacifiCorp (PacifiCorp) are listed as respondents to the OIR.

ensuring public safety during an extreme weather event, as well as the impacts of de-energization on affected populations, the Commission opted to address the implementation and logistics for de-energization of power lines in R.18-12-005,[31] rather than in R.18-10-007.[32]

This proceeding intends to: examine conditions in which proactive and planned de-energization is practiced; develop best practices that ensure an orderly and effective set of criteria for evaluating de-energization programs; ensure the electric utilities coordinate with state and local level first responders, and align their systems with SEMS;[33] mitigate the impact of de-energization on vulnerable populations; examine whether there are ways to reduce the need for de-energization; ensure effective notice to affected stakeholders of possible de-energization and follow-up notice of actual de-energization; and ensure consistency in notice and reporting of de-energization events.[34]

Pursuant to the schedule set in R.18-12-005, staff led the first of two workshops on December 14, 2018 in Santa Rosa, California. A second staff led workshop took place on January 9, 2019 in Calabasas, California. On January 25, 2019, the assigned Administrative Law Judge (ALJ) issued a ruling providing guidance to parties on the comments to the rulemaking and canceling the February 6, 2019 prehearing conference (PHC) date to allow adequate time for the Commission and parties to review comments on the rulemaking.

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[31] R.18-12-005 at 1: Resolution ESRB-8 will remain in effect during the pendency of this proceeding unless and until the Commission explicitly modifies or rescinds it.

[32] *Id.* at 3.

[33] R.18-12-005 at 2, footnote 2: SEMS is the system required by Government Code Section 8607(a) for managing emergencies involving multiple jurisdictions and agencies.

[34] *Id.* at 2.

Subsequently the assigned ALJ scheduled a PHC,[35] which was held on February 19, 2019 in Sacramento, California.[36]

In response to the opening comments and discussion at the PHC, the assigned Commissioner issued a Scoping Memo and Ruling (Scoping Memo) on March 8, 2019. The Scoping Memo divides this OIR into two phases[37] with the goal of the first phase being completed in advance of the 2019 wildfire season.[38] The first phase of the OIR, which is the subject of the instant decision, focuses on notice and communication issues in order to provide a framework under which the electric utilities may de-energize.[39]

The Scoping Memo attached a Staff Proposal authored by the Commission's SED. The Staff Proposal provides high-level responses to each of the issues in scope for Phase 1 of this proceeding. The Scoping Memo directed

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[35] *See* Administrative Law Judge's Ruling Setting Prehearing Conference (January 31, 2019).

[36] Opening comments and responses to the OIR were filed by: Small Business Utility Advocates (SBUA); Coalition of California Utility Employees (CUE); California Farm Bureau Federation (Farm Bureau); Sunrun, Inc.; Utility Consumers' Action Network (UCAN); SDG&E; Counties of Napa, Sonoma, Mendocino, and the City of Santa Rosa (*collectively referred to as*, the Joint Local Governments); California Energy Storage Alliance (CESA); PG&E; Direct Access Customer Coalition, Energy Users Forum (DACC/EUF); Protect Our Communities Foundation (POC); SCE; Northern California Power Agency (NCPA); Bear Valley, Liberty, and PacifiCorp (*collectively referred to as*, the California Association of Small and Multijurisdictional Utilities (CASMU); California Water Association (CWA); East Bay Municipal Utility District (EBMUD); Municipal Water District of Orange County (MWDOC); the Commission's Office of the Safety Advocate (OSA); California Municipal Utilities Association (CMUA); the City and County of San Francisco(CCSF); the Public Advocates Office of the California Public Utilities Commission (Public Advocates); The Utility Reform Network (TURN); Local Government Sustainable Energy Coalition (LGSEA); County of San Diego Office of Emergency Services; and Mussey Grade Road Alliance (MGRA).

[37] Scoping Memo at 3: Phase 2 issues will be set forth in a forthcoming scoping memo.

[38] *Id.*

[39] *Id.*

parties to respond to the Staff Proposal in comments.[40] Parties filed comments on March 25, 2019 and reply comments on April 2, 2019.[41]

3. Issues Before the Commission

The Assigned Commissioner's Scoping Memo and Ruling, issued on March 8, 2019, states: "The goal of the first phase of this proceeding is to ensure that the Commission has adopted de-energization parameters and protocols in anticipation of the upcoming 2019 wildfires season." Due to an expedited timeline, Phase 1 focuses primarily on notice and communication issues. Phase 2 will take a more comprehensive look at de-energization practices, including mitigation, additional coordination across agencies, further refinements to findings in Phase 1, re-energization practices, and other matters. A preliminary list of Phase 2 issues is attached to this decision as Appendix B.

The Phase 1 issues considered in this decision are:

1. Updates to Resolution ESRB-8;
    a. What, if any, updates or modifications should be made to Resolution ESRB-8 to ensure that, should de-energization become necessary during the 2019 wildfire season, de-energization is undertaken as efficiently and safely[42] as possible?

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[40] *Id.* at 5.

[41] The following parties filed Phase 1 comments: SDG&E, California State Association of Counties (CSAC); Rural County Representatives of California (RCRC); William B. Abrams (Abrams); SCE; Farm Bureau; AT&T, CTIA, California Cable & Telecommunications Association (CCTA), Frontier Communications, T-Mobile West LLC dba T-Mobile, Sprint Communications, California Company and the Small LECs, Comcast Phone of California LLC, and Verizon (*collectively,* the Joint Communications Parties); PG&E; NCPA; UCAN; Public Advocates; CMUA; CASMU; California Large Energy Consumers Association (CLECA); TURN; EBMUD; SBUA; DACC/EUF; Joint Local Governments; City of Malibu; Center for Accessible Technology (CforAT); OSA; CCSF; POC; and MGRA.

[42] Parties were requested to provide comment on what constitutes "efficient" and "safe" de-energization.

2. Notification and communication to the public (including vulnerable populations), local governments, critical facilities, and emergency/first responders;
   a. What are the best ways to notify the aforementioned parties of a planned de-energization event and when power will be restored in the event of de-energization?
      i. How far in advance (and in what order of priority) should the aforementioned parties be notified of an upcoming de-energization event?
      ii. What information should be conveyed about an upcoming de-energization event?
      iii. Who should be responsible for notifying affected customers/populations? Should the utilities be solely responsible, or should other parties such as local governments have a responsibility in communicating these events?
      iv. What systems [or frameworks][43] should be used for notification of customers (for example, the Standardized Emergency Management System[44] framework, reverse 9-1-1, *etc.*)?
   b. How should 'vulnerable populations' be defined and identified?
      i. Is a list of Medical Baseline customers sufficient, and if not, how should the utilities identify vulnerable populations?

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[43] Added to the original scope to improve clarity.

[44] The Commission notes that SEMS is not a notification system. The purpose of SEMS is to "provide effective management of multi-agency and multijurisdictional emergencies in California. By standardizing key elements of the emergency management system, SEMS is intended to: (1) facilitate the flow of information within and between levels of the system, and (2) facilitate coordination among all responding agencies.

Use of SEMS will improve the mobilization, deployment, utilization, tracking, and demobilization of needed mutual aid resources. Use of SEMS will reduce the incidence of poor coordination and communications and reduce resource ordering duplication on multi-agency and multijurisdictional responses." *See* SEMS Guidelines, Page 1 Section I.A.2. "Purpose of SEMS", November 2009.

c. How should critical facilities be defined and identified?

d. How should first responders/emergency responders be defined and identified?

i. Should water utilities and communication companies be defined as first responders?

3. What structures and practices should be in place to maximize coordination between utilities and first responders/local governments?

a. Should the utilities be required to embed liaison officers (who are empowered to make decisions on behalf of the utility) in emergency operations centers carried out under state and local plans consistent with SEMs?

4. What information should be provided to the Commission after a de-energization event to show that de-energization was used as a method of last resort and that it followed Commission rules?

5. What additional provisions or protocols are necessary if de-energization of transmission lines become necessary?

4. Positions of Parties on Scoping Memo and Staff Proposal

Attached to the March 8, 2019 Scoping Memo, the Commission's SED introduced its Phase 1 Staff Proposal containing preliminary recommendations on each of the questions contained in the Scoping Memo. Parties provided detailed comments on the Staff Proposal, which are summarized in the following sections.[45] Although this decision does not identify every comment made by each party, the Commission considered the input of all parties in adopting the guidelines herein. Furthermore, comment summaries are presented in a different order to the layout of the Staff Proposal.

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[45] Parties provided thorough comments on all issues in this proceeding. Due to the magnitude of information and the compressed timeline of Phase 1, summaries of party comments are not comprehensive. The assigned Commissioner and assigned ALJ did; however, review all comments. The decision contains a representative selection of comments for each section.

4.1. Definitions

Adopting standardized definitions and customer designations allows the utilities, CalOES (and other state or local government entities), CAL FIRE, local first/emergency responders, local governments, critical facilities, the Commission, customers and all others to operate with a shared understanding and language throughout a de-energization event. In addition, designation as one of the groups set forth below carries special consideration for notice, both in timing and form (discussed later in this decision,) possible mitigation to lessen the impacts before, during and after a de-energization event and possible prioritization during re-energization. Mitigation and re-energization will be explored more fully in Phase 2 of this proceeding.

4.1.1. First Responders/Emergency Responders/Public Safety Partners/Local Safety Partners (Issues 2(d) and 2(d)(i)

The Scoping Memo, in Issue 2(d), asks parties to answer the following question: How should first responders/emergency responders be defined and identified? As a follow-up to this initial question, in Issue 2(d)(i), the Scoping Memo solicits feedback on whether water utilities and communication companies should be designated as first responders. The Staff Proposal mentions the term "public safety partners" throughout but does not include a specific definition for that term. Party positions on the staff proposal are summarized below.

4.1.1.1. Staff Proposal

Staff set forth the following proposals:

> The term "first responder" refers to those individuals who in the early stages of an incident are responsible for the protection and preservation of life, property, evidence, and the environment,

> including emergency response providers. The term "emergency response providers" includes federal, state, and local governmental and nongovernmental public safety, fire, law enforcement, emergency response, emergency medical services providers (including hospital emergency facilities), and related personnel, agencies, and authorities. (*Issue 2(d)*)

Public Utilities Code Section 8386 (c)(6) states that Communications infrastructure providers should receive priority notification of planned de-energization events. For purposes of notification, water and communication companies should be prioritized; however, this should not include designation as first responders. (*Issue 2(d)(i)*).

4.1.1.2. Parties' Positions

4.1.1.2.1. Definition of First Responders/Emergency Responders

Parties broadly supported Staff's proposed definition of first responders/emergency responders, including CASMU, Public Advocates, CCSF, SDG&E, EBMUD, PG&E, the Joint Communications Parties, City of Malibu, CforAT and the Farm Bureau. CSAC agrees with Staff's definition but suggests the inclusion of Emergency Medical Associations and public works in this category. OSA recommends the inclusion of CalOES and CAL FIRE. SCE suggests expanding the definition to include certain electric utility staff, such as wildfire management personnel and troublemen. Abrams recommends expansion to include individual decision makers within the private and non-profit sectors that manage at-risk infrastructure, e.g. flammable and combustible material storage facilities.

Other parties recommend that the Commission adopt a different definition for first/emergency responders. CWA suggests the following definition: "fire departments, first responders, local communities, government, water service

providers, communications providers, and Community Choice Aggregators (CCAs)." The Joint Local Governments state that the Staff Proposal is too broad and does not identify the actual agencies that will be contacted first in a de-energization event. MWDOC recommends use of the definition of "first responder" set forth in the U.S. Department of Homeland Security Presidential Directive HSPD-8.[46] TURN offers that Merriam-Webster and Federal Emergency Management Agency (FEMA) definitions could be a starting place to define first/emergency responders. TURN further states that first/emergency responders should include responders that protect the public safety during a prolonged blackout, not just those that respond to accidents or emergencies.

4.1.1.2.2. Water Utilities and Communication Providers

Most parties agree with Staff's recommendation that "for purposes of notification, water and communication companies should be prioritized; however, this should not include designation as first responders"[47] (Farm Bureau, CASMU, CforAT, OSA, Public Advocates, EBMUD, City of Malibu, PG&E, SCE, SDG&E, TURN). Selected additional comments follow. The Joint Water Districts[48] and MWDOC recommend that water utilities be designated as first responders, citing in part to HSPD-8. However, TURN raises the concern that designation of water utilities as first responders by a state agency "may have

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[46] As cited in MWDOC opening comments at 6: refers to those…who in the early stages of an incident are responsible for the protection and preservation of life, property, evidence, and the environment, including…emergency management…public works, and other skilled support personnel (such as equipment operators) that provide immediate support services during prevention, response and recovery operations."

[47] Staff Proposal at 5.

[48] Valley Center Municipal Water District and Padre Dam Municipal Water District filed opening comments jointly. MWDOC joined these entities to file reply comments.

implications beyond the current de-energization proceeding."[49] CWA, in reply comments, acknowledges TURN's concern and suggests that priority notification of water utilities is more important than a designation as a first responder. RCRC and other parties suggests that telecommunications companies and water utilities should be notified as if they were first responders, but not receive an official designation as such.

Finally, the parties representing water infrastructure emphasize that the lack of water supply can reduce firefighting capabilities, and a lack of adequate water pressure can increase the risk of drinking water contamination. Electric service is also a vital component to the transport and treatment of wastewater. These parties agree that water infrastructure warrants priority designation for notification.

4.1.1.2.3. Public Safety Partners

CCSF, CWA, and MWDOC, among others, note that the Staff Proposal uses the term "public safety partners" throughout, but does not provide a definition for the term. CWA (supported by CCSF) asserts that the term "public safety partners" should be defined as "fire departments, first responders, affected local communities, local governments, publicly-owned utilities, communication providers, community choice aggregators, water service providers, and waste utilities." Several other parties recommend that public safety partners be defined as the collective group of emergency/first responders *and* critical facilities. PG&E suggests that the terms should be defined as city and county officials (or local officials), CalOES, CAL FIRE and the Commission.

[49] TURN Opening Comments at 10.

4.1.2. Critical Facilities (Issue 2(c))

In Resolution ESRB-8, the Commission requires that the utilities ensure that operators of critical facilities are aware of any planned de-energization event. Furthermore, in preparation for a de-energization event, the utilities must assist critical facility customers to evaluate their needs for backup generation and determine whether additional equipment is needed, including providing generators to facilities that are not well prepared for a power shut off.[50] Although Resolution ESRB-8 provides several examples of critical facilities, no comprehensive definition has yet been adopted by the Commission. Therefore, Issue 2(c) in the Scoping Memo solicits feedback on the following question: How should critical facilities be defined and identified?

4.1.2.1. Staff Proposal

Staff set forth the following proposal:

For the purposes of de-energization events, critical facilities should include the following:

- Police Stations
- Fire Stations
- Emergency Operations Centers
- Medical facilities, including hospitals, skilled nursing facilities, nursing homes, blood banks, and health care facilities
- Schools and day care centers
- Public and private utility facilities vital to maintaining or restoring normal services
- Drinking water and wastewater treatment plants
- Communication carrier infrastructure including selective routers, central offices, head ends, cellular switches, remote terminals, and cell sites.

[50] Resolution ESRB-8 at 7.

4.1.2.2. Parties' Positions

Many parties, including a majority of the utilities, support the list of critical facilities set forth in the Staff Proposal, most with proposed modifications. Selected comments follow. The Joint Local Governments and CforAT support the Staff Proposal as presented. CSAC recommends the addition of dialysis centers, surgical centers, hospitals, lock down facilities, pump stations, refineries and chemical production facilities. CASMU suggests the inclusion of jails and prisons. OSA recommends the Commission consider adding school districts, universities, colleges, private schools, hospice facilities, airports, prisons and nursing homes. RCRC recommends the addition of fairgrounds or other local government staging sites, including evacuation centers and shelters, as well as municipal airports.

CCSF concurs with the recommendations of others and offers that navigation communication systems, traffic control and landing and departure facilities for commercial air and sea operations, rail transit systems, petroleum refineries, other industrial facilities dependent on electricity for public safety, publicly-owned utilities (POUs), CCAs, and dialysis centers should be added to the list of critical facilities. CCSF recommends that the Commission combine the list presented in the Staff Proposal with the list of Essential Customers adopted in D.02-04-060, *Interim Opinion on Interruptible Programs and Curtailment Priorities*.[51] Abrams supports the inclusion of flammable and combustible material storage facilities. City of Malibu recommends an expanded list of water infrastructure, discussed more below, as well as the inclusion of city halls or similar city facilities.

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[51] D.02-04-060, Attachment B, lists Essential Customers.

The Joint Communication Providers note that SB 901 requires priority notification of communications providers without the requirement they be designated as critical facilities.[52] TURN recommends that critical facilities should include communications and telecommunications facilities in addition to schools, airports and other transit providers. TURN notes that, as required by ESRB-8, the IOUs must assist critical facilities to evaluate their needs for backup power and determine whether additional equipment is needed. Public Advocates recommends that the list of critical facilities be updated by the local utility when new critical infrastructure is established in its operating territory.

CSAC, MWDOC and Public Advocates recommend that the Commission consider the FEMA definition of critical facilities, which is broader than the Staff Proposal. EPUC offers that the Commission should consider whether a special outreach protocol is necessary for Category N customers. POC suggests that the list of 110 sites proposed by SDG&E to be prewired to accept portable generators, as discussed in D.09-09-030, is a good starting place to designate critical facilities.

CLECA notes that terms used by the utilities in their Wildfire Mitigation Plans and those presented in the Staff Proposal overlap. For example, SCE designates "Essential Service Providers,"[53] and PG&E references "critical services" and "critical facilities."[54] CLECA recommends that the Commission adopt a standard term for critical facilities/essential service providers along with a list of included categories to ensure proper notification of such facilities. CLECA also requests the inclusion of private industrial facilities necessary to the

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[52] Many other parties support inclusion of communication facilities as critical facilities.

[53] SCE Wildfire Mitigation Plan at 68.

[54] PG&E Wildfire Mitigation plan at 103-105.

operation of police, fire and emergency operations centers (e.g. pipeline transportation facilities that supply fuel directly to fire departments or other first responders). In addition to suggestions offered by others, CLECA recommends inclusion of radio and television broadcasting stations used for broadcasting emergency messages, instructions, and other public information related to electric curtailment.

Many parties suggest that drinking water and wastewater treatment plants do not encompass the scope of critical water infrastructure that should be designated as critical facilities. CMUA offers the following definition: "drinking water and wastewater facilities critical to maintain public health and safety standards, such as, treatment plants, pumping stations and other storage facilities."[55] CWA recommends that critical facilities be defined to include all infrastructure used to pump, divert, transport, store, treat and deliver water. The Joint Water Districts emphasize the inclusion of, at a minimum, water pumping stations, sewer lift stations, water and wastewater treatment plants, corporate headquarters and operation control facilities. MWDOC offers a complementary list of water facilities as those already presented, and EBMUD also recommends the inclusion of drinking water pumping distribution plants. The Farm Bureau notes that many rural users rely primarily on well water that requires electricity for access; therefore, advanced notification of such customers should be considered.

The utilities offer a varied response to the Staff Proposal. PG&E generally supports the Staff Proposal, noting that the proposal is generally aligned with the

[55] CMUA Opening Comments at 6. In Reply Comments, CLECA disagrees with SCE, arguing that the list of critical facilities should be expansive this year when the risks of de-energization are likely greater than in subsequent years (CLECA Reply Comments at 4).

list PG&E provides in its Wildfire Mitigation Plan; however, PG&E notes that its list is comprehensive and presents entities in order of priority for re-energization. PG&E disagrees with the suggestions of many parties, arguing that "the Commission [should] avoid broadening the definition in a manner that would be unmanageable or defeat the prioritization purpose."[56] SCE also agrees with most of the entities listed in the Staff Proposal but notes that it considers entities which provide critical services to the public as essential providers. For example, SCE notes that shutting off power to schools and daycare facilities does not pose the "same immediate risk to public safety operations as compared to fire and police agencies and other critical infrastructure such as hospitals and nursing homes."[57] CASMU generally supports the Staff Proposal, but encourages engagement with emergency service contacts to further evaluate needs and ensure all critical facilities are included. Finally, SDG&E argues that the Staff Proposal's list of critical facilities is overly broad.

Regarding how to identify critical facilities, few parties offered specific comments beyond a discussion of broad critical facility categories. CCSF recommends that each IOU have ultimate responsibility for identifying critical facilities within its service territory. Prior to the start of the wildfire season, CCSF states that the IOUs should be required to vet their lists of critical facilities with relevant emergency officials (a position supported by CASMU) and the IOUs should be required to update the list on an on-going basis as new information is learned, but no less frequently than annually.

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[56] PG&E Reply Comments at 6.

[57] SCE Opening Comments at 17.

4.1.3. Vulnerable Populations (Populations with Access and Functional Needs) (Issues 2(b) and 2(b)(i))

The Commission, in ESRB-8, first identifies the need to communicate with and educate vulnerable populations (although not designated as such in the resolution) including low-income customers, customers with limited English, disabled customers and the elderly.[58] In the OIR that opened this proceeding, the Commission set a preliminary scope that included the following questions: "Do notification standards differ for vulnerable populations,"[59] and "how [should the utilities] mitigate the impact of de-energization on vulnerable populations?[60]

Many parties' comments on the OIR stated that, absent a definition of "vulnerable populations," it would be challenging to ascertain appropriate notification standards and mitigation measures. Therefore, Issue 2(b) of the Scoping Memo asked the following question: How should 'vulnerable populations' be defined and identified? Issue 2(b)(i) expanded upon this threshold by seeking feedback on the following question: Is a list of medical baseline customers sufficient, and if not, how should the utilities identify vulnerable populations?

4.1.3.1. Staff Proposal

Staff proposed the following definition for vulnerable populations (*Issue 2b*):

> For the purposes of de-energization, "vulnerable populations" should address those individuals who are or have:

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[58] Resolution ESRB-8 at 6.

[59] OIR at 8.

[60] *Id* at 9.

- Physical, developmental or intellectual disabilities
- Chronic conditions or injuries
- Limited English proficiency
- Elderly
- Children
- Low income, homeless and/or transportation disadvantaged (i.e., dependent on public transit)
- Pregnant women

Regarding the question of medical baseline customers, Staff proposed the following (*Issue 2(b)(i)*):

> Although medical baseline customers do not represent the breadth and scope of the Access and Functional needs community, the use of this population is the best available proxy prior for the 2019 fire season. To augment the limitations on this methodology, IOUs should reach out to organizations with the ability to reach out to these communities, including (but not limited to): local Independent Living Centers, Regional Centers, paratransit providers, and other resource providers. Additionally, potential augmentation efforts to more fully address methods to identify and alert vulnerable populations should be addressed in Phase 2 of this rulemaking.

4.1.3.2. Parties' Positions

The majority of parties recommended that the definition of vulnerable populations be expansive in nature (Issue 2(b)) and not limited solely to those customers listed under the utilities' various medical baseline programs (Issue 2(b)(i)). Parties offered numerous additional populations and definitions the Commission could consider in its designation of vulnerable populations. The utilities and several other parties argue that the Staff Proposal's definition is infeasible in practice due to identification and privacy concerns and that the definition should be limited to data that is available to the utilities under its programs and tariffs.

CSAC, the Joint Local Governments, and City of Malibu generally agree with the Staff Proposal as presented, although the Joint Local Governments are concerned about the feasibility of identifying and providing effective notice to such a large group. Abrams suggests that the term 'vulnerable populations' be replaced with the term 'disproportionately vulnerable populations,' because all residents are vulnerable to utility ignited wildfires. UCAN suggests a more expansive definition featuring additional qualifiers, e.g. instead of the term 'elderly,' UCAN suggests replacing it with the following: "seniors and people living with disabilities to include people living both independently and in dependent care facilities."[61]

CCSF states that the Staff Proposal's list of vulnerable populations addresses the appropriate groups, but recommends that the Commission adopt a more specific definition, such as that set forth in Government Code § 8593.3.[62] Public Advocates cites to CAL FIRE's 2019 Community Wildfire Prevention and Mitigation Report as a possible source for defining vulnerable populations as well as § 745(c)(1), which, in addition to medical baseline customers, includes customers requesting third-party notifications and customers who the Commission has ordered cannot be disconnected from service without a prior in-person visit from a utility representative. SBUA agrees that vulnerable

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[61] UCAN Opening Comments at 7.

[62] Government Code § 8593.3 provides that cities and counties must update their emergency plans to include service for the 'access and functional needs' population. The code lists 'access and functional needs' populations as follows: ...the "access and functional needs population" consists of individuals who have developmental or intellectual disabilities, physical disabilities, chronic conditions, injuries, limited English proficiency or who are non-English speaking, older adults, children, people living in institutionalized settings, or those who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit or those who are pregnant.

populations should include Medical Baseline customers, but the Commission should also consider using the definition of 'hard to reach' customers as defined in D.18-05-041.[63]

RCRC requests inclusion of communities with only one method of ingress/egress, as these communities are particularly vulnerable during wildfires. RCRC also cautions against using only CalEnviroScreen to identify disadvantaged communities, as it would eliminate almost all of the most fire prone communities. TURN suggests that, at a minimum, vulnerable customers should include medical baseline customers and life support customers, customers who certify that they have a serious illness that could become life threatening absent electric service, and customers over 65 years old. TURN also recommends consideration of households with infants less than 12 months of age, noting that many states also provide protections against disconnections of households with infants.

CASMU asserts that the utilities do not have the data to ascertain whether customers fall under the Staff Proposal's 'vulnerable populations' definition. PG&E suggests that Staff's proposed definition is infeasible because it would require the utility to ascertain socio-economic data that is not legally or practically available to the utility. SCE suggests that the proposed definition is too broad and would be difficult, if not impossible, to reasonably implement. Adoption of this definition will shift responsibilities on to the IOUs that state law assigns to public sector emergency services. SDG&E submits that 'vulnerable populations' should be defined as those who are wholly dependent upon electricity for life-sustaining service, for example those designated as "Life

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[63] *Decision Addressing Energy Efficiency Plans.*

Support" customers, which are a subset of SDG&E's medical baseline population. In Reply Comments, PG&E agrees that there is a distinction between those customers who are dependent upon electricity for health care needs and those customers that are generally vulnerable, but notes if the Commission adopts a broad definition, then PG&E supports the suggestion that the utilities partner with the appropriate agencies who could then notify broader categories of "vulnerable populations."

Staff propose that, for the 2019 wildfire season, use of medical baseline customers is the best available proxy for vulnerable populations, with the caveat that the IOUs should increase outreach to community organizations that can contact vulnerable populations as a means of overcoming limitations of the use of the medical baseline program. This proposal was met with varying responses among parties. CASMU, PG&E, SCE and SDG&E agree that medical baseline customers are the best available proxy for 2019, although SCE disagrees with the recommendation that the IOUs use additional notification streams to notify communities disproportionately affected by de-energization. CSAC, CforAT, POC, CCSF, SBUA and others disagree that medical baseline is an appropriate proxy for 2019. The Joint Governments argue that medical baseline programs are undersubscribed. SBUA recommends prioritizing residential and small commercial customers residing in disadvantaged communities for the 2019 fire season.

Parties offer many suggestions on how to identify vulnerable populations, both through the utilities' own programs and tariffs and through partnership with local agencies. CSAC suggests that identification of "medically fragile" vulnerable populations should be handled by both the IOUs and the local Public

Health Department.[64] OSA recommends that the utilities identify vulnerable populations in the same way they identify medical baseline customers; the utilities should ask such customers to register with the utility. TURN supports this approach but recommends that the utilities be required to partner with community-based organizations that work with identified vulnerable populations to facilitate self-certification.

Public Advocates suggests that the utilities immediately update their Medical Baseline lists prior to the start of the 2019 wildfire season. If possible, the utilities should work with appropriate counties and departments of health and human services to identify eligible customers. CforAT notes that the utilities can identify and reach low income customers that are enrolled in the utilities' CARE (California Alternate Rates for Energy) and FERA (Family Electric Rate Assistance) programs. The Joint Local Governments recommend that the utilities must cultivate and maintain ongoing relationships and lines of communication with the agencies that serve its vulnerable populations. Further, customers could be given a way to self-select to the list of identified vulnerable populations. Similarly, UCAN notes that incorporating community-based organizations into notification systems builds both alert capacity and post-event effectiveness. Advanced cooperation is imperative. NCPA stresses that the Commission must adopt a means of identifying and locating vulnerable populations prior to the development of notification processes.

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[64] CSAC Opening Comments at 7.

4.2. De-Energization Notification and Communication

This decision will focus primarily on notice and communication in the days prior to and after a de-energization event, but the Commission will also adopt preliminary standards for advanced communication and notice (standardized templates, etc.), as well as communication during de-energization when power will be interrupted and also during re-energization. Communication and notice during de-energization and re-energization will be explored more fully in Phase 2.

This decision will answer the following questions: (1) who should receive notice; (2) who is responsible for providing notice; (3) when should agencies/entities/customers receive notice; (4) what information should be conveyed; (5) what systems and methods should be used to convey that information; and (6) what structures and practices should be in place to maximize coordination between utilities first responders and local governments.

In order to answer the above questions, information from the Staff Proposal (and party comments) are presented in a different order than originally presented in the Staff Proposal. This discussion section will correspond with this format.

4.2.1. Who Should be Notified? (Portions of Issue 2(a))

Communication with affected customers as well as first responders is critical to ensure that de-energization happens as orderly and safely as possible. Issue 2(a) in the Scoping Memo asked for feedback on the following question: What are the best ways to notify [the public, including vulnerable populations, local governments, critical facilities and emergency/first responders] of a

planned de-energization event and when power will be restored in the event of de-energization?

4.2.1.1. Staff Proposal

Staff provided the following proposal:

> ... IOUs will be responsible for contacting local public safety officials in impacted jurisdictions prior to a de-energization event and must utilize all available means to communicate a de-energization event. At a minimum, these contacts should include local and county public safety notification points whose jurisdictions include de-energized areas. These contacts must include primary 24-hour contact points, secondary contacts, and tertiary contacts.
>
> To ensure the accuracy of these lists, electric IOUs will be required to update these lists annually and conduct a communication exercise prior to fire season to confirm their ability to rapidly disseminate information. Additionally, all notifications related to de-energization events will be concurrently sent to CalOES, the CPUC and CAL FIRE. These notifications should include anticipated de-energization events, de-energization events, and estimated restoration timelines.

4.2.1.2. Parties' Positions

Parties provided a variety of comments, most generally supportive of the staff proposal, but with proposed modifications. Many of parties' comments pertain to timing, method and content of notice, which, although included minimally in Issue 2(a), will be discussed in later sections.

CASMU, the Joint Local Governments, CCSF, PG&E, CforAT, and Public Advocates generally support the Staff Proposal. CSAC recommends the addition of notice to the Emergency Management Agency, the Department of Public Health, and fire service and law enforcement agencies, at a minimum. EBMUD and the Joint Water Districts recommend that notice be given to water companies. SBUA recommends that the utilities should notify governmental

bodies beyond first responders. CCSF also recommends that notice be sent to relevant adjacent jurisdictions that may be impacted by de-energization.

Farm Bureau recommends that the Commission require a dedicated customer service line for wildfire-related information that is staffed with specifically trained personnel. CLECA offers that the utilities should be able to receive communications from critical facilities and/or large users in addition to sending messages. DACC/EUF note the importance of obtaining the correct contact at critical facilities and/or large customers; the billing contact may not be the appropriate contact in the case of de-energization. Several parties recommend notification of POUs and electric cooperatives that may be impacted by de-energization because of interconnection with the utility's grid.

SCE concurs with the Staff Proposal, but requests that the Commission not require that a specific information technology be used. Furthermore, SCE suggests that tertiary contacts should not be required because the utilities cannot require that public safety agencies provide a certain number of contacts. SDG&E supports annually updating its contact list as well as conducting a communication exercise on an annual basis. SDG&E also states that all affected groups should be notified as soon as practicable or operationally feasible.

4.2.2. When and in What Order Should Contact Occur? (Issue 2(a)(i))

Advance notice is crucial in order to allow agencies and affected customers time to adequately prepare for and respond to a de-energization event. The Scoping Memo (Issue 2 (a)(i)) seeks feedback on the following question: How far in advance (and in what order of priority) should [the public, including vulnerable populations, local governments, critical facilities and emergency/first responders] be notified of an upcoming de-energization event?

4.2.2.1. Staff Proposal

Staff set forth the following proposal:

> Every effort must be made by the IOUs to provide notice of potential de-energization events as early as possible. At a minimum, notifications to Public Safety officials and critical infrastructure owners/operators should occur when a utility Emergency Operations Center activates (stands-up) in anticipation of a public safety power shutoff (PSPS) Response Protocol taking place, when the PSPS Response Protocol is initiated, when re-energization begins, and when re-energization is completed within a jurisdiction.
>
> Instead of creating a multi-layer notification tiering system, it is recommended that notifications be provided to public safety partners and critical infrastructure partners prior to initial customer notifications; however, the completion of these notifications should not be an impediment to providing notification to impacted populations. To the extent practical, communities disproportionately impacted by de-energization events should include additional notification streams (up to and including in person notification) in lieu of staggered alerting timelines.

Staff also recommends consistency with the California Alert and Warning Guidelines by using alerts, warnings and notifications. This proposal will be discussed in Section 4.2.3, below. In addition, the method of notification, including possible in-person notification for vulnerable populations, is described in Section 4.2.5, below.

4.2.2.2. Parties' Positions

The parties universally agree that advanced notice is imperative and should be afforded whenever possible. Parties differ on which entities should receive priority notice and how far in advance notice should be given. Comments will focus first on the timing of notification and then on the priority of notification, although some comments overlap. Farm Bureau and the City of Malibu support the Staff Proposal as written. CSAC suggests a phased approach

beginning at seven days before de-energization, then 72 hours, 48 hours, 24 hours, 12 hours, and finally two hours before a de-energization event. CforAT supports advance notice but cautions that advance notice of de-energization events that ultimately do not occur could cause customer frustration and fatigue as customers take potentially expensive precautions.

The Joint Governments support the Staff Proposal but note that communication with local governments, public safety and CalOES is most critical. Public Advocates supports a generally structured and prioritized notification system. CLECA supports the Staff Proposal, pending the definition of critical facilities, and suggests extending any communication exercises to critical facilities. EPUC recommends an upfront notification system to customers based on their relative risk of de-energization. EPUC offers a relative risk categorization system, such as red/yellow/green. CMUA offers that the Commission should either clarify that the utility must always activate an Emergency Operations Center before a de-energization event or else designate some other point in time prior to de-energization that the utilities should use, to the extent feasible, to provide notice.

OSA suggests there should be five tiers of notification: Priority 1 (first responders) one-to-seven days in advance; Priority 2 (local government) two-to-six days in advance; Priority 3 (Critical Facilities) three-to-five days in advance; Priority 4 (medical baseline) four days in advance; Priority 5 (general public) two days in advance. The Joint Communication Parties recommend, in addition to those in the Staff Proposal, an additional notice two-to-four hours in advance of de-energization. TURN suggests that first responders, water and telecommunications providers receive between 96 and 48-hours advance notice,

local governments 24 to 48 hours, and the general public 24 to 48 hours- notice. Final notice should occur 24 hours before de-energization.

CCSF recommends that the Commission adopt specific notification timelines and recommends a 72-hour notice. Abrams emphasizes the importance of advance notification so that affected entities are prepared when a de-energization event is called. POC recommends that all customers in Tier 3 HTFD affirmatively sign an advisory notice at least one month in advance of fire season, inclusive of information regarding where to go during a de-energization event. DACC/EUF recommend that the Commission requires at least a 12-hour advance notice of re-energization.

CASMU supports the Staff Proposal as written. PG&E agrees with the Staff Proposal, noting that prioritization of alerts, warnings and notifications should not create any impediment to notification of the entire population. SCE agrees that the notification of public safety agencies and customers should generally occur two days in advance of de-energization. SDG&E states that it attempts to notify the public, local governments, critical facilities and emergency/first responders at least 48 hours in advance of a de-energization event. SDG&E prioritizes public safety partners, especially first/emergency responders, because these groups are best positioned to respond to emergencies. If concurrent notification does not occur, notification should next be made to local governments because the public is likely to turn to them for information and because local governments can initiate emergency response protocols. Next should be critical facilities such as hospitals, water and telecommunication providers, followed by the general public.

4.2.3. What Information Should Be Communicated? (Part of Issue 1, Part of Issue 2(a), Part of Issue 2(A)(i), Issue 2(a)(ii), and Part of Issue 2(a)(iii))

Public Safety Partners and affected customers will require accurate and up-to-date information for each de-energization event. Furthermore, different entities will require different information. For example, first/emergency responders will require a different type of information than residential customers since they must prepare for the public safety impacts of de-energization. Staff discussed the type of information that should be included in de-energization notifications and communications to both Public Safety Partners and customers in various portions of the Staff Proposal. This section brings those proposals together under one heading and presents a summary of party comments on the topic.

4.2.3.1. Staff Proposal

Staff offered the following proposals:

1. In order to facilitate situational awareness across public safety partners throughout California, IOUs must clearly articulate their threshold for strong wind events, as well as the conditions (humidity, fuel dryness, temperature) that define "an extreme hazard" to allow public safety partners to conduct parallel planning for potential de-energization events. Additionally, IOUs will be responsible for publishing a Geographic Information System Representational State Transfer Service (GIS REST) service articulating the geographic boundaries of the areas subject to de-energization to public safety partners concurrent with their notifications of de-energization events (*Issue 1*).

2. [All] notifications related to de-energization events will be concurrently sent to the CalOES the CPUC, and CAL FIRE. These notifications should include anticipated de-energization

events, de-energization events, and estimated restoration timelines. (*Issue 2a*).

3. Additionally, to be consistent with the California Alert and Warning Guidelines, the following definitions will be utilized to discuss de-energization communications (*Issue 2(a)(i)*):

    a. Alert - A communication intended to draw the attention of recipients to some previously unexpected or unknown condition or event.
    b. Warning – A communication that encourages recipients to take immediate protective actions appropriate to some emergent hazard or threat.
    c. Notification – A communication intended to inform recipients of a condition or event for which contingency plans are in place.

4. In order to ensure shared situational awareness, IOUs will need to provide public safety partners with the following information: total customer outages within a jurisdiction's boundaries, total number of impacted medical baseline customers within a jurisdiction's boundaries, the event triggering the de-energization, and the estimated length of the de-energization event. IOUs will be responsible for publishing a GIS REST service articulating the geographic boundaries of the areas subject to de-energization to public safety partners concurrent with their notifications of de-energization events. (*Issue 2(a)(ii)*).

5. IOUs should pre-script messages templates in advance in a format that allows public safety agencies to use their official public alerting channels to amplify the message if they choose to do so. Consistent with existing best practices articulated in the California Alert and Warning Guidelines, warning messages should answer five (5) key recipient questions (*Issue 2(a)(iii)*):

    a. Why are we at risk?
    b. Do you really mean me? (Does this affect my location or situation?)
    c. How long do I have to act?

d. What should I do?
e. Who says so?

4.2.3.2. Parties' Positions

4.2.3.2.1. Issue 1

Many parties supported Staff's proposal in Issue 1, with proposed modifications. For example, the Joint Local Governments, CCSF, Public Advocates, DACC/EUF, PG&E, SCE, SDG&E and the Joint Communication Parties generally support the provision of de-energization event boundaries to Public Safety Partners. Several parties, such as CCSF, request that more detailed information be provided, including affected circuits, real-time weather data and fire threat mapping. DACC/EUF recommend that notifications be precise as to what facilities are to be de-energized so that back-up generation can be activated. The Joint Communication Providers recommend that communication providers receive the same information as Public Safety Partners.

PG&E suggests that utility GIS were designed for utility information needs and therefore presents information that is not formatted for use by public safety agencies. SCE recommends against the requirement to share GIS REST files, instead stating that the information can be published to their website for far less cost. SCE also agrees with other parties that information such as outage boundaries, circuits impacted by shut-off, the number of customers per circuit, and the number of critical care customers per circuit should be shared with Public Safety Partners. SDG&E generally supports sharing information with Public Safety Partners but believes that the Staff Proposal requires more exploration and expansion. Furthermore, SDG&E does not believe that Resolution ESRB-8 requires modification, noting that SDG&E has received

positive feedback from local jurisdictions on their notification and communication efforts. CASMU supports the Staff Proposal as written.

Regarding the setting of thresholds for strong wind events and defining the conditions that constitute an "extreme hazard," parties provided varying comments. MWDOC, Abrams, the Joint Local Governments, NCPA and CCSF agree that the utilities should have clearly articulated thresholds and conditions. Abrams supports standardization of thresholds across the utilities. Both CCSF and NCPA notes that setting thresholds and standards should not be construed as automatically triggering a de-energization event; rather, such information helps Public Safety Partners with their own planning efforts.

The Joint Communication Parties suggest that defined standards are not as important as receiving clear and advance information in real time from the utilities. TURN, on the other hand, supports the adoption of thresholds and standards, noting that the utilities "are required to provide an essential public service, and they should not have unbounded discretion over when the essential public service should be suspended."[65] TURN states that the utilities should have narrow discretion, but defined thresholds must be met before the utility can exercise that discretion. To do otherwise would mean that the Commission cannot determine whether a particular instance of de-energization was necessary to protect the public safety, as required by ESRB-8.

SDG&E states that it does not utilize thresholds or define "extreme hazards," but it agrees with the sentiment of the Staff Proposal. SDG&E notes that it already shares information with the public, but the decision to de-energize requires utility operating experience in order to analyze all inputs. PG&E asserts

[65] TURN Reply Comments at 2.

that it already has set and articulated the parameters it uses to determine if de-energization is necessary. SCE opposes the adoption of thresholds because the determination to de-energize is complex and subject to change based on real-time conditions.

4.2.3.2.2. Issue 2(a) and 2(a)(ii)

This section will summarize party comments pertaining to relevant portions of Issue 2(a) and Issue 2(a)(ii). The staff proposals on these two issues overlap significantly. Comments pertaining to GIS REST services are summarized above.

CLECA and CforAT support the Staff Proposal, particularly information regarding the anticipated length of the de-energization event. CSAC suggests inclusion of the following information: (1) the reason for the proposed outage or event triggering the de-energization; (2) trigger points for outage; (3) area of proposed outage; (4) anticipated length of outage; (5) number of residents affected; (6) estimated de-energization start time and date; (7) restoration date and time; and (8) estimated time to re-energize the grid. The Joint Local Governments believe that weather data, fire threat assessments, maps of the circuits and transmission lines potentially affected, information regarding segmentation of those circuits for targeted de-energization, and the status of notifications to vulnerable populations should be communicated to local governments and the public. MWDOC adds that information regarding protocols for engagement during the event, including appropriate contacts and a reliable communication briefing timeline should be required.

EBMUD notes that water agencies also need circuit level information and an understanding of whether water facilities can remain online by employing sectionalization or other technologies for separating loads within a circuit.

EBMUD also requests re-energization estimates. The Joint Water Agencies generally agree with EBMUD's comments. RCRC and CCSF suggest that notice includes information regarding total number of impacted medical baseline or other medically vulnerable customers and critical facilities. POC recommends that, in order to develop messaging, the utilities should be required to hold a lessons-learned workshop focusing on the reports from previous de-energization events. TURN recommends that exact location information at a granular level be provided. Abrams focuses mostly on advanced education and notes that information should be provided about safe use of generators, traffic safety when traffic signals may be impacted, information regarding where to obtain information, and who to contact during a de-energization event.

PG&E and CASMU generally agree with the Staff Proposal regarding information to be conveyed. SCE suggests that, based on its experience, public safety agencies are most concerned about the impacts of de-energization, rather than information on what triggered the event. SCE disagrees with providing the number of medical baseline customers, noting that it should focus on Critical Care customers, those customers that require critical life support equipment at their home. SCE and SDG&E are concerned that providing an estimated duration for de-energization may be misleading and counterproductive since conditions can change rapidly.

4.2.3.2.3. Issue 2(a)(i)

Few parties provided comment on the use of the definitions included in the California Alert and Warning Guidelines Plan for notification (alert, warning, notification). As noted elsewhere, EPUC recommends the use of tiered notification using color coding, such as red/yellow/green to signify a customer's risk of de-energization. SBUA recommends the following definitions: (1) Alerts:

communicating that conditions in the coming days may result in de-energization. Alerts may continue for several days without other action; (2) Watches: announcing that potentially dangerous conditions are emerging and encouraging customers to begin preparations; (3) Warnings: predicting that the utility expects to de-energize; and (4) Notifications: reporting actual de-energization. SDG&E supports using consistent definitions but suggests that determining the appropriate definitions may require collaboration through workshops in order to achieve state-wide uniformity. SDG&E suggests this topic be deferred to Phase 2.

4.2.3.2.4. Issue 2(a)(iii)

No party filed comments disagreeing with the proposal that messages should be consistent with the existing best practices articulated in the California Alert and Warning Guidelines, which include answering the five questions set forth in the Staff Proposal. Presumably parties that concurred with the Staff Proposal as written (SDG&E, CASMU, PG&E, SCE, CLECA, POC, RCRC, Public Advocates, EPUC, Joint Communication Parties, Joint Water Agencies, MWDOC TURN, and others) also agreed with the use of the California Alert and Warning Guidelines best practices for notice.

4.2.4. Who is Responsible for Notification? (Issue 2(a)(iii))

The Scoping Memo, in Issue 2(a)(iii) asks the following question: Who should be responsible for notifying affected customers/populations? Should the utilities be solely responsible, or should other parties, such as local governments, have a responsibility in communicating these events and notifying affected customers/populations? If not, who should be responsible for notification?

4.2.4.1. Staff Proposal

Staff sets forth the following proposal:

> The IOUs should retain the responsibility for notifying impacted jurisdictions of de-energization events...

The Staff Proposal offers additional language pertaining to the method and content of messaging. This proposal is discussed in Section 4.2.5.

4.2.4.2. Parties' Positions

The parties universally agreed that the utilities should be primarily responsible for notification of affected customers. As the entity that is responsible for calling the de-energization event and the entity that holds contact information for its own customers, parties feel that the utility should take the primary leadership role in providing notice to customers. However, many parties recognize that the utilities may have limitations in identifying certain customer groups, such as vulnerable populations, and therefore recommend partnering with various agencies and organizations to more effectively disseminate information.

For example, Farm Bureau and CforAT recommend coordination with safety agencies, City of Malibu recommends coordination with local governments, and CSAC recommends that notification language be provided to the local Office of Emergency Services to send out via the emergency notification system. CSAC also recommends that the utilities develop a Memorandum of Understanding with local governments in order to coordinate notification. UCAN recommends collaboration with local public safety partners because such agencies have an "accurate and timely understanding of potential adverse

impacts of notification"[66] and can ensure that notifications will be distributed to vulnerable populations. The Joint Local Governments support the utility as the lead for notice but assert that the utility must partner with local health departments, medical service providers, nursing facilities and other social service organizations that serve vulnerable populations that are likely not enrolled in medical baseline.

PG&E concurs with the Staff Proposal and agrees to share notification templates with public safety agencies in advance so that the agencies can leverage their own public alert systems to supplement PG&E's notifications, if they choose to do so. SDG&E agrees that the utility should retain responsibility for notification and remains concerned with the proposed expansion of vulnerable populations. SCE and CASMU agree with the Staff Proposal.

4.2.5. What Notification Systems and Notification Methods Should Be Used? (How Should Contact Occur?) (Issue 2(a)(iv), Part of Issue 2(a), Part of Issue 2(a)(i), Part of Issue 2(a)(iii))

In order to provide notification and to communicate effectively with affected customers and public safety partners, the utilities will have to use many communication systems. Furthermore, the utilities, in order to collaborate effectively with first/emergency responders and local governments, will need to employ messaging structures that coordinate with the systems used by such entities and agencies. The Scoping Memo asks the following main questions: What systems should be used for notification of customers (e.g. reverse 9-1-1),

[66] UCAN Opening Comments at 5.

and what are the best ways to notify [entities] of a planned de-energization event and when power will be restored in the event of de-energization?

The Staff Proposal, in various places, discusses the frameworks for providing notice, such as SEMS, the systems that can be used to send out notifications, and the various types of communications that should be used (e.g. social media, telephone, in person notification). This section brings the staff proposals together under one heading and presents a summary of party comments on the topic.

4.2.5.1. Staff Proposal

Staff set forth the following proposals:

1. Consistent with the principles of the Standardized Emergency Response System (SEMS), (emphasis added) IOUs will be responsible for contacting local public safety officials in impacted jurisdictions prior to a de-energization event and must utilize all available means to communicate a de-energization event (emphasis added) (*Issue 2(a)*).

2. To the extent practical, communities disproportionally impacted by de-energization should include additional notification streams (up to and including in person notification) in lieu of staggered alerting timelines…Additionally, to be consistent with the California Alert and Warning Guidelines, the following definitions will be utilized to discuss de-energization communications (*Issue 2(a)(i)*):
    - Alert - A communication intended to draw the attention of recipients to some previously unexpected or unknown condition or event.
    - Warning – A communication that encourages recipients to take immediate protective actions appropriate to some emergent hazard or threat.
    - Notification – A communication intended to inform recipients of a condition or event for which contingency plans are in place.

3. [T]he California Alert and Warning Guidelines state that (*Issue 2(a)(iii)*):

   "People rarely act on a single warning message alone. To be effective, warnings should be delivered in various formats via various media, both to increase reliability of warning delivery and to provide a sense of corroboration that will encourage recipients to take protective actions"

   In order to ensure time sensitive notifications are sent to populations potentially impacted by de-energization events, IOUs should pre-script messages templates in advance in a format that allows public safety agencies to use their official public alerting channels to amplify the message if they choose to do so. Consistent with existing best practices articulated in the California Alert and Warning Guidelines, warning messages should answer five (5) key recipient questions: a. Why are we at risk; b. Do you really mean me? (Does this affect my location or situation?); c. How long do I have to act; d. What should I do; and e. Who says so?

4. In order to be effective, warnings should be delivered in multiple formats across several media channels, both to increase the potential a message successfully reaches an impacted population and to provide a sense of corroboration that will encourage individuals to take protective actions. These customer notifications should include, but are not limited to, telephonic notification, text message notification, social media advisories, emails, and messages to agencies that service disadvantaged communities within an impacted area to allow them to amplify any pertinent warnings. Although mandating public safety partners provide notifications to impacted jurisdictions in advance of a de-energization event is outside the scope of this proceeding, IOUs should develop messages that allow public safety partners to utilize their official notification tools at their discretion (Issue 2(a)(iv)).

4.2.5.2. Parties' Positions

4.2.5.2.1. Issue 2(a)

Many of the comments relating to Issue 2(a) have been discussed elsewhere. This section will focus primarily on comments regarding methods of communication; however, some of the comments will be necessarily duplicative of earlier sections. As noted earlier, many parties agree with the Staff Proposal as written. OSA recommends that all available communication channels be used to give notice and that notice must be given in multiple languages. Public Advocates agrees with OSA but recommends that the Commission adopt a standard notification timeline across utilities so that customers understand de-energization processes even if they move across service territories. Public Advocates also notes that first responders should receive maps and detailed information about de-energization as soon as they become available. De-energization without notice should be kept to a minimum and should receive heightened scrutiny by the Commission.

City of Malibu agrees with the Staff Proposal but highlights that during a de-energization event, internet and phone services may not be available. The utilities must take all necessary steps to communicate effectively, which may include door-to-door knocking or other efforts. TURN clarifies that attempted notifications may not be sufficient, especially for vulnerable populations. Positive or affirmative notification must be employed for such customers. The Commission should also direct the utilities to establish or re-establish local offices in areas most likely to experience de-energization. Finally, TURN notes, messages should be actionable and should educate and motivate audiences to act on what they have learned, use common language and terminology and should be generic and flexible. Both Abrams and SBUA emphasize coordinated

education campaigns in advance of wildfire season. Abrams suggests that surveys must be used to determine the effectiveness of education campaigns. Numerous parties support using all available communication channels including broadcast media, cellular text messaging, door-to-door notice (if warranted) electronic mail communications, radio, and phone calls.

PG&E supports establishing "clear and consistent notification processes that include advanced notification and more targeted customer outreach."[67] PG&E commits to working closely with first responders, critical facilities and others to establish clear lines of communication and established protocols. SDG&E notes that communication and coordination is important, but it cannot supersede or delay actual de-energization, which may occur rapidly if the need arises.

4.2.5.2.2. Issue 2(a)(i)

Most of the provisions of Issue 2(a)(i) were discussed earlier, including the use of the California Alert and Warning Guidelines definitions of alert, warning and notification. Most parties support the Staff Proposal and were either affirmative or silent on the use of the California Alert and Warning Guidelines definitions. SBUA provided other suggested definitions, discussed earlier, and EPUC recommended a color-coded system of green/yellow/red to denote de-energization risk for specific areas/populations. As noted earlier, TURN supports in-person notification for customers disproportionally impacted by de-energization and notes the importance of remembering that customers will be without power during de-energization and re-energization, thus limiting communication streams. CforAT, like TURN, supports the notion of positive

[67] PG&E Reply Comments at 2.

contacts or affirmative contacts for vulnerable populations. CforAT recommends that the utilities report on the number of positive contacts and requests that the utilities provide an explanation of why positive contacts were not made, if that occurs. Utility comments are summarized in the previous section and elsewhere in this decision.

4.2.5.2.3. Issue 2(a)(iii) and Issue 2(a)(iv)

Starting with the almost universally agreed upon understanding stated in the California Alert and Warning Guidelines that people rarely act on a single warning message alone (Issue 2(a)(iii)), the bulk of party comments focus on the methods and systems that should be used to contact affected entities in the case of a power shut-off. Comments also focus on differences between communication with affected customers and Public Safety Partners.

City of Malibu and CLECA support the Staff Proposal as written. CSAC asserts that warnings must be disseminated through as many formats and channels as possible, including partnering with local OES and broadcast media. The Joint Communication Parties recommend that messaging be sent via phone, text or email. The Joint Water Agencies recommend the use of radio and television broadcasts. RCRC emphasizes that rural communities have insufficient broadband connectivity and as such, broadband cannot be relied upon as a primary source of information for such entities. TURN agrees that wireless emergency alerts (WEA) or other local government systems could assist with notification. UCAN recommends that the utilities should select communication methods and technologies that are most effective for each jurisdiction's demographic, cultural and geographical area. Public Advocates recommends that "off-network" communication methods be used, such as in-person visits to medical baseline customers or the opening of physical

information centers." CforAT notes that the ability to send messages via multiple channels will be impacted by loss of power.

The Joint Local Governments support using the SEMS framework as the first line of communication between the utility and first responders. Once the utility has provided notice and relevant information, the local governments can use their own notification systems (e.g. Nixle, Nextdoor, Reverse 9-1-1) to amplify the message. The Joint Local Governments, as well as other parties, note that there should be a 24-hour hotline that remains active throughout the event. MWDOC also supports the use of the SEMS framework, but reminds the Commission that SEMS is not a notification system. CCSF recommends that coordination with critical facilities occur through the California Utilities Emergency Association.[68]

PG&E agrees with the Staff Proposal that warnings should be delivered through various channels including Interactive Voice Response (IVR), text, e-mail, social media, and mass media. PG&E agrees to share notification templates in advance with public safety agencies so that public alerting channels can be used to supplement PG&E's notifications. CASMU and SCE support the Staff Proposal as presented.

4.2.6. Coordination Between Utilities and First Responders/Local Governments (Issue 3) and Utility Liaisons in Emergency Operation Centers (Issue 3(a))

Safe and effective de-energization relies in large part on the ability of the utilities, first/emergency responders and local jurisdictions/governments to

[68] The California Utilities Emergency Association "serves as a point of contact for critical infrastructure utilities and [CalOES] and other Government Agencies before, during and after an event."

coordinate responses, including messaging, as seamlessly as possible. The Scoping Memo sought feedback from parties on the following questions: (1) What structures and practices should be in place to maximize coordination between utilities and first responders/local governments (*Issue 3*); and (2) Should the utilities be required to embed representatives (who are empowered to make decisions on behalf of the utility) in emergency response team operations centers carried out under state and local plans consistent with SEMS? (*Issue 3(a)*)

4.2.6.1. Staff Proposal

Staff offered the following proposals:

> In order to ensure situational awareness in a format compatible with state-of-the-art public safety systems, IOUs should provide geospatial REST services in a format that can be readily accessed and that provides a near real time overview. Additionally, IOUs should provide Shapefiles/KMZ files to public safety partners and critical infrastructure providers that geospatially represent historic de-energization boundaries and any available probabilistic models of de-energization events. (*Issue 3*)
>
> Yes; in order to ensure that public safety partners are able to address the full range of impacts that may stem from a de-energization event, IOUs who have initiated a de-energization plan should assign a liaison officer to the Emergency Operations Center (EOC) that has been activated to respond to a de-energization event. These liaison officers must be enabled to provide rapid and accurate information from the IOUs and should be in frequent communication with an IOU's operational center. *(Issue 3(a))*

4.2.6.2. Parties' Positions

4.2.6.2.1. Issue 3

Staff's proposal regarding the provision of GIS REST services has been presented elsewhere in this decision. This section will focus on party comments pertaining to the provision of historic de-energization boundaries and probabilistic models to Public Safety Partners. In addition, parties provided

comments on the general principles of utility/first responder/local government coordination.

Several parties support the Staff Proposal as articulated, including CLECA, CWA, EBMUD, City of Malibu, POC, RCRC and CCSF. OSA recommends using SEMS[69] for managing responses to multi-agency and multijurisdictional emergencies in California as the appropriate governing framework for de-energization. Public Advocates also recommends aligning the utilities' coordination practices with SEMS (or at least using SEMS to inform their coordination practices). CforAT agrees with the Staff Proposal but notes that the proposal requires additional coordination, including consideration of allocation of resources between utilities and local government agencies.

CSAC and CMUA recommend, as does CASMU below, that the utilities be required to provide pre-scripted message language to local OES for use in the Emergency Notification System as well as in all social media. This messaging should be used to augment the utilities' communications, and a Memorandum of Understanding should be developed between parties. Abrams asserts that structures and practices for coordination should be developed from a very specific set of protocols with associated communication tools and templates. MWDOC recommends that all provisions of data and messaging be delivered to water utilities in addition to first responders/local governments. The Joint Water Districts suggest that there should be increased electric utility/water utility coordination and documentation for critical water/wastewater facilities.

SDG&E supports information sharing and collaboration with Public Safety Partners, but suggests that more specificity, clarity and guidance is needed

[69] Government Code § 8607(a).

regarding the provision of shapefiles. CASMU supports the Staff Proposal but recommends that the utilities should pre-script message templates in advance in a format that allows public safety agencies to use their official alert channels to amplify the utility message, if they choose to do so. PG&E states that without additional detail on probabilistic models, PG&E cannot endorse Staff's recommendation.

4.2.6.2.2. Issue 3(a)

Most parties that responded to Issue 3(a) support the notion of embedding a utility liaison with decision-making authority in the local jurisdictional emergency operation centers (EOCs), including the Joint Local Governments, OSA, TURN and Abrams. CMUA suggests that this issue is out of scope because it is more appropriately addressed in R.15-06-009.[70] The Joint Local Governments, in response to the concerns articulated by the utilities below, recommend that the utility embed a liaison officer in the County EOC if and when it is activated. In the alternative, if the utility is able to hold twice-daily conference calls between its EOC Incident Commander and local governments, that may be sufficient to "address the previous shortcomings in PG&E's communications— assuming that the conference calls provide timely and accurate information and a direct line to PG&E's decision-makers."[71]

PG&E disagrees with the Staff Proposal noting that, depending on the scope of the event, or if there are multiple emergencies occurring, PG&E could

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[70] Order Instituting Rulemaking Regarding Policies, Procedures and Rules for Regulation of Physical Security for the Electric Supply Facilities of Electrical Corporations Consistent with Public Utilities Code Section 364 and to Establish Standards for Disaster and Emergency Preparedness Plans for Electrical Corporations and Regulated Water Companies Pursuant to Public Utilities Code Section 768.6.

[71] Joint Local Governments Reply Comments at 4.

face challenges with embedding liaisons. Furthermore, PG&E asserts that embedding liaisons with decision-making authority in multiple locations would defeat the purpose of having an Incident Command Structure (ICS).[72] PG&E proposes that it assign a full-time liaison that CalOES can call when local EOCs are activated in order to get the most up-to-date information from the Chief of Staff in PG&E's EOC. SDG&E also disagrees with the proposal to embed liaisons in local EOCs noting that it would strain limited resources and violate both Incident Command Systems and emergency management principles, which discourage self-deployment. SDG&E notes that it has designated seats in its EOC for both County and CalOES representatives.

4.3. Requests to Delay De-Energization (Issue 1(a))

In Issue 1 of the Scoping Memo asks for feedback on the following question: what, if any, updates or modifications should be made to Resolution ESRB-8 to ensure that, should de-energization become necessary during the 2019 wildfire season, de-energization is undertaken as efficiently and safely as possible? Staff set forth three main recommendations, the first two of which are discussed in earlier sections (thresholds for strong wind events and conditions for "an extreme hazard" as well as the provision of GIS REST service articulating the boundaries of the areas subject to de-energization). Staff also sets forth a recommendation to allow requests to delay de-energization. This section discusses Staff's recommendation as well as party comments on this matter.

4.4. Staff Proposal

Staff offers the following proposal:

[72] ICS is a management system designed to enable effective and efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure.

IOUs should ensure their de-energization plans provide the means for pre-designated first responders with statutory responsibility for impacted jurisdictions to request a temporary delay in de-energization events in exigent circumstances.

4.5. Parties' Positions

CLECA generally supports the Staff Proposal as written. Public Advocates recommends that the Commission make clear who qualifies to be a pre-designated first responder and determine who has ultimate authority to implement de-energization. Furthermore, the Commission, should it allow requests to delay de-energization for emergency circumstances, must clarify which emergency takes precedence and how long a delay can last before a decision to de-energize must be reached. Finally, Public Advocates asserts that the Commission must clearly define "exigent circumstances." MWDOC agrees that further clarification is necessary to determine who is a "pre-designated first responder with statutory responsibility..." MWDOC also notes that, after a de-energization occurs, there must be a protocol for rapid re-energization if an emergency occurs, e.g. if a non-utility wildfire occurs and water is needed from a de-energized water provider to fight the fire.

The Joint Local Governments and PG&E express concern about the allowance of a delay noting that once a utility has decided to de-energize, a delay could put communities at risk. The Joint Local Governments note that it is not clear that a situation would arise where the utility would decide to de-energize and then delay that decision because other circumstances outweigh the risk of a wildfire caused by utility equipment. SDG&E suggests that first responders with a statutory responsibility for an affected jurisdiction should be able to request a temporary delay, but the Staff Proposal as written is concerning and the issue of

liability if a delay is granted must be addressed. SCE recommends that this issue be explored more fully in Phase 2.

4.6. De-Energization of Transmission Lines (Issue 6)

To date, de-energization has focused primarily on the distribution system; however, there may be times when it becomes necessary for an electric utility to consider de-energization of a transmission line. De-energization of transmission lines will likely have more far-reaching and cascading impacts than distribution-level de-energization. As such, the Scoping Memo asked the following question: What additional provisions or protocols are necessary if de-energization of transmission lines becomes necessary?

4.6.1. Staff Proposal

Staff set forth the following proposal:

> As opposed to providing provisions or protocols that differ based on impacted infrastructure (transmission versus distribution), it is recommend that the IOUs shape their protocols based on the impacts to populations across impacted jurisdictions. In the case of transmission line de-energization events, this may require additional coordination with CalOES's State Operations Center.

4.6.2. Parties' Positions

TURN, Public Advocates, EBMUD, the Joint Local Governments, SDG&E and DACC/EUF generally agreed with the Staff Proposal that notice and communication methods and de-energization protocols should be based on the type, number, and location of customers that may be affected.[73] Some parties note, however, that transmission level de-energization requires a different assessment of impact as well as different notification and coordination efforts

[73] TURN-specific language, Opening Comments at 12.