California's BUG Problem: The Backup Generation Information Gap and its Impact on Vulnerable Communities

ANDREW H. JACOBS[†]

California's electricity system has faced unprecedented challenges in recent years. Extreme heat, wildfires, and additional severe weather events stressed the system to a breaking point. The state's electric grid operator repeatedly called for rolling blackouts on hot summer days to preserve the integrity of the electric grid. Electric utilities proactively shut off power during dry and windy conditions to prevent their equipment from sparking wildfires. Strings of powerful winter storms left hundreds of thousands across the state without power for multiple days.

In response to the poor reliability of the electrical grid, demand for backup generation has skyrocketed. Both residents and businesses are finding alternative ways to keep their lights on, especially during emergency events. Yet backup generation predominantly runs on fossil fuels to supply temporary power. These generators create high environmental costs, emitting greenhouse gases and air pollutants that contribute to climate change and negatively impact public health. Some communities are well-positioned to respond to these impacts, while others are more vulnerable and experience disproportionate harm.

This Note reviews the evolving legal landscape that allows the deployment and use of backup generation in California with a particular focus on the use of backup generation during emergency events. In doing so, it demonstrates a lack of readily available information associated with these generators and raises the concern that the backup generation information gap harms the state's most vulnerable populations. This Note concludes by suggesting an approach to reduce the information gap through increased reporting, tailored monitoring, and managed access of backup generators. Such an approach supports vulnerable communities while recognizing the role of backup generators in California's electricity system of the future.

[†] J.D. Candidate 2025, University of California, College of the Law, San Francisco; Executive Supreme Court of California (SCOCA) Editor, *UC Law Journal*. The Author thanks Dave Owen for his incredibly helpful insights and mentorship throughout the writing process.

TABLE OF CONTENTS

INTRODUCTION

Of all major power outages reported across the United States from 2000 to 2023, 58 percent were caused by severe weather.[1] Frequent severe weather events—made more extreme by climate change—continue to threaten the United States' power grid.[2] The number of "major electric disturbances" on the grid has increased thirteen-fold since the turn of the century,[3] and North America's electric grid reliability organization recently warned that summer weather-related extremes could risk blackouts across two-thirds of the continent.[4]

California has experienced its fair share of climate-induced impacts to its power grid.[5] Flex Alerts, or calls from California's primary grid operator for consumers to reduce their electricity consumption over certain hours of the day to prevent blackouts, have been commonplace in the state for the past twenty-five years.[6] The same grid operator has even ordered electric utilities to temporarily cut power to customers to avoid strain on the grid during intense summer heat.[7]

Extreme weather has also caused California's utilities[8] to anticipate severe weather and take the unprecedented step of proactively cutting power to

1. Juan Pablo Carvallo & Joan Casey, *Weather-related Power Outages Rising*, CLIMATE CENT. (Apr. 23, 2024), https://www.climatecentral.org/climate-matters/weather-related-power-outages-rising.

2. Emily Barone, *The U.S.'s Creaky Power Grid Is No Match for Worsening Weather Catastrophes*, TIME (Nov. 18, 2022, 3:31 PM EST), https://time.com/6235156/extreme-weather-us-power-outages.

3. *Strategies for Improving Critical Energy Infrastructure: Hearing Before the Subcomm. on Gov't Operations & Border Mgmt. of the S. Comm. on Homeland Sec. & Gov't Affs.*, 117th Cong. 2 (2021) (statement of Robert Bryce, Journalist and Host of the Power Hungry Podcast); *see also Major Disturbances and Unusual Occurrences*, U.S. DEP'T OF ENERGY (Sept. 2022), https://www.eia.gov/electricity/data/disturbance/disturb_events_archive.html.

4. N. AM. ELEC. RELIABILITY CORP., 2023 SUMMER RELIABILITY ASSESSMENT 5–6 fig.1 (2023), https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SRA_2023.pdf.

5. *See, e.g.*, Andrew Freedman, *The Biggest Factors Behind California's Historic Flooding*, AXIOS (Feb. 6, 2024), https://www.axios.com/2024/02/06/california-flooding-rainfall-climate-change (indicating that February 2024 storms in California led to multiple 1-in-1,000-year rainfall events in certain locations across the state); *see also* Tim Fang, *Widespread Power Outages Remain, Multiple Schools Closed After Powerful Bay Area Storm*, CBS NEWS (Feb. 5, 2024, 10:30 PM PST), https://www.cbsnews.com/sanfrancisco/news/bay-area-feb-5-atmospheric-river-storm-200k-without-power-schools-closed-wind-rain-damage (interviewing PG&E spokesperson who noted that the February 2024 storms led to one of the top three most damaging storms in terms of total number of power outages across northern California).

6. *See Summary of Alert, Warning, Emergency, and Flex Alert Notices Issued from 1998 to Present*, CAL. INDEP. SYS. OPERATOR (Jan. 19, 2022), http://www.caiso.com/Documents/FlexAlertNoticesIssuedFrom1998-Present.pdf.

7. CAL. INDEP. SYS. OPERATOR, CAL. PUB. UTIL. COMM'N & CAL. ENERGY COMM'N, ROOT CAUSE ANALYSIS: MID-AUGUST 2020 EXTREME HEAT WAVE 1 (2021), http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf.

8. Throughout this Note, the terms "utilities" and "electric utilities" refer to organizations that delivery electricity to customers. These organizations may be investor-owned, publicly owned, or member-owned. However, in California, most customers are served by investor-owned utilities, including the two largest

customers.[9] During such a Public Safety Power Shutoff (PSPS), utilities have the authority to shut off power to prevent wildfires when strong winds, low humidity, and high heat are present.[10] Since 2013, California utilities have announced PSPS events on nearly thirty days, with the average event lasting more than thirty hours.[11] Although utilities have made progress refining their protocols to reduce the number and duration of these PSPS events,[12] they still frequently occur.[13]

In response to the persistent reliability challenges of California's electric grid, both utilities[14] and consumers[15] have relied on backup generators (BUGs) as a source of power during outages such as PSPS events. Utilities have deployed mobile, diesel-powered generators to strategic locations in communities to temporarily supply power.[16] Consumers have sought various types of backup generation, including battery storage, but the majority of backup generation

investor-owned utilities in the nation: Pacific Gas & Electric and Southern California Edison. *See* Anodyne Lindstrom & Sara Hoff, *Investor-Owned Utilities Served 72% of U.S. Electricity Customers in 2017*, U.S. ENERGY INFO. ADMIN. (Aug. 15, 2019), https://www.eia.gov/todayinenergy/detail.php?id=40913. For a brief explanation of electric utilities, see Alison F. Takemura, *Electric Utilities 101: A Breakdown of the Basics on US Power Providers*, CANARY MEDIA (Oct. 12, 2022), https://www.canarymedia.com/articles/guides-and-how-tos/power-by-people-glossary-bundle.

9. *See, e.g.*, *Public Safety Power Shutoffs*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/psps (last visited Feb. 1, 2025) (describing the history of proactive electric utility power shutoffs to reduce wildfire risk).

10. *Id.*; *see also* CAL. PUB. UTIL. CODE § 451 (West 2025); CAL. PUB. UTIL. CODE § 399.2 (West 2025); Decision Granting Petition to Modify Decision 09-09-030 and Adopting Fire Safety Requirements for San Diego Gas & Electric Company, Decision 12-04-024, at 36–37 (Cal. Pub. Utils. Comm'n Apr. 19, 2012), https://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/165063.PDF.

11. *Use of Back-up Engines for Electricity Generation During Public Safety Power Shutoff Events*, CAL. AIR RES. BD. [hereinafter *Use of Back-up Engines*], https://ww2.arb.ca.gov/resources/documents/use-back-engines-electricity-generation-during-public-safety-power-shutoff#footnote8_edp8w6h (last visited Feb. 1, 2025).

12. Decision Adopting Phase 3 Revised and Additional Guidelines and Rules for Public Safety Power Shutoffs (Proactive De-energizations) of Electric Facilities to Mitigate Wildfire Risk Caused by Utility Infrastructure, Decision 21-06-034, at 162 (Cal. Pub. Utils. Comm'n June 24, 2021), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M389/K955/389955672.PDF ("The [Investor-Owned Utilities] should file . . . an annual report . . . to enhance transparency . . . [and] enable the Commission and stakeholders to track important issues in advance of PSPS events . . . .").

13. *E.g.*, PG&E Has Initiated a Public Safety Power Shutoff to About 600 Customers in Kern County, PG&E CURRENTS, https://www.pge.com/en/newsroom/currents/safety/pge-plans-for-a-potential-psps-to-approximately-600-customers-in-kern-county.html (last visited Feb. 1, 2025) (calling for a PSPS event during the week of January 20, 2025); *see also CPUC Public PSPS Dashboard*, CAL. PUB. UTILS. COMM'N, https://capuc.maps.arcgis.com/apps/dashboards/ecd21b1c204f47da8b1fcc4c5c3b7d3a (last visited Feb. 1, 2025) (highlighting a recent reduction but continual issuance of PSPS events).

14. *Microgrids & Remote Grids*, PG&E, https://www.pge.com/en_US/residential/outages/public-safety-power-shuttoff/microgrid-backup-power.page (last visited Feb. 1, 2025) (showcasing how temporary mobile generation can serve as backup power when the electric system is down).

15. *See infra* notes 44–50 and accompanying text.

16. *Use of Back-up Engines*, *supra* note 11.

procured by consumers in the past five years consists of gasoline- or diesel-powered generators.[17]

The demand for backup generation during emergency events in California raises particular concerns. Emissions from diesel BUGs are known to cause negative health effects to the respiratory, nervous, and immune systems.[18] The California Air Resources Board (CARB), a state agency dedicated to reducing air pollution, even lists diesel exhaust as a toxic air contaminant.[19] CARB and California's thirty-five air pollution control and air quality management districts ("air districts") regulate backup generation.[20] However, many air districts allow unlimited use of this generation during emergency events.[21] This provides an avenue of power reliability but exposes populations to increased air quality impacts, including vulnerable communities who may already be subject to high air pollution levels or who have limited ability to reduce their exposure.[22] Any such exposure also strays from California's vision for an equitable and clean energy future.[23] Although backup generation supports health and safety during emergency events,[24] this Note recommends improvements in the state's policy and regulatory structure surrounding backup generation to reduce impacts on California's most vulnerable populations.

Part I discusses the environmental impacts of backup generation in California, including the incremental impacts of backup generation during emergency events across the state. Part II reviews the development and evolution of California's regulatory structure for backup generation. Part II also discusses the emergency powers given to the executive of the government to act outside the traditional bounds of their authority when normal channels cannot be used

17. STEVEN MOSS & ANDY BILICH, DIESEL BACK-UP GENERATOR POPULATION GROWS RAPIDLY IN THE BAY AREA AND SOUTHERN CALIFORNIA 1 (2021), https://www.bloomenergy.com/wp-content/uploads/diesel-back-up-generator-population-grows-rapidly.pdf.

18. NANCY E. RYAN, KATE M LARSEN & PETER C. BLACK, SMALLER, CLOSER, DIRTIER: DIESEL BACKUP GENERATORS IN CALIFORNIA 26 (2002), https://www.edf.org/content/smaller-closer-dirtier ("Diesel exhaust also has numerous . . . effects on the respiratory, neurological, and immunological systems of the human body.").

19. *Id.*

20. *Use of Back-up Engines*, *supra* note 11.

21. *See, e.g.*, *Planned Safety Power Shutoff (PSPS) Events*, BUTTE CNTY. AIR QUALITY MGMT. DIST., https://www.bcaqmd.org/planned-safety-power-shutoff-psps-events (last visited Feb. 1, 2025) ("Permits generally do not have limits on backup generator usage during emergency events, such as PSPS."); *Emergency Generators*, GREAT BASIN UNIFIED AIR POLLUTION CONTROL DIST., https://www.gbuapcd.org/PermittingAndRules/PermitApplications/Generators/ (last visited Feb. 1, 2025) ("Gasoline or propane emergency generators are exempt from permitting except for large engines . . . that may require permits.").

22. *Climate Change and the Health of Socially Vulnerable People*, EPA (Nov. 26, 2024), https://www.epa.gov/climateimpacts/climate-change-and-health-socially-vulnerable-people.

23. *See infra* Part.III.

24. *See, e.g.*, *Portable Battery Program*, PG&E, https://www.pge.com/en/account/billing-and-assistance/financial-assistance/portable-battery-program.html (last visited Feb. 1, 2025) (providing batteries to qualifying customers to help reduce the impact of safety power outages).

to address a danger. Specifically, it highlights the way that this emergency authority has been used by California's governor to authorize the use of emergency generators outside the bounds of existing air district permits.[25] Part III includes policy recommendations at the intersection of health, safety, and reliability. Specifically, this Note argues that state and local authorities should (1) increase reporting efforts for BUGs of all sizes; (2) create tailored monitoring requirements to foster an understanding of the size, scope, and usage patterns of BUGs; and (3) manage expanded access to alternate backup power options while prioritizing individuals with the highest need. By implementing such improvements, California can continue to appreciate the value of backup generation while reducing both its environmental impact and its impact on the state's most vulnerable populations.

I. UNDERSTANDING BACKUP GENERATION

California is experiencing unprecedented climate-induced impacts, exposing vulnerabilities in its electricity system.[26] During the summer of 2020, California faced a heatwave that set records.[27] Death Valley reached a near-record high of 130 degrees Fahrenheit[28] as extreme heat spread across the entire western United States.[29] California also grappled with wildfires of increasing frequency and scale. Since 2013, the state has averaged more than 7,000 wildfires each year.[30] The last ten years have seen fifteen of the twenty most destructive wildfires in state history, including the 2020 August Complex fire that burned over a million acres.[31] The result is a statewide fire season that is year-round.[32] These events, and more, have led to frequent grid outages,[33] leaving people in the dark for extended periods of time. In fact, California has

25. *See infra* Subpart.II.D.

26. GOVERNOR GAVIN NEWSOM, CALIFORNIA'S ELECTRICITY SYSTEM OF THE FUTURE 9 (2021), https://www.gov.ca.gov/wp-content/uploads/2021/07/Electricity-System-of-the-Future-7.30.21.pdf.

27. W. ELEC. COORDINATING COUNCIL, AUGUST 2020 HEATWAVE EVENT ANALYSIS REPORT 1 (2021).

28. *Death Valley, Hottest Place on Earth, Hits Near-Record High as Blistering Heat Wave Continues*, CBS NEWS (July 17, 2023, 7:40 PM EDT), https://www.cbsnews.com/news/death-valley-hottest-place-on-earth-near-record-high-heat-wave.

29. W. ELEC. COORDINATING COUNCIL, *supra* note 27.

30. *Statistics*, CAL. DEP'T OF FORESTRY & FIRE PROT. (Dec. 30, 2024), https://www.fire.ca.gov/our-impact/statistics.

31. *Top 20 Most Destructive California Wildfires*, CAL. DEP'T OF FORESTRY & FIRE PROT. (Mar. 27, 2024), http://large.stanford.edu/courses/2022/ph240/chunduru1/docs/calfire-24oct22.pdf.

32. GOVERNOR NEWSOM'S STRIKE FORCE, WILDFIRES AND CLIMATE CHANGE: CALIFORNIA'S ENERGY FUTURE 1 (2019), https://www.gov.ca.gov/wp-content/uploads/2019/04/Wildfires-and-Climate-Change-California%E2%80%99s-Energy-Future.pdf.

33. GOVERNOR GAVIN NEWSOM, *supra* note 26, at 9.

more annual outages than any other state—double or more compared most other states.[34]

Losing power is more than an inconvenience. A lack of power disrupts lives and creates risks, especially for individuals who depend on life-sustaining medical equipment that use electricity.[35] Without power, these individuals are left with a difficult choice: stay at home or seek help elsewhere in order to ensure access to necessary power.[36] Even short-term power outages can lead to life-threatening situations. One study indicated that a power outage caused a 23 percent increase in hospital admissions for chronically ill patients.[37] Another revealed that a blackout caused a 10 percent increase in hospital admissions for individuals who depend on medical devices.[38] These patients utilized significant hospital resources and spent an average of fifteen hours in the emergency department.[39]

Moreover, public services and businesses similarly experience negative impacts of power loss. Public services, such as water agencies, gas stations, or grocery stores, must turn to BUGs to replace lost grid power and to provide communities with essential needs.[40] Without backup generation, these services and the people that rely on them may bear the burden of the power loss. For example, food banks that lose power often need to discard spoiled food, risking the ability to effectively provide for food insecure community members.[41] Businesses may experience lost revenue, lost productivity, and additional costs required to restore operating capacity following an outage.[42] Businesses frequently use BUGs to avoid disruptions in workflow and minimize the significant economic impacts that occur from prolonged power outages.[43]

---

34. *Power Outages by State 2024*, WORLD POPULATION REV., https://worldpopulationreview.com/state-rankings/power-outages-by-state (last visited Feb. 1, 2025).

35. Charlotte Huff, *Growing Power Outages Pose Grave Threat to People Who Need Medical Equipment to Live*, NPR (May 15, 2021, 7:01 AM ET), https://www.npr.org/sections/health-shots/2021/05/15/996872685/growing-power-outages-pose-grave-threat-to-people-who-need-medical-equipment-to-.

36. *Id.*

37. Wangjian Zhang et al., *Power Outage: An Ignored Risk Factor for COPD Exacerbations*, 158 CHEST 2346, 2348–49 (2020).

38. Peter W. Greenwald, Anne F. Rutherford, Robert A. Green & James Giglio, *Emergency Department Visits for Home Medical Device Failure During the 2003 North America Blackout*, 11 ACAD. EMERGENCY MED. 786, 787 (2004).

39. *Id.*

40. *Use of Back-up Engines*, *supra* note 11.

41. Jackie Botts, *"We Need the Food That We Lost." Low-Income Families Still Reeling from Blackouts*, CALMATTERS (Feb. 27, 2020), https://calmatters.org/projects/california-psps-power-shutoffs-poverty-spoiled-food-hunger.

42. *Backup Power May Be Vital to Your Business*, L.A. DEP'T OF WATER & POWER (Sept. 13, 2022), https://www.ladwp.com/publications/newsletters/articles/backup-power-may-be-vital-your-business.

43. *Use of Back-up Engines*, *supra* note 11.

In response to more frequent outages, demand for BUGs has soared.[44] Generac—one of the main providers of backup generation systems in the United States—saw sales increase 70 percent in a single year between 2020 and 2021 and had to expand its nationwide operations to meet the aggressive demand.[45] In 2021, the South Coast Air Quality Management District, the air district for one of the most polluted regions in California covering Orange County and the urban portions of Los Angeles, Riverside, and San Bernadino Counties, experienced a 22 percent increase in its fleet of permitted BUGs.[46] Similarly, the Bay Area Air Quality Management District saw a 34 percent increase in its fleet.[47] This reported demand indicates that backup generation is increasingly being relied upon throughout the state.

The BUGs that individuals and businesses are turning to can be broadly defined as electricity-generating equipment that provide a secondary source of power during an electric failure.[48] These resources can be either stationary, permanently-installed generators, or portable units that can be moved to supply power in different locations.[49] BUGs at the individual consumer level are typically powerful enough to produce enough electricity to run circuits for heating and cooling, refrigeration, cooking, medical equipment, and more.[50] BUGs at the industrial and commercial level can handle the power needs of an entire home or building.[51] BUGs come in various forms and are powered by different fuel types, though the vast majority of BUGs use fossil fuels like natural gas and diesel to generate electricity.[52]

Emergency BUGs are generators used to respond to an emergency event or any "situation arising from sudden and reasonably unforeseen natural disaster such as [an] earthquake, flood, fire, or other unforeseen event . . . that threatens

44. Matt Phillips, *Climate Change Calls for Backup Power, and One Company Cashes In*, N.Y. TIMES (Sept. 15, 2021), https://www.nytimes.com/2021/09/15/business/generac-climate-change-generators.html.

45. *Id.*

46. MOSS & BILICH, *supra* note 17.

47. *Id.*

48. *Use Generators Safely at Home*, FEMA (Sept. 3, 2021), https://www.fema.gov/fact-sheet/use-generators-safely-home.

49. *Generators for Back-Up Power During Outages*, BUILDING AM. SOL. CTR. (Sept. 30, 2021), https://basc.pnnl.gov/information/generators-back-power-during-outages.

50. *Id.*

51. *Id.*

52. MOSS & BILICH, *supra* note 17, at 2, 6. Batteries, including batteries that are paired with solar panels, are another form of backup generation different from most backup generation that relies on fossil fuels like gasoline, propane, natural gas, or diesel. However, battery systems can be prohibitively expensive to install and come with their own reliability implications. *See* Ivan Penn & Peter Eavis, *Backup Power: A Growing Need, if You Can Afford It*, N.Y. TIMES (May 6, 2023), https://www.nytimes.com/2023/05/06/business/energy-environment/backup-power-generators-climate-change.html ("Solar panels paired with batteries can provide emissions-free power, but they cost tens of thousands of dollars and typically cannot provide enough to run big appliances and heat pumps for more than a few hours. Those systems are also less reliable during cloudy, rainy or snowy days when there isn't enough sunlight to fully recharge batteries.").

public health and safety."[53] Given the predominance of natural gas and diesel generators, this Note solely focuses on fossil-fueled BUGs, and specifically their use in emergency situations. As such, reference to backup generation throughout the rest of this Note will refer only to those BUGs which are powered by fossil fuels. These types of generators serve a useful purpose during an outage by providing a reliable source of power, but they also present serious health and environmental concerns.[54]

A. HEALTH AND ENVIRONMENTAL IMPACTS

BUGs pose several impacts to human health and the environment through their operation and use. In fact, the harms are often interconnected because environmental pollution negatively impacts human health.[55] There are also specific safety hazards inherent in the use of BUGs. First, BUGs create shock and electrocution hazards because they often bypass safety devices, like circuit breakers, that are typically built into electrical systems.[56] Second, BUGs emit carbon monoxide, a colorless, odorless, toxic gas, which requires proper ventilation in an open, outdoor area.[57] Third, BUGs are a fire hazard because they run hot for long periods of time and use flammable fuels.[58] Fourth, BUGs create excessive noise and vibration that can cause hearing loss and fatigue.[59]

BUGs also have high environmental costs, emitting greenhouse gases and air pollutants, such as nitrogen oxides (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOCs), and particulate matter ($PM_{2.5}$).[60] Air pollution can create smog and exacerbate respiratory conditions like asthma, especially for

53. CAL. CODE REGS. tit. 13, § 2452(j) (2019).

54. *See Use Generators Safely*, *supra* note 48.

55. *See* Elisabeth A. Gilmore, Peter J. Adams & Lester B. Lave, *Using Backup Generators for Meeting Peak Electricity Demand: A Sensitivity Analysis on Emission Controls, Location, and Health Endpoints*, 60 J. AIR & WASTE MGMT. ASS'N 523, 523–24 (2010) [hereinafter Gilmore et al., *Using Backup Generators*]; *see also* Elisabeth A. Gilmore, Lester B. Lave & Peter J. Adams, *The Costs, Air Quality, and Human Health Effects of Meeting Peak Electricity Demand with Installed Backup Generators*, 40 ENV'T SCI. & TECH. 6887, 6887 (2006); Sunjoo Hwang, Sopitsuda Tongsopit & Noah Kittner, *Transitioning from Diesel Backup Generators to PV-Plus-Storage Microgrids in California Public Buildings*, 38 SUSTAINABLE PROD. & CONSUMPTION 252, 254 (2023).

56. *Using Portable Generators Safely*, OSHA (Sept. 2005), https://www.osha.gov/sites/default/files/publications/OSHA3286.pdf.

57. *Id.*

58. *Id.*

59. *Id.*

60. Gilmore et al., *Using Backup Generators*, *supra* note 55, at 523–24, 526.

children and older adults.[61] Reducing emissions of NO_x, an ozone precursor,[62] from BUGs is vital to avoid long-term health risks.[63] Evidence indicates that there is a causal relationship between ozone exposure and premature mortality.[64] Further, previous studies have shown that out of the top ten air toxic cancer risk contributors in California, diesel exhaust in particular was responsible for 70 percent of the statewide potential cancer risk.[65]

While some research has claimed to show that BUGs pollute less than predicted and should not pose a threat to public health,[66] more modern analyses performed both by state agencies[67] and by external stakeholders[68] indicate otherwise. CARB performed a study of generator usage associated with a power outage from a PSPS event in October 2019 and found that when BUGs ran for a fifty-hour period during the PSPS event, nine tons of diesel particulate matter were emitted.[69] That amount is equivalent to 29,000 heavy duty diesel trucks driving on California roadways for a month.[70] Furthermore, the South Coast Air Quality Management District analyzed the NO_x emissions in its region after emergency BUGs ran for twenty-four hours.[71] Daily NO_x emissions from the BUGs were greater than the average daily NO_x emissions from the eight refineries in the District's jurisdiction.[72] These BUGs were only run during emergency events but emitted substantial pollutants during a short period of time.

---

61. *See* Angelica I. Tiotiu, Plamena Novakova, Denislava Nedeva, Herberto Jose Chong-Neto, Silviya Novakova, Paschalis Steiropoulos & Krzysztof Kowal, *Impact of Air Pollution on Asthma Outcomes*, 17 INT'L J. ENV'T RSCH. & PUB. HEALTH 6212, 6212 (2020).

62. An ozone precursor is a pollutant whose presence, concentration, and chemical reactivity in the atmosphere result in the production of ozone. *See What Is Ozone?*, EPA (June 20, 2024), https://www.epa.gov/ozone-pollution-and-your-patients-health/what-ozone.

63. *See* Tiotiu et al., *supra* note 61.

64. NAT'L RSCH. COUNCIL, ESTIMATING MORTALITY RISK REDUCTION AND ECONOMIC BENEFITS FROM CONTROLLING OZONE AIR POLLUTION 75 (2008).

65. CAL. EPA: AIR RES. BD., RISK REDUCTION PLAN TO REDUCE PARTICULATE MATTER EMISSIONS FROM DIESEL-FUELED ENGINES AND VEHICLES 15–16 (2000), https://ww2.arb.ca.gov/sites/default/files/classic/diesel/documents/rrpfinal.pdf.

66. J.M. LENTS ET AL., 1 AIR QUALITY IMPLICATIONS OF BACKUP GENERATORS IN CALIFORNIA 7 (2005), https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=84c8463118e4813a117db3d768151a8622c4bf6b.

67. *See, e.g.*, CAL. AIR RES. BD., EMISSION IMPACT: ADDITIONAL GENERATOR USAGE ASSOCIATED WITH POWER OUTAGE 1 (2020) [hereinafter EMISSION IMPACT], https://ww2.arb.ca.gov/sites/default/files/2020-01/Emissions_Inventory_Generator_Demand%20Usage_During_Power_Outage_01_30_20.pdf.

68. *See, e.g.*, MOSS & BILICH, *supra* note 17.

69. EMISSION IMPACT, *supra* note 67, at 1–2.

70. *Id.* at 2.

71. Elizabeth McCarthy, *The Dark Side of California's Emergency Grid Rescue Plan: More Dirty Emissions from Backup Generators*, CANARY MEDIA (Aug. 24, 2021), https://www.canarymedia.com/articles/fossil-fuels/the-dark-side-of-californias-emergency-grid-rescue-plan-more-dirty-emissions-from-backup-generators.

72. *Id.*

The pollution impacts of fossil-fueled BUGs are often tied to their availability, efficiency, and reliability. BUGs are widely available, with residential-sized generators available for purchase at major hardware stores.[73] Gasoline-, propane-, diesel-, and natural gas-based generators each have their own advantages depending on the availability of the fuel source and the ease of delivering and storing the fuel.[74] However, natural gas generators are oftentimes found in commercial and industrial applications since they must be connected to an existing natural gas pipeline network.[75]

Diesel generators are the most efficient of the fossil-fueled BUGs,[76] meaning more electrical power is produced per unit of fuel, which drives their popularity.[77] The vast majority of BUGs in California are diesel-powered, with nearly 90 percent penetration in both the South Coast Air Quality Management District and the Bay Area Air Quality Management District.[78] However, the efficiency of diesel BUGs pales in comparison to their environmental costs, especially when compared to fossil-fueled, utility-scale power plants that normally supply power to the grid.[79] Even when individuals are near lower-emitting BUGs, their potential air pollution exposure is ten to one hundred times more than their exposure would be near a large-scale powerplant on a per unit of energy basis.[80] And when individuals are near higher-emitting BUGs, such as those in the existing stock of diesel BUGs in California, their potential air pollution exposure is up to one thousand times more.[81]

Additionally, although BUGs are used to address grid reliability concerns, they can sometimes be unreliable. The reliability of BUGs decreases over the course of a power outage.[82] These generators must be well-maintained, and even well-maintained BUGs are only considered to be eighty percent reliable for a long-term outage.[83] Similarly, certain fuels have limited shelf lives.[84] A diesel

73. *The Complete List of Standby Generator Fuel Types*, WOODSTOCK POWER CO., https://woodstockpower.com/blog/complete-list-generator-fuel-types (last visited Feb. 1, 2025).

74. *Id.*

75. *Id.*

76. SEAN ERICSON & DAN OLIS, NAT'L RENEWABLE ENERGY LAB'Y, A COMPARISON OF FUEL CHOICE FOR BACKUP GENERATORS 26–27 (2019), https://www.osti.gov/servlets/purl/1505554.

77. *The Complete List of Standby Generator Fuel Types*, *supra* note 73 (describing diesel as popular due to their "build, versatility and durability, enabling this type of generator to fit various needs across multiple industries").

78. MOSS & BILICH, *supra* note 17.

79. *See* Garvin A. Heath & William W. Nazaroff, *Intake-to-Delivered-Energy Ratios for Central Station and Distributed Electricity Generation in California*, 41 ATMOSPHERIC ENV'T 9159, 9171 (2007).

80. *Id.*

81. *Id.*

82. Hwang et al., *supra* note 55.

83. Jeffrey Marqusee & Donald Jenket II, *Reliability of Emergency and Standby Diesel Generators: Impact on Energy Resiliency Solutions*, 268 APPLIED ENERGY 114918, 114918 (2020).

84. Hwang et al., *supra* note 55.

generator may fail if its fuel is not removed and replenished over the course of a year to maintain its quality.[85]

BUGs have been relied upon for decades, even though their health and environmental impacts are generally well known.[86] Nonetheless, there currently is a lack of information about the environmental impacts of BUG use specifically during emergency events. For example, CARB's October 2019 PSPS outage study calculated emissions from only an estimated number of BUGs across the state.[87] The location, run times, and scale of resources were taken from a survey performed the prior year, and CARB used rough calculations to estimate emissions impacts.[88] Part of the reason for this may be the scope of the state and local regulations, since small-scale BUGs generally are less regulated compared to large-scale BUGs or utility-scale power plants.[89] Another reason may be the disparate and incomplete data available on BUGs at the local air district level.[90] This information gap complicates the assessment of the environmental impacts of backup generation and serves as the impetus for this Note, which raises the concern that the information gap impacts the state's most vulnerable populations.

The prospect of air pollution from untold numbers of BUGs is troubling for a state that already has some of the worst air quality in the country.[91] Even more concerning is the prospect of air pollution impacting communities already at heightened risk from preexisting stressors, whether those stressors be social, economic, health-related, or something else. Certain communities are particularly at risk from exposure to air pollution.[92] Racial and ethnic minority groups are disproportionately exposed to air pollution[93] and are known to have

85. *Id.*

86. California saw significant BUG usage during the state's energy crises in the early 2000s. LENTS ET AL., *supra* note 66, at viii ("During the 2001 California blackouts, diesel-fueled BUGs supplied 18.8% . . . of power reduction needs.").

87. EMISSION IMPACT, *supra* note 67, at 2.

88. *Id.*

89. *See infra* Subparts.II.B–C.

90. STEVEN MOSS & ANDREW BILICH, HIDDEN GRID: MORE THAN EIGHT GIGAWATTS OF FOSSIL FUELED BACK-UP GENERATORS LOCATED IN JUST FIVE CALIFORNIA DISTRICTS 3 (2020), https://www.lgsec.org/wp-content/uploads/2020/05/BUGs-in-5-CA-Air-Districts.pdf ("The datasets received [from the air districts] varied significantly in detail and consistency . . . .").

91. Cresencio Rodriguez-Delgado, *California Has Some of the Worst Air Quality in the Country. The Problem Is Rooted in the San Joaquin Valley*, PBS NEWS (June 16, 2022, 6:22 PM EST), https://www.pbs.org/newshour/nation/california-has-some-of-the-worst-air-quality-in-the-country-the-problem-is-rooted-in-the-san-joaquin-valley.

92. MEREDITH FOWLIE, REED WALKER & DAVID WOOLEY, CLIMATE POLICY, ENVIRONMENTAL JUSTICE, AND LOCAL AIR POLLUTION 7 (2020), https://www.brookings.edu/wp-content/uploads/2020/10/ES-10.14.20-Fowlie-Walker-Wooley.pdf.

93. Rachel Morello-Frosch, Miriam Zuk, Michael Jerrett, Bhavna Shamasunder & Amy D. Kyle, *Understanding the Cumulative Impacts of Inadequate Environmental Health: Implications for Policy*, 30 HEALTH AFFS. 879, 881 (2011).

poorer health outcomes than other groups.[94] Both environmental and social stressors, including social inequality, often combine to further worsen health outcomes.[95] Low-income populations are impacted by this combination. Beyond the fact that the costs of acquiring, fueling, and installing BUGs can be expensive and inaccessible,[96] low-income groups are also already disproportionately exposed to air pollution.[97] Additionally, medically vulnerable populations, including those with chronic illness or pre-existing conditions, are especially susceptible. Breathing toxic air pollutants increases the non-cancerous effects of diseases like emphysema and can lead to the development of various disorders, including reproductive disorders.[98]

Until the backup generation information gap is addressed and the state has a better grasp of the scope and scale of the pollution impacts from these resources, vulnerable populations are at risk. This information gap and the continued surge of BUGs across the state increases the risk that these populations are being negatively impacted by pollution from backup generation. To better understand how California can feasibly mitigate this problem, it is essential to understand the legal structure that allows backup generation to operate in the state, especially during emergency events.

II. DEVELOPMENT AND EVOLUTION OF THE REGULATORY STRUCTURE FOR BACKUP GENERATION

This Part presents a general overview of the basic regulatory structure applicable to backup generation. In addition, this Part discusses the emergency authority at all levels of government that can supersede such regulatory structure. BUG regulations are complex and vary based on the type of generator, generator size, and the jurisdiction where the generator is located. In the United States, air pollution is regulated at three levels of government: federal, state, and local.[99] Using larger BUGs requires securing an operating permit from the appropriate state or local regulatory body.[100] Using small generators sometimes requires registering with the appropriate state or local regulatory authority; although in many cases, no action is needed.[101]

94. *Id.* at 879.

95. *Id.*

96. *See* Penn & Eavis, *supra* note 52.

97. Morello-Frosch et al., *supra* note 93.

98. EPA, RISK ASSESSMENT FOR TOXIC AIR POLLUTANTS: A CITIZEN'S GUIDE 1 (1991), https://www.epa.gov/sites/default/files/2020-08/documents/riskassessmentacitizensguide.pdf.

99. Robert Martin & Lloyd Symington, *A Guide to the Air Quality Act of 1967*, 33 LAW & CONTEMP. PROBS. 239, 239 (1968).

100. *Emergency Backup Generators*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/our-work/programs/emergency-backup-generators/about (last visited Feb. 1, 2025).

101. *Id.*

Generally, the regulations are source-specific, meaning that they address individual generators as sources of emissions. These regulations are less focused on regulating emissions from BUGs in the aggregate or addressing emissions in a particular area of the state. Some regulations involve temporal emissions from BUGs. Regulations may restrict generator use to a set number of hours in a day, whereas others allow them to run at all hours during emergency events.[102] After reviewing air pollution regulations surrounding backup generation at the federal, state, and local levels, this Part concludes with a review of the emergency authority vested in all levels of government that, when exercised, allows for the use of backup generation outside the bounds of the existing regulatory structure.

A. FEDERAL REGULATION

The Clean Air Act (CAA) is the federal law that regulates emissions from stationary sources (like power plants) and mobile sources (like cars, trucks, or other portable engines).[103] The law authorizes the United States Environmental Protection Agency (EPA) to develop National Ambient Air Quality Standards (NAAQS) that address pollutants harmful to public health and welfare as well as the environment.[104] The EPA provides overall management to achieve NAAQS throughout the United States and its territories.[105] States are required to develop legally enforceable implementation plans, or State Implementation Plans (SIPs), that comply with NAAQS.[106] As part of the process, states must submit their SIPs to the EPA for review and approval.[107] The EPA has the authority to approve or reject a SIP.[108] If a SIP fails the review process, the EPA will prepare a federal implementation plan in its place.[109] The CAA authorizes the EPA[110] as well as citizens[111] to pursue various actions that enforce SIP provisions. Many emissions from BUGs are "criteria" air pollutants subject to NAAQS under EPA regulation.[112] Since NAAQS compliance occurs through the SIP process, the regulation and permitting of BUGs primarily occurs at the state and local levels.[113]

102. *See supra* note 21 and accompanying text.
103. Clean Air Act, 42 U.S.C. § 7401.
104. *Id.* § 7409.
105. *Id.*
106. *Id.* § 7410.
107. *Id.* § 7410(c).
108. *Id.* § 7410(k)(3).
109. *Id.* § 7410(c)(1).
110. *Id.* § 7413.
111. *Id.* § 7604.
112. *Reviewing National Ambient Air Quality Standards (NAAQS): Scientific and Technical Information*, EPA (Dec. 16, 2024), https://www.epa.gov/naaqs.
113. *See infra* Subparts.II.B–C.

Although most regulation of BUGs occurs at the state and local levels, the EPA can also directly regulate both stationary and portable BUGs. For the engines in stationary BUGs, chief among the regulations are the National Emission Standard for Hazardous Air Pollutants (NESHAP)[114] and the New Source Performance Standards (NSPS).[115] NESHAP sets generally applicable emission control standards for existing and new diesel and gasoline generators.[116] In essence, the EPA limits certain hazardous emissions from these generators; these limits increase as the engine size increases.[117] Under NSPS, the EPA regulates only new or significantly modified engines, with a focus on reducing certain pollutants, including NO_x, $PM_{2.5}$, and others.[118]

For the engines in portable BUGs, states usually are prohibited from enacting emission standards for new nonroad engines under the CAA.[119] However, California is allowed to seek authorization for its own standards for these engines.[120] When California files an authorization request, the EPA reviews public comments on the request, and the Administrator of the EPA determines whether to authorize the request.[121] California frequently seeks such authorization from the EPA.[122] In fact, the state is currently authorized to regulate small off-road engines and portable diesel equipment that make up portable BUGs, as further discussed below.[123] Even though California is unique in its ability to proactively seek authority to regulate these types of engines, doing so aligns with the early intentions of Congress when developing the CAA—that the federal government should delegate considerable authority to state and local governments to reduce air pollution.[124]

114. 40 C.F.R. § 63.6580 (2008).

115. 40 C.F.R. § 60.4230 (2021).

116. *See Compliance Requirements for Stationary Engines*, EPA (Oct. 23, 2024), https://www.epa.gov/stationary-engines/compliance-requirements-stationary-engines.

117. *Id.*

118. *Id.*

119. Clean Air Act, 42 U.S.C. § 7543(e)(2).

120. *Id.*

121. *Vehicle Emissions California Waivers and Authorizations*, EPA (Jan. 7, 2025), https://www.epa.gov/state-and-local-transportation/vehicle-emissions-california-waivers-and-authorizations.

122. *See id.*

123. *Id.*

124. *See* Edmund S. Muskie, *Role of the Federal Government in Air Pollution Control*, 10 ARIZ. L. REV. 17, 18 (1968) ("The philosophy of the Clean Air Act of 1963 was to encourage state, regional and local programs to control and abate pollution, while spelling out the authority of the national government to step into interstate situations with effective enforcement authority.").

B. STATE REGULATION

All air pollution control efforts across the state are overseen by CARB, California's air quality management agency.[125] Statewide authorization for county-level regulation of air pollution began in 1947, well prior to CARB's formation.[126] However, in 1967, the California Legislature passed the Mulford-Carrell Act to establish CARB as a cohesive statewide authority to administer, research, and coordinate air pollution regulation.[127] CARB is expressly responsible for dividing the state into air basins, or regions with similar meteorological and geographic conditions used to manage air quality, and coordinating with the federal government regarding air pollution control.[128] In addition to CARB, many state agencies have some level of involvement in air quality review or permitting, either directly or through environmental review processes pursuant to the California Environmental Quality Act.[129] These agencies include the California Energy Commission, State Lands Commission, and State and Regional Water Quality Boards, among others.[130]

Under the CAA, California is required to submit a SIP that complies with national standards but subdelegates authority to prepare parts of the SIP to local air districts.[131] Because air pollution control programs were in place prior to the enactment of the CAA, many states, including California, rely on the expertise of local air districts to prepare and implement the SIP.[132] Thus, CARB reviews, approves, and compiles updates to the SIP from local air districts and then submits the SIP to the EPA.[133] CARB also sets its own ambient air quality standards that are specific to California.[134] These standards are often stricter than federal limits, but achieving NAAQS has precedence over state standards due to federal penalties for failing to meet the federal standards.[135]

---

125. *About: The California Air Resources Board*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/about (last visited Feb. 1, 2025).

126. DAVID CARLE, INTRODUCTION TO AIR IN CALIFORNIA, at xvii (Phyllis M. Faber & Bruce M. Pavlik eds., 2006).

127. *See id.*

128. Jan Stevens, *Air Pollution and the Federal System: Responses to Felt Necessities*, 22 HASTINGS L.J. 661, 677 (1971).

129. *Stationary Source Permitting—Community Questions*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/Permitting-Questions (last visited Feb. 1, 2025).

130. *Id.*

131. Dave Owen, *Cooperative Subfederalism*, 9 U.C. IRVINE L. REV. 177, 209 (2018).

132. LENTS ET AL., *supra* note 66, at 24–25.

133. James D. Fine & Dave Owen, *Technocracy and Democracy: Conflicts Between Models and Participation in Environmental Law and Planning*, 56 HASTINGS L.J. 901, 946–47 (2005) (describing federal, state, and local roles).

134. *Government Roles and Contacts*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/our-work/programs/resource-center/introduction-community-air-quality/government-roles-and-contacts (last visited Feb. 1, 2025).

135. *See id.*

Like the EPA, CARB regulates both stationary and portable BUGs.[136] For stationary generators, CARB's Airborne Toxic Control Measure (ATCM) establishes emission limits and operational restrictions for stationary generators greater than fifty brake horsepower (bhp).[137] When a facility experiences an electrical outage beyond its reasonable control, such as a PSPS, the emergency BUG may be run to provide power.[138]

Currently, a multitude of regulations exist for portable BUGs. Statewide regulation of portable BUGs was a concern dating back to the twentieth century. In 1995, the California Legislature passed Assembly Bill 531, which led to the development of the Portable Equipment Registration Program (PERP).[139] The Legislature recognized that local air districts imposed emission control requirements for portable generators on a district-by-district basis, resulting in regulatory inconsistences.[140] Through PERP, an owner of a portable generator is allowed to apply for statewide registration, giving the owner the freedom to operate anywhere in the state without an air district permit.[141] PERP allows portable BUGs to run during "unforeseen interruptions of electrical power."[142] PERP even allows unregistered and unpermitted portable backup engines to operate during emergency events, although the owner and operator must notify CARB within twenty-four hours of commencing operation.[143] However, under current PERP implementation, local air district permit requirements are mandatory and take precedence over PERP registration.[144] Consequently, the statewide regulatory program envisioned by the Legislature to ensure more consistent and reasonable regulation of these BUGs is poorly aligned with its goals.

For portable, diesel-fueled BUGs, CARB established a separate standard due to concerns over their pollution intensity. CARB regulates these generators subject to an ATCM.[145] The ATCM establishes requirements for portable diesel engines to operate as "emergency-use engines."[146] Designated emergency-use diesel BUGs can only operate during an emergency event.[147]

136. *Use of Back-up Engines*, *supra* note 11.
137. CAL. CODE REGS. tit. 17, § 93115.5 (2007).
138. *Id.* § 93115.4(a)(30) (2011).
139. A.B. 531, 1995 Leg., Reg. Sess. (Cal. 1995).
140. *Id.*
141. CAL. CODE REGS. tit. 13, § 2450 (2018).
142. *Id.* § 2453(m)(4)(E) (2018).
143. *Portable Equipment: Frequently Asked Questions*, CAL. AIR RES. BD. 5 (June 19, 2019), https://ww2.arb.ca.gov/sites/default/files/2019-06/PERP%20FAQ.pdf.
144. *Id.* at 1.
145. CAL. CODE REGS. tit. 17, § 93116 (2005).
146. *Id.* § 93116.2(a)(15) (2018).
147. *Id.* § 93116.2(a)(13) (2018).

Lastly, CARB is responsible for evaluating and certifying the emission control systems of new engines in portable generators.[148] Every residential generator (less than fifty bhp) must be certified to California emission standards to be legally sold.[149] Yet once sold, these generators can be used without limits.[150] These residential generators generally are exempt from CARB requirements.[151] Most of these generators are also exempt from air district rules and reporting standards, which are discussed in turn below.[152]

C. LOCAL REGULATION

California has thirty-five local air districts responsible for regional air quality planning, monitoring, and permitting in their areas: twelve air quality management districts and twenty-three air pollution control districts.[153] Each district administers its own permitting program with a level of stringency designed to meet the area's designation for state or federal air quality standards.[154] CARB is responsible for monitoring the regulatory activity of the local air districts.[155] The air districts work closely with CARB to achieve improvements in California's air quality.[156]

Both stationary and portable BUGs are subject to air district requirements.[157] Similar to their treatment under CARB regulations, most residential generators (less than fifty bhp) are exempt from air district requirements.[158] However, BUG requirements vary greatly by air district due to many varying factors such as the size of the generator, when the generator can run during an emergency, and how long the generator can run, among other factors.[159] For example, some air districts, such as the Butte County Air Quality Management District, generally do not require a permit to use a BUG during emergencies or impose limits on their usage.[160] Others, like the Ventura County Air Pollution Control District, require permits under limited circumstances in

148. *New Vehicle and Engine Certification*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/our-work/programs/new-vehicle-and-engine-certification (last visited Feb. 1, 2025).

149. CAL. CODE REGS. tit. 13, § 2400(a)(2) (2022); *Id.* § 2401(a)(41) (2022); *Id.* § 2751(a) (2022).

150. *Use of Back-up Engines*, *supra* note 11.

151. *Id.*

152. *Id.*

153. *California Air Districts*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/california-air-districts (last visited Feb. 1, 2025).

154. *Government Roles and Contacts*, *supra* note 134.

155. *See* LENTS ET AL., *supra* note 66, at 25.

156. *California Air Districts*, *supra* note 153.

157. *Use of Back-up Engines*, *supra* note 11.

158. *Id.*

159. *See* LENTS ET AL., *supra* note 66, at F-1–2.

160. *See Planned Safety Power Shutoff (PSPS) Events*, *supra* note 21.

order to use an emergency BUG.[161] Lastly, some air districts, such as the South Coast Air Quality Management District, strictly maintain their permitted, hourly limits for BUG usage, even in an emergency event.[162] In response to recent PSPS events, the South Coast Air Quality Management District issued a compliance advisory to all owners and operators of BUGs. The advisory indicated that the limits identified in a generator permit would not change during an emergency event; any exceptions to the established limit would require petitioning the District.[163] The disparate regulation and enforcement of BUGs at the air district level likely contributes to the information gap associated with these resources, especially as it relates BUGs supplying emergency power within or outside of an existing permitting regime.

D. EMERGENCY AUTHORITY

Given the increased deployment and use of BUGs during emergency events in California, it is important to mention the emergency authority granted to the President of the United States and to the Governor of California. Emergency powers are given to the executive to act outside of the traditional bounds of their authority when normal channels cannot be used to address a danger.[164] As a consequence, gubernatorial emergency powers allow temporary emergency suspension of SIP requirements.[165] The suspension subsequently flows through to state and local permitting processes associated with BUGs, which can allow use of emergency generators outside the bounds of existing air district permits.[166]

Although the President is not explicitly authorized to exercise emergency authority over environmental policy, the President has established precedent over time.[167] The Constitution grants the President "executive powers" but does not define the range or scope of those powers,[168] only that the President must "faithfully execute[]" the laws.[169] These two provisions provide the basis for the

161. *Emergency Generators and Public Safety Power Shutoff (PSPS), and/or Grid Warning or Emergency Events per Governor Proclamation (GP) for Ventura County Residents*, VENTURA CNTY. AIR POLLUTION CONTROL DIST. (2021), http://www.vcapcd.org/pubs/Emergency-Generators-and-Public-Safety-Power-Shutoff-20210908.pdf.

162. *Compliance Advisory*, S. COAST AIR QUALITY MGMT. DIST. (Nov. 12, 2019), https://www.aqmd.gov/docs/default-source/compliance/compliance-advisory---emergency-generators-wildfires---11-12-19.pdf?sfvrsn=4.

163. *Id.*

164. *See Emergency Powers*, LEGAL INFO. INST., https://www.law.cornell.edu/wex/emergency_powers (last visited Feb. 1, 2025); *see also Governors Powers and Authority*, NAT'L GOVERNORS ASS'N, https://www.nga.org/governors/powers-and-authority/#emergency (last visited Feb. 1, 2025).

165. *See* LENTS ET AL., *supra* note 66, at 35.

166. *Id.*

167. *See id.* at 36.

168. *See* U.S. CONST. art. II, § 1.

169. U.S. CONST. art. II, § 3.

discretionary power of the presidency and the President's ability to exercise powers beyond those explicitly enumerated in the Constitution. The President can issue directives in the form of executive orders with the force of law and without prior congressional approval.[170] During a national emergency, the President may rescind, modify, or suspend federal laws and regulations[171] and rely on an additional 150 current statutory powers.[172] Notably, the President's primary emergency powers are provided through the National Emergencies Act, which only requires the President to state the reason for the national emergency and inform Congress of any resulting costs.[173]

In contrast to the President, the Governor of California can only rescind, modify, or suspend *state* laws and regulations, and not federal SIP requirements.[174] The governor may use the role of commander-in-chief of the National Guard and the Chief of State to issue executive orders independently of the state Legislature.[175] California Governor Newsom has repeatedly exercised this authority in recent years in response to the extreme weather and wildfires that have threatened the state.[176] In the summer of 2021, he proclaimed multiple states of emergency to respond to "the accelerating and compounding effects of continuing wildfires, ongoing drought, and extreme heat conditions caused by climate change."[177] Governor Newsom sought to ensure energy stability during the summer and provided additional incentives to large energy consumers to reduce their demand.[178] As a result, CARB and many air districts relaxed emissions regulations for various generators to attempt to ensure grid reliability.[179]

The CAA determines the relationship between the President and a state governor regarding air quality standards and emergency authority, and, consequently, the regulation of emergency BUGs.[180] Section 110(f) of the CAA

170. Jonathan P. West & Glen Sussman, *Implementation of Environmental Policy: The Chief Executive*, *in* THE ENVIRONMENTAL PRESIDENCY 77, 77–79 (Dennis L. Soden ed., 1999).

171. *Id.* at 106.

172. *A Guide to Emergency Powers and Their Use*, BRENNAN CTR. FOR JUST. (June 11, 2024), https://www.brennancenter.org/our-work/research-reports/guide-emergency-powers-and-their-use.

173. National Emergencies Act, 50 U.S.C. § 1621(a).

174. *See* CAL. GOV. CODE § 8567(a) (West 2025).

175. *See id.*; *see also* CAL. CONST. art. V, § 7.

176. *See, e.g.*, Jeff Daniels, *California Gov. Gavin Newsom Declares State of Emergency due to Increased Wildfire Risk*, CNBC (Mar. 23, 2019, 2:38 AM EDT), https://www.cnbc.com/2019/03/22/california-governor-to-declare-state-of-emergency-due-to-wildfire-risk.html.

177. *Proclamation of a State of Emergency*, EXEC. DEP'T STATE OF CAL. (July 30, 2021), https://www.gov.ca.gov/wp-content/uploads/2021/07/Energy-Emergency-Proc-7-30-21.pdf; *see also* J.D. Morris & Dustin Gardiner, *Newsom Declares State of Emergency to Relieve Stress on Power Grid, Speed Up Clean Energy Projects*, S.F. CHRON. (July 30, 2021, 9:25 PM PST), https://www.sfchronicle.com/bayarea/article/Newsom-declares-state-of-emergency-to-relieve-16353349.php.

178. *Proclamation of a State of Emergency*, *supra* note 177.

179. *Id.*

180. Clean Air Act, 42 U.S.C. § 7410(f)(1).

authorizes a state governor to issue a "temporary emergency suspension" of provisions of a SIP if the President determines the existence of "a national or regional energy emergency of such severity [that requires] a temporary suspension of any part of the applicable implementation plan . . . ."[181] If the President does not make such a determination, the SIP remains enforceable under the CAA.[182] Even during a state of emergency, the primacy of federal air quality law limits the governor's authority. A governor is required to issue a "temporary emergency suspension" of SIP provisions when (1) the President declares a national or regional energy emergency, and (2) the governor finds that the suspension will maintain jobs.[183]

Overall, the executive's emergency powers at both the federal and state levels allow for a relaxation of requirements under the CAA or other policies. Emergency authority shifts the regulatory landscape, allowing for the federal or state executive to step in and move swiftly outside the normal procedural bounds to address the emergency. The way in which the emergency powers of the President and a state governor interact, especially when it comes to the regulation of air pollution, reflect the complexity inherent in air pollution regulation between various entities at different levels of government. This complexity is no more apparent than in the regulation of emergency BUGs, which involves federal, state, local, and emergency authority.

Yet even within this regulatory structure, information related to these resources is lacking. Emergency authority only exacerbates the problem, as BUGs are often allowed to run outside of the confines of their permits to respond to emergencies.[184] The information gap associated with these resources must be reduced to ensure that these resources maintain their benefit without harming vulnerable populations.

III. MINIMIZING THE INFORMATION GAP

California has established a clear vision for its energy future.[185] The electricity system must be (1) equitable and inclusive; (2) clean, safe, reliable, and resilient; and (3) affordable.[186] No Californian can be excluded, and everyone should have the opportunity to save money while receiving clean energy.[187] The vision also emphasizes that vulnerable communities cannot be left behind—these communities must be able to share in the benefits of a cleaner

181. *Id.*
182. *See* LENTS ET AL., *supra* note 66, at H-7.
183. *Id.* at 35.
184. *Id.* at 39.
185. *See* GOVERNOR GAVIN NEWSOM, *supra* note 26, at 7–8.
186. *Id.* at 8.
187. *Id.*

system.[188] The treatment of BUGs under state and local law, especially during emergency events, strays from this vision. Although BUGs are "cheap, powerful, and [] widely available,"[189] these resources rely on pollution-intense fossil fuels,[190] present safety hazards,[191] and are oftentimes inaccessible to lower economic groups.[192] In particular, data and information related to their usage is lacking,[193] which leaves already vulnerable populations subject to the impacts of BUGs at a level of unknown scale. People need information to understand problems, act, and advocate for permanent solutions.

This Part provides policy recommendations to improve the legal structure related to emergency backup generation in order to minimize the backup generation information gap. It does not advocate for a specific approach, nor a specific combination of approaches. Instead, it recommends options for jurisdictions to envisage as they evaluate state and local considerations while prioritizing support for vulnerable populations.

A. INCREASE REPORTING

Minimizing the backup generation information gap inherently requires an increase in the information available about emergency BUGs. California maintains disparate usage and, consequently, reporting standards for emergency BUGs, some of which fail to capture the emissions associated with these resources.[194] Requiring reporting from all sizes of generators would help inform regulatory agencies of the pollution associated with emergency backup power. Otherwise, impacts of certain types of emergency backup generation escape regulatory scrutiny while increasing climate and health risks. In 2019, utilities across California implemented almost 806 PSPS events across the state.[195] Those events impacted nearly a million customers.[196] About one in eight households owns a residential generator.[197] Thus, an estimated 122,000 residential generators were running during these PSPS events in 2019, producing estimated excess emissions of 24.3 tons of NO_x, 101.5 tons of total hydrocarbon, and 10.6 tons of $PM_{2.5}$.[198] Without reporting standards for these residential generators, these emissions are only estimates for the given emergency events.

188. *Id.*
189. McCarthy, *supra* note 71.
190. *Id.*
191. *See Using Portable Generators Safely*, *supra* note 56.
192. *See* Penn & Eavis, *supra* note 52.
193. *See* MOSS & BILICH, *supra* note 90.
194. *See Emergency Backup Generators*, *supra* note 100.
195. EMISSION IMPACT, *supra* note 67.
196. *Id.*
197. *Id.* at 2.
198. *Id.*

To be clear, full reporting—the reporting of every hour of generator usage for every generator of any size and in any location—is not likely a conceivable solution due to the administrative burden on both the government and individual stakeholders. The solution assuredly lies somewhere between full reporting and the existing limited information associated with emergency BUGs.

California has effectively implemented tailored reporting standards for other fossil-fuel BUGs in other regulatory proceedings, which may provide insight for CARB or local air districts. The California Public Utilities Commission (CPUC) required utilities to collect information on the utilization of fossil-fuel BUGs as part of demand response programs.[199] Utilities were required to monitor and record information regarding the number, type, location, and hours of operation of these resources already in use.[200] Thus, like in the CPUC's demand response program, regulation that requires reporting during a specific timeframe, such as an emergency event, would lead to more accurate estimates of pollution impacts on communities. More accurate pollution estimates could then lead to more appropriate responses that mitigate such pollution.

Increased reporting requirements can also be folded into existing reporting or planning initiatives. This would be an efficient, straightforward addition to the regulatory process with the benefit of compiling data surrounding BUGs. For example, the Placer County Air Pollution Control District implemented guidance in response to PSPS events in 2021 that provided owners and operators of BUGs the option to register for a "flex" permit, which allowed continued use of BUGs specifically for the 2021 PSPS season.[201] The District could then keep track of BUGs used for this specific purpose during a set period.[202] Other air districts could create similar models for anticipated emergency events, such as prospective PSPS events.

Another approach would be to seek public input on the best way to increase the level and accuracy of BUG information. The California Energy Commission has hosted a workshop seeking input on alternatives to diesel BUG systems.[203]

199. Decision Resolving Several Phase Two Issues and Addressing the Motion for Adoption of Settlement Agreement on Phase Three Issues, Decision 14-12-024, at 60–61 (Cal. Pub. Utils. Comm'n Dec. 9, 2014), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M143/K552/143552239.pdf.

200. *Id.*

201. *Operating Portable Generators for Backup Power During Public Safety Power Shutoffs (PSPS): Interim Guidance Document*, PLACER CNTY. AIR POLLUTION CONTROL DIST. (Apr. 2021), https://www.placerair.org/DocumentCenter/View/51686 ("A District 'flex' permit can be obtained with provisions which would cover multiple engine and generator sizes allowing for the continued use of rental engines.").

202. *See id.*

203. *See Workshop to Discuss Research into Clean Energy Alternatives to Diesel Backup Generator Systems*, CAL. ENERGY COMM'N, https://www.energy.ca.gov/event/workshop/2021-01/workshop-discuss-research-clean-energy-alternatives-diesel-backup-generator (last visited Feb. 1, 2025).

Public, academic, and industry stakeholders came together to reflect on the increased use of diesel BUGs and potential alternatives to these systems moving forward, such as using batteries for energy storage or using cleaner and less emissions-intense fuels for generators. Given the current information gap for BUGs in conjunction with their increased demand, public insight may reveal a balanced approach towards improved reporting with minimal administrative burden.

B. TAILOR MONITORING

State and local government entities should also consider tailoring monitoring efforts based on geography, time, or fuel type, for example, to minimize the backup generation information gap. Tailored monitoring requirements will help foster an understanding of the size, scope, and usage patterns of certain BUGs. Researchers have identified an inability to comprehensively measure disparities in pollution exposure given the sparseness of the air pollution monitoring network in the United States.[204] Less than 20 percent of counties across the nation possess a "regulatory grade device capable of monitoring small particulates."[205] In 2022, the CPUC made a recent effort to try to increase the monitoring associated with generation resources in the state's demand response program.[206] After overseeing a pilot program that installed data logging devices on resources over a set period of time, the CPUC sought feedback from both the utility companies involved in the program and the generators themselves.[207] The overall feedback reflected the administrative burden of monitoring efforts but also the value in having the information.[208] The CPUC subsequently decided to tailor the monitoring of the resources to sixty resources per year and to reevaluate the data provided in the future.[209]

State and local government entities can similarly create a tailored monitoring approach for emergency BUGs. By limiting required reporting to specific areas, such as disadvantaged communities[210] identified across the state, government agencies would be able to better assess the pollution burden of BUGs in certain areas. Alternatively, government entities could install a set

204. *See* FOWLIE ET AL., *supra* note 92.

205. *Id.* at 6.

206. *See* Decision Adopting the Use of Data Collection Devices in the Demand Response Prohibited Resources Policy Verification Plan, Proposed Decision of Comm'r John Reynolds, at 49 (Cal. Pub. Utils. Comm'n Oct. 26, 2022), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M497/K964/497964594.PDF.

207. *Id.* at 2–3.

208. *Id.* at 48.

209. *Id.* at 50.

210. *See Final Designation of Disadvantaged Communities Pursuant to Senate Bill 535*, CAL. ENV'T PROT. AGENCY 8–13 (May 2022), https://calepa.ca.gov/wp-content/uploads/sites/6/2022/05/Updated-Disadvantaged-Communities-Designation-DAC-May-2022-Eng.a.hp_-1.pdf.

number of pollution monitoring devices, like those used in the CPUC demand response program, to collect data over a period of time. Or, specific types of emergency generators could be monitored. For example, diesel-fueled BUGs are more pollution intense than natural gas-fueled BUGs.[211] State or local government entities could focus efforts on the monitoring of diesel-fueled generators as a starting point to reduce the backup generation information gap.

Like increased reporting requirements, tailored monitoring can be folded into existing reporting or planning initiatives. Assembly Bill 617, which was passed by the California Legislature in 2017 to lessen the unequal burden of air pollution in communities across the state,[212] added critical support for community-based air quality monitoring throughout California. The bill created a statewide strategy that emphasizes local plans to reduce emissions.[213] It provides funding to community-based organizations, which help local residents participate in air pollution reduction programs.[214] Tailored monitoring of emergency BUGs could be included in the community monitoring efforts implemented through Assembly Bill 617. Some Air Districts already developed modeling procedures that tie local exposure to sources of pollution.[215] Pollution from emergency BUGs could be included as a criterion in such modeling procedures. This approach, through incremental additions to monitoring requirements, alleviates concerns surrounding the administrative burden of additional monitoring. At the same time, tailored monitoring can leverage existing regulatory processes to reduce the information gap.

C. MANAGE ACCESS

Lastly, given the expanded use of BUGs during emergency events, California can achieve its goals for an electricity system of the future by minimizing the information gap while managing equitable access to backup generation options statewide. A primary concern for economically vulnerable communities is the cost of emergency backup generation. Depending on the size and purpose of the BUG, the resource could cost anywhere from a few hundred dollars to many thousands of dollars.[216] For poor communities, generators are prohibitively expensive given the purchase price, maintenance, and fuel supply

211. *See* MOSS & BILICH, *supra* note 17.

212. A.B. 617, 2017 Leg., Reg. Sess. (Cal. 2017).

213. *Id.*

214. *See Community Air Protection Program: About*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/capp/about (last visited Feb. 1, 2025).

215. *See* FOWLIE ET AL., *supra* note 92.

216. Kelly Weimert & Corinne Tynan, *How Much Does a Generator Cost?*, FORBES (July 31, 2024, 12:53 PM), https://www.forbes.com/home-improvement/electrical/generator-cost-guide.

costs.[217] Moreover, without emergency backup generation, power outages disproportionately impact working and impoverished families.[218] Spoiled food from a lack of refrigeration can be costly to replace.[219] School shutdowns eliminate access to free or reduced-price lunches for students.[220] Additionally, power outages can result in lost hours of work and thus reduced earnings, further exacerbating the situation.[221]

An ambitious programmatic opportunity that avoids continued reliance on polluting backup generation and promotes access would be to install clean backup generation for vulnerable populations. In October 2023, Vermont utility Green Mountain Power submitted a petition to the state's public utility commission asking the regulatory body to approve a new "Zero Outages Initiative" to create an energy system where customers experience zero outages by 2030.[222] Green Mountain Power filed this petition after a year in which it had six different instances of some customers losing power for at least twenty-four hours.[223] Most utilities repair power lines and invest in grid hardening to make grids more resilient in poor weather.[224] But Green Mountain Power seeks money to install batteries at homes in its service territory so that its customers never go without electricity.[225] Analogous policies could be considered in California to determine whether the benefits of such a proposal for clean backup generation for certain populations would outweigh the costs of implementation.

Similarly, batteries may be able to meet a backup generation need for a specific vulnerable population: the chronically ill. Individuals with medical equipment that uses electricity face considerable risk during power outages.[226] Some individuals have been provided backup batteries at no cost from their

217. Daniel Thompson & Gianluca Pescaroli, *Buying Electricity Resilience: Using Backup Generator Sales in the United States to Understand the Role of the Private Market in Resilience*, J. INFRASTRUCTURE PRES. & RESILIENCE, May 6, 2023, at 1, 11.

218. Botts, *supra* note 41.

219. *Id.*

220. *Id.*

221. *Id.*

222. Petition of Green Mountain Power for Approval of its Zero Outages Initiative as a Strategic Opportunity Pursuant to 30 V.S.A. § 218d and GMP's Multi-Year Regulation Plan, Prefiled Direct Testimony of Michael Burke on Behalf of Green Mountain Power 5 (State of Vt. Pub. Util. Comm'n Oct. 9, 2023), https://greenmountainpower.com/wp-content/uploads/2023/10/2023-10-09-Prefiled-Direct-Testimony-of-Michael-Burke.pdf.

223. *Id.* at 6 n.1.

224. Ivan Penn, *Vermont Utility Plans to End Outages by Giving Customers Batteries*, N.Y. TIMES (Oct. 9, 2023), https://www.nytimes.com/2023/10/09/business/energy-environment/green-mountain-home-batteries.html.

225. *Id.*

226. *See* Huff, *supra* note 35.

utility company.[227] Others continue to grapple with the costs of such a system.[228] Physicians and researchers have proposed classifying battery storage as durable medical equipment in order to qualify for funding under Medicare, meaning that an individual's medically-necessary device would be prescribed alongside a home battery and paid for by Medicare.[229] However, like the proposal from Green Mountain Power, whether the upfront cost of such a proposal fills the long-term need for this population remains to be seen.

Although there is a need for managed access to BUGs, some related progress is being made. The California Energy Commission (CEC) is currently implementing the Distributed Electricity Backup Assets Program, which incentivizes the construction of cleaner and more efficient distributed energy assets.[230] These assets will receive funding to construct or upgrade a resource that will serve "on-call" to help supply power to the grid or reduce demand from the grid during "extreme events."[231] This program will ideally result in an overall smaller need for fossil-fueled BUGs during some grid-related emergencies by ensuring that electricity supply is properly able to meet demand, reducing the potential for backup generation pollution and its impacts.

CONCLUSION

Californians have experienced unprecedented, climate-induced weather events in recent years, often causing interruptions in electric service.[232] Frequent power outages lead to increased use of fossil-fueled backup generation, which serves as relatively affordable and widely available source of emergency power.[233] Meanwhile, BUGs contribute to climate change and negatively impact public health.[234] Minimizing the impacts of emergency backup generation will help prevent worsening health consequences of populations across the state who are already at heightened risk.

This Note has presented an inexhaustive list of policy approaches that could help address the concerns of vulnerable communities in California related

227. *Portable Battery Program*, *supra* note 24.

228. Marriele Mango, Joan A. Casey, & Diana Hernández, *Resilient Power: A Home-Based Electricity Generation and Storage Solution for the Medically Vulnerable During Climate-Induced Power Outages*, 128 FUTURES 102707, 102717 (2021).

229. *See* Huff, *supra* note 35.

230. *Distributed Electricity Backup Assets Program*, CAL. ENERGY COMM'N, https://www.energy.ca.gov/programs-and-topics/programs/distributed-electricity-backup-assets-program (last visited Feb. 1, 2025).

231. *Id.*

232. Ivan Penn, *Dodging Blackouts, California Faces New Questions on Its Power Supply*, N.Y. TIMES (Sept. 26, 2022), https://www.nytimes.com/2022/09/25/business/energy-environment/california-energy-grid-heat.html.

233. McCarthy, *supra* note 71.

234. *Id.*

to the use and deployment of emergency BUGs. Considering the limited information available on direct emissions and air quality impacts of these resources, additional information on emergency BUGs will foster a more comprehensive approach to address the concerns of the most vulnerable. Pathways to increase reporting, tailor monitoring, or both may help minimize the existing information gap. Policymakers in California should choose from a suite of policy options that make sense based on the costs and benefits of each option or a combination thereof. In doing so, they must also be mindful of the need to create an approach that promotes access to backup generation while minimizing the impacts of these resources. Only then can this power supply align with California's vision for an equitable and inclusive electricity system of the future.