Clean Coalition Portfolio of Experience

The Clean Coalition's mission is to accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise. Our "25 by 25" vision: from 2025 onward, at least 25% of all electricity generated from newly added generation capacity in the United States will be from local renewable energy sources.

Since our founding in 2009, the Clean Coalition has shaped policies and programs enabling the deployment of clean local energy to address climate change and deliver economic, environmental, and resilience benefits to communities. Our cutting-edge programs, policies, and initiatives have led to the development of nearly 3 gigawatts of clean local energy. When fully online, these projects will provide peak power to nearly 3 million American homes, reducing carbon emissions by 3.9 million metric tons annually.

The Clean Coalition has worked with many electric utilities, states, and municipalities across the United States to evaluate, design, and implement programs and policies that enable local renewables and grid modernization. Our work has focused on designing innovative programs and policies that aim to unleash deployment of local renewables and other distributed energy resources (DER), such as energy storage, demand response, and advanced inverters. We also design and implement unique, innovative combinations of DER through our Community Microgrid Initiative. We have thoroughly evaluated the impacts of such programs from technical, economic, environmental, and resilience perspectives.

In addition to program design, the Clean Coalition has a long history of policy innovation. We have been a leading intervener at the California Public Utilities Commission (CPUC), California Energy Commission (CEC), California Independent System Operator (CAISO), New York Public Service Commission (NYPSC), and similar state-level agencies across the country. Our combination of deep technical, policy, economic, and communications experience is a unique differentiator.

Provided below are samples of the Clean Coalition's extensive experience. References associated with any of these are available upon request.

Program experience

Current projects

City of Camarillo (2021 – present). The Clean Coalition was engaged to bring unprecedented expertise and depth to the City of Camarillo's energy program by conducting a Solar and Battery Standby Power Assessment of the feasibility for solar-driven resilience. The feasibility study found that the most feasible and economic solutions for the facilities would be Hybrid Solar Microgrids that incorporate solar, storage, and diesel generators at the City Hall, Corporation Yard, Police Station, and Wastewater Treatment Plant. The Hybrid Solar Microgrids will keep those four sites fully online during multi-day outages, with diesel generators reserved for use only when absolutely needed to maintain up to 100%

of the load. A pure Solar Microgrid, without any diesel, was recommended for the fifth site, the Camarillo Public Library, which never needs to be kept fully online during an extended power outage but can benefit from solar+storage backup for 100% of the loads some of the time and for the most critical loads 100% of the time.

Following the Feasibility Study, the Camarillo City Council voted unanimously to award the Clean Coalition a contract for initial designs of the four Hybrid Solar Microgrids and one Solar Microgrid. These designs are targeted to provide the foundation for a comprehensive request for proposal (RFP) and are expected to be completed by the end of June 2021. The Solar Microgrids will be designed to enjoy substantial utility bill savings from daily solar generation — and from using the storage to time-shift solar in order to optimize economic value through time-of-use (TOU) arbitrage and demand charge management (DCM) at all five facilities. In addition to bill savings, the microgrids will bring the City significant resilience benefits, which the Clean Coalition quantifies using its straightforward value-of-resilience methodology (VOR123) and proprietary modeling tools. The Solar Microgrids will be designed to achieve Net Zero Energy over their anticipated 30-year life and reduce the cumulative carbon footprint of the five sites by approximately 88 percent.

Santa Barbara Unified School District Solar Microgrids (2020 – present): Efforts got under way in January 2020, after the Santa Barbara Unified School District (SBUSD) unanimously approved an ambitious initiative with the Clean Coalition and Sage Energy Consulting to implement solar-driven microgrids and electric vehicle charging infrastructure (EVCI) at schools and other sites throughout the District. The Solar Microgrids feature solar and energy storage that will provide long-duration energy resilience to the District, and EVCI will be staged to support District staff and students during the day — as well as providing overnight charging options for neighbors who have challenges installing electric vehicle chargers where they live. The Clean Coalition was responsible for the resilience-related elements of the feasibility analyses at all 21 SBUSD sites, as well as for the state-of-the-art Solar Microgrid design specifications in the Request for Proposal (RFP). The Clean Coalition was also responsible for the negotiations and contract language that secured the designer-builder-owner-operator (DBOO) to deploy and operate compliant Solar Microgrids under 28-year power purchase agreements (PPAs). The Clean Coalition worked with the District to identify all critical and proprietary loads, utilized proprietary Clean Coalition tools for analyzing energy resilience requirements and sizing the minimum energy storage needed at each site, designed state-of-the-art RFP specifications and contract language to ensure the minimum levels of resilience in the awarded proposal, and led the RFP scoring of Solar Microgrid elements in each proposal.

Ultimately, 6 SBUSD sites were contracted for Solar Microgrids with deployments planned in the summer of 2021. Another 8 sites were contracted for solar only, and the solar at all 14 sites is in the form solar parking canopies. Importantly, the Clean Coalition also guided the selected DBOO in the formation of a state-of-the-art Performance Guarantee Agreement (PGA) that defines the guaranteed economic and resilience performance requirements of the Solar Microgrids. The economic and resilience benefits over the 28-year PPA periods deliver guaranteed bill savings of nearly $8 million with an additional $6.47 million in value-of-resilience for free (there is also potential value from yet-to-be known future value streams).

Redwood Coast Airport Microgrid (2019 – present): In 2019, the Clean Coalition's Executive Director was invited to participate on the Technical Advisory Committee for the Redwood Coast Airport Microgrid (RCAM) in Northern California's Humboldt County, staging to be the leading Community

Microgrid showcase in California — and potentially the country. This project, conducted in partnership with Pacific Gas & Electric (PG&E) and Redwood Coast Energy Authority (RCEA), the local Community Choice Aggregation (CCA) program, will include key Community Microgrid features: a seamless grid isolation switch that islands the Community Microgrid without electricity service interruption to any of its 20 customers; 2 megawatts (MW) of solar and 8 MWh of storage that are DC-coupled front of meter (FOM); 250 kW of solar behind the meter (BTM); eight Level-2 electric vehicle (EV) charging ports in a load-controllable and sheddable BTM configuration; full PG&E control of the distribution grid at all times; all assets controlled by asset owners during normal grid operations and by PG&E for master control during islanding operations; and key microgrid tariff and business model innovations.

Value-of-resilience methodology (VOR123) (2018 – present): Although everyone understands that there is significant value to the resilience provided by indefinite solar-driven backup power, quantifying this unparalleled value-of-resilience (VOR) has been a challenge, limiting market opportunities for Solar Microgrids. To overcome this challenge, the Clean Coalition developed a straightforward but effective VOR methodology, VOR123, which reflects the fact VOR has different values based on three load tiers. VOR123 can be applied to any type of facility by tiering loads and then applying a standardized VOR for each:

- **Tier 1**: Mission-critical, life-sustaining loads that warrant 100% resilience — usually about 10% of a facility's total load.
- **Tier 2**: Priority loads that should be maintained as long as doing so does not threaten the ability to maintain Tier 1 loads — usually about 15% of the total load.
- **Tier 3**: Discretionary loads that should be maintained only when doing so does not threaten Tier 1 and Tier 2 resilience — usually about 75% of the total load.

In 2020, after conducting extensive analyses, the Clean Coalition determined a standardized VOR for each of the three load tiers; we determined that applying the VOR123 methodology to solar-driven resilience for a typical facility provides overall VOR that is equivalent to a 25% adder to a facility's electricity bill. Our methodology has worked well for numerous Solar Microgrid projects — many of which provide critical community facilities with unparalleled levels of resilience for free.

Goleta Load Pocket Community Microgrid (GLPCM) (2018 – present): The Goleta Load Pocket (GLP) spans 70 miles of California coastline, from Point Conception to Lake Casitas, encompassing the cities of Goleta, Santa Barbara (including Montecito), and Carpinteria. Because this region is highly transmission-vulnerable and disaster-prone, the community can benefit greatly from the resilience provided by local renewables. The GLPCM will showcase the power grid of the future.

To achieve indefinite renewables-driven backup power that provides 100% protection to the GLP against a complete transmission outage, 200 megawatts (MW) of solar and 400 megawatt-hours (MWh) of energy storage needs to be sited within the GLP. The area has sufficient siting opportunity for these levels of solar and storage. Significant efforts are being made to align stakeholders, including property owners, policymakers, community leaders, solutions providers, and the electric utility, Southern California Edison (SCE), toward this goal. The initiative has these objectives:

1. Realize a comprehensive Community Microgrid for the Goleta Substation grid area.

2. Ensure that the GLP resilience objective is delivered via local renewables and other distributed energy resources (DER), and preempt any new gas peaker infrastructure.
3. Deliver the trifecta of economic, environmental, and resilience benefits of Community Microgrids to the region.

Montecito Community Microgrid Initiative (MCMI) (2018 – present): The MCMI provides an opportunity to build back right after a devastating fire and debris flow in the Montecito, California area in late 2017 and early 2018, while ensuring indefinite renewables-driven energy for critical facilities. The initiative has these objectives:

1. Stage a Community Microgrid for implementation that begins with the Montecito Fire Protection District headquarters, expands to include the Montecito Water District headquarters, including water wells and pumping stations, and then expands further to include an array of commercial properties within the Montecito Upper Village.
2. Create indefinite renewables-driven energy resilience for critical Montecito Fire Protection District and Montecito Water District facilities, as well as other critical facilities within the Montecito Upper Village.
3. Stage a Community Microgrid in the Montecito Lower Village, which is part of the City of Santa Barbara.
4. Provide a near-term showcase for additional Community Microgrids throughout Santa Barbara and Ventura Counties, and beyond.

Valencia Gardens Energy Storage project (2017 – present): The Clean Coalition is leading the Valencia Gardens Energy Storage (VGES) Project under a grant from the California Energy Commission (CEC). VGES is staged to become the first front-of-meter (FOM) merchant energy storage project in California. This groundbreaking project, located at the Valencia Gardens Apartments, which houses hundreds of low-income families and senior citizens in the heart of San Francisco, will showcase how FOM energy storage can be effectively deployed in dense, developed urban environments. VGES will deploy a 556 kWh battery energy storage system (BESS) that provides a replicable model for providing grid benefits exactly where they are needed most. The VGES project includes quantifying the technical and economic benefits of deploying energy storage on distribution feeders that are nearing capacity for hosting solar — unless local energy storage is added to time-shift solar for simultaneously optimizing grid operations and ratepayer economics. Key objectives of the VGES Project:

- Increase the solar hosting capacity of the distribution feeder by at least 25%. The feeder is currently at full capacity for hosting solar.
- Examine how energy storage can be monetized by CAISO wholesale markets and provide a comprehensive case study.
- Study the enhancements and associated costs required to upgrade VGES to an operational Community Microgrid that provides resilience to the Valencia Gardens Apartments and its at-risk residents, including low-income families and senior citizens:
    - Energy storage will be sized for Community Microgrid operations that can provide indefinite solar-driven backup power to the most critical loads during grid outages of any duration.
    - Community Microgrid analysis will be conducted to determine resilience solutions, costs, and cost-recovery opportunities.

    - A VGES Community Microgrid will provide easy societal value by ensuring that the easy opportunity for very vulnerable populations to shelter in place is leveraged, rather than requiring the consumption of scarce first-responder resources to move these vulnerable populations, only to consume even scarcer resources, like beds at emergency shelters.
- Leverage in-process efforts between the Clean Coalition and Pacific Gas & Electric (PG&E) to streamline FOM interconnection. This FOM interconnection streamlining advances similar collaborations that were pursued in a prior CEC grant to the Clean Coalition for the Peninsula Advanced Energy Community (PAEC).
- Leverage the Clean Coalition's policy expertise to propose policy & market mechanism innovations that advance commercial-scale FOM energy storage and other distributed energy resources (DER).

The VGES Project showcases how energy storage can be configured to work in dense urban settings. As shown in the graphics below, VGES will be deployed in the form of a 250 kW & 556 kWh BESS at the solar-loaded Valencia Gardens Apartments, which has existing solar of 516 kWdc on a feeder with a total of 580 kW of solar, exceeding the feeder peak load of 570 kW. The Valencia Gardens Apartments has 218 family flats and 42 senior apartments among 16 buildings on a five-acre site. This project will utilize distributed energy storage to optimize grid operations, including by shifting local solar generation into the evening, thereby avoiding grid upgrades and optimizing ratepayer economics.

By demonstrating how targeted deployment of energy storage can increase the grid's ability to handle greater amounts of distributed solar, yielding substantial grid and ratepayer benefits, VGES will set the stage for increased deployment of clean local energy in California and beyond.

Past projects

Los Angeles Community College District (2020). The Clean Coalition was contracted by the Los Angeles Community College District (LACCD) to conduct a feasibility assessment of backup power solutions for critical and priority loads during long-duration grid outages at the LACCD Educational Services Center (ESC), which is the sole tenant in an LACCD-owned high-rise building in downtown Los Angeles.

Our technical assessment compared the feasibility of a Solar Microgrid and a Hybrid Solar Microgrid to the ESC's existing diesel generator backup system. The Clean Coalition conducted stakeholder outreach on business continuity needs within various district departments and completed a thorough code review to ensure code compliance of all designs. The Clean Coalition defined and analyzed 40 configuration scenarios spanning various load requirements, outage durations, and distributed energy resources (DER), including solar, energy storage, and diesel generators — and included detailed economic and carbon emission analyses for the most viable configurations. Key differentiators for this project included in-depth critical load assessment, a solar canopy design for a high-rise building in a dense urban location, and investigation of the feasibility of replacing an existing code-required emergency diesel generator with a Solar Microgrid.

The Clean Coalition's feasibility analyses concluded with the following recommendation:

> Add 181 kWp of solar and 232 kW / 232 kWh of energy storage to the existing diesel system for Scenario A, with a follow-on phase within five years in which the existing 175 kW diesel is de-rated or eliminated by upsizing the energy storage to 580 kW / 2,320 kWh. This two-phase

approach allowed the LACCD to gain relatively quick environmental and resilience benefits via a Hybrid Solar Microgrid that meets all existing code requirements, while facilitating a second phase that gains more benefits when conditions are more accommodating. This recommendation also provided the most effective backup solution that met all four load scenarios noted in the table above.

In addition, the Clean Coalition recommended that the LACCD consider a district-wide portfolio approach to realize more favorable project economics; reduce critical loads to enable longer durations of backup power; and perform a sensitivity analysis of future LADWP time-of-use (TOU) periods and rates, to compare potential energy and demand charge savings provided by solar+storage to the savings at the current TOU rate.

Residential Solar Microgrid (2020). The Clean Coalition partnered with a homeowner in Montecito, California to deploy two Solar Microgrids on their property. The two systems will allow the homeowner to achieve solar net zero; power all critical electricity loads during power outages using solar+storage, and power all other loads when energy is plentiful; and save money on electricity bills. The project aims to develop and deploy a replicable large residential load management system using market-ready smart electrical panels, and if needed, microgrid controllers; control existing and future electricity loads during normal grid operation and during outages; enable economically optimized electric vehicle (EV) charging; and control the existing natural gas generator for last-resort power backup, in the most efficient and least carbon-polluting manner possible. The Clean Coalition issued a request for proposal (RFP) in early June 2020, and by the end of June contracted a single solution provider to design and install the system, as well as perform ongoing operations & maintenance (O&M) for at least 10 years. The project is expected to be operational in early 2021, in anticipation of California's fire season.

North Bay Community Resilience Initiative (2018 – 2020): In partnership with local and regional leadership, the Clean Coalition helped establish the North Bay Community Resilience Initiative to build a modern, resilient, and more sustainable energy system for communities in Sonoma County and Napa County, California that were devastated by 2017 wildfires. Driven from a community master-planning level, this modern energy solution will serve as a model for communities everywhere. The initiative had these objectives:

1. Publicize and track energy efficiency and electrification incentives and policies.
2. Identify model structures with "Community Microgrid–ready" designs for residential, commercial, and commercial retrofits.
3. Develop Community Microgrid Roadmap and Stage Pilot(s).

Partnership with NREL and the City of San Diego (2018 – 2019): The Clean Coalition partnered with the City of San Diego as part of the Solar Energy Innovation Network (SEIN), a program of the U.S. Department of Energy's National Renewable Energy Laboratory (NREL). SEIN is exploring new ways solar energy can improve the affordability, reliability, and resilience of the nation's electric grid. The solutions developed by the San Diego team will serve as a blueprint for other communities nationwide facing similar challenges and opportunities. The Clean Coalition's first task for this project was to conduct a Solar Siting Survey to identify the technical potential for commercial-scale solar throughout the City. The Solar Siting Survey methodology not only identifies viable solar siting opportunities across urban and suburban environments, but also evaluates those opportunities based on the interconnection potential of the local grid for each identified site. The Clean Coalition also helped San Diego unlock the

potential of the underserved commercial-scale solar market segment by designing a state-of-the-art Feed-In Tariff (FIT) with streamlined interconnection — a powerful tool to drive the development of clean local energy.

VMware Community Microgrid (2018): The VMware Community Microgrid aims to demonstrate large-scale deployment of local renewable energy and energy storage for cost savings, and to enable business continuity through energy resilience in the event of a grid outage. The Community Microgrid will provide renewables-driven backup power to on-site emergency services and sheltering areas, office buildings, and research and development labs. Additionally, the project will demonstrate a public-private partnership in which the VMware campus is equipped as a sheltering site for the City of Palo Alto to use during emergency situations. The campus's annual peak load is 8.5 MW, and its average monthly load is 2,800 MWh, cumulative across 17 electric meters. The solar and energy storage combination planned for the campus will potentially obviate the need for a backup fossil-fuel generator, leading to local emissions reductions. Three design scenarios are being considered for the Community Microgrid: a small system that powers the loads behind one utility meter, a medium system that powers several buildings and utility meters, and a large system that comprises the entire campus. All designs also include large EV charging installations and plumbing for future installations to support zero-carbon commuting.

Redwood City Community Microgrid (2017 – 2019): The Redwood City Community Microgrid (RWCCM) benefits a top-tier research university and demonstrates how DER provide energy cost savings and resilience at campuses and multi-meter clusters nationwide. The RWCCM will leverage $50 million of advanced energy investments, including a $40 million district thermal energy system, the CEF (Central Energy Facility), to provide clean, resilient power in a disadvantaged San Francisco Bay Area community.

The RWCCM includes the CEF, a data center, one parking garage, and four office buildings. Key to the RWCCM is the seamless integration of 886 kW of local solar capacity, nearly 50 MWh of energy storage, 52 Level-2 electric vehicle charging ports, and sophisticated load management of smart buildings and electric vehicle charging infrastructure (EVCI) capable of vehicle-grid integration (VGI). Of the 50 MWh of energy storage, there will be 2.1 MWh from Tesla Powerpack battery storage, while 47.6 MWh will come from Stanford's CEF, which electrifies heating and air conditioning loads through high-efficiency heat recovery. EOS, the microgrid controller developed by Johnson Controls, will co-optimize the DER for economic value during daily energy operations and for data center resilience benefits during grid outages. The battery will bring energy resilience to the data center by enabling island-mode backup power for up to 325 kW of load during short-term grid outages and indefinite renewables-driven backup power for up to 67 kW of load during long-term grid outages — greatly improving onsite reliability. Key benefits to the local community include ongoing jobs as well as access to electric vehicle charging, phone charging, and electricity for other critical equipment during grid outages. The RWCCM has these key objectives:

1. Integrate five unique DER elements with EOS to monitor, control, and optimize the microgrid for maximum value to Stanford RWC.
2. Enable indefinite, renewables-driven backup power for 67 kW of load at the Stanford RWC data center.
3. Demonstrate how smart integration of multiple DER can provide operational savings and tremendous GHG emissions reductions.
4. Simulate how RWCCM may provide demand response as a grid service to PG&E using sophisticated load management of the buildings and VGI-capable EVCI.

5. Stage RWCCM to accept higher penetrations of renewable energy.
6. Produce a business plan that will demonstrate the business case for advanced microgrids by analyzing the economics of each DER under different ownership and financing models, quantifying the market potential for advanced microgrid solutions and providing risk assessment and management techniques.

The RWCCM is a shovel-ready project that will be deployed once sufficient funding and financing have been secured.

Peninsula Advanced Energy Community Initiative (2016 – 2018): In 2016, the Clean Coalition was awarded a grant by the CEC for the Peninsula Advanced Energy Community (PAEC) Initiative. The CEC defines an Advanced Energy Community as one that minimizes the need for new energy infrastructure costs such as transmission and distribution upgrades; supports grid reliability and resiliency by incorporating technologies such as energy storage and microgrids; can be replicated and scaled up to further drive down costs; and provides affordable access to renewable energy generation. As part of PAEC, the Clean Coalition and PG&E collaboratively explored best practices for streamlining interconnection of commercial-scale solar. In 2017 and 2018, PAEC continued to streamline policies and showcase projects that facilitate clean local energy and other advanced energy solutions like energy efficiency, energy storage, and EV charging infrastructure. The PAEC initiative had these goals:

1. Incentivize and accelerate the planning, approval, financing, and deployment of Advanced Energy Communities.
2. Reduce the time, cost, and uncertainty associated with permitting and interconnecting commercial-scale solar and other DER.
3. Leverage zero net energy, efficiency, local renewables, energy storage, and other DER to reduce 25 MW of peak energy across southern San Mateo County.
4. Reduce the use of natural gas and minimize the need for expensive utility upgrades.
5. Create a model project and project elements — such as Community Microgrids and Solar Emergency Microgrids — focused on increasing economic, environmental, and resilience benefits that can be replicated throughout California and beyond.

University of California Santa Barbara Community Microgrid (2017): The University of California Santa Barbara Community Microgrid (UCSB CM) is located on a 1000-acre campus that supports more than 25,000 students, faculty, and staff. The UCSB CM will deploy 400 kW of additional solar PV, 2 MW / 4 MWh of lithium battery energy storage, and 1 MW of automated demand response through building controls and smart EV charging. The UCSB CM will provide indefinite renewables-driven backup power to key critical facilities on campus and will support UCSB's emergency evacuation and sheltering efforts. The UCSB CM will also reduce the campus's daily power peak demand. Key objectives include the following:

1. Demonstrate technical feasibility and cost-effectiveness of integrating solar PV, energy storage, smart EV charging, and automated demand response with monitoring, communications, and control systems to optimize the microgrid system and provide operational savings to UCSB.
2. Demonstrate technical feasibility and cost-effectiveness of islanding a medium-voltage (12 kV) distribution feeder circuit during grid outages with switch retrofits to enable the resilience benefits of the Community Microgrid.

3. Demonstrate automated load shedding strategies to enable indefinite renewables-driven backup power.
4. Provide CAISO grid services, including demand response and frequency regulation.
5. Stage UCSB to accept higher penetrations of renewable energy and an expanded microgrid that will eliminate the need for diesel generators as backup power.
6. Prove the commercial viability of Community Microgrids for resilience on public campuses by minimizing the use of grant funds for equipment purchases and instead financing the assets through private investment.

East Bay Community Energy FIT and Solar Siting Survey (2017): The Clean Coalition was part of a team that was contracted by Alameda County to develop the Local Development Business Plan for the County's CCA program, East Bay Community Energy (EBCE). The Clean Coalition delivered a Solar Siting Survey to determine the technical siting potential for commercial-scale solar PV installations within Alameda County, which identified over 650 MW of solar potential on over 250 discrete sites, with the potential to host at least 1,000 kW on rooftops, parking lots, and parking structures. In total, this survey identified enough local solar PV capacity to power 165,000 homes. In addition, the Clean Coalition designed a Feed-In Tariff (FIT) program for EBCE to support deployment of local renewables. The FIT includes Market Responsive Pricing to ensure efficient markets and a Dispatchability Adder to incentivize energy storage.

Hawaii solar+storage solution (2017): The Clean Coalition helped set the stage for a showcase solar+storage solution that spans multiple sites on the Island of Kauai. The solution is a game changer for the electricity industry because it shows the cost-effectiveness of local solar energy that is delivered when desired, rather than only while the sun is shining. The Clean Coalition conducted analysis that maximized economic value and minimized fossil fuel usage to guide the winning proposal to Kauai's electric utility. The result was a solar+storage solution that provides energy at 11¢ per kWh, cheaper than what most Americans were paying for electricity. (U.S. residential electricity prices averaged 12.5¢/kWh in October 2016.) The same type of solar+storage solution can be configured to provide indefinite, renewables-driven backup power to critical community facilities. This Kauai example, spanning multiple sites, combines 28 MW of solar with 20 MW / 100 MWh of battery storage and was expected to provide 11% of Kauai's electricity once online in 2018.

City of Palo Alto RFP and lease agreement (2016 – 2017): The Clean Coalition has a long history of consulting with the City of Palo Alto and its municipal utility. In 2012, the City unanimously approved a Feed-In Tariff (FIT) program for the City of Palo Alto Utilities (CPAU) that was developed with support from the Clean Coalition, which assisted CPAU staff in evaluating the value of local solar generation, as well as designing a program that would streamline deployment of local solar installations.

The Clean Coalition also designed a Request for Proposals (RFP) and associated lease agreement, under contract with the City, to have a solar developer build, own, and operate solar canopies atop Palo Alto's five City-owned parking structures. On 25 January 2016, the Palo Alto City Council approved a lease agreement with Komuna Energy to deploy 1.3 MW of solar from the parking structures. The RFP and lease agreement were written to encourage proposals that included EVCI deployment that leveraged the electrical work being performed for the solar installations. The EVCI objective was highly successful, and the agreement with Komuna contributed significantly to the electrification of transportation in Palo Alto. Komuna planned to install 18 electric vehicle chargers and lay the wiring for an additional 80 charging stations — providing a model for municipalities to unleash clean local energy and to facilitate

the electric vehicle future. 2017 saw the unveiling of the new solar carport installations and EVCI, which were possible because of the Palo Alto FIT that the Clean Coalition helped establish.

The Clean Coalition has continued to advise the City of Palo Alto on multiple energy-related fronts, including establishing a Solar Emergency Microgrid for critical facilities associated with the City's Office of Emergency Services**.**

CleanPowerSF FIT (2016): The Clean Coalition was hired by the San Francisco Public Utilities Commission (SFPUC) to design a FIT program for their local CCA program, known as CleanPowerSF. As part of this work, we evaluated and offered recommendations on FIT program pricing, sizing, project eligibility, contracts, and processes. Our recommendations were based on market analysis, solar insolation for San Francisco, discussions with SFPUC staff, and best practices associated with existing FITs nationwide. The FIT was anticipated to be launched in 2018; the program was delayed due to delays in the launch of CleanPowerSF.

City of Palo Alto Cubberley Solar Emergency Microgrid (2016): The Clean Coalition assisted the City of Palo Alto's Office of Emergency Services (OES) in staging the Cubberley Solar Emergency Microgrid, a microgrid designed to combine a new energy storage system with existing solar generation to provide indefinite solar-driven backup power to critical facilities located at the Cubberley Community Center. The Clean Coalition assessed the technical requirements and associated costs of the Cubberley Solar Emergency Microgrid, including a wiring reconfiguration, switching equipment, new battery installation, microgrid controller, and associated operations and maintenance costs, including licenses and warranties. The Clean Coalition also created a functional requirements document to facilitate a streamlined procurement process for deploying the Solar Emergency Microgrid.

Solar Solutions Guide (2016): Working with Southern California Edison (SCE), the Clean Coalition created the Solar Solutions Guide to address building owners' concerns about opening their properties up to solar installations. The Solar Solutions Guide addresses several major areas of concern expressed by Orange County building owners, including economics, facility concerns, vendor and technology risk, and permitting and approval. While the Solar Solutions Guide was designed to address concerns voiced by building owners in SCE's Preferred Resources Pilot grid area, many of the issues addressed are highly applicable to other utility service territories.

Long Island Community Microgrid and FIT programs (2016): The Clean Coalition helped design two FIT programs for Long Island Power Authority (LIPA) and collaborated with both Public Service Enterprise Group Long Island and LIPA on the Long Island Community Microgrid Project (LICMP), which is designed to source 50% of the total energy consumed within an entire substation grid area from local solar, serving 3,300 customers. A significant element of the LICMP is to ensure that effective procurement methods are in place to achieve the unparalleled deployment of local solar. The LICMP received one of the first NY Prize Community Grid Competition awards and was among the first to complete its Stage 1: Feasibility Study.

Alameda Municipal Power distributed generation program (2015): Throughout 2015, the Clean Coalition advised Alameda Municipal Power (AMP), a public utility with 75,000 customers, on developing a successor distributed generation program to replace its net energy metering (NEM) program. The Clean Coalition worked with AMP staff to gather details about AMP unique load characteristics, avoided costs, and preferences for meeting customer demand for local renewable

generation. Craig Lewis, Founder and Executive Director of the Clean Coalition, facilitated a town hall meeting on behalf of AMP to discuss issues and opportunities for a program that would succeed NEM for customer-sited solar. Four NEM successor program scenarios, developed by the Clean Coalition in collaboration with AMP, were presented. AMP has since implemented its new distributed generation program, known as the Eligible Renewable Generation Program, which is very closely modeled on one of the program designs the Clean Coalition produced for the utility.

Southern California Edison Preferred Resources Pilot Solar Siting Survey (2015): The Clean Coalition was contracted by Southern California Edison (SCE) to assess the technical solar potential in southern and central Orange County. The grid area assessed by this Solar Siting Survey makes up the Preferred Resources Pilot (PRP), which is an effort by SCE to study and demonstrate how distributed energy resources, including local solar, may support local reliability needs.

The PRP Solar Siting Survey identified over 160 MW of technical potential for large commercial solar installations within the PRP grid area. These built-environment sites are comprised of large rooftops, parking lots, and parking structures — most of which are large enough to host at least 500 kW of solar PV. More specifically, the PRP Solar Siting Survey identified about 90 MW of siting potential on large rooftops, 50 MW over large parking lots, and 23 MW atop multi-story parking structures. The PRP Solar Siting Survey includes a comprehensive spreadsheet and a sophisticated mapping tool for supporting solar project developers in investigating specific siting opportunities. This data will be particularly informative for solar project developers as they participate in the ongoing PRP Renewable Distributed Generation RFO. In addition to assessing the technical solar potential, the Clean Coalition analyzed the economics associated with procuring significant tranches of solar in the PRP grid area. Through this effort, we undertook an analysis to understand the price elasticity curve for procuring wholesale local solar in Orange County.

The Clean Coalition's engagement with SCE included developing methods to effectively procure local renewables in SCE's PRP grid area, the area that was most significantly impacted by the closure of the San Onofre Nuclear Generating Station.

Utah Associated Municipal Power Systems (2015): Utah Associated Municipal Power Systems (UAMPS) is a public power utility with 45 distribution utility members located in Utah, Arizona, California, Idaho, Nevada, New Mexico, Oregon, and Wyoming. In 2015, the Clean Coalition was hired by UAMPS to educate its 45 utility members about program options to support customer-sited solar. We provided two detailed guides. The first focused on transitioning away from net energy metering (NEM) toward alternative distributed generation programs. That guide gave an overview of NEM, provided details on necessary steps and considerations for retiring a NEM program, highlighted guiding principles that a NEM successor program should abide by, provided guidance in evaluating four successor program options (self-generation, a FIT, a hybrid self-generation and FIT, and utility-owned DG), and offered suggestions for successfully establishing a successor program. The second guide focused on how to design an effective FIT program.

Los Angeles Department of Water and Power (2014): The Clean Coalition offered guidance and support to the Los Angeles Department of Water and Power (LADWP) in the design of their 150 MW program CLEAN LA Solar Program. LADWP later planned an expansion of the CLEAN LA Solar Program by 300 to 450 MW, and the Clean Coalition continued offering program design recommendations to LADWP staff to ensure a successful expansion. In particular, the Clean Coalition helped LADWP learn from ineffective

program design elements — including local permitting and zoning issues, as well as pricing design flaws — that impeded a smooth rollout of the initial 150 MW CLEAN LA Solar Program.

Hunters Point Community Microgrid Project with Pacific Gas & Electric (2013): The Clean Coalition had a long-standing collaboration with PG&E on the Hunters Point Community Microgrid Project (HPCMP) in San Francisco. This flagship Community Microgrid project aimed to determine how to achieve at least 25% of total energy consumed within the Hunters Point substation grid area from local renewables, while maintaining or exceeding grid reliability and power quality. To prove the feasibility of the project, the Clean Coalition conducted a powerflow analysis of the Hunters Point Substation Distribution Grid in cooperation with PG&E. The results influenced PG&E's Distribution Resources Plan (DRP) that was submitted to the CPUC in July 2015. Once deployed, the HPCMP is expected to bring $100 million in local wages to the Bayview-Hunters Point community, while reducing greenhouse gas emissions by 1.5 billion pounds over 20 years.

Local CLEAN Program Guide (2011): In 2011, the Clean Coalition released a free, downloadable policy tool designed to help communities and utilities evaluate, design, and enact the most effective policies for the timely and cost-effective deployment of clean local energy. The Local CLEAN Program Guide, which provides an overview of the key considerations in assessing what a Clean Local Energy Accessible Now (CLEAN) Program (a FIT with streamlined interconnection) can do for communities and local utilities across the U.S., contains these seven modules:

Module 1: Overview and Key Considerations
Module 2: Establishing the Pricing for Renewable Energy
Module 3: Understanding the Avoided Cost of Conventional Energy
Module 4: Determining the Rate Impact and Program Size
Module 5: Quantifying the Economic Benefits of the Program
Module 6: Designing the Program Procedures
Module 7: Gaining Support for the Program

This guide has been downloaded hundreds of times and used by utilities across the country. For example, Georgia Power's Advanced Solar Initiative, which was designed using our Local CLEAN Program Guide, has enabled Georgia Power to cost-effectively expand its renewables portfolio, including 190 MW of local solar, without raising customer rates.

Fort Collins CLEAN (2011): In 2010, the City of Fort Collins retained RightCycle, which subcontracted to the Clean Coalition, to assess key considerations for structuring and implementing a pilot CLEAN Program for the City and Fort Collins Utilities.

The Clean Coalition conducted a detailed viability analysis, including a comprehensive modeling of project costs and economic viability in relation to regional solar resource availability, technological and market data, and a full assessment of the avoided costs that would otherwise be paid under current practices. In February 2011, the Clean Coalition finalized the CLEAN Program proposal and presented it to the Fort Collins City Council Finance Committee, where it received strong support. When Fort Collins's CLEAN Program (known as the Solar Power Purchase Program) was launched, it received nearly 7 MW worth of applications during its initial application period. This amount significantly exceeded the 2.3 MW allocated for the first round of the program.

Policy experience

Current work

Commercializing microgrids in California (2019 – present): In 2018, the California Legislature passed SB 1339, with the goal of facilitating the commercialization of microgrids across the state. The Clean Coalition has been active in the proceeding at the CPUC tasked with implementing SB 1339. We have pushed the CPUC to create a microgrid tariff and have taken a position during the comment process that the success of microgrids is incumbent on developing a standardized value-of-resilience.

Solar+storage obviating gas peaker plants (2017 – present): In 2017, the Clean Coalition conducted studies showing that solar+storage would be considerably cheaper than the proposed Puente Power Project natural gas plant and the Ellwood Peaker Plant in the Moorpark Subarea, a grid-constrained region of Southern California. These studies were instrumental in the denial of the Puente project by the CEC and the rejection of the Ellwood project by the CPUC. That led Southern California Edison (SCE), the utility in the area, to propose a Request for Offers (RFO) to procure renewable energy resources instead. In 2018, the Clean Coalition advocated to replace the RFO with a Feed-In Tariff (FIT) with streamlined interconnection and Market Responsive Pricing, as a quicker, cheaper, and more reliable way to install clean local energy in the Moorpark Subarea that is far more likely to successfully elicit adequate projects to fully meet local needs.

Transmission Access Charges Campaign (2016 – present): In 2016, the Clean Coalition launched a campaign to remedy the unfair Transmission Access Charges (TAC) being imposed on local renewable energy in California. In most parts of California, CAISO levies transmission fees on all electricity that is consumed by customers — even on power generated from local sources like rooftop solar that do not use the transmission grid. Transmission charges add about 3¢/kWh to the levelized cost of energy over a 20-year contract. This huge market distortion hinders the growth of distributed generation in California. The Clean Coalition's TAC Campaign gained wide support from DER developers, energy organizations, and advocates, and we guided the introduction of Senate Bill 692 by California Senator Ben Allen in March 2017. In response, CAISO started the Review TAC Structure Stakeholder Initiative, based on the Clean Coalition's proposed TAC fix. By early 2018, nearly 90 organizations had signed on to support the Clean Coalition proposal, and in February, 29 distributed energy resource developers, environmental groups, and energy experts signed on to a Clean Coalition letter to CAISO calling for a change in the TAC structure. In 2018, the Clean Coalition led on the technical and policy analysis of transmission rate design with CAISO, the CPUC, and the Federal Energy Regulatory Commission (FERC). This process resulted in CAISO acknowledging the issue but indicating it would not move forward on the issue unless the CPUC took action. In 2021, the Clean Coalition is working with a broad coalition to introduce legislation in California that directs the CPUC to take action to reform TAC.

Integrated Distributed Energy Resources (2014 – present): The Clean Coalition remains actively engaged with the Integrated Distributed Energy Resources (IDER) proceeding to develop associated tariffs, compensation mechanisms, and pilot programs for DER services. The Clean Coalition played a significant role in refining California's 2016 – 2019 regulatory mechanism incentive pilot. The pilot requires each utility to identify at least one grid-scale project — and authorize up to three additional projects — where the deployment of distributed energy resources would displace or defer the need for

significant costs associated with new energy transmission infrastructure, such as power plants and power lines.

Distribution resources planning (2013 – present): In 2013, California Governor Jerry Brown signed Assembly Bill (AB) 327 into law, which mandates that the state's largest investor-owned utilities proactively plan for a distributed power system. The new law brought together years of Clean Coalition work by including our language and recommendations and marked a significant step forward in smarter grid planning by ensuring that California ratepayers are protected from unnecessary investments in our outdated centralized power system. As they implement the law, the CPUC adopts numerous Clean Coalition recommendations, including our Community Microgrid Initiative methodology. On July 1, 2015, California's largest utilities — Pacific Gas & Electric Company, San Diego Gas & Electric, and Southern California Edison — filed their proposed Distribution Resources Plans as required by California's AB 327. These proposals, a direct result of the Clean Coalition's ongoing policy efforts, are accelerating the deployment of clean local energy in California. The Clean Coalition continues to be heavily involved in the ongoing DRP proceeding, as a leading participant in the working groups developing and refining the Integration Capacity Analysis of grid hosting capacity, Locational Net Benefits Analysis methodologies, and grid modernization investment strategies. This includes the Distribution Investment Deferral Framework and DER Procurement Advisory Group for the application of cost-effective DER alternatives to conventional infrastructure. This work is being extended across the United States.

2018 marked a major milestone in the maturation of the Clean Coalition's distribution resources planning work, with the much-anticipated full implementation of the Integration Capacity Analysis (ICA) maps and the first statewide implementation of Locational Net Benefits Analysis (LNBA) for DER. 2018 also saw the first annual Distribution Deferral Opportunities Reports filed by each of the investor-owned utilities, and the Distribution Planning Advisory Group will be reviewing each of the assessments and plans for the use of DER as non-wires alternatives to conventional grid investments — a whole new category of DER implementation and procurement. This resulted in a successful 10 MW DER RFO for distribution infrastructure deferrals, with 60 MW more scheduled for bids based on the 2018 report.

Streamlining interconnection (2010 – present): For years, the Clean Coalition has been the leading intervener in the CPUC proceeding addressing Electric Rule 21 and associated FERC wholesale tariffs, which regulate interconnection, operation, and metering requirements for distributed generation in California. Improvements to Rule 21 that the Clean Coalition has advocated for and achieved include publication of Integration Capacity Analysis (ICA) maps, development of pre-application reports on grid constraints, approval of clarifying regulations, and advancing methods to streamline the application and review process. ICA maps are crucial tools that assess all points on the distribution grid to determine which points can accommodate new wholesale distributed generation (WDG) capacity without significant grid upgrades — making it clear to developers where they can feasibly and cost-effectively site their projects. In 2018, the Clean Coalition's vision was realized in the upgraded ICA maps, or ICA 2.0. The map publication was delayed when the investor-owned utilities withdrew their previously published maps and argued against public release of any maps, citing confidentiality issues related to revealing critical infrastructure. Intervention by the Clean Coalition and others resulted in re-publication of the existing maps, and a December ruling ordering release of the new maps, which were published on 28 December 2018.

The CPUC approved the Clean Coalition's proposal to require all of California's investor-owned utilities to publish a Unit Cost Guide, designed to improve pricing transparency, predictability, and consistency for interconnecting distributed generation projects.

The CPUC also adopted proposals for Expedited Dispute Resolution procedures and launched a new proceeding to address a number of additional issues identified by the Clean Coalition. The Clean Coalition is a leading member of the associated working groups.

California's ReMAT program (2010 – present): The Clean Coalition played a leading role in the design of the Renewable Energy Market Adjusting Tariff (ReMAT) program, since Senate Bill 32 initiated the program. Clean Coalition staff worked hard to improve the original program design, as well as strengthen the program's Power Purchase Agreement (PPA) for this 750 MW wholesale distributed generation procurement program for projects up to 3 MW. In 2018, the Clean Coalition was instrumental in bringing about a speedy fix to the suspension of the ReMAT program. This came about through a determination that California was not in compliance with the federal Public Utilities Regulatory Policies Act (PURPA). Working with stakeholders and the CPUC to move quickly to come into compliance, the Clean Coalition helped ensure that the ReMAT program was reinstated and that key improvements would be made to the program.

Past work

New York State Public Service Commission (2015 – 2018): The Clean Coalition was active in the Reforming the Energy Vision (REV) proceeding at the New York State Public Service Commission (NYPSC). NYPSC staff requested a one-on-one meeting with our Economics & Policy Analysis Director, Sahm White, in order to learn from the Clean Coalition's experience as a successful advocate for interconnection regulations — at both the CPUC and FERC — and to consider how NYPSC could leverage our innovative policy work in New York. Sahm became a member of the NY REV's Interconnection Policy Working Group.

CPUC Green Tariff Shared Renewables (2016): The CPUC issued a decision on the Green Tariff Shared Renewables program, which included the Clean Coalition's recommendation to include sub-500 kW renewable energy projects. This important modification enhanced the number of siting opportunities for clean local energy in the built environment.

NEM valuation methodology (2016): The Clean Coalition successfully advocated for a NEM bill credit valuation methodology for solar systems paired with energy storage. This solution properly values energy export credits based on the size of the storage device, overall system, and consumption patterns.

California Renewable Auction Mechanism (2011 – 2016): The Clean Coalition helped establish and successfully prevented California utilities from weakening the Renewable Auction Mechanism, a program designed to streamline contracting to bring 3 – 20 MW clean energy projects online. The utilities sought to continue use of an inadequate data map, unfair deliverability requirements, and less frequent auctions.

National energy policy (2015): As the primary intervener in a motion with FERC to reform interconnection reporting methods, the Clean Coalition set a standard for publishing data by allowing easier access to information when applying to add clean energy to the grid.

California Senate Bill 1122 (2012): Designed by the Clean Coalition, California Senate Bill 1122, which required the state's largest investor-owned utilities to create an additional 250 MW of capacity for biopower projects, was signed into law.

Vermont 2012 Energy Bill (2012): Vermont Governor Shumlin signed into law the 2012 Energy Bill, which contained groundbreaking acknowledgement of the environmental and economic benefits of clean local energy and more than doubled the amount to be brought online through the state's CLEAN Program. The Clean Coalition provided leading policy support to Vermont-based clean energy organizations engaged in the legislative process.

California Renewable Energy Small Tariff (2011): Working with renewable energy project developers, SCE, the Governor's office, and the CPUC, the Clean Coalition removed barriers within the California Renewable Energy Small Tariff — demonstrating that with proper stakeholder collaboration, the market for clean local energy can be unleashed to create powerful and immediate economic benefits for California communities.

CEC Integrated Energy Policy Report (2011): The Clean Coalition was highly involved in the CEC's 2011 Integrated Energy Policy Report, which included research and analysis of energy demand and generation trends relevant to California's 33% Renewable Portfolio Standard and Governor Brown's 12,000 MW goal for distributed generation. The Clean Coalition's involvement resulted in a number of victories for proponents of distributed generation and laid the foundation for California's Distribution Resources Planning effort.