



Stronger Grids, Stronger Communities:

# How MCE's Virtual Power Plant is Building the Future of Energy



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## The electrical grid of the 21st century must be resilient, affordable, and powered by clean energy. It must also be dynamic and flexible.

As the sources of that clean energy increasingly include solar and wind, the grid will need to find creative solutions on both sides of the meter. That is to say, it will need to include novel and decentralized tools for its long-term stability. Those tools will rely on energy efficiency, behavior change, and trusting customers that share our vision of a clean future.

This is a different approach from what we've seen in the modern age of utility power — and that's the whole point. By challenging the status quo, we can produce different outcomes. The only way to mitigate the worst effects of climate change is to optimize, electrify, and decarbonize, and it must be done in a way that doesn't replicate the harms of the past by burdening historically underserved communities.

One key development will be virtual power plants (VPPs), which are a new way of building and managing energy infrastructure. By connecting distributed energy resources (DERs) such as solar panels, EV chargers, smart thermostats, and other smart building devices in a virtual network, **VPPs respond to energy demands at the source, shifting or reducing overall demands on the grid at key times of day and increasing the intelligence of how we use power.** Bidirectional VPPs can also dispatch energy from DERs to the grid to increase supply and ease demand issues.



Most VPPs only exist on paper. But this is a dynamic, two-way system that draws affordable energy from the grid and delivers renewable energy back to it, when it's needed most.



**Vicken Kasarjian**  
Chief Operating Officer at MCE

Interest in VPPs is growing, but there are questions around implementation: How can these be designed successfully? How is one funded? How can VPPs improve entire communities?

MCE, the first community choice aggregator (CCA) in California, is conducting an important pilot in VPP development that embraces an entirely different approach to supplying and using power.

For CCAs, policymakers, and community development stakeholders, this pilot demonstrates the opportunity that VPPs offer energy customers and their communities, providing a blueprint for VPP projects nationwide.



Cover photo: MCE's Solar One in Richmond, California.



MCE's partnership with RichmondBuild supported green local jobs to build MCE's Solar One.

## What is the Richmond Virtual Power Plant pilot?

Traditional power plants occupy a single centralized location. This could be a solar farm in the desert, a wind farm in the mountains or a natural gas power plant. Rather than occupying a singular space, a VPP consists of numerous DERs installed independently but connected virtually, allowing customers to power their home from onsite DERs and even send excess power generated onsite back to the grid.

The Richmond VPP pilot is starting from the ground up. **Funded in part by the California Energy Commission, it's retrofitting, rebuilding, and selling housing in underserved communities and installing DERs for selected residential, municipal, commercial, and industrial (C&I) customers in the City of Richmond, California.** The pilot aims to include up to 100 homes — 10 of which will be completely rebuilt — that are sold to lower-income, first-time homeowners and MCE customers.

"A fundamental principle of this project is providing an affordable pathway to homeownership, which is a huge financial challenge in the Bay Area," says Kasarjian. "We're selling these homes at subsidized rates, and these residences will be 21st-century, all-electric homes with solar panels, batteries, heat pumps, and smart appliances."

In addition to these single-family homes, MCE and its partners are refurbishing multifamily residences and up to 20 commercial and industrial customers. All DERs at these locations are being connected digitally to create the VPP, and MCE will bid the aggregated capacity into the California Independent System Operator (CAISO) markets. Customers will then receive financial credits for the energy contributed to the larger grid.



MCE's 10.5 megawatt Solar One in Richmond, California powers almost 4,000 homes annually and supported over 300 jobs



## How does a VPP benefit the community?

“VPPs are an agile, cost-effective alternative to less efficient traditional power plants,” says Chris Sentieri, principal at Community Energy & Equity Resources (CEER) and task lead on the Richmond pilot. “MCE, as the VPP operator, can use it to better align the energy demands of the communities they serve with the lowest cost, lowest carbon energy supplies that it can access on the wholesale market,” he explains.

This results in numerous benefits for communities participating in the VPP and all of MCE’s customer base, even those not specifically in the VPP, including:

### Building a more reliable grid

The Richmond VPP pilot is designed to shift energy usage during times of the day when the grid faces the most demand — currently in the late afternoon and evening. This is when CAISO might otherwise call on fossil-fueled energy generators, like natural gas plants, to bridge between availability of intermittent renewable resources.

“We’re leveraging a combination of batteries, DERs and energy efficiency tactics to shift some of the load off the grid at peak periods,” Sentieri says. “This keeps the entire grid more resilient by easing those peak loads, and it reduces the need for using peaker plants in the evening peak.”



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**Chris Sentieri**  
Principal at Community Energy & Equity Resources (CEER)

Gas peaker plants are less efficient than baseload plants and contribute disproportionately to air pollution, particularly in underserved communities and communities of color where they’re often located as the result of bias in past public planning decisions. They emit localized air pollutants that contribute to environmental justice concerns such as poor air quality and higher rates of asthma. **Having alternatives to these peaker plants can therefore help ensure that frontline or fenceline communities don’t bear the brunt of the health issues created by this pollution.**

Not only does the Richmond VPP reduce reliance on fossil-fuel-generated power sources, but it also encourages greater use of renewables. By storing solar energy in batteries during the day — when solar generation is at its peak but demand is lower — the VPP can reduce curtailing renewable energy sources.



## Lowering energy costs

VPP customers save on energy bills because their subsidized grid-smart devices draw less power from the grid during more expensive peak hours. Shifting energy consumption to off peak hours and using DERs and batteries during peak hours means lower electricity bills for those customers.

They also save money on the installation of equipment and subsequent load shaping — shifting energy usage to times of the day when prices are lowest — and receive credits on their bill depending on the installed equipment. **This three-level approach allows households of many incomes to contribute to a healthy grid.**

“Scheduling with CAISO is crucial,” Kasarjian says. “Since this is a bidirectional VPP, we will be able to dispatch power to the grid at opportune times,” he says. MCE has developed a custom tariff to compensate VPP participants whose DERs shift and send power to the grid. This flexibility allows customers to save money on their energy bills in multiple ways.

Financial benefits even flow to MCE customers who are not participating in the VPP. Since the VPP customers will impact the amount of load MCE needs to procure, “we’re buying less of the expensive power during peak hours, which allows us to keep rates low for all MCE customers,” Sentieri explains. “When a CCA runs a VPP, it’s a neighbors-helping-neighbors approach because participants save money, and the CCA can keep rates low for everyone while supplying clean power to the entire community.”



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Tour of a local home participating in MCE’s VPP pilot.

## 🏠 Revitalizing communities

Those clean power sources are important for addressing historical inequities — for example, the presence of peaker plants in communities of color where they produce particulate matter and emit pollutants that negatively impact residents. Reducing the use of these power plants through flexible, renewable power sources means less pollution in neighborhoods that have been most affected by environmental injustices.

The Richmond VPP pilot also provides fully modernized affordable housing in neighborhoods with a history of industrial zoning and underinvestment. Policies such as redlining and deed restrictions in Richmond meant that, in the past, home ownership was systemically prioritized for white families.

**Providing affordable housing for first-time lower-income homebuyers following decades of discriminatory practices supports home ownership and the potential to create intergenerational wealth for people of color in the pilot community.** This is made possible in part by an innovative financing tool, a social impact bond, that facilitates home remediation and homeowner financial training. It also provides additional support for Black residents whose families were structurally excluded from homeownership.



Local outreach helps promote the VPP pilot.



MCE Staff meet with RCF Connects staff to expand participation in the pilot.

## What are the challenges and how will they be addressed?

A project of this scope involves many stakeholders, funding mechanisms, and technological tools. For CCAs and those interested in implementing a VPP similar to MCE's, there are important learnings the project team has already derived:

### ☰ Data powers the project

"This isn't just one piece of data we're talking about," Sentieri says. "This is connecting many systems to each other, moving data back and forth, processing it all in real time — that technology has to be in place before a VPP can launch."

As local government entities, CCAs usually have smaller staff and work with third parties to develop the technological capabilities necessary for these types of efforts. As a result, it's vital that they seek out trusted systems and partners who can implement this foundational step. MCE is pursuing open-source software through [OpenADR](#) to ensure their systems function regardless of which vendor they choose.

### ✔ CCAs must be enabled as leaders of VPP projects with buy-in from multiple stakeholders

CCAs have the political will and buying power they need to help make systemic change because they are governed by locally elected policymakers and because the power to opt-out is placed in the



VPPs help us address challenges facing the grid by offering decentralized, decarbonized, and digital solutions. What makes MCE's VPP unique is the power of **democratizing** energy.



**Alexandra McGee**  
Director of Strategic Initiatives  
at MCE

hands of the customer — giving them a choice in where they get their power. These conditions allow CCAs to obtain favorable rates for customers and prioritize clean energy sources.

"California CCAs have elected officials rather than shareholders as the ultimate decision-makers. This also democratizes energy supply choices. "As a public agency, our customers are actually our owners," says Kasarjian. "VPPs are an opportunity to solidify that relationship even further."

At the same time, many other stakeholders have critical roles to play in launching and running a VPP. These include federal partners like the Department of Energy and state commissions such as the California Public Utilities Commission (CPUC), which advocate on behalf of ratepayers. Local trade allies are also key to making VPPs a reality, such as DER installers, battery vendors, energy aggregators, and financial service providers who assist with loans.





Electrification equipment connected to MCE's Richmond VPP Pilot.



We're not dictating anything — we're showing customers the opportunities for energy efficiency, time-of-use optimization and related strategies, and letting them decide which actions to take.



**Vicken Kasarjian**  
Chief Operating Officer at MCE

### **Grid resilience requires structural changes, not just behavioral changes**

Personal choices such as demand response or **time-of-use participation** are important, but a decentralized smart grid can accomplish decarbonization and improve costs and health outcomes, even if individuals can't or won't make those behavioral changes.

"It can be difficult to make personal changes unless structural ones are made first," Sentieri says. "Equipping energy customers with smart devices, apps and other tools that support their ability to make behavior changes is a crucial step. In the MCE pilot, the team is focused on providing these larger capabilities and encouraging customers to participate in a manner that fits their needs."



## Powering a better future

The energy grid of the future will be decarbonized, democratized, digitized, and decentralized. Getting there will require more collaboration and creativity than ever before. **Government and policy stakeholders can empower aggregators and energy providers to supply clean energy and better infrastructure by funding tangible improvements for residential and commercial customers.** Pilots such as MCE's Richmond VPP point the way toward making these improvements.

By supporting clean and equitable energy sources, revitalizing communities, and saving money for all ratepayers, VPPs can provide a better tomorrow for future generations. "VPPs are an effective tool for decarbonization, resiliency, and community improvement," Kasarjian says. "It can be difficult to reconcile something called 'virtual' with its impact on the physical world, but these power plants improve our communities now and into tomorrow."

[Contact MCE](#) to learn more about the Richmond VPP pilot.



EV Instant Rebate participant in Contra Costa County shows off her new car.



MCE is a not-for-profit public agency and the preferred electricity provider for more than 585,000 customer accounts and 1.5 million residents and businesses across Contra Costa, Marin, Napa, and Solano counties. Setting the standard for clean energy in California since 2010, MCE leads with 60-100% renewable, fossil-free power at stable rates, serving a 1400 MW peak load and significantly reducing greenhouse emissions and reinvesting millions in local programs. For more information about MCE, visit [mceCleanEnergy.org](https://mceCleanEnergy.org), or follow us on your preferred social platform @[mceCleanEnergy](https://twitter.com/mceCleanEnergy).

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MCE Solar One tour with CEC Commissioner Gunda and staff.



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