

# Electrification Technical Assistance Program

## Frequently Asked Questions

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### 1. Program Offering

Electrification transitions buildings away from natural gas to GHG-free electricity. All-electric buildings and vehicle electrification play a role in reducing local air pollution, improving public health, and helping our community reach our climate goals. All-electric buildings are safer to live in and are cost-effective in many scenarios, especially during new construction.

#### 1. What types of services are available to all participants?

The program provides project-specific assistance – from concept, design, through construction of all-electric buildings via a dedicated hotline and one-on-one expert assistance. The program will also host complementary developer roundtables and contractor trainings to increase industry knowledge, share best practices, and enable successful adoption of electrification technologies.

The program flyer provides a succinct summary: [https://allelectricdesign.org/wp-content/uploads/2020/08/ElecTechAssistance\\_Flyerv1.pdf](https://allelectricdesign.org/wp-content/uploads/2020/08/ElecTechAssistance_Flyerv1.pdf). Materials on our website are available to all.

#### 2. Which building industry members can benefit from the technical assistance services?

Developers, builders, their design teams (architects, engineers), contractors/installers, energy consultants, facility manager, and residents are all participants to benefit from program services.

#### 3. What technical assistance scope are covered?

Program scopes for all participants include electrification design approach recommendations (such as load reduction and shirting strategies, equipment specifications, and cost implications) and energy modeling and code compliance support.

#### **4. What additional assistance are available for affordable housing developers?**

Affordable housing developers qualify for additional, extensive support, including help with:

- Facilitating a design charette to kickstart design team collaboration
- Creating Owner Project Requirements (OPR) or Request for Proposal (RFP) language during project execution, and
- Scoping out a measurement and verification (M&V) plan

#### **5. Who are the program's technical experts and what are their specialties?**

The technical experts have extensive experience with all-electric integrated designs and designing for individual building systems including HVAC, hot water, and EV charging systems. Learn more about their experiences on our website: <https://allelectricdesign.org/#support>

#### **6. Why should I consider participating in the technical assistance program?**

Advantages for using the free, technical assistance program services include:

- Access to expert and experienced practitioners on design and implementation support
- Assistance complying with newly adopted reach codes, speed up the learning curve and avoid costly mistakes
- Identify fitting equipment and establish connections and relationships with developers, designers, equipment supplies and contractors
- For affordable housing projects, leverage additional implementation assistance
- Become prepared for future state regulations
- Stay competitive and maintain branding as building all electric is a differentiator

#### **7. What are some existing design and installation resources?**

We currently have a document titled All Electric New Construction System Options available that outlines system types, appropriate selection, and pros/cons of multiple electrification technologies for a variety of building types.

Additionally, below are a non-exhaustive list of design and installation guidelines and best practices for building electrification and EV infrastructure:

##### **Building Electrification**

- ASHRAE Multi-family Advanced Energy Design Guide for Zero Energy Buildings (release Oct. 2020): <https://www.ashrae.org/file%20library/technical%20resources/aedgs--specialprojects/aedg-mf-zeb-90--reviewdraft-20feb2020-locked.pdf>
- Menlo Spark / Redwood Energy - Zero Emissions All-Electric Single-Family Construction Guide: <https://fossilfreebuildings.org/wp-content/uploads/2020/04/SF-Guide-4-10-2020.pdf>
- Menlo Spark / Redwood Energy - Zero Emissions All-Electric Multifamily Construction Guide: <https://fossilfreebuildings.org/ElectricMFGuide.pdf>

- Menlo Spark / Redwood Energy - Zero Carbon Commercial Construction Guide: <https://fossilfreebuildings.org/ElectricNewCommercialConstructionGuide.pdf>
- Santa Monica / New Buildings Institute - A New Construction Guide to Support Santa Monica's Energy Reach Code: [https://newbuildings.org/wp-content/uploads/2020/06/SantaMonica\\_Climate-Friendly-Buildings\\_2020.pdf](https://newbuildings.org/wp-content/uploads/2020/06/SantaMonica_Climate-Friendly-Buildings_2020.pdf)

#### Heat Pump HVAC

- Northeast Energy Efficiency Partnerships - ASHP Sizing and Selection Guide: <https://neep.org/sites/default/files/Sizing%20%26%20Selecting%20ASHPs%20In%20Cold%20Climates.pdf>
- Northeast Energy Efficiency Partnerships - ASHP Installation Guide: [https://neep.org/sites/default/files/resources/InstallingASHPinCold\\_edits.pdf](https://neep.org/sites/default/files/resources/InstallingASHPinCold_edits.pdf)

#### Heat Pump Water Heating

- California Energy Commission / Ecotope - Central Heat Pump Water Heater Prescriptive Pathway: <https://efiling.energy.ca.gov/GetDocument.aspx?tn=231318>
- Department of Energy - Heat Pump Swimming Pool Heaters: <https://www.energy.gov/energysaver/heat-pump-swimming-pool-heaters#:~:text=Heat%20pumps%20use%20electricity%20to,and%20the%20heat%20pump%20heater.>

#### Electric Vehicle Infrastructure

- CA Governor's Office - Electric Vehicle Charging Station Permitting Guidebook: <https://businessportal.ca.gov/wp-content/uploads/2019/07/GoBIZ-EVCharging-Guidebook.pdf>
- Southern California Edison - The Electricians Guide for EV Chargers in Commercial and Multifamily Buildings: [https://www.sce.com/sites/default/files/inline-files/CommEV\\_Electrician%2BGuide.pdf](https://www.sce.com/sites/default/files/inline-files/CommEV_Electrician%2BGuide.pdf)
- San Diego Gas & Electric / Center for Sustainable Energy - Electric Vehicle Charging Station Installation Guidelines: Residential and Commercial Locations: [https://energycenter.org/sites/default/files/docs/nav/programs/pev-planning/san-diego/fact-sheets/ResComm%20EVSE%20Permit%20Guidelines%20v3\\_Final\\_attach.pdf](https://energycenter.org/sites/default/files/docs/nav/programs/pev-planning/san-diego/fact-sheets/ResComm%20EVSE%20Permit%20Guidelines%20v3_Final_attach.pdf)
- California Energy Commission / Center for Sustainable Energy - Cal eVIP Eligible Equipment List: <https://calevip.org/calevip-eligible-equipment>

## 2. Eligibility and Participation

### 8. What are the minimum qualifications for the technical assistance support?

The technical assistance is aimed at firms serving San Mateo and Santa Clara counties, especially for construction in the PCE/SVCE service territories. Project teams don't necessarily operate to these specific boundaries so we are intentionally leaving eligibility open for now. We encourage your projects to apply, and if there is a project that we feel we cannot serve immediately due to location, we can share their needs with our partners. Please note that all of the roundtables, contractor trainings, and materials posted on [AllElectricDesign.org](http://AllElectricDesign.org) are available to all.

### 9. How do I participate?

Customers can participate via the following steps:

- **Reach out and sign up:** Reach out via our Interest Form online or call the program hotline to request support and fill out the Participation Agreement and Application to sign up.
  - Hotline: 650-429-8910
  - Online Interest Form: <https://docs.google.com/forms/d/e/1FAIpQLSeFU3EYoPfqTSlSsHA6ZjMjd8XWhGN-WT-dmrwCykSBBs-9Ucw/viewform>
  - Participation Agreement and Application form: [https://allelectricdesign.org/wp-content/uploads/2020/08/PCE\\_SVCE\\_ParticipationAgreement\\_Redesign.pdf](https://allelectricdesign.org/wp-content/uploads/2020/08/PCE_SVCE_ParticipationAgreement_Redesign.pdf)
- **Receive technical assistance:** Be matched and connected with our technical experts and receive one-on-one help on design approaches, application of design guidelines, and energy model peer reviews.
- **Stay active:** Participate in developer roundtables and contractor trainings as they are organized to address the most pressing aspects of all-electric designs, equipment selection, and installation practices through 2021.

### 10. Can I participate in the program if electrification is required by the local jurisdiction?

Yes, we are here to help you overcome any challenges.

### 11. What kind of electrification projects are eligible?

Nearly any project in design can request support.

- New construction and retrofits
- Market rate and affordable housing
- All building end uses, in units and common/shared systems;
- EV Infrastructure
- Project concept through construction documents

### 12. What are some examples of services *excluded* from program scope?

The electrification technical assistance services scope does not cover signing off or stamping of drawings or cost negotiations for equipment.

### 3. Benefits of Electrification

#### Building Sites

#### 13. What are the safety and health benefits of building electrification?

Research indicates that natural gas is a major fire risk in the event of earthquake. The link between earthquakes and natural gas triggered fires is documented in the State's 2002 study:

[https://ssc.ca.gov/forms\\_pubs/cssc\\_2002-03\\_natural\\_gas\\_safety.pdf](https://ssc.ca.gov/forms_pubs/cssc_2002-03_natural_gas_safety.pdf)

Natural gas use in the home is linked with asthma and other health risks:

- EPA identifies indoor air quality as a significant health risk and gas appliances are listed as a point of concern: <https://www.epa.gov/indoor-air-quality-iaq/inside-story-guide-indoor-air-quality>
- 2019 meta research links gas stoves and asthma: <https://heetma.org/gas-cooking-and-asthma/>
- 2008 Johns Hopkins study linking gas stoves and asthma <https://www.sciencedaily.com/releases/2008/10/081013131530.htm>
- Lawrence Berkeley Labs, California Energy Commission and others have also produced similar studies
- Carbon monoxide from fuel use has been long deemed a risk. Enough that CO sensors are required in homes that burn fossil fuels: <https://www.creia.org/california-carbon-monoxide-law-takes-effect>

#### 14. What are the benefits of electric vehicles?

Drivers of electric vehicles identify EVs as more fun to drive in general because they are quicker, smoother and quieter than gas cars. In addition, EV drivers typically save \$1,000 to \$1,500 per year in reduced "fuel" and maintenance costs. And of course, they dramatically reduce pollution.

#### 15. Aren't gas appliances more resilient?

Natural gas appliances in general do not support resilience as most modern gas equipment depends on electricity to operate. In emergencies gas is also shut-off.

#### Electric Grid

#### 16. How reliable is the electric grid as compared to natural gas?

The natural gas grid and electric grid both go down on occasion. In fact, during California's primary natural disaster events, wildfires and earthquakes, utilities are supposed to turn the gas off. If 100% reliability is a goal for your home or project, electrification with battery and solar backup via microgrid is the way to get there.

#### 17. Will electrification require expensive transformers and distribution grid upgrades?

Depending on the building size and the amount of EV charging some additional secondary transformers may be required. These costs are mitigated when compared to the savings from not installing gas infrastructure. EV charging does represent an added cost but those costs are small relative to overall construction costs and substantially less than retrofitting.

Additional distribution grid transformers are rare and most or all of the costs are typically the responsibility of PG&E. If there are costs to the property, these are costs are usually more than offset from the savings of all-electric construction.

## 4. Electrification Technologies

### Building Electrification

#### 18. Are natural gas systems more efficient than all-electric?

In every case, all-electric systems operate more efficiently than natural gas systems:

- Gas heating appliances range from 0.78-0.98 COP
- Electric resistance heating appliances are 1.0 COP
- Electric heat pumps appliances can achieve higher than 3.0 COP because they are moving heat, rather than extracting heat via combustion. All-electric heat pumps are highly efficient and effective in weather far colder than ours, and Cold Climate Heat Pumps are highly efficient at as low as 5 degrees Fahrenheit.

#### 19. How do the costs for electric space heating and water heating compare to that of natural gas-based options?

The answer largely depends on the product chosen, climate, and occupant behavior. Generally, energy costs can be treated as similar. This is because while electricity is more expensive than gas per Btu, heat pumps are more efficient. A considerable cost implication for going electric is that increased electrical infrastructure costs are mitigated by eliminating natural gas infrastructure.

#### 20. Don't people prefer gas stoves?

Many people prefer gas stoves. However, most people are unfamiliar with induction stoves which offer superior speed, cool and safe surfaces while cooking, and better indoor air quality. Six of the top eight ranges for 2020 were electric, with the top two being induction.

Induction cooking has more specific temperature control, is much safer, easier to clean, and can vary heat settings faster than gas. They are also more efficient, as demonstrated by this study on [Residential Cooktop Performance and Energy Comparison](#).

#### 21. How do I design a central water heating system?

There are multiple design options for multi-family buildings including central heat-pump water heaters (HPWH) with larger tanks, central HPWH's in parallel, distributed HPWHs within each unit, or distributed HPWHs serving multiple units. Central HPWH it is absolutely an option with dozens of case studies and several practitioners, particularly in affordable housing. The following guide

provides case studies, design insights and products: [https://peninsulareachcodes.org/wp-content/uploads/2019/10/AZeroEmissionsAll-ElectricMultifamilyConstructionGuide\\_RedwoodEnergy.pdf](https://peninsulareachcodes.org/wp-content/uploads/2019/10/AZeroEmissionsAll-ElectricMultifamilyConstructionGuide_RedwoodEnergy.pdf)

There is also a prescriptive pathway available, with more details from the CEC coming later in 2020 and early 2021: <https://efiling.energy.ca.gov/GetDocument.aspx?tn=231318>

## **22. Can a heat pump water heater match the performance of a gas system?**

Yes, a heat pump water heater can equal the performance of a gas equivalent. For example, Rheem's 55 gallon unit can deliver 70 gallons of hot water in the first hour, enough for about four showers. For comparison, Rheem's gas equivalent delivers 79 gallons in the first hour. When selecting any hot water heater, no matter the fuel, make sure it is the right size for your use type. A home with a big family or a vacation home might need a larger 80-gallon tank.

## **23. Will the heat pump water heater need to be supplemented by electric resistance?**

Heat pump water heaters are typically designed with hybrid heating capability, including a backup electric resistance coil. This enables the heat pump to work when it's bitterly cold, and also helps the heat pump replenish its hot water supply more quickly. In most cases, particularly in mild California climates, the electric resistance coil will remain idle.

## **Electric Vehicle Infrastructure**

### **24. How are the electric vehicle charging spaces shared between tenants in multifamily buildings?**

The market has shown multiple ways to allow charging spaces to be either dedicated to particular dwelling units or shared. One example is similar to a "pet fee" where an electric vehicle owner can be assigned a parking spot with a charger for an additional monthly fee. However, many adopted reach codes require that all parking spaces or dwelling units have access to EV infrastructure, even parking spaces that are unassigned to specific dwelling units.

### **25. What are the impacts to affordable housing projects?**

In most housing, all-electric buildings cost less to build than supplying gas to all major fixtures. To assist with ensuring optimal design and cost-effectiveness, PCE is planning training and technical assistance for new construction.

Electric vehicle charging reach codes would require more EV charging which *would* cost more than State code levels (while providing on-going savings to EV drivers using the infrastructure). To address this issue, PCE is launching incentives in 2020 that include an explicit element for new construction of affordable housing

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