



A business guide to
beneficial electrification



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Beneficial Electrification is the process of upgrading your company's carbon-emitting equipment with newer, more advanced, cleaner electrical alternatives. SMUD has beneficial electrification solutions for your business that also help your bottom line. If you want to modernize your existing building equipment for water heating, space heating or you want to add a more cost-effective fleet of electric vehicles, SMUD has a solution and incentives to help.

The benefit of electrification is creating a cleaner environment, which is good for any business. Securing a clean future for our community is an undeniable benefit and a significant driver in the push towards beneficial electrification. Electrification of your older carbon-emitting equipment and vehicles with new, clean, electrically powered equipment can save you money, reduce maintenance costs and increase efficiency.



Why change now?

The future is now. The technology is right, incentives are right and SMUD rates are among the lowest in California. The time to change has never been better.



[smud.org/EnergyVideos](https://www.smud.org/EnergyVideos)



Does electrification cost more?

In many cases, electrification will have similar costs to its gas-fired counterparts. However, when prices are higher, SMUD provides incentives and rebates for both building and transportation electrification projects that will help pay the difference. Plus, the potential savings from installing more efficient electric equipment will continue for the life of the installation. We recommend you consult with your Strategic Account Advisor or SMUD's electrification program team to find the best solution for your unique business and to maximize the benefits available to you. This overview will help you answer any questions you may have and ensure electrification is right for you.



Does SMUD offer any incentives?

Yes! SMUD provides many incentives for both building and transportation electrification projects. These incentives help make electrification opportunities financially competitive and cost-effective when compared to their older, less efficient gas-fired alternatives.



What are the steps I need to take to change?

The steps include:

- 1** Researching products for vehicle and equipment electrification to find those that best meet your needs.
- 2** Addressing your location's existing electrical equipment's ability to handle the increased electrical load required by electrification.
- 3** Examining all the resources that are available to you in the form of incentives and grants. Keep in mind that grants and incentives can change each year, so your SMUD Strategic Account Advisor can help provide you the most current information.



What part does SMUD play in this electrification transformation?

SMUD's Strategic Account Advisors and the electrification program team members are here to help you with your electrification transformation. While we cannot recommend any company, vehicle, or specific equipment, we can discuss with your team expectations, opportunities and be your trusted energy advisor partner during this transformation.

To find your Strategic Account Advisor, go to smud.org/MyAdvisor



HVAC Heat Pump and Heat Pump Water Heater

Why should I change to electricity?

Replacing your gas-fired heating equipment with efficient electric heat pumps is a step towards a more efficient, healthier community. While a gas-fired unit works by burning natural gas to create heat, a heat pump works by moving heat. Heat is moved from the surrounding air to heat your building or water. Because a heat pump is moving energy as opposed to creating it, a heat pump can be up to three times more efficient than a gas-fired unit.

When do I change?

The best time to replace gas-fired equipment with heat pumps is at the end of their useful life. However, increasing demands for carbon reduction and clean energy make the switch to cost-competitive electric heat pumps an excellent opportunity to meet those goals.



There are two main applications for heat pumps; space heating and water heating:



Space Heating

How do I know which HVAC heat pump to install?

In almost all cases, a heat pump alternative is available from your preferred manufacturer or vendor. A properly sized and designed heat pump can entirely replace your gas-fired unit while utilizing clean and efficient electric energy.

In some cases, heat pumps require supplemental heating to warm a space on cold days, or when the heat pump is defrosting. However, keep in mind there is alternative heat pump technology suitable for lower temperatures that may not require supplemental heat. Consult your contractor or Strategic Account Advisor for more information on appropriately sizing your building space heat pump.



Water Heating

How do I know which heat pump water heater to install?

There are many water heater manufacturers selling heat pump water heaters ranging from small residential units to large commercial units.

As with heat pump space heating, some types of heat pump water heaters will require supplemental heating. Heat pump water heaters are not as powerful as many gas water heaters. To meet large demands and remain efficient, heat pumps will run longer hours and will require larger tanks.

What size heat pump water heater will I need?

Several specifications need to be considered when selecting your water heater including tank volume and your building's hot water demand. Be sure to understand the heat pump's heat input, not simply the rated capacity of the water heater, which includes electric resistance. Many common water heating terms like "recovery" and "first hour delivery" are more complex than they would appear. To reduce reliance on electric resistance, these ratings need to be carefully reviewed to ensure efficient operation and understand their actual value when electric resistance is omitted.

How does hot water demand affect efficiency?

To avoid impacting your bill, it is important to limit the amount of time electric resistance heaters operate. Heat pump water heaters can often take advantage of larger storage tanks to help bridge the periods of high demand. If a light duty application is converting gas to electric heat pumps, a larger storage tank is often an efficient choice. Water heaters should not be sized using the unit rating (overall rating) but should be sized using the storage capacity and the heat input in "efficiency" mode.

Temperature setpoints should remain within the manufacturer's specification for "efficiency" mode. If the water heater is serving high temperature uses, consider a booster heater at the point of use.



How are residential and commercial style heat pump water heaters different?

Depending on tank size, residential style storage hot water heaters have about 40 to 60 gallons of useable hot water capacity. Once the tank is depleted, the heat pump returns about 6 gallons per hour of hot water to the tank. If more hot water is required, the electric resistance elements will engage. Heat pump water heaters need time to recharge between periods of high demand to avoid electric resistance heating.

Commercial heat pump water heaters have about 90 to 100 gallons of hot water. Commonly available large commercial storage hot water heaters can produce about 45 gallons of water per hour using just the heat pump mode (often called efficiency mode). Laboratory testing indicates that commercial units, in intermittent-flow applications, can provide 500 to 600 gallons per day of hot water with no electric resistance use.

Where should I install the heat pump water heater?

Heat pump water heaters function best in warm environments and cool the space around them because they take heat from the air and put it into your water. Follow the manufacturer's instructions for ventilation. Some areas, like commercial kitchens, can benefit from the cooling effect of the water heater.

Heat pump water heaters typically have a minimum temperature for operation. Below the minimum temperature, the heat pump turns off and the units run only using electric resistance. To prevent this from occurring, some types of water heaters should be placed indoors. Other heat pump water heaters use refrigerants better suited for low temperature operation (like CO₂) and can operate efficiently across all temperatures commonly seen in the Sacramento area.

How do I apply for SMUD's incentives?

Your Strategic Account Advisor will work with you from your first request for transformer sizing thru the application and incentive process. Go to [smud.org/BusinessRebates](https://www.smud.org/BusinessRebates) for building electrification program details and to download a copy of the program handbook for detailed instruction on how to submit an application. If you have any questions, contact your Strategic Account Advisor.



Induction Cooking

Why should I change to electricity?

Induction cooktops are not only safe and energy efficient, but they also improve your kitchen's air quality compared to a gas-fired stovetop. Induction cooktops produce zero kitchen pollution while natural gas stoves can release carbon monoxide, formaldehyde and other harmful pollutants into the air. Because the cooktop's heat is focused on the pan and nowhere else, less heat is wasted, and it reduces the risk of burns and accidental fires. Also, your kitchen stays cooler reducing your air conditioning costs.



Do I have the right cookware?

Induction cooktops work by heating the cookware through induction as opposed to heating the stovetop which then heats your cookware. As a result, only specific cookware is compatible with an induction stovetop. Ensure your cookware is compatible or remember to include the cost of new cookware when determining if an induction cooktop is right for you.

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Commercial Fleet

Why should I change to electricity as fuel?

Converting your commercial fleet from petroleum burning, internal combustion engines (ICE) to clean electricity is beneficial to your business in many ways including fuel savings and maintenance costs. Many operations cite extended maintenance intervals due to regenerative braking and the significantly lower number of moving parts per vehicle type. Additionally, there are significant reductions in pollution and carbon production.



When should I change?

There's never been a better time to consider the conversion of your ICE fleet. With statewide incentives and SMUD's incentive program, the cost differential between efficient, clean electricity and carbon producing ICE units is smaller than ever. Now is the time to move your commercial fleet into a clean, electricity-powered future. Electric vehicles have a lower cost over the vehicle's service life and require less maintenance.

Another good time to consider electrifying your fleet is when you retire a vehicle. The exception would be when your organization has a corporate or legislative mandate to convert or when an incentive program makes it overwhelmingly more cost effective, e.g. California's state incentives for school buses.

An additional consideration with conversion is the availability of suitable replacement models. Models continue to be debuted each week, and companies are already announcing more light, medium, and heavy-duty models targeting the commercial fleet operator. Among the areas well represented besides the light-duty vehicles are passenger buses, box or step vans, refuse trucks and local delivery trucks up to class eight chassis models.



How do I know which vehicles to buy?

As with all your fleet purchases, the different company salespeople will be best suited to explain their vehicles' ability to fulfill the needs of your fleet. Reach out to your Strategic Account Advisor at SMUD if you want unbiased input on your findings.

How do I know what EV charger to install?

Many equipment providers offer charging equipment and even more offer a list of compatible non-OEM charging equipment. SMUD recommends you get a list of outside vendor's compatible chargers and compare the OEM labeled equipment to others in the marketplace to ensure you get the best deal.

How do I find a contractor?

Any licensed electrician can install an electric vehicle (EV) charger, the simple regulator of AC or DC energy, which in turn charges the vehicle battery bank. The wiring and installation are well within the scope of a professional electrical contractor. Actual interconnection to the SMUD's electrical grid is laid out in our Commercial EV Electric Service requirements TO14 on smud.org.

SMUD's Commercial EV program manual also describes the program benefits and guidelines, which will be invaluable to both your team and the contractor installing your equipment.

How much does it cost?

With state and SMUD incentives, the cost of conversion can be much less than expected and sometimes very minimal. Your Strategic Account Advisor can work with you and your contractor to help you find the best incentive path. With an electric vehicle, you are not only buying the electric vehicle, but will need to also install a fueling/charging station. Electric vehicle chargers can run from \$4-\$10k each, but incentives can cover a large portion of those cost.

How do I apply for incentives?

Your Strategic Account Advisor will work with you from your first request for transformer sizing thru the application and incentive process.

Go to smud.org/DriveElectricBusiness for program details and to download a copy of the program handbook for detailed instruction on how to submit an application. If you have any questions, contact your Strategic Account Advisor.





Steps to Beneficial Electrification

How do I determine if my onsite electrical equipment is sufficient for my project?

Your equipment provider and the contractor should be able to provide you with the future load impact and help you determine if your onsite existing service panel(s) are adequately sized. Your Energy Advisors can also assist with any load impact calculations for your heat pump or induction stovetop projects.

What if my existing equipment is adequately sized?

A properly sized service panel is a positive first step, but you're substantially changing your load profile. SMUD must confirm our transformers can handle your new load profile.

What if I need to upgrade my main service panel?

Your Strategic Account Advisor will help you and your contractor with this process. The size of your new equipment will determine the next steps. Different paths are based upon the final main breaker and buss rating of your new main service panel.

Under or equal to 200 amps (final main service panel size), your contractor will need to work with your Strategic Account Advisor to create a Meter and Service Request through **SMUD's Project Application Website (PAW)** or by calling the SMUD Customer Service Center. There's no deposit required for a Meter and Service request. The submission of a Meter and Service request doesn't guarantee a Rule 16 application will not be needed, but this is the first step. You'll also need to submit the load calculations and electrical plan sets to SMUD.

Over 200 amps (final panel size) will always result in a Rule 16 application and a deposit of \$5,000. Your Strategic Account Adviser and your contractor will submit the Rule 16 application through PAW with the required single line drawing load calculations, any supporting documents, and a \$5k deposit.

What if I need entirely new SMUD service for this project?

A request for new service or a new SMUD account is handled through a Rule 16 application, as described above. Your Strategic Account Advisor will work with both you and your contractor to assist you in this process.

How do I know if my transformer needs upgrading?

Your Strategic Account Advisor will need the load calculations from your equipment provider, contractor or Energy Advisor, along with the main breaker rating of your existing service panel. We'll also need the meter number from the front of the SMUD meter, which feeds the service panel that you are tying into your new electrification loads.

Your Strategic Account Advisor will research your existing transformer capacity to determine if your transformer will have to be upgraded.

Why would the transformer not be already sized for my new loads?

When your building or fleet yard was built, an electrical plan was submitted to SMUD for their design. SMUD used those load calculations to size the transformer. SMUD sizes transformers based upon expected loads at the time of construction to increase reliability, lower the upfront cost to builders and keep rates lower.

Some builders decided to put larger main panels than the proposed loads required to lower upgrade costs in the future. Other builders even installed larger in-ground conduits to lower future transformer upgrade costs. In short, SMUD sized the original transformer based upon the load calculations provided when the site was built.

Are there any other funding sources available besides SMUD grants?

CALeVIP: calevip.org

California Air Resources Board: ww2.arb.ca.gov/

Carl Moyer Program: ww2.arb.ca.gov/our-work/programs/carl-moyer-memorial-air-quality-standards-attainment-program

Sacramento Metropolitan Air Quality Management District:
emissionadvisors.com/sacramento-metropolitan-air-quality-management-district-smaqmd/





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