DATE: August 12, 2019

AGENDA ITEM #2

TO: Environmental Commission

FROM: Callie Niday, Staff Liaison

SUBJECT: Silicon Valley Clean Energy Authority (SVCEA) 2019 Building Electrification and Electric Vehicle Infrastructure Reach Code Initiative

RECOMMENDATION:

Review and discuss Reach Code options and make a recommendation to City Council

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BACKGROUND

Silicon Valley Clean Energy (SVCE), along with Peninsula Clean Energy (PCE) and the San Mateo County Office of Sustainability, are supporting their municipalities to adopt building codes that will result in safer and more comfortable buildings, increase their electric vehicle charging infrastructure, and reduce their carbon footprint.

In support of municipalities and counties in SVCE and PCE service territory, SVCE and PCE are providing extensive technical assistance plus a $10,000 incentive to each city that brings reach codes to their councils.

What Are Reach Codes?

Every three years, cities and counties across the state adopt the new Building Standards Code (Standards) or Title 24 of the California Code of Regulations. Cities and counties may adopt building codes more advanced than those required by the state, which are known as reach codes.

Reach codes aim to update local building codes concurrently with the state-required adoption of the 2019 Standards. The previous adoption cycle with new Standards took effect January 1, 2017. The next code adoption cycle, with new Standards, must be adopted by cities and the County by the end of calendar year 2019. Reach codes may include:

Prescriptive Codes: Require one or more specific energy efficiency measures.
Performance Codes: Require a building to perform more efficiently based on accepted computer modeling and allow trade-offs between energy efficiency measures.

Why Establish Reach Codes?

The benefits of greenhouse gas (GHG) free electricity can best be realized by electrification of new and existing buildings and transportation vehicles. Electrifying buildings and vehicles transition them away from the use of natural gas and gasoline to clean energy provided by SVCE. By developing electrification reach codes, cities can save energy and reduce GHG emissions in Santa Clara and San Mateo County. All-electric buildings are safer and healthier to live in along with being cost effective,

especially when adopted at the new construction stage. It is most efficient for cities to coordinate adoption of reach codes with the adoption of the new 2019 building code, taking effect January 1, 2020.

Staff attends monthly Member Agency Working Group (MAWG) meetings with SVCEA and discusses updates with the reach code initiative.

For more information on Reach Codes with SVCE, please visit:
https://www.svcleanenergy.org/reach-codes/

DISCUSSION

SVCEA MAWG Updates (January 2019 – July 2019):

The MAWG did not meet in December 2018. City staff attended the SVCE County-wide Reach Code Working Group Launch on January 15, 2019 to learn more about the Reach Code project described above. Members of the City Manager's Office and Community Development Department attended as well.

At the January 24, 2019 MAWG meeting, the group discussed the potential for SVCEA to form a joint funding mechanism with BAAQMD and other agencies to fund EV infrastructure. SVCEA staff is currently developing an RFP and scope of work to secure a consultant to explore the EVSE market and identify barriers, forecast infrastructure needs, and establish a mechanism to pursue grant funding. SVCEA also updated the group on youth focused programs like the Bike to the Future event, which took place in April 2019 and the creation of a student ambassador program, focused on educating students and schools about ways to reduce GHG emissions.

On March 20, 2019, SVCEA hosted a workshop on the Reach Code project to the appropriate City Staff, the Building/Developer Community and interested stakeholders. The Reach Code project is currently underway, the consultant completed the cost effectiveness study, and the initial draft of the reach codes was released in March.

At the April 25, 2019 MAWG meeting, the group discussed the release of the new PG&E rates for 2019. Sunnyvale gave a presentation on their Climate Action Playbook. The group received an update from Aimee Bailey, Director of Decarbonization and Grid Innovation, on SVCE Innovation Onramp which went live April 3, 2019. The Heat Pump Technology Days: Water Heating Meeting was held on May 9, 2019 in San Francisco. SVCEA also informed the group that the results of the cost effectiveness study for the Reach Codes project are available. SVCE is looking for input from cities and stakeholders; May 15, 2019 is the deadline to provide input before the reach code language is drafted. In May 2019, SVCEA launched a showcase design grant focused on all-electric projects within the service territory; the new all-electric Los Altos Community Center may be eligible. Also, the group announced that PG&E has delivered gas data for the Climate Action Plan.

At the May 23, 2019 MAWG meeting, SVCE presented the heat pump water heater program, which launched in June 2019. This program is offering funding for 100 residential projects including incentives for new heat pump water heaters and new solar panels. The group received an update on the showcase of all-electric design awards, which also launched in June 2019. The awards are going to be available for all-electric buildings that are already built, rather than future projects. The goal is to

showcase the participating projects in SVCE's resource center. SVCE also gave an update on the jurisdictions that have sent in a letter of intent for the reach codes – including Cupertino, Milpitas, Morgan Hill, Mountain View, Campbell, Los Altos, and Sunnyvale. On May 29, 2019, the building model reach code language was shared and on June 6, 2019, the electric vehicle model reach code was discussed.

At the June 27, 2019 MAWG meeting, the group discussed the reach codes initiative with the building officials from various jurisdictions. The building officials from the City of Sunnyvale, City of Milpitas, and the City of Cupertino attended this meeting. As previously discussed, the overall goal of adopting a reach code is to increase the electrification of buildings and decrease buildings overall carbon emissions. Additional benefits of constructing a home that is all-electric is that they are the healthier, cleaner, safer, and more cost-effective option than building a home that has mixed-fuel (electricity and natural gas). Three pathways were presented at the meeting, including: pathway 1 (all-electric), pathway 2 (mixed fuel), and pathway 3 (mixed-fuel with no space and water heating). Pathway 3 would cut the carbon emissions by 80% and would still offer people the option to have comfort appliances (i.e. gas stove top and gas fire pit). In addition, the group received an update that the all-electric showcase awards are now live; applications will be accepted until July 26, 2019. SVCE will showcase the customers who have successfully constructed an all-electric home and will showcase the design elements to help support the reach code effort. The FutureFit Heat Pump Water Heater program launched on June 28, 2019 and about 115 people have already shown their interest. The Heat Pump Cost Effectiveness webinar was given on July 3, 2019.

At the July 25, 2019 MAWG meeting, Aimee Bailey introduced a new program focused on grid integration called the Virtual Power Plant (VPP) initiative. To better understand VPP functions and values, SVCE and Gridworks are releasing the Silicon Valley Clean Energy Virtual Power Plant Options Analysis Discussion Draft to generate thoughts, ideas, and feedback on possible solutions and the path to achieving those solutions in Silicon Valley. Other programs discussed at the MAWG meeting include the Innovation Onramp Program, the All-Electric Showcase Awards, and FutureFit – the heat pump water heater program. The Heat Pump Water Heater Buyers Guide can be found in Attachment A. It was announced that the City of Berkeley unanimously voted to ban natural gas for new low-rise residential buildings starting January 1, 2020. PG&E has offered to attend council meetings in support of building electrification. There is a Building Decarb Coalition webinar on August 29, 2019 called "Is a Gas Moratorium Right for You?" In addition, SVCE announced that there are existing tools on their website to help support the reach code effort, including the Model Staff Report Letter Template and informational flyers (found in Attachment B). Additional tools are currently under development, including a general slide deck for City staff use, building department checklists, a cost effectiveness informational chart, an electric vehicle cost effectiveness analysis, and an informational video. An update was given to the group that the 2018 GHG inventory is almost completed. Lastly, the Draft EV Infrastructure Joint Action Plan was discussed.

Attachments:
A. Heat Pump Water Heater Buyers Guide
B. Reach Code Informational Flyers

HEAT PUMP WATER HEATER BUYERS GUIDE

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The Future is Electric

***Products shown are examples of available products and are not endorsements.**

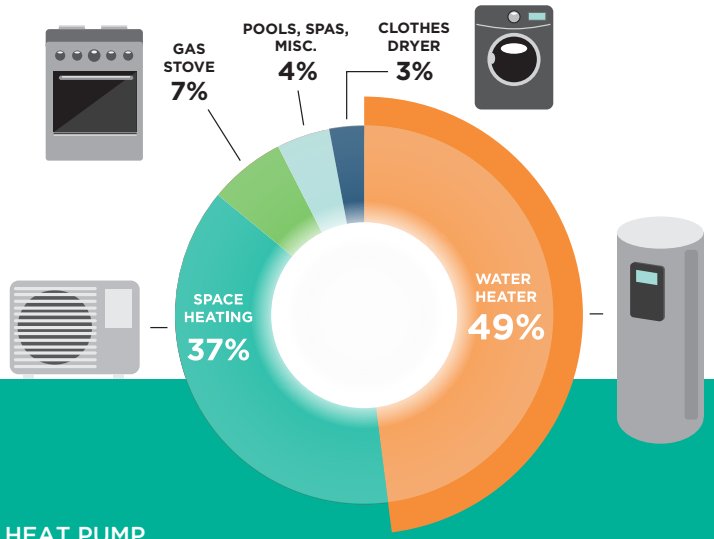
1. INTRODUCING THE "FUTUREFIT" HOME

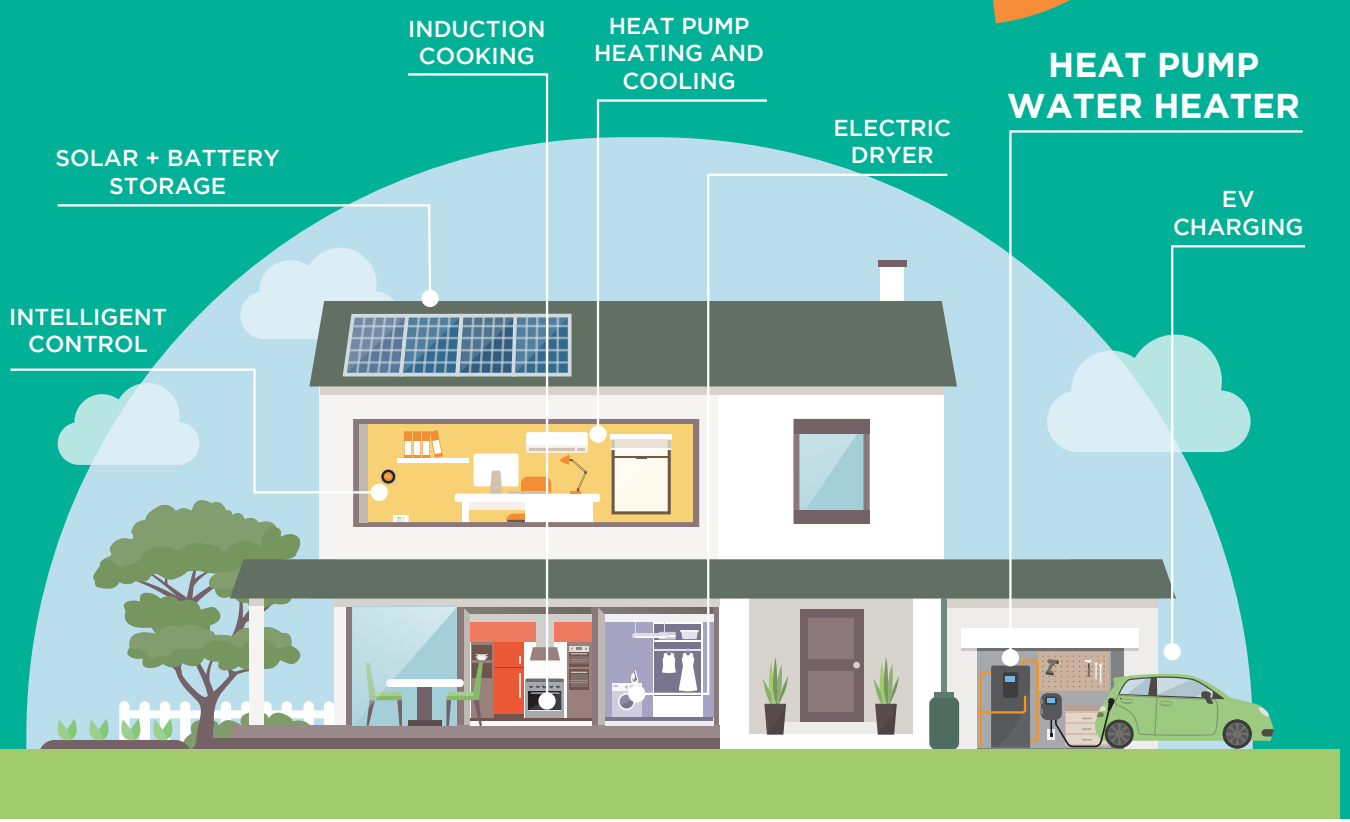
An all-electric FutureFit home is more efficient, comfortable and safe. Appliances run exclusively on clean electricity from sources such as solar, wind and hydropower – rather than fossil fuels that harm indoor air quality and pollute the environment. At the core of a FutureFit home is an electric Heat Pump Water Heater.

Most existing homes in the San Francisco Bay Area have water heaters that run on natural gas. Gas water heaters are typically a home's single biggest source of emissions that are damaging to air quality and the environment.

This guide offers important information on the benefits of installing an electric Heat Pump Water Heater, buying considerations, product details and installation.

HOME EMISSION SOURCES





2. BENEFITS

A Heat Pump Water Heater (HPWH) offers many benefits compared to gas water heaters:

Energy Savings

Heat Pump Water Heaters are more energy efficient because they use less energy to heat water compared to natural gas water heaters.

Heat Pump Water Heaters can also engage with money-saving options, like time-of-use electricity rates, and even money generating opportunities, like utility grid-interactive programs, neither of which are available to natural gas water heaters.

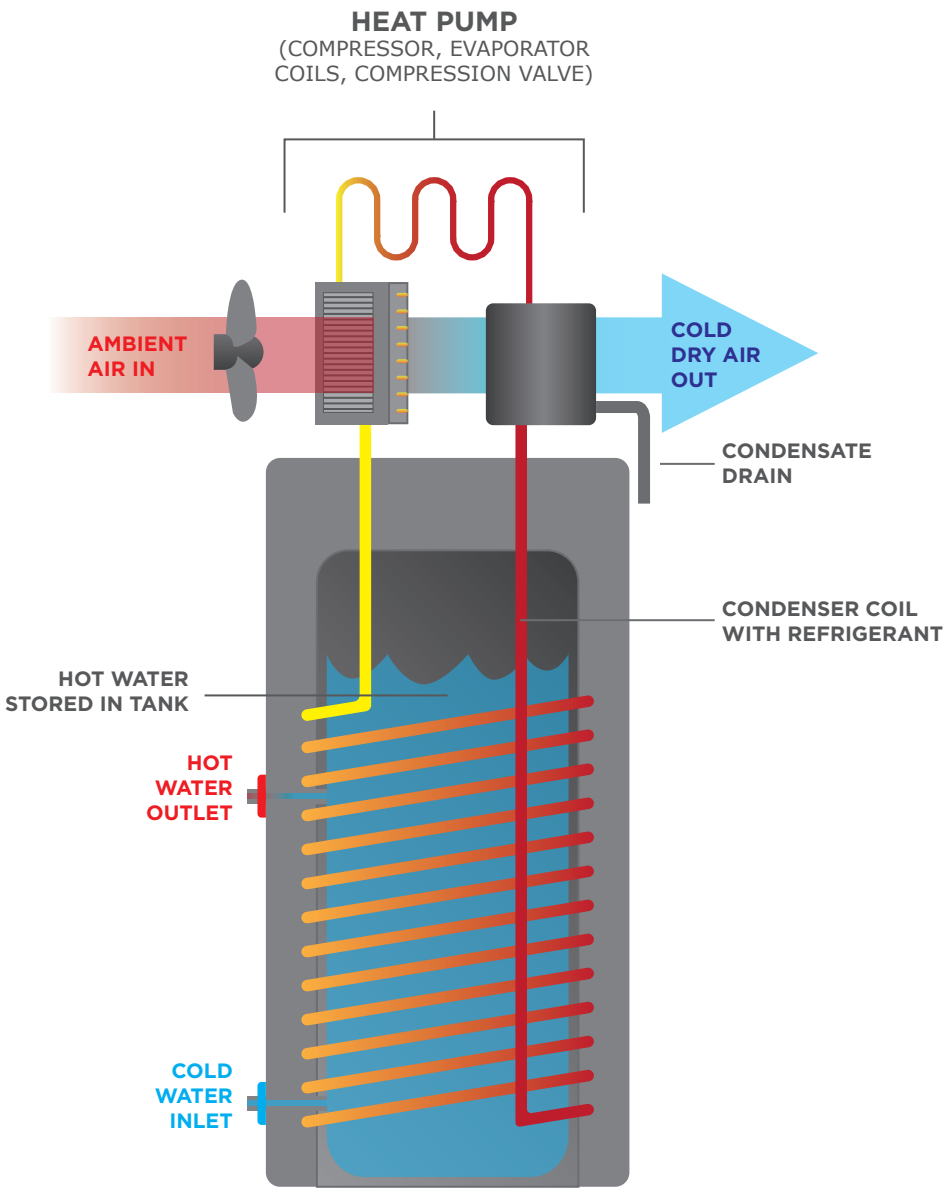
Usable Cold Air

When a heat pump is operating, it expels cold air. This can often make the surrounding space more comfortable.

Healthier and Safer

Replacing the combustion of natural gas with clean electricity for your water heater removes a major potential source of Carbon Monoxide (CO) and Nitrogen Dioxide (NO2) from your home, according to the California Air Resources Board.

With SVCE providing carbon-free electricity for your home, switching to an electric Heat Pump Water Heater cuts nearly 50% of your house's overall greenhouse gas emissions that otherwise would have occurred with your natural gas water heater.



3. HOW IT WORKS

A Heat Pump Water Heater works similarly to a refrigerator, except in reverse. While a refrigerator removes heat from an enclosed box and expels that heat to the surrounding air, a HPWH takes the heat from surrounding air and transfers it to water in an enclosed tank.

Air is pulled inside the tank, then heat from the air is absorbed by an evaporative coil which transfers heat to the water. The cooled, dehumidified air is then pushed back out into the surrounding space. Cool water flows into the tank, is heated by the stored heat in the coil and is then sent to you through your home's pipes.

HPWHs typically allow for multiple modes of operation depending on the situation:

- Efficiency/Economy – Maximizes energy efficiency and savings by only using the heat pump to heat water.
- Electric/Heater – This high-demand setting is the least energy-efficient, using only the electric resistance element to heat water.
- Auto/Hybrid – The default setting is ideal for daily use, providing energy-efficient water heating using the heat pump, with sustained heat as needed from the electric element.
- Vacation & Timer (not available on all models) – Save energy when away from home by placing the unit in "sleep" mode until you return.

4. THINGS TO CONSIDER WHEN BUYING

SVCE recommends the higher efficiency and quieter models. Other considerations:

Efficiency
Look for a Uniform Energy Factor (UEF) of at least 3.0. This number represents how efficiently the unit operates. The higher the number, the less it will cost to heat water. A UEF of 3.5 or greater is quite common.

View the Northwest Energy Efficiency Alliance's qualified products list to find a product with a UEF of 3.0 or greater: **neea.org/img/documents/qualified-products-list.pdf**.

A unit rated as Tier 3 indicates a higher level of efficiency and quieter operation than Tiers 1 or 2.

Tank Size
Select a tank of similar size (or larger) than your existing tank. Larger units are typically more efficient, store more hot water, and provide better money saving opportunities from utility demand response programs and time-of-use rates than their smaller counterparts.

First Hour Rating
First Hour Rating is the calculated amount of water your heater can deliver in an hour of usage. As hot water is used, cold water is added to the tank and heated. Therefore, this number can be larger than the tank capacity and is the best measure for how much consistent hot water your unit can supply in a given hour.

Refrigerant
Some units use naturally occurring CO2 refrigerants providing the lowest global warming potential. Others use synthetic refrigerants, such as R410A or R134A.

Overall Costs
For new construction, all-electric homes cost less to construct and a HPWH is a key component.

For existing homes, HPWHs can have a higher upfront cost as the home was likely constructed for natural gas lines, not 220V electrical lines to the water heater location.

In either case, a HPWH can end up being more cost-effective over the long term, especially when operating using lower cost, off-peak rates.

Electrical Panel
Check your main service panel to see if it can handle the added electric load of a HPWH, typically 30 Amps though some units only require 15 Amps. If you're thinking of cutting your carbon footprint even further with an electric vehicle, or switching other gas appliances to electric, you may want to prepare for the future and upgrade your panel now.

Noise
All HPWHs contain a compressor, similar to a refrigerator, and will emit noise when operating. The lower the decibel level, the quieter the operation. Look for units with a decibel level (dBa) of 55 or lower and/or locate the unit in the garage. 50 decibels is associated with sounds like quiet conversation, light traffic or a refrigerator.

Common Manufacturers

- A.O. Smith
- American
- Bradford White
- Kenmore
- Lochinvar
- Reliance
- Rheem
- Richmond
- Ruud
- Sanden
- State
- U.S. Craftmaster

The above manufacturers are featured on the Northwest Energy Efficiency Alliance qualified product list as of 4/15/2019.

Where to Buy

Local hardware or home improvement centers

Through your contractor

Online retailers

5. PRODUCTS & WHERE TO BUY

6. CONTRACTOR & INSTALLATION

Engaging with a contractor experienced with Heat Pump Water Heaters is recommended. A proper installation includes connecting the heat pump to your main electric service panel as well as capping the existing gas line that was serving your previous gas water heater.

Contractors are licensed and regulated through the Contractors State Licensing Board. Review the status of the contractor's license on the State Licensing Board's website. When selecting a contractor, we recommend receiving quotes from more than one contractor and speaking with one or more previous customers about their experiences with this contractor. When searching for a contractor you may utilize online resources, while some major home improvement stores have contractor referrals for products they sell.

HOW DO I KNOW IF A HEAT PUMP WATER HEATER IS A GOOD MATCH FOR ME?

- Your existing gas water heater is in the garage, or in a laundry room or similar indoor space.
- You have a spare 220V outlet near your existing gas water heater, such as an outlet for an electric clothes dryer.
- You have available circuit breaker capacity in your main electrical panel. For electrical panels below 200 Amps, this may be more difficult.
- You are comfortable with technologies that reduce your energy bill – solar, smart electric vehicle charging, time-of-use electricity rates, connected thermostats (like Ecobee, Honeywell or Nest).

If your home does not meet all these criteria, don't worry, heat pumps can still work for you.

7. BEST PRACTICES

- If you have solar, a HPWH can save you money by using your solar generation to heat water during peak solar times, then store it for later use.
- Use vacation mode when you plan to be away for a while. The HPWH will turn off while you are gone and reheat before you return so there is hot water when you arrive, without wasting energy.
- If on a time-of-use (TOU) rate, time your water heater to heat up during off-peak times so the HPWH uses the lowest-cost electricity available to heat your water.
- Include a thermostatic mixing valve to increase usable hot water. These valves allow storing water at a higher than normal temperature in the tank, then the valve automatically mixes your stored hotter water with cold water to deliver the desired temperature at the sink or shower.
- Look for units that include internet connectivity. This allows you greater control over the unit's operation and may unlock even more savings if your utility runs a specific program for grid-interactive "smart water heaters."

For more information and to learn more about Heat Pump Water Heaters please visit:

www.svcleanenergy.org/water-heating

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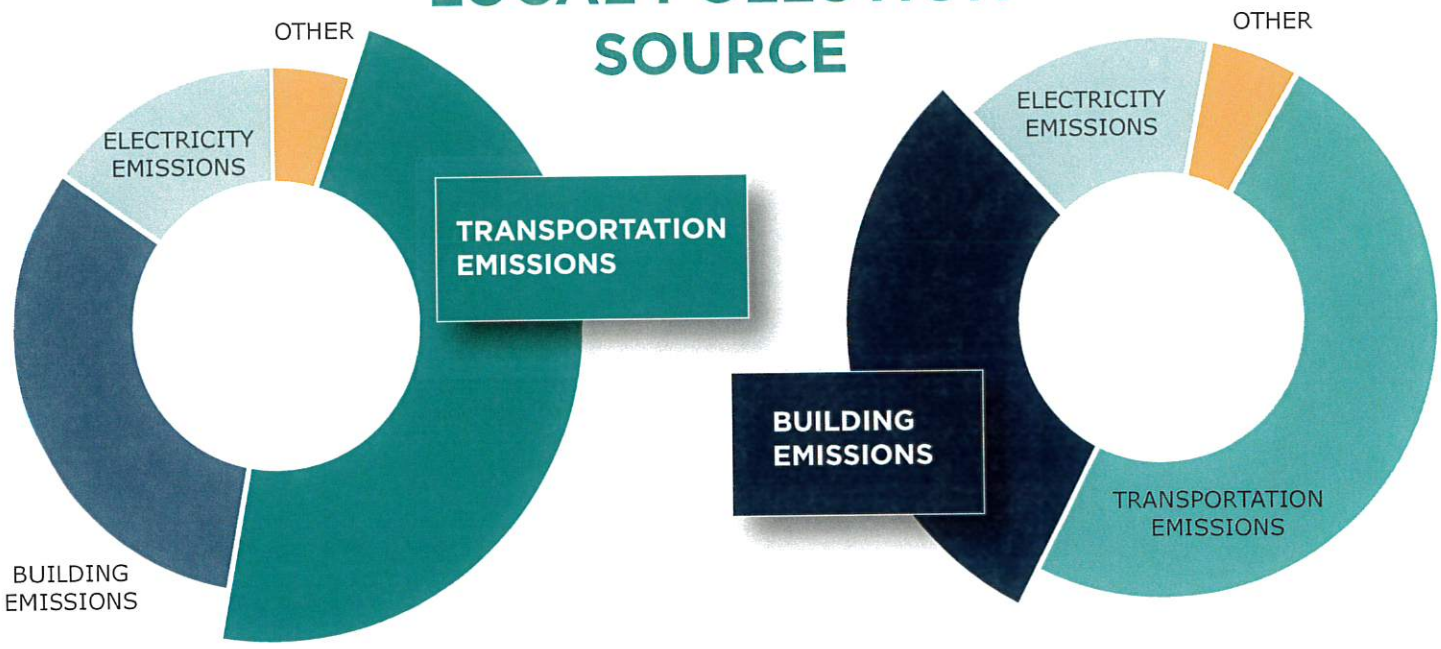
LOCAL POLLUTION SOURCE



A BETTER BUILDING CODE WILL ENCOURAGE MORE ELECTRIC VEHICLES AND CLEAN ELECTRIC BUILDINGS

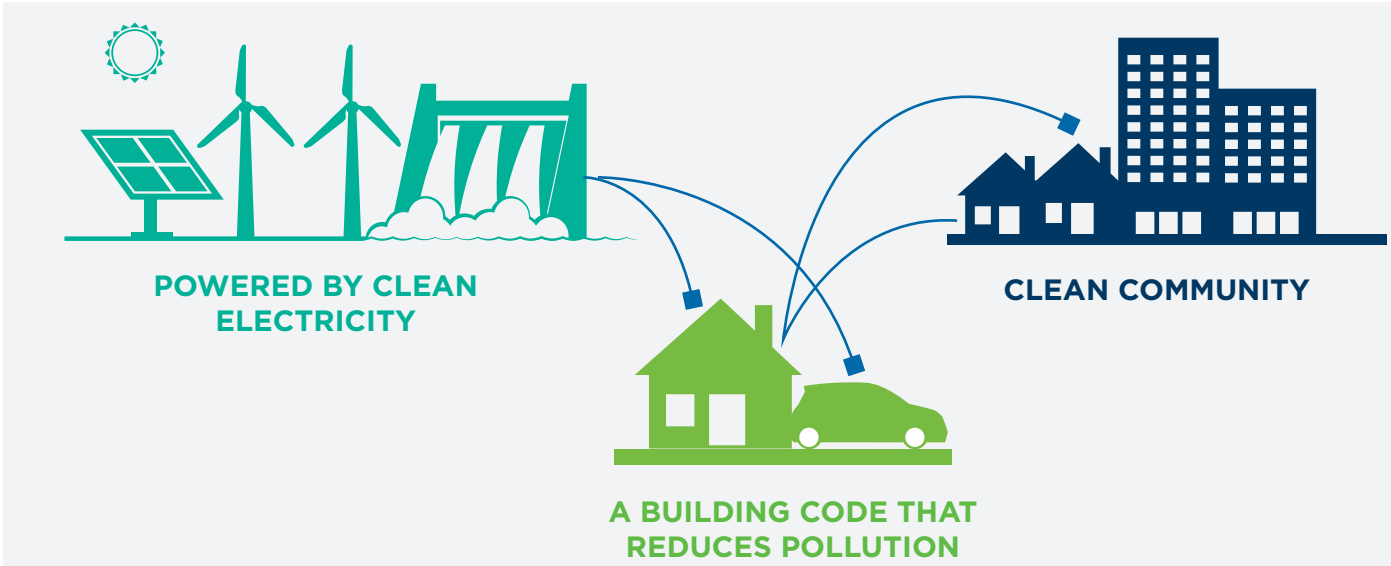
	ELECTRIC VEHICLES	ELECTRIC BUILDINGS
SAVES MONEY	An EV Reach Code **saves money in future retrofit costs** by making new buildings more **ready for electric vehicle charging** as Santa Clara County leads the state in per capita EV adoption rates	Not running gas infrastructure to new buildings **saves thousands for new homes and even more for larger buildings** [1]
IMPROVES AIR QUALITY	Unlike gas powered cars, **electric vehicles do not spew nitrogen oxides, and particulate matter** that contribute to smog and poor air quality [2]	By not burning fossil fuels, electric buildings would reduce pollution. Our current building stock contributes to **1/3 of regional air pollution.** Using solely clean electricity to power buildings creates buildings that do not pollute!
PROMOTES PUBLIC HEALTH	Electric vehicles **do not contribute to air pollution** that is known or suspected to cause cancer or other serious health issues related to gas powered transportation emissions [2]	Avoiding the use of natural gas in buildings **prevents the release of carbon monoxide and nitrogen dioxide** which can be toxic to people and pets [3]

1 - **E3;** Residential Building Electrification in California
2 - **EPA;** https://www.epa.gov/transportation-air-pollution-and-climate-change/smog-soot-and-local-air-pollution
3 - **CARB;** Combustion Pollutants in Your Home

SVCleanEnergy.org/reach-codes

SILICON VALLEY CLEAN ENERGY

A BETTER BUILDING CODE



Our cities and towns can adopt local amendments to the new energy code, known as Reach Codes, to construct buildings that lead the way to a cleaner, safer future for Santa Clara County communities.

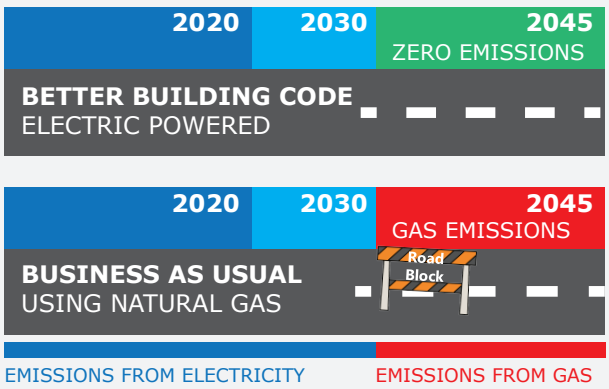
Every three years, cities adopt the new building code set by the state. This year our communities can be at the forefront of meeting our state climate goals by ensuring our new buildings promote a clean, comfortable and healthy future for Santa Clara County.

BENEFITS

Improved Air Quality | Cost Savings | Better Public Health

The proposed Reach Code focuses on encouraging transportation and buildings powered with clean electricity and discouraging pollution from fossil fuels in our community.

As long as gas is used to heat buildings and power transportation, the path to zero emissions is blocked.



A CODE THAT TAKES US TO
ZERO EMISSIONS

*graphic not to scale

SVCleanEnergy.org/reach-codes

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